CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY

STANDING ADVISORY COMMITTEE

Committee Members

Roberta Jaffe (Chair)	Brad DeBranch	Joe Haslett
Brenton Kelly (Vice Chair)	Louise Draucker	Mike Post
Claudia Alvarado	Jake Furstenfeld	Hilda Leticia Valenzuela

AGENDA

January 8, 2019

Agenda for a meeting of the Cuyama Basin Groundwater Sustainability Agency Standing Advisory Committee to be held on Tuesday, January 8, 2019 at 4:00 PM, at the Cuyama Valley Family Resource Center, 4689 CA-166, New Cuyama, CA 93254. To hear the session live, call (888) 222-0475, code: 6375195#.

Teleconference Locations:

Cuyama Valley Family Resource Center 4689 CA-166 New Cuyama, CA 93254	7870 Fairchild Ave Winnetka, CA 91306

The order in which agenda items are discussed may be changed to accommodate scheduling or other needs of the Committee, the public or meeting participants. Members of the public are encouraged to arrive at the commencement of the meeting to ensure that they are present for Committee discussion of all items in which they are interested.

In compliance with the Americans with Disabilities Act, if you need disability-related modifications or accommodations, including auxiliary aids or services, to participate in this meeting, please contact Taylor Blakslee at (661) 477-3385 by 4:00 p.m. on the Friday prior to this meeting. Agenda backup information and any public records provided to the Committee after the posting of the agenda for this meeting will be available for public review at 4689 CA-166, New Cuyama, CA 93254. The Cuyama Basin Groundwater Sustainability Agency reserves the right to limit each speaker to three (3) minutes per subject or topic.

1. Call to Order
2. Roll Call
3. Pledge of Allegiance
4. Approval of Minutes
5. Groundwater Sustainability Plan
    a. Groundwater Sustainability Plan Update
    b. Technical Forum Update
    c. Groundwater Conditions Chapter Adoption
    d. Adoption of Threshold Numbers for Representative Wells
    e. Stakeholder Engagement Update

6. Groundwater Sustainability Agency
    a. Report of the Executive Director
    b. Board of Directors Agenda Review
    c. Report of the General Counsel
7. Items for Upcoming Sessions
8. Committee Forum
9. Public comment for items not on the Agenda

    At this time, the public may address the Committee on any item not appearing on the agenda that is within the subject matter jurisdiction of the Committee. Persons wishing to address the Committee should fill out a comment card and submit it to the Executive Director prior to the meeting.
10. Adjourn

Cuyama Basin Groundwater Sustainability Agency Standing Advisory Committee Meeting

November 29, 2018

Draft Meetings Minutes

Cuyama Valley Family Resource Center, 4689 CA-166, New Cuyama, CA 93254

PRESENT:
Jaffe, Roberta – Chair
Kelly, Brenton – Vice Chair
DeBranch, Brad
Draucker, Louise
Furstenfeld, Jake
Haslett, Joe
Beck, Jim – Executive Director

ABSENT:
Alvarado, Claudia
Post, Mike
Valenzuela, Hilda Leticia
Hughes, Joe – Legal Counsel

1. **Call to Order**
Chair Roberta Jaffe called the Standing Advisory Committee (SAC) to order at 4:01 p.m.

2. **Roll Call**
Hallmark Group Project Coordinator Taylor Blakslee called roll of the Committee (shown above).

Cuyama Basin Groundwater Sustainability Agency (CBGSA) Board Chair Derek Yurosek participated via teleconference in a listen-only capacity, and CBGSA Directors Byron Albano, George Cappello, and Jane Wooster attended in-person; however, Director Cappello left the meeting shortly after arriving.

3. **Pledge of Allegiance**
The pledge of allegiance was led by Chair Jaffe.

4. **Approval of Minutes**
CBGSA Executive Director Jim Beck presented the November 1, 2018 CBGSA SAC meeting minutes.

MOTION
Vice Chair Brenton Kelly made a motion to adopt the minutes. The motion was seconded by Committee Member Louise Draucker and the motion passed.

AYES:	Committee Members DeBranch, Draucker, Furstenfeld, Haslett, Jaffe and Kelly
NOES:	None

ABSTAIN: None
ABSENT: Committee Members Alvarado, Post and Valenzuela

5. Groundwater Sustainability Plan

a. Groundwater Sustainability Plan Update

Woodard & Curran (W&C) Project Manager Brian Van Lienden provided an update on GSP activities, which is included in the SAC packet.

Vice Chair Kelly asked for clarification on the Board sustainability threshold numbers approval process. Mr. Van Lienden said they are looking for approval of rationales that will be used to set threshold levels on each representative well (which will receive Board approval). Mr. Van Lienden said these approved threshold numbers will then form the basis for writing the sustainability chapter. Mr. Beck said the goal at this month's SAC and Board meetings is to come to a consensus on the rational for the various threshold regions. He said if we succeed, then W&C will develop draft preliminary threshold numbers for each representative well for SAC and Board approval.

b. Groundwater Conditions Chapter Adoption

Mr. Van Lienden provided an overview of the Groundwater Conditions Chapter.

Chair Jaffe opened discussion up to Committee members.

Vice Chair Kelly asked why the SAC is being asked to approve a document that is missing half of the content. Mr. Van Lienden replied there will not be as much content for those pieces due the data that is available and the SAC is being asked to approve only the content that is being provided at the meeting, not the placeholders to be written once additional data is available.

Vice Chair Kelly asked how the model will generate a calculation when there is no gage for the numbers. W&C Senior Hydrogeologist John Ayers said they are required by the regulations to have an estimate and will not have any content for those sections without the model. Vice Chair Kelly stated that he would like the document to say that there is not a water gage that exists and the model is the only way to determine this estimate.

Vice Chair Kelly also commented that he was concerned with the data gap placeholder language. Mr. Beck asked Vice Chair Kelly if he had language for W&C to consider using in place of W&C's language for those pending sections. Mr. Ayres said part of the reason the data gap section is incomplete is to allow stakeholders an opportunity to identify the data gaps at the times most suitable to do so.

Mr. Beck suggested a motion to approve the sections provided to the Committee today. Vice Chair Kelly said he would accept this method, or he is comfortable waiting.

Chair Jaffe said her concern is with the Groundwater Sustainability Plan (GSP) chapter process. She understood that due to the Holidays, there was a delay with the revised section and the comments matrix. However, she said the review is difficult and there needs to be time allowed to review the sections more thoroughly. Chair Jaffe said a number of comments were from Santa Barbara County Water Agency and the County of San Luis Obispo, and she would like to hear what they have to say on how their comments were addressed. She expressed concern regarding her comments and felt as if some were dismissed.

Vice Chair Kelly asked when the model results will be available to write the remaining content of the Groundwater Conditions Chapter. Mr. Van Lienden said around January 2019, when the Water Budgets section is released.

Chair Jaffe pointed out that comment No. 64 in the Groundwater Conditions comment matrix related to nitrogen, however the comment was meant to relate to the CBGSA not having the authority to regulate nitrates. Mr. Ayres commented that W&C described level monitoring within the section for data background, but the topic of monitoring will be covered in the Monitoring Network section. Additionally, this question leads to another potential discussion regarding projects and management actions and whether the CBGSA can perform any sort of management that would affect the levels at all. Chair Jaffe said that would have been an appropriate response to comment No. 64. Mr. Ayres let her know he cannot write multiple paragraphs to all of the comments made on each section.

Mr. Beck said he is not supportive of pushing the chapter back by three months, but he recommended the section adoption be pushed back by a month and individuals work directly with W&C regarding their comments. However, he stated that the schedule will not allow for an additional cycle of comment revisions.

Cuyama Valley Family Resource Center Executive Director Lynn Carlisle commented that she believes the SAC members are not comfortable voting to approve a section that is incomplete, therefore can the sections be more complete prior to adopting in the future. Ms. Carlisle also requested audience members raise their hands when they want to talk.

Landowner Karen Adams stated she was a paralegal for most of her life and feels that the sections that do not have data or information seem like they are being whitewashed. Mr. Van Lienden said W&C does state in the documents that they do not have the data. Ms. Adams said then they are not placeholders.

Vice Chair Kelly said he would like the comments and responses matrix for the GSP sections in an editable format. He said a number of the comments on water age went unanswered.

Mr. Beck commented the Hallmark Group and W&C have transparency on the top of their list and work hard to ensure the work on the GSP is being done in an inclusive manner.

The SAC tabled this item until the January 3, 2019 SAC meeting.

c. Discussion on Data Management Chapter

Mr. Van Lienden provided an overview of the Data Management Chapter.

Chair Jaffe asked if the wells within the Data Management System (DMS) are all the monitoring network wells. Mr. Van Lienden said that the DMS is reflective of what happened in the past, not necessarily what is there going forward.

Mr. Van Lienden reported that the additional well perforation data that he initially thought was there has now been included. Vice Chair Kelly asked if the Forest Service precipitation data was included in that data. Mr. Van Lienden said it was duplicative of the data received by the counties.

Vice Chair Kelly asked if we will see another layer to the monitoring network. Mr. Van Lienden said not as part of the GSP development process, but the CBGSA can elect to do this going forward.

Chair Jaffe clarified that all monitoring wells will be in the system and Ms. Long said that is the goal.

Vice Chair Kelly asked if the DMS is a useful tool for the W&C team currently or if it will be helpful in the future. Mr. Ayres replied that it has been helpful and he has pulled data from the DMS to build hydrographs.

Vice Chair Kelly asked if the GSA can pay to have the data inputted in the implementation phase. Mr. Van Lienden said this is something we could put in the implementation plan.

d. Review of Preliminary Threshold Numbers

Spike of Water in Schoolhouse Canyon Area

Mr. Ayres first presented an explanation of a spike of water observed in a hydrograph in the Schoolhouse Canyon area. It showed that starting in May 2017 a “slug” of water moved down the canyon which caused well levels to peak and then stabilize near previous levels. He said this indicates that the basin is relatively full in that area.

Landowner Steve Gliessman commented that since these are shallow wells, the observed spike of water may be occurring in the subsurface and may not be indicative of the deeper aquifer conditions.

Mr. Albano said he thinks Mr. Ayres’ presentation on this was very good and appreciated it.

Review of Preliminary Threshold Numbers

Mr. Ayres provided a refresher on the November 7, 2018 Board direction to use threshold regions to develop rationales.

Chair Jaffe asked if the SAC is being asked to provide input at the January 3, 2018 meeting on threshold rationales and Jim confirmed that this is correct.

Ms. Adams asked how the 20% number was decided on for the range and asked if it is an industry standard. Mr. Ayres said it is a value that he used based on his professional experience.

Vice Chair Kelly asked how the 5-year period was decided on. Mr. Ayres said it was his professional opinion to use this as a starting point but stressed that setting thresholds is a starting point and they will need to change this number as more data is gathered.

W&C recommended rationales for the below regions.

SOUTHEASTERN REGION

W&C proposed 20% of range for the minimum threshold and 5 years of storage for the measurable objective.

Director Albano said it appears we are looking at an underground stream in this area that it does not respond as a typical groundwater storage system. He said the assumption is that the pumpers in that area will be responsible to keep that portion of the basin sustainable and does not see how they can affect the flows of a groundwater storage system that acts like a stream. Mr. Ayres said those are all fair points and the answer is he does not know, but they need to start somewhere and will need to update things going forward.

Mr. Albano suggested setting much broader thresholds and Mr. Ayres asked what percent of range Mr. Albano had in mind. Mr. Albano suggested a minimum threshold (MT) of 100% of range. Vice Chair Kelly said that proposal is concerning.

Committee member Haslett asked if Mr. Ayres considered the wells to be impacted by streamflow. Mr. Ayres said the well is near the river, but he does not have enough data to make a professional opinion on that.

Mr. Albano asked if the measurable objective would change if depth to water raises. Mr. Beck said the thought is that you will set them in the plan at a depth to elevation and they would not move based on recharge events automatically.

Ms. Carlisle asked if the California Department of Water Resources (DWR) would approve a MT of 100% of range. Mr. Ayres said yes, because it does not cause undesirable results and it would not dewater wells in that area.

Mr. Beck reminded folks that the threshold numbers will be very flexible since we expect them to change as we get more data and that we may not have management actions in certain areas if we do not have sufficient data.

Mr. Albano said the proposal is a reasonable starting point given the fact that we do not have enough data.

Vice Chair Kelly said he is very frustrated that we are trying to determine rationales without an understanding of how this affects the water budget and ultimately sustainability. Mr. Beck said in an ideal world we would have 10 years of data, however we are looking at discrete areas in the basin.

Chair Jaffe commented that the MT is set at 2015, which is at the end of a drought period.

Southeastern Region Recommendation

The SAC reached the following recommendation on the proposed rationale for the Southeastern Region with a minimum threshold of 20% of range and a measurable objective of 5 years of storage:
DeBranch – Yes
Draucker – Yes
Haslett – Yes
Jaffe – Yes
Kelly – Yes

EASTERN REGION

W&C proposed 20% of range for the minimum threshold and 5-years of storage for the measurable objective in the Eastern Region.

Vice Chair Kelly commented that the well depth for Opti Well 85 is 233 feet and undesirable results are shown near 220 feet under the 20% of range proposal which does not make sense for this well.

A recommendation was made to change the minimum threshold to 2015 levels.

Eastern Region Recommendation
The SAC reached the following recommendation on the proposed rationale for the Eastern Region with a minimum threshold at 2015 levels, and 5-years of storage for the measurable objective:
DeBranch – Yes
Draucker – Yes
Haslett – Yes
Jaffe – Yes
Kelly – Yes

CENTRAL REGION
Mr. Ayres presented the three rational options for the Central basin which were: (1) use 20% of range for the MT, (2) using 2015 as the MT, and (3) use 2015 as the measurable objective (MO). Mr. Ayres let the SAC know W&C is not making a recommendation but presenting three options for SAC consideration.

Ms. Carlisle asked if this was applied to some wells that have a steeper drop. Mr. Ayres said the example (Opti Well 421) is actually a fairly steep drop but does not appear that way due to the hydrograph scaling. Ms. Carlisle asked how setting thresholds in the basin affects overdraft. Mr. Ayres said regardless of where we set thresholds, they must not go down and need to flatten out.

In explaining the differences between the threshold options, Mr. Beck said if you believe there are not undesirable results in this area, you likely want to keep the minimum threshold low, however if you think there have been, you likely want to keep it higher.

Committee member DeBranch asked if there is an advantage of starting in the red. Mr. Ayres said if you start there then your management actions have to be more aggressive.

Mr. Gliessman said an advantage in the central basin is more data and it provides a better justification for choosing 2015 as the minimum threshold.

Committee member Draucker said we need to determine how to ensure that the minimum threshold does not go any lower.

Committee member Haslett said he likes using 2015 as the measurable objective because it allows some flexibility. Mr. Ayres said DWR intends for GSAs to meet measurable objectives, but the regulatory teeth are based on minimum thresholds.

Mr. Gliessman commented that he is concerned that the hydrograph does not show more data. Mr. Ayres said he choose the well because it was a USGS well that has more data points and with the understating that we already know there is an elevation problem in the Central Basin.

Central Region Recommendation
The SAC reached the following recommendations on the proposed rationales for the Central Region, which include the following options:
(1) 20% of range as the MT
(2) 2015 as the MT
(3) 2015 as the MO

DeBranch – Option 3
Draucker – Option 2
Haslett – Option 3
Jaffe – Option 2
Kelly – Option 2

WESTERN REGION

W&C proposed 2018 as the MO, and 10 feet below that as the MT. Mr. Ayres commented that thresholds were selected for this area since we do not have much data and levels appear to be full in this region. He said he understands residents in the western region want protective thresholds and used a conservative recommendation.

Committee member Haslett said he has had a drop of 20 feet over 20 years. Chair Jaffe and Committee member Haslett agreed that conditions in Schoolhouse Canyon are very different than conditions in Cottonwood Canyon and that may not be the best case to look at.

Committee member Haslett said John Jones has a well in Cottonwood Canyon that has data dating back to at least 2015. He mentioned they may want to consider using that data because it may be more illustrative. He commented that the minimum threshold is too conservative. Mr. Gliessman disagreed and suggested the minimum threshold is not conservative enough. Mr. Gliessman said their well has not dropped in 20 years except for the last two years.

Mr. Albano commented that he thinks thresholds are overly strict in all the areas except the main basin. Landowner Ann Myhre said she thinks Mr. Albano has a point regarding areas with runoff in some of the canyons. She said she thinks we will discover areas where water is perched and once it is gone, we will not see it there again. Ms. Myhre commented that at least we know water is moving through the area and it is not perched. Mr. Gliessman said we do not know how much water is moving through the area.

Chair Jaffe asked if Mr. Ayres were to use the data from Cottonwood Canyon would it affect their recommendation. Mr. Ayres said the data only goes back a year and a half.

Mr. Beck said since we will likely revisit this topic in a year, is the SAC comfortable using W&C's recommendation and reworking the minimum threshold once more data is received. Mr. Beck asked Chair Jaffe and Mr. Gliessman if their well's operations would be affected if levels fall below 20 feet depth to water. Mr. Gliessman confirmed that that would affect their energy load to pull water up and the would need to lower their bowls.

Ms. Myhre said SGMA is not about a landowner needing to deepen their well slightly but is about considering depleting aquifers. She also commented that if you have been able to pump at 20 feet that has been a blessing. Ms. Wooster commented that people should be mindful and responsible for all residents and not just your personal interests.

Mr. Albano said it seems to him it makes sense to set looser thresholds and adjust levels as problems arise. Mr. Albano said everyone will have to pitch in to solve the overdraft in the basin, but there needs to be room to breathe.

Ms. Wooster said it does not make sense to set a 10-foot threshold at a spring, that is not part of the problem.

Committee member Haslett commented that Ms. Wooster's property and Schoolhouse Canyon are not in overdraft and there are certain areas that are not in overdraft. He said the Central Basin is in overdraft and that is the reason for the basin is in the predicament it is in. He said he is not worried about the levels in his well and that he agrees with Mr. Albano that thresholds need to be treated differently in other areas.

Mr. Ayres commented that if we set levels that are too draconian, they may not be defensible and may be challenged by other stakeholders.

Vice Chair Kelly said his concern is that he knows there are wells in the area with better data to set a rationale for the region. Mr. Ayres said they have asked for data many times and this is all the data they have.

Chair Jaffe stressed how challenging it is to set a rationale in the western region since its hydrology is so complex.

Mr. Albano suggested that setting strict levels to prevent Chair Jaffe's concern of Grapevine's potential effect on their groundwater levels unduly punishes other landowners in the area such as Ms. Wooster and pumping monitoring may be better to track this.

Mr. Albano commented it seems ridiculous drawing such tight timeframes around limited data sets. Ms. Wooster said she has well data going back much farther, but Mr. Ayres reminded the group that they have to set thresholds based on a current monitoring network.

Western Region Recommendation

Chair Jaffe asked the SAC to table a recommendation on this area due to complexity of the hydrology and limited data.

Northwestern Region

Mr. Ayres presented the following three rational options: (1) use 2015 as the MT, (2) using 2015 as the MO, and (3) calculate the MT based on subsidence and saturated aquifer thickness.

Mr. Shady said the aquifer they are in is an awesome aquifer and the Upper Morales dips down over 700 feet. He said the performance actually improves each year since you improve the aquifer's ability to recharge as you draw it down some which creates a cone. Mr. Shady said they looked at how to utilize the aquifer responsibly as a storage tool and limit subsidence and they feel the thresholds they presented would prevent subsidence.

Chair Jaffe said calculating the MT based on subsidence and saturated aquifer thickness (option No. 3) completely concerns her in that it will cause undesirable results. Mr. Shady asked Chair Jaffe what the undesirable result would be. She said there would be a drawdown of the aquifer. Chair Jaffe said she feels option No. 3 is setting up a precedent for going the same way as the Paso Robles basin.

Mr. Gliessman commented that groundwater dependent ecosystems (GDE) rely on groundwater at the surface and if you draw down the water you will eliminate that GDE.

Mr. Albano asked how we determine what appropriate thresholds are that protects against undesirable results but also does not put Grapevine Capital out of business.

Chair Jaffe asked if that vineyard is appropriate in that region without over drafting the basin. Mr. Albano said that is the question but feels that we are talking about cutting them at the bud and not finding out what the impacts would be.

Ms. Wooster said she would expect draw downs, but we need to start with the supposition that not all water use is bad and that not all farming is bad, but we are going to responsible for use under SGMA. However, she said we do not know what responsible use is for this area and they should be allowed to demonstrate this. She said she felt decisions are being driven by fear on this. Ms. Wooster said the assertion that it may impact downstream users is not a scientific approach.

Chair Jaffe asked how GDEs will be impacted. Mr. Ayres said they are still working on that map and will need to look at where those are and how to protect those.

Mr. Gliessman asked if pumping to 220 feet will create a cone of depression. Mr. Shady said if it does Ms. Wooster will let him know.

Mr. Ayres said they will be monitoring monthly for the first three years and will have a lot of valuable data to make decisions on.

Mr. Albano asked how they will know the impact on Cottonwood Canyon. Mr. Ayres said SGMA requires that we report pumping. He said we will be monitoring over 100 wells in the basin monthly. Mr. Ayres said if levels do not change and land use does not change, there are inferences to make.

Chair Jaffe asked how quickly you can change practices. Mr. Ayres said how fast you change things is more a function of your Board's direction.

Ms. Carlisle commented that if you pump as much as possible, even without causing undesirable results, will you be able to replenish the aquifer if your threshold is set too low.

Mr. Shady commented that holding pumping to a certain level near current levels is not based on causing undesirable results.

Ms. Wooster said none of us really know what is going to happen and we should rely on the monitoring network and not be punitive of other landowner's operations.

Mr. Shady commented that the scale of the hydrograph does not show the depth of the aquifer, which is roughly at 800 feet.

Vice Chair Kelly expressed his concern of setting thresholds without data and thinks we need to be conservative when operating without adequate data.

Ms. Carlisle asked when thresholds can change. Mr. Ayres said DWR requires updates every 5 years, but the GSA can update yearly.

Northwestern Region Recommendation
The SAC reached the following recommendations on the proposed rationale for the Northwestern Region, which include the following options:
(1) 2015 as the MT
(2) 2015 as the MO
(3) MT based on subsidence and saturated aquifer thickness.

DeBranch – No recommendation
Draucker – Option 3
Haslett – Option 3
Jaffe – Option 2
Kelly – 2018 as the MO, 5-years of storage for the MT

e. Technical Forum Update
Mr. Van Lienden provided an overview of the October 23, 2018 technical forum call. A summary of the issues discussed is provided in the SAC packet.

f. Stakeholder Engagement Update
GSP Outreach the Catalyst Group's Mary Currie provided an update on stakeholder engagement activity.

6. Groundwater Sustainability Agency

a. Report of the Executive Director
Nothing to report.

b. Board of Directors Agenda Review
Mr. Beck provided an overview of the December 3, 2018 CBGSA Board of Directors agenda.

c. Report of the General Counsel
None.

7. Items for Upcoming Sessions
Nothing to report.

8. Committee Forum
Nothing to report.

9. Public comment for items not on the Agenda
Nothing to report.

10. Adjourn
Chair Jaffe adjourned the meeting at 8:37 p.m.

I, Jim Beck, Executive Director of the Cuyama Basin Groundwater Sustainability Agency, do hereby certify that the foregoing is a fair statement of the proceedings of the meeting held on Thursday, November 29, 2018, by the Cuyama Basing Groundwater Sustainability Agency Standing Advisory Committee.

Jim Beck
Dated: January 8, 2019

TO: Standing Advisory Committee
Agenda Item No. 5a

FROM: Brian Van Lienden, Woodard & Curran (W&C)

DATE: January 8, 2019

SUBJECT: Groundwater Sustainability Plan Update

Issue
Update on the Cuyama Basin Groundwater Sustainability Agency Groundwater Sustainability Plan.

Recommended Motion
None – information only.

Discussion
Cuyama Basin Groundwater Sustainability Agency Groundwater Sustainability Plan (GSP) consultant Woodard & Curran's GSP update is provided as Attachment 1.

Cuyama Basin Groundwater Sustainability Agency

Groundwater Sustainability Plan Update

January 8, 2019

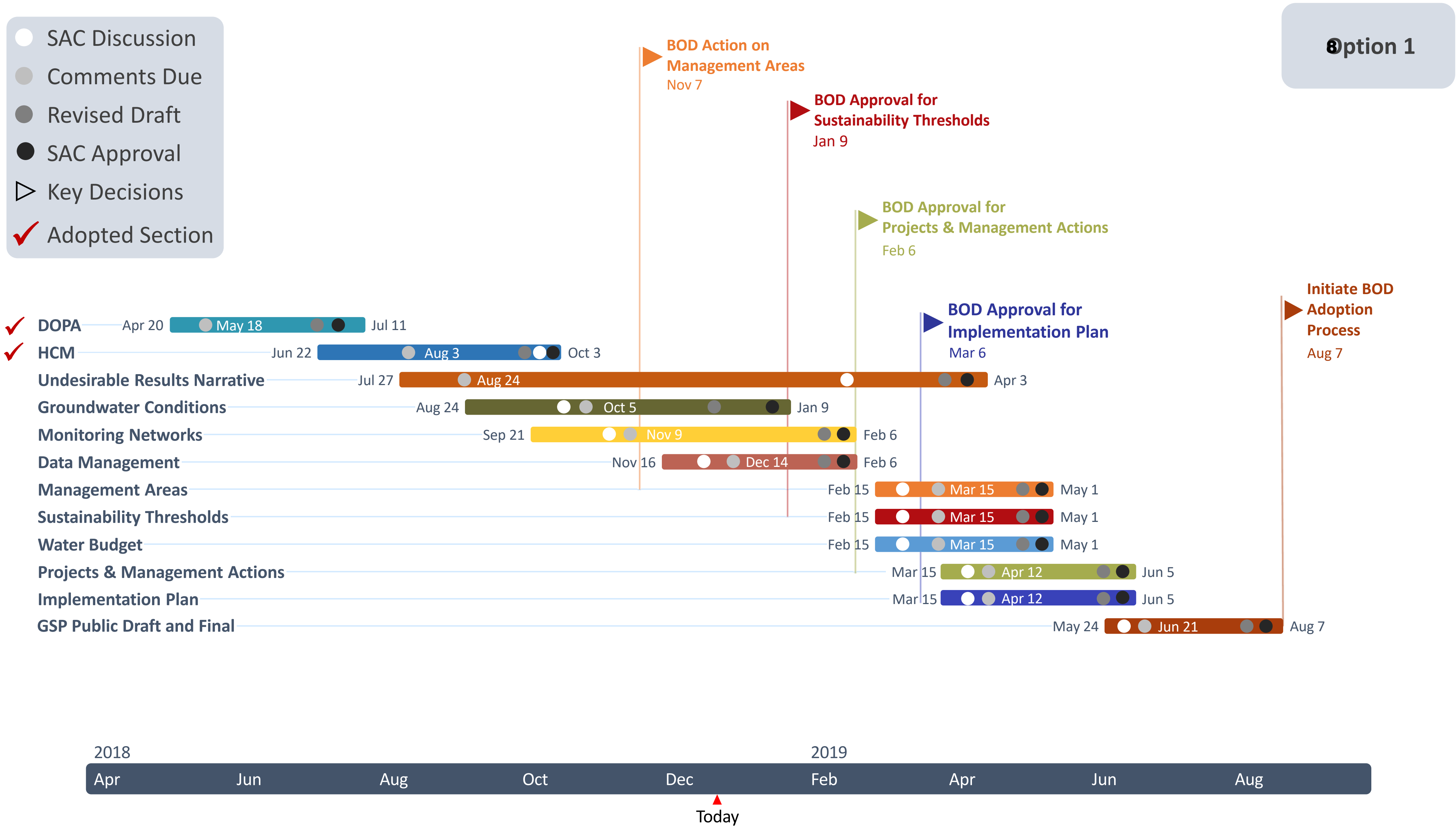
Cuyama Basin Groundwater Sustainability Plan – Planning Roadmap

December GSP Accomplishments

- ✓ Developed preliminary threshold numbers for discussion
- ✓ Facilitated discussion on thresholds at SAC/Board meetings
- ✓ Developed revised threshold numbers per Board direction
- ✓ Refined historical calibration and future conditions scenario of GSP numerical model based on comments from Technical Forum
- ✓ Updated Data Management System data in response to comments

GSP Sections

1. Introduction
   - 1.1 GSA Authority & Structure
   - 1.2 Plan Area
   - 1.3 Outreach Documentation
2. Basin Settings
   - 2.1. HCM
   - 2.2 GW Conditions
   - 2.3 Water Budget
     - *Appendix:* Numerical GW Model Documentation
3. Undesirable Results
   - 3.1 Sustainability Goal
   - 3.2 Narrative/Effects
   - 3.2 ID Current Occurrence
4. Monitoring Networks
   - 4.1 Data Collection/Processing
   - 4.2 GSP Monitoring Networks
5. Sustainability Thresholds
   - 5.1 Threshold Regions
   - 5.2 Minimum Thresholds, Measurable Objectives, Margin of Operational Flexibility, Interim Milestones
6. Data Management System
   - *Appendix:* DMS User Guide
7. Projects & Management Actions
8. GSP Implementation



Option 1
SAC Discussion
Comments Due
Revised Draft
SAC Approval
Key Decisions
Adopted Section
BOD Action on Management Areas
Nov 7
BOD Approval for Sustainability Thresholds
Jan 9
BOD Approval for Projects & Management Actions
Feb 6
BOD Approval for Implementation Plan
Mar 6
Initiate BOD Adoption Process
Aug 7
DOPA Apr 20 May 18 Jul 11
HCM Jun 22 Aug 3 Oct 3
Undesirable Results Narrative Jul 27 Aug 24 Apr 3
Groundwater Conditions Aug 24 Oct 5 Jan 9
Monitoring Networks Sep 21 Nov 9 Feb 6
Data Management Nov 16 Dec 14 Feb 6
Management Areas Feb 15 Mar 15 May 1
Sustainability Thresholds Feb 15 Mar 15 May 1
Water Budget Feb 15 Mar 15 May 1
Projects & Management Actions Mar 15 Apr 12 Jun 5
Implementation Plan Mar 15 Apr 12 Jun 5
GSP Public Draft and Final May 24 Jun 21 Aug 7
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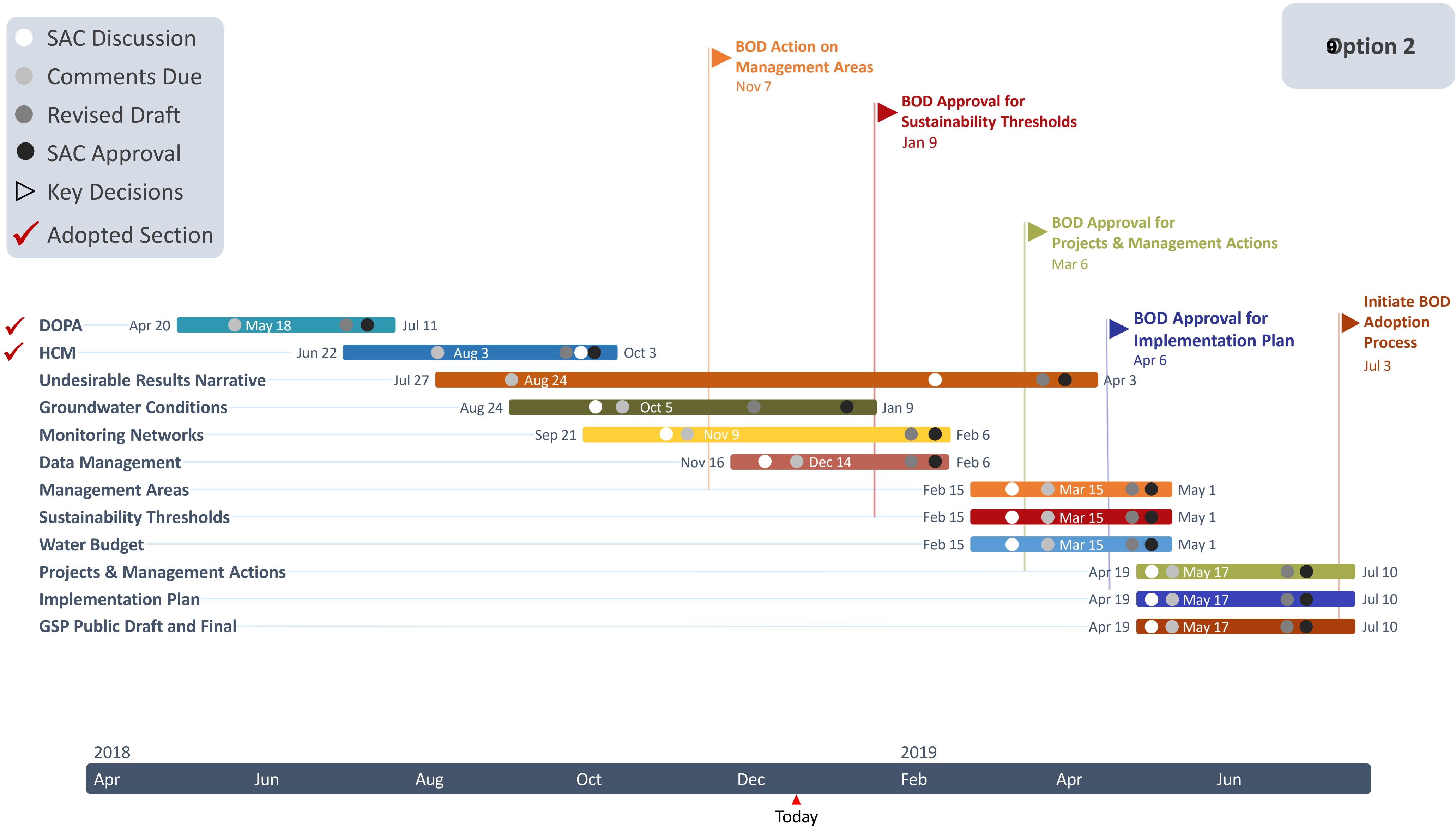

SAC Discussion
Comments Due
Revised Draft
SAC Approval
Key Decisions
Adopted Section
Option 2
BOD Action on Management Areas
Nov 7
BOD Approval for Sustainability Thresholds
Jan 9
BOD Approval for Projects & Management Actions
Mar 6
BOD Approval for Implementation Plan
Apr 6
Initiate BOD Adoption Process
Jul 3
DOPA Apr 20 May 18 Jul 11
HCM Jun 22 Aug 3 Oct 3
Undesirable Results Narrative Jul 27 Aug 24 Apr 3
Groundwater Conditions Aug 24 Oct 5 Jan 9
Monitoring Networks Sep 21 Nov 9 Feb 6
Data Management Nov 16 Dec 14 Feb 6
Management Areas Feb 15 Mar 15 May 1
Sustainability Thresholds Feb 15 Mar 15 May 1
Water Budget Feb 15 Mar 15 May 1
Projects & Management Actions Apr 19 May 17 Jul 10
Implementation Plan Apr 19 May 17 Jul 10
GSP Public Draft and Final Apr 19 May 17 Jul 10
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Today

TO: Standing Advisory Committee
Agenda Item No. 5b

FROM: Brian Van Lienden, Woodard & Curran (W&C)

DATE: January 8, 2019

SUBJECT: Technical Forum Update

Issue
Update on the Technical Forum.

Recommended Motion
None – information only.

Discussion
At the request of Cuyama Valley landowners, Cuyama Basin Groundwater Sustainability Agency Groundwater Sustainability Plan (GSP) consultant Woodard & Curran (W&C) has been meeting monthly with technical consultants representing landowners to discuss W&C's approach and to provide input where appropriate.

A summary of the topics discussed at the December 14, 2018 technical forum meeting is provided as Attachment 1, and the next forum date is January 25, 2019.

Cuyama Basin Groundwater Sustainability Agency

Technical Forum Update

January 8, 2019

December 14th Technical Forum Discussion

- Review of Preliminary Threshold Numbers
- Numerical Model Development Update
- Next Steps
- Next Meeting – Friday, January 25

Technical Forum Members

- Catherine Martin, San Luis Obispo County
- Matt Young, Santa Barbara County Water Agency
- Matt Scrudato, Santa Barbara County Water Agency
- Matt Klinchuch, Cuyama Basin Water District
- Jeff Shaw, EKI
- Anona Dutton, EKI
- John Fio, EKI
- Dennis Gibbs, Santa Barbara Pistachio Company
- Neil Currie, Cleath-Harris Geologists
- Matt Naftaly, Dudek

COMMITMENT & INTEGRITY
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MEETING MEMORANDUM

PROJECT: Cuyama Basin Groundwater Sustainability Plan Development

MEETING DATE: 12/14/2018

MEETING: Technical Forum Conference Call

ATTENDEES: Matt Young (Santa Barbara County Water Agency)
Fay Crease (Santa Barbara County Water Agency)
Tim Cleath (Cleath-Harris Geologists)
John Fio (EKI)
Jeff Shaw (EKI)
Dennis Gibbs (Santa Barbara Pistachio Company)
Matt Naftaly (Dudek)
Brian Van Lienden (Woodard & Curran)
Sercan Ceyhan (Woodard & Curran)
Micah Eggleton (Woodard & Curran)
John Ayres (Woodard & Curran)
Ali Taghavi (Woodard & Curran)

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1. AGENDA

- Numerical Model Development Update
- Review of Preliminary Thresholds Presentation

2. DISCUSSION ITEMS

The following table summarizes comments raised during the conference call and the response and plan for resolution (if appropriate) identified for each item.

Item No.	Comment	Commenter	Response/Plan for Resolution
1	What drives the model boundary flows to be higher in recent years?	Matt Young	The boundary flows are still being reviewed as part of model calibration. The cause of this difference will be investigated.
2	Can you provide the projected land use for review along with more information on the ARMA model for projecting land use?	Jeff Shaw	These will be provided to the Technical Forum members.
3	Can you talk about how and why you make an assumption about improved agricultural efficiency? How much of the decline in agricultural pumping is due to improved efficiency versus change in cropping pattern?	Matt Young	Irrigation efficiencies in the model are based on the rationale that improved irrigation practices have been applied in the field. The actual change in agricultural water use in the model is due to both the change in cropping patterns and the change in irrigation efficiency. W&C will review the data to assess how much change is due to each factor.

4	The shallowest well may not be the most important factor to use to determine thresholds. It would be better to look at the bottom of basin.	Tim Cleath	The shallowest nearby well is not a sole factor that is used, but it is an indicator of aquifer conditions. There is not a lot of good information on the bottom of the aquifer in many parts of the basin
5	You should look at a longer period of record – focusing on just 2010 to present is focusing just on a single drought and could be misleading.	Tim Cleath	For the most part, the data doesn't really go further back on wells that are currently monitored.
6	Isolating the Badlands region on the eastern part of basin is a good improvement	Tim Cleath	Comment noted.
7	Many wells only have monitoring measurements once per year – the frequency of data makes it hard to understand trends	Tim Cleath	A number of the wells in the monitoring network are from private landowners, and they only measured once a year. We have to work with the data we have now, but can change the frequency of monitoring going forward.
8	In wells with no fluctuations, the five years of storage approach doesn't work very well; we should consider a different approach in these regions	Jeff Shaw & Tim Cleath	We may need to consider other ideas; Technical Forum members are welcome to submit ideas for how to develop thresholds in these areas.
9	We should include a buffer in the thresholds so that we don't trigger an "undesirable result" if we go below the minimum threshold.	Jeff Shaw	Going below the minimum threshold initially triggers an investigation by the GSA to determine the cause. The GSA will need to consider the available information and determine how to respond.
10	Using 2015 as an operational level is not a good approach in the western basin. Thresholds should be based on quantitative estimates of undesirable results, similar to what we have provided the Board	Tim Cleath	The proposal from Grapevine provided to the Board will be included for discussion in the slides on the northwestern region at the Dec 18 Board meeting.
11	The Caliente Hills fingers should be treated like the eastern Badlands (i.e. put into their own region) because there is no development in those areas.	Tim Cleath	This is something that could be considered by the Board.
12	The distribution of wells to be used for management should be more restrictive than those to be used for thresholds	Tim Cleath	We are restricted by the available data and available time to develop the GSP. The monitoring network and thresholds will need to be adjusted as more information is available in the future.

13	You should do a statistical analysis of which strategies work in each region.	Jeff Shaw	Comment noted. We will have a table available with summary information at the meeting on December 18.
14	If you're going to propose a saturated-thickness method option for calculating sustainability criteria in one of the Threshold Regions, you should examine that method for all of them. It's a technically defensible method (vs. subtracting some arbitrary value from 2015, for example), and it may help create more MoOF.	Jeff Shaw	This can be considered, however, data may not available to do this type of analysis in all parts of the basin.

TO: Standing Advisory Committee
Agenda Item No. 5c

FROM: Brian Van Lienden, Woodard & Curran (W&C)

DATE: January 8, 2019

SUBJECT: Groundwater Conditions Chapter Adoption

Issue
Recommend adoption of the Groundwater Conditions chapter.

Recommended Motion
Adopt the Groundwater Conditions chapter.

Discussion
An overview of the revised Groundwater Conditions chapter is provided as Attachment 1. The comments and responses matrix is provided as Attachment 2, and the revised Groundwater Conditions chapter is provided as Attachment 3.

Cuyama Basin Groundwater Sustainability Agency

Groundwater Conditions Chapter Adoption

January 8, 2019

Groundwater Conditions GSP Chapter

- Revised GSP Section provided to SAC and Board for review as part of Board Packet on August 24th
- Revised section reflects responses to comments received on August Draft version
- Description of Plan Area describes:
  - Groundwater trends
  - Changes in groundwater storage (placeholder)
  - Land subsidence
  - Groundwater quality
  - Interconnected surface water systems (placeholder)
  - Groundwater dependent ecosystems (placeholder)
- Seeking recommendation from the SAC for approval by CBGSA Board

WOODARD & CURRAN

Cuyama Basin Groundwater Conditions September Draft
Summary of Public Comments and Responses
November 19, 2018

Comment #	Commenter	Commenter Organization	Section	Section Paragraph #	Paragraph's Sentence #	Sentence Starts with, "...	Comment	Response to Comment
1	Brenton Kelly	Quail Springs Permaculture	General	N/A	N/A	N/A	The text is overtly understated regarding significante conditions depicted with conclusive data sets & trends.There is a need to "state the obvious" when viewing conclusive data sets.	Comment noted. No change required in document.
2	Brenton Kelly	Quail Springs Permaculture	General	N/A	N/A	N/A	No historical baseline is established for the discussion of measurable objectives. The contextual perspective of past or current conditions is not generally available. The uncertainty of this will not be helped when a algorithm generates it in the model.	Comment noted. No change required in document.
3	Brenton Kelly	Quail Springs Permaculture	General	N/A	N/A	N/A	Data Gaps are recognized as a significant challenge to fully understanding the groundwater conditions and drive a higher degree of uncertainty when making assumptions & conclusions	
4	Brenton Kelly	Quail Springs Permaculture	2.2	1	N/A	Bullets # 4,5 & 6 of 7	Three intended objectives outlined in the first paragraph of section 2.2, have not been addressed	As noted in the document, these sections are under development and will be available in a future version of this section.
5	Brenton Kelly	Quail Springs Permaculture	2.2.1	N/A	N/A	Fig. 2.2-1	Landmarks - Caliente Range - Ventucopa Uplands (Badlands) - Apache Canyon	Caliente Range and Apache Canyon have been added to Figure 2.2-1. Ventucopa Uplands are not specifically discussed in this section.
6	Brenton Kelly	Quail Springs Permaculture	2.2.3	N/A	N/A	Fig. 2.2-16 to18	If the screening intervals and perforation depths of these three multi completion wells are know and presented here, then why are they not in the Opti DMS?	This information will be added to the Opti DMS for these well locations
7	Brenton Kelly	Quail Springs Permaculture	2.2.3	N/A	N/A	Fig. 2.2-19	Text should explain that the blue arrows indicate the direction of the downward horizontal groundwater flow. These arrows are helpful and should be used in other Groundwater Contour maps.	The text referring to this figure has been updated. There are no other figures in this section for which these arrows would be appropriate.
8	Brenton Kelly	Quail Springs Permaculture	2.2.3	N/A	N/A	Fig. 2.2-20	Illustrates a classic example of a Bullseye depression. Speak to the significance of these conditions. Speak also to the Data Gaps representing the missing northeast area, near the intersections of 166 & 33. How big or deep is the zone of depression?	Comment noted. The document notes that the depth to water is up to 600 feet deep.
9	Brenton Kelly	Quail Springs Permaculture	2.2.4	1	N/A	Bullet #1	Storage loss is a significant groundwater condition that should be measurable, but we are going to model it first. The cart is before the horse!	While changes in groundwater storage can be inferred from changes in groundwater levels, storage quantities cannot be directly measured with the available data. The numerical model will provide the best available estimate of groundwater storage.
10	Brenton Kelly	Quail Springs Permaculture	2.2.6	2	1	Subsidence	Subsidence at a rate of > 0.5" / year should not be dismissed or diminished by comparison to the collapse of the San Joaquin. This is a critical Data Gap with only one monitor site in the central basin. It may or may not be anomalous without anything to compare it to	Comment noted. The need for additional subsidence monitoring is discussed in the Monitoring Networks section.
11	Brenton Kelly	Quail Springs Permaculture	2.2.7 Literature Review	8	1	The USGS reported the following	The USGS, SBCWA & the GAMA data files all indicate constituante levels (TDS, Nitrate, Sulfate, & Arsenic) above MCL in the central basin implicating a causal nexus with localized excessive groundwater extraction.	Comment noted. The data is insufficient to make a definitive conclusion about the relationship between groundwater extraction and water quality.
12	Brenton Kelly	Quail Springs Permaculture	2.2.7	5	2	Toward the northeast end of the basin...	The available data is inconclusive in establishing any trends in conditions over time, stable or otherwise. How can we quantify a minimum threshold and how can we monitor this causal nexus between groundwater extraction & groundwater quality degradation?	Comment noted. The data is insufficient to make a definitive conclusion about the relationship between groundwater extraction and water quality.
13	Brenton Kelly	Quail Springs Permaculture	2.2.7	N/A	N/A	Groundwater Quality	Available groundwater age & temperature data should be used to help determine flow rates over faults, intermixing of aquifer layers, and recharge rates of deep percolation.The response to this same comment on the Draft HCM was that it would be presented in this section of the GSP. What section will it be in next?	As discussed at the November 1 SAC meeting,
14	Brenton Kelly	Quail Springs Permaculture	2.2.8	N/A	N/A	InterconnectedSurface Water Systems	When this section is developed it should additionally include the following: 1.)Consideration of the causal nexus between declines in ephemeral and intermittent streams, and SGMA related activities. 2.)Estimates of the ecological services and emergent benefits of interconnected surface water systems. 3.)Literature Review of the historic loss of the riparian habitats through the valley. 4.)Consider potentials for river channel modification to slow, spread & sink stream discharge for enhanced recharge.	Comment noted. This will be taken into consideration when this section is developed.
15	Brenton Kelly	Quail Springs Permaculture	2.2.9	N/A	N/A	Groundwater Dependent Ecosystems	When this section is developed it should additionally include the following: 1.)Estimates of Evapotranspiration needs of existing GDEs and the stream discharge requirements to satisfy their dependance. 2.)Assessment of the Beneficial Uses and emergent benefits of the biology associated with the GDEs. 3) Consider the causal nexus of desertification and the loss of native wetland habitats due to SGMA related activities. 4)Consideration of enhancing GDEs to facilitate stormwater capture and recharge by the reduction of flash runoff	Comment noted. This will be taken into consideration when this section is developed.
16	Brenton Kelly	Quail Springs Permaculture	2.2.10	N/A	N/A	Data Gaps	Recognised Data Gaps include: 1) Recent groundwater level & quality data in the Ventucopa upland & river corridor, 2) Historical groundwater data from the Cottonwood subarea. 3) More multi-completion wells in the main basin to better understand the zone of depression. 4) Data for Groundwater elevations in the north and west of the basin. 5) Well Completion Data with perforation intervals. Available from down hole video logging. 6) More CGPS Subsidence monitors in the main basin. 7) Current Groundwater quality data basin wide. 8) Surface water flow gauges on the Cuyama in the Basin, at bridges on Hwy 33 in Ventucopa uplands and Hwy 166 in the central basin. 9) Data concerning GDEs in the basin.	Comment noted. This will be taken into consideration when this section is developed.
17	Brenton Kelly	Quail Springs Permaculture	2.2.10	N/A	N/A	Data Gaps	Major Data Gaps continue to generate the concern for the uncertainty of any conclusions made from the assumptions needed to develop a numerical model. Greater uncertainty requires a more conservative approach to model assumptions.	Comment noted. No change required in document.
18	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	General	N/A	N/A	N/A	In its current form, the draft GWC chapter is incomplete relative to 23 CCR §354.16 because several GWC elements identified above (groundwater storage changes, interconnected surface water systems, and groundwater dependent ecosystems) are included in the chapter only as placeholders and are not complete	Comment noted. No change required in document.
19	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.2 GW Hydrographs 2.2.3 GW Contours	N/A	N/A	N/A	The GWC chapter does not adequately reference the hydrogeologic conceptual model (HCM). The discussion of groundwater contour figures lacks any mention of the hydraulic effect of faults. For instance, the HCM documents that SBCF is a barrier to groundwater flow. This significant fact should be used to interpret water level observations ("Groundwater Hydrographs" [2.2.2]; "Groundwater Contours" [2.2.3]).	Comment noted. No change required in document.
20	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.2 GW Hydrographs 2.2.3 Vertical Gradients 2.2.3 GW Contours	N/A	N/A	N/A	The GWC chapter does not adequately reference the hydrogeologic conceptual model (HCM). Similarly, the HCM discusses varying hydraulic conductivities between the younger alluvium, older alluvium, and Morales Formation. The effects of hydrostratigraphy should be considered in discussions of vertical gradients, hydrograph comparisons, and groundwater elevation contours ("Groundwater Hydrographs" [2.2.2]; "Vertical Gradients" [2.2.3]; "Groundwater Contours" [2.2.3]).	Comment noted. No change required in document.
21	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3			1947 to 1966 Groundwater Trends	The chapter cites results from the outdated CUVHM model. Cited CUVHM results ("1947 to 1966 Groundwater Trends" [2.2.3]) may be unreliable and obsolete given that WC is developing a new model.	Comment noted. Even after development of the updated model, data from the USGS study will still be a primary source of information for the earlier period from 1947-1966.

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22	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	Figures 2.2-11 to 2.2-15				Hydrograph figures lack organization and their interpretation is insufficiently clear (2.2-11 to - 15). Partial overlap and repetition of hydrographs make the figures confusing. Figures should be revised so that each one exclusively covers a portion of the basin with unique hydrographs. Well 620 should be discussed under "central portion" because it is north of SBCF and follows the pattern of decline in that region. South of the fault to the Ventucopa area is showing a largely consistent picture of long-term steady elevations (Wells 40, 41, 85) with the exception of decline in Well 62 since the 1990s. The area of decline in the western portion of the basin extends to Well 70, just west of Bitter Creek. Regarding the statement that "all monitoring wells in [the central portion of the basin] show consistent declines, consider that Well 28 has elevations leveling off in the 1990s and then starting to recover in the 2000s.	The figure and text have been made consistent. Title corrected.
23	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3				Referenced hydrographs are missing, or more useful selections are available. Hydrographs for Wells 40, 316, and 640 are discussed in the text but not included in the figures. Consider adding hydrographs for Wells 70, 107, 110, 112, and 114, because they have significantly long data records, fill spatial gaps, and preserve the variation in water level trends observed in the basin. Consider removing hydrographs for Wells 108, 121, 571, 830, 840, and 846 because their data records are too short to reveal much about water level trends.	The figure and text have been made consistent. Title corrected.
24	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 GW Hydrographs			Groundwater levels followed	The GWC chapter contains unsupported statements. The statement, "Groundwater levels followed climactic patterns" ("Groundwater Hydrographs" [2.2.3]) is ambiguous. If it refers to cycles of wet and dry years, a hyetograph of monthly or annual rainfall totals should be included to support it.	Comment noted. No change required in document.
25	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.7 Data Analysis			The spikes of TDS	The GWC chapter contains unsupported statements. The statement, "The spikes of TDS increases correspond with Cuyama River flow events" ("Data Analysis" [(2.2.7]) should be supported by showing a river hydrograph on the same plot.	Figures showing the climactic variability will be included in the Water Budgets section.
26	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.1 Useful Terminology 2.2.3 Vertical Gradients				Wells that are screened in different intervals are not differentiated. In two mentions of wells having different depths ("Useful Terminology" [2.2.1], "Vertical Gradients" [2.2.3]), language should be precise that perforations are at different depth intervals.	Comment noted. No change required in document.
27	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Vertical Gradients				Improvements are needed in vertical gradient hydrographs and interpretation ("Vertical Gradients" [2.2.3]). The hydrographs should have finer x-axis label resolution than annual, because seasonality is discussed in the document. Regarding their interpretation, hydrographs that behave similarly lend themselves into being grouped by geographic subareas when possible. This type of grouping is one consideration when defining potential groundwater management areas. It is therefore important that these assessments accurately represent the data. Uncertainty must be clearly communicated by (for example) use of hydrographs which reflect the variability observed in a spatial grouping. Some specific examples include:	The scale of the hydrographs have been modified to show greater vertical detail
28	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Vertical Gradients				a. (CVFR) "There is no vertical gradient." At the scale of the hydrograph figure, we cannot discern whether there is no gradient or a small gradient.	The scale of the hydrographs have been modified to show greater vertical detail
29	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Vertical Gradients				b. (CVBR) We cannot dismiss the contribution of horizontal recharge; the CVFR site shows the basin is not vertically driven, at least not everywhere. Also, given the depth to water it is speculative to conclude vertical recharge exceeds horizontal. Furthermore, the hydrographs show "shallow" wells are influenced by seasonal conditions just as much as "deep" wells.	The text has been revised for clarity.
30	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Vertical Gradients				c. (CVKR) "The hydrograph of the four completions shows that at the deeper completions are slightly lower than the shallower completions in the spring at each completion, and deeper completions are generally lower in the summer and fall." This statement seems to say groundwater levels decrease with depth in the in the spring, summer, and fall. Why is winter excluded—no measurements?	The text has been revised for clarity.
31	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Vertical Gradients				d.(CVKR) "This likely indicates that...the vertical gradient is significantly smaller at this location in the spring measurements." Or does it indicate that there is no vertical gradient during unpumped conditions?	The text has been revised for clarity.
32	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Appendix Y				Errors and overgeneralizations exist in the mapped groundwater elevation contours (including Appendix Y). The text analyzing the contour figures (including in the appendices) contains interpretive errors ("Groundwater Contours" [2.2.3]). For instance, "In the southeastern portion of the basin near Ventucopa, groundwater is mostly between 100 and 150 feet bgs" should be "between 150 and 200 feet bgs."	The text has been revised for clarity.
33	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Appendix Y				The same discussions of contour maps in Appendix Y seem to be reused for each season/map, ignoring or smoothing over distinctions between them. For example, an area of low groundwater elevation is described as "northeast of...Cuyama" for Figures Y-1, -3, -5, and -7, yet the figures show that area shifting between the north and northwest of Cuyama.	The text has been revised for clarity.
34	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Appendix Y				In several instances, "groundwater levels rising" should be replaced with "depth to water decreasing" because the topic is DTW contours. Contour labels on Figure Y-4 neither match values posted on wells nor represent a 50-ft contour interval.	Figure Y-4 has been corrected.
35	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Appendix Y				Explanation of the maps should specify that they "improve understanding of recent horizontal trends in the basin." The inferred contours are unnecessary, speculative, and often seem to be physically unreasonable. The small contour interval relative to low well density causes several occurrences of a "target" effect, where a single well drives the appearance of a dramatic groundwater mound (like a "bullseye"). In some cases, the actual cause of the large head differential appears to be the SBCF. Larger contour intervals would decrease this effect.	Due to the regional nature and large topographic and groundwater depth ranges in the Cuyama Basin, the 50 foot contour interval was chosen to capture trends while not ignoring conditions that are shallower than 100 feet. Like many presentation figure decisions, this one is a compromise. No change made to contour maps.
36	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.7 Data Analysis				Explanation of water quality constituents is needed. An explanation of why TDS, nitrate, and arsenic are selected for mapping and discussion would be helpful ("Data Analysis" [2.2.7]).	These consituents were selected because they were identified as being of interest during the stakeholder process. Very limited data is available for analysis of other constituents.
37	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.7 Data Analysis				An incorrect Nitrate MCL is cited. The nitrate MCL is cited as 5 mg/L ("Data Analysis" [2.2.7]). It actually is 10 mg/L as N.	The MCL value has been corrected
38	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	Figure 2.2-25				Consistent time scales in Figure 2.2-25 should be used for clarity. The plot time scales are inconsistent, which makes interpretation unnecessarily difficult.	The time scales on the plots have been set to allow readers to clearly see the data.

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39	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	Appendix X				The hydrograph appendix contains errors and omissions. Many wells are symbolized in the map but not labeled. Many wells labeled in the map do not have hydrographs included. Data axis label intervals are inconsistent (one year vs. three years). For Wells 90 and 639, the y-axis minimum is too high.	Wells symbolized in the maps incorporated into Appendix X incorporate all "OPTI Wells." These includes both groundwater level monitoring and groundwater quality wells that are included in the source datasets. This means that some wells on the map will not have a hydrograph associated with them. Additionally, some of the wells may overlap one another so closely that GIS is unable to automate every well number label on the map. These limitations are not affected in the online DMS, but Appendix X is intended to provide as much information as reasonable in print form. Hydrograph label axis intervals are automated. Labels still effectively show GWE and DTW. The Y-axis in the hydrographs have been adjusted to show all data in wells 90 and 639.
40	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	Appendix Z			This loss of aquifer	The subsidence appendix requires further explanation. Regarding the statement, "This loss of aquifer is limited to the water that was stored in the compressed clays, and storage capacity lost is limited to the water that was stored in clays that were compressed" ("How Subsidence Occurs"), what does WC intend to communicate regarding the difference between loss of aquifer and loss of storage capacity? Aren't they effectively the same thing?	The text has been revised for clarity.
41	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2 GW Conditions	1	1	The groundwater conditions section	Chapter scope. The statement, "The groundwater conditions section is intended to...Define measurable objectives to maintain or improve specified groundwater conditions" ("Groundwater Conditions" [2.2]) is more accurately worded in the following paragraph: "The groundwater conditions described in this section...are used elsewhere in the GSP to define measurable objectives."	The text has been revised for clarity.
42	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.1 Useful Terminology				Terms not used in the document. Two defined terms ("Useful Terminology" [2.2.1]) are not used elsewhere in the document, and their purposes should be stated: "historical high groundwater elevation" and "historical low groundwater elevation."	These definitions have been removed from the section.
43	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	Figures 2.2-1 & 2.2-2				Map symbology. Figure 2.2-1 has non-intuitive and inconsistent symbology. Purple lines and points represent an eclectic set of "landmarks". All the canyons are labeled, but most of the creeks are not. Bitter Creek is referenced many times in this document, but it is not shown on any subsequent figures. In Figure 2.2-2, Bitter Creek and SBCF are mentioned in the text discussion but not shown on the figure.	Comment noted. The purpose of Figure 2.2-1 is to show the locations of elected landmarks in the Basin to assist in discussion of conditions in the section. It is not necessary to repeat each landmark in subsequent figures.
44	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 GW Hydrographs			In the western area	Unclear sentences. There are several incomplete and/or confusing sentences in the document. "In the western area west of Bitter Creek are near the surface near the Cuyama river, and deeper below ground to the south, uphill from the river, and have been generally stable since 1966" ("Groundwater Hydrographs" [2.2.3]).	The text has been revised for clarity.
45	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 Vertical Gradients			The hydrograph of the four completions	Unclear sentences. There are several incomplete and/or confusing sentences in the document. "The hydrograph of the four completions shows that at the deeper completions are slightly lower than the shallower completions in the spring at each completion, and deeper completions are generally lower in the summer and fall" ("Vertical Gradients" [2.2.3]).	The text has been revised for clarity.
46	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.3 GW Countours			Measurements from wells of different	Unclear sentences. There are several incomplete and/or confusing sentences in the document. "Measurements from wells of different depths are representative of conditions at that location and there are no vertical gradients" should say "...assumes there are no vertical gradients" ("Groundwater Contours" [2.2.3]).	The text has been revised for clarity.
47	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.7 Data Analysis			TDS in the central portion	Unclear sentences. There are several incomplete and/or confusing sentences in the document. "TDS in the central portion of the basin" ("Data Analysis" [2.2.7]).	The text has been revised for clarity.
48	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.7 Data Analysis			The chart for Well 85	Unclear sentences. There are several incomplete and/or confusing sentences in the document. "The chart for Well 85 at the intersection of Quatal Canyon and the Cuyama River is generally below 800 mg/L TDS with spikes of TDS increases" ("Data Analysis" [2.2.7]).	The text has been revised for clarity.
49	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	Appendix Z			[Subsidence is] not restricted	Unclear sentences. There are several incomplete and/or confusing sentences in the document. "[Subsidence is] not restricted in rate, magnitude, or area involved" (Appendix Z).	The text has been revised for clarity.
50	Jeff Shaw, Anona Dutton, John Fio, Tim Ingrum	EKI Environment and Water	2.2.7 Reference and Data Collection				Links and sources identical. Two different DWR data source links ("Reference and Data Collection" [(2.2.7]) share the same web address.	The link for the CNRA dataset has been updated.
51	Mike Post	SAC Member	General	N/A	N/A	N/A	It seems that there has been no examination of faults/aquitards down stream (West) from the basin border. While it is acknowledged that the GSA has no authority beyond the defined basin, it would seem that knowing what the further extent of pooled ground water is present and where/why that water is held back would be important for making management decisions in that segment of the basin. It may well be that the basin's western limit was drawn for exactly to account for this but that does not seem to be clearly spelled out.	Comment noted. This is outside of the scope of the GSP.
52	Jane Wooster	CBGSA Board member	Figure 2.2-1				On Figure 2.2-1 the location of the Russell Ranch Oil Field is not too accurate....it is also wrong on OPTI ID (Jane to send Brian a map).	Russell Ranch Oil Field has been removed from the figure.
53	Jane Wooster	CBGSA Board member	Appendix X				In the hydrographs (appendix X), many of the wells on our place are no longer there. It is misleading because some wells were drilled, tested once and that was it. I guess they give info about water depth.	The maps and data in Appendix X are intended to show the groundwater level information that is available historically in the Basin. Because of this, many wells that no longer exist will be included.
54	Jane Wooster	CBGSA Board member	Figures Y-4 & Y-6				Just based on what I know the stats were on our wells, it looks like Figures Y-4 and Y-6 are over-generalized. Some places we saw differences and some places the Wells didn't fluctuate all.	Comment noted. The contour maps represent estimates based on the available information in each period.
55	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	General				On all maps, in every section, please show the major faults and major streams as landmarks for easier location of what is being shown on the specific map.	This represents too much detail for most maps in the section. Figure 2.2-1 is intended to provide geographic locations of features for reference.

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56	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	General				Age dating of water is an important component of groundwater conditions since it indicates sources and recharge. Any claim for surface recharge of the groundwater needs to be validated by tritium analysis.	This is incorrect. Tritium analysis can provide some useful information about groundwater recharge, but is not a conclusive method for determining whether surface recharge has occurred.
57	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	General				The Cuyama Basin needs dedicated test wells at critical locations in order to better understand groundwater availability and movement	Comment noted. Potential locations of new monitoring wells is discussed in the Monitoring Networks section.
58	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.3 GW Trends				While the maps clearly show the decades-long downward trend of the central basin (Figure 2.2-7), the narrative just mentions specifics and does not give enough of a full watershed overview of how there are records since 1950 of extraction without replenishment which has created a record of a severe downward trend of approximately 500 feet over 6+ decades. This overview is key to establishing minimum thresholds for the GSP since this downward trend needs to stop with no continued depletion. We recommend adding a summation overview to this section.	Comment noted. This level of detail is not needed in this section.
59	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.4 Change in GW Storage				The determination of groundwater storage from the model seems backwards, since the model is highly dependent on how much water there is to pump. Isn't there data available to inform the groundwater storage available in certain areas? Without such data the accuracy of the model seems much more uncertain.	The model provides the best estimate currently available of the quantity of groundwater storage available.
60	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.6 Land Subsidence				Any subsidence can negatively affect groundwater storage. The very limited measurements to date don't adequately determine if current subsidence has been occurring for a long period of time or is just beginning. This creates a data gap that adds more uncertainty to the model and therefore more monitoring sites are needed to determine both rates and extent of subsidence.	Comment noted. The need for additional subsidence monitoring is discussed in the Monitoring Networks section.
61	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.7 GW Quality				This section on groundwater quality reports on various constituents' historical conditions, but does not develop a foundation for a baseline for future monitoring nor identify what constituents are recommended for monitoring.	Monitoring is addressed in the Monitoring Networks section. There is not enough existing historical data to 'establish a baseline' in this basin.
62	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.7 GW Quality				In reviewing the information in this section, plus in discussing this in meetings as well as with the CCSD and other hydrologists involved in monitoring wells in the Cuyama Basin, we would recommend that current baselines be established for TDS, nitrate levels, and specific heavy metals such as arsenic relevant to different areas of the basin	What is a 'baseline' for TDS, arsenic, nitrates and metals? This is not a term typically used in conjunction with water quality
63	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.7 GW Quality				Monitoring be established that relates depth of groundwater extraction to constituents present and monitors for changes over time. Water quality analysis should also include tritium analysis to determine the age dating of water and verify if recharge from the surface is occurring.	The relationship between depth to groundwater and the concentration of water quality constituents is not known in this basin due to limited groundwater quality monitoring information - therefore - the relation between depth and constituent concentration cannot be developed accurately, and is a data gap that should be filled during GSP implementation
64	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.7 GW Quality				How will nitrogen loading from both agricultural applications and groundwater use be monitored?	GSAs do not have authority toregulate agricultural fertilizer practices - therefore, the GSA will not be monitoring them.
65	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.7 GW Quality				How will arsenic induction by extraction of ancient water be monitored?	It won't be performed as a part of the initial GSP - the relationship between depth to groundwater and the concentration of water quality consituents (like arsenic) is not known at this time. The GSA board may decide to establish an arsenic monitoring program as part of GSP implementation and expansion of the water quality monitoring grid, but existing monitoring is erratic, spatially inaedquate and not useful for this purpose.
66	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.7 GW Quality				Does CCSD have a time series of arsenic level in their wells to see if changes have occurred?	The CCSD has not provided water quality data
67	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.8 Interconnected Surface Water Systems				This section will also need a historical component of surface water loss through looking at riparian habitats.	Comment noted. Historical information on surface water loss is not available except through model estimates.
68	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.9 GDE				A response to the study being conducted by a consulting biologist: this study should be done when GDEs are most biologically active and engage ground-truthing by accessing local knowledge of the different areas of the Basin.	Comment noted.
69	Stephen Gliessman & Roberta Jaffe	Farmers/residents; Standing Advisory Committee Chair (Roberta)	2.2.10 Data Gaps				Throughout this section data gaps are referred to, but are not listed here. The fact that there are so many data gaps in this section is very disconcerting, since most of these gaps provide critical data to inform the model. Not having these data introduces greater uncertainty in the validity of the model.	Comment noted. The model will be developed based on the best available information that is currently available, but can be updated in the future.
70	Cathy Martin	County of San Luis Obispo	Ch 2 Intro	1	1	This document includes the	It looks like some the GSP regulations for § 354.8 is missing or maybe part of another chapter. Other GSP Regulations seem to be included but not listed.	As noted, this is just one section that will satisfy the requirements of § 354.8
71	Cathy Martin	County of San Luis Obispo	2.2.1 Useful Terminology	N/A	N/A	MCL – Maximum Contaminant	Suggest defining the Primary and Secondary MCL which is discussed in the document, but not defined.	These terms are not used in the document.
72	Cathy Martin	County of San Luis Obispo	2.2.2 GW Elevation Data Processing	Bullet list	N/A	N/A	Please verify if any wells are duplicates and/or reported to multiple agencies?	This was performed prior to development of the section.

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73	Cathy Martin	County of San Luis Obispo	2.2.2 GW Elevation Data Processing	2	2	Data collected also included	Please clarify the meaning of "questionable measurement code"	This information is provided by monitoring agencies to indicate when conditions at a well effect the quality of a measurement. This level of detail is not needed in this document.
74	Cathy Martin	County of San Luis Obispo	Figure 2.2-2 & 2.2-4	N/A	N/A	N/A	Please label [Bitter Creek] on figure.	The location of Bitter Creek is shown in Figure 2.2-1
75	Cathy Martin	County of San Luis Obispo	2.2.1 Useful Terminology	N/A	N/A	Figure 2.2-1	Add faults to acronym list (missing GRF and TTRF)	These have been added to the acronyms list
76	Cathy Martin	County of San Luis Obispo	Figure 2.2-2	N/A	N/A	N/A	Suggest removing the word Earlier from figure and adding actual years, if possible	This change is not needed as the purpose of this figure is to highlight wells with recently measured data.
77	Cathy Martin	County of San Luis Obispo	General	N/A	N/A	N/A	Suggest showing State and Federal lands on all of the figures. This may help the public understand why some areas have no wells or water quality data.	These are shown on the figures in the Plan Area section.
78	Cathy Martin	County of San Luis Obispo	General	N/A	N/A	N/A	Suggest adding stream/creek names to all figures that mentioned streams/creeks in the description of the figure.	The stream names have been added to Figure 2.2-1
79	Cathy Martin	County of San Luis Obispo	Figure 2.2-3	N/A	N/A		Suggest adding on figure abbrev. or defining terms in the description of Figure 2.2-3 for CVKR, CVFR, CVBR	These are names that are provided for the wells. We assume they are abreviations, but have not come across definitions, and thus cannot provide that information.
80	Cathy Martin	County of San Luis Obispo	Figure 2.2-5	N/A	N/A		Suggest - Label on figure (Russell Ranch Oilfields, Cottonwood Canyon, & Aliso Canyon)	These are labeled on Figure 2.2-1
81	Cathy Martin	County of San Luis Obispo	Figure 2.2-11	Bullet list	N/A		Round Springs Canyon, near Ozena Fire Station & Springs Canyon, near Ozena Fire Station - Please label on figures.	These are labeled on Figure 2.2-1
82	Cathy Martin	County of San Luis Obispo	2.2.3 GW Hydrographs			Figure 2.2-12 shows	Suggest stating your interpretation of why this area is having a quick recovery (for example - stream influence provides recharge to this basin area / fault/ etc.), if known or is additional investigation required?	Comment noted. This is beyond the scope of this section.
83	Cathy Martin	County of San Luis Obispo	2.2.3 GW Hydrographs			Near Ventucopa, hydrographs for Wells 85	Suggest defining climatic patterns.	Figures showing the climactic variability will be included in the Water Budgets section.
84	Cathy Martin	County of San Luis Obispo	Figure 2.2-12			The hydrograph for Well 40	Missing: Suggest adding well hydrograph to the Figure 2.2-12. (for wells 40 & 316)	The text has been revised for clarity.
85	Cathy Martin	County of San Luis Obispo	2.2.3 GW Hydrographs	9	2	The hydrographs in this area show consistent	Suggest adding your interpretation of why this area shows consistent decline and little to no responses, if known or is additional investigation required?	Comment noted. This is beyond the scope of this section.
86	Cathy Martin	County of San Luis Obispo	Figure 2.2-14	10	3	Levels remain lowered along	Missing: Suggest adding well hydrograph to the Figure 2.2-14. (well 640)	The text has been revised for clarity.
87	Cathy Martin	County of San Luis Obispo	2.2.3 GW Hydrographs	10	4	Groundwater levels are higher to the west	Suggest adding your interpretation of why this area shows consistent decline, if known or is additional investigation required?	Comment noted. This is beyond the scope of this section.
88	Cathy Martin	County of San Luis Obispo	Figure 2.2-15	N/A	N/A		Please define GSE and WSE – located on hydrographs	These have been added to the acronyms list
89	Cathy Martin	County of San Luis Obispo	2.2.3 Vertical Gradients	Bullet list	N/A	CVFR is comprosed of four completion	Please clarify term "completion". Is this a cluster of monitoring wells?	A sentence has been added to the section to define "multiple completion well"
90	Cathy Martin	County of San Luis Obispo	2.2.3 Vertical Gradients	Bullet lists	N/A	N/A	Suggest showing the map location for CVFR, CVBR, and CVKR if possible.	The locations of these wells are shown in Figure 2.2-3
91	Cathy Martin	County of San Luis Obispo	2.2.3 GW Countours	Bullet List	N/A	Due to the limited spatial amount	Please explain more of the process to generate the contours in this section or in an appendix, number of wells used, etc.	Comment noted. Additional information is not needed.
92	Cathy Martin	County of San Luis Obispo	2.2.3 GW Countours			The contour maps are not indicative	Suggest adding: do not account for topography ***or faults*** . A short discussion on faults would be helpful to the public with the groundwater contours.	The faults are discussed in detail in the GCM section.
93	Cathy Martin	County of San Luis Obispo	Figure 2.2-20				Bitter Creek - Place label on figure	This is labeled on Figure 2.2-1
94	Cathy Martin	County of San Luis Obispo	2.2.3 GW Countours			Contour maps for spring 2017	Suggest explaining the difference between the years from all of these figures, to help the public understand what they are reviewing.	The text has been added to the document.
95	Cathy Martin	County of San Luis Obispo	Figure Y-1, Y-3, Y-5, Y-7				Suggest adding groundwater flow arrows to the figure	Groundwater flow arrows have been added to these figures
96	Cathy Martin	County of San Luis Obispo	Figure Y-1				Ozena fire station - place label on figure	This is labeled on Figure 2.2-1
97	Cathy Martin	County of San Luis Obispo	2.2.3 GW Countours			The contour map shows a steep	The contour map shows a steep gradient ***north*** of - Suggest verifying the direction	The text has been revised for clarity.
98	Cathy Martin	County of San Luis Obispo	2.2.6 Land Subsidence	N/A	N/A	N/A	Suggest showing and discussing the entire basin area, as well as showing the three stations (P521, OZST, and BCWR) on a figure with graphs, if possible.	The current figure shows all 3 station locations. The data for P521 is shown because it is the most relevant.
99	Cathy Martin	County of San Luis Obispo	2.2.7 Data Analysis	2	2	In 1966, TDS was above the MCL	Please list and discuss all of the secondary MCL standards for TDS (500 mg/L; 1,000 mg/L and 1,500 mg/L) and why 1,500 mg/L is being recommended.	Comment noted. No change needed.
100	Cathy Martin	County of San Luis Obispo	Figure 2.2-23	N/A	N/A	N/A	Place label on figure (Ozena Fire Station, Santa Barbara Canyon, and upper Quatal Canyon)	These are labeled on Figure 2.2-1
101	Cathy Martin	County of San Luis Obispo	2.2.7 Data Analysis			In the 2011-2018 period, TDS was	In the 2011-2018 period, TDS was above the **MCL** in over 50% of measurements. - Suggest listing which MCL standard?	Comment noted. No change needed.
102	Cathy Martin	County of San Luis Obispo	Figure 2.2-24	N/A	N/A		Place label on figure (Quatal Canyon, and along the Cuyama River between Cottonwood Canyon and Schoolhouse Canyon)	These are labeled on Figure 2.2-1
103	Cathy Martin	County of San Luis Obispo	Figure 2.2-25	N/A	N/A		Place label on figure (Quatal Canyon)	This is labeled on Figure 2.2-1

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104	Cathy Martin	County of San Luis Obispo	2.2.7 Data Analysis			Figure 2.2-26 shows that the	Figure 2.2 26 shows that data collected in 1966 was below the MCL of 5 mg/L throughout the basin, with **some measurements** above the **MCL** in the central portion of the basin where irrigated agriculture was operating Suggest adding number of samples: ## samples out of ### total samples & Suggest adding the primary MCL for nitrates to be consistent with the rest of the page	Nitrate MCL has been corrected to 10 mg/L
105	Cathy Martin	County of San Luis Obispo	2.2.7 Data Analysis			Figure 2.2-27 shows that the	Figure 2.2 27 shows that data collected over this period **was generally** below the **MCL**, with two measurements that were over 20 mg/L. Suggest adding number of samples: ## samples out of ### total samples & Suggest adding the primary MCL for nitrates to be consistent with the rest of the page	Nitrate MCL has been corrected to 10 mg/L
106	Cathy Martin	County of San Luis Obispo	2.2.7 Data Analysis			Figure 2.2-28 shows that the	Figure 2.2 28 shows arsenic measurements from 2008-2018. Data was not available prior to this time period in significant amounts. Figure 2.2 28 shows arsenic measurements **were below** the MCL of 10 ug/L where data was available. Suggest adding number of samples, ## samples out of ### total samples	Text has been revised for clarity.
107	Cathy Martin	County of San Luis Obispo	Figure 2.2-31				Place label on figure (Ballinger, Quatal, and Apache Canyons)	These are labeled on Figure 2.2-1
108	Cathy Martin	County of San Luis Obispo	2.2.7 Literature Review	Bullet List		97% of samples had concentrations greater than	Is this the MCL for each concentration? If so, please add the MCL in the bullet point	These are not the MCL. No change needed.
109	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	General				This section as a whole requires significant revision. The description of wells needs to be revised to be clear what entity conducted the monitoring, not what database W&C gathered the data from. For a discussion of SBCWA monitoring programs in the basin, the SBCWA contract with the USGS, and its relationship to CASGEM, please contact Matt Scrudato. This section contains minimal analysis of groundwater conditions, just reporting of selected hydrographs, with little explanation or interpretation. The water quality section is confusingly structured and incomplete. Finally, although we understand the time sensitivities in preparing the GSP by spring 2019, it would save reviewers quite a bit of time if a technical editor or senior W&C staff member reviewed these sections prior to distribution.	The section has been revised for clarity.
110	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	General				Most of the wells in the basin are not dedicated monitoring wells, but are frequently described in this section as such.	Text has been revised for clarity.
111	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.1 Useful Terminology	Bullet list		There are two versions of contour maps	Consider breaking identification of gw elevation and depth to water info out into a separate bullet point. GW elevation and depth to water are not just used on contour maps, they are used in hydrographs as well.	Text has been revised for clarity.
112	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	General				Please change "collected" to "compiled" throughout this section. It is potentially confusing to the reader to describe gathering data from various sources as collecting data. Typically collecting well data refers to taking measurements	Text has been revised for clarity.
113	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing	1	1	Groundwater well information and	"collected from **local stakeholders**" - These appear to be included in the 8 major sources.	Text has been revised for clarity.
114	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing	Bullet List		Well and groundwater elevation data were	Was data collected from the CSD? If so, include in list.	No data was collected from the CSD
115	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing	Bullet List		list of data	Include references for publically available data sources; Any available info on data validation, and collection would be useful for these.	References are included in the Data Management GSP section
116	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Data collected included well information	Data accuracy section is needed. What standards/protocols are each of these data collection entities following? How is ground surface elevation being determined. DGPS like the original USGS model? Off a map with +/-20 foot accuracy? Please elaborate.	This has been addressed in a footnote.
117	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-2 & 2.2-3				Figures should be titled differently. These are not DWR wells. They are wells with data pulled from the DWR database. The DWR database I assume is CASGEM, which was ultimately collected by SBCWA/USGS. The database that Woodard and Curran compiled the data from is ultimately less important than how it was gathered. Need to make distinction in the title (which is different on the actual figure) of what this is supposed to show. Where they got the data and/or who collected it? Actual title on figure says "DWR Wells" which is not an accurate statement.	Figure titles have been revised for clarity.
118	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Roughly half of the wells from DWR's database	Please provide context for why this is important in the text. "measured in 17-18 is mentioned throughout without context. This is a plan that will be issued in 2020. Why 17-18 is the focus needs to be explained.	Text has been revised for clarity.
119	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Data collected from the DWR	This is confusing. Data was perhaps collected by Woddard and Curren from DWR, but the data was not collected by DWR. Clarify data received (how / where did they locate the data) vs collected (who and how collected.	Text has been revised for clarity.
120	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Data collected from the DWR	"one measurement in the spring, and one measurement in the fall " - If this refers to the CASGEM wells this is not entirely true – most wells monitored 1xyear with a few 2xyear	Text has been revised for clarity.
121	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-3				This list of wells is mostly accurate, but is missing some wells like Spanish Ranch on far west end.	Wells included in Figure 2.2-3 have been reviewed and it has been confirmed that the Figure includes all well data provided by the USGS
122	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Data collected from USGS has been typically measured bi-annually	Not entirely true. And there is data overlap here with CASGEM program. Again, describe SBCWA/USGS monitoring program.	Text has been revised for clarity.

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123	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Santa Barbara wells are concentrated in the western portion	This does not include all wells monitored by the County. The County does not own these wells, and monitors far more than just these wells.	The maps show the wells and data that had been provided as of June 2018.
124	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Data collected from the counties	"measured bi-annually" - Currently making quarterly measurements. Appear to be missing wells. Were a few select wells chosen?	Text has been revised for clarity.
125	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-4				Missing a few. Difficult to determine how many. At some point need to should describe why/how these are different from DWR/CASGEM and USGS program. For example, Matt Scrudato is monitoring in the west end because there is a lack of data in that area – something SBCWA agreed to do to help with GSP development.	The maps show the wells and data that had been provided as of June 2018.
126	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing				Need to add a section somewhere that describes QA/QC process, who does it (USGS, SBCWA), who doesn't (Bolthouse/Grimmway/Grapevine), and why.	This has been addressed in a footnote.
127	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			The locations of SBCWA well data are located	What is the difference between these wells and the wells referenced in Figure 2.2-4? SBCWA should be taken off Figure 2.2-5 for several reasons (we don't own the wells shown, we're not a private company, we're not ag, etc). All of wells measured by Matt Scrudato should be in Figure 2,2-4	Wells included in these figures have been reviewed and it has been confirmed that the Figure 2.2-4 includes all well data provided by the SBCWA and that Figure 2.2-5 includes all well data provided by private landowners.
128	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			The locations of SBCWA	"The locations of SBCWA well data are located **west of Cottonwood Canyon**" - West of Aliso Canyon would be more accurate	Text has been revised for clarity.
129	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			The date of measurement varies significantly by year.	Explain why this is important as context for the reader.	Text has been revised for clarity.
130	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing				"Data provided by Grapevine Capital Partners is **bi-annual** " - quarterly	Text has been revised for clarity.
131	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-7				This graph is more confusing than helpful. Please reomve. Well locations are already identified previously and hydrographs are better described in later sections. The need for this statement and graph appears to be validation for the quality of water level data provided by Grimway and Bolthouse. This should be done in a separate data validation section. Please remove the statement "accurate measurements" from this paragraph. At best, the statement can note that data "match ing tracking historical trends within a 4-mile area", but in no way should refer to these data as "accurate measurements". Then again, what is the definition of an "accurate measurement"? The USGS states that discrete water level measurements made with graduated steel or electric tapes are accurate to 0.01 foot. What standard is Woodard & Curran using? If this graph is kept in the document, the graph should start in about year 1977 when there is a comparison between the data sets. The data prior to this is irrelevant. It is not clear which well relates to which line on the graph. 1. Were there any wells which were monitored by BOTH Grimway/Bolthouse and the USGS where data can be compared for a single location? Are these all the Grimway/Bolthouse wells where data are available or only a select few? 2. DWR are not collecting well data in Cuyama	The figure is included because of interest expressed during public meetings regarding how data provided by private landowners compares with data provided by public agencies. The text describing the figure has been revised for clarity.
132	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Figure 2.2-7 shows a comparison of data	Need context to explain why this comparison is being done.	Text has been revised for clarity.
133	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			Figure 2.2-8 shows a comparison of data	Need context to explain why this comparison is being done.	Text has been revised for clarity.
134	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-8				The need for this statement and graph appears to be validation for the quality of water level data provided by Grapevine Capital Partners. Please remove both the discussion (page 2.2-11) and the graph as these data illustrates nothing at all. 1. Two of the Santa Barbara County wells are not even part of the network. I don't even think these wells exist in the Valley. It is unclear where these data came from. 2. You appear to be comparing very shallow wells to a 6 of the 12 deep production wells. 3. Are these discrete static water level measurements used for the Grapevine data or select points from the continuous 5-minute data sets? SBCWA has been making periodic discrete water level measurements at the 12 productions wells on the Harvard property. A comparison of 26 measurements shows differences between discrete water level and computed water levels ranging from -47.9 feet to 150.36 feet. These are large outliers when compared to all the measurements, but would be a better indication of the data quality (see chart below). SBCWA has measurements from 9/2018 to compare as well. There would be some variation of only a few feet in this comparison based on equipment PSI (most likely higher PSI being used due to large level changes and therefor reduced accuracy), MP elevation choice, computation procedures, etc. Please contact Matt Scrudato to discuss specifics.	The figure is included because of interest expressed during public meetings regarding how data provided by private landowners compares with data provided by public agencies. The text describing the figure has been revised for clarity.
135	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.2 GW Elevation Data Processing			A long term comparison is not possible	The wells are in different locations, what value does this provide?	The figure is included because of interest expressed during public meetings regarding how data provided by private landowners compares with data provided by public agencies. The text describing the figure has been revised for clarity.

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Comment #	Commenter	Commenter Organization	Section	Section Paragraph #	Paragraph's Sentence #	Sentence Starts with, "...	Comment	Response to Comment
136	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-5				Again, misleading title here vs. actual figure which states "Owners and Operating Entities" SBCWA does not own or operate the wells assigned to us in this graph. We only own and maintain CVFR, CVKR, and CVBR. Further this map does not include most of the wells measured by the SBCWA	The figure title has been revised for clarity
137	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Trends				This section needs major reorganization. There is a time based section, then a number of other sections without a designated timeframe. Also, the wording in this section needs a thorough review by a technical editor.	The text has been revised for clarity.
138	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 1947 to 1966 GW Trends			1947 to 1966 Groundwater Trends	Hydrographs illustrated are all through 2018. Are you trying to differentiate between times or is the next section a separate concept? If so, there needs to be discussion on more current trends following 1966.	The text has been revised for clarity.
139	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Groundwater Hydrographs	This is confusing. The previous section is about a specific time period. If this is 1966-present you should say so.	The text has been revised for clarity.
140	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Groundwater hydrographs were developed to provide indicators	What indicators? Don't the hydrographs just show trends?	The text has been revised for clarity.
141	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Hydrographs for all monitoring wells with elevation	There can be a big difference between a monitoring well and a well that is being monitored. Be more clear.	The text has been revised for clarity.
142	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Appendix X				Comments on Appendix X: 1) Some graphs extrapolate off the hydrograph – is this in error or is there a data point(s) not shown? 2) Similarly, some graphs don't show any data points. 3) Scale issues 4) No need for one per page, consider 4 5) Hydrographs don't identify data source, who and how collected and whether data has been QA/QC. Consider adding an index of all wells, like a lookup table, with OPTI number, USGS number, and well number owner/operator uses, etc.	1) This has been fixed by increasing vertical scale 2) Some OPTI wells only have groundwater quality data associated with them. Because there are so many wells, a hydrograph was made for every OPTI well; therefore some do not have level data. 3) This has been addressed in #1. The graph scales were selected to show the depth to water of all wells on the same scale. 4)One figure per page allows greate detail to be seen in the graphs, as some have a significant amount of data points. 5) This information is available through OPTI for those who would like to review it.
143	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Figure 2.2-11 shows Hydrographs in different portions	Please describe in the text why these wells were chosen. Are they representative of the areas?	The text and figure have been revised for clarity.
144	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs	Bullet list		In the area southeast of Round Springs Canyon	Please edit for clarity and grammar. Also, if you are going to describe the hydrographs, you should describe all of them If they want to generalize then make the graph mimic these areas, pick 5 representative hydrographs. Right now there are 7 on the Figure which looks cluttered.	The text has been revised for clarity.
145	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-11				Bitter Creek area - Illustrate on map as a reference	This is labeled on Figure 2.2-1
146	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Figure 2.2-12 shows selected hydrographs	Why is this section in a different format than the previous. Please make consistent.	Comment noted. No change needed.
147	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-12				Well 40 & 316 - where? Not shown in map	The text has been revised for clarity.
148	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Figure 2.2-13 shows hydrographs of discontinued monitoring wells	Then need to explain why they were selected.	The text has been revised for clarity.
149	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	General				Stick with one descriptor – either elevation or depth to water. Mixing elevation and depth to water is confusing to the reader.	The section consistently discusses depth to water
150	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-14				Well 640 - where? Not shown in map	The text has been revised for clarity.
151	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Figure 2.2-15 shows hydrographs of monitoring wells	The discussion on west end hydrographs and the related Figure 2.2-15 is misleading. Continuous data sets from the 12 wells indicate water levels drops as large as 100 feet in CHG-14 since data collection started in June 2017. This well is the extreme, where other production wells on Harvard vineyard property show water level drops of 25-50 feet. The trends indicate the yearly hydrologic minimum continues to drop.	Wells shown in Figure 2.2-15 show a range of conditions in the western edge of the Basin. OPTI Well 840 shows conditions see in part of the Basin.

Cuyama Basin Groundwater Conditions September Draft
Summary of Public Comments and Responses
November 19, 2018

Comment #	Commenter	Commenter Organization	Section	Section Paragraph #	Paragraph's Sentence #	Sentence Starts with, "...	Comment	Response to Comment
152	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Hydrographs			Hydrographs for wells 571 and 108	Earlier discrete data located in NWIS.	Well 571 (USGS Code 345847119534901) only has two measurements as shown in the hydrograph (https://groundwaterwatch.usgs.gov/AWLSites.asp?S=345847119534901&ncd=) Well 108 has 8 measurements. Individual points are difficult to destinguish due to hydrograph size, but the hydrograph is correct.
153	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-11				Suggest illustrating hydrographs using same scale / minimize white space for all Figures in this section	All hydrographs on each figure are the same scale
154	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-12 & 2.2-13				Actual Figure has typo in title Also for all Figures in this section, suggest only showing hydrographs referred to in text.	The figure and text have been made consistent. Title corrected.
155	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 Vertical Gradients			Knowledge about vertical gradients is required by regulation	Please cite the regulation for the reader.	The text has been revised for clarity.
156	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 Vertical Gradients			Figure 2.2-16 shows the combined hydrograph	State that these wells were installed by USGS as part of the Cuyama Valley Water Availability Study in cooperation with the SBCWA. Multiple completion wells are owned by SBCWA.	This text has been added.
157	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-16, 2.2-17, 2.2-18				The data used to determine there is no vertical gradient as illustrated in the figure 2.2-16 (page 2.2-27) appear to be discrete measurements. At times, there were only two discrete measurements in a year with the remainder of the year interpolated. This is not enough data for an elevation comparison. The USGS used continuous 15-minute unit value data for this nested well and concluded the following (from page 39, Scientific Investigations Report 2013-5108) CVFR.....did show similar seasonal and longer-term changes. Similar to CVKR and CVBR, the vertical hydraulic gradients were upward during the winter months and reversed to downward gradients during the irrigation season; however the gradients at the CVFR site were notably smaller. USGS conclusion supported by water chemistry samples showing increased tritium with depth which may result from younger water from shallow sytem. Woodard & Curran should review the full continuous data set prior to making a conclusion about vertical gradients. Data are available on NWIS. This is data for 3B2- https://nwis.waterdata.usgs.gov/ca/nwis/uv?cb_72019=on&format=gif_default&site_no=345351119323102&period=&begin_date=2010-09-04&end_date=2012-09-01 1.The scale used in these graphs (2.2-16, 17 and 18) mask the trends and makes any analysis impossible. Please change the graph scale for all three graphs (2.2-16-18). 2.The x-axis date scale for Figures 2.2-16 and 17 follow an unusual interval. Is this done for any specific reason (see figure below)? A graph with a scale that masks everything that is happening. A 600 ft axis for a graph with an 80 ft range.	Available Continuous Data has been added. Continuous data is only available from 7/21/201 through 11/28/2012 as it has been "Approved." All other "Provisional" data is only available in summary form, which is the data that was being shown in the hydrograph. Newly added continuous data follows the trend that was already shown on hydrograph.
158	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Countours			Groundwater contour maps were prepared for	Where is 2016	The hydrograph periods were selected to show the change over the most recent period of 3 years for which data was available in the Spring (from 2015 to 2018) and from the Fall (from 2014 to 2017). Therefore, a figure for 2016 was not necessary.
159	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Countours			These years were selected	Explain in the text the importance of this date in relation to SGMA. Why? Explain. I may have missed this in earlier sections but are they choosing Jan 1 2015 as their baseline?	The text has been revised for clarity.
160	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Countours			Each contour map is contoured at	Labels and symbols should be obvious on the map without having to describe in the text	Comment noted. No change needed.
161	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Countours			Due to the limited temporal amount	Non-pumping and static measurements? What was the selection of wells based on? It appears wells are missing.	The maps are based on available data during the period in question.
162	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Countours			These assumptions make the contours	Explain in the text which wells aree used and why? Howe was data interpolated?	The maps are based on available data during the period in question.
163	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-19				Correct typo in text on lower right of map - "limitated"	The figure has been corrected.
164	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Appendix Y				Where are contour maps for 2016?	The hydrograph periods were selected to show the change over the most recent period of 3 years for which data was available in the Spring (from 2015 to 2018) and from the Fall (from 2014 to 2017). Therefore, a figure for 2016 was not necessary.
165	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Countours				These descriptions are not useful with the maps in the appendix. The descriptions should be with the maps, either here in the text or back in the appendix.	Comment noted. No change needed.

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Comment #	Commenter	Commenter Organization	Section	Section Paragraph #	Paragraph's Sentence #	Sentence Starts with, "...	Comment	Response to Comment
166	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.3 GW Countours			Figure Y-1 through Figure Y-8	Explain reason for changes in seasonal contours.	Comment noted. No change needed.
167	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.4 Change in GW Storage			Change in groundwater storage for the last 10 years	Why 10?	SGMA requires 10 years of data for historical water budgets
168	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.6 Land Subsidence				The paper mentions that the USGS determined 0.2 feet of subsidence in 10 years. This appears to be the change in daily land surface elevation starting in about May 2007 (0.00 mm) and ending in April 2012 (-68mm). This would be a 5-year period of record for analysis. The full 12 year period of record from 2000-2012 is 0.4 feet of subsidence and the 10-years mentioned in the W&C paper (2000-2010) is 0.26 feet of subsidence. Woodard&Curran used data from 1999 to 2018 to determine 1 foot of subsidence. The brief and general summary of the USGS data and analysis from SIR 2013-5108 does not seem to correlate to what is written in this paper. Please expand on the first paragraph related to the USGS data. This will help the reader determine what was completed prior to your analysis of these data.	The subsidence estimate in the first paragraph has been corrected.
169	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Appendix Z				Appendix Z adds little value to the document, appears to be at least partly taken directly from Wikipedia, only focuses on subsidence effects on agriculture, and appears to have been written prior to W&C contracting with the GSA. It is unclear why this was included in the document. Background educational materials data on, e.g., water level data collection, water quality, and other topics is not provided, so why provide this for subsidence. Please delete.	Comment noted. The appendix is included because some readers are interested in this content.
170	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 GW Quality				A summary of the conclusions drawn about water quality would be very useful. As written, the section is quite disjointed. There is a smattering of data analysis, and review of other studies, but no conclusions about what groundwater quality conditions are in various regions of the basin. There is no explanation of why constituents were selected for analysis. The literature review might be better placed before the data analysis to provide context.	Some additional explanation has been added, including an explanation has been added for why these constituents were included.
171	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Reference and Data Collection				Why was age dating data not considered in this analysis and discussion? Why no data from the CSD? Does this (USGS) include NWIS?	The CSD did not provide water quality data. Age dating does not provide information on water quality conditions in the data. The USGS data does include NWIS.
172	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Reference and Data Collection			Data used in reference studies was not generally available	This is not correct. ALL data used in USGS and SBCWA studies (3 out of the 4 referenced in this section) are available and are therefore represented in the data.	The text has been revised for clarity.
173	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Data Analysis			Collected data was analyzed for TDS, nitrate, and arsenic	Explain in the text why only these constituents were selected. Explain for the lay reader what the possible sources of these constituents are	The text has been revised for clarity.
174	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Data Analysis			Figure 2.2-24 shows TDS of groundwater	Note: Additional data for west end collected July 2018 will be available soon.	Comment noted. Due to budget and schedule constraints, data provided after June 2018 will not be incorporated into the current version of the plan.
175	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Data Analysis			Multiple years of collected data were used	Where is the comparison? Figure 2.2-23 (1966 data) shows high (>2000mgL) TDS for wells on west end N of river. These are very shallow and recharged by the river. Figure 2.2-24 shows wells directly S of river with low TDS. These are new deep wells. They shouldn't be compared as the same unit. The map aludes to the fact that they are. That possibly the quality has improved	The text does not make a direct comparison because there is insufficient data to make specific conclusions regarding how TDS may have changed over time.
176	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	Figure 2.2-25				Include a line showing the MCL on the figure	MCL lines have been added to the figure.
177	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Data Analysis			Figure 2.2 28 shows arsenic measurements	USGS data indicate 4 of the 33 wells were >10 Only 25 wells used in this study. Why the discrepancy and why were the 4 wells with >10 not used? Please elaborate on data selection used for this analysis.	The text and figure have been reviewed and updated.
178	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Data Analysis			Figure 2.2-28 shows arsenic measurements	What about the CSD? They treat for arsenic.	The CSD did not provide any arsenic data.
179	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Data Analysis			Figure 2.2-29 shows that most of these sites	Describe for the reader what this means – leaks from storage tanks?	The text has been revised for clarity.
180	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Literature Review	1	1	In 1970, Singer and Swarzenski reported	"TDS was as high as 1,500 to 1,800 mg/L TDS" - contradicts following sentence; "and higher (3,000-6,000 mg/L) in wells " - This is much higher than the first sentence says.	The text has been revised for clarity.
181	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Literature Review	1		They state that the high TDS is generated	"water from marine rocks" - Confusing if you don't identify them geologically	Comment noted. No change needed.
182	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Literature Review	2		The study identified that specific conductance	In the text, please provide context for why this is important and what this means in the context of groundwater quality.	The text has been revised for clarity.
183	Matt Young, Matt Scrudato, & Fray Crease	Santa Barbara County Water Agency	2.2.7 Literature Review			In 2013, USGS reported	Please discuss any vertical gradients in constituent concentrations in the multicompletion wells.	The text and figure have been reviewed and updated.

Cuyama Valley Groundwater Basin

Groundwater Sustainability Plan

Groundwater Conditions

Revised Draft

Prepared by:

November 2018

Table of Contents

List of Figures

Chapter 2 Chapter 2.2 Groundwater Conditions

This document includes the Groundwater Conditions Section that will be included as part of a report section in the Cuyama Basin Groundwater Sustainability Plan that satisfies § 354.8 of the Sustainable Groundwater Management Act Regulations. Water budget components will be included in the upcoming Groundwater Sustainability Plan (GSP) Section titled "Water Budgets". The amounts of water moving through the basin, consumptive uses, and inflows and outflows of the basin, comparisons of extractions to recharge, and other components, will be presented in the water budget section.

The majority of published information about groundwater in the Cuyama Valley Groundwater Basin has been focused on the central part of the basin, roughly from an area a few miles west of New Cuyama to roughly Ventucopa. The eastern uplands and western portion of the basin has been studied less, and consequentially, fewer publications have been written about those areas, and less historical information is available in those areas.

There are a small number of sub-sections that are not complete at this time, due to requiring either groundwater modeling results or field work to complete the sub-section. These subsection titles are highlighted yellow and a list of the subsections intended contents is listed.

2.1 Acronyms

Basin	Cuyama Valley Groundwater Basin
bgs	below ground surface
CUVHM	Cuyama Valley Hydrologic Model
DWR	Department of Water Resources
ft.	feet
ft/day	feet per day
GAMA	Groundwater Ambient Monitoring and Assessment
GPS	global positioning system
GRF	Graveyard Ridge Fault
GSE	Ground Surface Elevation
GSP	Groundwater Sustainability Plan
InSAR	Interferometric Synthetic-Aperture Radar
MCL	Maximum Contaminant Level
RWQCB	Regional Water Quality Control Board
SBCF	Santa Barbara Canyon Fault
SBCWA	Santa Barbara County Water Agency
SGMA	Sustainable Groundwater Management Act
TDS	Total Dissolved Solids

TTRF	Turkey Trap Ridge Fault
UNAVCO	University NAVSTAR Consortium
USGS	United States Geological Survey
WSE	Water Surface Elevation

2.2 Groundwater Conditions

This section describes the historical and current groundwater conditions in the Cuyama Valley Groundwater Basin (Basin). As defined by the GSP regulations promulgated by the Department of Resources (DWR), the groundwater conditions section is intended to:

- Define current and historical groundwater conditions in the Basin
- Describe the distribution, availability, and quality of groundwater
- Identify interactions between groundwater, surface water, groundwater-dependent ecosystems, and subsidence
- Establish a baseline of groundwater quality and quantity conditions that will be used to monitor changes in the groundwater conditions relative to measurable objectives and minimum thresholds
- Provide information to be used for defining measurable objectives to maintain or improve specified groundwater conditions
- Support development of a monitoring network to demonstrate that the GSP is achieving sustainability goals of the Basin

The groundwater conditions described in this section are intended to convey the present and historical availability, quality, and distribution of groundwater and are used elsewhere in the GSP to define measurable objectives, identify sustainability indicators, and establish undesirable results. Groundwater conditions in the Basin vary by location. To assist in discussion of the location of specific groundwater conditions, Figure 2.2-1 shows selected landmarks in the Basin to assist discussion of the location of specific groundwater conditions. Figure 2.2-1 shows major faults in the basin in red, highways in yellow, towns as orange dots, and canyons and Bitter Creek in purple lines that show their location.

2.2.1 Useful Terminology

The groundwater conditions section includes descriptions of the amounts, quality, and movement of groundwater, among other related components. A list of technical terms and a description of the terms are listed below. The terms and their descriptions are identified here to guide readers through the section and are not a definitive definition of each term:

- **Depth to Groundwater –** This is the distance from the ground surface to groundwater, typically reported at a well.
- **Horizontal gradient** – The gradient is the slope of groundwater from one location to another when one location is higher, or lower than the other. The gradient is shown on maps with an arrow showing the direction of groundwater flow in a horizontal direction.
- **Vertical gradient** – A vertical gradient describes the movement of groundwater perpendicular to the ground surface. Vertical gradient is measured by comparing the elevations of groundwater in wells that are of different depths. A downward gradient is one where groundwater is moving down into the ground, and an upward gradient is one where groundwater is upwelling towards the surface.
- **Contour Map –** A contour map shows changes in groundwater elevations by interpolating groundwater elevations between monitoring sites. The elevations are shown on the map with the

use of a contour line, which indicates that at all locations that line is drawn, it represents groundwater being at the elevation indicated. There are two versions of contour maps shown in this section:
    - Elevation of groundwater above mean sea level (msl), which is useful because it can help identify the horizontal gradients of groundwater, and
    - Depth to water (i.e. the distance from the ground surface to groundwater), which is useful because it can help identify areas of shallow or deep groundwater.
- **Hydrograph –** A hydrograph is a graph that shows the changes in groundwater elevation over time for each monitoring well. Hydrographs show how groundwater elevations change over the years and indicate whether groundwater is rising or descending over time.
- **MCL –** Maximum Contaminant Levels (MCLs) are standards that are set by the State of California for drinking water quality. An MCL is the legal threshold limit on the amount of a substance that is allowed in public water systems. The MCL is different for different constituents.
- **Elastic Land Subsidence -** is the reversible and temporary fluctuation in the earth's surface in response to seasonal periods of groundwater extraction and recharge.
- **Inelastic Land Subsidence** – is the irreversible and permanent decline in the earth's surface resulting from the collapse or compaction of the pore structure within the fine-grained portions of an aquifer system

2.2.2 Groundwater Elevation Data Processing

Groundwater well information and groundwater level monitoring data were compiled from four public sources, with additional data compiled from private landowners. These include the following:

- United States Geologic Survey (USGS)
- Department of Water Resources (DWR)
- Santa Barbara County Water Agency (SBCWA)
- San Luis Obispo County
- Private Landowners

Data provided by these sources included well information such as location, well construction, owner, ground surface elevation and other related components, as well as groundwater elevation data including information such as date measured, depth to water, groundwater surface elevation, questionable measurement code, and comments. At the time that this analysis was performed, groundwater elevation data was available for the time period from 1949 to June 2018.[1] There are many wells with monitoring data from some time in the past, but no recent data, while a small number of wells have monitoring data recorded for periods of greater than 50 years. Figure 2.2-2 through Figure 2.2-5 show the locations of well with available monitoring data as well as the entity that maintains monitoring records at each well. The figures also show in a larger, darker symbol if the monitoring well has been measured in 2017 or 2018.

Figure 2.2-2 shows the locations of well data received from the DWR database. As an assessment of which wells have been monitored recently, the wells with monitoring data collected between January 2017 and June 2018 were identified. Roughly half of the wells from DWR's database contain monitoring data in 2017-18, with roughly half the wells having no monitoring data during this period. Wells in DWR's database are concentrated in the central portion of the basin, east of Bitter Creek and north of the

[1] The analysis shown in this section was performed in the summer of 2018 and does not reflect data that may have been collected after June 2018. In addition, the analysis reflects the available data as provided by each entity - an assessment has not been performed on the standards and protocols followed by each entity that compiles and maintains the available datasets.

Santa Barbara Canyon Fault (SBCF). Many wells in DWR's database have been typically measured bi-annually, with one measurement in the spring, and one measurement in the fall.

Figure 2.2-3 shows the locations of well data received from the USGS database. It should be noted that many of these wells are duplicative of wells contained in the DWR database. The majority of wells from the USGS database were not monitored in 2017-18. Wells that were monitored in 2017-18 are concentrated in the western portion of the basin, west of New Cuyama, with a small number of monitoring wells in the central portion of the basin and near Ventucopa. Many wells in the USGS database haves been typically measured bi-annually, with one measurement in the spring, and one measurement in the fall.

Figure 2.2-4 shows the locations of well data received from the Santa Barbara and San Luis Obispo Counties. The wells from both counties were monitored in 2017-18. Wells monitored by Santa Barbara County are concentrated in the western portion of the basin west of Bitter Creek. The two wells monitored by San Luis Obispo County are located in the central portion of the basin and also appeared in the USGS database. Data is collected in many of these wells on a bi-annual basis, with one measurement in the spring, and one measurement in the fall, with some measurements at some wells occurring on a quarterly basis.

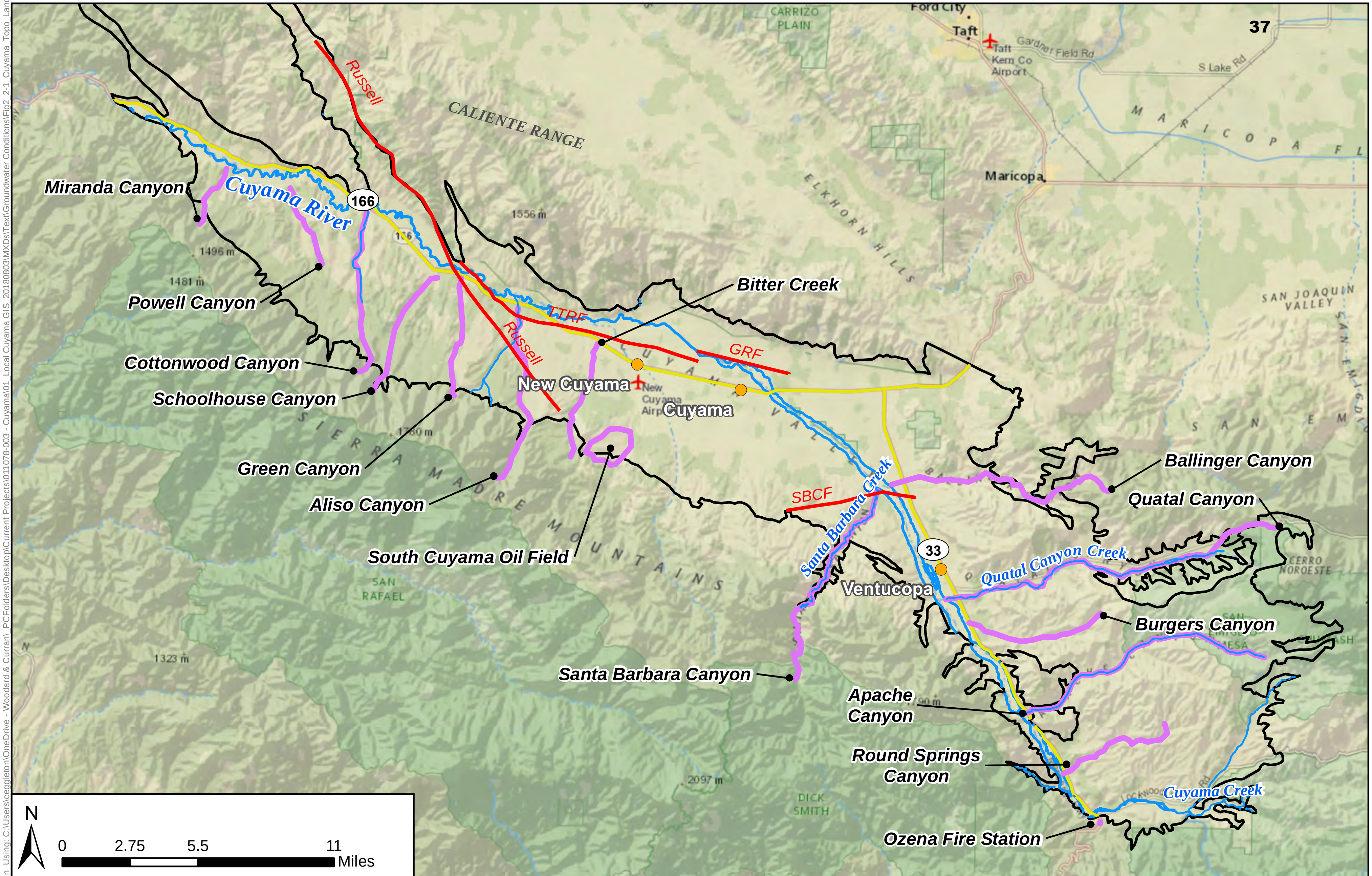

Figure 2.2-1 - Cuyama Basin Landmarks

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Cuyama River
- Streams
- Faults
- Highways
- Landmarks
- Towns

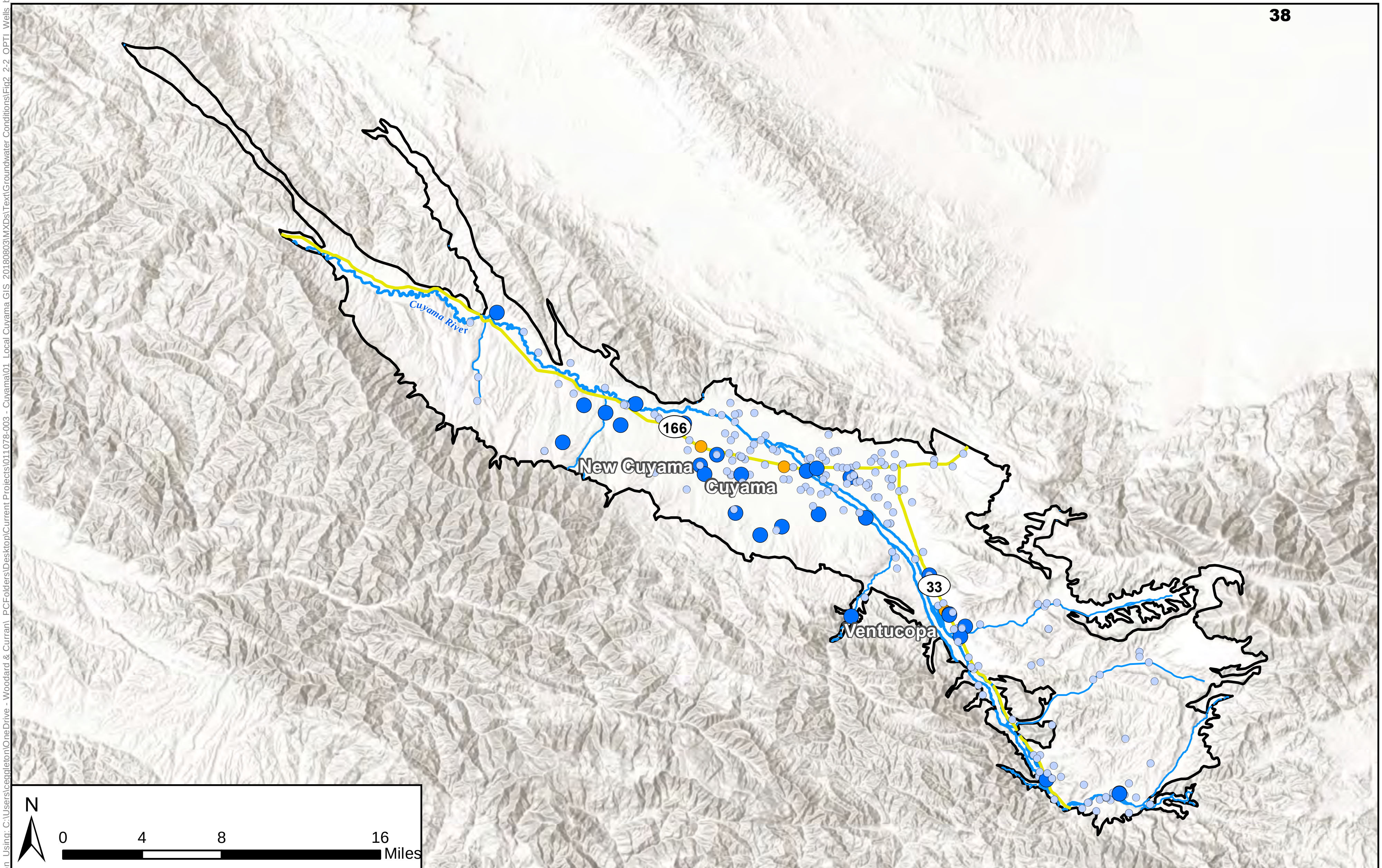

Figure 2.2-2: Cuyama GW Basin Wells with Monitoring Data Provided by DWR

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

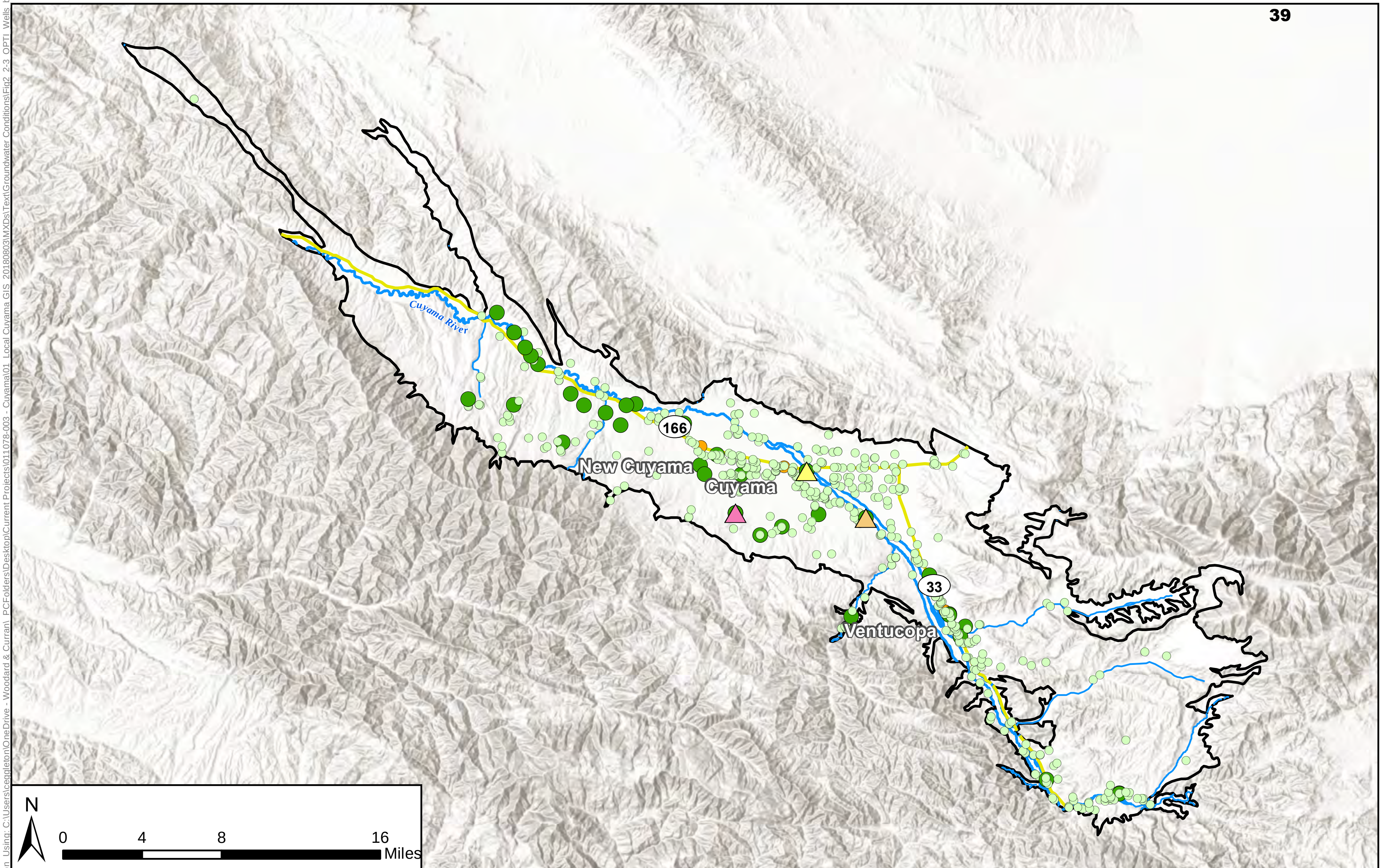

Figure 2.2-3: Cuyama GW Basin
Wells with Monitoring Data Provided by USGS

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- USGS Database Wells Last Measured in 2017-2018
- USGS Database Wells Last Measured 2016 or Earlier
- CVBR Multi-Completion Well
- CVFR Multi-Completion Well
- CVKR Multi-Completion Well

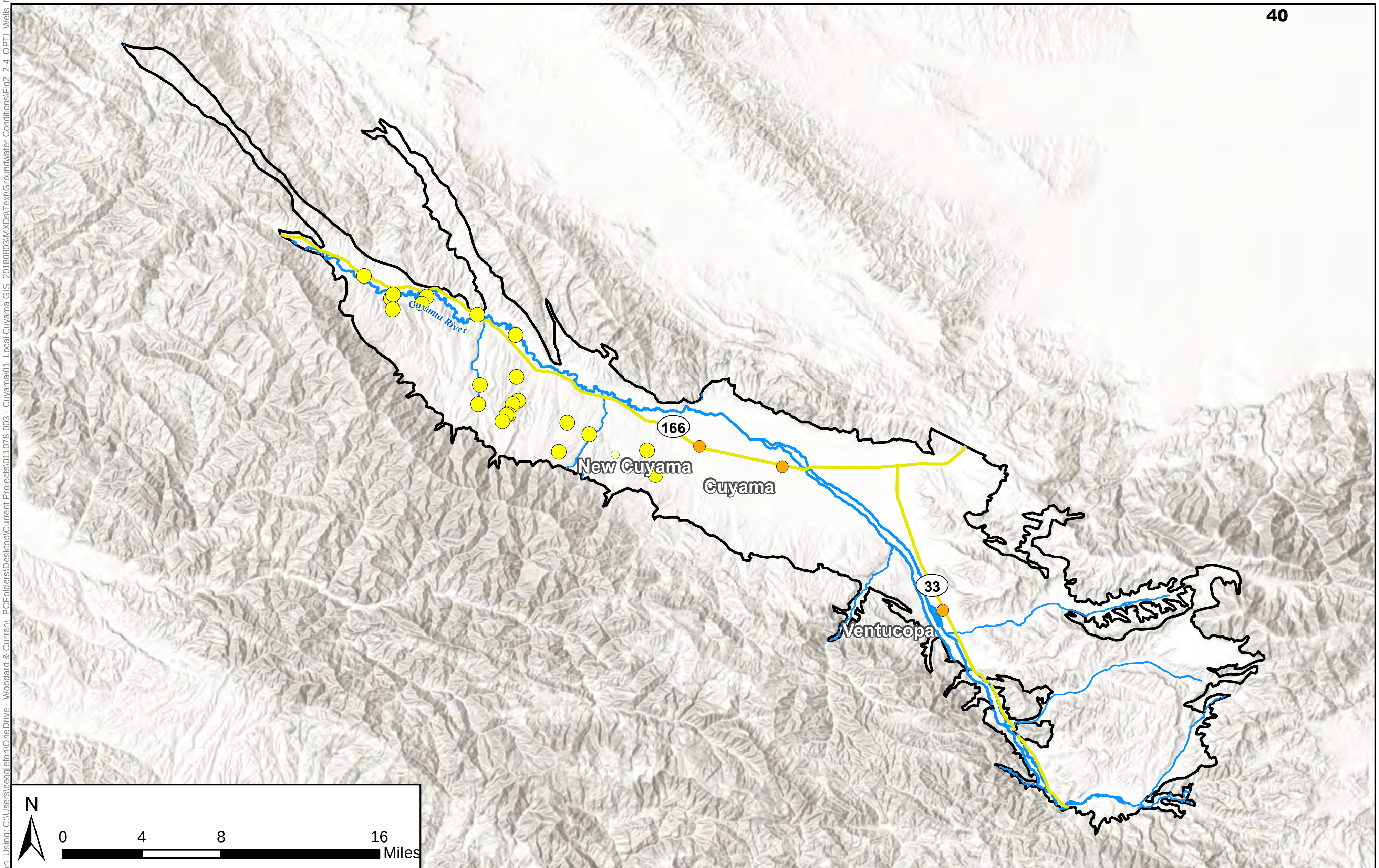

Figure 2.2-4: Cuyama GW Basin Wells with Monitoring Data Provided by Local Agencies

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- County Database Wells Last Measured in 2017-2018
- County Database Wells Last Measured 2016 or Earlier

Figure 2.2-5 shows the locations of well data received from private landowners. The majority of wells provided by private landowners are located in the central portion of the basin, between the Cuyama River and Highway 33, generally running along Highway 166. Additional wells provided by private landowners are located along the Cuyama River and Highway 166, near the Russell Ranch Oilfields. Associated data provided with private landowners varies by source. Some data and measurements were taken annually, while other well owners were taken biannually or quarterly.

Figure 2.2-6 shows the locations of collected data from all entities by their last measured date. Wells with monitoring data in 2017-2018 are shown in bright green triangles. There are recent measurements in many different parts of the Basin:

- Near the Cuyama river in the eastern uplands and near Ventucopa
- In the central portion of the basin, especially north of Highway 166 but with some wells located in the southern portion of the central basin
- In the western portion of the basin east of Aliso Canyon. An additional concentration of recent monitoring points is present along the Cuyama River near the Russell Ranch Oilfields.

Figure 2.2-7 shows a comparison of data provided by private landowners and data compiled from the DWR and the USGS databases in the central portion of the Basin. This figure was developed to provide information on the consistency between data from these differing sources. The figure shows the location of compared wells, and the measurements on those wells by source. The measurements of groundwater elevation among the measured wells indicate that the monitoring by the private landowners and agencies approximately match in tracking historical trends from the public databases.

Figure 2.2-8 shows a comparison of data collected from other private landowners, and data collected from SBCWA. This figure was developed to provide information on the consistency between data from these differing sources. The figure shows the location of compared wells, and the measurements on those wells by source. A long-term comparison is not possible due to the shorter measurement period of the Santa Barbara County wells, but the measurements of groundwater elevation among the measured wells indicate that the monitoring by private landowners in the western portion of the Basin and the county are similar in elevation, with the county's data showing slightly higher elevations.

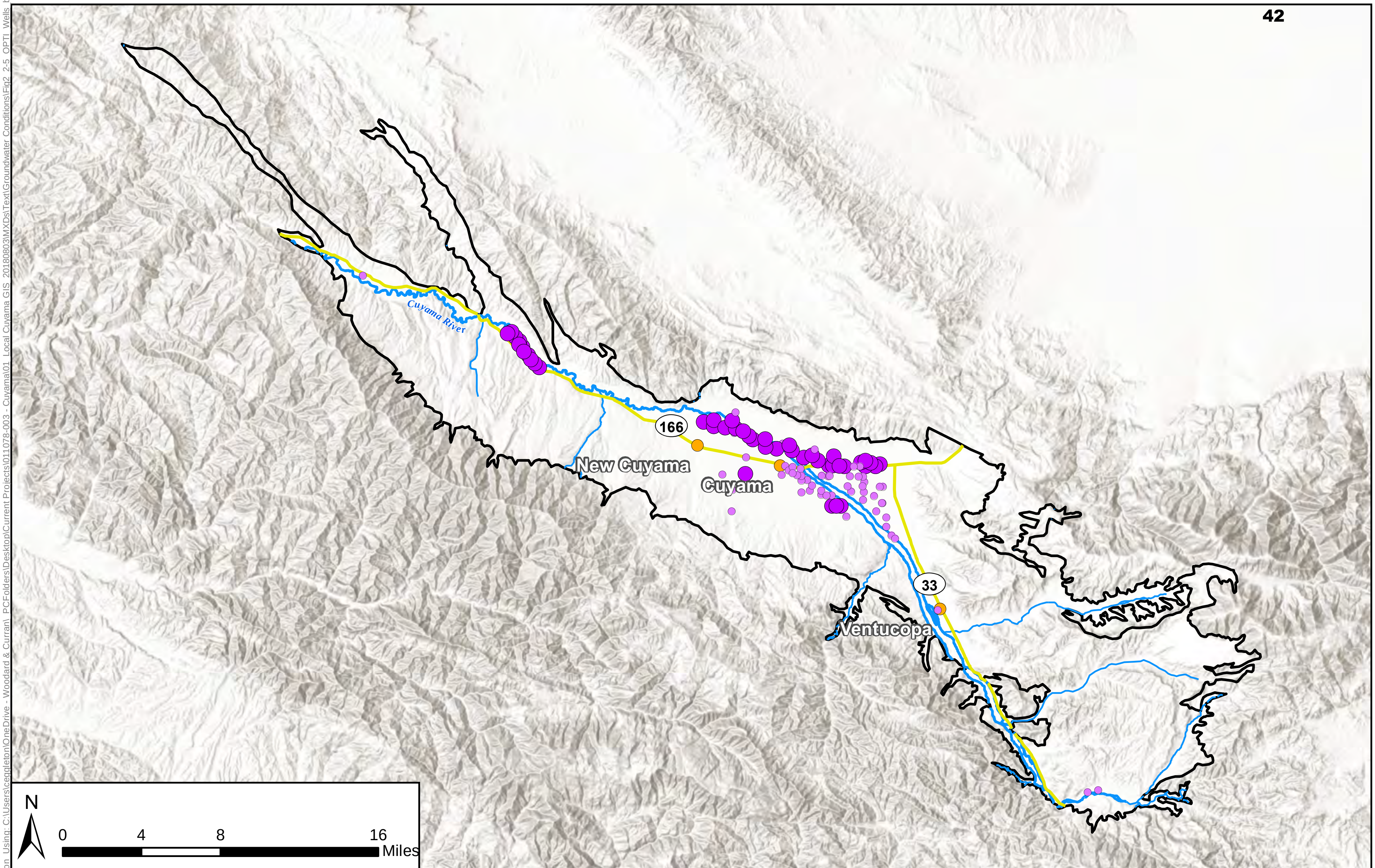

Figure 2.2-5: Cuyama GW Basin Wells with Monitoring Data Provided by Private Landowners

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Private Landowners Reported Wells Last Measured in 2017-2018
- Private Landowners Reported Wells Last Measured 2016 and Earlier

Figure Exported: 11/19/2018 By: ceggleton Using: C:\Users\ceggleton\OneDrive - Woodard & Curran_PCFolders\Desktop\Current Projects\011078-003 - Cuyama\01_Local Cuyama GIS_20180803\MXDs\Text\Groundwater Conditions\Fig2_2-5_OPTI_Wells_by_Agency

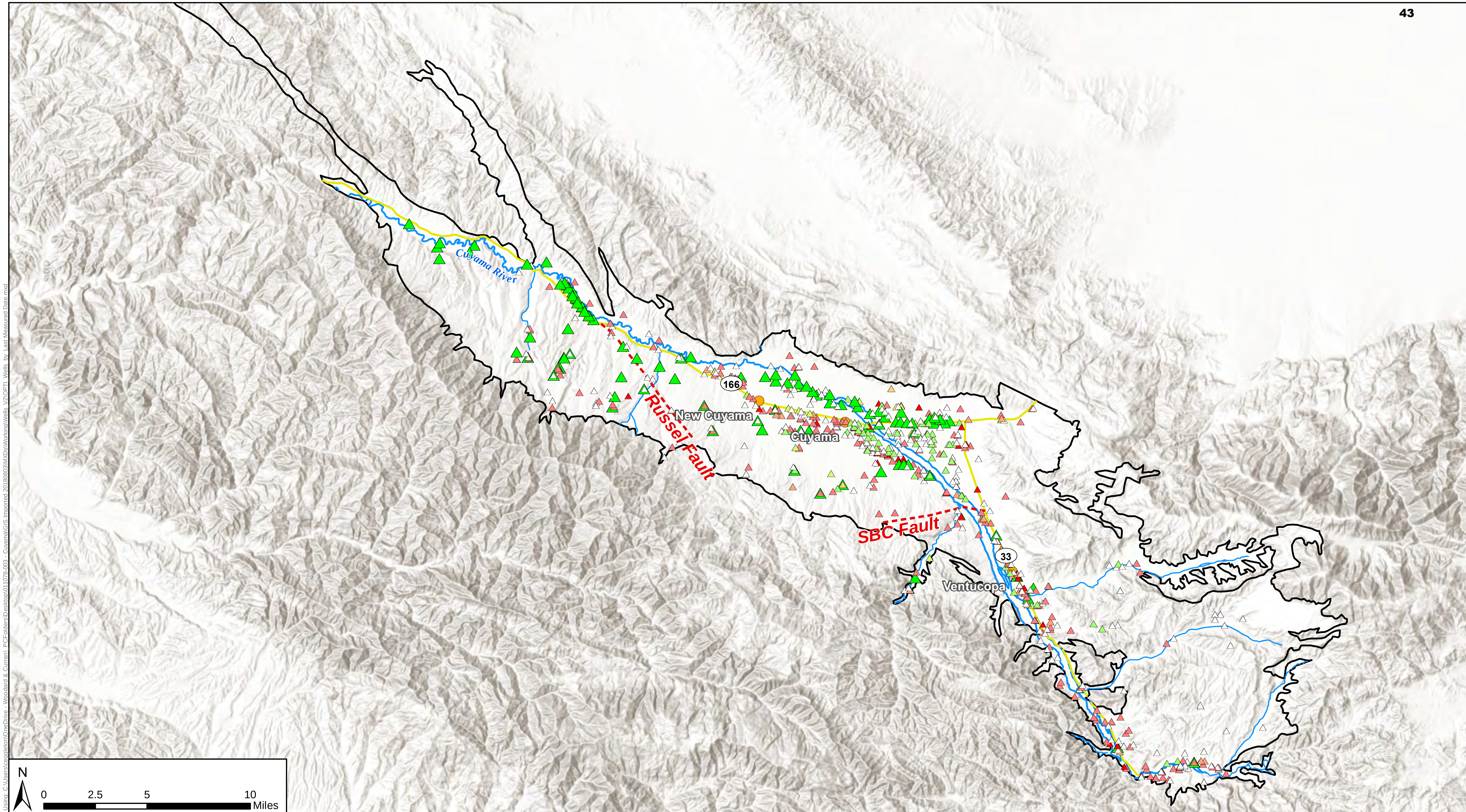

Figure 2.2-6: Cuyama GW Basin Wells by Last Measurement Date

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Fault

Most Recent Year with Measurements

- 2017 - 2018
- 2010 - 2016
- 2000 - 2009
- 1990 - 1999
- 1980 - 1989
- 1970 - 1979
- 1960 - 1969
- 1950 - 1959
- Pre-1950
- No Measurment Data

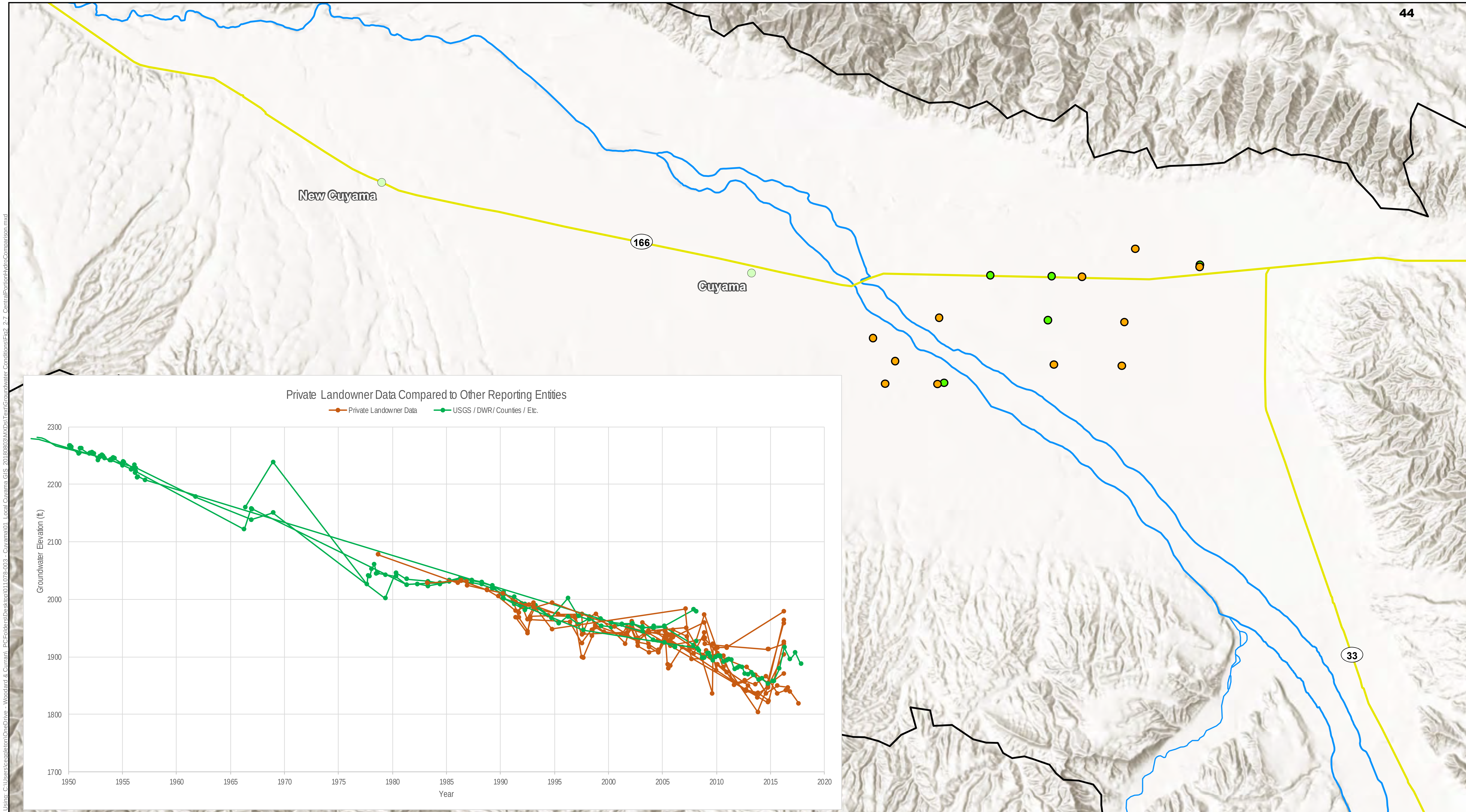

Figure 2.2-7: Central Cuyama GW Basin Wells and Hydrographs by Data Source

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- USGS, DWR, County, Etc., Wells
- Private Landowners

N

0 0.5 1 2 Miles

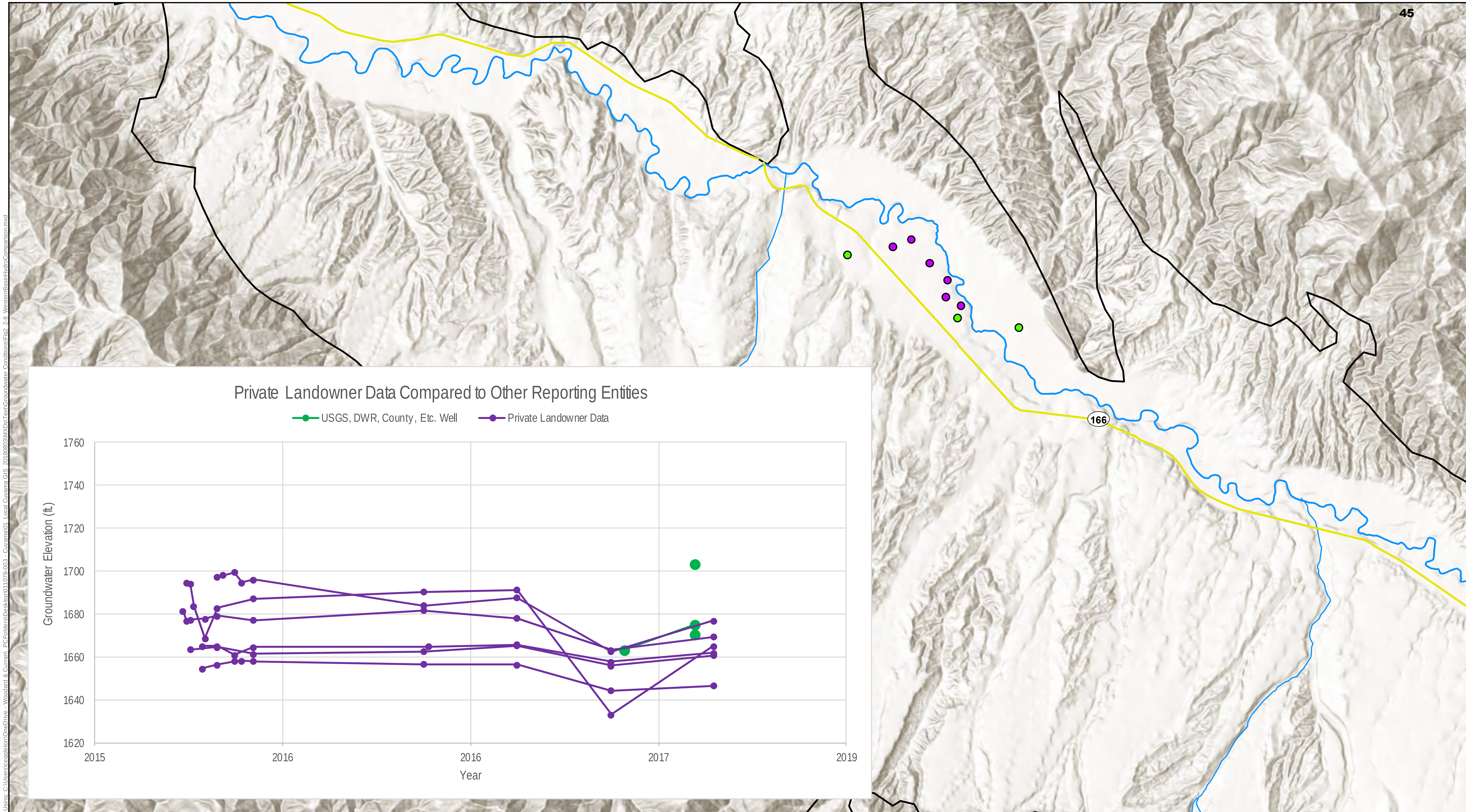

Figure 2.2-8: Western Cuyama GW Basin Wells and Hydrographs by Data Source

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Highways
- Cuyama River
- Streams
- USGS, DWR, County, Etc. Wells
- Private Landowner Wells

N

0 0.5 1 2 Miles

2.2.3 Groundwater Trends

This section describes groundwater trends in the basin generally from the oldest available studies and data to the most recent. Groundwater conditions vary widely across the Basin. In the following sections, some historical context is provided by summarizing information contained in relevant reference studies about conditions during the 1947-1966 period, followed by discussion of how groundwater conditions have changed based on available historical groundwater level monitoring data.

Historical Context - 1947 to 1966 Groundwater Trends

This section discusses public reports about conditions from 1947-1966. Information about groundwater conditions in the basin in this period are limited to reports that discuss the central portion of the basin and scattered groundwater elevation measurements in monitoring wells.

The report *Water Levels in Observation Wells in Santa Barbara County, California* (USGS 1956) discussed groundwater elevation monitoring in the Cuyama Valley Groundwater Basin. The report states that prior to 1946, there was no electric power in the valley, which restricted intensive irrigation, and that groundwater levels in the central portion of the basin remained fairly static until 1946. The report states that:

"Declines in groundwater began after 1946" (USGS 1956). Groundwater declined "as much as 8.8 feet from the spring of 1955 to 1956; the average decline was 5.2 feet. The decline of water levels at the lower and upper ends of the valley during this period was not so great as in the middle portion and averaged 1.7 and 2.2 feet respectively. Since 1946, water levels in observation wells have decline on the average about 27 feet."

The report *Hydrologic Models and Analysis of Water Availability in the Cuyama Valley, California* (USGS 2015) presents two maps generated by the Cuyama Valley Hydrologic Model (CUVHM) simulated data. Figure 2.2-9 shows the estimated drawdown in the central portion of the basin from 1947 to 1966. Figure 2.2-9 shows that estimated drawdown ranged from zero at the edges of the central basin to over 160 feet in the southeastern portion of the central basin. Figure 2.2-10 shows the estimated contours of groundwater elevation for September 1966. These contours show a low area in the central portion of the central basin, and a steep groundwater gradient in the southeast near Ventucopa and in the highlands. A gentle groundwater gradient occurs in the southwestern portion of the central basin, generally matching topography.

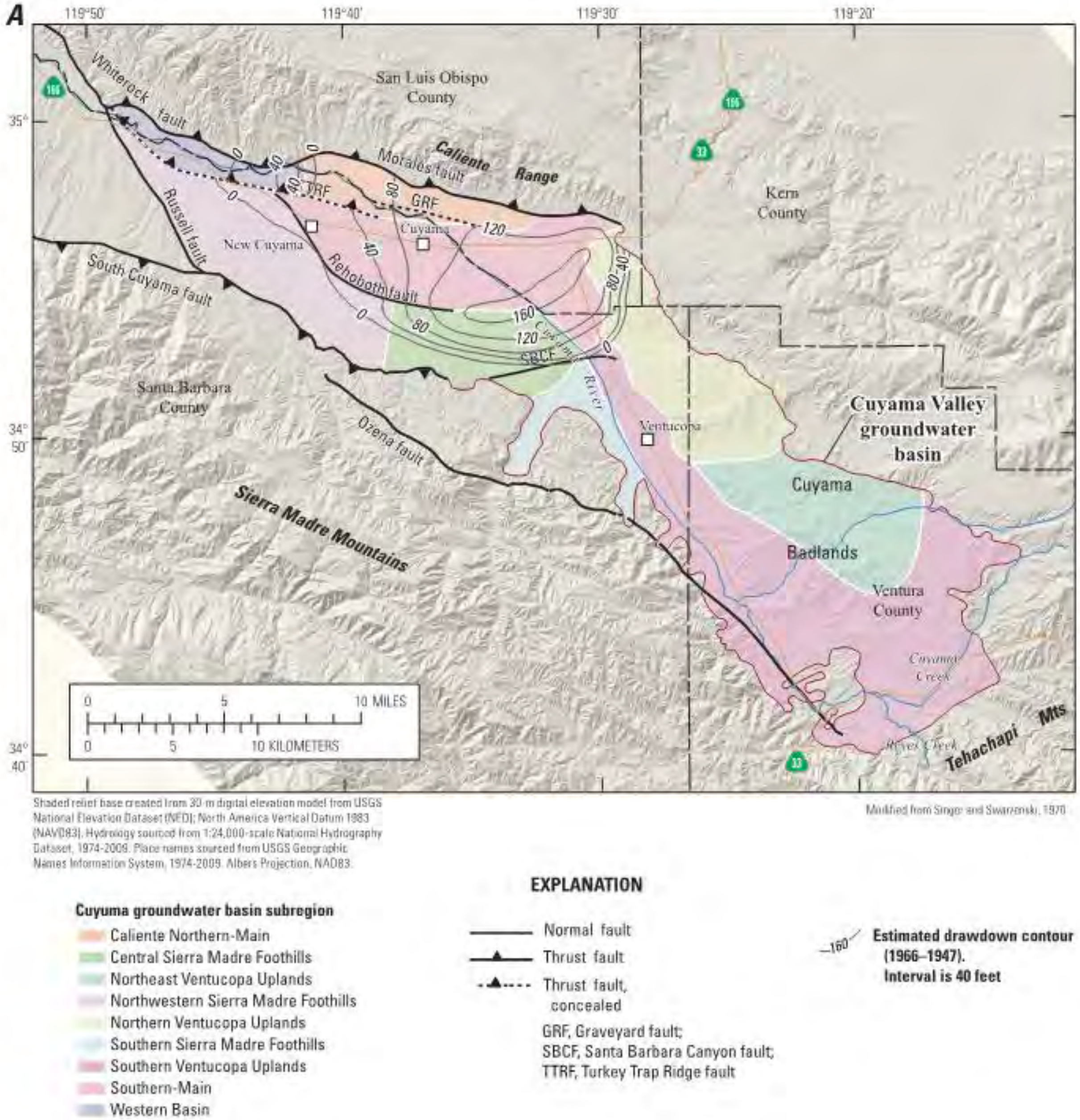

Figure 2.2-9: USGS 2015 – Water Level Drawdown Contours 1966 - 1947

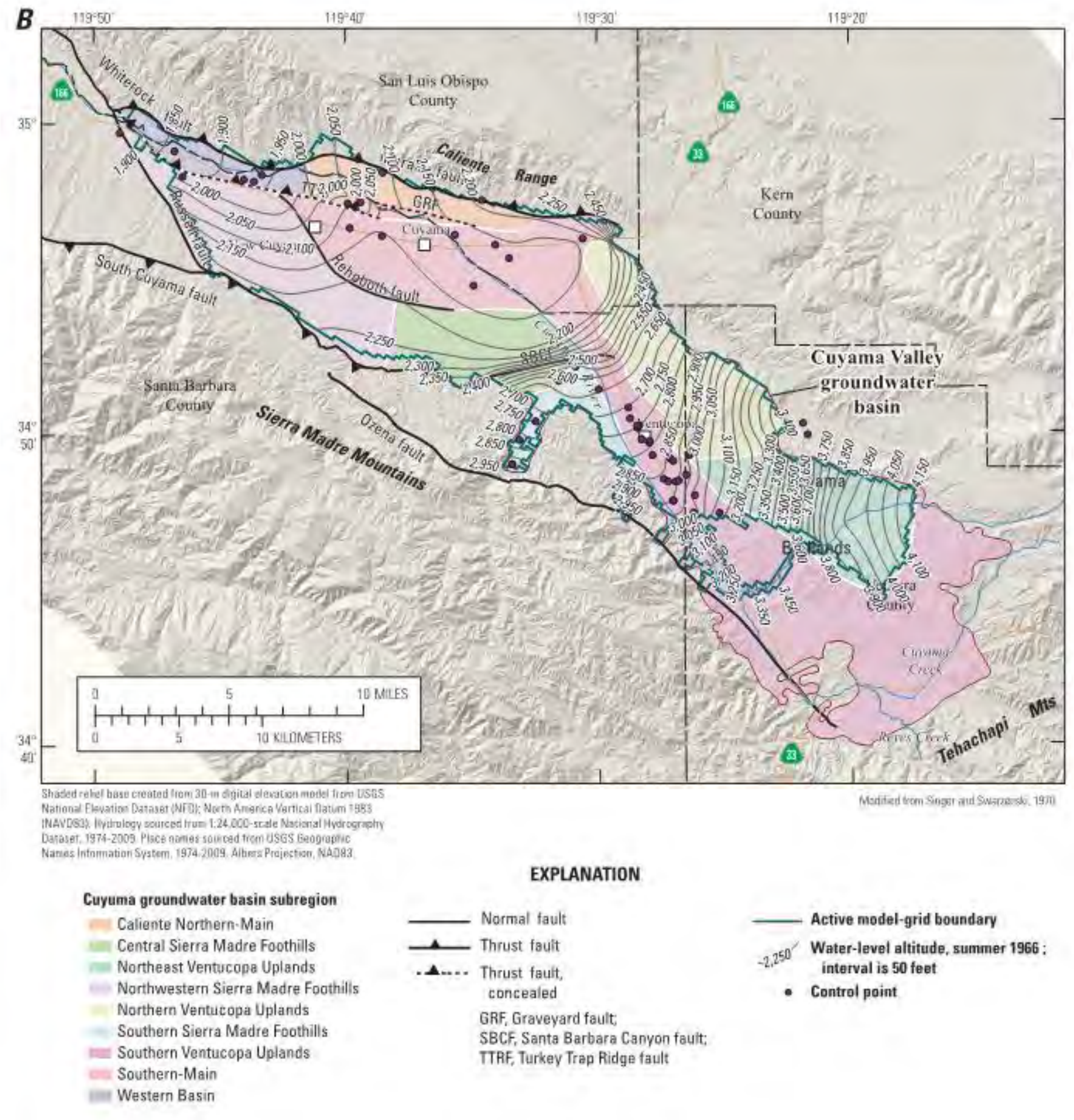

Figure 2.2-10: USGS 2015 – Water Level Contours 1966

Groundwater Trends from Available Monitoring Data

To understand how groundwater conditions have changed in the Basin in recent decades, groundwater hydrographs, vertical gradients and contours have been developed and analyzed. These are discussed in the sections below.

Groundwater Hydrographs

Groundwater hydrographs were developed to provide indicators of groundwater trends throughout the Basin. Measurements from each well with historical monitoring data were compiled into one hydrograph for each well. These hydrographs are presented in Appendix X.

In many cases, changes in historical groundwater conditions at particular wells have been influences by climactic patterns in the Basin. Figures showing historical precipitation and flows in the Basin will be included in the Water Budgets section. The historical precipitation is highly variable, with several relatively wet years as well as some multi-year droughts.

Groundwater conditions generally vary in different parts of the Basin. Figure 2.2-11 shows hydrographs in select wells in different portions of the basin. These wells were selected because of their representative nature of Basin conditions in their areas. In general:

- In the area southeast of Round Springs Canyon, near Ozena Fire Station (e.g. well 89) - Groundwater levels have stayed relatively stable with a small decline in the 2012-2015 drought and quick recovery.
- In the vicinity of Ventucopa (e.g. well 62) - Groundwater levels followed climactic patterns and have generally been declining since 1995.
- Just south of the SBCF (e.g. well 101) – Groundwater levels have been fairly stable and are closer to the surface than levels in Ventucopa.
- North of the SBCF and east of Bitter Creek in the central portion of the basin (e.g. wells 55 and 615) - Groundwater levels have been declining consistently since 1950.
- In the area west of Bitter Creek (e.g. wells 119 and 830) – groundwater levels are near ground surface in the vicinity of the Cuyama riveR; and deeper below ground in the area to the south, uphill from the river; and have been generally stable since 1966.

Figure 2.2-12 shows selected hydrographs for wells in the area near Ventucopa. In the area southeast of Round Springs Canyon, near Ozena Fire Station, the hydrograph for Well 89 is representative of monitoring wells in this area, and groundwater levels have stayed relatively stable with a small decline in the 2012-2015 drought and quick recovery. Near Ventucopa, hydrographs for Wells 85 and 62 show the same patterns and conditions from 1995 to the present and show that groundwater levels in this area respond to climactic patterns, but also have been in decline since 1995 and are currently at historic low elevations. The hydrograph for Well 85 shows that prior to 1985 groundwater levels responded to drought conditions but recovered during wetter years. Well 40 is located just south of the SBCF and its hydrograph indicates that groundwater levels in this location have remained stable from 1951 to 2013, when monitoring ceased. Wells 91 and 620 are north of the SBCF and their hydrographs show more recent conditions, where depth to water has declined consistently and is below 580 below ground surface (bgs).

Figures 2.2-13 and 2.2-14 show hydrographs of discontinued and currently monitored wells in the central portion of the basin, north of the SBCF and east of Bitter Creek. The hydrographs of discontinued wells in this area are shown in Figure 2.2-13. These hydrographs show consistent declines of groundwater levels and little to no responses to either droughts or wetter periods. The hydrograph for Well 35 shows a consistent decline from 1955 to 2008, from 30 feet bgs to approximately 150 feet bgs. Well 472 shows a decline from approximately 5 feet bgs in 1949 to approximately 85 feet bgs in 1978.

Figure 2.2-14 shows hydrographs of currently monitored wells in the central portion of the basin. In general, these hydrographs show that groundwater levels are decreasing, with the lowest levels in the southeast portion of the area just northwest of the SBCF, as shown in the Well 610 hydrograph, where groundwater levels were below 600 feet bgs. Levels remain lowered along the Cuyama River, as shown in the hydrographs for Wells 604 and 618, which are currently approximately 500 feet bgs. Groundwater levels are higher to the west (Well 72) and towards the southern end of the area (Well 96). However, almost all monitoring wells in this area show consistent declines in elevation.

Figure 2.2-15 shows hydrographs of monitoring wells in the western portion of the basin, west of Bitter Creek. Hydrographs in this area show that generally, groundwater levels are near the surface near the Cuyama River, and further from the surface to the south, which is uphill from the river. The hydrograph for Well 119 shows a few measurements from 1953-1969, as well as three recent measurements, all measurements on this well show a depth to water of 60 feet bgs. The hydrograph for Well 846 shows that in 2015 depth to water was slightly above 40 feet and is slightly below 40 feet in 2018. The hydrograph for Well 840 shows a groundwater level near ground surface in 2015, and a decline to 40 feet bgs in 2018. Hydrographs for wells uphill from the river (Wells 573 and 121) show that groundwater is roughly 70 feet bgs in this area. Hydrographs for wells 571 and 108, at the edge of the basin only have recent measurements, show groundwater levels that range from 120 to 140 feet bgs.

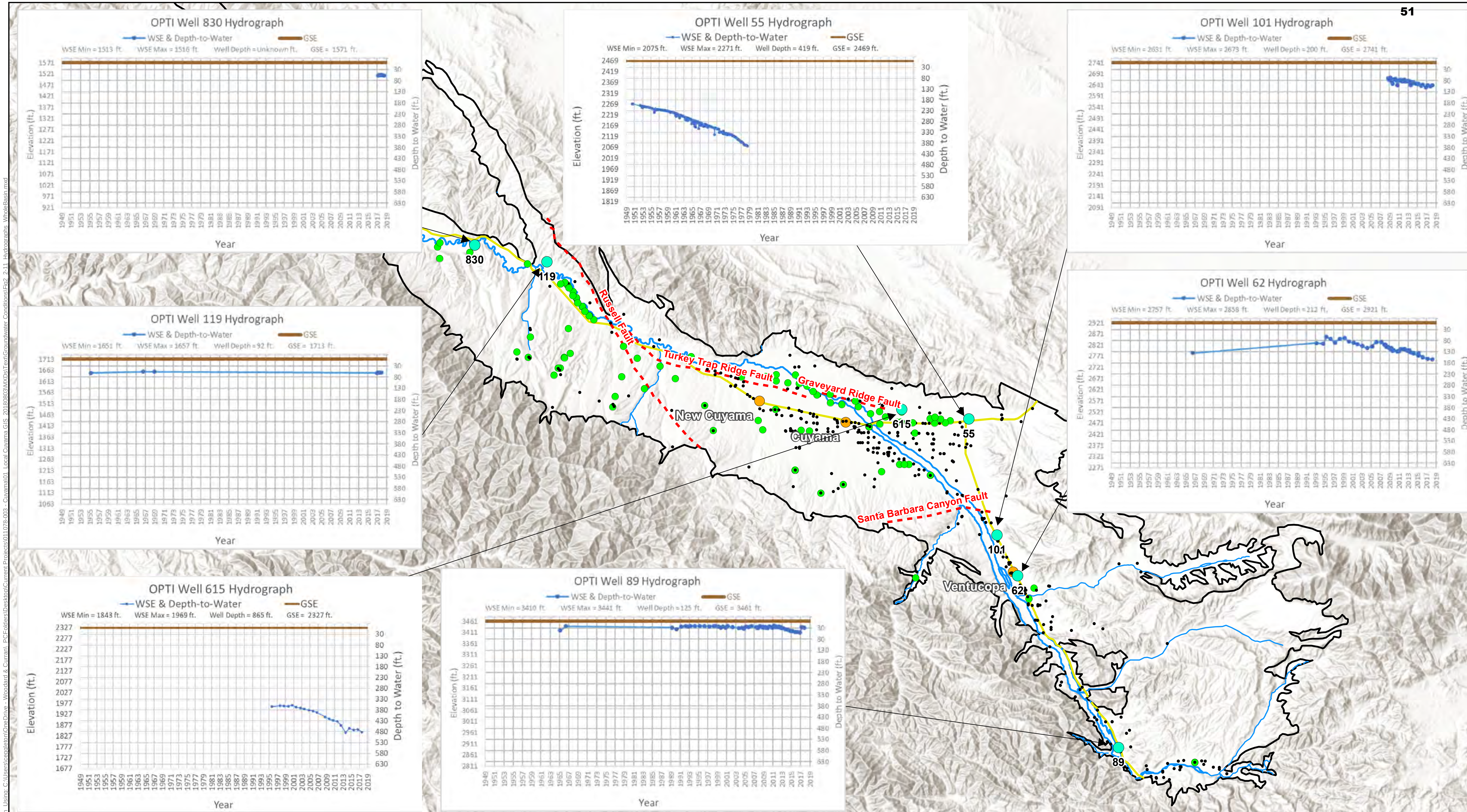

Figure 2.2-11: Cuyama GW Basin Hydrographs

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Faults
- Hydrographed Wells
- Currently Monitored Wells
- Not Currently Monitored

N

0 2.5 5 10 Miles

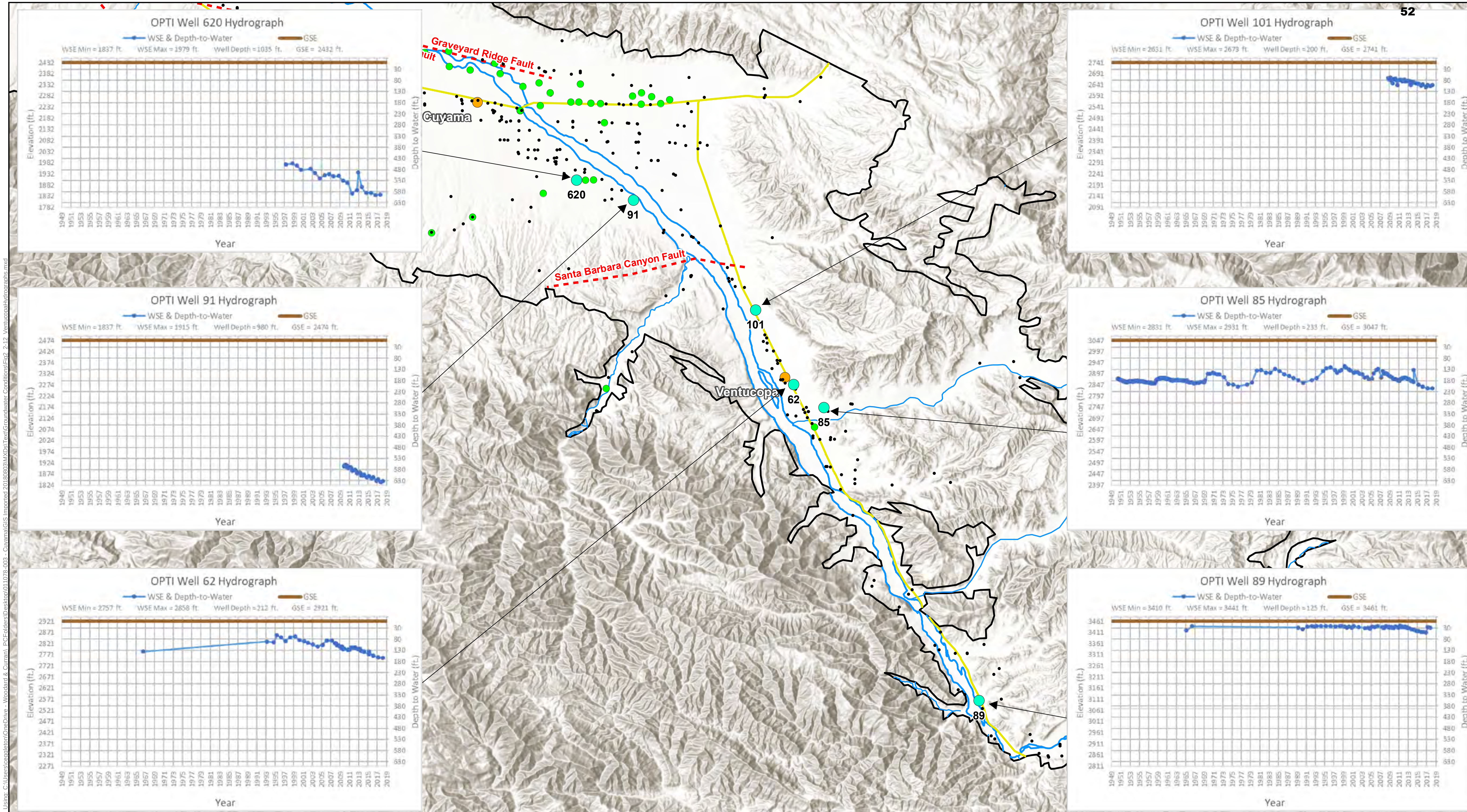

Figure 2.2-12: Cuyama GW Basin Hydrographs for the Ventucopa Area of the Basin

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Faults
- Hydrographed Wells
- Currently Monitored Wells
- Not Currently Monitored

N

0 1.25 2.5 5 Miles

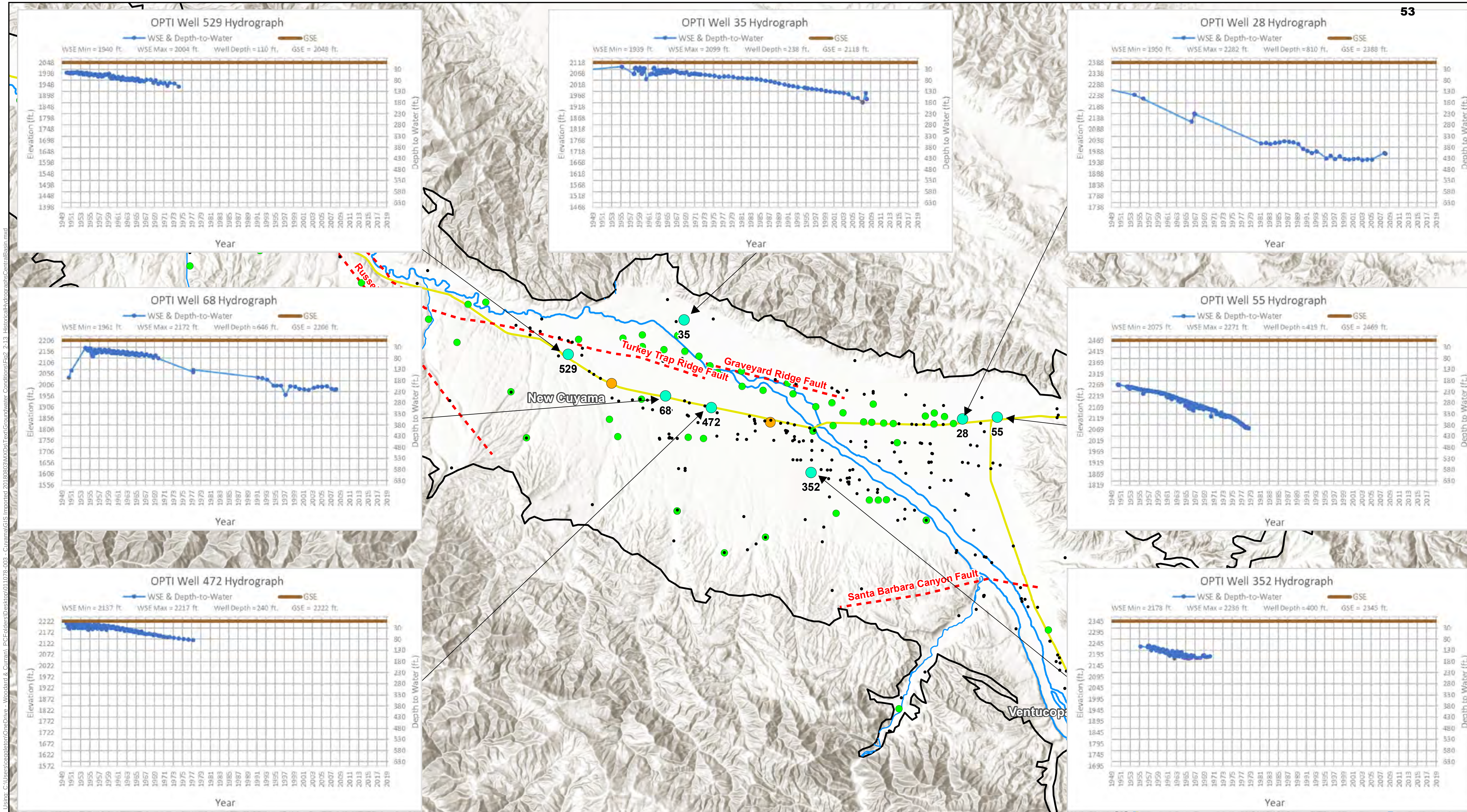

Figure 2.2-13: Cuyama GW Basin Hsitorical Hydrographs in the Central Basin

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Faults
- Hydrographed Wells
- Currently Monitored Wells
- Not Currently Monitored

N

0 1.25 2.5 5 Miles

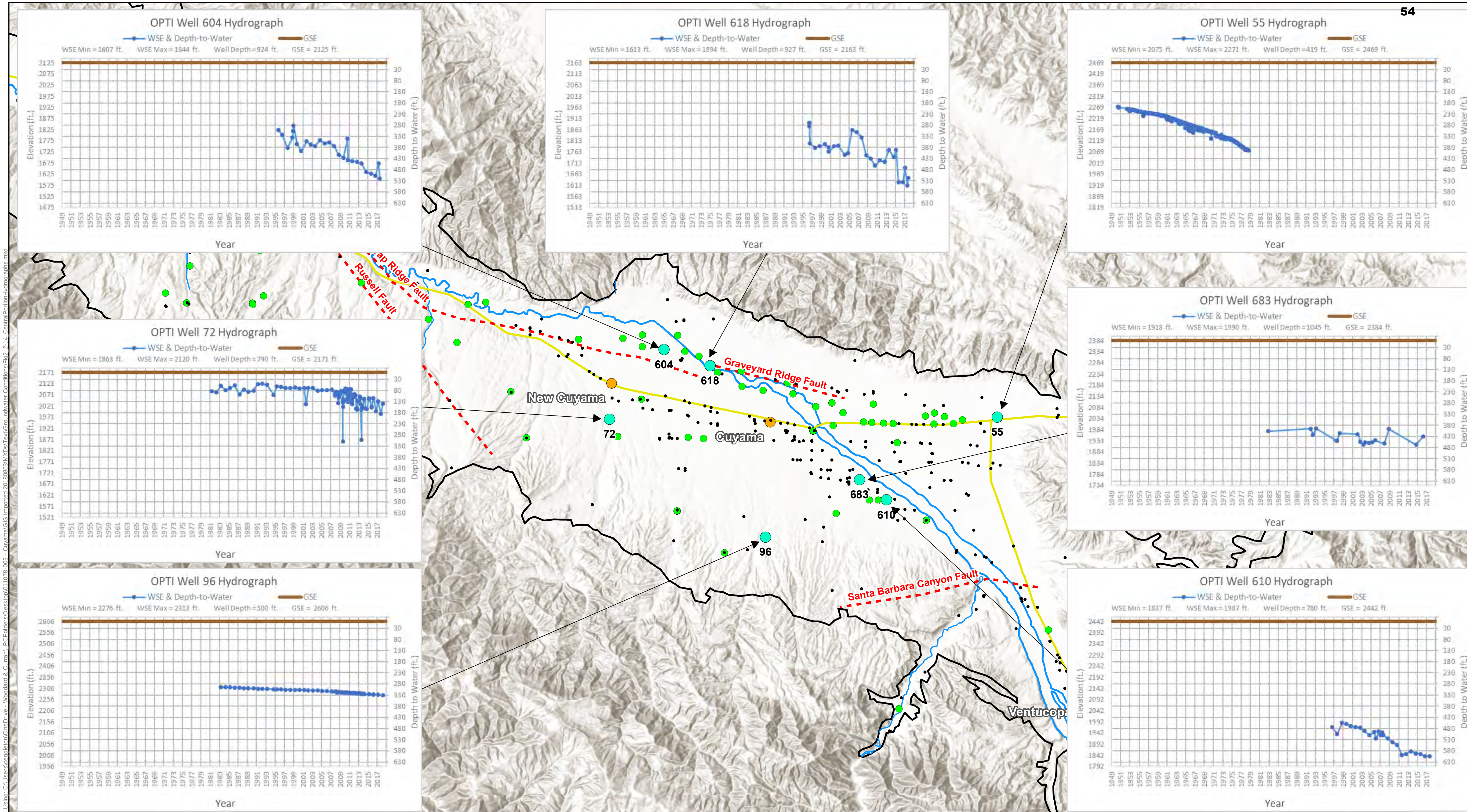

Figure 2.2-14: Cuyama GW Basin Hydrographs for the Central Portion of the Basin

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Faults
- Hydrographed Wells
- Currently Monitored Wells
- Not Currently Monitored

N

0 1.25 2.5 5 Miles

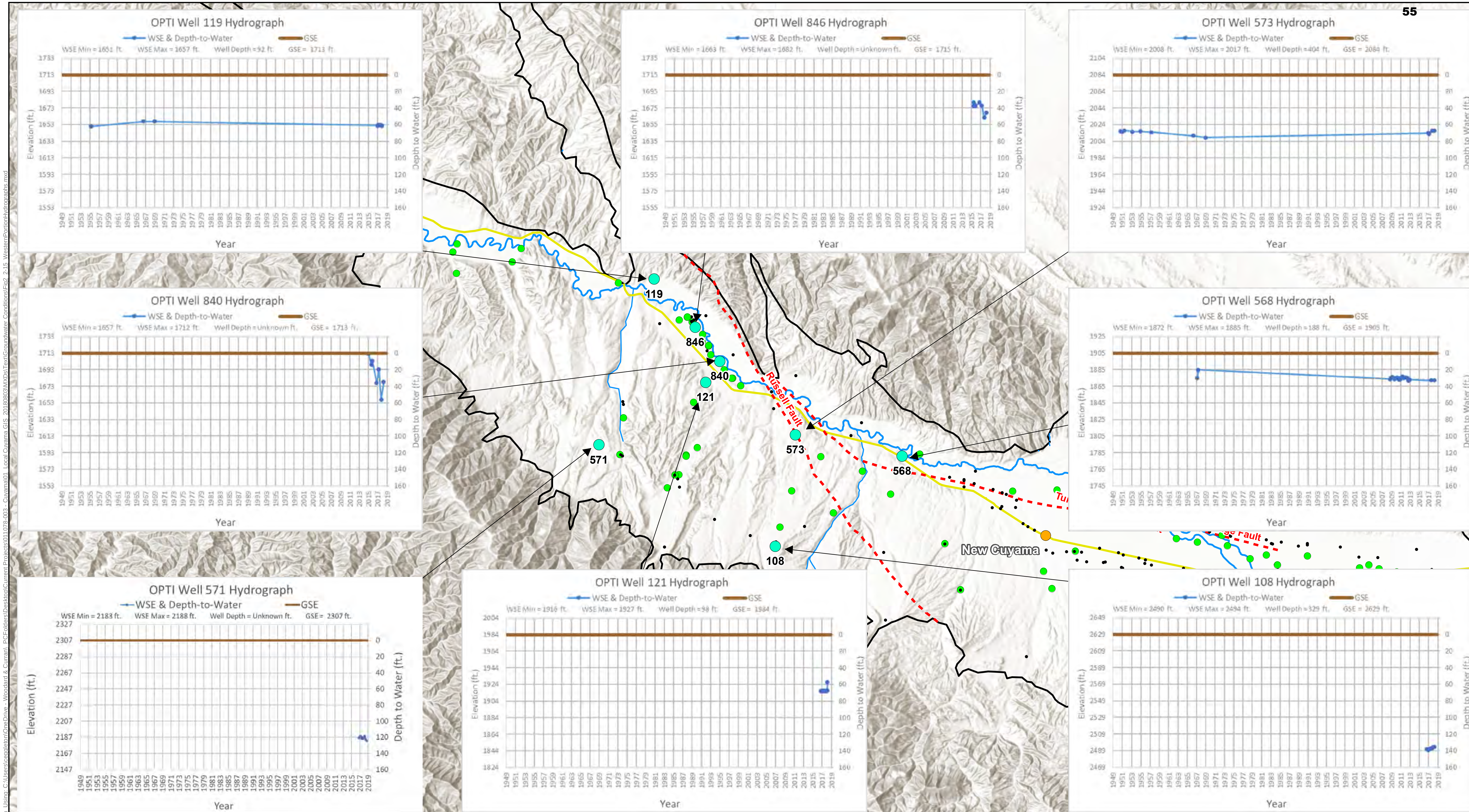

Figure 2.2-15: Cuyama GW Basin Hydrographs for the Westside Area of the Basin

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Faults
- Hydrographed Wells
- Currently Monitored Wells
- Not Currently Monitored

N

0 1.25 2.5 5 Miles

Vertical Gradients

A vertical gradient describes the movement of groundwater perpendicular to the ground surface. The vertical gradient is typically measured by comparing the elevations of groundwater in a well with multiple completions that are of different depths. If groundwater elevations in the shallower completions are higher than in the deeper completions, the gradient is identified as a downward gradient. A downward gradient is one where groundwater is moving down into the ground. If groundwater elevations in the shallower completions are lower than in the deeper completions, the gradient is identified as an upward gradient. An upward gradient is one where groundwater is upwelling towards the surface. If groundwater elevations are similar throughout the completions, there is no vertical gradient to identify. Knowledge about vertical gradients is required by Regulation 354.16(a) and is useful for understanding how groundwater moves in the Basin.

There are three multiple completion wells in the Basin. A multiple completion well includes perforations at multiple perforation intervals and therefore provides information at multiple depths at the well location. The locations of the multiple completion wells are shown in Figure 2.2-3. The three multiple completion wells are located in the central portion of the basin, north of the SBCF and east of Bitter Creek.

Figure 2.2-16 shows the combined hydrograph for the multiple completion well CVFR, which was installed by the USGS[2]. CVFR is comprised of four completions, each at different depths:

- CVFR-1 is the deepest completion with a screened interval from 960 to 980 feet bgs
- CVFR-2 is the second deepest completion with a screened interval from 810 to 830 feet bgs
- CVFR-3 is the third deepest completion with a screened interval from 680 to 700 feet bgs
- CVFR-4 is the shallowest completion with a screened interval from 590 to 610 feet bgs

The hydrograph of the four completions shows that they are very close to the same elevation at each completion, and therefore it is unlikely that there is any vertical gradient at this location.

Figure 2.2-17 shows the combined hydrograph for the multiple completion well CVBR, which was installed by the USGS. CVBR is comprised of four completions, each at different depths:

- CVBR-1 is the deepest completion with a screened interval from 830 to 850 feet bgs
- CVBR-2 is the second deepest completion with a screened interval from 730 to 750 feet bgs
- CVBR-3 is the third deepest completion with a screened interval from 540 to 560 feet bgs
- CVBR-4 is the shallowest completion with a screened interval from 360 to 380 feet bgs

The hydrograph of the four completions shows that at the deeper completions, groundwater elevations are slightly lower than the shallower completions in the winter and spring, and deeper completions are generally lower than the shallower completion in the summer and fall. This indicates that during the irrigation season, the deeper portions of the aquifer are likely to be where pumping occurs. This pumping removes water from the deeper portion of the aquifer, creating a vertical gradient during the summer and fall. By the spring, enough water has moved down or horizontally to replace removed water, and the vertical gradient is significantly smaller at this location in the spring measurements.

Figure 2.2-18 shows the combined hydrograph for the multiple completion well CVKR, which was installed by the USGS. CVKR is comprised of four completions, each at different depths:

- CVKR-1 is the deepest completion with a screened interval from 960 to 980 feet bgs
- CVKR-2 is the second deepest completion with a screened interval from 760 to 780 feet bgs

---

[2] All three multiple completion wells were installed by the USGS as part of the Cuyama Valley Water Availability Study in cooperation with SBCWA

- CVKR-3 is the third deepest completion with a screened interval from 600 to 620 feet bgs
- CVKR-4 is the shallowest completion with a screened interval from 440 to 460 feet bgs

The hydrograph of the four completions shows that at the deeper completions are slightly lower than the shallower completions in the spring at each completion, and deeper completions are generally lower in the summer and fall. This indicates that during the irrigation season, the deeper portions of the aquifer are likely to be where pumping occurs. This pumping removes water from the deeper portion of the aquifer, creating a vertical gradient during the summer and fall. By the winter and spring, enough water has moved down to replace removed water, and the vertical gradient is very small at this location in the spring measurements.

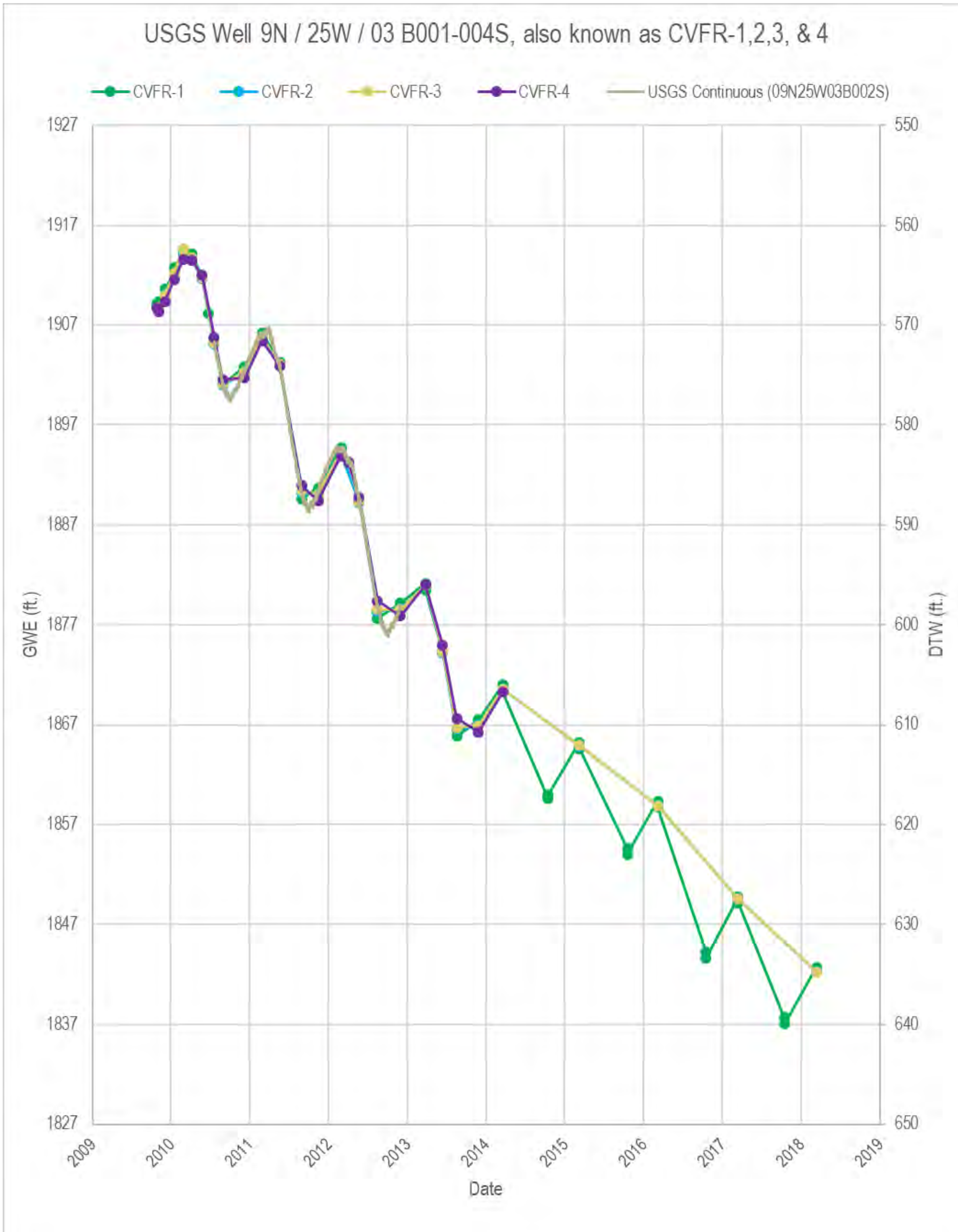

Figure 2.2-16: Hydrographs of CVFR1-4

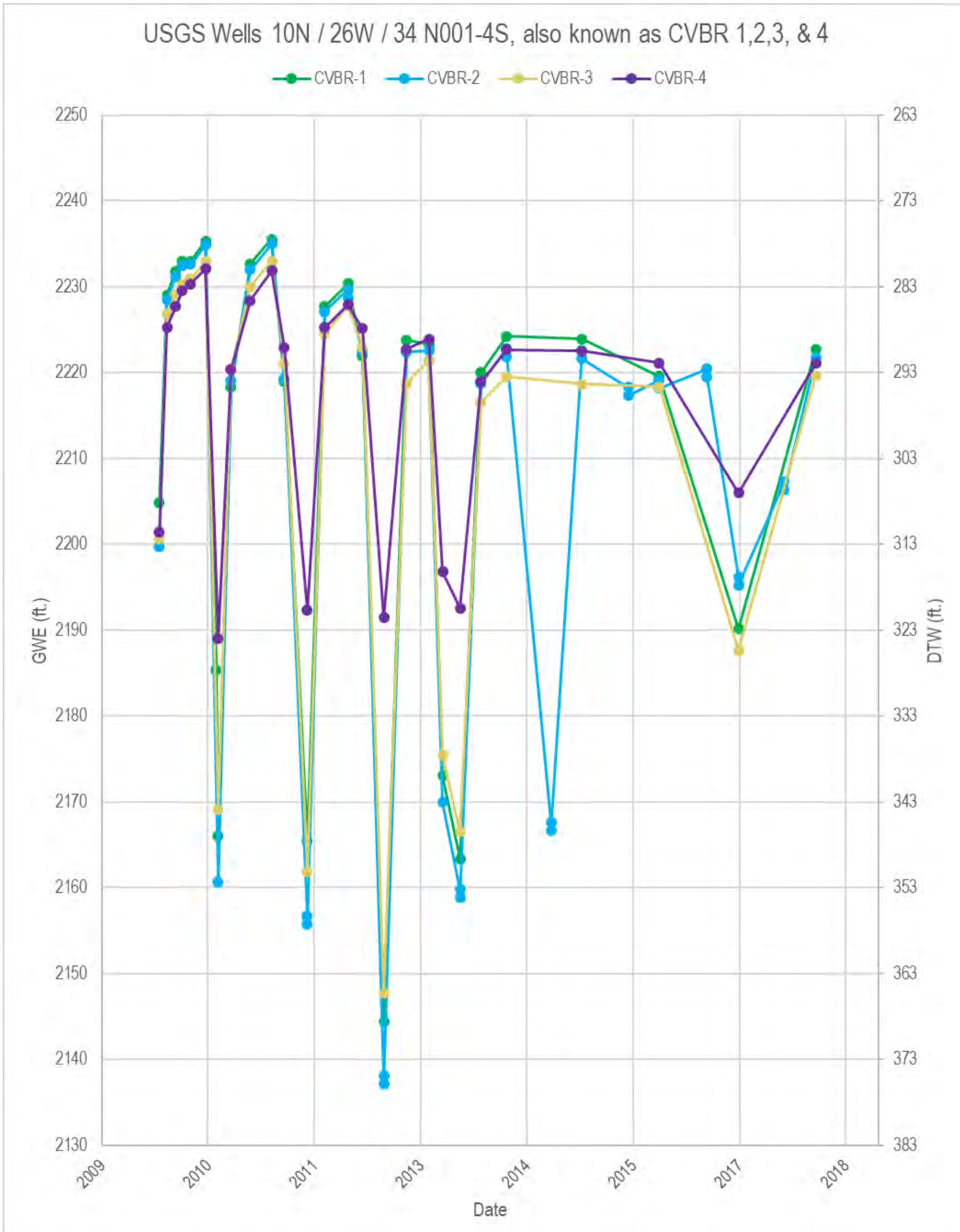

Figure 2.2-17: Hydrographs of CVBR1-4

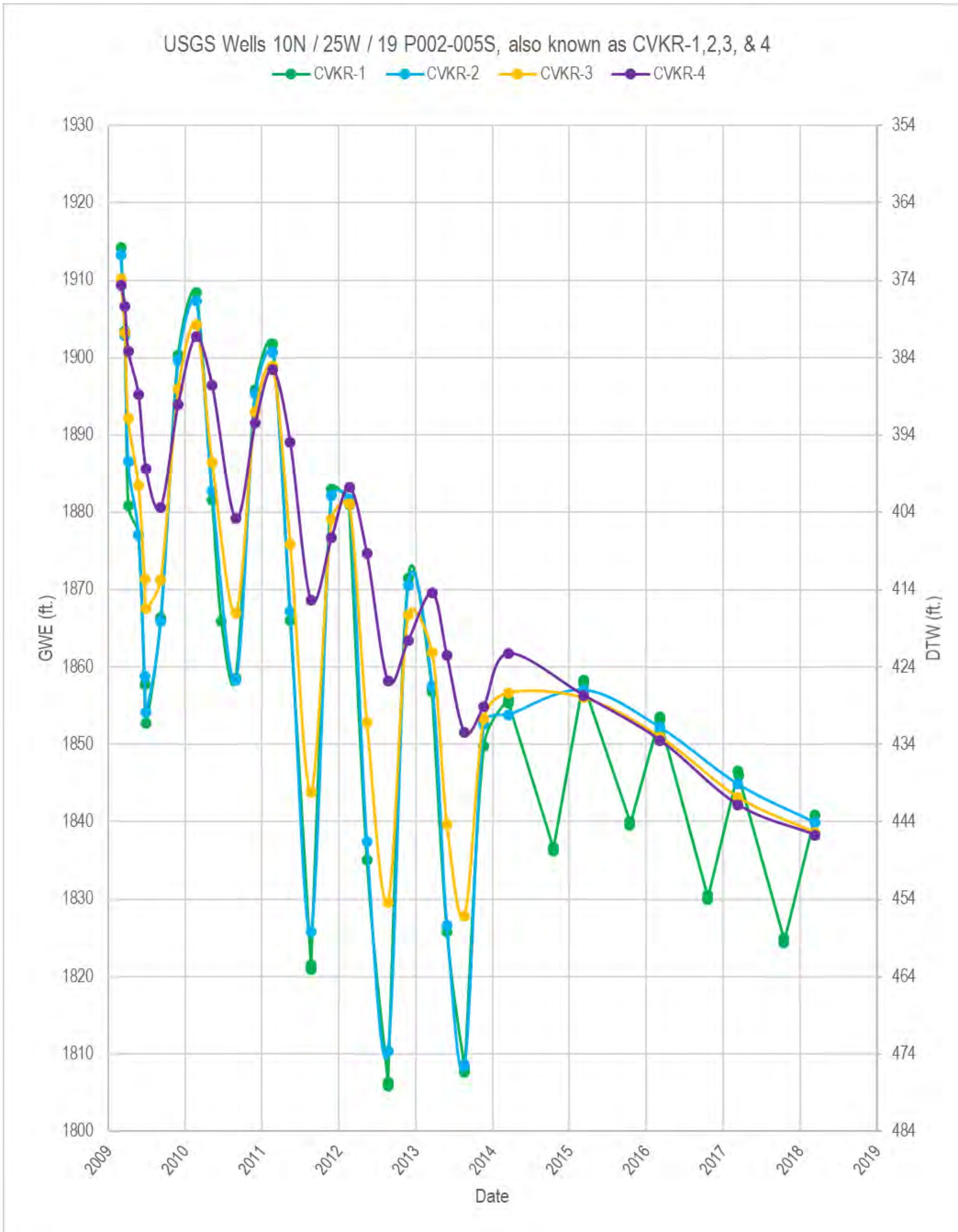

Figure 2.2-18: Hydrographs of CVKR1-4

Groundwater Contours

Groundwater contour maps were prepared to improve understanding of recent groundwater trends in the basin. Data collected in Section 2.2.2 was used to develop the contour maps. A contour map shows changes in groundwater elevations by interpolating groundwater elevations between monitoring sites. The elevations are shown on the map with the use of a contour line, which indicates that at all locations that line is drawn, it represents groundwater being at the elevation indicated. There are two versions of contour maps used in this section, one which shows the elevation of groundwater above msl, which is useful because it can be used to identify the horizontal gradients of groundwater, and one which shows contours of depth to water, the distance from the ground surface to groundwater, which is useful because it can identify areas of shallow or deep groundwater.

Groundwater contour maps were prepared for both groundwater elevation and depth to water for the following periods and are described below: Spring 2018, Fall 2017, Spring 2017, Spring 2015, and Fall 2014. These years were selected for contours to provide analysis of current conditions, and to identify conditions near January 1, 2015, the date whenthe Sustainable Groundwater Management Act (SGMA) came into effect.

Each contour map follows the same general format. Each contour map is contoured at a 50 foot contour interval, with contour elevations indicated in white numeric labels, and measurements at individual monitoring points indicated in black numeric labels. Areas where the contours are dashed and not colored in are inferred contours that extend elevations beyond data availability and are included for reference only. The groundwater contours prepared for this section were based on several assumptions in order to accumulate enough data points to generate useful contour maps:

- Measurements from wells of different depths are representative of conditions at that location and there are no vertical gradients. Due to the limited spatial amount of monitoring points, data from wells of a wide variety of depths were used to generate the contours.
- Measurements from dates that may be as far apart temporally as three months are representative of conditions during the spring or fall season, and conditions have not changed substantially from the time of the earliest measurement used to the latest. Due to the limited temporal amount of measurements in the basin, data from a wide variety of measurement dates were used to generate the contours.

These assumptions make the contours useful at the planning level to understand groundwater levels across the basin, and to identify general horizontal gradients and regional groundwater level trends. The contour maps are not indicative of exact values across the basin because groundwater contour maps approximate conditions between measurement points, and do not account for topography. Therefore, a well on a ridge may be farther from groundwater than one in a canyon, and the contour map will not reflect that level of detail.

Expansion and improvement of the monitoring network in order to generate more accurate understandings of groundwater trends in the basin is discussed in Section Z: Monitoring Networks

Figure 2.2-19 shows groundwater elevation contours for spring of 2018, along with arrows showing the direction of groundwater flow. In the southeastern portion of the basin near Ventucopa, groundwater has a horizontal gradient to the northwest. The gradient increases in the vicinity of the SBCF and flows to an area of lowered groundwater elevation southeast of the town of Cuyama. From the town of New Cuyama to the west, groundwater has a horizontal gradient that generally flows to the northeast, from areas with higher elevation topography towards areas with lower elevation topography where the Cuyama River is located.

Figure 2.2-20 shows depth to groundwater contours for spring of 2018.. Just south the SBCF, groundwater is near 100 feet bgs. North of the SBCF, depth to groundwater declines rapidly and is over 600 feet bgs. Depth to groundwater reduces to the west towards New Cuyama, where groundwater is around 150 feet bgs. West of Bitter Creek, groundwater is shallower than 100 feet bgs in most locations, and is shallower than 50 feet bgs in the far west and along the Cuyama River.

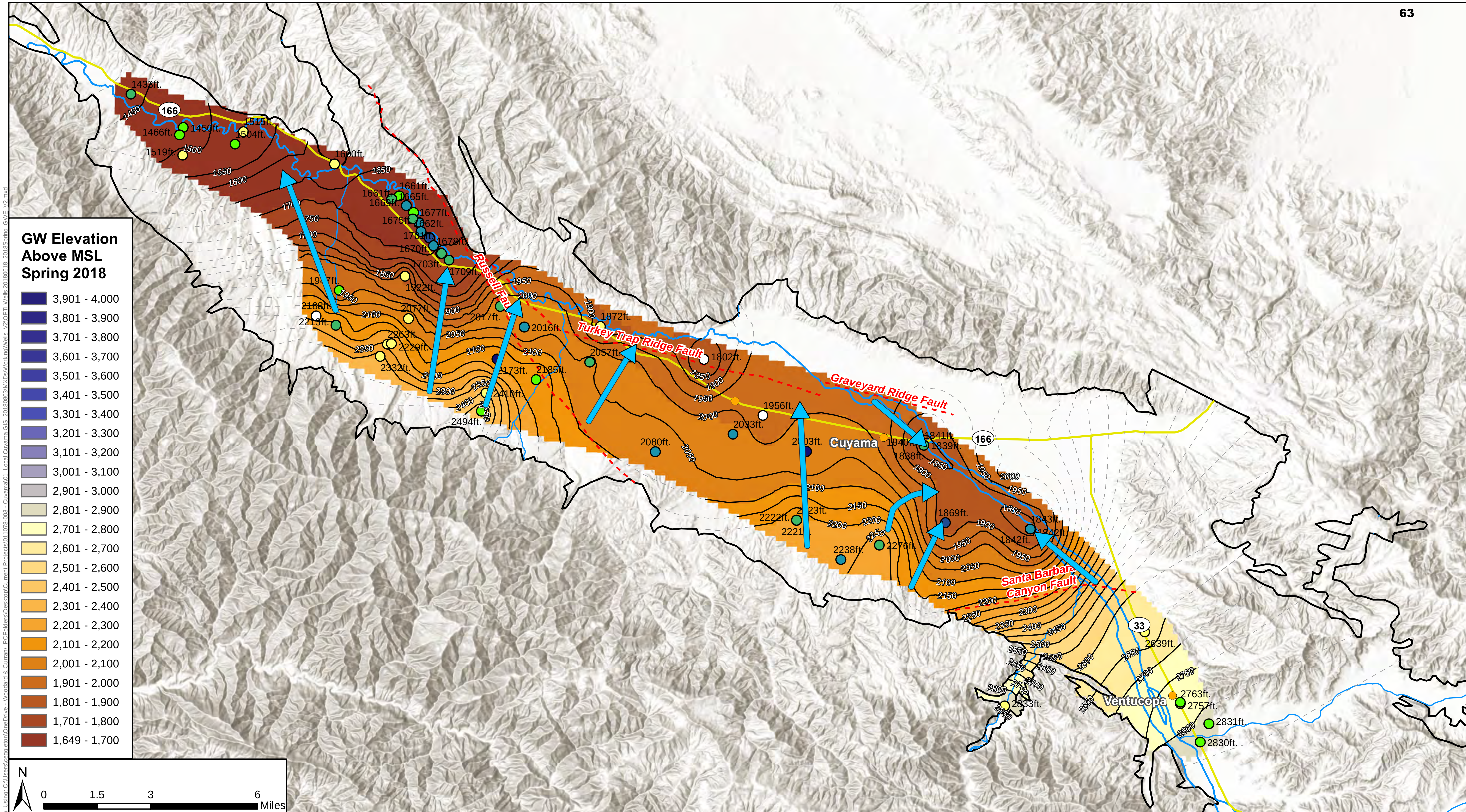

Figure 2.2-19: Cuyama GW Basin Wells by Groundwater Surface Elevation

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Cuyama River
- Faults
- Groundwater Elevation Above MSL
- Inferred Groundwater Elevation Above MSL
- Groundwater Flow Direction

Well Depth Below GSE

- Unknown
- 0 - 200 ft
- 200 - 400 ft
- 400 - 600 ft
- 600 - 800 ft
- 800 - 1,000 ft
- 1,000 - 1,200 ft

Contours were interpolated using data measured from 2/1/2018 - 4/30/2018 due to limited data availability.

Contours Interval: 50 ft.

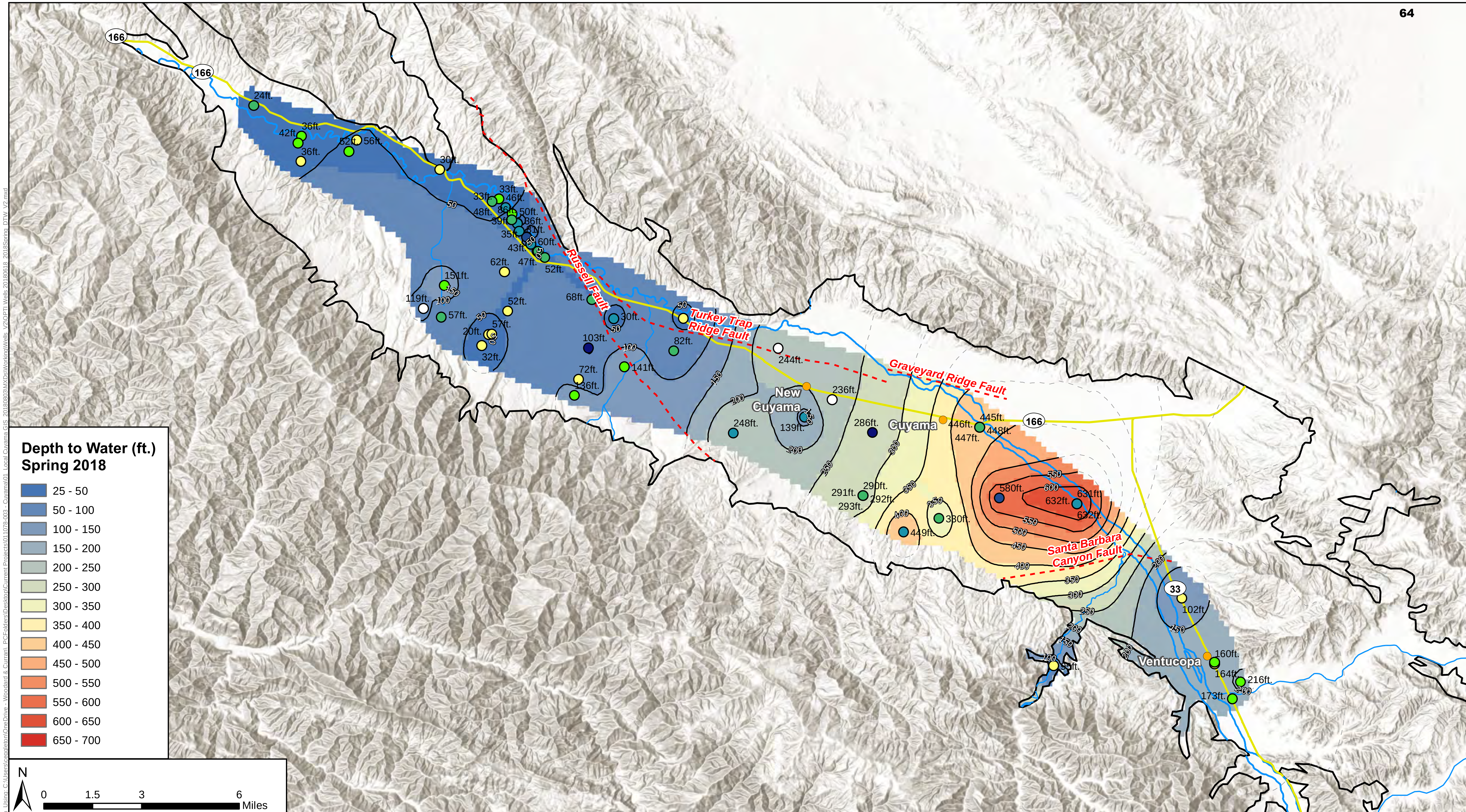

Figure 2.2-20: Cuyama GW Basin Wells by Depth to Water

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

- Cuyama Basin
- Cuyama River
- Faults
- Groundwater Depth-to-Water Contours below Groundsurface
- Inferred Groundwater Depth-to-Water Contours below Groundsurface

Well Depth Below GSE

- Unknown
- 0 - 200 ft
- 200 - 400 ft
- 400 - 600 ft
- 600 - 800 ft
- 800 - 1,000 ft
- 1,000 - 1,200 ft

Contours were interpolated using data measured from 2/1/2018 - 4/30/2018 due to limitated data availability.

Contours Interval: 50 ft.

Contour maps for spring 2017, fall 2017, spring 2015, and fall 2014 are included in Appendix Y. These dates were selected to show the changes over the most recent period of 3 years for which data was available in the Spring (from 2015 to 2018) and from the Fall (from 2014 to 2017). Each contour map is described in this section.

Figure Y-1 shows groundwater elevation contours for fall of 2017. Because more data was available in this time frame, the contour map has increased detail in some areas. In the southeastern portion of the basin near the Ozena fire station, groundwater gradients appear to indicate flows that follow the Cuyama River. The contour map shows a steep gradient across the SBCF and flows to an area of lowered groundwater elevation northeast of the town of Cuyama. From the town of New Cuyama to the west, groundwater has a horizontal gradient that generally flows to the northeast, from areas with higher elevation topography towards areas with lower elevation topography where the Cuyama River is located.

Figure Y-2 shows depth to water contours for fall of 2017. Because more data was available in this time frame, the contour map has increased detail in some areas. In the southeastern portion of the basin near the Ozena fire station, depth to water is under 50 feet bgs. There is a steep gradient near the SBCF, and groundwater is below 600 feet bgs immediately northwest of the SBCF. The central portion of the basin generally has a depth to water between 400 and 500 feet bgs, with depth to groundwater decreasing to the west of New Cuyama. West of Bitter Creek, groundwater is generally shallower than 100 feet below bgs, and is shallower than 50 feet bgs along the Cuyama River in most cases.

Figure Y-3 shows groundwater elevation contours for spring of 2017. Because more data was available in this time frame, the contour map has increased detail in some areas. In the southeastern portion of the basin near the Ozena fire station, groundwater gradients appear to indicate flows that follow the Cuyama River. The contour map shows a steep gradient across the SBCF and flows to an area of lowered groundwater elevation northeast of the town of Cuyama. From the town of New Cuyama to the west, groundwater has a horizontal gradient that generally flows to the northeast, from areas with higher elevation topography towards areas with lower elevation topography where the Cuyama River is located.

Figure Y-4 shows depth to water contours for spring of 2017. In the southeastern portion of the basin near the Ozena fire station, depth to water is under 50 feet bgs. Depth to groundwater near Ventucopa is between 150 and 200 feet bgs. There is a steep gradient near the SBCF, and groundwater is below 600 feet bgs immediately northwest of the SBCF. The central portion of the basin generally has a depth to water between 350 and 500 feet bgs, withdepth to groundwdater decreasing to the west of New Cuyama. West of Bitter Creek, groundwater is generally shallower than 100 feet below bgs, and is shallower than 50 feet bgs along the Cuyama River in most cases.

Figure Y-5 shows groundwater elevation contours for spring of 2015. In the southeastern portion of the basin near the Ozena fire station, groundwater gradients appear to indicate flows that follow the Cuyama River. The contour map shows a steep gradient across the SBCF and flows to an area of lowered groundwater elevation northeast of the town of Cuyama. From the town of New Cuyama to the west, the limited number of data points restrict strong interpretation of the gradient, which is to the northwest.

Figure Y-6 shows depth to water contours for spring of 2015. In the southeastern portion of the basin near the Ozena fire station, depth to water is under 50 feet bgs. Depth to groundwater near Ventucopa is between 150 and 200 feet bgs. There is a steep gradient near the SBCF, and groundwater is below 600 feet bgs immediately northwest of the SBCF. The central portion of the basin generally has a depth to water between 350 and 450 feet bgs, with groundwater levels rising to the west of New Cuyama. These depths are in general less severe than those shown for the spring of 2017, reflecting deepening depth to groundwater conditions in the central portion of the Basin. Interpretation from New Cuyama to monitoring points in the northwest is hampered by a limited set of data points.

Figure Y-7 shows groundwater elevation contours for fall of 2014. In the southeastern portion of the basin near the Ozena fire station, groundwater gradients appear to indicate flows that follow the Cuyama River. The contour map shows a steep gradient across the SBCF and flows to an area of lowered groundwater elevation northeast of the town of Cuyama.

Figure Y-8 shows depth to water contours for fall of 2014. In the southeastern portion of the basin near the Ozena fire station, depth to water is under 50 feet bgs. There is a steep gradient near the SBCF, and groundwater is below 600 feet bgs immediately northwest of the SBCF. The central portion of the basin generally has a depth to water between 350 and 500 feet bgs, with groundwater levels rising to the west of New Cuyama. These depths are in general less severe than those shown for the fall of 2017, reflecting depth to groundwater conditions in the central portion of the Basin.. Interpretation from New Cuyama to monitoring points in the northwest is hampered by a limited set of data points.

2.2.4 Change in Groundwater Storage

This section is under development and will feature outputs from model development. This section will include the following:

- Change in groundwater storage for the last 10 years
- How change in storage was calculated
- Estimates of annual use
- Water year types and their relationship to changes in storage
- Cover conditions at Jan 1 2015, or as close as possible

2.2.5 Seawater Intrusion

Seawater intrusion is not an applicable sustainability indicator, because seawater intrusion is not present in the Basin and is not likely to occur due to the distance between the Basin and the Pacific Ocean, bays, deltas, or inlets.

2.2.6 Land subsidence

The USGS measured land subsidence as part of its technical analysis of the Cuyama Valley in 2015. The USGS used two continuous global positioning systems (GPS) sites and five reference point interferometric synthetic-aperture radar (InSAR) sites, shown in Figure 2.2-21 (USGS, 2015). There are 308 monthly observations from 2000 to 2012, and total subsidence over the 2000 to 2012 period ranged from 0.0 to 0.4 feet. The USGS simulated subsidence using CUVHM, and estimated that inelastic subsidence began in the late 1970s (USGS, 2015).

Subsidence data was collected from the University NAVSTAR Consortium (UNAVCO) database. UNAVCO maintains data on five GPS monitoring stations in the area in and around the basin. Figure 2.2-22 shows the monitoring stations and their measurements since 1999. Three stations (P521, OZST, and BCWR) are located just outside the basin. The three stations' measurements show ground surface level as either staying constant or slightly increasing. The increase is potentially due to tectonic activity in the region. Two stations (VCST and CUHS) are located within the basin. Station VCST is located near Ventucopa and indicates that subsidence is not occurring in that area. Station CUHS indicates that 300 millimeters (approximately 12 inches) of subsidence have occurred in the vicinity of New Cuyama over the 19 years that were monitored. The subsidence at this station increases in magnitude following 2010, and generally follows a seasonal pattern. The seasonal pattern is possibly related to water level drawdowns during the summer, and elastic rebound occurring during winter periods.

A white paper that provides information about subsidence and subsidence monitoring techniques is included in Appendix Z.

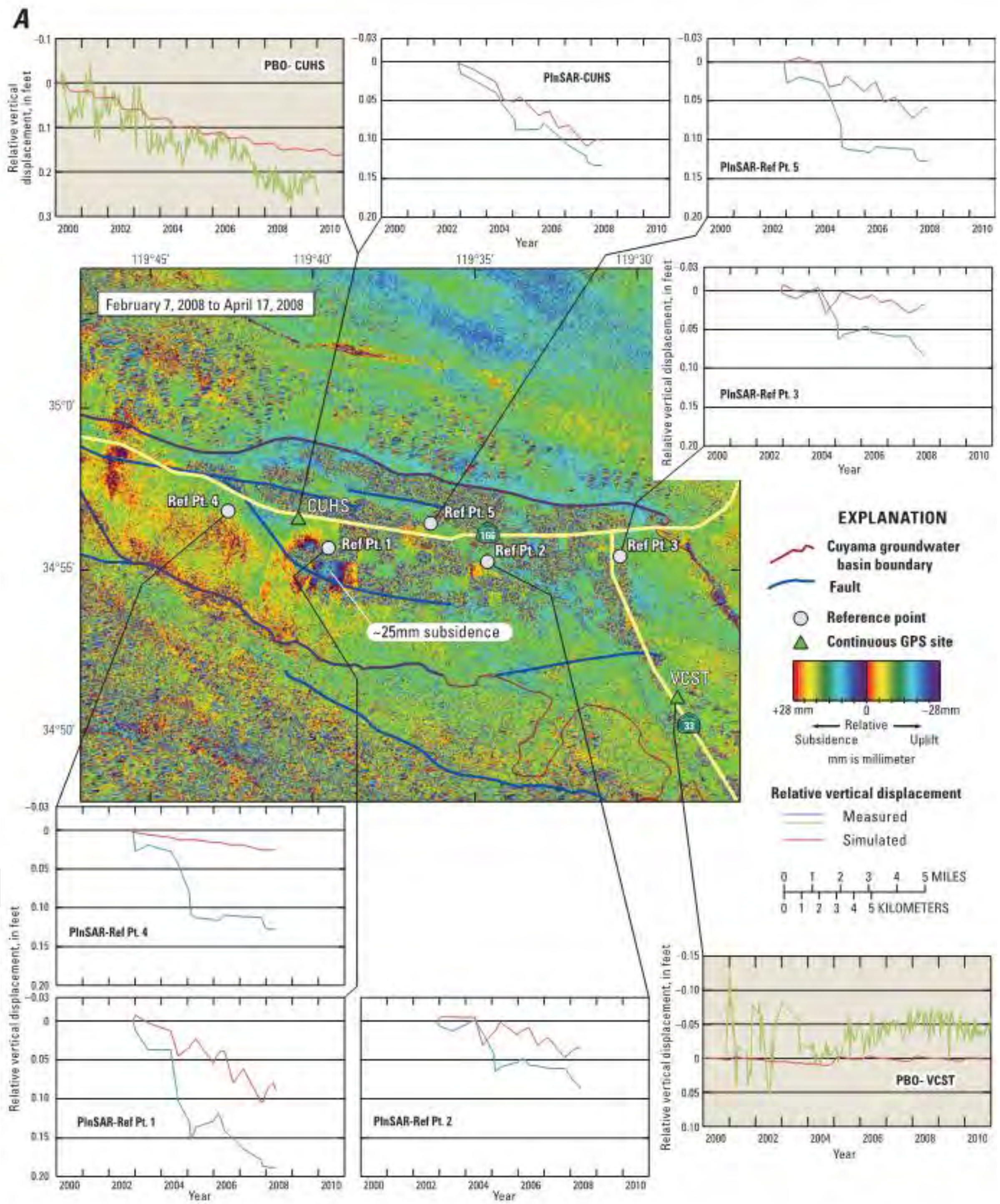

Figure 29. Historical subsidence as *A*, map of seasonal InSAR with graphs of simulated and measured time series for selected locations of relative land-surface deformation from Plate-Boundary Observation (PBO) sites and Point InSAR targets, and *B*, simulated total subsidence 1950–2010 for the calibrated hydrologic flow model, Cuyama Valley, California.

- Source: USGS, 2015

Figure 2.2-21: Locations of Continuous GPS and Reference InSAR Sites in the Cuyama Valley

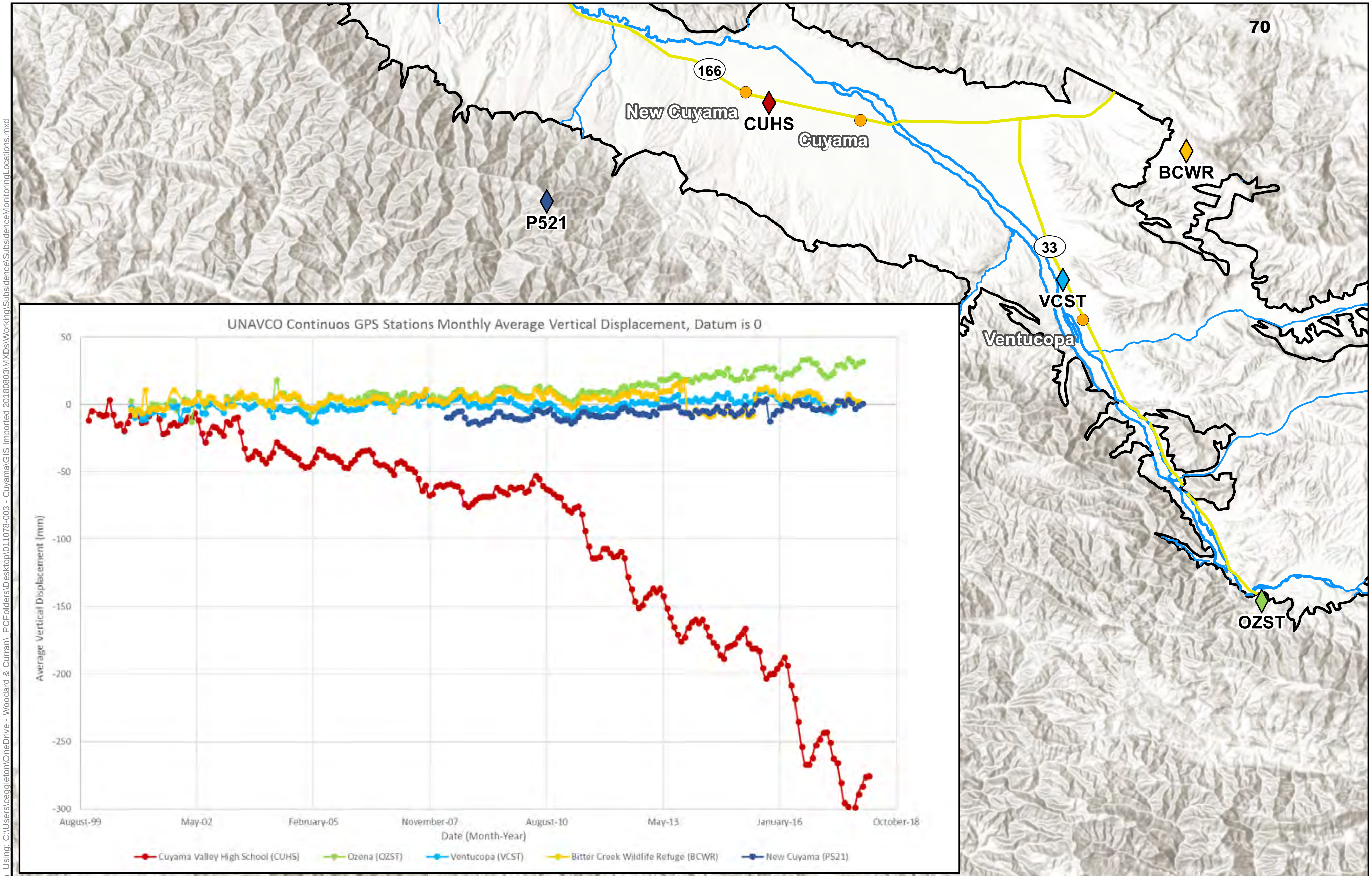

Figure 2.2-22: Subsidence Monitoring Locations

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD &CURRAN

Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams

0 2.5 5 10 Miles

N

2.2.7 Groundwater Quality

This section presents groundwater quality information in the basin, including a discussion of available water quality data and references, analysis of water quality data that was performed for the GSP, and a literature review of previous studies of water quality in the Basin.

Reference and Data Collection

References and data related to groundwater quality were collected from a variety of sources. Data was collected from:

- National Water Quality Monitoring Council (USGS)- Downloaded 6/1/2018 from https://www.waterqualitydata.us/portal/
- GeoTracker GAMA (DWR)- Downloaded 6/5/2018, for each county, from http://geotracker.waterboards.ca.gov/gama/datadownload
- California Natural Resources Agency (DWR) downloaded 6/14/2018 from https://data.cnra.ca.gov/dataset/periodic-groundwater-level-measurements
- County of Ventura
- Private landowners

Data was compiled into a database for analysis.

References containing groundwater quality information were also compiled. The information included in these references are used to enhance understanding of groundwater quality conditions beyond available data. References used in this section include:

- Singer and Swarzensky, 1970 – *Pumpage and Ground-Water Storage Depletion in Cuyama Valley, 1947-1966.* This report focused on groundwater depletion, but also included information about groundwater quality.
- USGS, 2008 - Groundwater-Quality Data in the South Coast Interior Basins Study Unit, 2008: Results from the California Groundwater Ambient Monitoring and Assessment (GAMA) Program. This study performed water quality testing on 12 wells in the Cuyama Valley and tested for a variety of constituents.
- SBCWA 2011 – *Santa Barbara County 2011 Groundwater Report.* This report provided groundwater conditions throughout the County, and provided water quality information for the Cuyama Valley.
- USGS 2013c – Geology, Water-Quality, Hydrology, and Geomechanics of the Cuyama Valley Groundwater Basin, California, 2008-12. This report investigated a wide variety of groundwater components including water quality.

Data Analysis

Collected data was analyzed for Total Dissolved Solids (TDS), nitrate, and arsenic. These three constituents have been included because they were cited during public meetings as being of concern to stakeholders in the Basin.

Figure 2.2-23 shows TDS of groundwater measured in wells in 1966. In 1966, TDS was above the MCL of 1,500 micrograms per liter (mg/L) in over 50% of measurements. TDS was over 2,000 mg/L near the Cuyama River in the southeast portion of the basin near the Ozena Fire Station, Santa Barbara Canyon, and upper Quatal Canyon, indicating that high TDS water was entering the basin from the watershed above these measurement points. TDS measurements were over the Maximum Contaminant Level (MCL) throughout the central portion of the basin where irrigated agriculture was operating, and near the towns of Cuyama and New Cuyama, and along the Cuyama River to the northwest of New Cuyama. TDS was less than 500 mg/L in a number of measurements between Bitter Creek and Cottonwood Canyon, indicating that lower TDS water was entering the basin from the watersheds in this area.

Figure 2.2-24 shows TDS of groundwater measured in wells between 2011 and 2018. Multiple years of collected data were used to generate enough mapped data density for comparison to 1966 data. In the 2011-2018 period, TDS was above the MCL in over 50% of measurements. TDS was over 1,500 mg/L near the Cuyama River in the southeast portion of the basin near the Ozena Fire Station, and in Santa Barbara Canyon, indicating that high TDS water was entering the basin from the watershed above these measurement points. TDS measurements were over the MCL throughout the central portion of the basin where irrigated agriculture was operating. A number of 500-1,000 mg/L TDS concentrations were measured near New Cuyama and in upper Quatal Canyon, and along the Cuyama River between Cottonwood Canyon and Schoolhouse Canyon.

Figure 2.2-25 shows measurements of TDS for selected monitoring points over time. Monitoring points were selected by the number of measurements, with higher counts of measurements selected to be plotted. The charts indicate that TDS in the vicinity of New Cuyama has been over 800 mg/L TDS throughout the period of record, and that TDS has either slightly increased or stayed stable over the period of record. The chart for Well 85 at the intersection of Quatal Canyon and the Cuyama River is generally below 800 mg/L TDS with rapid spikes of TDS increases above that level. The timing of rapid increases in measured TDS correspond with Cuyama River flow events, indicating a connection between rainfall and stream flow and an increase in TDS. This is the only location where this trend was detected.

Figure 2.2-26 shows measurements of nitrate in 1966. Figure 2.2-26 shows that data collected in 1966 was below the MCL of 10 mg/L throughout the basin, with some measurements above the MCL in the central portion of the basin where irrigated agriculture was operating.

Figure 2.2-27 shows measurements of nitrate of groundwater measured in wells between 2011 and 2018. Multiple years of collected data were used to generate enough mapped data density for comparison to 1966 data. Figure 2.2-27 shows that data collected over this period was generally below the MCL, with two measurements that were over 20 mg/L.

Figure 2.2-28 shows arsenic measurements from 2008-2018. Data was not available prior to this time period in significant amounts. Figure 2.2-28 shows that arsenic measurements were below the MCL of 10 ug/L in the majority of the Basin where data was available. However, high arsenic values exceeding 20 ug/L were recorded at three well locations in the area to the South of the town of New Cuyama – all of these high concentration samples were taken at depths of 700 feet or greater; readings in the same area taken at shallower depths were below the MCL level.

Figure 2.2-29: shows the results of a query with the Regional Water Quality Control Board (RWQCB)'s Geotracker website. Geotracker documents contaminant concerns that the RWQCB is or has been working with site owners to clean up. As shown in Figure 2.2-29, in most of these sites gas, oil and/or diesel have been cited as the contaminant of concern.

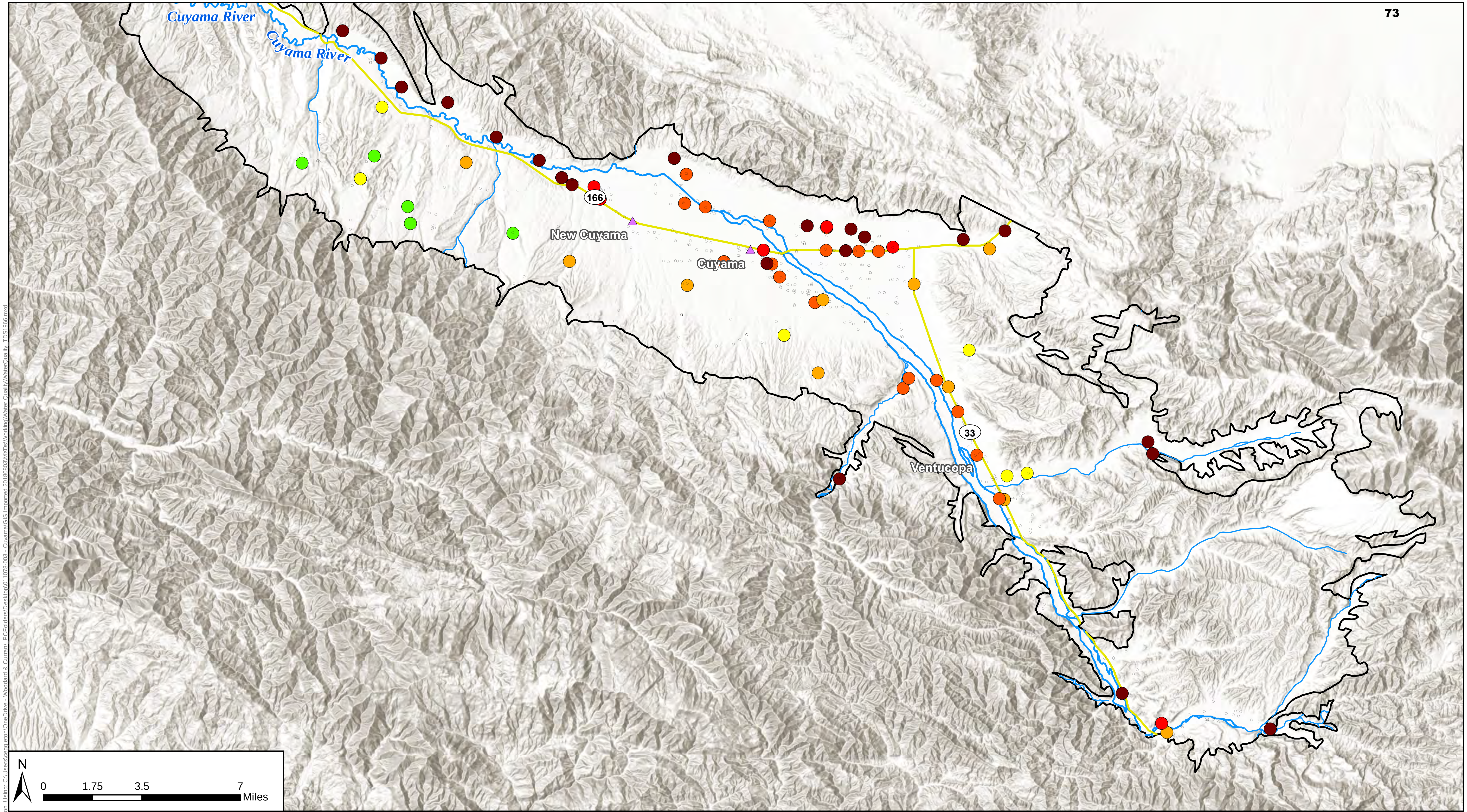

Figure 2.2-23: 1966 Average Well Measurements of Total Dissolved Solids, mg/L

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

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Legend

TDS, mg/L

- No Measurements
- < 500 mg/L
- 500 - 1,000 mg/L
- 1,000 - 1,500 mg/L
- 1,500 - 1,750 mg/L
- 1,750 - 2,000 mg/L
- >2,000 mg/L

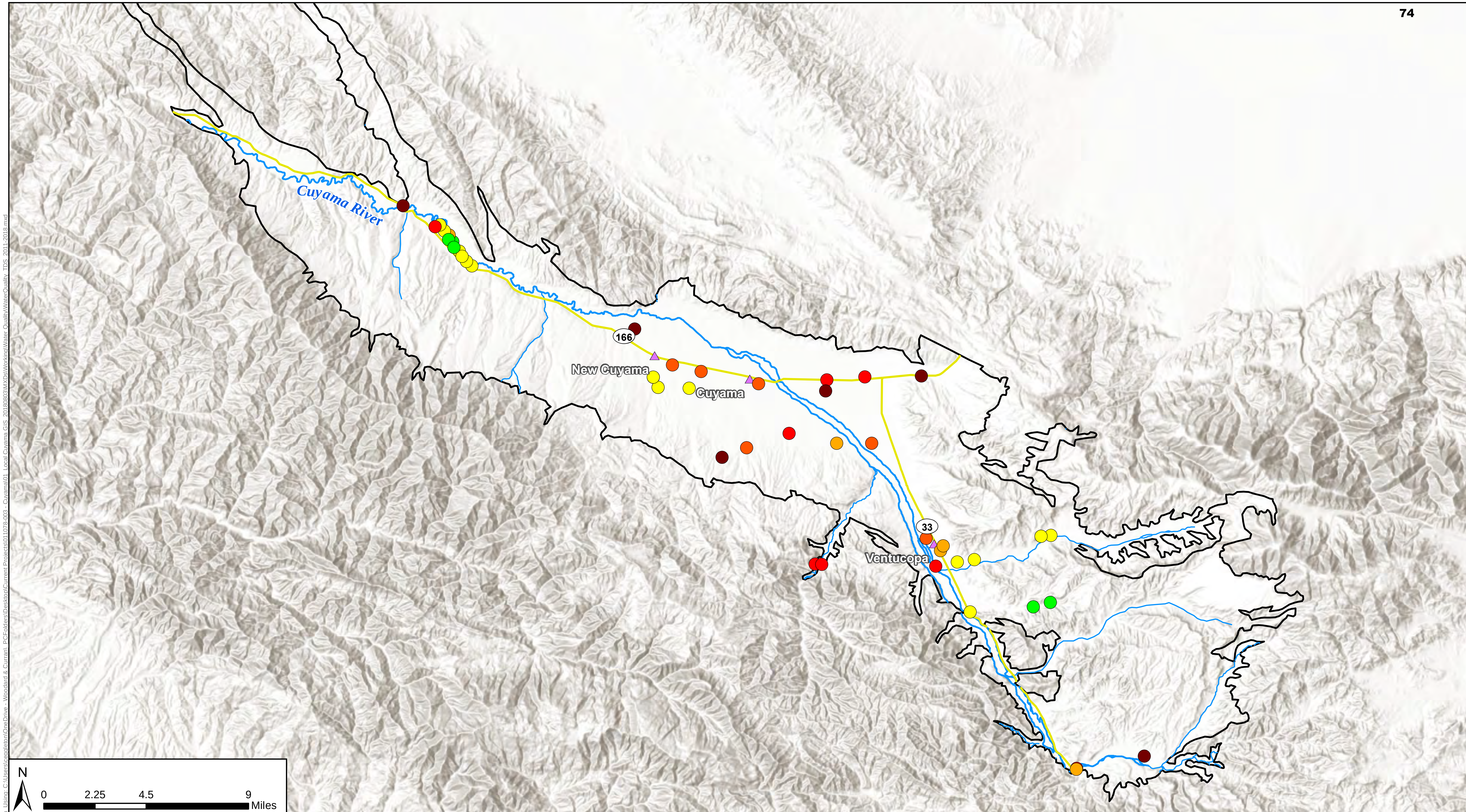

Figure 2.2-24:2011-2018 Average Well Measurements of Total Disolved Solids, mg/L

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

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Legend

TDS, mg/L

Average_Re

- < 500 mg/L
- 500 - 1,000 mg/L
- 1,000 - 1,500 mg/L
- 1,500 - 1,750 mg/L
- 1,750 - 2,000 mg/L
- > 2,000 mg/L

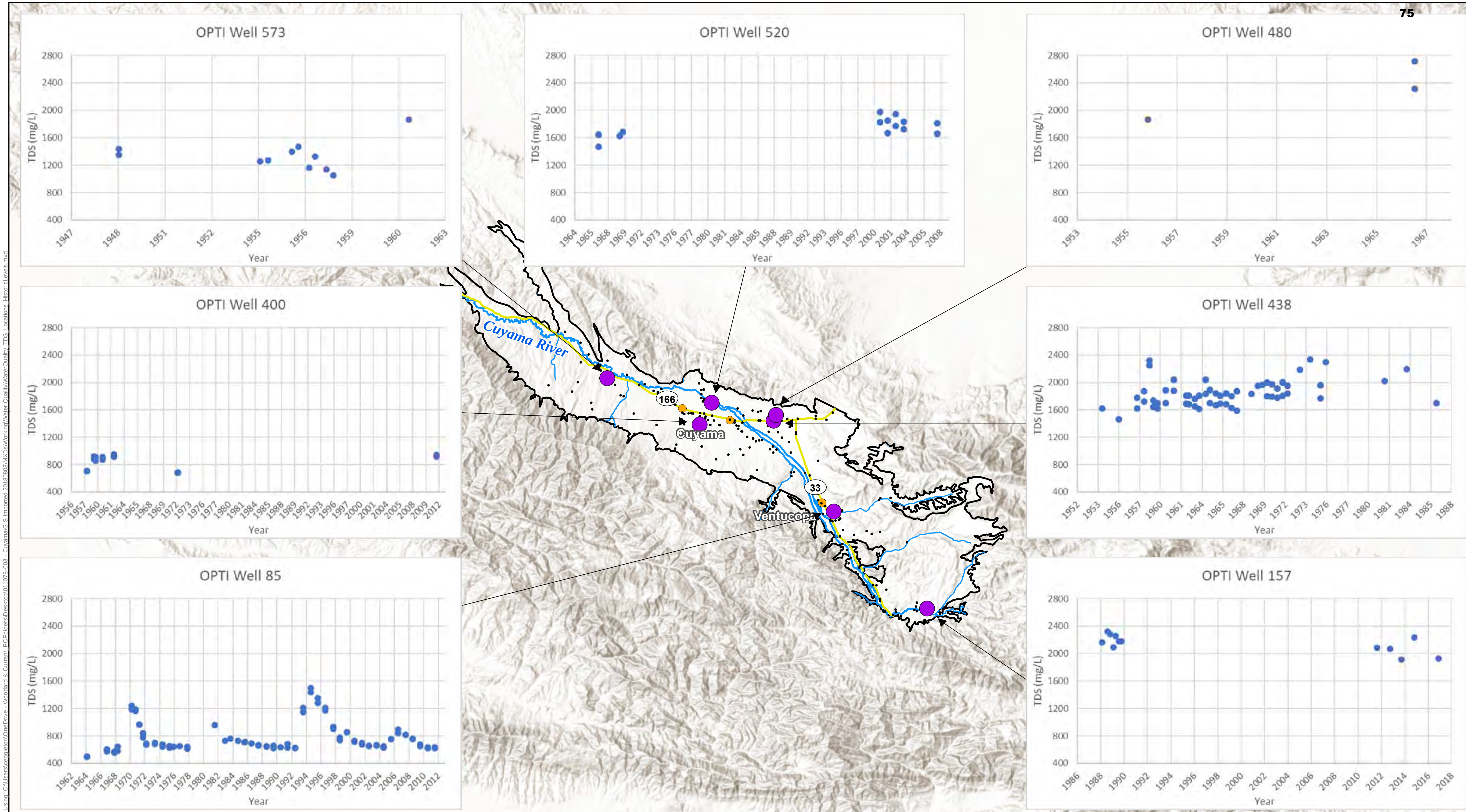

Figure 2.2-25: Cuyama Groundwater Basin Historic TDS Levels in Selected Wells

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

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Legend

- Cuyama Basin
- Towns
- Highways
- Cuyama River
- Streams
- Wells with Graphed Data
- Location of TDS WQ Measurements

N

0 4.5 9 18 Miles

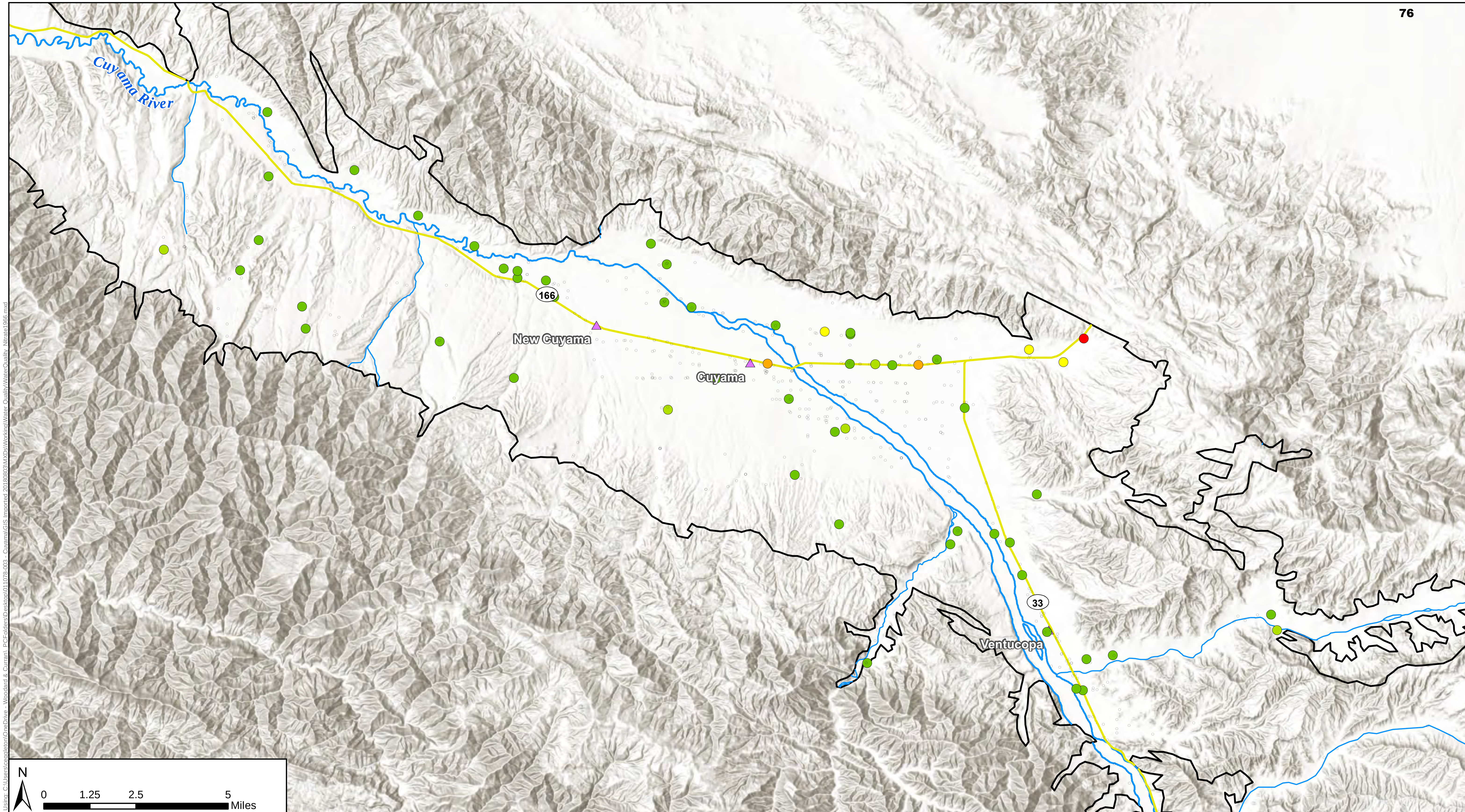

Figure 2.2-26: 1966 Average Well Measurements of Nitrate (NO3) as Nitrogen

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

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Legend

Nitrate (NO3) as N, mg/L

- No Measurements
- < 5 mg/L
- 5 - 8 mg/L
- 8 - 10 mg/L
- 10 - 15 mg/L
- 15 - 20 mg/L
- > 20 mg/L

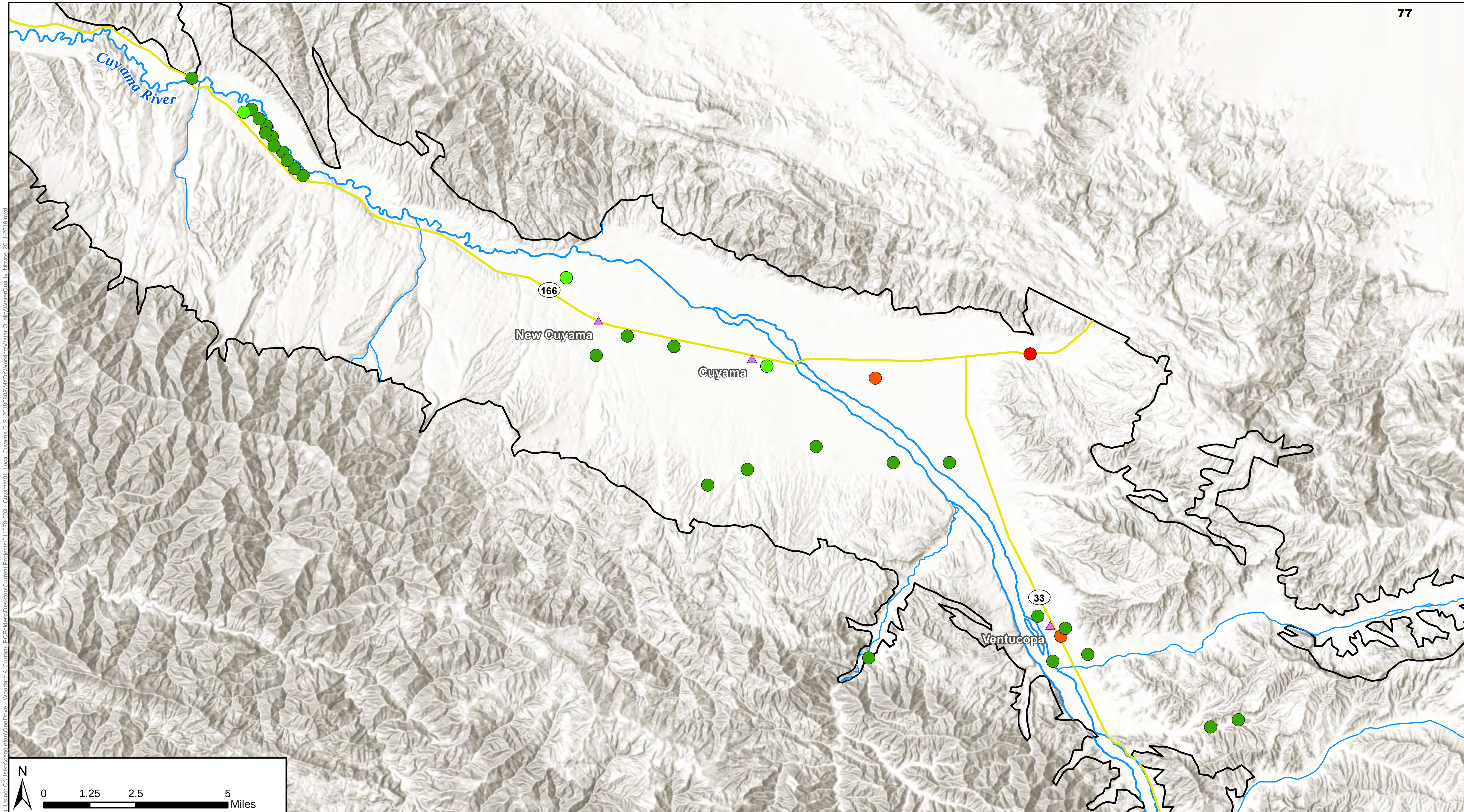

Figure 2.2-27: 2011-2018 Average Well Measurements of Nitrate (NO3) as Nitrogen

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

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Legend

Nitrate (NO3) as N, mg/L

- < 5 mg/L
- 5 - 8 mg/L
- 8 - 10 mg/L
- 10 - 15 mg/L
- 15 - 20 mg/L
- > 20 mg/L

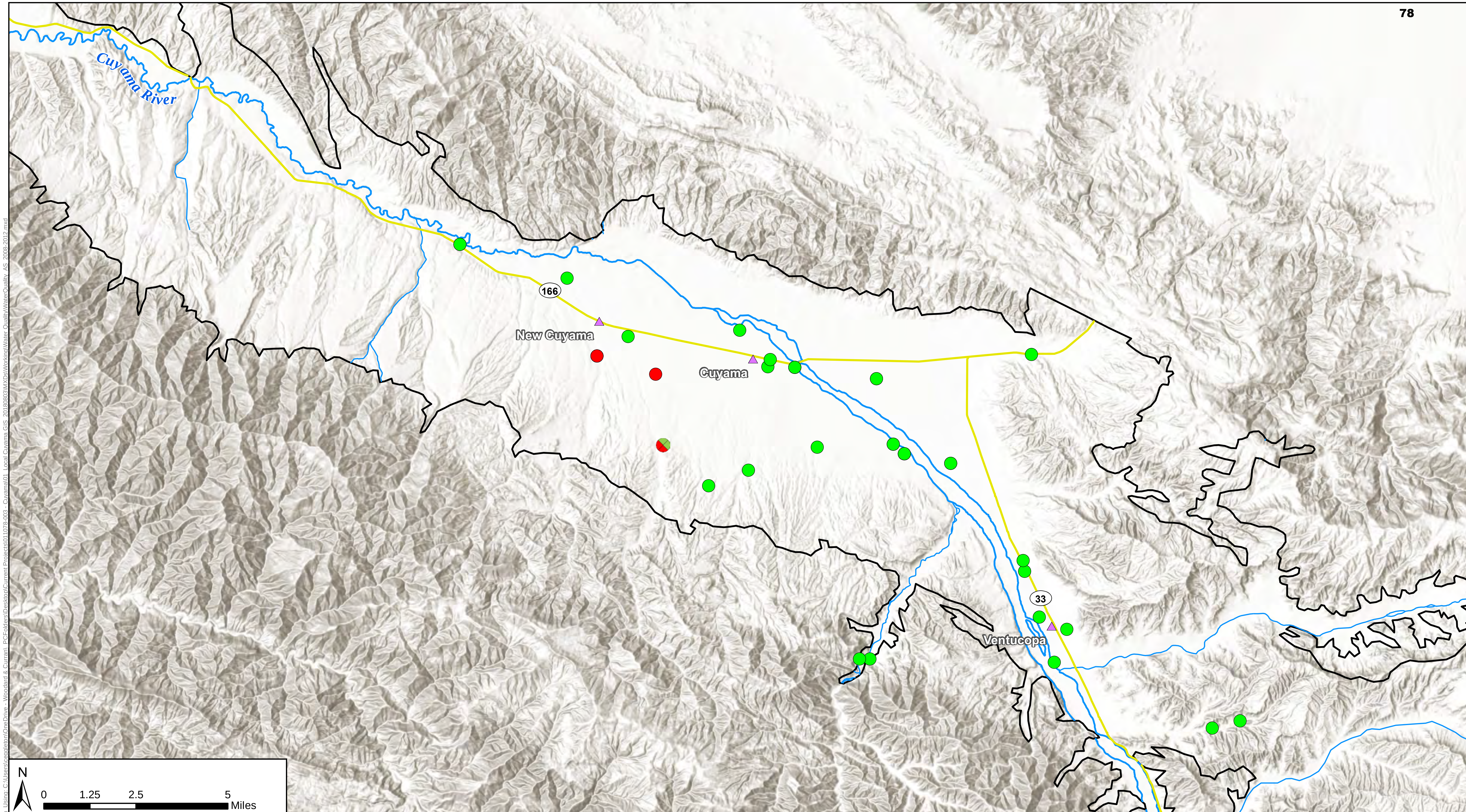

Figure 2.2-28: 2008-2018 Average Well Measurements of Arsenic, ug/L

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

WOODARD & CURRAN

Legend

Aresenic (As), ug/L

- < 5 ug/L
- 5 - 10 ug/L
- 10 - 20 ug/L
- > 20 ug/L

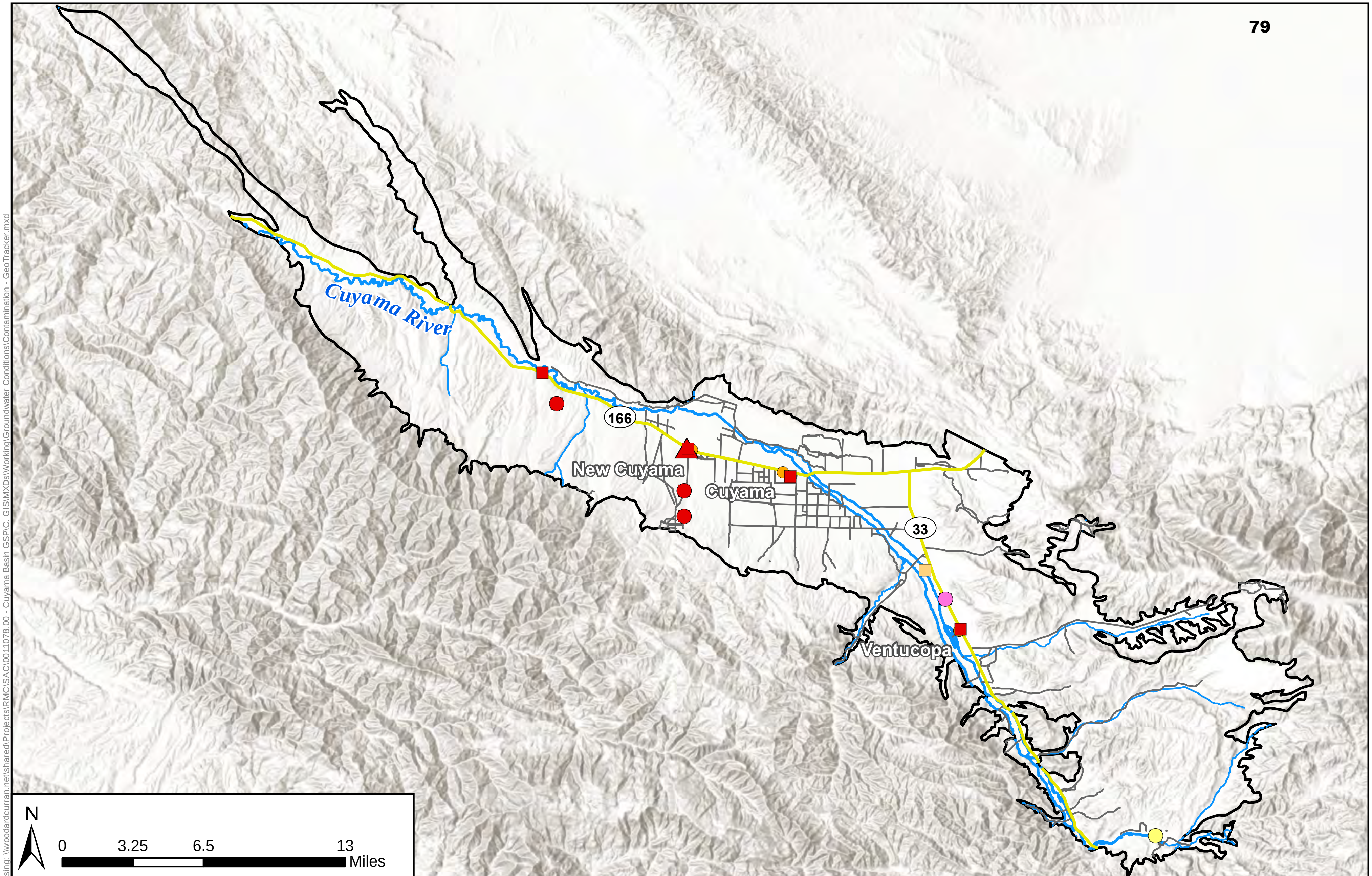

Figure 2.2-29 - Sites with Water Quality Concerns

Cuyama Basin Groundwater Sustainability Agency

Cuyama Valley Groundwater Basin Groundwater Sustainability Plan

August 2018

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Legend

Cuyama Basin
Towns
Highways
Local Roads
Cuyama River
Streams

Site Status
Open Sites
Closed Sites
Permitted UST

Contaminant of Concern
Gas, Oil &/or Diesel
TPH & Lead
VOCs
Alcohols

Literature Review

In 1970, Singer and Swarzenski reported that TDS in the central basin was in the range of 1,500 to 1,800 mg/L TDS, and that the cations that contributed to the TDS and the amount of TDS varied by location in the basin. They reported that TDS was lower (400 to 700 mg/L) in areas downstream from the Sierra Madre Mountains where TDS was made up of sodium or calcium bicarbonate, and higher (3,000-6,000 mg/L) in wells close to the Caliente Range and in the northeastern part of the valley. They stated that the high TDS is generated by mixing of water from marine rocks with more recent water from alluvium. They determined that groundwater movement favors movement of brackish water from the north of the Cuyama River towards areas of groundwater depletion, and that return of some water applied during irrigation and needed for leaching the soil carries dissolved salts with it to the water table (Singer and Swarzensky, 1970).

In 2008, the USGS reported the results of the GAMA study, which sampled 12 wells for a wide variety of constituents. The locations of the wells provided in the GAMA study are shown in Figure 2.2-30. The study identified that specific conductance, which provides an indication of salinity, ranged from 637 to 2,380 uS/cm across the study's 12 wells. The GAMA study reported that the following constituents were not detected at levels above the MCL for each constituent in any samples for the following constituents:

- Pesticides or pesticide degradates
- Gasoline and refrigerants
- Aluminum, antimony, barium, beryllium, boron, cadmium, copper, iron, and lead
- Ammonia and phosphate
- Lithium, Molybdenum, Nickel, Selenium, Strontium, Thallium, Tungsten, Uranium, Vanadium, and Zinc
- Bromide, Calcium, Chloride, Fluoride, Iodide, Magnesium, Potassium, Silica, and Sodium

The GAMA study reported that there were detections at levels above the MCL for the following constituents:

- Manganese exceeded its MCL in two wells.
- Arsenic exceeded the MCL in one well.
- Nitrate exceeded the MCL in two wells
- Sulfate exceeded its MCL in eight wells
- TDS exceeded its MCL in seven wells
- VOCs detected in one well.

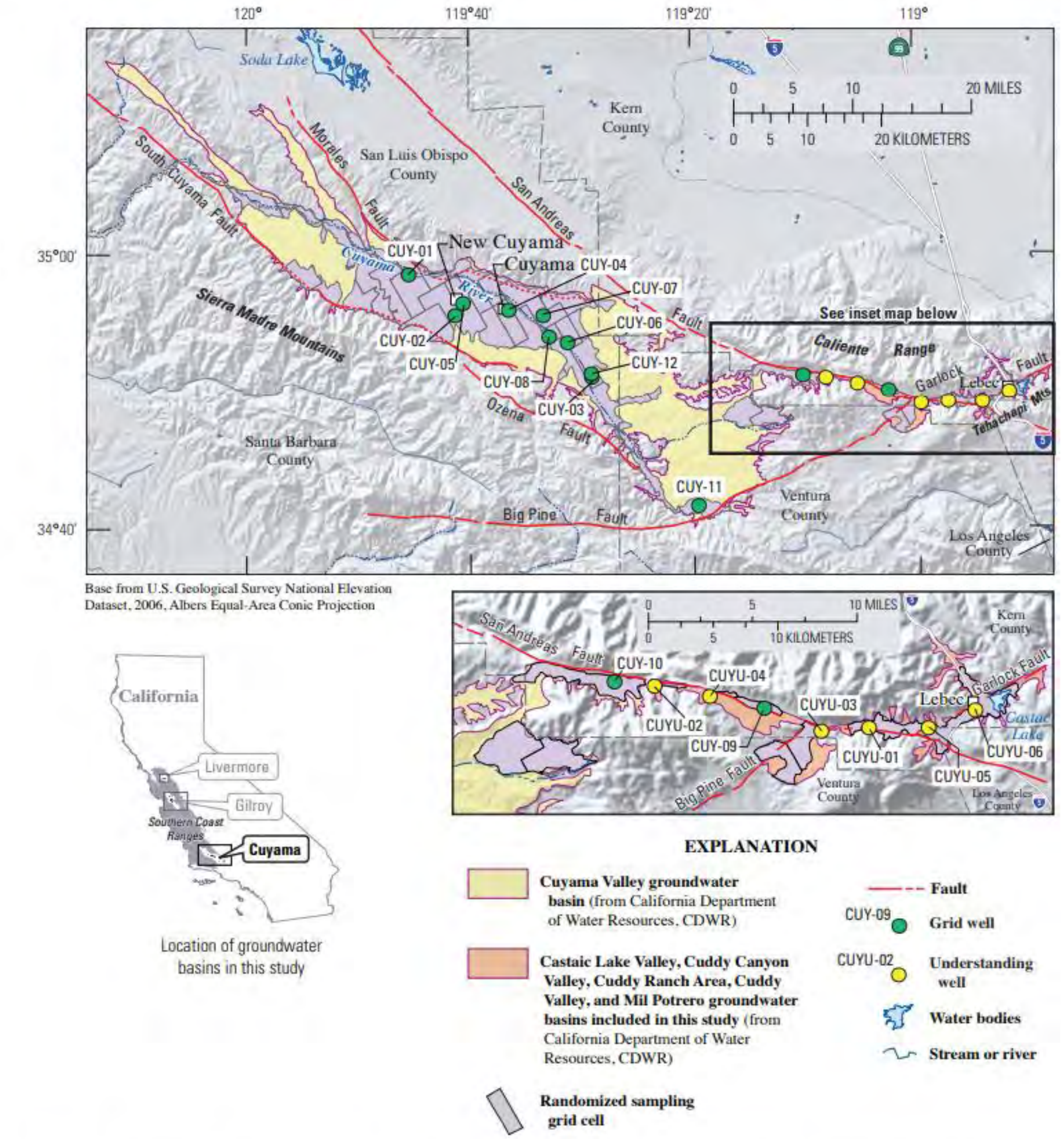

Figure 5. The South Coast Interior Basins Groundwater Ambient Monitoring and Assessment (GAMA) study unit showing the distribution of the Cuyama study-area grid cells, the location of sampled grid wells and understanding wells, the Cuyama Valley, Castaic Lake Valley, Cuddy Canyon Valley, Cuddy Ranch Area, Cuddy Valley, and Mil Potrero groundwater-basin boundaries (as defined by the California Department of Water Resources, CDWR), major cities, major roads, topographic features, and hydrologic features. Alphanumeric identification numbers for grid wells

Source: USGS, 2008

Figure 2.2-30: Locations of GAMA Sample Locations

In 2011, SBCWA reported that TDS in the basin typically ranges from 1,500 to 1,800 mg/L in the main part of the basin, while the eastern portion of the Cuyama Badlands near Ballinger, Quatal, and Apache Canyons has better water quality with TDS typically ranging rom 400 to 700mg/L. SBCWA noted spikes in TDS in the Badlands Well following the wet rainfall years of 1969 and 1994 and state that the spikes are attributable to overland flow from rainfall which is flushing the upper part of the basin after dry periods.

SBCWA reported that boron is generally higher in the upper part of the basin and is of higher concentration in the uplands than in the deeper wells in the central part of the basin. Toward the northeast end of the basin at extreme depth there exists poor quality water, perhaps connate (trapped in rocks during deposition) from rocks of marine origin.

SBCWA also reported: "There was little change in TDS, calcium, magnesium, nitrates and sulfates during the 2009- 2011 period. In some cases, concentrations of these nutrients actually fell during the period, most likely due to a lack of rainfall, recharge and flushing of the watershed. As the Cuyama watershed is mostly dry, water quality data must be examined with caution as sometimes overland flow from rainfall events "flushes" the watershed and inorganic mineral concentrations actually peak during storm flows. Typically, in other areas of Santa Barbara County mineral concentrations are diluted during widespread storm runoff out of natural watersheds."

In 2013, USGS reported that they collected groundwater quality samples at 12 monitoring wells, 27 domestic wells, and 2 springs for 53 constituents including: field parameters (water temperature, specific conductance, pH, DO, alkalinity), major & minor ions, nitrate, trace elements, stable isotopes of hydrogen and oxygen, tritium and carbon-14 activities, arsenic, iron, and chromium. The USGS sampling locations are presented in a figure from the report in Figure 2.2-31. The USGS reported the results of the sampling as:

- Groundwater in the alluvial aquifer system has high concentrations of TDS and sulfate
- 97% of samples had concentrations greater than 500 mg/L for TDS
- 95% of samples had concentrations greater than 250 mg./L for sulfate
- 13% of samples had concentrations greater than 10 mg/L for nitrate
- 12% of samples had concentrations greater than 10 ug/L for arsenic
- 1 sample had concentrations greater than the MCL for fluoride
- 5 samples had concentrations greater than 50 mg/L for manganese
- 1 sample had concentration of iron greater than 300 mg/L for iron
- 1 sample had concentration of aluminum greater than 50 mg/L

The USGS reported that nitrate was detected in five locations above the MCL of 10 mg/L. Four wells where nitrate levels were greater than the MCL were in the vicinity of the center of agricultural land-use area. Irrigation return flows are possible source of high nitrate concentrations. There was a decrease in concentrations with depth in the agricultural land use area which indicated the source of higher nitrate concentrations likely to be near the surface. The lowest nitrate levels were outside the agricultural use area, and low concentrations of nitrate (less than 0.02 mg/L) in surface water samples indicated surface water recharge was not a source of high nitrate

The USGS reported that arsenic was found in greater concentration than the MCL of 10 ug/L in 4 of the 33 wells sampled, and samples of total chromium ranged from no detections to 2.2 ug/L, which is less than the MCL of 50 ug/L. Hexavalent chromium ranged from 0.1 to 1.7 ug/L which is less than the MCL of 50 ug/L.

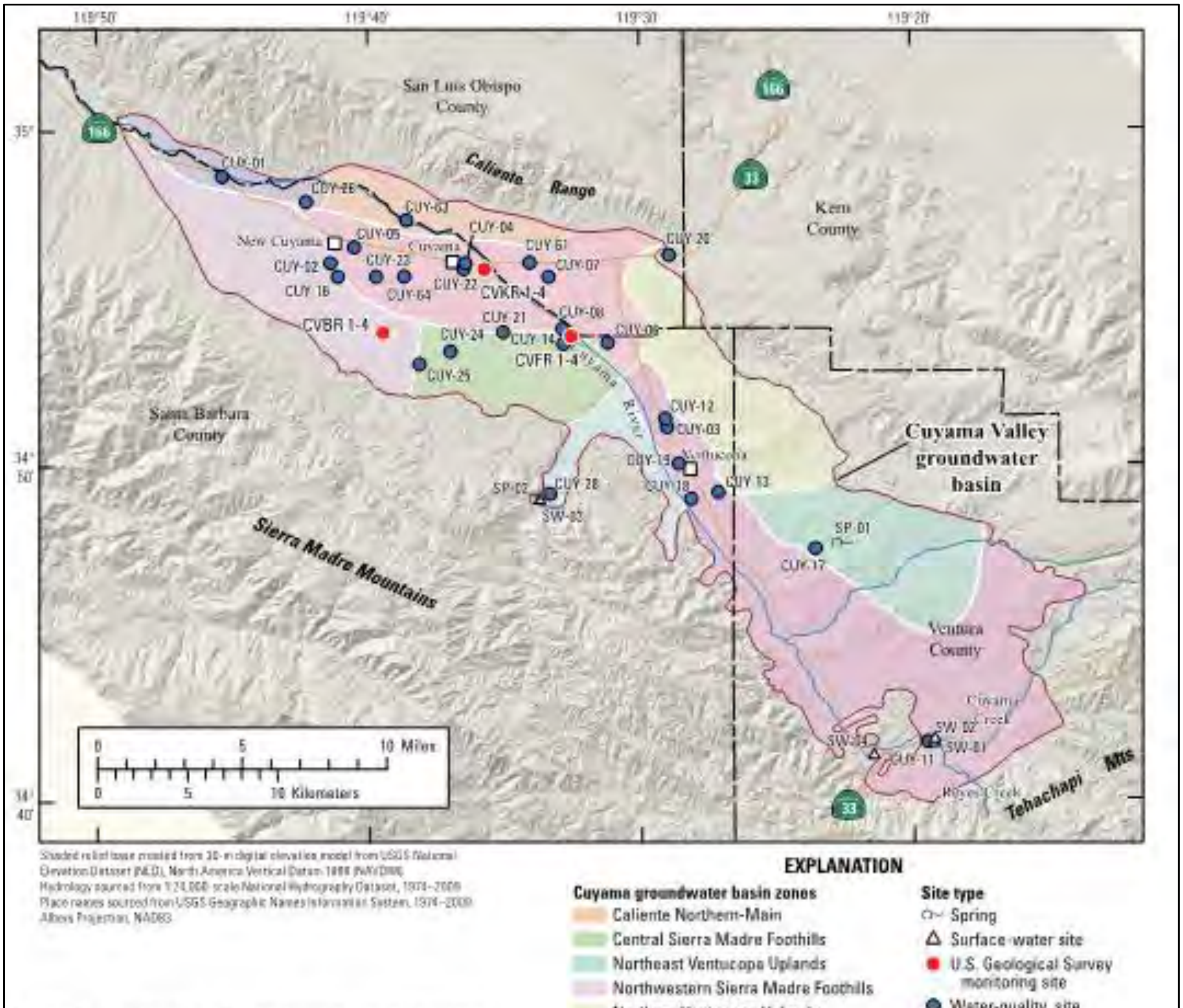

Figure 8. The location of multiple-well monitoring sites, domestic and supply wells, springs, and surface water sites with available water-quality data, Cuyama Valley, Santa Barbara County, California.

USGS 2013c

Figure 2.2-31: USGS 2013c Water Quality Monitoring Sites

2.2.8 Interconnected Surface Water Systems

This section is under development and will feature outputs from model development. This section will include the following:

- Identification of interconnected surface water systems
- Estimates of timing and quantity of depletions
- Map of interconnected surface water systems
- Consideration of ephemeral and intermittent streams, and where they may cease to flow if applicable

2.2.9 Groundwater Dependent Ecosystems

This section is under development and study is being performed by a biologist. This section will include the following:

- Summary of Groundwater Dependent Ecosystem (GDE) analysis
- Describe locations and types of GDEs
- Map of GDEs

2.2.10 Data Gaps

This subsection will be used to document identified data gaps in the groundwater conditions section of the GSP. Feedback from stakeholders is essential in identifying data gaps.

2.2.11 References

Cleath-Harris. 2016. Groundwater Investigations and Development, North Fork Ranch, Cuyama, California. Santa Barbara, California.

Dudek. 2016. Hydrogeologic Conceptual Model to Fulfill Requirements in Section I of the Basin Boundary Modification Application for the Cuyama Valley Groundwater Basin. http://sgma.water.ca.gov/basinmod/docs/download/784. Accessed September 14, 2018

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Santa Barbara County Water Agency (1977) Adequacy of the Groundwater Basins of Santa Barbara County.
http://www.countyofsb.org/uploadedFiles/pwd/Content/Water/WaterAgency/Adequacy%20of%20the%20GW%20Basins%20of%20SBC%201977_sm.pdf

Appendix X - Hydrographs

This appendix presents hydrographs of every monitoring well with groundwater elevation data that was collected during development of the GSP. Each hydrograph has been assigned a database number, and the maps at the front of this section should be used to find the location of hydrographs of interest to the reader. The beginning of this appendix presents a map showing the locations of four detailed maps with the well identification numbers. The four location maps are intended to facilitate identifying the location of a specific hydrograph.

Appendix Y - Groundwater Contours

This appendix includes groundwater elevation and depth to water contour maps for the following periods:

- Figure Y-1: Fall 2017 Groundwater Elevation
- Figure Y-2: Fall 2017 Depth to Water
- Figure Y-3: Spring 2017 Groundwater Elevation
- Figure Y-4: Spring 2017 Depth to Water
- Figure Y-5: Spring 2015 Groundwater Elevation
- Figure Y-6: Spring 2015 Depth to Water
- Figure Y-7: Fall 2014 Groundwater Elevation
- Figure Y-8: Fall 2014 Depth to Water

Descriptions of each contour map are included in 2.2.3 Groundwater Trends.

Appendix Z - Subsidence Information White Paper

Groundwater Conditions Section Exhibits

Due to the number of pages in the exhibits, the links have been included below:

- **Appendix X – Hydrographs –** This file contains hydrographs of groundwater elevation data. http://www.cuyamabasin.org/assets/pdf/Cuyama-GSP-Appendix-X-Hydrographs.pdf
- **Appendix Y – Groundwater Contours –** This file contains groundwater elevation and depth contour maps. http://www.cuyamabasin.org/assets/pdf/Cuyama-GSP-Appendix-Y-Groundwater-Contours.pdf
- **Appendix Z – Subsidence White Paper –** This file contains on information of subsidence. http://www.cuyamabasin.org/assets/pdf/Cuyama-GSP-Appendix-Z-Subsidence-White-Paper.pdf

TO:	Standing Advisory Committee Agenda Item No. 5d
FROM:	John Ayres, Woodard & Curran (W&C)
DATE:	January 8, 2019
SUBJECT:	Adoption of Threshold Numbers for Representative Wells

Issue
Recommend adoption of the threshold numbers for representative wells.

Recommended Motion
Adopt the threshold numbers for representative wells.

Discussion
An overview of the recommended threshold numbers for representative wells is provided as Attachment 1. A table with draft measurable objectives and minimum thresholds for representative wells sorted by region is provided as Attachment 2.

Cuyama Basin Groundwater Sustainability Agency

Adoption of Threshold Numbers for Preliminary Wells

January 8, 2018

Adoption of Threshold Numbers for Preliminary Wells

- Seeking recommendation from the SAC for approval of threshold numbers by CBGSA Board
  - Measurable Objective (MO) and Minimum Threshold (MT) numbers were developed using the approaches approved for each threshold region by the Cuyama Basin GSA Board on Dec 18, 2018.
  - A table of numbers was provided for review on Dec 26

Board Direction on Threshold Rationales

- Threshold rationales approved by Board at Dec 18 Board Meeting:

Threshold Region	Board-Approved Threshold Rationale
SOUTHEASTERN	MO = 2015 levels.
EASTERN	MT = 20% below 2015 levels, or 10’ above the shallowest nearby well, whichever is more restrictive.
CENTRAL	MT = 20% below 2015 levels.
WESTERN	MT = 15% of saturated portion of each representative well.
NORTHWESTERN	MT = 15% of saturated aquifer thickness.

MO = Measurable Objective
MT = Minimum Threshold
**A supermajority vote of 75% is needed for each rationale to be passed by the Board.*

WOODARD & CURRAN

Representative Wells

- 65 Wells
- Corrected an Error (Missing Wells)
- Expanded to address comments received

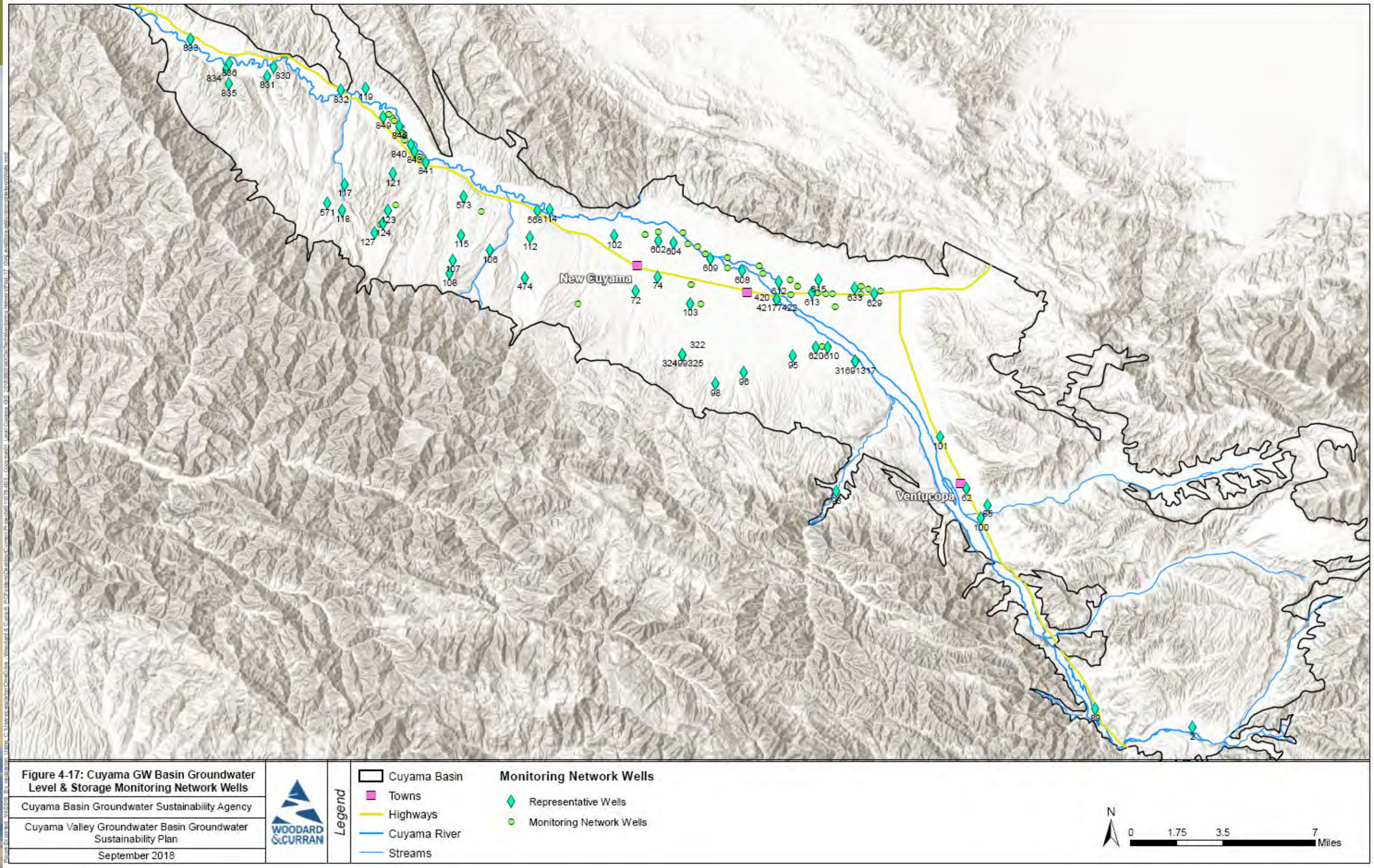


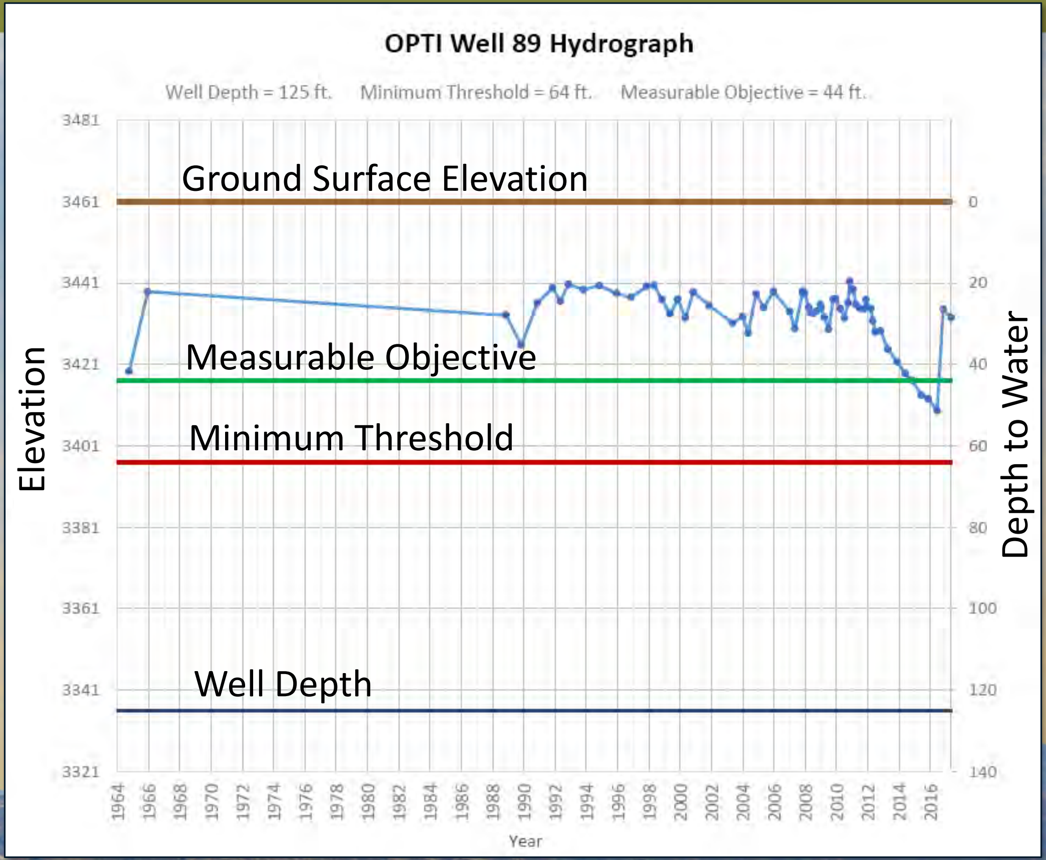
Figure 4-17: Cuyama GW Basin Groundwater Level & Storage Monitoring Network Wells

Table of Threshold Numbers

OPTI Well	Region	Final MT	Final MO	Well Depth	Screen Top	Screen Bottom	GSE
72	Central	169	124	790	340	770	2171
77	Central	450	400	980	960	980	2286
91	Central	625	576	980	960	980	2474
95	Central	573	538	805			2449
96	Central	333	325	500			2606

- 8 wells MOOF calculation were modified to provide a reasonable 5 years of storage to set the MO
- 3 wells were dropped, no method was available to set a reasonable MO
- Described in table memo

Hydrographs of Threshold Numbers



WOODARD &CURRAN

Discussion on Threshold Numbers for Preliminary Wells

- Are there any questions about the preliminary threshold numbers or about how they were developed?
- Is there any feedback related to future MT and MO updates, (e.g. how soon, how often, and what to consider)?
- We are not revisiting rationales

Attachment 2

Cuyama Basin GSP - Measurable Objectives and Minimum Thresholds for Representative Wells in each Threshold Region
January 4, 2019 (all values in feet)

OPTI Well	Region	Final MT	Final MO	Well Depth	Screen Top	Screen Bottom	GSE
72	Central	169	124	790	340	770	2171
74	Central	256	243				2193
77	Central	450	400	980	960	980	2286
91	Central	625	576	980	960	980	2474
95	Central	573	538	805			2449
96	Central	333	325	500			2606
98	Central	450	439	750			2688
99	Central	311	300	750	730	750	2513
102	Central	235	197				2046
103	Central	290	235	1030			2289
112	Central	87	85	441			2139
114	Central	47	45	58			1925
316	Central	623	574	830			2474
317	Central	623	573	700			2474
322	Central	307	298	850			2513
324	Central	311	299	560			2513
325	Central	300	292	380			2513
420	Central	450	400	780			2286
421	Central	446	398	620			2286
422	Central	444	397	460			2286
474	Central	188	169	213			2369
568	Central	37	36	188			1905
602	Central	497	408	725	325	725	2114
604	Central	526	487	924	454	924	2125
608	Central	436	407	745	440	745	2224
609	Central	458	421	970	476	970	2167
610	Central	621	591	780	428	780	2442
612	Central	463	440	1070	657	1070	2266
613	Central	503	475	830	330	830	2330
615	Central	500	468	865	480	865	2327
620	Central	606	566	1035	550	1035	2432
629	Central	559	527	1000	500	1000	2379
633	Central	547	493	1000	500	1000	2364
62	Eastern	167	142	212			2921
85	Eastern	171	147	233			3047
93	Eastern	105	91	151			2928
100	Eastern	154	125	284			3004
101	Eastern	104	81	200			2741
119	Northwestern	203	153	92			1713
121	Northwestern	203	153	98.25			1984
830	Northwestern	203	153	77.2			1571
831	Northwestern	203	153	213.75			1557
832	Northwestern	203	153	131.8			1630
833	Northwestern	203	153	503.55			1457
834	Northwestern	203	153	320			1508
835	Northwestern	203	153	162.2			1555
836	Northwestern	203	153	325			1486
840	Northwestern	203	153	900	200	880	1713
841	Northwestern	203	153	600	170	580	1761
843	Northwestern	203	153	620	60	600	1761
845	Northwestern	203	153	380	100	360	1712
849	Northwestern	203	153	570	150	550	1713
2	Southeastern	72	55	73			3720
89	Southeastern	64	44	125			3461
106	Western	154	141.4	227.5			2327
107	Western	91	72.23	200			2482
108	Western	165	135.62	328.75			2629
115	Western	267	102.8	1200			2276

117	Western	160	150.82	212	2098
118	Western	124	57.22	500	2270
123	Western	31	12.59	138	2165
124	Western	73	57.12	160.55	2287
127	Western	42	31.74	100.25	2364
571	Western	144	120.5	280	2307
573	Western	118	67.5	404	2084

DEVELOPMENT OF CUYAMA BASIN MEASURABLE OBJECTIVES AND MINIMUM THRESHOLDS BY THRESHOLD REGIONS

The attached table shows Measurable Objective (MO) and Minimum Threshold (MT) numbers that were developed for each representative well using the approaches approved for each threshold region by the Cuyama Basin GSA Board on December 18, 2018.

ACRONYM LIST

DWR = Department of Water Resources

GIS = Geographic Information System

MO = Measurable Objective

MT = Minimum Threshold

OPTI = the Cuyama Basin Data Management System (http://opti.woodardcurran.com/cuyama/login.php)

METHODOLOGIES

The methodologies used to develop these numbers are described below.

1. SOUTHEASTERN REGION

The MO is calculated by finding the measurement taken closest to (but not before) 1/1/2015. Additionally, measurements were not used if they exceeded 4/30/2015. If no measurement was taken during this 4-month period, then a linear trendline was applied to the data and the value for 1/1/2015 was extrapolated.

The MT is calculated by adding 5 years of groundwater storage to the MO. 5 years of storage is calculated by calculating the decline in groundwater levels form 2013-2018 (a drought period). If measurements are insufficient for this time period, a linear trendline was used to extrapolate the value.

2. EASTERN REGION

The MT is calculated by taking the either the value 20% groundwater level range below 2015 measurement, or 10 feet above the nearest well - whichever is more restrictive (depth to water's lowest value).

20% of the range of groundwater level measurements is calculated by taking the minimum and maximum groundwater levels for each well, taking 20% of that total range and subtracting it from the measurement closest measurement to (but not before) 1/1/2015. If no measurement was taken during this 4-month period, then a linear trendline was applied to the data and the value for 1/1/2015 was extrapolated.

A Geographic Information System (GIS) analysis was conducted to find the shallowest wells near each of the representative wells. This incorporated both the OPTI dataset, as well as the Department of Water Resources (DWR)'s Township and Range mapping application that utilizes well drilling reports. OPTI well analysis used a 1.5-mile radius circle to find nearby well depths, and the DWR data uses a 9 square mile grid to find the shallowest well.

The MO is calculated by subtracting 5-yrs of groundwater storage from the MT. 5-yrs of storage is calculated by calculating the decline in groundwater levels form 2013-2018 (a drought period). If measurements are insufficient for this time period, a linear trendline was used to extrapolate the value.

3. CENTRAL REGION

The MT is calculated by taking the minimum and maximum groundwater levels for each well, taking 20% of that total range and subtracting it from the measurement closest measurement to (but not before) 1/1/2015. If no measurement was taken during this 4-month period, then a linear trendline was applied to the data and the value for 1/1/2015 was extrapolated.

The MO is calculated by subtracting 5-yrs of groundwater storage from the MT. 5-yrs of storage is calculated by calculating the decline in groundwater levels form 2013-2018 (a drought period). If measurements are insufficient for this time period, a linear trendline was used to extrapolate the value.

4. WESTERN REGION

The MT is calculated by taking the difference between the total well depth and the value closest to mid-February, 2018, and calculating 15% of that depth. That value is then subtracted from the mid-February measurement to get the final MT.

The MO is calculated by finding the measurement closest to mid-February, 2018 (i.e what is considered a "full" condition) and setting it as the MO.

5. NORTHWESTERN REGION

The MT is calculated using 15% of the saturated thickness for the overall region, which is equal to approximately 169 feet below ground surface elevation.

The MO is calculated using 5 years of storage. Because historical data reflecting new operations in this Threshold Region is extremely limited, 50 feet was used as 5 years of storage based on local landowner input.

EXCEPTIONS

There were 11 representative wells with monitoring records that were not conductive to estimating a reasonable MO. These wells fell into two categories:

1. Modified Measurable Objective Calculation: These wells had no vertical change in groundwater elevation within 5 years of 2015, and alternate methods were used to calculate the MO for these wells. These wells and the methods used included:

- OPTI 74, 114, 568, 609, and 615 – the MO was calculated by using five years of vertical change in elevation using the overall trendline slope of the well’s measurements,
- OPTI 103 – The MO was calculated by using the average spring measurement, and
- OPTI 474 – the MO was calculated by using the historic high at this well.

2. Wells with no vertical change in groundwater elevation at all over their period of record were not useful for estimating a MO without a substantial change in approach and were removed from the representative network (and are kept in the overall monitoring network). These wells had nearby representative wells that provide spatial coverage, and include OPTI 110, 122, and 125.

TO: Standing Advisory Committee
Agenda Item No. 5e

FROM: Mary Currie, Catalyst Group

DATE: January 8, 2019

SUBJECT: Stakeholder Engagement Update

Issue
Update on the Cuyama Basin Groundwater Sustainability Agency Groundwater Sustainability Plan stakeholder engagement.

Recommended Motion
None – information only.

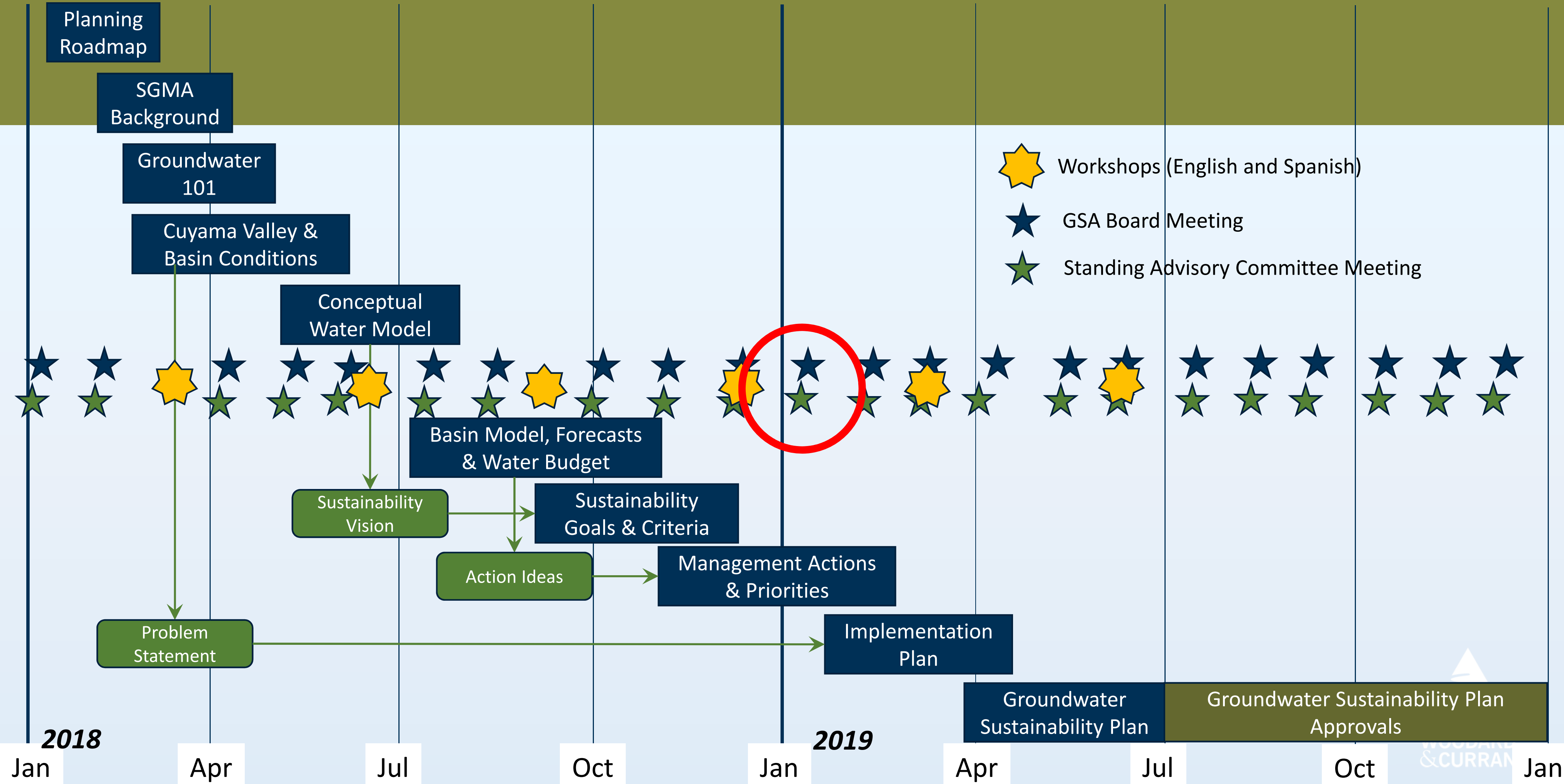
Discussion
Cuyama Basin Groundwater Sustainability Agency (CBGSA) Groundwater Sustainability Plan (GSP) outreach consultant the Catalyst Group's stakeholder engagement update is provided as Attachment 1.

Cuyama Basin Groundwater Sustainability Agency

Groundwater Sustainability Plan Stakeholder Engagement Update

January 8, 2019

Cuyama Basin Groundwater Sustainability Plan – Planning Roadmap



Update on Outreach Activities

- Community Workshops Monday, December 3, 2018
  - 40 stakeholders attended with 10 new stakeholder contacts
  - Discussed Water Budgets and Sustainability Thresholds
  - Workshop Summary Report available for January 9 GSA Board Meeting
- Next Round of Community Workshops
  - February 2019, date to be determined
  - Topic = projects and management actions
- February-April 2019 Recreation Center Newsletter
  - Deadline to Submit GSA Newsletter is January 18

TO:	Standing Advisory Committee Agenda Item No. 6b
FROM:	Jim Beck, Executive Director
DATE:	January 8, 2019
SUBJECT:	Board of Directors Agenda Review

Issue
Review of the January 9, 2019 Cuyama Basin Groundwater Sustainability Agency Board of Directors agenda.

Recommended Motion
None – information only.

Discussion
The January 9, 2019 Cuyama Basin Groundwater Sustainability Agency Board of Directors agenda is provided as Attachment 1 for review.

Attachment 1

CUYAMA BASIN GROUNDWATER SUSTAINABILITY AGENCY BOARD OF DIRECTORS

Board of Directors

Derek Yurosek Chairperson, Cuyama Basin Water District
Lynn Compton Vice Chairperson, County of San Luis Obispo
Das Williams Santa Barbara County Water Agency
Cory Bantilan Santa Barbara County Water Agency
Glenn Shephard County of Ventura
Zack Scrivner County of Kern
Paul Chounet Cuyama Community Services District
George Cappello Cuyama Basin Water District
Byron Albano Cuyama Basin Water District
Jane Wooster Cuyama Basin Water District
Tom Bracken Cuyama Basin Water District

AGENDA

January 9, 2019

Agenda for a meeting of the Cuyama Basin Groundwater Sustainability Agency Board of Directors to be held on Wednesday, January 9, 2019 at 4:00 PM, at the Cuyama Valley Family Resource Center, 4689 CA-166, New Cuyama, CA 93254. To hear the session live call (888) 222-0475, code: 6375195#.

The order in which agenda items are discussed may be changed to accommodate scheduling or other needs of the Board or Committee, the public, or meeting participants. Members of the public are encouraged to arrive at the commencement of the meeting to ensure that they are present for discussion of all items in which they are interested.

In compliance with the Americans with Disabilities Act, if you need disability-related modifications or accommodations, including auxiliary aids or services, to participate in this meeting, please contact Taylor Blakslee at (661) 477-3385 by 4:00 p.m. on the Friday prior to this meeting. Agenda backup information and any public records provided to the Board after the posting of the agenda for this meeting will be available for public review at 4689 CA-166, New Cuyama, CA 93254. The Cuyama Basin Groundwater Sustainability Agency reserves the right to limit each speaker to three (3) minutes per subject or topic.

	1.	Call to Order (Yurosek) (1 min)
	2.	Roll Call (Blakslee) (1 min)
	3.	Pledge of Allegiance (Yurosek) (1 min)
	4.	Approval of Minutes (Yurosek) (3 min)
Motion		a. December 3, 2018 (Regular Meeting)
Motion		b. December 18, 2018 (Special Board)
Memo	5.	Report of the Standing Advisory Committee (Jaffe) (3 min)
Memo	6.	Technical Forum Update (Melton) (3 min)
	7.	Groundwater Sustainability Plan
Memo		a. Groundwater Sustainability Plan Update (Melton) (5 min)
M/M		b. Groundwater Conditions Chapter Adoption (Melton) (5 min)
Memo		c. Adoption of Threshold Numbers for Representative Wells (Ayres) (30 min)
Memo		d. Stakeholder Engagement Update (Gardiner) (5 min)

8. Groundwater Sustainability Agency

Verbal — a. Report of the Executive Director (Beck) (3 min)

Memo — b. Progress & Next Steps (Beck) (3 min)

Verbal — c. Report of the General Counsel (Hughes) (2 min)

9. Financial Report

Memo — a. Financial Management Overview (Blakslee) (3 min)

Memo — b. Financial Report (Blakslee) (3 min)

M/M — c. Payment of Bills (Blakslee) (3 min)

10. Reports of the Ad Hoc Committees (3 min)

11. Directors' Forum (3 min)

12. Public comment for items not on the Agenda (5 min)

At this time, the public may address the Board on any item not appearing on the agenda that is within the subject matter jurisdiction of the Board. Persons wishing to address the Board should fill out a comment card and submit it to the Board Chair prior to the meeting.

13. Adjourn (5:25 pm)