APPENDIX 1-F
Comments to the Draft Groundwater Sustainability Plan and Responses

Response to Comments Summary and Master Responses to
Public Review Draft of the Vina Subbasin Groundwater Sustainability Plan
Released September 2021

Overview

The Vina Groundwater Sustainability Agency (GSA) and the Rock Creek Reclamation District (RCRD) GSA (GSAs) in the Vina Subbasin would like to thank the public, partner agencies, and interested parties for their participation in the development of the Vina Subbasin Groundwater Sustainability Plan (GSP). During the public review period, a total of seven entities and eight individuals submitted comment letters on the draft GSP. In addition, numerous members of the public also submitted comments using the comment tracking sheet format. Each of these comments are included in this Appendix in a comment tracking table that also includes the GSAs' response. Comment letters and associated attachments are included following the comment tracking table.

Submitted public comments describe a variety of issues, some of which have been acknowledged and incorporated into the GSP. The GSAs acknowledge that the GSP is a living-breathing document and subject to revision and update in the future as data gaps are filled, projects and management actions (PMAs) are refined and completed, resource management responds to changing conditions, and to continue compliance with SGMA.

The specified Measurable Objectives (MOs) and Minimum Thresholds (MTs) (and resulting definitions of Undesirable Results) were developed through an iterative process with GSAs, technical consultant, and the Stakeholder Advisory Committee (SHAC) using best available information. They are based on local input and a balance of local concerns. Over the last two years, discussions were held during the Vina SHAC meetings, at public workshops, and by the individual GSA boards throughout GSP development. Protection of domestic wells, and those within the subbasin who are dependent on them (including Disadvantaged Communities), was an important criteria for establishing MTs for groundwater levels. Although the Vina Subbasin benefits from the historical Butte Basin Groundwater Model, additional data is needed to understand and analyze impacts to beneficial uses and users regarding interconnected surface waters and Groundwater Dependent Ecosystems (GDEs). This was identified as a data gap, and the GSP includes a specific Project to help fill this data gap (described in Section 5.4). Understanding subbasin condition effects on these uses and users of groundwater is expected to improve through new information as GSP implementation proceeds. Sustainable Management Criteria (SMC) may be modified in future versions of the GSP.

Several comment topics from the received public comments/comment letters are addressed in the Master Responses, further below, which are referred to in the individual responses to comments in the comment tracking sheet.

Commenters seeking further clarification of issues or questions raised in individual comments or by agency letters are encouraged to address them with the Vina GSA Management Committee or RCRD GSA manager. The GSAs will continue to seek to foster participation and partnerships with the public, NGOs, agencies, and interested parties as the GSP is implemented.

Public Review Period

The Draft GSP was released for a 40-day public review period beginning on September 10, 2021 and ending October 19, 2021. As part of the public review process, the GSAs held two public workshops 1) an in-person workshop on October 4, 2021 and 2) a virtual workshop on October 13, 2021. In addition, the Vina GSA Stakeholder Advisory Committee (SHAC) also met on October 19 and November 4, 2021 to provide comments to the Vina GSA Management Committee and Geosyntec (consultant team) for review and consideration for incorporation into the GSP, as appropriate, prior to finalizing the document for review by the GSA Boards. The GSAs heard additional comments and considered final revisions during the Public Hearing of the GSP on November 15, 2021.

Comments Received / Comment Tracking Table

The comment tracking table identifies all of the comments received during the 40-day public comment period. The comment tracking table tabulates approximately 175 comments on the GSP and clarifying questions posed during public workshops. The comment tracking table also identifies eight letters submitted by members of the public (identified as P1 through P8) and seven letters submitted by agencies and organizations (identified as A1 through A7). These seven agencies and organizations include:

1. Audubon California, Clean Water Action, Clean Water Fund, Local Government Commission, The Nature Conservancy, American Rivers and Union of Concerned Scientists.
2. California Department of Fish and Wildlife (CDFW)
3. Agriculture Groundwater Users of Butte County (AGUBC)
4. Audubon California
5. Butte Environmental Council (BEC)
6. AquAlliance
7. Glenn-Colusa Irrigation District (GCID)

The comment letters are cross-referenced in the table and included in their entirety as an attachment to the comment tracking table.

The Vina GSA Management Committee in coordination with the consultant team reviewed all comments received and responded accordingly. Comments that resulted in edits, additions, or deletions to the GSP were documented in tracked changes for ease of review by the GSA Boards prior to adoption. These revisions are also noted in the comment tracking table.

Master Responses

Master Response – Measurable Objectives and Minimum Thresholds (MO/MT)

Comments express concern that the MT and MO are set too low to protect against undesirable results to domestic well owners, groundwater dependent ecosystems, and stream flows. Other comments express support for the established SMC for groundwater levels.

The specified Measurable Objectives (MOs) and Minimum Thresholds (MTs) (and resulting definitions of Undesirable Results) were developed through an iterative process with GSAs and local stakeholders and using best available information. The MO and MT are based on local input and a balance of local concerns. Over the past year, discussions were held during Vina GSA Stakeholder Advisory Committee

meetings, at public workshops, and by joint meetings of the GSA boards throughout GSP development. Protection of domestic wells, and those within the subbasin who are dependent on them (including Disadvantaged Communities), was an important criteria for establishing MTs for groundwater levels. However, the GSP identifies an important data gap related to establishing this MT:

> *"The MT for groundwater levels is based on total depths of domestic wells. The dataset used for this assessment is poor and may include wells no longer in use or poorly maintained. To resolve this data gap, the GSAs will conduct surveys of active domestic wells to assess the actual total depth of these wells within the Vina Subbasin. The GSAs will also maintain a record of verifiable domestic wells that go dry during the implementation period that will include depth of these wells, screen intervals, and available maintenance records. These data will be used to modify the MT over the implementation period, as appropriate." - Section 4.10*

The GSP includes a specific Project, the Community Monitoring Program, to help fill this data gap (described in section 5.4.3). Understanding subbasin condition effects on all uses and users of groundwater is expected to improve through new information as GSP implementation proceeds. As a result, Sustainable Management Criteria (SMC) may be modified in future versions of the GSP.

The methodology for establishing the MT is described in Section 3.3.2. and Appendix 3 shows graphs of the distribution of domestic well depths associated with each Representative Monitoring Site (RMS) well. These graphs along with consideration of ground surface elevation changes within the RMS zone were used to establish the MT. The GSA Boards gave direction to use this approach at their July 14, 2021 Joint GSA Board meeting.

In response to comments, Section 3.3 was revised to clarify and better describe the methodology used to establish the MT for each RMS well. Maps have been added to Appendix 3 to show average depths of wells throughout the subbasin. Graphs in Appendix 3 show the Elevation of the Bottom of each domestic well located within the RMS Zone relative to the RMS well's ground surface elevation. Each red point on the graph represents a domestic well in the RMS zone. The elevation of the MO and MT established at the RMS well is shown relative to the elevation of the bottom of all domestic wells (post 1980 from the well database) within the zone. The graphs were used to identify the MT that would be protective of the majority of the domestic wells in the RMS zone while recognizing the RMS well is not fully representative of wells within the zone due to changes in ground surface and water surface elevation throughout the RMS zone. Wells above the MT elevation tend to be especially shallow (less than 100 feet deep) or have a significantly different (higher) ground surface elevation than the RMS well. The proposed MTs for groundwater elevation do not necessarily protect all domestic wells because it is impractical to manage a groundwater basin in a manner that fully protects the shallowest wells. However, the GSP describes a management action, Domestic Well Mitigation (Section 5.3.2), that describes a number of steps the GSAs would take to mitigate impacts if an increasing number of domestic groundwater wells go dry in the Vina subbasin.

Comments express concern that the MT is set too low, "below the 80 foot maximum rooting depth of Valley Oaks" and therefore do not sufficiently consider groundwater dependent ecosystems (GDEs). It is important to note the RMS wells were selected to be representative of domestic wells and the GSP identifies a data gap related to the lack of shallow groundwater monitoring that is needed to characterize the water table (depth to first groundwater). This shallow monitoring data is needed to evaluate

groundwater conditions in relation to rooting depths and GDEs. The GSP describes a framework (Section 3.8.2) to address this data gap which has application both to characterizing interconnected surface water and GDEs throughout the Vina Subbasin. For additional details, see GDE Master Response.

Comments also express concern that the MO for groundwater levels is set too low. The methodology for establishing the MO is described in Section 3.3.3 and was considered through extensive public dialogue via Vina GSA Stakeholder Advisory Committee meetings, public workshops, and discussions by the GSA Boards since at least February 2021. In response to the received public comments on the Public Review draft of the GSP (contained in the attached comment tracking sheet), the management committee proposed an alternative MO based on 2010-2020 average groundwater levels in each RMS well for the GSAs' consideration. At a Public Hearing of the GSP on November 15, 2021 the GSA Boards considered input from the Vina GSA SHAC and public members. The GSA Boards decided to utilize the 2030 trend of groundwater conditions for each RMS well to establish the MO, as originally described in the public review draft.

The GSAs acknowledge that the SMC are subject to revision and update in the future as data gaps are filled, projects and management actions (PMAs) are refined and completed, and implementation of the GSP responds to changing conditions.

Master Response – Groundwater Dependent Ecosystems (GDE)

Comments discussed the benefits of protecting Groundwater Dependent Ecosystems (GDEs), the analysis process for identifying GDEs, and potential impacts to GDEs associated with changing groundwater levels.

Groundwater Dependent Ecosystems are defined in the SGMA regulations as "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface." The GSP acknowledges that GDEs exist within the Vina Subbasin largely where vegetation accesses shallow groundwater for survival; and in areas with streams and creeks where a connection to groundwater exists. The extent of where these conditions occur is largely unknown in the Vina subbasin at this time due to the lack of shallow groundwater monitoring to characterize water table conditions. To address this, a framework is described in the GSP in Section 3.8.2 and a Project (5.4.4) to obtain the needed data identified in the framework to monitor and characterize groundwater conditions in relation to beneficial uses and users of groundwater, including GDEs. This will be an important activity of early GSP implementation.

A distinction between an ecosystem's dependence on groundwater versus its dependence on surface water and the associated riparian zone or floodplain is important and not well understood in the Vina subbasin at this time. The Vina Subbasin acknowledges that overall function of the riparian zone and floodplain is dependent on multiple components of the hydrologic cycle that may or may not have relationships to groundwater levels in the principal aquifer and may or may not be impacted by pumping in the subbasin. For example, hydrologic impacts outside of the Vina Subbasin, such as upper watershed development or fire-related changes in run-off, could result in impacts to streamflow, riparian areas, or GDEs that are completely independent of any connection to groundwater use or groundwater conditions within the Vina Subbasin.

While only limited data from a few monitoring wells exist to understand these connections, the following is an example of one nested monitoring well (23N01W31M; Figure 2-22) that includes a well completed in the shallow aquifer zone and three wells within deeper zones. The hydrograph for the shallow wells suggests it has a total depth within what could be termed “floodplain sediments” and is in direct hydraulic communication with the Sacramento River. This means that groundwater conditions in this location are likely tied closer to streamflow conditions from the adjacent river than groundwater use. Another nested well completed further away from the Sacramento River indicates that the shallow well in the group is in clear connection with deeper zones and does not indicate any connection to Sacramento River dynamics.

The subbasin does not have a sufficient amount of wells at differing appropriate distances from surface waters (with streamflow monitoring devices already installed on them) with differing depths to be able to sufficiently characterize the spatial or temporal conditions relating to how surface water and groundwater in this subbasin are connected, nor the impacts of groundwater use on potential GDEs. This lack of monitoring wells is identified in the GSP as a data gap. The RMS wells in the subbasin which are used to monitor groundwater levels are not indicative of shallow groundwater (i.e.. water table) conditions, as the majority of them have a total depth of over 150’ deep, or are not screened at depths, which when monitored would allow for an accurate representation of the shallow water table elevations to provide a way to monitor impacts to GDEs. For this reason groundwater level monitoring wells are not evaluated in relation to potential GDEs. As discussed in Section 4.10 sufficient data is lacking at this time to analyze the interaction of streams and pumping within the principle aquifer system. These data are not available and are identified as a data gap for the GSP with a clear plan on how it will be addressed. The GSAs in the Vina Subbasin intend to further evaluate this the groundwater level and interconnected surface water SMC to avoid undesirable results to aquatic ecosystems and GDEs. Additional wells and other monitoring networks will be installed, as appropriate, following the framework discussed in Section 3.8.

As additional data are collected and evaluated, the Vina Subbasin GSAs will evaluate the development or refinement of additional SMC, as appropriate, for specific stream reaches and associated habitat where priority GDEs are identified, where there is a clear connection to groundwater pumping in the principal aquifer.

The GSAs will focus on connectivity where there is a measurable connection between groundwater levels in the principal aquifer and streamflow or associated aquatic habitat viability. The Vina Subbasin specifically recognizes deep-rooted tree species, such as Valley Oak, that are common along riparian corridors in both upland streams and the Sacramento River. This connectivity is not well measured or understood in the Vina Subbasin at this time. As these conditions are better understood the GSAs will determine if GDEs are being adversely impacted by groundwater management and adjust management actions accordingly. In the interim, an undesirable result defined for interconnected surface waters is defined as:

> *Avoiding significant and unreasonable depletion of surface water flows caused by groundwater pumping that significantly impacts beneficial uses.*

The SMC developed for groundwater levels are used as a proxy for interconnected surface water in an interim manner until data gaps are addressed. As outlined in Section 6, an aggressive schedule has been provided to fill these data gaps and the GSAs are committed to addressing these issues and will refine and develop appropriate SMCs for the Vina Subbasin through implementation of the GSP.

Additionally, it is important to note that SGMA does not require GSAs to identify species present in GDEs. The NCCAG dataset provides the dominant species per polygon and can be referenced online. The approach to the initial analyses of GDEs was developed through discussions with staff of The Nature Conservancy, a locally formed GDE working group, County staff, GSA managers and staff from other subbasins in the region. As additional data are collected and evaluated, the Vina Subbasin GSAs will evaluate the development of additional criteria for identifying GDEs including but not limited to comparing water depths in representative monitoring sites to the rooting depths of nearby potential GDE communities. These and other updates will be provided in the periodic evaluations of the GSP provided to the Department of Water Resources.

Master Response – Interconnected Surface Waters (ISW)

Comments expressed concern regarding lack of consideration of stream-groundwater interactions and impacts of groundwater extractions on stream depletions and associated beneficial uses and users in development of Sustainable Management Criteria (SMC) for this sustainability indicator.

Section 4.10 describes a significant data gap discussed earlier in Section 3.8 as it pertains to development of Sustainable Management Criteria (SMC) for Interconnected Surface Water (ISW):

"Data needed to develop this SMC include definition of stream reaches and associated priority habitat, streamflow measurements to develop profiles at multiple time periods, and measurements of groundwater levels directly adjacent to stream channels, first water bearing aquifer zone, and deeper aquifer zones. These data are not available and are a data gap for the GSP."

The GSP acknowledges additional data is needed to characterize the relationship between shallow groundwater conditions, groundwater pumping, and surface water depletions to evaluate impacts to environmental users, such as listed aquatic species, river flows and timing, or water temperatures. The Plan demonstrates a thorough understanding of where data gaps exist and demonstrates a commitment to eliminate those data gaps. In particular, increasing monitoring in shallow aquifer zones will lead to a better overall understanding of the dynamics and impacts of depletions of interconnected surface water.

Section 3.8.2 describes an "ISW SMC Framework" that outlines the specific data needs required to address the identified data gap. Section 5.4.4 describes a data collection project to address this data gap as the GSP is implemented. The GSA intends to seek grant funds and/or Technical Support Services to install additional monitoring wells and may partner with neighboring subbasins to address shared data gaps and monitoring needs (see Inter-basin Coordination Master Response).

Additionally, through local partnerships with Chico State, studies such as the Butte Creek Stream-Aquifer Interaction Study is underway in 2021. Butte County and other GSAs in the Butte Subbasin are investing in data and analyses needed to improve understanding of the timing, location, and extent of stream-aquifer interactions along Butte Creek. This study will benefit the Vina Subbasin since Butte Creek traverses the Vina South management area. In addition, the Interconnected Stream Monitoring project (see Section 6.1.5) will include additional monitoring of shallow groundwater conditions throughout the subbasin, and future Airborne Electromagnetic (AEM) data collection conducted by the Department of Water Resources will help inform understanding of vertical connectivity between shallow and deeper zones of the aquifer system. This will improve understanding of groundwater extraction impacts on

shallow groundwater conditions in space and over time which is critical for analyzing impacts of stream depletions, both on environmental uses and users and on senior water right holders.

The GSP was developed with best available data and tools. Identified data gaps as they relate to ISW will be addressed during the implementation phase of the GSP, and the Vina GSA Boards recognize that SMC may need to be revisited as data gaps are filled and improved information is available. Understanding stream-groundwater interactions in the Vina Subbasin is expected to improve through new information as GSP implementation proceeds.

Master Response – Projects and Management Actions/Timing of Implementation

Comments discussed various opinions pertaining to the projects and management actions, including timing of implementation, identified in the GSP.

The projects and management actions, described in Section 5 of the Plan, are reasonable and commensurate with the level of understanding of the Subbasin setting and designed to improve adaptive management practices. The GSP describes several project and management actions to further its monitoring networks and understanding of the Subbasin. In addition revisions were made to Section 5, based on direction of the Vina GSA and RCRD Boards at the November 15, 2021 Joint Board meeting.

Master Response – Inter-basin Coordination

Several comments identified the importance of inter-basin coordination with regard monitoring programs and data collection for groundwater levels and subsurface flows patterns and influences between basins as well as water supplies and demand.

Section 6.7 of the GSP notes that Inter-basin Coordination is critical due to the interconnectedness of groundwater. The Northern Sacramento Valley Inter-basin Coordination Report, Appendix 6-A, describes coordination efforts. An overview and the intent and purpose of the Coordination Report is provided herein:

> Inter-basin coordination is critical in the Northern Sacramento Valley as GSAs develop and implement Groundwater Sustainability Plans (GSPs). Since groundwater subbasins in the Northern Sacramento Valley are hydrologically interconnected, water management decisions and actions in subbasins (i.e., groundwater pumping and processes affecting recharge, water demand, and supply including climate change) could change aquifer conditions. Understanding and accounting for these processes is important towards achieving sustainability in all subbasins.
>
> Inter-basin coordination is described in the GSP Regulations in Article 8. Under the regulations, GSAs must describe how they coordinate with adjoining subbasins to demonstrate implementation will not adversely affect adjoining subbasins. The Department of Water Resources (DWR) is required to evaluate whether a GSP adversely affects the ability of an adjacent basin to implement their GSP or impedes achievement of sustainability goals in an adjacent basin (Water Code 17033(c)). Coordination among GSAs can be formalized in different ways and inter-basin agreements are voluntary.
>
> Inter-basin coordination discussions among staff representatives from 11 subbasins (Antelope, Bowman, Butte, Colusa, Corning, Los Molinos, Red Bluff, Sutter, Vina, Wyandotte Creek, and

Yolo), with facilitation support from the Consensus Building Institute (CBI) began during the summer of 2020. While efforts focused on these subbasins, coordination will occur, as warranted, with other neighboring subbasins (Anderson and North Yuba).

After an initial attempt to compile technical information to better understand basin conditions at respective boundaries, staff realized differing timelines for the completion of Basin Setting content in each subbasin meant there would not be sufficient time during initial GSP development to fully characterize or address major inconsistencies. Therefore, the goal for regional inter-basin coordination shifted towards establishing a framework for long-term inter-basin coordination and dialogue (post GSP submittal in 2022). Informal coordination discussions among staff and consultants between neighboring subbasins continued during the GSP development process.

Inter-basin coordination efforts in the Northern Sacramento Valley are focused on establishing a foundation and guidelines for sustained inter-basin coordination through GSP implementation, following the initial submittal of GSPs by January 31, 2022. GSAs intend to:

1. Establish a framework allowing for continued dialogue and a venue to address issues and discrepancies during the implementation of the GSPs;
2. Coordinate on consistent messaging and communicate shared expectations at a regional level;
3. Demonstrate regional coordination efforts and outcomes; and
4. Leverage existing agreements and arrangements in the region (e.g., Northern Sacramento Valley Integrated Regional Water Management (NSV IRWM), the Six County Memorandum of Understanding among Butte, Colusa, Glenn, Tehama, Shasta, and Sutter).

Five foundational pillars that comprise the framework for inter-basin coordination under SGMA between and among subbasins in the Northern Sacramento Valley were identified. These pillars build upon a long-standing history of regional collaboration and embody a commitment for continued coordination, collaboration, and communication for successful groundwater management in the region. These pillars represent a menu of options neighboring subbasins can draw upon, based on individual or neighboring subbasins' needs and challenges.

1. Information-sharing
2. Joint analysis and evaluation
3. Coordination on mutually beneficial activities
4. Coordinated communication and outreach
5. Issue-resolution process

Ongoing and continued inter-basin coordination will assist in ensuring that implementation of the GSPs do not adversely affect the ability of an adjacent basin to implement their GSP nor impede achievement of sustainability goals in an adjacent basin.

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Comment Tracking Table

References are made throughout the Comment Tracking Table to various Master Responses included in the Responses to Comments Summary and Master Responses memo. Provided below is a list of the Master Responses and a key to the Master Response abbreviations:

- Groundwater Dependent Ecosystems Master Response, GDE Master Response
- Measurable Objectives/Minimum Thresholds Master Response, MO/MT Master Response
- Inter-basin Coordination Master Response
- Interconnected Surface Waters Master Response
- Projects and Management Actions/Timing of Implementation Master Response

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
1	Eric Lundberg	Public Comments	GSP 3.2.2		3370	Managers should not have the flexibility to implement actions at "any time". Actions should have deadlines associated with seasons and agricultural activities. Actions should be taken before crops are planted, or at the beginning of an irrigation season.	Comment noted.
2	Eric Lundberg	Public Comments	GSP 3.3.1		3392 - 3393	Change "environmental uses of groundwater occur" to "the environment and ecosystems within the GSA". Pumped groundwater has many benefits to the environment and ecosystems. For many crops, pumped groundwater offers as many benefits to the environment as GDEs. MTs and MOs should not be managed exclusively for the benefit of GDEs, but should also take into consideration the improvements and benefits that pumped groundwater offers to the ecosystem. "... environmental uses of groundwater" should not only consider the GDE but also the impacts pumped groundwater has on the ecosystem. An orchard has as much benefit to the environment as the urban forest.	Thank you for this recommendation. The GSAs will consider this suggestion when GSP updates are made in the future.
3	Eric Lundberg	Public Comments	GSP 3.3.2		3412 - 3414	It is unreasonable for the VINA GSA to guarantee a well owner that his/her well will not go dry. By setting an MT and MO, well owners can know that a source of water will be protected, but that some additional well development to the MT or MO levels might be needed. Managers should encourage well owners to develop wells with the MT and MO levels in mind for a protected water source. "Sustainably constructed domestic wells" should take into consideration the MT and MO levels. It is the responsibility of the well owner for the maintenance of its well, not the GSA.	Comment noted. Butte County Department of Water and Resource Conservation provides well owner materials to the public through email notices, newsletter articles, and flyers, especially during periods of drought.
4	Eric Lundberg	Public Comments	GSP 5.2.3.4		4508 - 4515	I support storing flood water into storage locations. I would encourage the development of more ponds and lakes to capture flood water coming off the many creeks and rivers in the Vina GSA. However, I do not support the complexities associated with "recharge", so I would encourage the flood water storage to be utilized as a surface water supply for the Vina GSA.	Comment noted. The commenter provides a suggestion and does not raise specific technical or policy issues with the Plan.
5	Eric Lundberg	Public Comments	GSP 5.2.4.1		4544 - 4551	When PID has extra surface water, it seems only prudent for Vina GSA to utilize that excess.	Comment noted. The commenter provides a suggestion and does not raise specific technical or policy issues with the Plan.
6	Eric Lundberg	Public Comments	GSP 5.2.4.2		4573 - 4580	I support Vina GSA trying to utilize extra surface water from water right holders from outside of our GSA.	Comment noted. The commenter identifies their support to utilize extra surface water and does not raise specific technical or policy issues with the Plan.
7	Eric Lundberg	Public Comments	GSP 5.2.4.4		4635 - 4639	Utilizing the Miocene Canal as a way of capturing surface water is both practical and sensible.	Comment noted. The commenter provides an opinion regarding the capture of surface water and does not raise specific technical or policy issues with the Plan.
8	Eric Lundberg	Public Comments	GSP 5.2.4.6		4692 - 4697	I support utilizing all available water coming out of the wastewater treatment plant.	Comment noted. The commenter provides support for utilizing wastewater and does not raise specific technical or policy issues with the Plan.
9	Eric Lundberg	Public Comments	GSP 5.2.4.11		4871 - 4876	I support trying to increase the surface water supply to the Vina Subbasin.	Comment noted. The commenter provides support for trying to increase surface water supplies and does not raise specific technical or policy issues with the Plan.
10	Eric Lundberg	Public Comments	GSP 5.3		4939	The timing of the "schedule to implement the management actions" must be appropriate for the pumpers affected by these actions. I would like to have the Vina GSA board be directed by a written policy as to when these actions can be taken.	The GSA Boards will decide in a public process on the timing and schedule of PMAs based on a variety of considerations including but not limited to subbasin conditions, PMA readiness and funding availability.
11	Eric Lundberg	Public Comments	GSP 5.3.2		4949 - 4962	It is valuable to gather more information to understand the domestic well situation. However, I do not support the Vina GSA becoming involved by funding the improvement and deepening of domestic wells. It is the responsibility of the well owner for the maintenance of its well, not the GSA. The GSA should not be responsible for providing bottled water and potable water for sanitation. The responsibility of the GSA is to protect the water under our land and not the means to acquire it. I recommend omitting # 3 and # 4 from the PMA and the last sentence of the PMA.	Comment noted. The commenter provides support for gathering more information regarding domestic wells and an opinion regarding well owners' responsibilities pertaining to well maintenance. The commenter also recommends changes to Project and Management Actions. Although not specific to their comment, the commenter is referred to the changes that have been made to Section 5, Project and Management Actions.

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
12	Eric Lundberg	Public Comments	GSP 5.3.3		4970 - 4972	I do not support the amendment "requirements for well screens to account for MT" to the BC code. Well drillers need to understand the risks and consequences, but as long as they understand these risks, allow them to drill the well to the depth they think is best.	Comment noted. The commenter notes their lack of support for changes to the Butte County code and does not raise specific technical or policy issues with the Plan.
13	Eric Lundberg	Public Comments	GSP 5.3.5		4981 - 4983	Ponds and lakes are good for the environment, GDEs, and other shallow water systems. Ideally, they should be filled with surface water, but even if they are not, the water still stays inside the Vina GSA in some form. I do not support the Vina GSA encouraging Butte County to amend the zoning ordinance to prohibit the use of groundwater for ski lakes or any recreation that land owners desire on their property, such as swimming, fishing, water habitat, water plants, beauty, wading, floating, sailing, rowing, etc. I recommend omitting GSP 5.3.5.	Comment noted. The commenter notes their lack of support for changes to the Butte County zoning ordinance pertaining to water ski lakes. The commenter does not raise specific technical or policy issues with the Plan.
14	Eric Lundberg	Public Comments	GSP 5.3.7		4991 - 5004	I recommend omitting GSP 5.3.7 and that the VINA GSA board support the development of groundwater irrigation districts like Tuscan Irrigation District that could deal more effectively with ground water level issues.	Comment noted. The commenter provides a suggestion and does not raise specific technical or policy issues with the Plan.
15	Eric Lundberg	Public Comments	GSP 5.5		5061	There does not seem to be any specific schedule requirements to "begin implementation of management actions". For some actions a schedule isn't important, but other actions may have serious negative effects on those who rely upon pumping. It should be clear when certain actions can be taken and when they cannot.	Comment noted. The GSA Boards will decide in a public process on the timing and schedule of PMAs based on a variety of considerations including but not limited to subbasin conditions, PMA readiness and funding availability.
16	Eric Lundberg	Public Comments	GSP 6.1		5096 - 5131	These costs seem to be a duplication of the work that Butte County Water Resources already does. I would reduce these costs and work with BCWR department.	Comment noted. The County is a member agency of the Vina GSA and serves on the GSA management committee. The County will work with the GSA to clarify its role and minimize duplication of work efforts, as appropriate.
17	Eric Lundberg	Public Comments	GSP 6.5		5210	I would recommend annual reports to be submitted by February 1 instead of April 1. April 1 reporting does not allow adequate time for management actions to be taken before seasonal irrigation begins.	Comment noted. The content of the Annual Report and timing of its submission may be considered in the future by the GSA Boards.
18	Ernest & Sharon Robinson	Public Comments				Thank you for giving us an opportunity to support the sustainable groundwater management act up for the required adoption by January 30, 2022. We are residents of Durham since 2007 and have our own well. We hope our support will help but our senior years hopefully will continue here in Durham.	Comment noted. Thank you for participating.
19	Scott Brady	Public Comments			ES 8	Figure ES 8 suggests that management of the aquifer will deplete the aquifer more rather than restore it to a higher level. The draft plan's measurable 20objective is too low. Our objective should be to restore the aquifer to a level close to its historical average, ideally 120 feet above mean sea level, not further deplete it.	Comment noted. The commenter notes their concern that the Measurable Objective is too low and should be more in line with historical conditions. See MO/MT Master Response.
20	Scott Brady	Public Comments			Executive Summary	The attachment from page 10 of the Executive summary identifies the sustainable yield of pumping for agricultural use at 233,000 AF/year. This is not sustainable. While less than the current rate of pumping, 244,000 AF/year, there is a strong possibility/ probability that pumping at this level will further deplete the aquifer. This is especially true if the so-called "drought" really reflects the "new abnormal" of climate in the North Valley. Restoring and carefully stewarding this irreplaceable resource should lead to a more conservative estimate of sustained yield. Perhaps an 18% reduction in the existing pumping rate to around 200,000 AF/year would be a reasonable starting point. After all, Californians have been asked by Gov Newsom to reduce water use by 18% due to the drought. Let's start there as a sustainable yield.	Comment noted. Historical groundwater level data and observed declines were used to estimate the volume of water associated with the 20-year declining trend. Section 2.3.6 describes the data and approach used to estimate Sustainable Yield. Although water budget estimates are useful, sustainability of the subbasin is *demonstrated* through monitoring and the avoidance of undesirable results relative to each sustainability indicator. Future work and updates to the GSP may refine the Sustainable Yield.
21	Cliff Jacobson	Public Comments				Please review your use of the proposed PID intertie language in your plan. At this point, there is no planned PID Intertie. By your organization and everyone else, including the proposed Tuscan water district, constantly referring to available surface water from the Campfire, you are doing a big disservice to the residents of Paradise. Please stop	Comment noted. The suggestion will be considered in future revisions or updates of the GSP.
22	Grace Marvin	Public Comments				Do not see view any failure of wells as acceptable, i.e., 10 % of wells going dry is unacceptable. We should have minimum groundwater levels that improve over the years to protect humans and nature.	Comment noted. See MO/MT Master Response
23	Grace Marvin	Public Comments				We need to protect the ownership of water by the county. Therefore, we cannot accept artificial recharge, since those doing the recharging come to own the groundwater. We do not want the profit motive, e.g., through private or corporate ownership, since that would mean that there would be an incentive to transfer water out of our county and the north state.	Comment noted.
24	Susan Schrader	Public Comments			3306, Figure 3-2	First of all, I appreciate how thorough this document is. It is evidence of hard work and effort. However, i do have concern about the Minimum Threshold. When I look at Figure 3-2, Line 3306, our "current conditions" seem safely above the Measurable Objective (MO) and significantly above the Minimum Threshold (MT) where undesirable results may begin to occur. I think that by the time we get to the MT two years in a row in non-dry years, it will be too late. I notice adverse effects already as domestic wells dry up and trees die around town.	Comment noted. See MO/MT Master Response.

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
25	Susan Schrader	Public Comments				I've heard that the reason to set the MT so low is so that it will never be reached and, therefore DWR won't come in and take over. I think that is dangerous reasoning if true. We need to have a contingency plan as to what steps will be taken to mitigate undesirable results long before we get to the MT. This prediction for rain this year is tenuous for our area. La Nina will bring drier, warmer temperatures to the southwest and colder, wetter weather to the north. 26We are in the middle and given an even chance for either to occur in our area. I think the MT needs to be set higher to avert water shortage disaster.	Comment noted. See MO/MT Master Response
26	Julian Zener	Public Comments				At the October 4th workshop on the Vina public draft GSP, Dr. Christina Buck indicated that approximately 40 residential wells had already gone dry in the Vina sub basin. I fail to understand the rational or humanity of intentionally letting this number increase, probably exponentially, in the next year or two before any of the proposed GSP mitigation actions are taken. Yes, I understand that it takes time to implement structural portions of the GSP but conservations measures can be enacted almost immediately. Agricultural irrigation efficiency and if needed fallowing would achieve more than half of the needed 10,000 acre feet projected to reach sustainability. Please increase the measurable objective ground water level to avoid major hardship for residential well users and potential harm to our urban forest. Most likely, the drought will continue.	Comment noted. See Master Response MT/MO
27	Kathy Watje (1)	Public Comments				I attended the Public Review Groundwater mtg. on Oct. 4, 2021 last Monday at the Masonic Lodge. The audience was invited to submit comments. I learned if "we" don't come up with anything doable the State will come in and dictate to Northern Californians what to do. We certainly don't need any more government overreach than we already have. Since this is supposed to be a 20-year sustainability plan and regardless of weather conditions, droughts, etc. we are supposed to figure out how to keep our groundwater levels at a level so all people have water who need it; whether it's the farmers or homeowners. I don't see how that can be done if the State of California, as a whole, keeps importing hundreds of thousands of people into our state and building more and more housing for them. This is a statewide issue and it becomes Northern California's issue because it is my understanding that we either sell or give water to the southern part of the state. As far as Northern California, Chico in particular, the city planning department or city council (I don't know which entity makes these decisions) has allowed hundreds if not close to a thousand new homes to be built in Butte County. There has to be a limit as to how many more homes can be built in these Northern Californian counties over the next 20 years if we are to maintain the water levels we say will be sustainable in our reports.My guess is it is all political and people trying to capitalize on making millions of dollars, particularly developers, by purchasing vacant land that is either not farmable for one reason or another or that the green belt lines are being ignored by the politicians. These developers need water for the homes they are building and I assume they dig massively deep wells in order to provide that water. There seems to be Zero regulation regarding this and that has to stop or we will never have enough water in Butte County or Northern California to be sustainable.Thank you and I hope your committee receives a good number of comments that help in this very important decision ahead for Northern California.	Comment noted.
28	Pam Stoesser (1)	Public Comments	3			I would like to speak to the subject of Minimum Threshold (MT) and what is shown in Section three of your Draft Plan. During the Public Workshop held in Chico on Monday Oct 4, the audience was told that the current groundwater sustainability MT for the Vina Subbasin is to be set at 50 feet below our historical lows. The chart doesn't show that number but it was told to us verbally by the staff. We were also told those historical lows are now, during this current severe drought. Many people spoke out in opposition to this setting. Here is how you bullet point the MT in your Plan: *MT– Quantitative threshold for each SI used to define the point at which undesirable results may begin to occur.* This is not accurate. We are already seeing undesirable results at our current groundwater levels. So I take great issue with the idea that what is happening now, at our current groundwater levels (not the MT set at 50 feet lower), i.e. domestic wells going dry, streams and rivers extremely low, and our struggling and dying trees, would not be considered undesirable results under this setting. That before the alarm goes off, things would have to get a lot worse. If the MT setting remains at 50 ft below current levels, I believe the wording of that definition needs to change to something like: *MT– Quantitative threshold for each SI used to define the point at which the level of undesirable results already occurring is unacceptable* (and then expressly state that actions are to be taken to insure we do not reach that point). I would rather see the MT set higher. I understand the argument against moving this number up, something to do with alarming the state to step in too soon. But if the number isn't moved up, there needs to be additional clarification added about what happens within the Margin of Operational Flexibility. Specifically what actions start happening when, as soon as we get below the green line into the Margin of Operational Flexibility. We cannot allow ourselves the chance of taking our	Comment noted. See MO/MT Master Response

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
						groundwater levels down another 50 feet! A statement providing the intention of not reaching the MT is nowhere to be found. Please add.	
29	Pam Stoesser	Public Comments				See Vina DRAFT GSP Comment P2	Comment noted. The commenter notes their concern about the effects of water management on the environment. The commenter also provides suggestions on the prioritization of the projects and management actions identified in Section 6 of the GSP. However, the commenter does not raise specific technical or policy issues with the Plan; no changes have been made to the GSP.
29	Pam Stoesser	Public Comments				See Vina DRAFT GSP Comment P3	Comment noted. Thank you for providing the article. It has been included as part of the Responses to Comments documentation.
30	J. Pablo Ortiz-Partida, Ph.D.	NGO Consortium				See Vina DRAFT GSP Comment A1 1. Beneficial uses and users are not sufficiently considered in GSP development (DACs, tribes, Domestic well information) nor are the indirect impacts on them described or analyzed sufficiently. 2. Interconnected Surface Waters - lack of supporting information provided for the ISW analysis, lack of clarity regarding which stream segments are retained as ISWs or potential ISWs in the GSP. 3. GDE – lack of analysis of groundwater data to verify the NC dataset polygons, some incorrectly removed in areas adjacent to irrigated fields or due to the presence of surface water supplies, lack of discussion regarding the flora or fauna species present in potential GDEs 4. Water Budget - the current and projected water demands for managed wetlands, (approximately half the historical water demands) need justification and the water budget model documentation is not provided 5. Stakeholder Engagement – A description of the active and targeted outreach to engage DAC members, drinking water users, environmental stakeholders and consultation to tribes during all phases of the GSP process is lacking. 6. Water Quality - Comments expressed the opinion that Water Quality MTs should address other constituents, rather than just electrical conductivity and discuss impacts on beneficial users. 7. Potential impacts on environmental beneficial uses and users, GDEs and instream habitats from the MOs/MTs need to be considered when defining undesirable results. 8. Climate change is not sufficiently considered. 9. Data gaps are not sufficiently identified and the GSP does not have a plan to eliminate them. 10. Projects and Management Actions do not sufficiently consider potential impacts or benefits to beneficial uses and users.	1. Thank you for these recommendations, a map of tribal lands and a map showing domestic well depths have been added to the GSP. Additional suggestions will be considered in future revisions or updates of the GSP. 2. Please see Interconnected Surface Waters Master Response. 3. Please see GDE Master Response. 4. The Butte Basin Groundwater Model (BBGM) documentation has been updated as part of the GSP development effort and is now available. The BBGM model documentation is included as a reference document of the GSP. Land use data, other than 2014 and 2016, is based on Department of Water Resources ground-based surveys from the Northern Region Office. For 2014 and 2016, satellite-based land use mapping developed by LandIQ was used. A significant reduction in managed wetland acreage occurs in the land use estimates beginning in 2016. This drives the drop reduction in ET and groundwater pumping associated with managed wetlands. If corrections or refinements are needed to model inputs, these can be addressed through model updates which are a planned activity of GSP implementation. 5. Thank you for your comment, additional refinements will be considered in future revisions or updates of the GSP. 6. Thank you for your comment, additional refinements will be considered in future revisions or updates of the GSP. 7. The GSP is not intended to address all groundwater quality conditions in the Subbasin; rather it sets a baseline to assess whether future actions taken by the GSAs may impact groundwater quality. Thank you for the additional specific recommendations regarding consideration of beneficial uses and users. The GSA Board(s) will consider these recommendations as the GSP is implemented and as updates to the GSP are made in the future. 8. Please see the MO/MT, GDE and Interconnected Surface Waters Master Responses. 9. The GSA Boards will consider these recommendations to the GSP in the future. 10. Thank you for this recommendation. Staff have included revisions to this section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
31	April Dorman	CDFW				See Vina DRAFT GSP Comment A2 <u>GDE Comments</u> 1. Potential GDE areas were classified as “Not Likely a GDE” if the areas were located within 150 feet of perennial surface water supplies, 150 feet of rice fields, 50 feet of other irrigated agriculture, or 150 feet of agricultural-dependent surface waters. This GDE-elimination method may disregard a GDE’s adaptability and opportunistic approach to accessing water in which the vegetation may rely on both surface water and groundwater between seasons and years.	GDE Comments - See GDE Master response. SMC Comments – See SMC Master response Monitoring Network Comments - See GDE Master response PMA Comments - Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
						2. The GDE analysis also classifies potential GDEs from the NCCAG dataset as "Not Likely a GDE" if the vegetation "did not indicate surviving conditions" over the four drought years reviewed for the analysis. During drought years, it is likely that GDEs were experiencing adverse impacts due to combined groundwater depletion and reduced surface water availability 3. The GSP does not identify or discuss species that may be present within the subbasin that rely on groundwater, groundwater dependent ecosystems, or interconnected surface waters. 4. In discussing potential impacts of groundwater depletions on GDEs or interconnected surface waters, the GSP refers to "deep rooted tree species" (lines 189, 3406, 3698). This phrasing is narrow and excludes consideration of all vegetation types that may be groundwater dependent or supported by interconnected surface waters apart from tree species. 5. In discussing potential impacts of groundwater depletions on GDEs or interconnected surface waters, the GSP refers to "deep rooted tree species" (lines 189, 3406, 3698). This phrasing is narrow and excludes consideration of all vegetation types that may be groundwater dependent or supported by interconnected surface waters apart from tree species. <u>SMC Comments</u> 1. Use of groundwater levels as a proxy metric for ISW depletions may misinform groundwater management activities and poorly predict instream habitat conditions for fish and wildlife species 2. ISW Framework does not discuss the methods that will be used to identify the number or locations of groundwater monitoring wells or stream gages. 3. Minimum thresholds (MTs) and measurable objectives (MOs) for groundwater levels, and by proxy for depletions of interconnected surface water, are not likely to prevent undesirable results for environmental beneficial uses and users of groundwater and interconnected surface water, including groundwater dependent ecosystems. 4. The GSP does not include any discussion or analysis of whether the established SMCs sufficiently avoid identified potential impacts to GDEs or environmental users of interconnected surface waters, and proposed indicators of undesirable results (i.e., SMC) for groundwater levels. Depletions of interconnected surface water effectively do not exist for dry water years. no groundwater management accountability during increasingly prevalent and challenging periods of dryness. 5. The GSP states that for the established SMCs, if observed data "trend toward the locally defined MT, this will trigger action on part of the GSAs." It is unclear over what time period data will need to be collected in order to establish a 'trend' toward the SMCs, and what action will be triggered. <u>Monitoring Network Comments</u> 1. It is unclear whether any of the selected groundwater level monitoring wells are located near areas with likely groundwater dependent ecosystems and if plan implementation will involve comparing water depths in representative monitoring sites to the rooting depths of nearby GDE communities. <u>PMA Comments</u> 1. The GSP should include details on specific metrics, targets, and timelines that if not reached with implementation of the planned PMAs will trigger the implementation of additional PMAs. <u>Interconnected Surface Water Comments</u> 1. No discrete time schedule is provided for installation of necessary groundwater wells and stream gages, refinement of the characterization of interconnected surface waters within the subbasin, and updates to the SMCs.	November 2021. The GSA Boards may consider additional updates to the plan in the future. Interconnected Surface Water Comments - See Interconnected Surface Water Master response.
32	Vita Segalla	Public Comments				See Vina DRAFT GSP Comment P1	Comment noted. The commenter notes their support for changing the minimum threshold and a suggestion for changing agricultural management practices. However, the commenter does not raise specific technical or policy issues with the Plan.

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33	Darren Rice	RCRD		5.2.3.4		PMA regarding Flood MAR. RCRD requests that methods of MAR considered under this PMA include direct injection via wells as a method of MAR. We recognize that this form of MAR may include additional characterization and impacts analysis as part of scoping. Flood MAR/Surface Water Supply and Recharge Scoping Under this project, Vina GSA and RCRD GSA will expand on the Flood MAR initiative, which was originally developed by the DWR to promote recharge programs that use fields, recharge basins, new or existing well structures and/or recharge ponds to divert high flows in creeks and streams. Individual recharge projects will eventually occur, but this particular project will focus on the initial scoping and identify specific recharge opportunities in the Vina Subbasin. At first, Vina GSA and RCRD GSA will focus their efforts on areas with the greatest need for recharge and seek grants and other funding sources to implement the projects. Interested landowners would be identified and participation in the program would be voluntary. Estimated Groundwater Offset and/or Recharge: Not applicable. Future recharge projects are possible based on results of scoping. Measurable Objective Expected to Benefit: Future increase of groundwater levels Project Status: This project is in the planning stages. Required Permitting and Regulatory Process: N/A Timetable for Initiation and Completion: 2022-2032 Expected Benefits and Evaluation: This project would develop the first steps of the Flood MAR initiative and recharge efforts for the Vina Subbasin region and identify specific groundwater recharge and management projects based on feasibility, need, and available funding. The initiation of this project would then lead to future recharge projects. How Project Will Be Accomplished/Evaluation of Water Source: This project will help to identify and develop specific recharge projects in the region, which will then individually determine recharge sources. Legal Authority: The project would be under the authority of the Vina GSA and RCRD GSA. Estimated Costs and Plans to Meet Costs: TBD, funding via Proposition 1 and Proposition 68 Circumstances for Implementation: This project is a Planned Project that is anticipated to move forward. Trigger for Implementation and Termination: None Process for Determining Conditions Requiring the Project to Occur: This is a Planned Project that is anticipated to move forward.	Comment noted. Projects or Management Actions can be included or amended in the GSP by the GSA Boards in the future after initial GSP adoption.
34	Rich McGowan	AGUBC				See Vina DRAFT GSP Comment A3 1. Support provided for the MOs/MTs for groundwater levels 2. Data gaps exist and should be discussed in the future with stakeholders, including but not limited to the SHAC, Butte County Farm Bureau and the AGUBC 3. Additional clarity regarding Groundwater Allocation should be included in the GSP along with an updated Appendix number and a description of the decision making process the GSA Boards will take in regards to this Management Action. 4. The GSP should remove the use of the phrase " suitable habitat" and provide clarity regarding the use of the term "environmental uses" with specific language proposed in the letter, Additional clarification is needed as indicted in the comment tracking sheet provided, with the comments re: Section 2 lines 3212-3225 and Section 5 lines 4477-4506 highlighted.	1.Thank you for your comments. 2. Thank you for your comment. The GSAs will continue to engage and encourage stakeholder participation and input throughout GSP implementation. 3. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future. 4. Thank you for this recommendation. The GSA Boards will consider this suggestion when GSP updates are made in the future. 5. Please see individual responses to each comment noted above.
35	Rich McGowan	AGUBC	ES		Lines 223 - 225	The draft GSP states that undesirable results occur if Minimum Thresholds (MTs) are exceeded in "… an established percentage of sites in the Subbasin's representative monitoring network." Have the GSAs established that percentage? If so, we request that the GSP include that percentage. If not, the GSAs should determine a percentage. Upon review of other draft GSPs in the Northern Sacramento Valley, we have found GSAs that suggest 25% for this purpose.	The GSAs did not establish the MT based on a specified percentage of wells being less than a certain depth. The methodology for establishing the MT is described in Section 3.3.2. See MO/MT Master Response.
36	Rich McGowan	AGUBC	ES		Table ES-1	We are generally supportive of the methodology used to determine the Measurable Objectives (MO) and MTs for groundwater levels in the Vina North and Vina South management areas, as stated. However, there is only 20 feet of operational flexibility for Representative Monitoring Sites (RMS) 21C001M for the Vina South management area. We recommend that this area be re-visited to consider lowering the MT to allow for more operational flexibility, recognizing that the goal is the MO.	Thank you for your comment. In the public review draft, there are errors in Table ES-1. It should be consistent with Table 3-1. These corrections have been made to the final document and result in an operational range of 54 feet for well 21C001.
37	Rich McGowan	AGUBC	ES		Figure ES-10	This figure appears to depict 16 RMS wells instead of 17 RMS wells, as noted preceding page. We request that the GSAs verify the correct number of RMS wells and correct, if needed.	Thank you for your comment. The GSP defines 17 RMS wells. In the public review draft, one is missing from Figure ES-10. This has been corrected in the final document.
38	Rich McGowan	AGUBC	Ch. 2		Lines 2902 - 2903	This section considers 243,000 AFY of groundwater pumping as "outflows" but the figure on this page seems to categorize this amount as "inflows." We request that the GSAs verify this amount and correct the information, if needed.	There is a figure for the Land and Surface Water System (Figure 2-33) and one for the Groundwater System (Figure 2-34). Groundwater pumping is an "inflow" to the land and surface water system (due to irrigation, groundwater is used to meet water demands in this system) and an outflow from the groundwater system. Although easily confusing, the text and figures describe this correctly.

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39	Rich McGowan	AGUBC	Ch. 2		Lines 3212 - 3225	We do not disagree with the draft GSP's conclusion that the sustainable yield is 233,000 AFY and the decrease of storage is 10,000 AFY. However, the explanation of the average specific storage value and range of storativity values is unclear, especially because Table 2-11 does not have a value of 233,000 AFY to point to as the estimated sustainable yield. We request that the GSAs revise this language to clarify the explanation regarding average specific storage value.	Thank you for this recommendation language was added to clarify the explanation regarding average specific storage value.in the final GSP.
40	Rich McGowan	AGUBC	Ch. 5		Lines 4388 - 4398	The following bullet points should be inserted in this section: (1) “Project Status” should be added after “The Measurable Objective benefitted by the project." (2) “Process to Determine conditions requiring project to occur” should be added after “Implementation circumstances." Finally, the “Public noticing” bullet point at Line 4398 is not included in the project descriptions, so it should either be added to each description or removed as a bullet point in this section.	Thank you for this recommendation. The GSA Boards will consider this suggestion when GSP updates are made in the future.
41	Rich McGowan	AGUBC	Ch. 5		Lines 4399 – 4400	Figures 5-1 and 5-2 show locations of planned and potential projects, but the figures do not seem very useful for that purpose as many projects seem to apply throughout the Subbasin. If the figures are left in, then the concept that no specific location applies at this time needs to be better described and presented in Figures 5-1 and 5-2.	Thank you for this recommendation. Staff agree the PMA figures should not be included and have made this revision in the final GSP.
42	Rich McGowan	AGUBC	Ch. 5		Figure 5-1	The project number in the table on the bottom left-hand side of this figure should reflect the same order as they are listed in Section 5. We request that the GSAs revise this figure to reflect this ordering. Further, we recommend that the GSAs revise “Flood-MAR” to “Flood-MAR Scoping" and “Additional Water to Creeks and Streams” to “Streamflow Augmentation." The names of the projects should be the same as listed in Section 5. Finally, two of the five projects identified in this figure (Agricultural Irrigation Efficiency and Flood-MAR Scoping) seem to apply throughout the Subbasin as opposed to specific locations, but the representation in this figure does not make that clear. We request that the GSAs revise this figure, accordingly.	Thank you for this recommendation. Staff agree the PMA figures should not be included and have made this revision in the final GSP.
43	Rich McGowan	AGUBC	Ch. 5		Figure 5-2	We recommend that the GSAs add the following projects to the table on the bottom left-hand side of this figure: (1) “Community Monitoring Program” should be added after “Recharge from the Miocene Canal;" and (2) “Surface Water Supply and Recharge” should be added after “Removal of Invasive Species”. Further, it is unclear whether the position of Numbers 10, 11, 12 and 13 at the northwest part of the Subbasin indicate that these projects would occur throughout the Subbasin. If so, then we recommend that the GSAs clarify that information. If not, then we do not believe that those will necessarily occur in that location or that their implementation will be limited to that location. If the position of these numbers is to identify projects that may occur throughout the Subbasin and/or do not have specific locations at this time, that should be applied to “Extend Orchard Redevelopment” and “Surface Water Supply and Recharge” as well, if not others. In addition, the location identified in the figure for “Agricultural Surface Water Supplies” is misleading because it would only be a *possible* location while there is a very real possibility that it could occur in other locations.	Thank you for this recommendation. Staff agree the PMA figures should not be included and have made this revision in the final GSP.
44	Rich McGowan	AGUBC	Ch. 5		Line 4418	The results of the survey mentioned in this section were not made available in September 2021. The GSAs should revise this language to reflect the month when the GSAs reasonably expect the results of this survey to be available.	Thank you for this recommendation language was added to clarify this in the final GSP.
45	Rich McGowan	AGUBC	Ch. 5		Lines 4477 – 4506	The “Streamflow Augmentation” project should be categorized as a “potential project” instead of a “planned project.” The draft GSP expressly provides that this project is “in the planning stages.” (Pg. 144, Line 4488.) Further, the draft GSP provides that before the project is started, a feasibility study must first be performed to “ensure that enough surface water would be available.” Therefore, until this feasibility study is performed and its results are evaluated, it is premature to include this project as a “planned project.”	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
46	Rich McGowan	AGUBC	Ch. 5		Line 4479	The project references transportation of excess untreated surface water from PID. Is this the same as what is contemplated by the PID Intertie project described later as a Potential Project? If so, it should either be removed here or the PID Intertie project should be removed since the references are duplicative.	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
47	Rich McGowan	AGUBC	Ch. 5		Line 4498	Regarding the “Streamflow Augmentation” project, it is unclear how the GSA determined an estimated fee of $50 to $100 per acre-foot for surface water supplies when a feasibility study has yet to be performed. If the GSA has not determined whether surface water is even available, how can it determine the fees associated with its purchase? Until this feasibility study is performed, we request that this estimated fee be removed.	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
48	Rich McGowan	AGUBC	Ch. 5		Lines 4639 - 4640	This section is not clear as to the sources of the 20% efficiency number. We request that the GSAs provide additional clarity regarding its establishment of this number.	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future. The project recharge estimates will be refined in the future once implemented.

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49	Rich McGowan	AGUBC	Ch. 5		Lines 4695 – 4697	Why does this section limit the use of recycled wastewater to “non-crop vegetation in Chico?" Is there an established rule against this by the Regional Water Quality Control Board?	Thank you for this recommendation language was added to clarify this in the final GSP.
50	Rich McGowan	AGUBC	Ch. 6		Figure 6-1	We request that the GSAs change "Floor MAR," at ID 42, to ""Flood MAR Scoping." Further, we request that the GSAs amend the timeline associated with this project. Because this project is only a study, we do not believe that it should take eight to nine years to complete.	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
51	Monroe Sprague	Public Comments	Chap 5	5.1	pg. 374	Public Vina GSP Comments This citizen of Butte County, Vina GSA, requests a paragraph be added to our GSP for an Interim Milestone Action Plan (IMAC) with more specific and earlier triggers for adjustment actions as recommended by Kamie Loeser, Director, Butte County Department of Water and Resource Conservation. The purpose would be to define smaller segments in Operating Range on the hydrologic graph, example page 374, and raise our effective or functioning Minimum Threshold level. Our Real Objective should be to continue in the water level range we have had since 1975, which is above the Measurable Objective. Why would we want to use up or kill part of the goose that is giving us our golden aquifer? If we want to grow, increase productivity, etc., we need to use our eggs better. Thank you for working to maintain our public natural resource.	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
52	Samantha Arthur	Audubon California				See Vina DRAFT GSP Comment A4 1. The GSP identifies managed wetlands in maps and water budgets, yet details regarding assumed acres and ET rates are lacking. 2. Concerns that future conditions inadequately account for the water needs of managed wetlands 3. Lack of information regarding water needs for managed wetlands should be identified as a data gap. 4. Reduction in water from the historic to current and future water budgets for managed wetlands point to a serious reduction in habitat acreage or function	The comment letter refers to their review of documentation of the Butte Basin Groundwater Model (BBGM) and a lack of detail in the GSP regarding ET rates and acreages for managed wetlands. The BBGM documentation has been updated as part of the GSP development effort. Some of the details requested by the comment letter are available in this updated report. Land use data other than 2014 and 2016 is based on Department of Water Resources ground-based surveys from the Northern Region Office. For 2014 and 2016, satellite-based land use mapping developed by LandIQ was used. A significant reduction in managed wetland acreage occurs in the land use estimates beginning in 2016. This drives the drop off of ET and groundwater pumping associated with managed wetlands. If corrections or refinements are needed to model inputs, these can be addressed through model updates which are a planned activity of GSP implementation. It should be noted the GSP is a planning document to achieve groundwater sustainability; the GSAs are not responsible for developing water supplies to meet demands of managed wetlands. For the updated model documentation, the commenter is referred to: Butte County Department of Water and Resource Conservation. 2021. Model Documentation v 1.0. Butte Basin Groundwater Model. 30 November. The GSAs thank Audubon for their offer to participate in scoping Flood MAR/Surface Water Supply and Recharge projects. The GSA Board(s) will consider their recommendations as the GSP is implemented and as updates to the GSP are made in the future.
53	Annette Faurote	Public Comments				See Vina DRAFT GSP Comment P4	Please MO/MT Master Response. The commenter opines that the GSP does not adequately address sustainability, that the operational range between the measurable objective and the minimum objective is too large, and identifies concerns for domestic wells and loss of urban forests due to lowering groundwater levels. However, the commenter does not raise specific technical or policy issues with the Plan. The commenter also asks if an environmental impact report (EIR) has been prepared for the GSP. Pursuant to Water Code Division 6, Part 2.74, Section 6, Section 10728.6, the California Environmental Quality Act (CEQA) is not applicable to the development of a groundwater sustainability plan. However, the implementation of subsequent projects and management actions will be subject to the California Environmental Quality Act (CEQA) and the appropriate environmental studies and documents will be prepared as part of the approval process of future projects and actions.
54	Holly Dawley	GCID				See Vina DRAFT GSP Comment A7	Please see the Interconnected Surface Waters Master Response and Inter-basin Coordination Master Response. The commenter, a member of three GSAs, confirms

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							their support of the GSPs. However, they express concerns about groundwater and surface water interactions and a particular area of concern regarding stream-aquifer interactions and the potential impacts from unrestricted groundwater pumping. Specifically, the commenter states that there is over 1 million acre-feet per year of groundwater pumping from adjacent subbasins. The commenter requests that the GSA consider their concerns but does not specifically identify, or ask for, revisions be made to the GSP.
55	Margaret Scarpa	Butte Environmental Council				See Vina DRAFT GSP Comment A5 1. Concerned that the basin setting does not take into account climate change and the changing water supply and overestimates the water supply available for recharge. 2. Concerned that the City of Chico Urban Forest is not included as a potential Groundwater Dependent Ecosystem 3. Demand management and reuse of water need to be prioritized demand management projects need to be implemented before any water supply expansion projects are implemented. 4. Other – Support for the following projects (Wastewater Recycling Project, Residential Conservation Project, Agricultural Irrigation Efficiency Project, Community Monitoring Program and Community Water Education Initiative, Rangeland Management and Fuel Management for Watershed Health Projects, Removal of Invasive Species Project) and Inclusion of Valley Oaks in the Sustainability Indicators.	1. Comment noted. Although water budget estimates are useful, sustainability of the subbasin is *demonstrated* through monitoring and the avoidance of undesirable results relative to each sustainability indicator. The GSA Board(s) will consider these concerns as the GSP is implemented. 2. Please see GDE Master Response 3. Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future. 4. Comment noted
56	Michael Bolzowski	Cal Water	1	1.3.5.2	941	The GSP references that Cal Water published our UWMP in 2007 as written in the Chico 2030 General Plan, which was published in 2010. We may want to have a line added that the latest UWMP was just published in 2020.	Thank you for this recommendation language was added to clarify this in the final GSP.
57	Michael Bolzowski	Cal Water	1	1.3.5.2	944	The Master Plan will be updated in the near future along with a Reliability Study being planned for 2023 for the Cal Water Districts in the region.	Thank you for this recommendation language was added to clarify this in the final GSP.
58	Michael Bolzowski	Cal Water	2	2.3.8	3226	The GSP does not specify a sustainable pumping yield. Line 82, the estimated sustainable yield for the Subbasin is 233,000 acre-feet per year and from Line 1392, Vina Subbasin Sum of Acres is 184,918 acres, This will give a pumping yield of 1.26 AF/acre. It may be good to have this shown in the report, though this maybe an oversimplification of the current conditions.. This can be added to eh recommendation of next steps as a future refinement.	Comment noted. The GSP Regulations require an estimate of Sustainable Yield which is provided and described in Section 2.3.6.
59	Anne Dawson	Vina SHAC	Exec Summ.		254	The Vina Chico area MTs are established in accordance with the statement on Line 223. But the methodology used to establish the MTs for Vina North and Vina South are not discussed. What led to choosing a level of, say, 70ft bgs instead of 60ft? Was a percentage of domestic wells included in this? The word “majority“ is included but not defined.	The statement was revised in the GSP to accurately reflect the methodology for establishing the MT. The Methodology for establishing the MT is described in Section 3.3.
60	Anne Dawson	Vina SHAC	Exec Summ.		Table ES-1	Vina North has 2 RMS wells demonstrating Operating Margins of 80+ ft. This is excessive and unnecessary.	Comment noted. See MO/MT Master Response. The commenter notes their concern with the large Operational Range due to the level of the MT.
61	Anne Dawson	Vina SHAC	Exec Summ.			The first well in Vina South has the wrong number attached to the MT.	Table ES-1 has been corrected to be consistent with Table 3-1
62	Anne Dawson	Vina SHAC	Exec Summ.			Again the Operating margins in Vina South are mostly over 60 ft.	Comment noted. See MO/MT Master Response. The commenter notes their concern with the large Operational Range due to the level of the MT.
63	Anne Dawson	Vina SHAC	Exec Summ.			I believe these massive operating ranges will come back to haunt us. We may be inviting the state to encourage surrounding basins to surrender their surface water and use GW. That depletes our aquifer, but it would have little effect on our GSP which will likely remain in compliance because the MO and MT are separated by such a large margin. Bottom line, I think we are risking a state takeover of our GW.	Comment noted. The commenter notes their concern with the large Operational Range due to the level of the MT.
64	Anne Dawson	Vina SHAC	Chap 5	5.3.2	4948	I suspect the info described will be difficult to obtain. I believe we need to define a “sustainable” well. Perhaps current Butte County rules and well standards might be used to establish what is sustainable. Pre-1980 wells may have been deepened and are functioning just fine. They should be included. I would like to see a plan to financially help ALL domestic well owners impacted by SGMA. We use 4% of the GW but are being landed with almost 100% of the costs.	Comment noted. The Domestic Well Mitigation Management Action applies to all domestic wells and is based on voluntary participation.
65	Anne Dawson	Vina SHAC	Chap 3	3.1	3341-44	Demand reduction is absent.	Sections 5.3 and 5.4 describes the full suite of projects and management actions, including Groundwater Allocation, that will be considered by the GSA Boards in the future to meet the Sustainability Goal.
66	Anne Dawson	Vina SHAC	Chap 3	3.3.2	3414	Please consider changing this line to read ”going dry or remaining dry during non-dry year conditions”	Thank you for your review and suggestion. See MO/MT Master Response.

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67	Anne Dawson	Vina SHAC	Chap 5	5.5		This plan has very generous operating margins. We are putting all our faith in a plan that will undoubtedly have shortcomings, and drought remains unpredictable. I am concerned that we have no backstop. If the plan is failing our remedies will have to employ demand reduction. This would be a contentious topic. It already takes a long time to get updated GW levels, it will take months to establish what to do if we are at risk of failing, and probably years to agree on the details. None of us wants to have to resort to demand reduction. But we don't want to have a delay of years in implementing a remedy. So let's put in place some guidelines to trigger a response. Then, if we have to act on it, we'll be able to proceed faster and those demand reductions would be lifted sooner.	Comment noted. The GSA Boards will decide in a public process on the timing and schedule of PMAs based on a variety of considerations including but not limited to subbasin conditions, PMA readiness and funding availability.
68	Jim Graydon	Private Well Owner	3. Sustainable Management Criteria	3.3 Groundwater Levels Sustainable Management Criteria	Table 3-1	Proposed MT and MO for Lowering Groundwater Levels in the Chico Management Area are too low to protect against undesirable results. Consider revising definition of MT and MO to derive more protective trigger values. I am aware of four domestic supply wells within 1 mile of CWSCH02 which were constructed in 1986 to County standards and are less than 100-ft total depth bgs (approx. 88-ft amsl). The current water level in the localized area as of October 2021 is at the MO of 105-ft elevation amsl. The operational flexibility range gives approximately 1 more drought year before these wells go dry at an elevation above the MT.	Comment noted. See MO/MT Master Response.
69	Jim Graydon	Private Well Owner	3. Sustainable Management Criteria	3.5 Water Quality Sustainable Management Criteria	Table 3-2	The water quality in the Chico Management Area has been documented to be high quality as it relates to dissolved solids. With specific conductance typically below 300 uS/cm, the proposed MO of 900 uS/cm allows an unacceptable level of degradation before action is initiated. Recommend setting MO to at a level such that action is taken before water quality approaches the secondary MCL. Setting the MO somewhere between 500-600 uS/cm with an MT between 900-1,000 uS/cm is warranted to protect agricultural water quality.	Comment noted. The GSAs, in setting the Water Quality SMC, committed to managing groundwater quality in line with the State Secondary Drinking Water Standards at each RMS Secondary standards relate to aesthetic verses primary standards which are even higher values established to address health considerations. The RMS wells are screened at deeper depths below domestic wells and most agricultural wells and should provide an acceptable warning before water quality issues occur in these zones. Evaluations of these trends will be evaluated annually and re-assessed during the first 5-year review to evaluate if changes to the MO and MT should be proposed.
70	Jim Graydon	Private Well Owner	3. Sustainable Management Criteria	3.8 Interconnected Surface Water Sustainable Management Criteria		I encourage completion of the necessary studies to determine the principal factors impacting groundwater dependent ecosystems in the Chico Management Area. With additional local documentation, more specific and protective MT and MO can be set. Without riparian woodland and adjacent seasonal wetlands, Chico is a very different place.	Comment noted.
71	Jim Graydon	Private Well Owner	Section 4: Monitoring Network	4.9: Representative Monitoring Sites for Sustainability Indicator	Table 4-5.	The RMS Well Construction Details for the 5 wells chosen for monitoring in the Chico Management Area are lacking total depth and screened interval information. 4 of the 5 wells are CWS production wells that are no doubt screened across multiple aquifer zones. There are numerous wells in the total depth range of 100 to 400 feet within the Chico Management Area that have known depths and screened intervals that would better represent the conditions in the basin (See DTSC's EnviroStor database at https://www.envirostor.dtsc.ca.gov/public/). Consider adding 2-3 additional RMS wells with known construction to the monitoring program in the Chico Management Area.	Thank you for this recommendation. The RMS network may be reevaluated in the future per the Boards direction when GSP updates are made in the future.
72	Jim Graydon	Private Well Owner	Section 5: PMAs	5.2.3.3: Streamflow Augmentation	Line 4484-4485	Add Lindo Channel to the list of surface water drainages that would receive augmented flow to disperse the groundwater benefits throughout the basin	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
73	Jim Brobeck (1)	Aqualliance	02 Executive summary	Section	49-51	"The interests and vulnerability of stakeholders and groundwater uses in these Management Areas vary based on the nature of the water demand (agricultural, domestic, municipal)" Water demand for the environment must be included. GDEs include upland and riparian valley oak groves, small stream flow, GD urban forests.	Comment noted. Thank you for participating.
74	Jim Brobeck (2)	Aqualliance	2		143-144	"groundwater use has increased and as forces ranging from population growth to climate change play out," This sentence ignores the fact that increased cross-boundary flows that may result from expanded demand west of the river (primarily agriculture and water-market-driven aquifer exercise) is at play. This threat to meeting our management goals must be acknowledged and addressed in inter-basin coordination/communication process yet to be developed.	Comment Noted.
75	Jim Brobeck (3)	Aqualliance			153-154	"Groundwater storage in Subbasin is relatively stable except in the areas noted above with depressions." The identification of localized hydrograph trends is relevant, but it is important to recognize long-term basin declines that occur due to cross-boundary flows influence the baseline water levels. In general (depending on soil conditions and strata) the greater the distance or depth of groundwater pumping and water levels in the VGSA, the lower the magnitude but the longer the timescale of depletions. As a consequence, the ultimate effects in the Vina of pumping in nearby sgma subbasins can occur significantly after pumping starts, or even after pumping has ceased. The timescales involved in aquifer responses to pumping and other stresses can be on the order of decades, making it difficult to associate cause with effect. As such,	This section was revised to be more consistent with descriptions of groundwater level trends and storage in the Basin Setting (Section 2). Available monitoring data and water budget estimates as described in the Basin Setting (Section 2) clearly indicate the Vina Subbasin is experiencing a declining trend in groundwater levels and corresponding storage due to pumping activities occurring within the subbasin. Water Budget analysis presented to the Vina GSA Board in May 2021 suggests a slight imbalance of pumping and recharge based on vertical flows

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						monitoring must account for this lag in impacts. In general, the longer the timeframe for effects to be observed at a given monitoring point once they become evident, the longer those effects will persist.	alone. The GSP outlines projects and management actions to address this and the GSAs are committed to managing groundwater sustainably in the subbasin. Additional analysis is needed to characterize the temporal and spatial impacts of neighboring subbasins. This is acknowledged in the GSP and Inter-basin Coordination will be critical for establishing the facts and the appropriate actions to address any identified inter-basin impacts. See Inter-basin Coordination Master Response.
76	Jim Brobeck (4)	Aqualliance			166-167	165 “If the water table beneath the stream lowers as a result of groundwater pumping, the stream may disconnect entirely from the underlying aquifer.” A stream that ceases to flow once it enters the alluvial basin is entering the aquifer at that point. The deeper the aquifer level the more of the streambed is dewatered and the earlier. So while a stretch of the creek may be “disconnected” the creek itself is still connected. Mr. Toccoy Dudley, a Department hydrogeologist with the Northern District in Red Bluff, wrote in 2000: At any location in the basin, the gradient between the surface water and groundwater system is directly proportional to the head differences (water surface elevation difference) between the two hydrologic systems. The larger the head differences the higher the gradient and the higher the recharge rate....The shorter the horizontal distance over which the head change occurs increases the recharge rate dramatically. An example of this would be pumping next to a river would induce a much higher recharge rate from the surface water system than the same pumping many miles away.....increased extraction causes the groundwater levels to decline, which increases the head difference between the groundwater and surface water systems, and consequently increases the gradient and recharge rate. In short, the more you pump, the more you can pump, to a point. Anecdotal and archeological evidence indicates the small streams of the Vina SB were perennial during pre-pumping eras.	Comment noted. Commenter provides an opinion pertaining to stream-groundwater interaction and does not raise specific technical or policy issues with the Plan.
77	Jim Brobeck (5)	Aqualliance			249 figure ES-7	249 The sample hydrograph is one of several that I have reviewed in other parts of the GSP that have disturbing MO and MT levels. The MO is below the historic low, not the appropriate level to designate the top of the operational range. The MT as defined in other parts of the GSP, is purported to designate “the point at which Undesirable Results may BEGIN to occur.” But undesirable results will begin much earlier in the operational range. The historic low of this hydrograph is above the 80’ max rooting depth of native phreatophytes. The MT is significantly lower than 80’ bgs. Furthermore, the lower water table will dewater longer reaches of streams earlier in the season and persist later in the year. The operational range proposed is pessimistic in meeting goals that would avoid triggering Undesirable Results. Wise resource management strives to improve conditions that have been degraded by human development. Accepting degraded status quo or planning for increased degradation may be realistic given the human inclination to ambitiously convert resources into useful products. But the term “sustainable” implies we have the capacity to identify and honor carrying capacity while devising demand flexibility strategies to meet evolving climate conditions. Robust Management Objectives reduce the probability of careening toward Management Thresholds. Our MO levels can strive to improve conditions without risk of State management takeover. § 354.30. Measurable Objectives (g) An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan.	Comment noted. See MO/MT Master Response and GDE Master Response
78	Jim Brobeck (6)	Aqualliance	Section 2 Basin setting			Section 2 Basin setting	*Heading-Not a Comment*
79	Jim Brobeck (7)	Aqualliance				3251 The failure of the GSP to attempt an estimate of Inter-basin subsurface flow along the Western Boundaries invalidates the Water Budget on which much of the GSP uses as a foundation. It is inappropriate to explain that "Characterization of Inter-basin Flows and Net Outflows along Western Boundary" is placed in the "Next Steps" category. Water Code § 354.16 explains "Groundwater Conditions Each Plan shall provide a description of current and historical groundwater conditions in the basin, including data from January 1, 2015, to current conditions, based on the best available information that includes the following: (a) Groundwater elevation data demonstrating flow directions, lateral and vertical gradients, and regional pumping patterns, including: (1) Groundwater elevation contour maps depicting the groundwater table or potentiometric surface associated with the current seasonal high and seasonal low for each principal aquifer within the basin." Code § 354.18. “Water Budget (a) Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions...	The Water Budget described in the GSP (Section 2.3) provides a complete accounting of total annual volume of groundwater and surface water entering and leaving the subbasin. It is acknowledged that the western boundary of the Butte Basin Groundwater Model (BBGM, the tool used to estimate water budgets in the GSP) is defined by the Sacramento River which is also associated with a boundary between groundwater subbasins. The GSP and BBGM documentation acknowledge that this introduces uncertainty in evaluating Sacramento River stream-aquifer interactions separately from subsurface inter-basin boundary flows between Vina and the Corning subbasin. As a result, model results are reported as Net Western Boundary outflows which is the combination of estimated Sac River inflow/outflow to the groundwater system and subsurface flows. The BBGM is an excellent tool for evaluating subsurface boundary flows between Vina’s other neighboring subbasins.

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							Although water budget estimates are useful, sustainability of the subbasin is *demonstrated* through monitoring and the avoidance of undesirable results relative to each sustainability indicator. Therefore, the water budget is not the foundation upon which defining sustainability rests. However, refining characteristics of inter-basin boundary flows and dynamics will be an important component of GSP implementation. See Inter-basin Coordination Master Response.
80						(3) Outflows from the groundwater system by water use sector, including ... subsurface groundwater outflow." Early basin-setting drafts of the Vina, Butte and Colusa sub-basins showed large discrepancies in the modeled subsurface aquifer outflow patterns. The Butte Basin Groundwater Model has no capacity to quantify subsurface GW flow out of the western boundary of the sub-basin. The present draft recognizes the data gap and inadequacy of regional modeling that characterizes the water budget of inflow and outflow. The Butte County Drought Task Force recognizes that Groundwater extractions outside the Vina boundaries such as the past and present Water Transfer Programs and Supplemental Groundwater Pumping Operations in the Northern Sacramento Valley may have enduring cumulative impacts on Vina's water budget. SGMA regulations require Each Plan to contain a water budget for the basin that identifies discharges including subsurface groundwater outflow.	
81	Jim Brobeck (8)	Aqualliance				"2.1.2.4 Groundwater Recharge Areas 1415 "Groundwater recharge is the downward movement of water from the surface to the groundwater system." Some recharge occurs from upward movement. Piezometric pressure from the semi-confined portions of the Tuscan System allows water to move upward recharging into or supporting alluvial unconfined aquifers if sufficient pressure exists. Line 1940 explains; "In locations where groundwater levels in the shallower wells are lower than in the deeper wells, the gradient indicates upward movement of groundwater, with a similar relationship defining the volume of upward flow." Conversely the alluvial shallow aquifer can leak downwards if the piezometric elevation is reduced. Line 1937: "When groundwater levels in the shallower wells are higher than in the deeper completions, the gradient indicates downward movement of groundwater. The volume of downward flow is proportional to the gradient and the hydraulic conductivity between the shallow and deep measurement points." The USDA groundwater atlas [https://pubs.usgs.gov/ha/ha730/ch_b/B-text3.html] explains this well-known water fact: "By the early 1960's, intensive ground-water development had significantly lowered water levels and altered ground-water flow patterns in the Central Valley aquifer system. By far the most dramatic impact of development was in the San Joaquin Valley, where water-level declines in the confined part of the aquifer system were locally more than 400 feet (fig. 82). Although predevelopment flow was toward the San Joaquin River throughout most of the basin, large withdrawals from deep wells in the western and southern parts of the aquifer system changed the direction of horizontal flow in the confined part of the system until the water moved toward the withdrawal centers (fig. 83). Also, because the magnitude of the withdrawals caused hydraulic heads in the confined parts of the aquifer system to fall far below the altitude of the water table (fig. 84), the vertical hydraulic gradient was reversed over much of the San Joaquin Valley. Where these wells are open to the unconfined and confined aquifers, they allow virtually unrestricted vertical flow through the well bore (fig. 87). The amount of water that flows downward through one large-diameter well has been estimated to be equivalent to the natural leakage through the "E-clay" over an area of approximately 7 square miles. During the peak of the withdrawal season, the net downward flow may be, on average, as much as 0.3 cubic foot per second per well." Significant Depressurization of the regional confined aquifer can take place within and outside of the Vina sub basin. Well-casings that have perforations at shallow and deep levels increase the vertical flow. Lines 1456-1460 indicate there is this type of potentially inter-basin leakage in the Vina SB "Aquifer testing conducted as part of the Lower Tuscan Aquifer study (Brown and Caldwell, 2013) indicated there is also the potential for Upper Watershed recharge in the shallow aquifer interval to move down to greater depths due to irrigation pumping, causing a mixing of recharge sources in the intermediate and possibly deeper aquifer zones in the Vina South Management Area." Line 1469 discusses "Additional recharge through management activities of flood flows or irrigation practices has potential in the Vina Subbasin..." but does not discuss how the recharged water can migrate	Comment noted. The GSP recognizes the need for additional shallow monitoring to better characterize vertical gradients in the groundwater system (Section 2.1.8).

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						through the deep aquifer into adjacent sub-basins that are being pumped. As a result, much of the water in the upper unconfined zone of the aquifer system that flowed laterally toward the river under predevelopment conditions leaked downward through the confining beds into the lower confined aquifer after development...Ground-water development in the San Joaquin Valley has reduced the effectiveness of the confining beds within the aquifer. Thousands of wells with casings perforated for much of their length have been drilled through the clay confining units.	
83	Jim Brobeck (9)	Aqualliance				1522 2.1.5 Groundwater Producing Formations presents an incomplete overview of the producing geology and fails to quantify the robust yields of the Tuscan even while quantifying the production amounts available in less important aquifer units, line 1614: "Wells penetrating the sand and gravel units of the Riverbank and Modesto Formations produce up to about 1,000 gallons per minute (gpm)" The Update on the Stony Creek Fan aquifer Performance Testing [http://cetehama.ucdavis.edu/files/135217.pdf] indicated that that Lower Tuscan can produce 2,500-3,000 gpm. The GCID and others are exploiting/depressurizing this extremely productive aquifer. The cumulative yield of the wells exercising the lower Tuscan is undoubtedly impacting water levels in all aquifer layers in the 4-county basin.	Comment noted.
84	Jim Brobeck (10)	Aqualliance				Line 1736 2.1.8.2 Beneficial Uses "Water produced from the principal aquifer is primarily used to meet irrigation, domestic, and municipal water demand." This sentence should include "environmental demand". Groundwater and surface water are historically and, in many cases, currently connected. Beneficial uses must include the benefits to ecosystems including Groundwater Dependent upland vegetation. According to the State Water Board delineation of beneficial uses [https://www.waterboards.ca.gov/rwqcb2/water_issues/programs/planningtmdls/basinplan/web/bp_ch2.html] 2.1.3 COLD FRESHWATER HABITAT (COLD)Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.2.1.14 PRESERVATION OF RARE AND ENDANGERED SPECIES (RARE)Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.2.1.18 FISH SPAWNING (SPWN) Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. 2.1.19 WARM FRESHWATER HABITAT (WARM) Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates. 2.1.20 WILDLIFE HABITAT (WILD) Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl. Beneficial uses of streams that have intermittent flows, as is typical of many streams in the region, must be protected throughout the year and are designated as "existing."	Thank you for this recommendation. Groundwater Dependent Ecosystems and stream flows supported by relatively shallow groundwater in the subbasin are mentioned as beneficial uses in the GSP as well as a lack of a thorough understanding of how groundwater conditions influence each of them. The Vina GSA will consider this suggestion when GSP updates are made in the future. Also, please see GDE Master Response.
85	Jim Brobeck (11)	Aqualliance				1866 2.2 Groundwater Conditions; • "Wells showing depths to first encountered groundwater deeper than 500 feet were eliminated from the data set." The rationale behind this limitation is unclear. If there is significant piezometric pressure identified in the water encountered below 500' it should be included in the analysis. The hydrographs in this section measure a shallow portion of the system. It is likely that groundwater flow volumes would be stimulated when the pressurized portion of the aquifer is depressurized by major production operations. The cumulative effect of these extractions may be the cause of the decline in the seasonally fluctuating regional aquifer levels. The failure to evaluate the effect of confined/semi-confined piezometric pressure dynamics on groundwater conditions must be remedied. Line 2143 identifies the existence and importance of this pressure in relation to subsidence but there is no other mention of piezometric pressure. "As the pressure created by the height of water (i.e., head) declines in response to groundwater withdrawals, aquitards between production zones are exposed to increased	Comment noted. Confined and unconfined conditions and associated vertical gradients in the Vina Subbasin is discussed in Section 2.2.2.2 and the need for additional data to better characterize vertical gradients within the principle aquifer is discussed in Section 2.1.8. These descriptions clearly acknowledge the pressurized nature of the aquifer system in some areas and the lack of vertical gradients and relative vertical connectivity in others.

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						vertical loads." The measurement of piezometric pressure is important for groundwater monitoring. It allows us to determine the level and flow patterns of the groundwater. Omitting a discussion of piezometric pressure when discussing groundwater conditions in our region is like ignoring blood pressure during a human physical exam.	
86	Jim Brobeck (12)	Aqualliance				1996 "Since the year 2000, there has been a cumulative decline in March 1 groundwater storage of about 400,000 acre-feet (AF). This indicates the cycles of groundwater pumping are not in balance with the cycles of recharge that replenish the aquifer, and that groundwater depletion has occurred consistent with long-term decline in groundwater levels." Without a regional GW model and a record of pumping throughout the Tuscan basin it is impossible to identify pumping in the VGSB as the sole demand resulting in the decline in GW storage.	See response to comment 75.
87	Jim Brobeck (13)	Aqualliance				2017 "Development of groundwater quality-related Sustainable Management Criteria for the Vina Subbasin is not intended to duplicate or supplant the goals and objectives of ongoing programs including those by Butte County, the SVWQC and the State Drinking Water Information System (SDWIS) [SWRCB Geotracker/GAMA website, the California Department of Toxic Substances Control (DTSC) EnviroStor website, and the Environmental Protection Agency's (EPA) National Priorities List (NPL)]." GW pumping stimulates the movement of toxic plumes through the aquifer system. Advection is the movement of dissolved solute with flowing groundwater. The amount of contaminant being transported is a function of its concentration in the groundwater and the quantity of groundwater flowing, and advection will transport contaminants at different rates in each stratum. Who are the personnel in the VGSA that will be tracking these data and correlating it to various GW pumping regimes and flow patterns?	The GSA Board(s) will be responsible for completing periodic evaluations every five year and providing written assessments to DWR. The first evaluation will be due to DWR in 2027. The five-year evaluation will include but is not limited to a description of current groundwater conditions for each applicable sustainability indicator relative to measurable objectives, interim milestones and minimum thresholds. Is it not feasible to identify individuals or organizations whom will be directly working on these assessments at this time.
88	Jim Brobeck (14)	Aqualliance				2268 Figure 2-23: "Hydrographs for Nested Well Located Near Feather River" is the description of the figure but the text explains "As seen in this figure, the hydrograph for the nested well located adjacent to the Sacramento River…" Typographical error?	Question noted. Staff also noticed this and have made appropriate revisions in the final GSP.
89	Jim Brobeck (15)	Aqualliance				<u>Surface Depletion Comment</u> 2298 "There is no indication in the streamflow data to suggest groundwater interactions that contribute to the streamflow behavior. Similar conditions would be expected for other creeks that traverse the Vina Subbasin (Little Chico, Sycamore, Rock, and Butte Creek) since they flow across a similar fan topography and similar shallow subsurface geology. The overall conclusion from this study in relation to interconnected surface water is that, for significant portions of the year, the upland creeks in the Vina Subbasin would be classified as disconnected streams and the surface water would be considered "completely depleted" as defined under SGMA." Water code chapter 23 explains "(o) "Interconnected surface water" refers to surface water that is hydraulically connected <u>at any point by</u> a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted." As I read Water Code it is clear that streams flowing out of the foothills are hydraulically connected until they reach a point where the aquifer has been depleted below stream level at which point the stream loses as it recharges the evacuated aquifer. As the GW level declines the stretch of dewatered stream expands. Spatial and temporal dewatering monitoring is a critical GDE function of a GSA. The California Department of Fish and Wildlife has specific GDE recommendations that must be implemented in the VGSA [https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=170185&inline] "GROUNDWATER DEPENDENT ECOSYSTEMS (GDES) 1. How will groundwater plans identify GDEs and address GDE protection? 2. How will GSAs determine if GDEs are being adversely impacted by groundwater management? 3. If GDEs are adversely impacted, how will groundwater plans facilitate appropriate and timely monitoring and management response actions? INTERCONNECTED SURFACE WATERS (ISW) 1. How will groundwater plans document the timing, quantity, and location of ISW depletions attributable to groundwater extraction and determine whether these depletions will impact fish and wildlife? 2. How will GSAs determine if fish and wildlife are being adversely impacted by groundwater management impacts on ISW? 3. If adverse impacts to ISW-dependent fish and wildlife are observed, how will GSAs facilitate appropriate and timely monitoring and management response actions." According to a study on small streams flowing through the Vina SB: "Nonnatal rearing of juvenile Chinook salmon was documented in several intermittent tributaries to the Sacramento River. Condition factors and length measurements of juvenile chinook captured in the intermittent tributaries were compared with those captured in the mainstem Sacramento River. The data suggests that juvenile chinook rearing in the tributaries grew faster and were heavier for their length than	Thank you for your comments. Please see the GDE and ISW Master Responses.

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						those rearing in the mainstem. Faster growing fish smolt earlier, and may enter the delta earlier in the year before low water and pumping degrade rearing habitat." Intermittent Streams as Rearing Habitat for Sacramento River Chinook Salmon. https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/swrcb/swrcb_maslin1997.pdfThe unregulated streams that flow into the Sacramento River are leaking into drained aquifers. Dan Wendell of The Nature Conservancy, a panelist at a workshop held by the California Natural Resources Agency, explained "since the 1940s, groundwater discharge to streams in the Sacramento Valley has decreased by about 600,000 acre-feet per year due to groundwater pumping, and it's going to decrease an additional 600,000 acre-feet in coming years under status quo conditions due to the time it takes effects of groundwater pumping to reach streams." https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_282.pdf	
90	Jim Brobeck (16)	Aqualliance				2.2.7 Groundwater Dependent Ecosystems 2488 Not Likely a GDE Due to Adjacency to Irrigated Agricultural Fields 2504 Not Likely a GDE Due to Dependence on Agricultural-dependent Surface Water GDEs were incorrectly removed in areas adjacent to irrigated fields due to the presence of surface water. However, GDEs can rely on multiple water sources – including shallow groundwater receiving inputs from irrigation return flow from nearby irrigated fields - simultaneously and at different temporal/spatial scales. Basins with a stacked series of aquifers may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow principal aquifers, that support springs, surface water, and groundwater dependent ecosystems. Areas in proximity to irrigated land can still potentially be reliant on shallow groundwater aquifers, and therefore should not be removed solely based on their proximity to irrigated fields.	Please see GDE Master Response.
91	Jim Brobeck (17)	Aqualliance				2.3.4 Water Budget Estimates2831 "Other components are more difficult to measure or do not have measured values readily available (e.g., deep percolation, subsurface flows, groundwater pumping, surface water-groundwater interaction, etc.) and are estimated using the BBGM." It is unclear how the BBGM estimates Western Boundary Net Outflows 56,100- 65,000 AFY. This map from the first draft of the Vina Water Budget presentation last year estimated a total of 200k AFY flowing from the east out of Butte into Colusa. The first draft of the Butte Subbasin Preliminary Basin Setting Results indicated 261k AFY of water flow from the west into the Butte basin from Colusa. These large discrepancies in outflow estimates do not inspire confidence in the Water Budget, the identification of who is responsible for GW declines or the efficacy of proposed recharge efforts. "The ultimate effects of pumping can occur significantly after pumping starts, or even after pumping has ceased. The timescales involved in aquifer responses to pumping and other stresses can be on the order of decades, making it difficult to associate cause with effect. As such, monitoring must account for this lag in impacts. In general, the longer the timeframe for effects to be observed at a given monitoring point once they become evident, the longer those effects will persist, even if the pumping causing the effects is halted immediately." Davids Engineering 2014. Prepared for NCWA, Sacramento Valley Groundwater Assessment Active Management – Call to Action, pp. 14-15. We know that Inter-basin flows are dependent on conditions in adjacent basins. "3014 Western boundary net outflows represent Sacramento River gains from groundwater and subsurface outflows to the Corning Subbasin. The split between these outflows is uncertain at this time and identified as a data gap." This significant data gap will present challenges as the impacts of GW pumping are not immediate and can take months or years to occur. The emerging California Water Market is a factor that is going to complicate regional water budget estimates. BCWRC's Drought Task Force intention to evaluate the cumulative impacts of Water Transfer Programs (including GW Substitution water market transactions) and Supplemental Groundwater Pumping Operations in the Northern Sacramento Valley is essential to understand sub basin water budgets.	Comment noted. Although water budget estimates are useful, sustainability of the subbasin is *demonstrated* through monitoring and the avoidance of undesirable results relative to each sustainability indicator. Therefore, the water budget is not the foundation upon which defining sustainability rests. However, refining characteristics of inter-basin boundary flows and dynamics will be an important component of GSP implementation. See Master Response Inter-basin Coordination. It should be noted that the preliminary Basin Setting water budgets results for the Butte Subbasin broke out stream accretions/depletions from subsurface flows. When these were combined for the Sacramento River along the model boundary/subbasin boundary and reported as Net Western Boundary Outflows, the net flow became an outflow. This is largely driven by significantly large accretions of groundwater to the Sacramento River (considered an outflow of groundwater from the subbasin). The Butte Subbasin GSP discusses these dynamics in more detail. A description of how the BBGM represents and estimates boundary conditions can be found in the model documentation: Butte County Department of Water and Resource Conservation. 2021. Model Documentation v 1.0. Butte Basin Groundwater Model. 30 November.

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92	Jim Brobeck (18)	Aqualliance				3014 "Western boundary net outflows represent Sacramento River gains from groundwater and subsurface outflows to the Corning Subbasin. The split between these outflows is uncertain at this time and identified as a data gap." The subsurface outflow analysis must be expanded to include outflows into other nearby sub basins including Butte and Colusa. Increased GW extractions due to crop changes, "emergency" supplemental GW pumping and GW substitution transfers is likely to increase subsurface flows over time. Butte Counties nascent Drought Impacts Analysis Study plans to compile the 2021 water transfer programs (April 2021-December 2021) from Butte, Tehama, Glenn, Colusa, Yuba and Sutter counties. The report will include a brief description of the programs, amount of water transferred, recipient of water, whether surface water or groundwater substitution is utilized, destination of transferred water, etc. including maps. Analysis of the transfer programs will evaluate the cumulative impacts of the programs' impacts on water supplies and demands. This type of annual evaluation must be ongoing as demand/supply conditions evolve and consider "timescales involved in aquifer responses to pumping and other stresses can be on the order of decades, making it difficult to associate cause with effect. As such, monitoring must account for this lag in impacts. In general, the longer the timeframe for effects to be observed at a given monitoring point once they become evident, the longer those effects will persist, even if the pumping causing the effects is halted immediately." [1] [1] Davids Engineering 2014. Prepared for NCWA, Sacramento Valley Groundwater Assessment Active Management – Call to Action.	Comment noted. Please refer to the response to comment 75 and 91 above. The commenter refers to a Drought Impacts Analysis Study, a contract for which is expected to be awarded to a consultant by the Butte County Board of Supervisors in December 2021. The study will include some of the information, as identified by the commenter, with regard to water diversions, transfers, and programs and will also analyze the associated economic impacts to the County resulting from the drought.
93	Jim Brobeck (19)	Aqualliance				Line 3016 Water Banking Stimulation of sub surface flows "It is anticipated that this data gap [sub surface flows] will be addressed through future refinements to the BBGM and through coordination and collaboration with neighboring subbasins as part of GSP implementation." The coordination and collaboration with neighboring subbasins is, at best, a forthright sharing of information and unbiased evaluation of model results. However, the VGSA would be naïve to ignore the special interests of key players in the Northstate Water World that may inspire some purveyors to profitably engage in the emerging California Water Market with less regard to the interests of GDEs and water users that are not participating in Transfer/sales that "exercise" the shared regional aquifer while promising to use PMAs to refill drained aquifer water banks.	Comment noted. Please see the Inter-basin Coordination Master Response. The commenter acknowledges the importance of inter-basin coordination and provides opinions that do not raise specific technical issues with the Plan.
94	Jim Brobeck (20)	Aqualliance				3181 "It is anticipated that these uncertainties will be reduced over time through monitoring and additional data collection, refinements to the BBGM and other tools, and coordination with neighboring basins." The DGSP is deficient because significant monitoring infrastructure has yet to be funded and built in the shallowest portion of the aquifer system that GDEs rely upon. According to the 2007 DWR/NCWA Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework; "The long-term health of riparian vegetation, wetland species, and number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels and an appropriate level of interaction between surface water and groundwater resources. The lowering of groundwater levels due to natural climatic changes or the interception of groundwater underflow to surface water systems due to the increased groundwater extraction associated with water management programs, have the potential to impact the native habitat areas. Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. In order to identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. In evaluating impacts to certain wetlands species, it is important to discern both the rate of groundwater level change, as well as the cumulative change over the entire year. Data collection and monitoring frequency should be appropriately selected to support the temporal and long-term evaluations." https://www.waterboards.ca.gov/waterrights//water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_280.pdf	Please see GDE Master Response.
95	Jim Brobeck (21)	Aqualliance				3266 3. SUSTAINABLE MANAGEMENT CRITERIA	

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96	Jim Brobeck (22)	Aqualliance				3298 • "MT– Quantitative threshold for each Sustainability Indicator used to define the point at which undesirable results may begin to occur." The stated definition is the most egregious violation of common sense in the DGSP. Undesirable results BEGIN to occur even before historic low levels (the approximate upper reach of the operational range) are occur. Domestic well failures, destruction of GDEs and chronic lowering of groundwater levels occur at historic GW levels and would be exacerbated if the aquifer is managed within the Operational Ranges being proposed. I find the Plan to be deficient in protecting beneficial uses. Historic low GW levels shown in most of the Appendix 3-B hydrographs are still above the 80' max rooting depth of native and urban forest trees. The Minimum Threshold as defined in the GSP, is purported to designate "the point at which Undesirable Results may BEGIN to occur." But undesirable results will begin much earlier in the proposed operational range shown in most of the hydrographs. These MTs are significantly deeper than 80' bgs. Furthermore, the lower water table will dewater longer reaches of streams earlier in the season and persist later in the year. Dan Wendell of The Nature Conservancy, a panelist at a workshop held by the California Natural Resources Agency, explained "since the 1940s, groundwater discharge to streams in the Sacramento Valley has decreased by about 600,000 acre-feet per year due to groundwater pumping, and it's going to decrease an additional 600,000 acre-feet in coming years under status quo conditions due to the time it takes effects of groundwater pumping to reach streams." The operational range proposed will not avoid triggering this and other significant irreversible Undesirable Results.SGMA Regulations define "Measurable objectives" as "specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions..." Setting GW level MOs below historic low levels does not meet this requirement. Most of the proposed MOs are below historic low levels. This is not the appropriate level to designate the top of the operational range. SGMA Water Code § 354.30 explains "An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan." The managers assure the public that the goal of the VGSP is to maintain GW levels above or near the MOs or that if the MT is approached/transgressed PMAs would be employed to bring water levels back to the MO or higher. The definition of the MT shows the "Operational Range" as the defined goal. The proposed broad operational ranges fit the prescription for market driven groundwater banking but would result in many undesirable impacts to water users not participating in the rapidly emerging California Water Market.	Comment noted. See GDE Master Response and MO/MT Master Response.
97	Jim Brobeck (23)	Aqualliance				3415 "The quantitative Vina Subbasin Undesirable Result for the Chronic Lowering of Groundwater Levels occurs when: Two RMS wells within a management area reach their MT for two consecutive years of non-dry year-types." Two years of operating at the MT level would destroy GDEs including the urban forest of Chico. The insulting caveat that it would be acceptable to forgive the extreme MT levels if they occur during 2 consecutive dry years would allow GW levels to decline below the MT and implies that artificial recharge during "wet" years is a mitigating option. This is another example of an operation prescription for conjunctive use water bank marketing.	Comment noted.
98	Jim Brobeck (24)	Aqualliance				3477 "Groundwater levels are typically lower during dry years and higher during wet years. Superimposed on this four- to seven-year short-term cycle is a long-term decline in groundwater levels. In other words, groundwater levels during more recent dry-year cycles are lower than groundwater levels in earlier dry-year cycles." The DGSP fails here to identify the cumulative impacts of increased pumping in the regional shared Tuscan aquifer system that is driving the long-term trend in driving down the fluctuating hydrograph record. Management of connected groundwater systems is challenging for several reasons. First, the cumulative GW depletions caused by pumping depends on the spatial scale: in general (depending on soil conditions and strata) the greater the distance or depth between groundwater pumping and a monitoring well, the lower the magnitude but the longer the timescale of depletions. Consequently, the ultimate effects of pumping can occur significantly after pumping starts, or even after pumping has ceased. The timescales involved in aquifer responses to pumping and other stresses can be on the order of decades.	Comment noted. Please refer to response to comment 75. The GSP is a planning document and it establishes thresholds and objectives that will be monitored to determine if undesirable results, as identified in the Plan, are occurring. The Plan identifies projects and management actions that will be implemented to maintain or improve conditions, as warranted, in order to meet interim milestones and achieve sustainability.

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99	Jim Brobeck (25)	Aqualliance				3703 Outside Hydrologic Influence “hydrologic impacts outside of the Vina Subbasin, such as upper watershed development or fire-related changes in run-off, could result in impacts to streamflow, riparian areas, or GDEs that are completely independent of any connection to groundwater use or conditions within the Vina Subbasin.” Since the deep Tuscan Aquifer System is recharged from the eastern basin foothills it is certainly appropriate to recognize impacts to groundwater use and conditions within the Vina SB resulting from fire related soil conditions and streamflow in the recharge area. [https://www.buttecounty.net/waterresourceconservation/SpecialProjects/StableIsotopeRechargeProject.aspx] Additionally, conditions in the down-gradient portion of the Tuscan System are worthy of evaluation as the VGSP evolves. The lower Tuscan Aquifer system is being developed as a water source west of the Sacramento River and is being evacuated with vigor especially during dry years. This may accelerate the rate of subsurface flow out of the Vina SB. The Glenn Colusa Irrigation District board pumped over 25K af of Tuscan groundwater for 2-3 months this summer to supplement their river allocation. This is on top of 10k af of groundwater substitution water transfers and even more surface water sales from “willing sellers” to "willing buyers" South Of Delta. The 35k/a/f is more water in 3 months than the Chico Urban Area pumps in a year. The State emergency declaration allows water purveyors like GCID to sidestep laws that require environmental review. GCID used district wells located 5-10 miles west of Chico that can pump 3KAF/minute. The Butte County Drought Task Force recognizes the importance of evaluating cumulative impacts of programs on water supplies and demands on the Vina SB may be significant and is initiating a “Drought Impacts Analysis Study” that will compile and analyze the 2021 Water Transfer Programs and the Supplemental Groundwater Pumping Operations in the Northern Sacramento Valley. https://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=1006&meta_id=157029	Comment noted. The GSP is a Plan that establishes baseline conditions using historical conditions. See response to comment 98 above.
100	Jim Brobeck (26)	Aqualliance				3776 Upland GDE Designation “The Vina Subbasin specifically recognizes deep-rooted tree species, such as Valley Oak, that are common along riparian corridors in both upland streams and the Sacramento River. This connectivity is not well measured or understood in the Vina Subbasin at this time.” The failure of the DGSP to accept the well-documented fact that deep rooted trees are not exclusively located along riparian corridors but are nonetheless dependent on the shallow aquifer. US Forest Service Index of Species Information for Valley Oak explains the wide distribution of the Valley Oak ecosystem: https://www.fs.fed.us/database/feis/plants/tree/quelob/all.html“Valley oak typically has several vertical roots that tap groundwater and extensive horizontal root branches. Vertical root depth has been measured as deep as 80 feet (262m) in some individuals. Best growth is attained when water tables are about 33 feet (10 m) below the surface. Historically, these forests extended 0.6 to 5.0 miles (1-8 km) on each side of major rivers. Valley oak cover was once extensive, extending through lowlands and into foothills.” Limiting GDE evaluation to measurable impacts to interconnected streamflow is insufficient. California Code of Regulations, Title 23 § 351. Definitions. “(g) Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information. (m) “Groundwater dependent ecosystem” refers to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.” The DGSP, like other planning documents, promises on line 3785 “to fill these data gaps and the GSAs are committed to addressing these issues and develop appropriate SMCs for the Vina Subbasin.” But like other co-equal goals that assure balancing water supply with ecosystem health it is meeting the demand that takes precedence. In 2007 the DWR, NCWA and the State Water Board recognized the importance of habitat monitoring in their Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_280.pdf “The lowering of groundwater levels due to natural climatic changes or the interception of groundwater underflow to surface water systems due to the increased groundwater extraction associated with water management programs, have the potential to impact the native habitat areas….In order to identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer.” But there has been no investment in creating the network needed to collect baseline conditions or to monitor declines in this critical GDE preservation goal.	Thank you for this recommendation to indicate acknowledgment of Valley Oak species in non-riparian areas as indicated in the NCCAG database. Staff agrees and have made this revision in the final GSP. Please also see the GDE Master Response regarding future steps to address data gaps.

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101	Jim Brobeck (27)	Aqualliance				5. PROJECT AND MANAGEMENT ACTIONS4412 5.2.3.1 Agricultural Irrigation Efficiency4414 Butte County agriculture is a keystone feature of culture in the Vina SB. The importance of maintaining the viability of irrigated agriculture is of paramount importance. The results of the Vina GSA, Agricultural Groundwater Users of Butte County, and Butte County Farm Bureau survey to evaluate current irrigation methods and practices, identify opportunities and methods to improve irrigation efficiency, determine potential issues preventing the adoption of efficiency practices, and provide recommendations for increasing participation in these practices were expected to be available in September 2021. A summary of the results would be helpful in evaluating opportunities to stabilize or reduce demand. Incentives to invest in efficient GW irrigation through grant funding and tax rebates are needed to maximize benefits. According to Valerie Kincaid "A project proponent maintains the right to water that is recharged whether it results from recharge projects or groundwater demand reduction projects (e.g., conservation, recycling)." Why is this not listed as a recharge project?	Thank you for your comment. This project is not characterized as a recharge project because it focuses on water demand reduction through water use and conveyance efficiency as opposed to a traditional understanding of the term recharge which in most cases (other than in-lieu recharge) implies application of surface to the ground surface. When the GSA Board(s) decide to implement projects, a more-thorough analysis of the legal implications of the project(s) will be completed as part of the environmental review process.
102	Jim Brobeck (28)	Aqualliance				4449 5.2.3.2 Project: Residential Conservation The Estimated Groundwater Offset and/or Recharge: 100 acre-feet/year is certainly below the potential for urban efficiency. The voluntary expansion of xeriscape replacement of turf is evident and the adoption of efficient water using appliances is inevitable. The managers should review the successful urban conservation data from last decade to evaluate more realistic estimates of potential offset amounts.	Comment noted. The project proponent provided the estimate of groundwater offset.
103	Jim Brobeck (29)	Aqualliance				4079 " As discussed in Section 4.1, the GSAs in the Vina Subbasin intend to further evaluate the SMC for interconnected surface waters to avoid undesirable results to aquatic ecosystems and GDEs. As additional data are collected and evaluated, the Vina Subbasin commits to developing additional SMC and installation of monitoring points, as appropriate, for specific stream reaches and associated habitat where there is a clear connection to groundwater pumping in the principal aquifer." Restricting monitoring points and GDE considerations to riparian proximities is insufficient for the protection of deep-rooted vegetation, both native trees and the Chico urban forest. According to the USDA Forest Service "Urban forests help to filter air and water, control storm water, conserve energy, and provide animal habitat and shade. They add beauty, form, and structure to urban design. By reducing noise and providing places to recreate, urban forests strengthen social cohesion, spur community revitalization, and add economic value to our communities." [https://www.fs.usda.gov/managing-land/urban-forests] The shallowest portion of the aquifer system that sustains this vegetation extends beyond riparian corridors. The Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework [2007 DWR NCWA https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_280.pdf] recognizes the importance of establishing a monitoring network in the shallowest portion of the aquifer for this purpose: "The long-term health of riparian vegetation, wetland species, and number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels and an appropriate level of interaction between surface water and groundwater resources. The lowering of groundwater levels due to natural climatic changes or the interception of groundwater underflow to surface water systems due to the increased groundwater extraction associated with water management programs, have the potential to impact the native habitat areas. Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. In order to identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. In evaluating impacts to certain wetlands species, it is important to discern both the rate of groundwater level change, as well as the cumulative change over the entire year. Data collection and monitoring frequency should be appropriately selected to support the temporal and long-term evaluations."	Thank your comment. Please see the GDE Master Response regarding future steps to address data gaps.

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104	Jim Brobeck (30)	Aqualliance				Section 4: MONITORING NETWORKS 4218 Well "Construction Data – Well data such as perforation depths, construction date, and well depth was considered for selection." Many of the selected wells to not meet the above criteria for selection: 4262 Table 4-5. Groundwater Levels RMS Well Construction Details North MA: 3/6 of the wells do not have listed screen intervals. This makes it difficult to know what layer of aquifer is being monitored. Scientifically constructed multi-completion wells with defined screen depths/elevations is needed. The other 3 have screen intervals ranging from about 70' to almost 500'. While this type of well construction is suitable for production it is unsuitable for transparent depth/elevation monitoring of the aquifer system. Chico MA The well depths are undefined as are the screen depths. There is a notable lack in monitoring the shallow aquifer that supports the unirrigated Chico Urban forest. South MA: The screen intervals on two of the MC wells have appropriate 10' spacing allowing for better scientific analysis of monitoring data.	Total well depth is included for all RMS wells in the GSP. Wells < 200 feet deep are considered representative of groundwater conditions for domestic wells.
105	Jim Brobeck (31)	Aqualliance				5. PROJECT AND MANAGEMENT ACTIONS [cont.] 4477 5.2.3.3 Project: Streamflow Augmentation"The project would primarily take place at Comanche Creek, Butte Creek, Little Chico Creek, and Big Chico Creek." It is unclear how Little Chico Creek and Big Chico Creek would be integrated into this program since they are, apart from flood control infrastructure, unregulated by dams. If a project includes the application for a new right to recharge water, it will need to obtain a water right permit from the State Water Resources Control Board (SWRCB) through a surface water right application and a supplemental groundwater recharge form. The water right permit application would need to identify the "beneficial use" that the project intends to meet. Recharging groundwater is not considered a beneficial use, however, meeting the sustainable management criteria in a GSP may be determined to be a beneficial use. Since this project is in the "Planned" category and is expected to move forward and be completed there must be more detailed information available to the public. The project description should be clear on permits that would be required to be negotiated with regulatory agencies such as CFW and the State Water Board.	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
106	Jim Brobeck (32)	Aqualliance				4507 5.2.3.4 Flood MAR/Surface Water Supply and Recharge Scoping This planned scoping project must include a detailed evaluation of the efficacy of up-gradient recharge efforts that may enhance extraction opportunities in down-gradient sub-basins that are developing new groundwater exploitation infrastructure to supply expanding permanent crop acres and engaging in water transfers that integrate the shared aquifer system into their transfer portfolio and have a history of using the same aquifer as an "emergency" supplemental water supply. The legal consequences of attempting MAR have been summarized by Ms. Kincaid and issues of aquifer privatization and potential water bank extirpation of Butte Section 33 protection remain unresolved and exacerbated by the expert analysis presented by the Public Policy Institute of California. "County export ordinances prevent beneficial trades. In the absence of state regulation of groundwater, county ordinances have protected local parties against injury from groundwater-related exports. But their export permitting hurdles are so high that they impede any transfers, including those that present no significant risk to local groundwater sustainability. In Butte County, for instance, it would take 18 months to go through all the steps to obtain a permit for a same-year groundwater substitution transfer. Once GSAs establish sustainability plans that address undesirable impacts of pumping, it should be possible to ease the coarser restrictions on this practice found in most county ordinances—which effectively preclude trades if they entail water leaving the county. If counties with restrictive groundwater export ordinances fail to amend their laws to conform to SGMA, the legislature should consider preempting local laws that discriminate against out-of-county uses or place undue burdens on groundwater and groundwater-substitution transfers that would not jeopardize sustainable groundwater management of the source aquifer." https://www.ppic.org/publication/improving-californias-water-market/	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.

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107	Jim Brobeck (33)	Aqualliance				All the projects outlined in lines 4408-4663, as well as 4870 5.2.4.11 Project: Surface Water Supply and Recharge, whether they are conservation (demand reduction) or recharge (supply augmentation) projects have the potential to carry the legal consequences of artificial recharge efforts. According to Kincaid [https://www.vinagsa.org/files/4441577c7/PMA+Legal+Implications+Discussion+Paper.pdf] “A project proponent maintains the right to water that is recharged whether it results from recharge projects or groundwater demand reduction projects (e.g., conservation, recycling). If a project uses or obtains a surface water supply and recharges into the aquifer, the project proponent would have a legal right to the recharged water. Water does not legally become “common” or “native” supply available to overlying groundwater right holders unless it is abandoned by the project proponent.” The contentious issue of privatization of the aquifer that is used as a water bank must be resolved at the State level because local ordinances may be overridden by SGMA jurisdiction. The strategy of integrating the Tuscan Aquifer System into the State Water Supply is a long-standing threat to the balance of uses required to maintain the quality of life in the Vina SB. According to the Public Policy Institute of California [https://www.ppic.org/publication/improving-californias-water-market/] County export ordinances prevent beneficial trades. In the absence of state regulation of groundwater, county ordinances have protected local parties against injury from groundwater-related exports. But their export permitting hurdles are so high that they impede any transfers, including those that present no significant risk to local groundwater sustainability. In Butte County, for instance, it would take 18 months to go through all the steps to obtain a permit for a same-year groundwater substitution transfer. "Streamline transfer reviews while maintaining protections. Approval delays by federal, state, and local authorities often reflect uncertainties about the physical impact of a surface or groundwater transfer on other water users or the environment. Yet there are various ways to streamline the process while maintaining protections, for instance by conducting more up-front analysis of impacts through programmatic reviews, developing a “fast lane” for transfers below a certain size, developing a structured evaluative process for reviews, and establishing an after-the-fact process for balancing accounts to enable quicker approvals of time-sensitive activities. "Develop more equitable local rules for groundwater substitution transfers. Well-run groundwater substitution programs can expand long-term water availability by more actively using local groundwater storage. Once GSAs establish sustainability plans that address undesirable impacts of pumping, it should be possible to ease the coarser restrictions on this practice found in most county ordinances—which effectively preclude trades if they entail water leaving the county. If counties with restrictive groundwater export ordinances fail to amend their laws to conform to SGMA, the legislature should consider preempting local laws that discriminate against out-of-county uses or place undue burdens on groundwater and groundwater-substitution transfers that would not jeopardize sustainable groundwater management of the source aquifer." The State may use emergency proclamation or legislative action to neutralize local control of water policy such as the Section 33 ordinance in Butte County. The broad operating range and historic low-level starting point (MO) that the VGSA consultants and staff have inserted into the VGSP will create the storage space needed to bank/sell water stored in the Butte Basin. The Kincaid white paper explains that Potential Management Actions “would allow the Vina GSA to protect the Vina subbasin and the implementation of the GSP from negative implications from artificial recharge projects through enactment of rules, ordinances and/or policies.” But her estimation that ordinances or policies that the GSA may adopt to ensure recharge projects are operating without adverse impact to the basin offer no assurance that the VGSA would have the capacity to successfully navigate the State prerogative to manipulate the emerging water market that intends to “Streamline groundwater substitution and water transfer permitting and approval processes by allowing consolidated basin-level environmental reviews to facilitate water market transactions,” [https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118]	Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. When the GSA Board(s) decide to implement projects, a more-thorough analysis of the legal implications of the project(s) will be completed as part of the environmental review process.

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
108	Jim Brobeck (34)	Aqualliance				4664 5.2.4.5 Community Monitoring Program "This project would create routine water table monitoring programs for approximately 8,000 acres of Ecological Reserves in the region between lower Forest Ranch and Cohasset Road near Chico Airport, including the Big Chico Creek, Sheep Hollow, and Cabin Hollow tributaries." This project should be required to be implemented yesterday! Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. To identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. In evaluating impacts to certain GDE species, it is important to discern both the rate of groundwater level change, as well as the cumulative change over the entire year. Data collection and monitoring frequency should be appropriately selected to support the temporal and long-term evaluations.	Comment noted.
109	Jim Brobeck (35)	Aqualliance				4691 5.2.4.6 Project: Wastewater Recycling While this project requires time consuming permitting and coordination with regulatory agencies as well as significant infrastructure installations it will be helpful in keeping Chico's GW demand from expanding along with the urban development that is anticipated. Focusing purple pipe infrastructure on athletic field irrigation is a good target during dry seasons.	Comment noted.
110	Jim Brobeck (36)	Aqualliance				4722 5.2.4.7 Project: Community Water Education Initiative A population that is well informed on watershed health, water use conservation and water policy is an excellent education goal. This project should identify regional responsible water use and climate responsive flexibility. The political science portion should dive into the history of California water policy; how it has shaped regional water infrastructure and the need for local vigilance in defending the hydrologic balance from insatiable demand from unfettered urban and agricultural expansion south of the Delta.	Comment noted
111	Jim Brobeck (37)	Aqualliance				4768 5.2.4.8 Project: Rangeland Management and Water Retention4802 5.2.4.9 Project: Fuel Management for Watershed Health4833 5.2.4.10 Project: Removal of Invasive Species Investments in the health of ecosystems that provide the water recharge for the Tuscan Aquifer System have been, like in the rest of the Sierra Cascade watershed, unwisely underfunded. An excerpt from the Sierra Nevada Ecosystem Project lays out the imbalance of resource extraction vs reinvestment. These projects would begin to address that imbalance. "Based on estimates of direct resource values as one input (not the total revenue produced by resource dependent activities), the Sierra Nevada ecosystem produces approximately $2.2 billion worth of commodities and services annually. Water accounts for more than 60% of that total value. Other commodities [timber and grazing] account for 20% as do services. "Public timber and private recreation are the largest net contributors of funds to countygovernments both in total dollars and as a percentage of their total value. Around 2% of all resource values are presently captured and reinvested into the ecosystem or local communities through taxation or revenue sharing arrangements. The declining status of some aspects of the Sierra Nevada ecosystem suggests that this level of reinvestment is insufficient to ensure sustainable utilization of the ecosystem." https://pubs.usgs.gov/dds/dds-43/VOL_III/VIII_C23.PDF	Comment noted.
112	Jim Brobeck (38)	Aqualliance				4870 5.2.4.11 Project: Surface Water Supply and Recharge While it is suggested that these projects will require a SWRCB permit; CEQA and others the State is on a path of "streamlining and acceleration of managed aquifer recharge and groundwater banking permitting processes" and to "Streamline groundwater substitution and water transfer permitting and approval processes to optimize the economic value of groundwater". [https://data.ca.gov/dataset/californias-groundwater-update-2020-bulletin-118/resource/94f3a5f6-23f3-4aec-ab84-b546bf211bab] It is unclear if the legal and environmental consequences of this project will be adequately considered. The preservation of undisturbed critical vernal pool habitat is an ecological priority in some of the presumed areas of inundation.	Comment noted.
113	Jim Brobeck (39)	Aqualliance				4973 5.3.4 Landscape Ordinance 4980 5.3.5 Prohibition of Groundwater Use for Ski (Recreational) Lakes These two common sense regulations would help meet our goals.	Comment noted.
114	Jim Brobeck (40)	Aqualliance				4984 5.3.6 Expansion of Water Purveyors' Service Area Assuming that this is exclusively for residential development it is critical that service area expansion does not stimulate urban sprawl that intrudes on either green-line or gold-line open space.	Comment noted.

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
115	Jim Brobeck (41)	Aqualliance				4990 5.3.7 Groundwater Allocation The consideration of groundwater allocation must be scientifically connected to the actual cause of failure to achieve sustainability goals by 2042. If cross-boundary water flows are causing declining levels in up-gradient portions by extractions in the down-gradient portion of the shared regional aquifer system there must be well designed/implemented monitoring/modeling systems in place that have the confidence of all involved.	Comment noted.
116	Jim Brobeck (42)	Aqualliance				5005 5.4 Data Collection 5006 5.4.1 County Contour Mapping "As part of the efforts to collect the information necessary to fill the data gaps identified in Section 3, this project proposes to expand the existing monitoring program to include Butte, Glen, Colusa, and Tehama counties and conduct these groundwater elevation surveys in the spring, summer, and fall. The monitoring program would gather data used to produce groundwater contours and estimates of lateral and vertical flow direction and volume. Producing this data for the four counties will help to identify Inter-basin flow patterns and influences on surface water flows and replenishment locations, thereby improving coordination between counties and water management decision-making." This inter-basin effort must be implemented ASAP! A reliable inter-basin GW modeling is also at the top of the management list.	Comment noted.
117	Jim Brobeck (43)	Aqualliance				6. PLAN IMPLEMENTATION 5135 Table 6-5: Estimated Costs for Implementing Data Gaps "Interconnected Stream Monitoring $100,000 – $250,000" As mentioned in previous comments the immediate implementation of a network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. The long-term health of riparian vegetation, wetland species, and number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels. Limiting the data gap to Interconnected Stream Monitoring would leave out GDEs that are outside of designated riparian zones. The shallow aquifer has an important role to play in keeping deep rooted trees, including the large trees in the Chico Urban Forest, that survive the regional dry months without supplemental irrigation. The USDA also recognizes that Urban Forests such as exists in Chico and other Butte County towns provide a range of valuable ecosystem services. I posit that the groundwater dependent trees of our towns ARE ecosystems. Many environmental challenges are exacerbated within the urban landscape, such as stormwater runoff and flood risk, chemical and particulate pollution of urban air, soil and water, the urban heat island, and summer heat waves. Chico's urban forest canopy mitigates these challenges. Research shows that urban trees are integral to the environmental quality of cities and towns. In April of 2007 Butte County resolved to adopt an oak woodlands management plan. http://www.buttecounty.net/Portals/10/Docs/Planning/Projects/OakWoodland/Section53_ButteCounty_OakWoodlandMitigationOrd_2018-10-29.pdf?ver=2018-10-29-165211-350 "Butte County supports significant acreage of oak woodland habitat. The historical importance of oaks is apparent in the names of towns, cities, streets and residential complexes throughout California. Butte County's oak woodlands enhance the natural and scenic beauty of the area, provide forage and shelter for more than 300 species of wildlife, facilitate nutrient cycling, moderate temperature extremes, reduce soil erosion, sustain water quality and increase the monetary and ecological value of property." Water Code § 113It is the policy of the state that groundwater resources be managed sustainably for long-term reliability and multiple economic, social, and environmental benefits for current and future beneficial uses.	Please see GDE Master Response.
118	Jim Brobeck (44)	Aqualliance				5253 6.7 Inter-basin Coordination 5271 1. Information Sharing "This will continue throughout GSP implementation and may include: 1. Inform each other on changing conditions (i.e., surface water cutbacks, land use changes, policy changes that inform groundwater management) 2. Share annual reports and interim progress reports 3. Share data and technical information and work towards building shared data across and/or along basin boundaries (e.g., monitoring data, water budgets, modeling inputs and outputs, and Groundwater Dependent Ecosystems)" Information Sharing must include the water-market/emergency GW pumping volumes/locations/timing that members of the North Sac River Corridor group intend to implement and a report on the final v/l/t of these extra demands on the shared aquifer system. These extra pumping	Please see the Inter-basin Coordination Master Response. With regard to the Drought Impacts Analysis Study, please refer to the response to comment number 92 in this comment tracking table.

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						demands are not unprecedented and have become a routine component of California's plan to use the Northern Sacramento Valley as a "reliable" source of supply. Butte County is on the verge of conduction a Drought Impacts Analysis Study that will evaluate the numerous 2021 Water Transfer Programs in Northern Sacramento Valley including the Supplemental Groundwater Pumping Operations. The study portends to accomplish an evaluation of cumulative impacts of programs on water supplies and demands in the inter-basin, but focus on the Vina Subbasin" https://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=1006&meta_id=157029 pdf Pg. 42-43 The report will include a brief description of the programs, amount of water transferred, recipient of water, whether surface water or groundwater substitution is utilized, destination of transferred water, etc. including maps. This report should be conducted every year, funded by SGMA Inter-basin coordination parties and be included in the VGSA Annual report submitted by April 1 for the prior year's activities.	
119	Jim Brobeck (45)	Aqualliance				5295 3. Coordinate on mutually beneficial activities GSAs that overlie the Tuscan Aquifer Formation should provide cooperative funding for mutually beneficial watershed management in the recharge areas located in the foothills east of the valley floor.	Comment noted.
120	Jim Brobeck (46)	Aqualliance				5314 5. Issue Resolution Process"Vina Subbasin will pursue development of an issue-resolution process with neighboring subbasins in the North Sac River Corridor group."This single sentence belies the potential for regional conflict over water management issues. The drama surrounding the nascent Tuscan Water District and the unpopular "Operational Range[s]" proposed in the DVGSP are examples of "issues" that have already emerged in this process. Conflict arising from expanded GW demand in the North Sac River Corridor group are being litigated between stakeholders and agencies. Achieving sustainability requires local agencies, stakeholders, and water users to make many difficult and potentially contentious decisions. These decisions are prone to conflict, particularly when pumping restrictions are viewed as infringing on property rights, or when fees are charged to support local management. Newly formed GSAs have additional layers of potential conflict. Questions regarding authority, streamlined legal and regulatory timelines, a lack of existing precedents and the need to represent agency and constituent interests have the potential to exacerbate conflicts under SGMA. In some cases, where authoritative interpretations of legal authority and limits have not been established yet, litigation may be necessary and warranted. The State prefers the Northern Sacramento Valley to quietly comply with the myth that this region is a source of "surplus" water that can peacefully serve the accelerating water market through conjunctive-use water banking. However, it is likely that conjunctive-use water banking would degrade the groundwater basin and groundwater users who are not involved in conjunctive use but are reliant on the same groundwater basin.	Please refer to the Inter-basin Coordination Master Response. The commenter provides opinions on various topics related to groundwater, water management issues, and water banking but does not specifically identify the technical or policy issue that should be addressed in the Plan.
121	Jim Brobeck (47)	Aqualliance				See Vina Draft GSP Comment A6	Comment Letter A-6 contains the same comments included in this comment tracking spreadsheet for comments 74 through 120. See responses to these individual comments above.
122	Bruce Smith	Public Comments	BaS	1.1.6.1	553, 554 Fig. 1-9A	Important to note electric logs us1 To define formation boundaries in AEM cross section	Comment noted.
123	Bruce Smith	Public Comments	BaS	1.1.8, 1.1.8.1	599-605	There are four principal aquifers in The Vina Subbasin. The shallow Aquifer, the intermediate aquifer And the upper and lower deep Aquifers. This data gap needs to Be better defined using well logs and cross sections and conceptual models that show flow paths. This section from 599-605 implies one principal aquifer. Gives the false impression that surface recharge then recharges other/lower aquifers. They may not be connected.	Comment noted. The GSP acknowledges the need for new data to better characterize vertical gradients and connectivity between shallow and deeper zones in the aquifer system.
124	David Eaton	Public Comments				See Vina Draft GSP Comment P5	Thank you for providing your comments. The commenter addresses concerns regarding the MO, sustainable yield, and reduction of groundwater levels. However, the commenter does not specifically identify changes or alterations that should be made to the Plan pertaining to these topics.
125	Debra Lucero	Public Comments				See Vina Draft GSP Comment P6	Thank you for providing your comments. The commenter identifies their concerns regarding several topics discussed in the GSP and is referred to the Master Responses provided as part of this responses to comments documentation for further discussion and clarification. However, the commenter does not specifically identify technical changes or alterations that should be made to the Plan pertaining to these topics.
126	Lisa Creamer O'Donnell	Public Comments				See Vina Draft GSP Comment P7	Thank you for providing your comments. The commenter identifies their concerns regarding several topics discussed in the GSP and is referred to the Master

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							Responses provided as part of this responses to comments documentation for further discussion and clarification. However, the commenter does not specifically identify technical changes or alterations that should be made to the Plan pertaining to these topics.
127	Nancy Gillard-Bartels	Public Comments				See Vina Draft GSP Comment P8	Thank you for providing your comments. The commenter provides an opinion pertaining to groundwater rights and injected surface water, but does not raise specific technical or policy issues with the Plan.
128	Jim Grayden	Self	3-SMC			Why are Cal Water wells in Chico the only ones chosen in the monitoring network as there are others available, particularly shallower monitoring wells. Also, Management objectives are probably not protective enough. Total Dissolved Solids and Electrical conductivity (TDS/EC) levels aren't protective as should be, need more that secondary MCLs	Thank you for your comment. Please see Section 4.8.1 Selection Criteria for Representative Monitoring Sites for information on the criteria used to identify the RMS wells.
129	Commenter 5	Self	3-SMC			Already at a record low. MO is too low! We need to be better than where we are now	Comment noted. See MO/MT Master Response
130	Todd Green	SHAC/Self	3-SMC			If Measurable Objectives level is the desirable level seem you are more talking it being a more strategic objective vs measurable. Why not use the average of historical lows the way the Butte Subbasin did where they take an average of levels?	Comment noted. See MO/MT Master Response
131	Anne Dawson	SHAC/Self	3-SMC			Basing SMCs on the Minimum Thresholds (MT) vs desirable levels. How were they developed? . How was it decided? Need to stop using the word sustainable. More detail is needed on how the line was determined. Where wells are in relation to measuring use/topography etc. Need more data to show how you got there.	Comment noted. Revisions were made to section 3.3 to clarify the methodology for establishing the Groundwater Level SMC. Additionally, please see MO/MT Master Response.
132	Jim Brobeck	SHAC/Self	3-SMC			In the draft GSP, the MT is the point where undesirable levels begin but undesirable results will occur earlier. Will the operational levels in the hydrographs in Appendix result in domestic wells going dry? Concerned about data gaps. I do not think that the hydrographs were shared with the Stakeholder Advisory Committee.	Comment noted. Hydrographs were made available to the GSA Boards and the public when the MT was considered by the GSA Boards in July 2021.
133	Bruce Smith	SHAC/Self	3-SMC			They say our aquifer is healthy but wells are going dry. There is massive groundwater pumping occurring on the other side of the Sacramento River. Well data needs to be posted on the DWR and County websites. On the verge of a crisis and need to take it seriously.	Comment noted. Butte County is partnering with other agencies as appropriate to respond to the current drought emergency. This includes outreach and education to private well owners as well as providing an Emergency Water Filling Station for drinking water access for households whose domestic well has gone dry or is experiencing well reliability issues.
134	Commenter	Self	5-PMAs			Why not use the average of 5 years for the MO used by the Butte Subbasin?	See MO/MT Master Response.
135	Jim Brobeck	SHAC/Self	5-PMAs			Please summarize the legal ramifications of In-lieu and direct recharge scoping project. What incentives are available to encourage conservation on family farms? Residential conservation estimate of 100 AF is too low.	When the GSA Board(s) decide to implement projects, a more-thorough analysis of the legal implications of the project(s) will be completed as part of the environmental review process as well as a determination of any incentives included for voluntary participation in projects as applicable . The project proponent provided the estimate of groundwater offset for the residential conservation project. Staff have included revisions to the PMA Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
136	Gary Cole	SHAC/Self	5-PMAs			My experience is instream augmentation and recharge projects to address the 10,000 Acre Feet deficit will be hindered by the DWR permit process. Also concerned about ownership of recharge water.	Comment noted.
137	Bill Loker	Self	Monitoring and Evaluation			Speakers have frequently mentioned that the measurable objective and sustained yield are "best Guesses" and subject to revisions with more data and experience. In my experience, initial numbers become benchmarks that are difficulty to change. At the least, a very contentious process. I think a more conservation approach with more robust measurable objective and higher levers are needed.	Comment noted.
138	Jim McCabe	Self	PMAs	pg. 5 line 557/5-PMAs		Statement the "Vina GSA does not and will not have employees" the words "will not" \needs to be removed. For PMAs, Paradise intertie should be removed as there are cheaper solutions available, such as the diversion of PID water to Butte Creek, Butte County Section 33 has never been audited or enforced to determine noncompliance with the groundwater transfers laws. Enforcement of Section 33 could be a PMA that may fix the 10,000 AF deficiency	Thank you for your comment. The Joint Powers Agreement forming the Vina GSA states that the GSA will not have employees. Staff have included revisions to the PMA Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
139	Norah Todenhagen	Self	3-SMC/MO	3-SMC/Exec Summary ES-7 on pg. 13		Unacceptable to set a MO below what we know are dangerous levels. Move the line to a more acceptable and representative level so that it is truly a measurable objective. Why aren't there identified alert levels in the GSP such as those found in the Best Management Objectives in the County's Section 1? Also trees won't survive at levels suggested	Comment noted. See GDE Master Response.

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140	Joseph Connell	Self	PMAS			Legal issues related to who owns water when it is recharged must be dealt with by the State Water Board and the legislature. Without clarity on this topic, recharge projects could be non-starters by the GSA's. This is a statewide issue.	Comment noted.
141	J.W. Cook	Senate				Great work. Use science. Thanks.	Comment noted.
142	Marty Dunlap	public interest attorney	MO			The MO needs to be higher to reflect desired goals for a healthy aquifer (not based on historical lows and disregarding drought effects)	Comment noted. See MO/MT Master Response.
143	Marty Dunlap	public interest attorney	MTs			The MTs need to be raised to avoid long-term and irreversible impacts to the basin/aquifer.	Comment noted. See MO/MT Master Response.
144	Marty Dunlap	public interest attorney	MO/MT			The Section 33 of Butte County code delineates the Basin Management Objectives (BMOs) with alert levels and these protections need to be incorporated into the MO & MT.	Comment noted. More specific triggers for project and management actions may be identified through GSP implementation.
145	Bill Loker	self	MA			Meter all wells that use groundwater, especially the largest groundwater users	Comment noted.
146	Bill Loker	self	MO			MO needs to be set higher to protect our groundwater. Drought is not a transient feature of our area. Drought is potentially the "new abnormal." We need to be CAREFUL STEWARDS of our groundwater for TRUE SUSTAINABILITY.	Comment noted. See MO/MT Master Response.
147	Bill Loker	Self	MO/MT			The MO and sustainable yield allow too much exploitation of groundwater. Presenters say these "best guesses" can be modified with "more data." What is the process for changing these? In my experience, changing these benchmarks will be a very contentious process. Ag users are often more well represented and have more political access than domestic users. I have little confidence that change will be easy or more protective of the aquifer. Change the MO- raise it! Change the sustainable yield- lower it!	Comment noted.
148	Pam Stoesser	Self	MO			Please explain the logic behind setting minimum groundwater levels below historic lows. This makes no sense!! Does this have to do with recharge?	Comment noted.
149	Pam Stoesser	Self	MTs			Minimum groundwater level thresholds must be above historic lows. This plan must protect domestic wells, streams, our urban forest, trees and wildlife. Conservation, conservation, conservation. Domestic well failure must not be acceptable. Implement groundwater pumping reductions up front, not last. No to "recharge" and ownership of our public water.	Comment noted.
150	Richard Harriman	NCEDC	Funding			SGMA is a state-mandated program that should be paid for by the state with regular funding.	Comment noted. The commenter provides an opinion pertaining to SGMA funding and does not raise specific technical or policy issues with the Plan.
151	Richard Harriman	NCEDC	Mas			The GSP should adopt Management Actions that implement a Project that provides for measurement via electronic system to record pumping for all major groundwater pumpers for agriculture and commercial business.	Thank you for this recommendation. Staff have included revisions to this Section in the final GSP based on the GSA Boards direction provided in November 2021. The GSA Boards may consider additional updates to the plan in the future.
152	Pam Stoesser	Self	3-SMC			1) How are we regulating people digging deeper wells? Is there a safety net in this plan to make it harder for people to do that? 2) She expressed that she was most bothered by the minimum threshold, exclaiming, “this bothers me the most,” particularly the way this topic was presented. She related that when she attended the in-person workshop, it was confirmed that right now our groundwater is at historic lows. We learned and that the MT is set 50 feet below the historic low. This graph doesn’t show that. 3) She addressed interconnectedness with aquifers and surface water. She stated, “it bothers me that there isn’t more understanding about this before we move forward with the plan…I would like our urban forest to be prioritized as much or even more than agriculture moving forward.”	Thank you for your comments. The commenter provides an opinion pertaining to MTs, interconnected surface water and groundwater and urban forests and does not raise specific technical or policy issues with the Plan. Please see section 1.3.5.3 Permitting of New Wells for the question posed related to well regulation.
153	Kathy Faith	Self	PMAs			I appreciate all of the brains and perspectives involved, but this effort seems too late. For those whose wells go dry, that will be a huge deal. The MT line is too low. Would be possible for that line to be raised at some point in the process?	Comment noted. See MO/MT Master Response.
154	Anne Dawson	Self	PMAs			Although this subbasin isn’t critical, it is high priority, and despite that, the board decided that they were not going to develop groundwater allocations. They have also said they will not implement triggers to institute groundwater allocation discussion. I am worried that with the drought and continued pumping, lots of domestic wells will go dry and there is no plan to stop it.	Comment noted. The commenter expresses their concern that domestic wells will go dry as a result of continued pumping.
155	Anne Dawson	Self	PMAs			My primary concern is that there are no triggers in place to make allocation happen. it seems we are being left with the bill. We are the ones who will be spending thousands of dollars digging new and deeper wells, whereas agriculture will continue as before, unimpacted. There should be a better effort to spread the pain among all groups, rather than having domestic well owners shoulder the cost.	Comment noted. The commenter expresses their concern that the GSP does not address water allocation for agricultural well users and that domestic well owners will be forced to deepen their wells, which is costly.
156	Jim Brobeck (A)	Self	MTs			I am reviewing the Vina GSP and I appreciate the work that has gone into its preparation. However, I find the Plan to be deficient in protecting beneficial uses. Historic low GW levels shown in most of the Appendix 3-B hydrographs are above the 80’ max rooting depth of native and urban forest trees. The Minimum Threshold as defined in the GSP, is purported to designate “the point at which Undesirable Results may BEGIN to occur.” But undesirable results will begin much earlier in the proposed operational range shown	Please see the MO/MT Master Response. The commenter discusses the minimum threshold, undesirable results, and the operational range described in the GSP, but does not specifically identify how they would like the information to be changed.

	Commenter Name	Commenter Organization	Section #	Section	Line #(s) or Figure #	Comment	Response
						in most of the hydrographs. These MTs are significantly deeper than 80' bgs. Furthermore, the lower water table will dewater longer reaches of streams earlier in the season and persist later in the year. Dan Wendell of The Nature Conservancy, a panelist at a workshop held by the California Natural Resources Agency, explained "since the 1940s, groundwater discharge to streams in the Sacramento Valley has decreased by about 600,000 acre-feet per year due to groundwater pumping, and it's going to decrease an additional 600,000 acre-feet in coming years under status quo conditions due to the time it takes effects of groundwater pumping to reach streams." The operational range proposed will not avoid triggering this and other significant irreversible Undesirable Results. SGMA Regulations define "Measurable objectives" as "specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions.." Setting GW level MOs below historic low levels does not meet this requirement. Most of the proposed MOs are below historic low levels, not the appropriate level to designate the top of the operational range. SGMA Water Code § 354.30 explains "An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan." The managers assure the public that the goal of the VGSP is to maintain GW levels above or near the MOs. But I have not seen this intention in writing. Instead, I see the term "Operational Range" as the defined goal. The proposed broad operational ranges fit the prescription for market driven groundwater banking but would result in many undesirable impacts to water users not participating in the rapidly emerging California Water Market.	
157	Debra Lucero	Self				I am concerned that there may be a false sense of protection and local control, but that the reality may be quite different when SGMA takes full affect. I am worried that people will be able to pump groundwater simply by claiming it is from initial rainfall that fell on their property.	Comment noted. The comment does not specifically address items in the GSP.
158	Eric Wright	Self				I request that the climatic patterns and trends are incorporated by looking at the original areas around the subbasin.	Comment noted. The GSP discusses the climate scenario used to evaluate future conditions. It is unclear what the commenter is referring to with regard to "the original areas around the subbasin."
159	Richard Harriman	Self	MTs			I agree with the comments of Jim Brobeck and Debra Lucero. If one looks at the MT's and then looks at the analysis in regard to trees in Chico area, this is the canary in the coal mine. The MT's have been set so low as to allow the canary in the mine to die before we even act. Sustainability, by definition, means that one learns to use what one has before one tries to bring in more to replace what has been overused. An analytical inconsistency exists in the model, in that there is a default towards supply before even exhausting conservation remedies. Conservation should be prioritized before seeking to bring in water from outside the aquifer. It is very challenging to make changes once bureaucratic action has been put in motion; "works like the titanic. It has a lot of momentum going in one way. Once you want to slow it down, it takes a long time before you can get it to reverse."	Comment noted. The commenter notes their agreement with other commenters regarding Measurable Thresholds being set too low, but does not raise specific technical or policy issues with the Plan; no changes to the GSP were made. The commenter is referred to the MO/MT Master Response.
160	Tasha Levinson	Self				California Water Commission hosted a Zoom meeting today (with another tomorrow) about groundwater trading within each basin. A key element for anything workable was that fair and equitable groundwater allocations be made in the Groundwater Sustainability Plan. Such allocations were particularly important to assure that (a) water as a human right, (b) protection for disadvantaged communities, and (c) protection for groundwater dependent ecosystems, ALL are protected. I have attended many of the meetings of each of our sub-basins and, to the best of my knowledge, none of the 3 sub-basins have made any groundwater allocations. If they have not then any plans involving trading or banking are pre-mature until such allocations are made. Thank you to all of you for your attention.	There is a Management Action for Groundwater Allocation included in the PMA Section of the GSP.

GSP Workshops October 4 and October 13, 2021 - Clarifying Questions – Responded to During Workshop						
160	Jim Brobeck	SHAC/Self	Introduction/S GMA Overview			How are comments to be incorporated into the Final Groundwater Sustainability Plan (GSP).
162	Commenter 1	Self	Introduction/S GMA Overview			When and how was authority to enforce GSPs given to DWR? Relationship of the Vina GSA JPA between Chico, Durham Irrigation District and the County? Is Rock Creek Reclamation District (RCRD) its own Management Area or part of the Vina GSA?
163	Commenter 2	Self	Introduction/S GMA Overview			No trust in the public process and not confident comments will be heard.
164	Jim Brobeck	SHAC/Self	2-Basin Setting			Given the data gaps, are you confident that the Butte Basin Groundwater Model (BBGWM) is adequate to set the water budget?
165	Commenter 3		2-Basin Setting			Who will fund and monitor all the data so that we get better information?
166	Commenter 1		2-Basin Setting			Is the Primary Aquifer the Lower Tuscan Aquifer? What is the definition of sustainable yield? Does what comes in equal what goes out?
167	Bruce Smith	SHAC/Self	2-Basin Setting			Is the Butte Basin Groundwater Model (BBGWM) based on DWR's cross sections? Will the AEM information be used and incorporated in the BBGWM?
168	Bill Loker	Self	3-SMC			How was the Measurable Objective (MO) set? Why is it so low? Concerned about how Management objectives in different Management Areas will be reconciled since we share one aquifer?
169	Commenter 4		3-SMC			Isn't salinity considered the same as seawater under SMC? Does the plan to gain more data mean drilling more wells?
170	Commenter 1	Self	3-SMC			What is the definition of shallow wells? You say that we have no projects going on right now. Who is "we"? Isn't groundwater being pumped now, aren't they projects?
171	Commenter 2	Self	3-SMC			Aren't our groundwater levels at historical levels? 60 wells have gone dry, correct? Are we at Minimum Threshold now? How Close? What about conservation?
172	Commenter 6		3-SMC			Heard there might be moratorium on wells? How many new wells are being drilled?
173	Commenter 2	Self	3-SMC			How long will projects take to raise the groundwater levels and fix the problem? Will we not do anything for 20 years?
174	Commenter 3	Self	3-SMC			Why are there no Chico residential wells in the monitoring network? Should we drill shallower wells for monitoring?
175	Richard Harriman	Self	3-SMC			Concerned with the definition of irreversible results such as subsidence? How do you determine the probability of overshooting the operational flexibility? If allow water levels to go too low you may overshoot the "operational flexibility" based on assumptions of duration of droughts. How would you prevent overshooting to avoid irreversible results to groundwater dependent ecosystems?
176	Richard Coon		5-PMAs			In regards to the Flood-Mar project, if Rock Creek Reclamation District implement recharge projects who owns the water? What percentage of the water is considered native? Does the GSA set the percentages?
177	Commenter		5-PMAs			Does residential conservation include metering domestic wells?
	Commenter 3		6-Implementation			Ag conservation is considered voluntary, what if they don't care? Does the plan have a big stick to enforce conservation?
178	Public Comment Period (see speaker cards)					
179	Lynn Haskell	self				Why are comments regarding the formation of the Tuscan Water District not being considered by the Vina GSA, the Board of Supervisors and LAFCo?
180	Richard Coon		Butte Co Section 33 & water transfers under SGMA			See Comment in Q&A Session - Mr. Coon left the meeting before the public comment session.
181	Bruce Smith	SHAC/Self	3-SMC	3.8	Slide page 11	Statement on the interconnected streams slide states that "groundwater does not appear to be connected to upland streams" is incorrect and flawed.
182	Comment Cards					
183	Jeanne Christopherson	Self				All this work assumes we have time to react and that the future will continue to reflect patterns of water supply from the past. It is apparent that this is not so-- from unprecedented momentum of global warming. We have no choice. To wait for "voluntary" conservation, to wait for more data...Are we going to wait for a water crisis as large as the fires to descend upon us? We need to look at worst cast scenarios... water

						retention- universal cisterns at every house, mandatory conservation...swimming pools in every backyard and gardens, credits for these measures. And social urgency. Let's mobilize and stop tiptoeing.
184	Marty Dunlap	public interest attorney				Q: How do we ensure that the Vina GSA sustainability efforts to keep our region's groundwater robust are not integrated into statewide efforts to increase supply to areas that are depleted of adequate water?
185	Marty Dunlap	public interest attorney	PMAs			Q: What are the skills that qualify the Vina GSA Board to evaluate the data that impacts the project being considered under the GSP?
186	Bill Loker	self	Administration/ Plan Area			Agricultural pumping affects City of Chico water. The citizens of Chico are not well represented in this process. City of Chico is 21,000 acres/100K people and should have proportional say in water use decisions! How will the City and their domestic water users be represented in these discussions?
187	Debra Lucero	Self	Introduction/SGMA Overview			Will public comments go to GSA staff first and which body, according to the statute, is required to provide answers to comments?
188	Grace Marvin	Self	Introduction/SGMA Overview			Will SHAC members know what the public is asking and will there will be a summary sheet provided before the plan is adopted?
189	Richard Harriman	Self	Introduction/SGMA Overview			Is the GSA's duty to the local area or is it to implement what DWR wants?
190	Debra Lucero	Self	2-Basin Setting			The draft states that there are 16 million acre feet of storage in the aquifer and asked, 'How can we know what is currently in the aquifer?'
191	Commenter		2-Basin Setting			How many acre feet are used for a 4-person household?
192	Pam Stoesser	Self	2-Basin Setting			The presentation touched on salinity and claimed that we don't have that issue here, but we would if wells were dug deep enough. How deep would that need to be? 1500-2000 ft.? Is that what farmers are doing?
193	Todd Greene	Self	2-Basin Setting			DWR bases their estimates on gas and oil electric wells, which is a concern is when you get to the east, where the marine units get closer.
194	Pam Stoesser	Self	2-Basin Setting			If there anything in place to ensure that people aren't drilling down far enough to compromise water quality?
195	Eric Wright	Self	2-Basin Setting			If the subbasin study accounts for what watersheds are percolating and recharging the subbasin, as well as what impacts property development at upper elevation is having on the water?
196	Eric Wright	Self	2-Basin Setting			How does different vegetation and different land use affects the subbasin storage capacity and sustainability?
197	Amy Raymond	Self	2-Basin Setting			There are 16 million acre feet in the 'bathtub,' and it may have taken 10,000 years to fill the bathtub.
198	Amy Raymond	Self	2-Basin Setting			A more interesting number might be the answer to how much water comes in and out of the bathtub over a year or multi-year period? What is the volume relative to what's recharging on an annual basis against what we're using?
200	Debra Lucero	Self	3-SMC			How deep are the wells are that are being monitored for water quality? Is it known how many wells in Butte County are more than 800 feet deep?
201	Nancy	Self	PMAs			Is the concept of equity being used in water reduction targeting?
202	Commenter	Self	PMAs			Who owns our groundwater now and how might that be altered? What dangers are in store for controlling the groundwater that we have?"
203	Grace Marvin	Self	PMAs			Will we no longer have the same rights to the water once somebody else owns it?
204	Debra Lucero	Self	PMAs			How is this playing out elsewhere in the state with domestic well owners whose wells have gone dry, with GSA's in charge of setting MT's, are they bringing those cases into the courts?
205	Pam Stoesser	Self	PMAs			What would trigger that last resort, groundwater allotment?
206	Commenter	Self				There was an article on the front page of the (didn't get the name of the publication) talking about the exceptional drought occurring in Butte County, where fields are left fallow, vegetable yields are low, fire season is costly, food aid is needed, etc. I am not surprised that the GSP is not spreading the pain more between big agriculture and residential. The reason for this is that the people writing these plans are the same people approving these plans. It seems like a real conflict of interest. How are we supposed to have confidence in our plan?"

From:	NGO Consortium
To:	VinaGSA@gmail.com
Cc:	Pablo Ortiz; Melissa Rohde; ddolan@lgc.org; E. J. Remson; Ngodoo Atume; Arthur, Samantha; amerrill@americanrivers.org; kculbert@americanrivers.org
Subject:	Comments on Draft Groundwater Sustainability Plan for Vina Subbasin
Date:	Friday, October 15, 2021 10:24:32 AM
Attachments:	Public Comment Letter_DraftGSP_Vina.pdf

Hello,

I am writing on behalf of Audubon California, Clean Water Action, Clean Water Fund, Local Government Commission, The Nature Conservancy, American Rivers and Union of Concerned Scientists with the attached comments on the draft Groundwater Sustainability Plan for this basin.

We know that SGMA plan development and implementation is a major undertaking, and we want every basin to be successful. We would be happy to meet with you to discuss our evaluation as you finalize your Plan for submittal to DWR. Feel free to contact us at ngos.sgma@gmail.com for more information or to schedule a conversation.

Sincerely,

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

October 19, 2021

Vina GSA
308 Nelson Avenue
Oroville, CA 95965

Submitted via email: VinaGSA@gmail.com

Re: Public Comment Letter for Vina Subbasin Draft GSP

Dear Christina Buck,

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

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

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

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.
2. Climate change **is not sufficiently** considered.
3. Data gaps **are not sufficiently** identified and the GSP **does not have a plan** to eliminate them.
4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

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

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

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

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

Best Regards,

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

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

Samantha Arthur
Working Lands Program Director
Audubon California

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Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Amy Merrill, Ph.D.
Acting Director, California Program
American Rivers

Kristan Culbert
Associate Director, California Central Valley River Conservation
American Rivers

Attachment A

Specific Comments on the Vina Subbasin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

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

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities, Drinking Water Users, and Tribes

The identification of Disadvantaged Communities (DACs) and drinking water users is **insufficient**. The GSP provides information on DACs, including identification by name and location on a map. However, the plan fails to clearly document the population of each DAC. In addition, the GSP fails to include the population dependent on groundwater as their source of drinking water in the subbasin.

Appendix 1-D of the GSP states that the Mechoopda Indian Tribe of Chico Rancheria is located in Vina Subbasin. The location and map of tribal lands, however, is not provided.

While the plan provides a density map of domestic wells in the subbasin (Figure 1-9), the GSP fails to provide depth of these wells (such as minimum well depth, average well depth, or depth range) within the subbasin.

These missing elements are required for the GSAs to fully understand the specific interests and water demands of these beneficial users, and to support the consideration of beneficial users in the development of sustainable management criteria and selection of projects and management actions.

RECOMMENDATIONS

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

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**, due to lack of supporting information provided for the ISW analysis. GSP Section 2.2.6.2 (Evaluation of Surface Water Connectivity) describes well locations, proximity to streams, and screening depths that were used to evaluate surface water connectivity. However, Section 2.2.6.3 (Estimates of Surface

Water Connection Based on BBGM [Butte Basin Groundwater Model]) does not describe the data used in the BBGM model, such as the groundwater level monitoring well data and stream gauge data that were incorporated into the model. Additionally, no description was provided of the temporal (seasonal and interannual) variability of the data used to calibrate the model. This information should be provided in the GSP to support the conclusions presented.

Figure 2-26 presents a map of stream reaches in the subbasin, showing the percentage of months of either a gaining or losing condition in the subbasin as predicted by the BBGM model. Based on the color coding it appears that all surface water is considered to be connected, but the percentage of connection for many of the upland streams and tributaries in the subbasin are labeled 0%. Therefore it is not clear what is an ISW and what is not based on this map. We recommend that these labels are clarified in the text so it is more clear which stream segments are retained as ISWs or potential ISWs in the GSP and to include a description of the logic behind determining which reaches are and are not ISWs. Note the regulations [23 CCR §351(o)] define ISW as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted". "At any point" has both a spatial and temporal component. Even short durations of interconnections of groundwater and surface water can be crucial for surface water flow and supporting environmental users of groundwater and surface water.

RECOMMENDATIONS

- Describe the legend labels used on Figure 2-26 in the GSP text to make clear which stream segments are retained as ISWs or potential ISWs in the GSP.
- Further describe the groundwater elevation data and stream flow data used in the BBGM analysis. Ensure depth-to-groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) are used to determine the range of depth and capture the variability in environmental conditions inherent in California's climate.
- To confirm and illustrate the results of the groundwater modeling, overlay the stream reaches shown on Figure 2-26 with depth-to-groundwater contour maps to illustrate groundwater depths and the groundwater gradient near the stream reaches. Show the location of groundwater wells used in the analysis.
- For the depth-to-groundwater contour maps, use the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found.
- Describe data gaps for the ISW analysis in the ISW section, in addition to the discussion in the HCM section (2.1.9.2). On Figure 2-26, include reaches with data gaps as potential ISWs.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **insufficient**. The GSP does not discuss how the Natural Communities Commonly Associated with Groundwater dataset (NC dataset) was verified with the use of groundwater data from the shallow aquifer. Without an analysis of groundwater data to verify the NC dataset polygons, it will be difficult or impossible to adequately monitor and manage the subbasin's GDEs throughout GSP implementation.

The GSP took initial steps to identify and map GDEs using the NC dataset and other sources. However, we found that some mapped features in the NC dataset were improperly disregarded. NC dataset polygons were incorrectly removed in areas adjacent to irrigated fields or due to the presence of surface water supplies. However, this removal criteria is flawed since GDEs, in addition to groundwater, can rely on multiple water sources – including shallow groundwater receiving inputs from irrigation return flow from nearby irrigated fields – simultaneously and at different temporal/spatial scales. NC dataset polygons adjacent to irrigated land or surface water supplies can still potentially be reliant on shallow groundwater aquifers, and therefore should not be removed solely based on their proximity to irrigated fields or surface water.

The GSP did not discuss the flora or fauna species present in the subbasin's GDEs, except to acknowledge the presence of Valley oak (*Quercus lobata*) in the subbasin. We commend the GSAs for retaining all Valley oak polygons in the NC dataset based on the recognition that they can access groundwater at deeper depths.

RECOMMENDATIONS

- Provide a comprehensive set of maps for the subbasin's GDEs. For example, provide a map of the NC Dataset. On the map, label polygons retained, removed, or added to/from the NC dataset (include the removal reason if polygons are not considered potential GDEs, or include the data source if polygons are added). Discuss how local groundwater data was used to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer.

- Use depth-to-groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth to groundwater around NC dataset polygons. We recommend that a baseline period (10 years from 2005 to 2015) be established to characterize groundwater conditions over multiple water year types. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer.

- Provide depth-to-groundwater contour maps, noting the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a DEM to estimate depth-to-groundwater contours across the landscape.

- If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network. It is not clear from the description in the GSP whether NC dataset polygons labeled as 'Not Likely a GDE' are retained as potential GDEs.

- Include an inventory of the fauna and flora present within the subbasin's GDEs (see Attachment C of this letter for a list of freshwater species located in the Vina Subbasin). Note any threatened or endangered species.

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required[1,2] to be included in the water budget. The integration of these ecosystems into the water budget is **sufficient** because the groundwater demands of native vegetation and managed wetlands are included in the historical, current, and projected water budgets. Additional clarification is needed on why the current and projected water demands for managed wetlands are approximately half the water demands represented in the historical water budget (Table 2-7). These ecosystems will have continued or higher water needs in the future to provide habitat for migratory birds.

RECOMMENDATION

- Revisit the current and projected water demands for managed wetlands, which are represented in the GSP as approximately half the historical water demands. Provide a justification for these water budget values for managed wetlands in Table 2-7. Also, provide the water budget model documentation referenced in the GSP (BCDWRC 2021).

B. Engaging Stakeholders

Stakeholder Engagement during GSP development

Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders[3] is not fully met by the description in the Communication and Engagement Plan (Appendix 1-D).

The Communication and Engagement Plan documents representation of tribal and environmental interests during the GSP development process. A tribal staff member from the Mechoopda Indian Tribe of Chico Rancheria has represented the tribe during GSP development and participates as a member of the Vina GSA Management Committee. Additionally, there is an environmental representative on the GSA Advisory Committee.

However, we note the following deficiencies with the overall stakeholder engagement process:

- The opportunities for public involvement and engagement with DACs and drinking water users are described in very general terms. They include meetings open to the public, including GSA Board meetings, meetings in conjunction with the Reclamation District,

[1] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]

[2] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

[3] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

subbasin-wide technical meetings, Farm Bureau Water Forum meeting, City of Chico meetings, and Regional Water Management Group meetings. No specific outreach targeted to DACs is described in the GSP.

- The GSP describes an Engagement Matrix in Appendix 1-F for engaging with DACs, tribes, and environmental stakeholders through the implementation phase. However, Appendix 1-F was not included in the Draft GSP.

RECOMMENDATION

- In the Communication and Engagement Plan, describe active and targeted outreach to engage DAC members, drinking water users, environmental stakeholders and consultation to tribes through the GSP development and implementation phases. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results[4] and establishing minimum thresholds.[5,6]

Disadvantaged Communities and Drinking Water Users

For chronic lowering of groundwater levels, the GSP discusses minimum thresholds impact on domestic wells (see Section 3.3.2 Minimum Thresholds). The GSP states (p. 103): *"In recent years, Butte County has documented a number of domestic wells that have "gone dry," meaning groundwater levels have fallen below the depth of the well installation and/or pump. This occurred during summer months of recent drought years and heightened concern among some stakeholders. As a result, domestic well reliability and protection are the focus of the Groundwater Levels MT."* The GSP discusses the use of the DWR domestic well database and sets minimum threshold levels protective of domestic wells by establishing a representative zone for each RMS well.

The GSP does not however, sufficiently describe or analyze direct or indirect impacts on DACs or tribes when defining undesirable results, nor does it describe how the existing minimum threshold groundwater levels are consistent with avoiding undesirable results to DACs and tribes in the subbasin.

[4] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]
[5] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]
[6] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

For degraded water quality, salinity is the only constituent of concern (COC) for which SMC are established in the Vina Subbasin. The minimum threshold is set to the upper limit of the Secondary Maximum Contaminant Level (SMCL) for specific conductance based on the state secondary drinking water standards. The GSP states (p. 108): *"Other constituents, as discussed in Section 2.2.4, are managed through existing management and regulatory programs within the Subbasin, such as the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) and the Irrigated Lands Regulatory Program (ILRP), which focus on improving water quality by managing septic and agricultural sources of salinity and nutrients. Additionally, point-source contaminants are managed and regulated through a variety of programs by the Regional Water Quality Control Board (RWQCB), Department of Toxic Substances Control (DTSC), and the U.S. Environmental Protection Agency (EPA)."* However, SMC should be established for all COCs including chemicals of emerging concern (CEC) in the subbasin impacted or exacerbated by groundwater use and/or management, in addition to coordinating with water quality regulatory programs.

The GSP only includes a very general discussion of impacts to drinking water users when defining undesirable results and evaluating the impacts of proposed minimum thresholds. The GSP does not, however, mention or discuss direct and indirect impacts on DACs, drinking water users or tribes when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on beneficial users.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on DACs and tribes when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels (in addition to describing impacts to drinking water users).

Degraded Water Quality

- Describe direct and indirect impacts on drinking water users, DACs, and tribes when defining undesirable results for degraded water quality. For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[7]

- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users, DACs, and tribes.

- Set minimum thresholds and measurable objectives for all water quality constituents within the subbasin that can be impacted and/or exacerbated as a result of groundwater use or groundwater management. Ensure they align with drinking water standards[8].

[7] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

[8] "Degraded Water Quality [...] collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." [23 CCR §354.34(c)(4)]

Groundwater Dependent Ecosystems and Interconnected Surface Waters

Sustainable management criteria for chronic lowering of groundwater levels provided in the GSP do not consider potential impacts to environmental beneficial users. The GSP neither describes nor analyzes direct or indirect impacts on environmental users of groundwater when defining undesirable results. This is problematic because without identifying potential impacts to GDEs, minimum thresholds may compromise, or even destroy, these environmental beneficial users. Since GDEs are present in the subbasin, they must be considered when developing SMC for chronic lowering of groundwater levels.

The GSP recognizes a data gap with respect to the interconnected surface water SMC. The GSP states (p. 113): *"The GSAs in the Vina Subbasin intend to further evaluate this SMC to avoid undesirable results to aquatic ecosystems and GDEs. To that end, an Interconnected Surface Water SMC framework has been developed for the GSP as described below. This framework will guide future data collection efforts to fill data gaps, either as part of GSP projects and management actions or plan implementation."*

While the data gap is being filled, the SMC for depletion of interconnected surface water are established by proxy using groundwater levels. The GSP states (p. 115): *"Therefore, at this time, Groundwater Levels SMC are used by proxy and the MT for interconnected surface water is the same as for groundwater levels: Two RMS wells reach their MT for two consecutive non-dry year-types."* However, no analysis or discussion is presented to describe how the SMC will affect GDEs, or the impact of these minimum thresholds on GDEs in the subbasin. Furthermore, the GSP makes no attempt to evaluate the impacts of the proposed minimum threshold on environmental beneficial users of surface water. The GSP does not explain how the chosen minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the subbasin, such as increased mortality and inability to perform key life processes (e.g., reproduction, migration).

RECOMMENDATIONS

- Define chronic lowering of groundwater SMC directly for environmental beneficial users of groundwater. When defining undesirable results for chronic lowering of groundwater levels, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable' effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results[9] in the subbasin. Defining undesirable results is the crucial first step before the minimum thresholds[10] can be determined.

- When establishing SMC for the basin, consider that the SGMA statute [Water Code §10727.4(l)] specifically calls out that GSPs should include "impacts on groundwater dependent ecosystems".

[9] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results". [23 CCR §354.26(b)(3)]

[10] The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

- When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the subbasin are reached[11]. The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts to environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law[6,12].

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations[13] require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.

The integration of climate change into the projected water budget is **insufficient**. The GSP incorporates climate change into the projected water budget using DWR change factors for 2030 and 2070. However, the plan does not consider multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) in the projected water budget. The GSP should clearly and transparently incorporate the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for the subbasin. While these extreme scenarios may have a lower likelihood of occurring, their consequences could be significant, therefore they should be included in groundwater planning.

The GSP includes climate change into key inputs (e.g., precipitation, evapotranspiration, and surface water flow) of the projected water budget. However, the sustainable yield is based on historic pumping rates instead of the projected water budget with climate change incorporated. If the water budgets are incomplete, including the omission of extremely wet and dry scenarios, and sustainable yield is not calculated based on climate change projections, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, DACs, tribes, and domestic well owners.

[11] "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." [23 CCR §354.28(c)(6)]

[12] Rohde MM, Seapy B, Rogers R, Castañeda X, editors. 2019. Critical Species LookBook: A compendium of California's threatened and endangered species for sustainable groundwater management. The Nature Conservancy, San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/Critical_Species_LookBook_91819.pdf

[13] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

RECOMMENDATIONS

- Integrate climate change, including extremely wet and dry scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Calculate sustainable yield based on the projected water budget with climate change incorporated.
- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**, due to lack of specific plans to increase the Representative Monitoring Sites (RMSs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around DACs, domestic wells, tribes, GDEs, and ISWs in the subbasin.

Figure 4-5 (Groundwater Level RMS Wells) and Figure 4-6 (Water Quality RMS Wells) show that no monitoring wells are located across portions of the subbasin near DACs, domestic wells, and tribes (see maps provided in Attachment E). Beneficial users of groundwater may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. The Plan therefore fails to meet SGMA's requirements for the monitoring network[14].

The GSP provides some discussion of data gaps for GDEs and ISWs in Sections 4.10 (Network Assessment and Improvements) and Section 6.1.3 (Data Analysis), however does not provide specific plans, such as locations or a timeline, to fill the data gaps.

RECOMMENDATIONS

- Provide maps that overlay current and proposed monitoring well locations with the locations of DACs, domestic wells, tribes, GDEs, and ISWs to clearly identify potentially impacted areas. Increase the number of RMSs in the shallow aquifer across the subbasin as needed to adequately monitor all groundwater condition indicators. Prioritize proximity to DACs, domestic wells, tribes, and GDEs when identifying new RMSs.
- Describe biological monitoring that can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the subbasin.

[14] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**, due to the failure to completely identify benefits or impacts of identified projects and management actions, including water quality impacts, to key beneficial users of groundwater such as GDEs, aquatic habitats, surface water users, DACs, drinking water users, and tribes. Therefore, potential project and management actions may not protect these beneficial users. Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for *all* beneficial users.

The GSP includes projects and management actions with explicit benefits to the environment. The plan also includes a domestic well mitigation program. However, the mitigation program is described as a potential project instead of a proposed project that will be implemented within the GSP planning horizon.

RECOMMENDATIONS

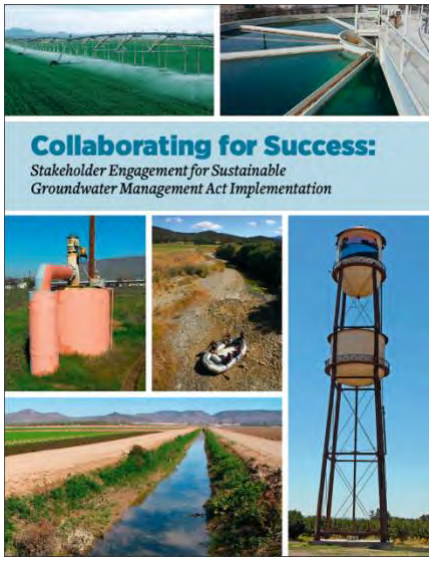
- Clarify the planning horizon of the described domestic well mitigation program to ensure that it will proactively monitor and protect drinking water wells through GSP implementation. Refer to Attachment B for specific recommendations on how to implement a drinking water well mitigation program.
- For DACs and domestic well owners, include a discussion of whether potential impacts to water quality from projects and management actions could occur and how the GSAs plans to mitigate such impacts.
- Recharge ponds, reservoirs, and facilities for managed aquifer recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document"[15].
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[15] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

Attachment B

SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users

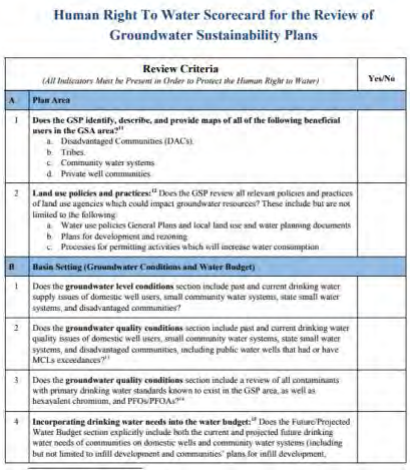
Stakeholder Engagement and Outreach



Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement during Groundwater Sustainability Plan (GSP) development and implementation. Conducting a targeted outreach involves:

- Developing a robust Stakeholder Communication and Engagement plan that includes outreach at frequented locations (schools, farmers markets, religious settings, events) across the plan area to increase the involvement and participation of disadvantaged communities, drinking water users and the environmental stakeholders.
- Providing translation services during meetings and technical assistance to enable easy participation for non-English speaking stakeholders.
- GSP should adequately describe the process for requesting input from beneficial users and provide details on how input is incorporated into the GSP.

The Human Right to Water

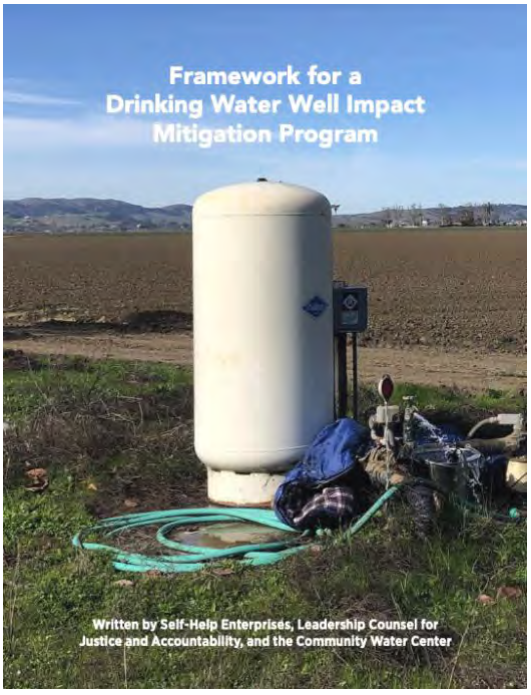


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	Review Criteria *(All Indicators Must be Present in Order to Protect the Human Right to Water)*	Yes/No
A	**Plan Area**	
1	**Does the GSP identify, describe, and provide maps of all of the following beneficial users in the GSA area:**[43] a. Disadvantaged Communities (DACs). b. Tribes. c. Community water systems. d. Private well communities.	
2	**Land use policies and practices:**[44] Does the GSP review all relevant policies and practices of land use agencies which could impact groundwater resources? These include but are not limited to the following: a. Water use policies General Plans and local land use and water planning documents b. Plans for development and rezoning. c. Processes for permitting activities which will increase water consumption.	
B	**Basin Setting (Groundwater Conditions and Water Budget)**	
1	Does the **groundwater level conditions** section include past and current drinking water supply issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities?	
2	Does the **groundwater quality conditions** section include past and current drinking water quality issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities, including public water wells that had or have MCLs exceedances?[45]	
3	Does the **groundwater quality conditions** section include a review of all contaminants with primary drinking water standards known to exist in the GSP area, as well as hexavalent chromium, and PFOs/PFOAs?[46]	
4	**Incorporating drinking water needs into the water budget:**[47] Does the Future/Projected Water Budget section explicitly include both the current and projected future drinking water needs of communities on domestic wells and community water systems (including but not limited to infill development and communities' plans for infill development,	

The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in GSPs to adequately protect the Human Right to Drinking water.

Drinking Water Well Impact Mitigation Framework



The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure its data gathering, monitoring network and management actions to proactively monitor and protect drinking water wells and mitigate impacts should they occur.

Groundwater Resource Hub

The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Rooting Depth Database

The Plant Rooting Depth Database provides information that can help assess whether groundwater-dependent vegetation are accessing groundwater. Actual rooting depths will depend on the plant species and site-specific conditions, such as soil type and

availability of other water sources. Site-specific knowledge of depth to groundwater combined with rooting depths will help provide an understanding of the potential groundwater levels are needed to sustain GDEs.

How to use the database

The maximum rooting depth information in the Plant Rooting Depth Database is useful when verifying whether vegetation in the Natural Communities Commonly Associated with Groundwater (NC Dataset) are connected to groundwater. A 30 ft depth-to-groundwater threshold, which is based on averaged global rooting depth data for phreatophytes[1], is relevant for most plants identified in the NC Dataset since most plants have a max rooting depth of less than 30 feet. However, it is important to note that deeper thresholds are necessary for other plants that have reported maximum root depths that exceed the averaged 30 feet threshold, such as valley oak (*Quercus lobata*), Euphrates poplar (*Populus euphratica*), salt cedar (*Tamarix spp.*), and shadescale (*Atriplex confertifolia*). The Nature Conservancy advises that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to groundwater threshold of 80 feet should be used instead of the 30 ft threshold, when verifying whether valley oak polygons from the NC Dataset are connected to groundwater. It is important to re-emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and availability to other water sources.

The Plant Rooting Depth Database is an Excel workbook composed of four worksheets:

1. California phreatophyte rooting depth data (included in the NC Dataset)
2. Global phreatophyte rooting depth data
3. Metadata
4. References

How the database was compiled

The Plant Rooting Depth Database is a compilation of rooting depth information for the groundwater-dependent plant species identified in the NC Dataset. Rooting depth data were compiled from published scientific literature and expert opinion through a crowdsourcing campaign. As more information becomes available, the database of rooting depths will be updated. Please Contact Us if you have additional rooting depth data for California phreatophytes.

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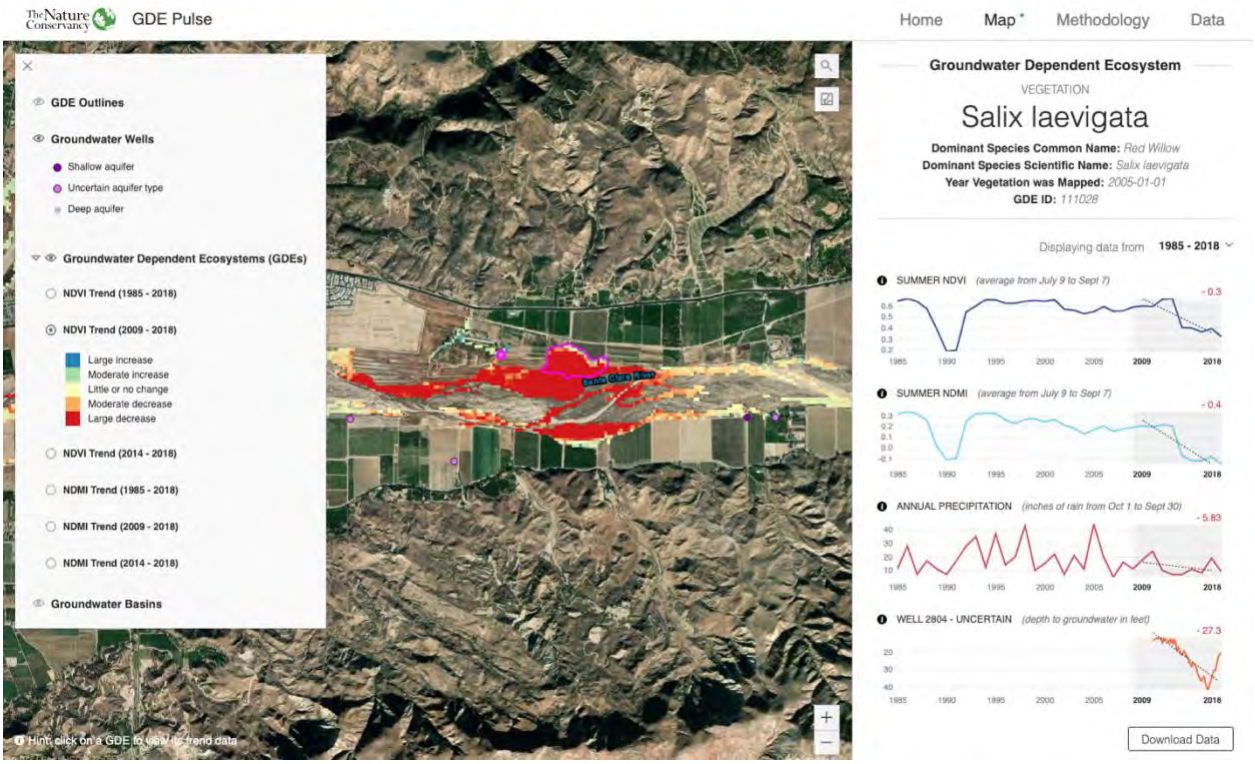
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

GDE Pulse



GDE Pulse is a free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data. Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset. The following datasets are available for downloading:

Normalized Difference Vegetation Index (NDVI) is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

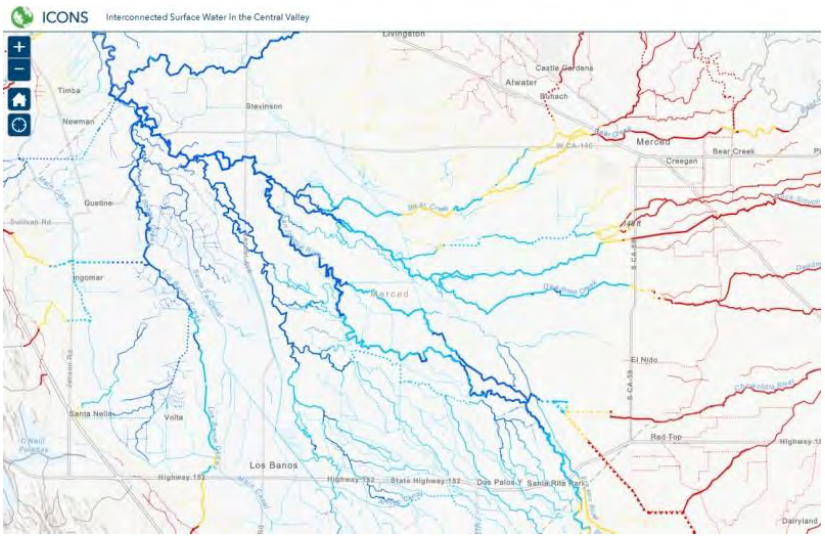
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

Annual Precipitation is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

Depth to Groundwater measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

ICONOS Mapper

Interconnected Surface Water in the Central Valley



ICONS maps the likely presence of interconnected surface water (ISW) in the Central Valley using depth to groundwater data. Using data from 2011-2018, the ISW dataset represents the likely connection between surface water and groundwater for rivers and streams in California's Central Valley. It includes information on the mean, maximum, and minimum depth to groundwater for each stream segment over the years with available data, as well as the likely presence of ISW based on the minimum depth to groundwater. The Nature Conservancy developed this database, with guidance and input from expert academics, consultants, and state agencies.

We developed this dataset using groundwater elevation data available online from the California Department of Water Resources (DWR). DWR only provides this data for the Central Valley. For GSAs outside of the valley, who have groundwater well measurements, we recommend following our methods to determine likely ISW in your region. The Nature Conservancy's ISW dataset should be used as a first step in reviewing ISW and should be supplemented with local or more recent groundwater depth data.

Attachment C

Freshwater Species Located in the Vina Subbasin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located in the Vina Subbasin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the basin boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[1]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[2] as well as on The Nature Conservancy's science website[3].

Scientific Name	Common Name	Legal Protected Status		
		Federal	State	Other
BIRDS				
Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo	Candidate - Threatened	Endangered	
Riparia riparia	Bank Swallow		Threatened	
Actitis macularius	Spotted Sandpiper			
Aechmophorus clarkii	Clark's Grebe			
Agelaius tricolor	Tricolored Blackbird	Bird of Conservation Concern	Special Concern	BSSC - First priority
Aix sponsa	Wood Duck			
Anas acuta	Northern Pintail			
Anas americana	American Wigeon			
Anas clypeata	Northern Shoveler			
Anas crecca	Green-winged Teal			
Anas cyanoptera	Cinnamon Teal			
Anas platyrhynchos	Mallard			
Anas strepera	Gadwall			
Anser albifrons	Greater White-fronted Goose			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya affinis	Lesser Scaup			
Aythya americana	Redhead		Special Concern	BSSC - Third priority
Aythya collaris	Ring-necked Duck			
Aythya valisineria	Canvasback		Special	
Botaurus lentiginosus	American Bittern			
Bucephala albeola	Bufflehead			

[1] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710

[2] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS

[3] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Bucephala clangula	Common Goldeneye			
Butorides virescens	Green Heron			
Calidris mauri	Western Sandpiper			
Calidris minutilla	Least Sandpiper			
Chen caerulescens	Snow Goose			
Chen rossii	Ross's Goose			
Chroicocephalus philadelphia	Bonaparte's Gull			
Cinclus mexicanus	American Dipper			
Cistothorus palustris palustris	Marsh Wren			
Cygnus columbianus	Tundra Swan			
Egretta thula	Snowy Egret			
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Gallinula chloropus	Common Moorhen			
Geothlypis trichas trichas	Common Yellowthroat			
Grus canadensis	Sandhill Crane			
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Himantopus mexicanus	Black-necked Stilt			
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Laterallus jamaicensis coturniculus	California Black Rail	Bird of Conservation Concern	Threatened	
Limnodromus scolopaceus	Long-billed Dowitcher			
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Numenius americanus	Long-billed Curlew			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Pandion haliaetus	Osprey		Watch list	
Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority
Phalacrocorax auritus	Double-crested Cormorant			
Plegadis chihi	White-faced Ibis		Watch list	
Pluvialis squatarola	Black-bellied Plover			
Podiceps nigricollis	Eared Grebe			
Podilymbus podiceps	Pied-billed Grebe			
Recurvirostra americana	American Avocet			

Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Tringa solitaria	Solitary Sandpiper			
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		Special Concern	BSSC - Third priority
CRUSTACEANS				
Branchinecta conservatio	Conservancy Fairy Shrimp	Endangered	Special	IUCN - Endangered
Branchinecta lynchi	Vernal Pool Fairy Shrimp	Threatened	Special	IUCN - Vulnerable
Lepidurus packardi	Vernal Pool Tadpole Shrimp	Endangered	Special	IUCN - Endangered
Linderiella occidentalis	California Fairy Shrimp		Special	IUCN - Near Threatened
Branchinecta mackini	Alkali Fairy Shrimp			
Branchinecta mesovallensis	Midvalley Fairy Shrimp		Special	
Cambaridae fam.	Cambaridae fam.			
Hyalella spp.	Hyalella spp.			
FISH				
Oncorhynchus mykiss irideus	Coastal rainbow trout			Least Concern - Moyle 2013
Acipenser medirostris ssp. 1	Southern green sturgeon	Threatened	Special Concern	Endangered - Moyle 2013
Oncorhynchus mykiss - CV	Central Valley steelhead	Threatened	Special	Vulnerable - Moyle 2013
Oncorhynchus tshawytscha - CV spring	Central Valley spring Chinook salmon	Threatened	Threatened	Vulnerable - Moyle 2013
Oncorhynchus tshawytscha - CV winter	Central Valley winter Chinook salmon	Endangered	Endangered	Vulnerable - Moyle 2013
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Rana boylii	Foothill Yellow-legged Frog	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Taricha granulosa	Rough-skinned Newt			

Taricha torosa	Coast Range Newt		Special Concern	ARSSC
Thamnophis couchii	Sierra Gartersnake			
Thamnophis gigas	Giant Gartersnake	Threatened	Threatened	
Thamnophis sirtalis sirtalis	Common Gartersnake			
INSECTS & OTHER INVERTS				
Ablabesmyia spp.	Ablabesmyia spp.			
Acentrella turbida	A Mayfly			
Ambrysus spp.	Ambrysus spp.			
Anax junius	Common Green Darner			
Antocha spp.	Antocha spp.			
Apedilum spp.	Apedilum spp.			
Argia agrioides	California Dancer			
Argia emma	Emma's Dancer			
Argia lugens	Sooty Dancer			
Argia nahuana	Aztec Dancer			
Argia spp.	Argia spp.			
Argia vivida	Vivid Dancer			
Asioplax spp.	Asioplax spp.			
Baetidae fam.	Baetidae fam.			
Baetis spp.	Baetis spp.			
Baetis tricaudatus	A Mayfly			
Berosus spp.	Berosus spp.			
Brechmorhoga mendax	Pale-faced Clubskimmer			
Brillia spp.	Brillia spp.			
Caenis latipennis	A Mayfly			
Caenis spp.	Caenis spp.			
Callibaetis spp.	Callibaetis spp.			
Camelobaetidius warreni	A Mayfly			
Cardiocladius spp.	Cardiocladius spp.			
Centroptilum spp.	Centroptilum spp.			
Cheumatopsyche spp.	Cheumatopsyche spp.			
Chimarra spp.	Chimarra spp.			
Chironomidae fam.	Chironomidae fam.			
Chironomus spp.	Chironomus spp.			
Cladotanytarsus spp.	Cladotanytarsus spp.			
Coenagrionidae fam.	Coenagrionidae fam.			
Corixidae fam.	Corixidae fam.			
Cricotopus nostocicola				Not on any status lists
Cricotopus spp.	Cricotopus spp.			
Cryptochironomus spp.	Cryptochironomus spp.			
Despaxia augusta	Smooth Needleflyl			
Dicrotendipes spp.	Dicrotendipes spp.			
Diphetor hageni	Hagen's Small Minnow Mayfly			
Dolophilodes spp.	Dolophilodes spp.			
Dytiscidae fam.	Dytiscidae fam.			

Ecdyonurus criddlei	A Mayfly			
Elmidae fam.	Elmidae fam.			
Enallagma carunculatum	Tule Bluet			
Enallagma civile	Familiar Bluet			
Enallagma cyathigerum				Not on any status lists
Epeorus spp.	Epeorus spp.			
Ephemerellidae fam.	Ephemerellidae fam.			
Erythemis collocata	Western Pondhawk			
Fallceon quilleri	A Mayfly			
Fallceon spp.	Fallceon spp.			
Glossosoma spp.	Glossosoma spp.			
Gomphus kurilis	Pacific Clubtail			
Gumaga spp.	Gumaga spp.			
Helicopsyche spp.	Helicopsyche spp.			
Helochares normatus				Not on any status lists
Heptageniidae fam.	Heptageniidae fam.			
Hetaerina americana	American Rubyspot			
Hydrobius fuscipes				Not on any status lists
Hydropsyche californica	A Caddisfly			
Hydropsyche spp.	Hydropsyche spp.			
Hydropsychidae fam.	Hydropsychidae fam.			
Hydroptila spp.	Hydroptila spp.			
Hydroptilidae fam.	Hydroptilidae fam.			
Ischnura cervula	Pacific Forktail			
Ischnura denticollis	Black-fronted Forktail			
Ischnura perparva	Western Forktail			
Labrundinia spp.	Labrundinia spp.			
Laccobius spp.	Laccobius spp.			
Larsia spp.	Larsia spp.			
Lepidostoma spp.	Lepidostoma spp.			
Leptoceridae fam.	Leptoceridae fam.			
Leptohyphidae fam.	Leptohyphidae fam.			
Leucotrichia pictipes	A Micro Caddisfly			
Libellula forensis	Eight-spotted Skimmer			
Libellula luctuosa	Widow Skimmer			
Libellula pulchella	Twelve-spotted Skimmer			
Libellula saturata	Flame Skimmer			
Libellulidae fam.	Libellulidae fam.			
Liodessus obscurellus				Not on any status lists
Macromia magnifica	Western River Cruiser			
Microcylloepus similis				Not on any status lists
Microcylloepus spp.	Microcylloepus spp.			
Micropsectra spp.	Micropsectra spp.			
Microtendipes spp.	Microtendipes spp.			

Mideopsis spp.	Mideopsis spp.			
Mystacides alafimbriatus	A Caddisfly			
Mystacides spp.	Mystacides spp.			
Nanocladius spp.	Nanocladius spp.			
Nectopsyche spp.	Nectopsyche spp.			
Nilothauma spp.	Nilothauma spp.			
Ochrotrichia spp.	Ochrotrichia spp.			
Oecetis disjuncta	A Caddisfly			
Oecetis spp.	Oecetis spp.			
Ophiogomphus bison	Bison Snaketail			
Optioservus spp.	Optioservus spp.			
Oxyethira spp.	Oxyethira spp.			
Pachydiplax longipennis	Blue Dasher			
Paltothemis lineatipes	Red Rock Skimmer			
Pantala hymenaea	Spot-winged Glider			
Parakiefferiella spp.	Parakiefferiella spp.			
Paraleptophlebia spp.	Paraleptophlebia spp.			
Paraphaenocladius spp.	Paraphaenocladius spp.			
Paratanytarsus spp.	Paratanytarsus spp.			
Peltodytes spp.	Peltodytes spp.			
Pentaneura spp.	Pentaneura spp.			
Petrophila spp.	Petrophila spp.			
Phaenopsectra spp.	Phaenopsectra spp.			
Plathemis lydia	Common Whitetail			
Polycentropus spp.	Polycentropus spp.			
Polypedilum spp.	Polypedilum spp.			
Procloeon spp.	Procloeon spp.			
Progomphus borealis	Gray Sanddragon			
Protoptila spp.	Protoptila spp.			
Psectrocladius spp.	Psectrocladius spp.			
Psephenus falli				Not on any status lists
Pseudochironomus spp.	Pseudochironomus spp.			
Pseudosmittia spp.	Pseudosmittia spp.			
Rheotanytarsus spp.	Rheotanytarsus spp.			
Rhyacophila spp.	Rhyacophila spp.			
Sanfilippodytes spp.	Sanfilippodytes spp.			
Serratella micheneri	A Mayfly			
Sialis spp.	Sialis spp.			
Simulium spp.	Simulium spp.			
Sperchon spp.	Sperchon spp.			
Stenochironomus spp.	Stenochironomus spp.			
Stenocolus scutellaris				Not on any status lists
Stictotarsus spp.	Stictotarsus spp.			
Sympetrum corruptum	Variegated Meadowhawk			
Tanypus spp.	Tanypus spp.			
Tanytarsus spp.	Tanytarsus spp.			

Telebasis salva	Desert Firetail			
Tinodes spp.	Tinodes spp.			
Tramea lacerata	Black Saddlebags			
Tricorythodes spp.	Tricorythodes spp.			
Tvetenia spp.	Tvetenia spp.			
Zaitzevia spp.	Zaitzevia spp.			
MAMMALS				
Castor canadensis	American Beaver			Not on any status lists
Lontra canadensis canadensis	North American River Otter			Not on any status lists
Neovison vison	American Mink			Not on any status lists
Ondatra zibethicus	Common Muskrat			Not on any status lists
MOLLUSKS				
Anodonta californiensis	California Floater		Special	
Ferrissia spp.	Ferrissia spp.			
Gonidea angulata	Western Ridged Mussel		Special	
Gyraulus spp.	Gyraulus spp.			
Helisoma spp.	Helisoma spp.			
Lymnaea spp.	Lymnaea spp.			
Margaritifera falcata	Western Pearlshell		Special	
Menetus opercularis	Button Sprite			CS
Physa spp.	Physa spp.			
Pisidium spp.	Pisidium spp.			
Sphaeriidae fam.	Sphaeriidae fam.			
PLANTS				
Limnanthes floccosa californica	Shippee Meadowfoam	Endangered	Endangered	CRPR - 1B.1
Limnanthes floccosa floccosa	Woolly Meadowfoam		Special	CRPR - 4.2
Orcuttia pilosa	Hairy Orcutt Grass	Endangered	Endangered	CRPR - 1B.1
Orcuttia tenuis	Slender Orcutt Grass	Threatened	Endangered	CRPR - 1B.1
Rhynchospora californica	California Beakrush		Special	CRPR - 1B.1
Sagittaria sanfordii	Sanford's Arrowhead		Special	CRPR - 1B.2
Tuctoria greenei	Green's Awnless Orcutt Grass	Endangered	Rare	CRPR - 1B.1
Alisma triviale	Northern Water-plantain			
Alnus rhombifolia	White Alder			
Alnus rubra	Red Alder			
Alopecurus aequalis aequalis	Short-awn Foxtail			
Alopecurus carolinianus	Tufted Foxtail			
Alopecurus geniculatus geniculatus	Meadow Foxtail			
Alopecurus saccatus	Pacific Foxtail			

Ammannia coccinea	Scarlet Ammannia			
Ammannia robusta	Grand Redstem			
Arundo donax	NA			
Azolla filiculoides	NA			
Baccharis salicina				Not on any status lists
Bacopa rotundifolia	NA			
Bergia texana	Texas Bergia			
Boehmeria cylindrica	NA			Not on any status lists
Callitriche heterophylla bolanderi	Large Water-starwort			
Callitriche longipedunculata	Longstock Water-starwort			
Callitriche marginata	Winged Water-starwort			
Carex densa	Dense Sedge			
Carex feta	Green-sheath Sedge			
Carex nudata	Torrent Sedge			
Carex vulpinoidea	NA			
Cephalanthus occidentalis	Common Buttonbush			
Ceratophyllum demersum	Common Hornwort			
Chamaecyparis lawsoniana				Not on any status lists
Cicendia quadrangularis	Oregon Microcala			
Crassula aquatica	Water Pygmyweed			
Crypsis vaginiflora	NA			
Cyperus bipartitus	Shining Flatsedge			
Cyperus erythrorhizos	Red-root Flatsedge			
Cyperus flavescens	NA			
Cyperus fuscus	NA			
Cyperus squarrosus	Awned Cyperus			
Damasonium californicum				Not on any status lists
Darmera peltata	Umbrella Plant			
Datisca glomerata	Durango Root			
Downingia bella	Hoover's Downingia			
Downingia bicornuta	NA			
Downingia cuspidata	Toothed Calicoflower			
Downingia ornatissima	NA			
Downingia pusilla	Dwarf Downingia		Special	CRPR - 2B.2
Echinochloa oryzoides	NA			
Echinodorus berteroi	Upright Burhead			
Elatine brachysperma	Shortseed Waterwort			
Elatine californica	California Waterwort			
Elatine heterandra	Mosquito Waterwort			
Elatine rubella	Southwestern Waterwort			

Eleocharis acicularis acicularis	Least Spikerush			
Eleocharis acicularis gracilescens	Least Spikerush			
Eleocharis acicularis occidentalis				Not on any status lists
Eleocharis atropurpurea	Purple Spikerush			
Eleocharis bella	Delicate Spikerush			
Eleocharis coloradoensis				Not on any status lists
Eleocharis engelmannii engelmannii	Engelmann's Spikerush			Not on any status lists
Eleocharis flavescens flavescens	Pale Spikerush			
Eleocharis macrostachya	Creeping Spikerush			
Eleocharis parishii	Parish's Spikerush			
Eleocharis quadrangulata	NA			
Eleocharis radicans	Rooted Spikerush			
Eleocharis rostellata	Beaked Spikerush			
Elodea canadensis	Broad Waterweed			
Epilobium campestre	NA			Not on any status lists
Epilobium cleistogamum	Cleistogamous Spike-primrose			
Epipactis gigantea	Giant Helleborine			
Eryngium aristulatum aristulatum	California Eryngo			
Eryngium articulatum	Jointed Coyote-thistle			
Eryngium castrense	Great Valley Eryngo			
Eryngium vaseyi vallicola				Not on any status lists
Eryngium vaseyi vaseyi	Vasey's Coyote-thistle			Not on any status lists
Euphorbia hooveri	NA			Not on any status lists
Euthamia occidentalis	Western Fragrant Goldenrod			
Fimbristylis autumnalis	NA			
Gratiola ebracteata	Bractless Hedge-hyssop			
Gratiola heterosepala	Boggs Lake Hedge-hyssop		Endangered	CRPR - 1B.2
Hypericum anagalloides	Tinker's-penny			
Isoetes howellii	NA			
Isoetes nuttallii	NA			
Isoetes orcuttii	NA			
Juncus acuminatus	Sharp-fruit Rush			
Juncus dubius	Mariposa Rush			
Juncus effusus pacificus				
Juncus uncialis	Inch-high Rush			

Juncus usitatus	NA			Not on any status lists
Lasthenia fremontii	Fremont's Goldfields			
Lasthenia glabrata coulteri	Coulter's Goldfields		Special	CRPR - 1B.1
Leersia oryzoides	Rice Cutgrass			
Lemna minor	Lesser Duckweed			
Lemna minuta	Least Duckweed			
Limnanthes alba alba	White Meadowfoam			
Limnanthes douglasii douglasii	Douglas' Meadowfoam			
Limnanthes douglasii rosea	Douglas' Meadowfoam			
Limosella acaulis	Southern Mudwort			
Lindernia dubia	Yellowseed False Pimpernel			
Lipocarpha micrantha	Dwarf Bulrush			
Ludwigia palustris	Marsh Seedbox			
Ludwigia peploides montevidensis	NA			Not on any status lists
Ludwigia peploides peploides	NA			Not on any status lists
Lycopus americanus	American Bugleweed			
Lythrum portula	NA			
Marsilea vestita vestita	NA			Not on any status lists
Mimulus cardinalis	Scarlet Monkeyflower			
Mimulus glaucescens	Shield-bract Monkeyflower		Special	CRPR - 4.3
Mimulus guttatus	Common Large Monkeyflower			
Mimulus latidens	Broad-tooth Monkeyflower			
Mimulus pilosus				Not on any status lists
Mimulus tricolor	Tricolor Monkeyflower			
Myosurus minimus	NA			
Myosurus sessilis	Sessile Mousetail			
Myriophyllum aquaticum	NA			
Najas gracillima	NA			
Najas guadalupensis guadalupensis	Southern Naiad			
Navarretia heterandra	Tehama Navarretia			
Navarretia intertexta	Needleleaf Navarretia			
Navarretia leucocephala leucocephala	White-flower Navarretia			
Panicum acuminatum acuminatum				Not on any status lists
Panicum dichotomiflorum	NA			
Paspalum distichum	Joint Paspalum			
Perideridia kelloggii	Kellogg's Yampah			

Persicaria hydropiper	NA			Not on any status lists
Persicaria hydropiperoides				Not on any status lists
Persicaria lapathifolia				Not on any status lists
Persicaria maculosa	NA			Not on any status lists
Persicaria punctata	NA			Not on any status lists
Phyla lanceolata	Fog-fruit			
Phyla nodiflora	Common Frog-fruit			
Pilularia americana	NA			
Plagiobothrys austiniae	Austin's Popcorn-flower			
Plagiobothrys greenei	Greene's Popcorn-flower			
Plagiobothrys humistratus	Dwarf Popcorn-flower			
Plagiobothrys leptocladus	Alkali Popcorn-flower			
Plantago elongata elongata	Slender Plantain			
Platanus racemosa	California Sycamore			
Pogogyne douglasii	NA			
Pogogyne zizyphoroides				Not on any status lists
Potamogeton diversifolius	Water-thread Pondweed			
Potamogeton foliosus foliosus	Leafy Pondweed			
Potamogeton nodosus	Longleaf Pondweed			
Potamogeton pusillus pusillus	Slender Pondweed			
Psilocarphus brevissimus brevissimus	Dwarf Woolly-heads			
Psilocarphus oregonus	Oregon Woolly-heads			
Ranunculus aquatilis aquatilis	White Water Buttercup			
Ranunculus aquatilis diffusus				Not on any status lists
Ranunculus hystriculus				Not on any status lists
Ranunculus pusillus pusillus	Pursh's Buttercup			
Ranunculus sardous	NA			
Ranunculus sceleratus	NA			
Rorippa palustris palustris	Bog Yellowcress			
Rotala ramosior	Toothcup			
Rumex conglomeratus	NA			
Sagittaria latifolia latifolia	Broadleaf Arrowhead			
Sagittaria longiloba	Longbarb Arrowhead			

Sagittaria montevidensis calycina				Not on any status lists
Salix babylonica	NA			
Salix exigua exigua	Narrowleaf Willow			
Salix gooddingii	Goodding's Willow			
Salix laevigata	Polished Willow			
Salix lasiandra lasiandra				Not on any status lists
Salix lasiolepis lasiolepis	Arroyo Willow			
Salix melanopsis	Dusky Willow			
Schoenoplectus acutus occidentalis	Hardstem Bulrush			
Schoenoplectus mucronatus	NA			
Schoenoplectus tabernaemontani	Softstem Bulrush			
Sequoia sempervirens				
Sidalcea calycosa calycosa	Annual Checker-mallow			
Sidalcea hirsuta	Hairy Checker-mallow			
Spirodela polyrhiza	NA			
Stachys stricta	Sonoma Hedge-nettle			
Stuckenia pectinata				Not on any status lists
Symphyotrichum bracteolatum				Not on any status lists
Typha domingensis	Southern Cattail			
Typha latifolia	Broadleaf Cattail			
Utricularia macrorhiza	Greater Bladderwort			
Utricularia minor	Lesser Bladderwort		Special	CRPR - 4.2
Veronica anagallis-aquatica	NA			
Wolffia brasiliensis	Pointed Watermeal		Special	CRPR - 2B.3
Zannichellia palustris	Horned Pondweed			

Attachment D

The Nature Conservancy

July 2019

IDENTIFYING GDEs UNDER SGMA
Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[1] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[2]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.

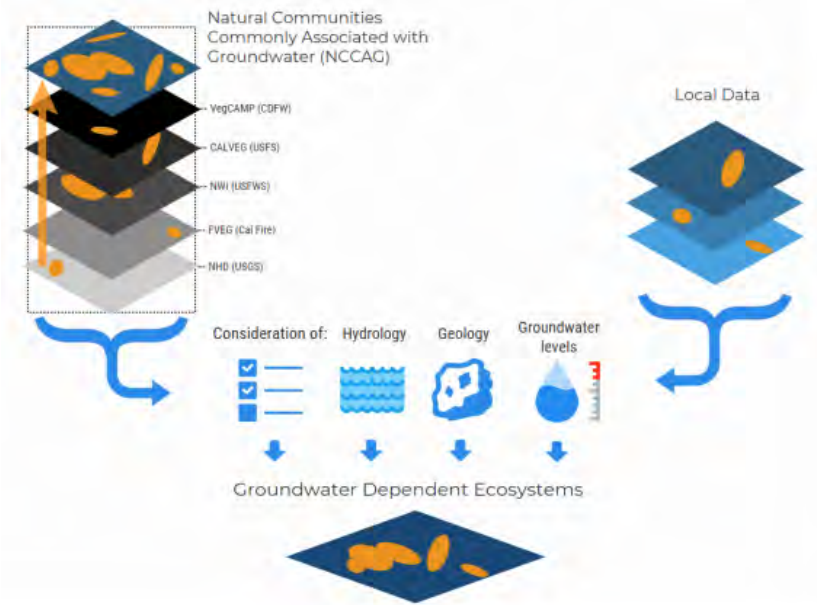


Figure 1. Considerations for GDE identification.
Source: DWR[2]

[1] NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/
[2] California Department of Water Resources (DWR). 2018. Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[4] on the Groundwater Resource Hub[5], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer*.

[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf
[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/
[5] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

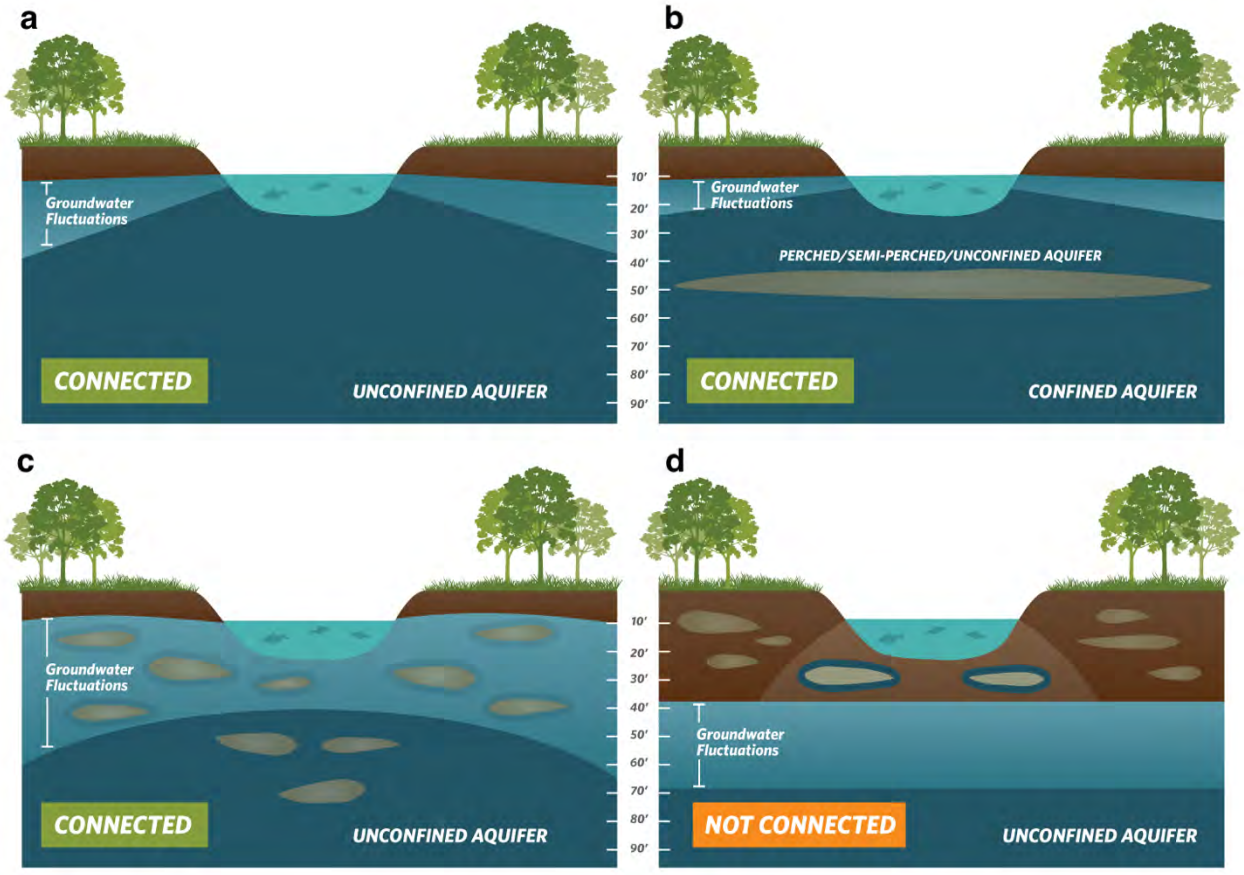


Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. (b) Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. Bottom: (c) Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. (d) Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[6] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[7] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[8] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[9]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

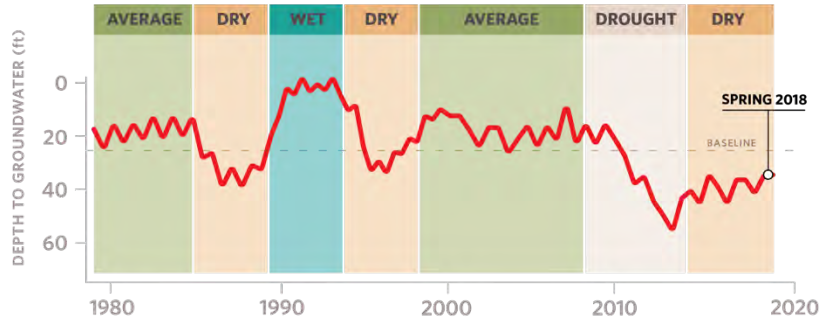


Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

[6] DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

[7] Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]

[8] Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs[4]).

[9] SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[10], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

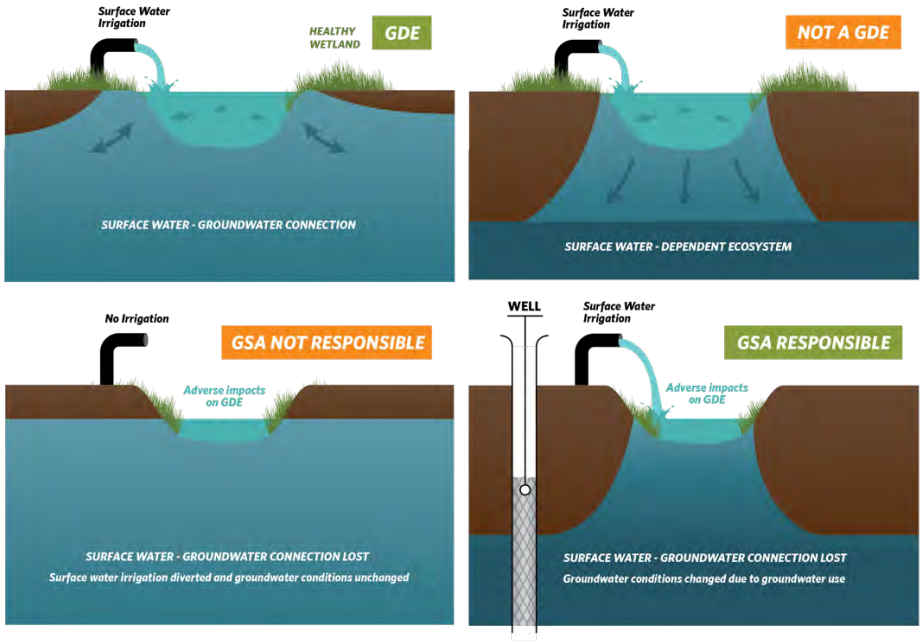


Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. (Right) Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. Bottom: (Left) An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. (Right) Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[10] For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

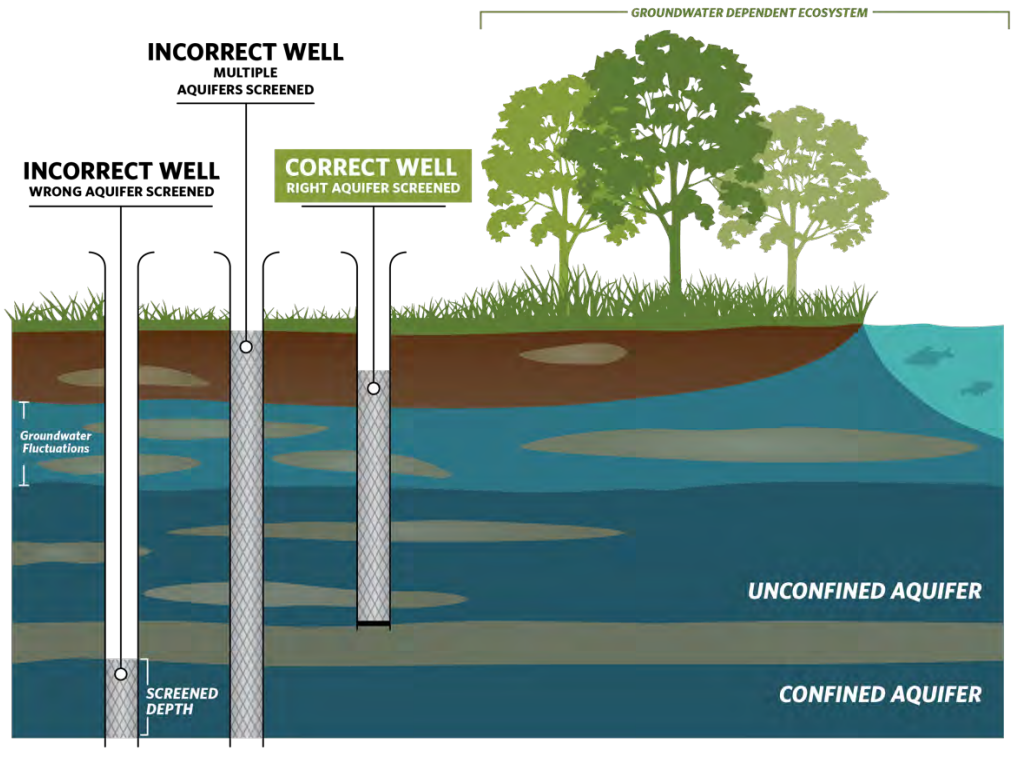


Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate groundwater elevations at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[11] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

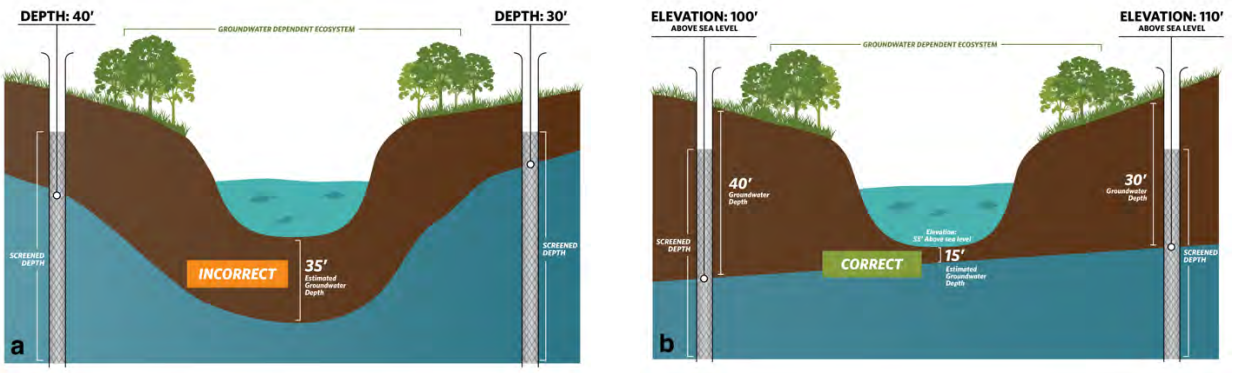


Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. (b) Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

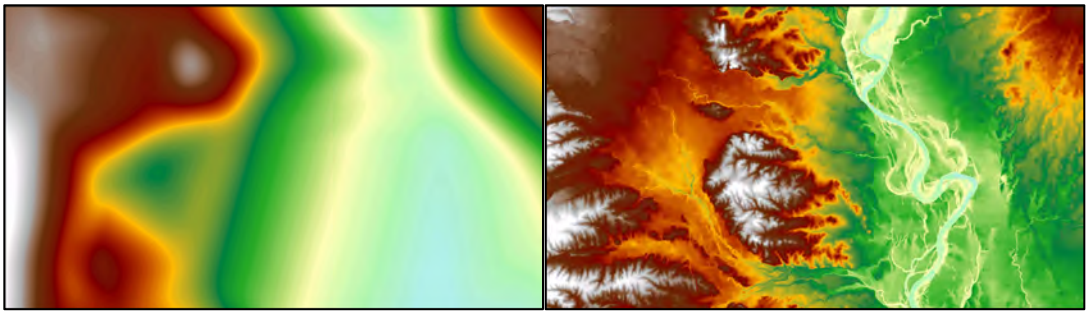


Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. (Right) Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

[11] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

BEST PRACTICE #6. Best Available Science

Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. If sufficient data are not available in time for the 2020/2022 plan, The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network. Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

KEY DEFINITIONS

Groundwater basin is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

Groundwater dependent ecosystem (GDE) are ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. *23 CCR §351(m)*

Interconnected surface water (ISW) surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

Principal aquifers are aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. *23 CCR §351(aa)*

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Attachment E

Maps of representative monitoring sites in relation to key beneficial users

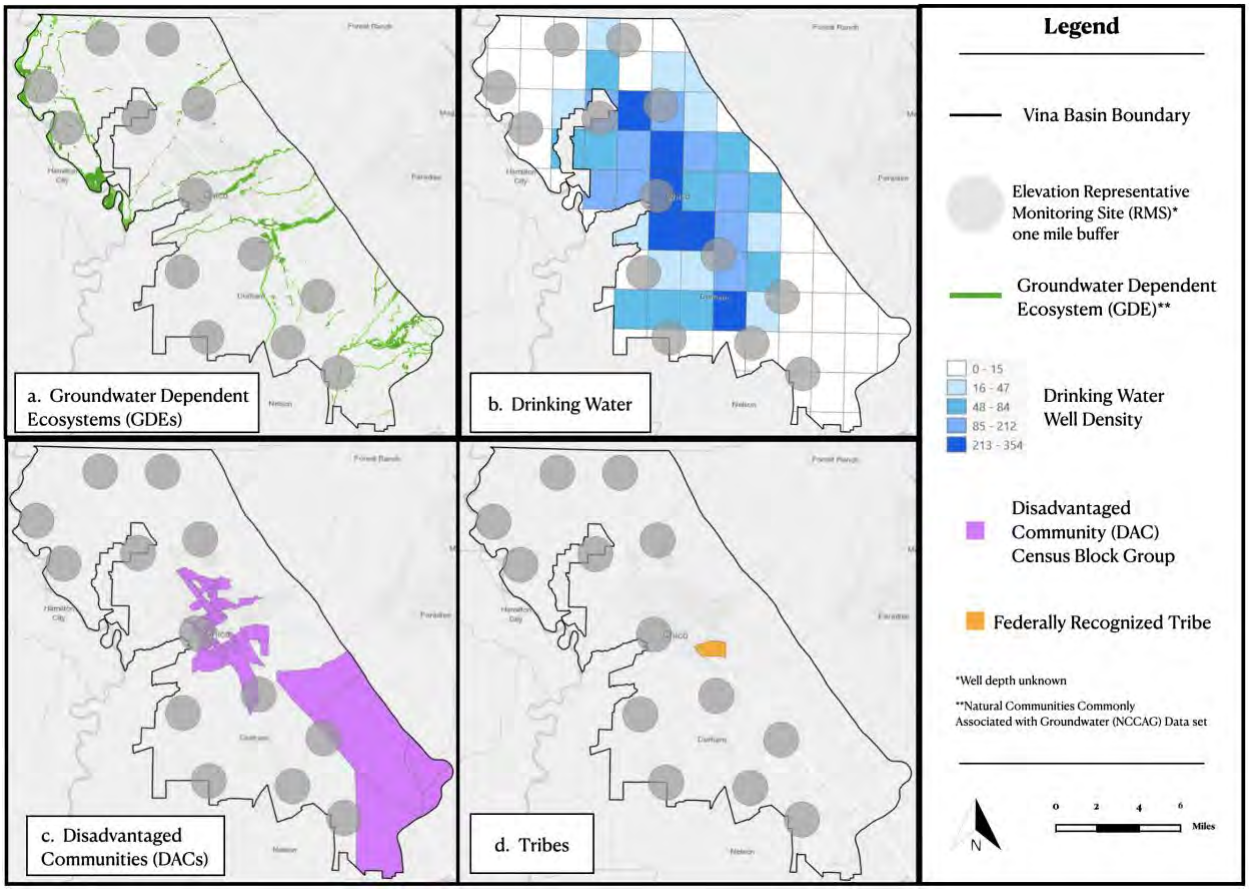


Figure 1. Groundwater elevation representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

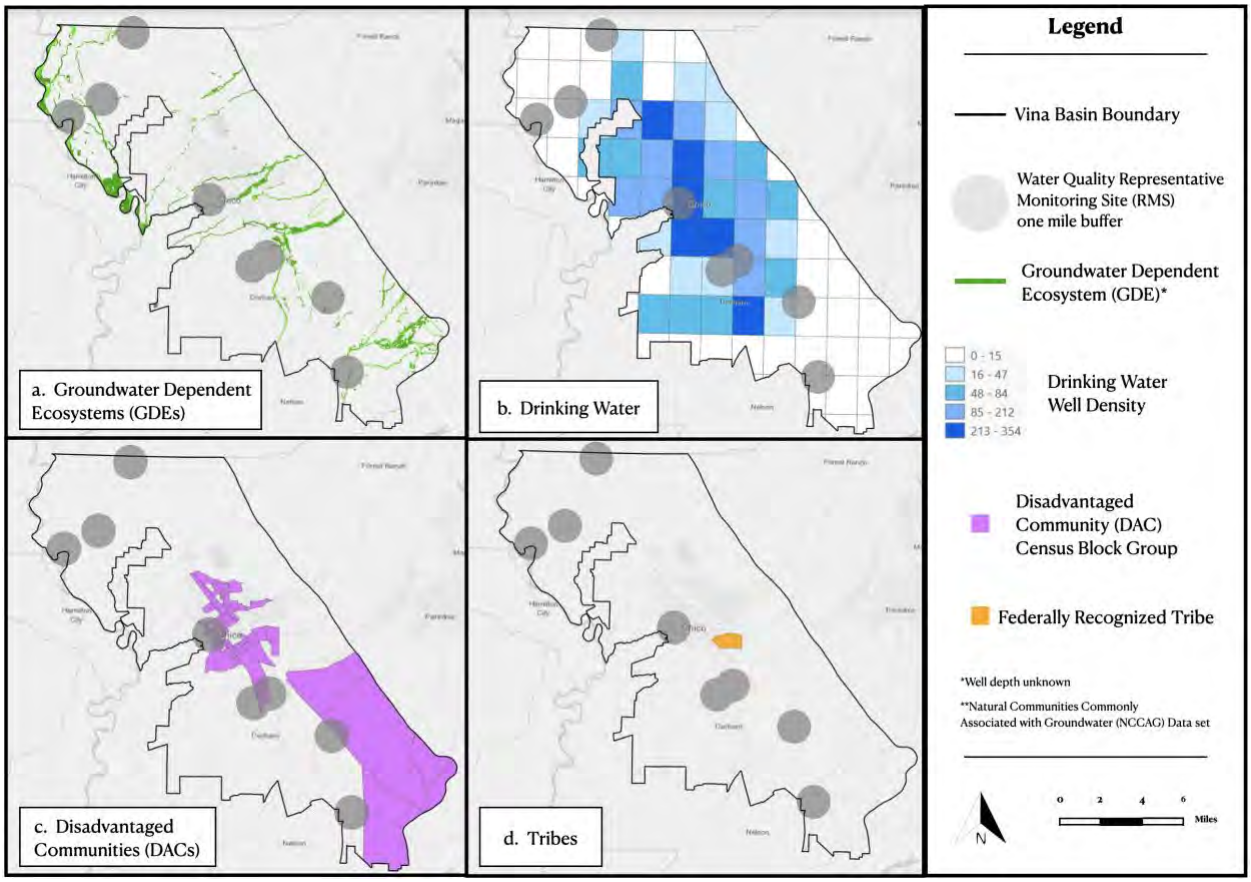


Figure 2. Groundwater quality representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

From:	Dorman, April@Wildlife
To:	VinaGSA@gmail.com
Cc:	Grover, Joshua@Wildlife; Holmes, Robert@Wildlife; Murvine, Angela@Wildlife; Garcia, Jennifer@Wildlife; Seapy, Briana@Wildlife; Gibbons, Bridget@Wildlife; Altare, Craig@DWR; Spangler, Debbie@DWR; Durham, Winley; Stork, Natalie@Waterboards; Rick.Rogers@noaa.gov
Subject:	Vina Subbasin Draft Groundwater Sustainability Plan
Date:	Thursday, October 7, 2021 2:47:19 PM
Attachments:	image001.png Vina_DraftGSP_CDFW_10-4-21.pdf

Hello,

Please see the attached document regarding CDFW comments on the Vina Subbasin Draft Groundwater Sustainability Plan.

Sincerely,

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State of California – Natural Resources Agency
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

October 7, 2021

Butte County Department of Water & Resource Conservation
Vina Subbasin
308 Nelson Avenue
Oroville, CA 95965
Email: VinaGSA@gmail.com

Subject: COMMENTS ON THE VINA SUBBASIN DRAFT GROUNDWATER SUSTAINABILITY PLAN

The California Department of Fish and Wildlife's (Department) North Central Region is providing comments on the Vina Subbasin Draft Groundwater Sustainability Plan (GSP) prepared by the Vina Groundwater Sustainability Agency (GSA) and Rock Creek Reclamation District GSA pursuant to the Sustainable Groundwater Management Act (SGMA).

As trustee agency for the State's fish and wildlife resources, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species (Fish & Game Code §§ 711.7 and 1802).

Development and implementation of GSPs under SGMA represents a new era of California groundwater management. The Department has an interest in the sustainable management of groundwater, as many sensitive ecosystems and species depend on groundwater and interconnected surface waters, including ecosystems on Department-owned and -managed lands within SGMA-regulated basins.

SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following as pertinent to Groundwater Sustainability Plans:

- GSPs must **consider impacts to groundwater dependent ecosystems** (GDEs) (Water Code § 10727.4(l); see also 23 CCR § 354.16(g));
- GSPs must consider the interests of all beneficial uses and users of groundwater, including environmental users of groundwater (Water Code § 10723.2) and GSPs must **identify and consider potential effects on all beneficial uses and users of groundwater** (23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3));
- GSPs must **establish sustainable management criteria that avoid undesirable results** within 20 years of the applicable statutory deadline, including **depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water** (23 CCR § 354.22 *et seq*. and Water Code §§ 10721(x)(6) and 10727.2(b)) and describe monitoring networks that can identify adverse

impacts to beneficial uses of interconnected surface waters (23 CCR § 354.34(c)(6)(D)); and

- GSPs must **account for groundwater extraction for all water use sectors,** including managed wetlands, managed recharge, and native vegetation (23 CCR §§ 351(al) and 354.18(b)(3)).

Furthermore, the Public Trust Doctrine imposes a related but distinct obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to navigable surface waters and surface waters tributary to navigable surface waters are also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses (Environmental Law Foundation v. State Water Resources Control Board (2018), 26 Cal. App. 5th 844). Accordingly, groundwater plans should consider potential impacts to and appropriate protections for navigable interconnected surface waters and their tributaries, and interconnected surface waters that support fisheries, including the level of groundwater contribution to those waters.

In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, the Department values SGMA groundwater planning that carefully considers and protects groundwater dependent ecosystems (GDEs) and fish and wildlife beneficial uses and users of groundwater and interconnected surface waters.

COMMENT OVERVIEW

The Department is writing to support ecosystem preservation in compliance with SGMA and its implementing regulations based on Department expertise and best available information and science.

The Department recognizes and appreciates the effort of the GSAs to characterize subbasin groundwater conditions based on the data available. However, the Department believes the GSP could improve its consideration of environmental users of groundwater and establish more protective management criteria. Accordingly, the Department recommends that Vina Subbasin GSAs address the following comments before submitting the GSP to the Department of Water Resources (DWR).

COMMENTS AND RECOMMENDATIONS

The Department comments are as follows:

1. **Comment #1 Groundwater Dependent Ecosystems** (Groundwater Conditions, 2.2 Groundwater Dependent Ecosystems, starting page 67): GDE identification, required by 23 CCR § 354.16(g), is based on methods that risk exclusion of ecosystems that may depend on groundwater.

a. *Issues*:

i. "Not Likely a GDE" Area Identification: The methodology used to classify potential GDE areas within the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset primarily involved desktop review of aerial imagery from four drought years: 2007, 2009, 2013, and 2015 (line 2515). Potential GDE areas were classified as "Not Likely a GDE" if the areas were located within 150 feet of perennial surface water supplies, 150 feet of rice fields, 50 feet of other irrigated agriculture, or 150 feet of agricultural-dependent surface waters. This GDE-elimination method may disregard a GDE's adaptability and opportunistic approach to accessing water in which the vegetation may rely on *both* surface water and groundwater between seasons and years. Without additional analysis that compares the potential rooting depths of groundwater dependent vegetation with the depth to groundwater below the ground surface, there is insufficient information to categorize these potential GDE areas as "Not Likely a GDE." The GDE analysis also classifies potential GDEs from the NCCAG dataset as "Not Likely a GDE" if the vegetation "did not indicate surviving conditions" over the four drought years reviewed for the analysis. During drought years, it is likely that GDEs were experiencing adverse impacts due to combined groundwater depletion and reduced surface water availability. For instance, in 2015, groundwater extraction increased to replace more than 70% of lost agricultural water supplies (Lund 2018); additional groundwater pumping during drought years may have lowered the groundwater table below the rooting zone of GDEs that had previously been able to access groundwater, leading to significant impacts or mortality. The GSP states that impacts or minimum threshold exceedances that occur during dry water year types would not constitute an undesirable result (See Comment #2(iv)). It is inappropriate to simultaneously abdicate management responsibility for impacts to groundwater users during dry water year types (see Comment #2(iv)) while at the same time relying on impacts that occurred during drought years to categorize potential GDE areas as "Not Likely a GDE."

ii. Special Status Species: SGMA defines GDEs as ecological communities *or species* that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface [23 CCR § 351 (m)]. The GSP does not identify or discuss species that may be present within the

subbasin that rely on groundwater, groundwater dependent ecosystems, or interconnected surface waters.

iii. Tree Species: In discussing potential impacts of groundwater depletions on GDEs or interconnected surface waters, the GSP refers to "deep-rooted tree species" (lines 189, 3406, 3698). This phrasing is narrow and excludes consideration of all vegetation types that may be groundwater dependent or supported by interconnected surface waters apart from tree species.

b. *Recommendations*:

i. "Not Likely a GDE" Area Identification: To assess potential GDE areas located near surface waters or irrigated areas, the GSP should incorporate a comparison of potential rooting depths with the groundwater surface elevation. Analysis of groundwater surface elevations should include multiple years that are representative of multiple water year types. The GDE analysis as it relates to survivability during drought years should consider the impacts of drought and increased pumping on groundwater elevation and compare those levels to GDE rooting depths. A more robust analysis would also incorporate other metrics of GDE health, including Normalized Difference Vegetation Index (NDVI) to compare between potential GDE areas and known non-groundwater dependent vegetation, rather than simply reviewing aerial imagery for indications of survival. Until sufficient information is presented to support the classification of these areas as "Not Likely a GDE," the areas should be conservatively classified as "Uncertain." The Department appreciates the GSP's acknowledgement that Valley Oak (*Q. lobata*) can access groundwater at a variety of depths and inclusion of areas containing Valley Oak communities as "Likely GDE."

ii. Special Status Species: The Department recommends the GSP include a list of special status species that may be present within the Vina Subbasin and an assessment of each species' likely groundwater dependence. The GSP should also include a spatial assessment of special status species within the subbasin to characterize which surface waters or GDE areas provide these species habitat or forage; this level of GDE-species-relationship assessment enables GSAs to prioritize GDE monitoring and management decisions.

iii. Tree Species: The Department recommends the GSP language referring to "deep-rooted tree species" be updated to be inclusive of groundwater dependent vegetation more broadly.

2. **Comment #2 Sustainable Management Criteria** (Sustainable Management Criteria; 3.3 Groundwater Levels Sustainable Management Criteria, 3.8 Interconnected Surface Water Sustainable Management Criteria): Interconnected surface water (ISW) sustainable management criteria (SMC) is unlikely to protect against undesirable results for groundwater dependent ecosystems and fish and wildlife beneficial uses and users of groundwater and interconnected surface waters.
    a. *Issues*:
        i. Groundwater Level Proxy Metric: The GSP identifies a data gap related to interconnected surface waters within the subbasin and therefore defaults to using groundwater levels as a proxy metric. However, the GSP does not provide evidence that "significant correlation exists between groundwater level elevations" and depletions of interconnected surface waters [23 CCR § 354.36(b)(1)]. In its discussion of available monitoring data from nested or multi-completion wells within the subbasin, the GSP identifies well 23N01W31M, located adjacent to the Sacramento River (page 47, line 1947). The GSP indicates that the shallowest of the 4 nested wells, screened from 65 to 75 feet below ground surface (bgs), is likely in direct continuity with river levels, while the deeper three wells display greater fluctuation and generally track one another, indicating less direct continuity with the river. While the Department recognizes the lack of available data and uncertainty surrounding aquifer heterogeneity as it relates to vertical conductivity between aquifer zones, if a significant correlation is lacking between the shallower aquifer zones that are likely interconnected with surface waters and deeper zones where pumping occurs and that are monitored for the groundwater level sustainable management criteria (SMCs), use of groundwater levels as a proxy metric for ISW depletions may misinform groundwater management activities and poorly predict instream habitat conditions for fish and wildlife species.
        ii. ISW Framework: The Department acknowledges the GSP's identification of the data gap related to interconnected surface water and appreciates the development of a framework to guide data collection efforts. However, while the ISW Framework identifies the types of measurements and data necessary to better characterize groundwater-surface water interactions within the subbasin, it does not discuss the methods that will be used to identify the number or locations of groundwater monitoring wells or stream gages.

iii. Minimum Thresholds and Measurable Objectives: Minimum thresholds (MTs) and measurable objectives (MOs) for groundwater levels, and by proxy for depletions of interconnected surface water, are not likely to prevent undesirable results for environmental beneficial uses and users of groundwater and interconnected surface water, including groundwater dependent ecosystems. For representative monitoring sites, measurable objectives are set to the groundwater level projected to occur in 2030 based on the trendline of historical data; management to this level would result in groundwater levels falling below historic lows for many of the monitoring wells. The GSP states that the year 2030 was chosen due to the assumption that it would take until this date to implement projects and management actions (line 3490). While the Department acknowledges that some planned PMAs involving supply augmentation may require this length of time to implement, other projects or management actions related to conservation could be implemented in a shorter timeframe, allowing the GSAs to establish more protective MOs rather than defaulting to the trend of long-term groundwater decline, which SGMA was designed to combat. MTs for groundwater levels, which the GSP asserts are designed to be protective of domestic wells, are set far below MOs, and would allow groundwater levels to fall significantly before experiencing what the GSP considers an undesirable result. For instance, within the Vina North Management Area, the MT for representative monitoring site 25C001M is set 80 feet below the MO (Table 3-1, page 107). In setting groundwater level SMCs as proxy metrics for the depletion of interconnected surface waters, the GSP fails to analyze or discuss potential impacts of the established criteria on the rate or volume of surface water depletions or on groundwater dependent ecosystems in areas that have historically demonstrated shallow groundwater levels accessible to environmental users. Under the established SMCs that allow for continued groundwater decline from current conditions, the Department expects that fish and wildlife beneficial uses and users of groundwater and interconnected surface waters could lose access to shallow groundwater water supplies and experience significant and unreasonable impacts prior to the minimum thresholds being reached, including decline of GDEs and ISW habitat suitable for cold water fisheries. The established SMCs would allow groundwater levels to drop well below levels that occurred in 2015, which was the second of back-to-back critically dry water years in the

Sacramento Valley during which time vegetated and aquatic GDEs experienced adverse impacts including stressed or dying riparian vegetation, poor instream habitat availability, and increased water temperatures (DFW 2019). The Department does not believe groundwater levels above the proposed minimum thresholds and below the proposed measurable objectives (in the margin of operational flexibility) will allow the basin to achieve sustainability, particularly with respect to avoiding undesirable results for fish and wildlife beneficial uses and users of groundwater and interconnected surface water.

iv. Undesirable Results: The GSP defines an undesirable result for depletions of interconnected surface waters as "avoiding significant and unreasonable depletion of surface water flows caused by groundwater pumping that significantly impacts beneficial uses." Though the GSP includes a list of potential impacts to environmental uses and users as identified by stakeholders (page 113, line 3692), the GSP does not include any discussion or analysis of whether the established SMCs sufficiently avoid these identified potential impacts to GDEs or environmental users of interconnected surface waters. Additionally, the GSP notes that groundwater levels that fall below the minimum threshold during hydrologically dry or critically dry years are not considered to be an indicator of undesirable results (page 104, line 3424). This means proposed indicators of undesirable results (i.e., SMC) for groundwater levels and depletions of interconnected surface water effectively do not exist for dry water years. This absence of undesirable results indicators for certain water years means beneficial users of groundwater and interconnected surface water may experience significant and unreasonable effects throughout the duration of dry or critical water years before the undesirable results are 'identified' and managed. Accordingly, there is no groundwater management accountability during the most challenging of years for water resource managers and fish and wildlife beneficial users alike. Moreover, the frequency and intensity of dry water year types is expected to increase in California (Mann & Gleick, 2015), meaning if accepted as is, this GSP would have no groundwater management accountability during increasingly prevalent and challenging periods of dryness without the certainty of subsequent wet periods.

v. SMC Triggers: The GSP states that for the established SMCs, if observed data "trend toward the locally defined MT, this will trigger action on part of the GSAs." It is unclear over what time period data will need to be

collected in order to establish a 'trend' toward the SMCs, and what action will be triggered.

b. *Recommendations*:

i. Groundwater Level Proxy Metric: To justify use of groundwater elevations as a proxy metric for depletions of interconnected surface water until additional data can be collected, the GSP should specify how groundwater elevations are significantly correlated to surface water depletions. Alternatively, if groundwater elevation is not a defensible proxy, the GSP should: 1) specify their plans for better approximating the volume and timing of ISW depletions attributable to groundwater extraction [23 CCR § 354.28(c)(1)] using the anticipated data collection that will fill the ISW data gap (See Comment #5); and 2) select more conservative interim SMC to protect ISW until such time as more information is available.

ii. ISW Framework: The Department recommends that the GSP identify discrete timing and locations for planned groundwater and streamflow monitoring sites as needed to address the identified ISW data gap. Installation of wells and gages and data collection should be completed prior to the first 5-year plan update (See Comment #5).

iii. Minimum Thresholds and Measurable Objectives: The Department recommends the GSP identify representative monitoring sites located near interconnected surface waters and/or groundwater dependent ecosystems and reselect minimum thresholds that would better protect environmental uses and users of groundwater, rather than enabling immense declines in groundwater over the implementation horizon.

iv. Undesirable Results: The Department recommends that the GSP include additional information related to how environmental beneficial users of groundwater may experience the effects of undesirable results. For instance, the GSP should explicitly discuss the relationship between the proxy groundwater level SMCs, modeled monthly depletions of interconnected surface waters, water temperatures, and the impacts of lowering groundwater levels below historic lows on groundwater dependent ecosystems. The GSP should also identify undesirable results indicators for dry and critically dry water years for all sustainability indicators.

v. SMC Triggers**:** While the Department appreciates that the GSP includes discussion of triggers that will initiate GSA action to avoid reaching minimum thresholds, the Department recommends establishing specific

trigger metrics for each sustainability indicator that when reached, would initiate GSA action, and defining the actions to be taken. For environmental users of groundwater, including groundwater dependent ecosystems, triggers should include not only groundwater levels but also physical indicators such as NDVI.

3. **Comment #3 Monitoring Network** (Monitoring Networks, 4.9.1 Groundwater Levels, 4.10 Network Assessments and Improvements): The groundwater level monitoring network may not sufficiently monitor impacts to groundwater dependent ecosystems.
    a. *Issue*: The GSP uses both the groundwater level SMCs and representative monitoring network as a proxy for evaluating impacts to interconnected surface waters and GDEs until additional information can be collected. The GSP primarily considered domestic well protection when establishing SMCs for groundwater levels and selecting representative monitoring sites. It is unclear whether any of the selected groundwater level monitoring wells are located near areas with likely groundwater dependent ecosystems and if plan implementation will involve comparing water depths in representative monitoring sites to the rooting depths of nearby GDE communities.
    b. *Recommendation*: The Department recommends that the GSP assess the groundwater level monitoring network, and by proxy, the monitoring network for interconnected surface waters, for its ability to characterize potential impacts and undesirable results for groundwater dependent ecosystems (See Comment 2(iv)). If wells within the representative monitoring network are not located near identified groundwater dependent ecosystems, a discrete number of groundwater monitoring wells should be installed to capture groundwater trends that would affect priority GDEs. Additional analysis related to the locations of special status species within the subbasin and the groundwater dependent ecosystems that support them can be used to prioritize areas for increased monitoring (See Comment 1(ii)).

4. **Comment #4 Project and Management Actions** (Project and Management Actions; 5.2.2 Project Implementation; starting page 138): Project and management actions (PMAs) may not be sufficient to achieve sustainability, and timelines for pursuing additional PMAs are needed.
    a. *Issue*: The Department recognizes that the GSP identifies Potential Projects that are in the planning phase and may be implemented in addition to the four Planned Projects if necessary to achieve sustainability in the subbasin. However, the GSP fails to identify specific metrics or timelines that would trigger the

implementation of additional PMAs. The Streamflow Augmentation project (5.2.3.3, page 144) relies on excess surface water being made available from the Upper Watershed and would involve potentially lengthy permitting and regulatory review to change water rights as necessary. The GSP states that this project is expected to reduce groundwater demand by 1,000 to 5,000 acre-feet per year, or up to half of the projected 10,000 acre-foot per year overdraft within the subbasin. Should unexpected delays occur, or if sufficient surface water is unavailable in the Upper Watershed, additional PMAs will be necessary.

b. *Recommendation*: The GSP should include details on specific metrics, targets, and timelines that if not reached with implementation of the planned PMAs will trigger the implementation of additional PMAs. The Department recommends identifying the projects, including those aimed at reducing demand through conservation, that could be implemented on shorter timescales if needed for the subbasin to achieve sustainability.

5. **Comment # 5 Interconnected Surface Water Data Gap** (Plan Implementation; 6.3 Schedule for Implementation; starting page 167): A more detailed time schedule for collecting additional data and revising the sustainable management criteria for depletion of interconnected surface water is needed.
    a. *Issue*: The GSP identifies information related to the depletion of interconnected surface water as a data gap, and the plan proposes a framework to collect additional information needed to revise the ISW SMCs. The GSP states that "an aggressive schedule" has been provided to fill the data gap in Section 6. However, the only time schedule related to filling identified data gaps identified during Department review is in Figure 6-1, which displays an "Interconnected Stream Monitoring" Data Gap filling effort start date of February 1, 2022, and an end date of April 1, 2042. No discrete time schedule is provided for installation of necessary groundwater wells and stream gages, refinement of the characterization of interconnected surface waters within the subbasin, and updates to the SMCs.
    b. *Recommendation*: The GSP should include a detailed time schedule for completing each action as outlined in the ISW SMC Framework to characterize interconnected surface waters in the subbasin and establish appropriate SMCs. The ISW SMC Framework should be completed prior to the first 5-year plan update so that management criteria can be effectively established to protect environmental users of groundwater and interconnected surface waters throughout the implementation period.

CONCLUSION

In conclusion, though the draft GSP accurately identifies the need to improve monitoring of shallow groundwater and interconnected surface water systems, the GSP lacks a robust analysis of potential impacts to environmental beneficial users and should establish more protective management criteria. The Department recommends that the Vina Subbasin GSAs address the above comments before GSP submission to DWR to best prepare for the following regulatory criteria for plan evaluation:

1. The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science. [23 CCR § 355.4(b)(1)] (See Comments #1, 2, 3)
2. The GSP does not identify reasonable measures and schedules to eliminate data gaps. [23 CCR § 355.4(b)(2)] (See Comments #3, 5)
3. The interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have not been considered. [23 CCR § 355.4(b)(4)] (See Comments #1, 2, 3)
4. The projects and management actions are not feasible and/or not likely to prevent undesirable results and ensure that the basin is operated within its sustainable yield. [23 CCR § 355.4(b)(5)] (See Comment #4)

The Department appreciates the opportunity to provide comments on the Vina Subbasin Draft GSP. Please contact Bridget Gibbons, Environmental Scientist, by email at Bridget.Gibbons@wildlife.ca.gov with any questions.

Sincerely,

DocuSigned by:
Jennifer Garcia
B35A7660DD7848B...

Kevin Thomas
Regional Manager, North Central Region

Enclosures (Literature Cited)

ec:

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Literature Cited

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AGUBC

Agriculture Groundwater Users
of Butte County

October 19, 2021

VIA E-MAIL AND U.S. MAIL

Board of Directors
Vina GSA
308 Nelson Avenue
Oroville, CA 95965
VinaGSA@gmail.com

Board of Directors
Rock Creek Reclamation District GSA
5130 Anita Road
Chico, CA 95973
rockcreekreclamation@gmail.com

Re: Comments to Draft Groundwater Sustainability Plan

Dear Board Members:

The purpose of this letter is to provide Vina Groundwater Sustainability Agency (Vina GSA) and Rock Creek Reclamation District Groundwater Sustainability Agency (Rock Creek GSA), collectively the "GSAs," with the comments of the Agricultural Groundwater Users of Butte County (AGUBC) to the GSAs' draft groundwater sustainability plan (GSP). In addition, this letter reiterates some of the past comments AGUBC submitted to the GSAs that remain unresolved.

First and foremost, we appreciate the dedication and hard work by the GSAs' management staff and Ad Hoc Committees, as well as their consultants, in putting together this draft GSP. Further, we appreciate the previous opportunities to comment on individual draft chapters of the GSP as they were developed, as well as this opportunity to comment on the comprehensive draft GSP. It is clear that the GSAs have taken past comments into consideration. We hope the following comments are constructive and will likewise be considered in finalizing the draft GSP for submission to the Department of Water Resources (DWR). In considering the following comments, we recognize that this draft GSP is a "living" document and will undergo updates and modifications as more information is gathered to help the Vina Subbasin reach sustainability by 2042 and beyond.

Provided are our specific comments:

1. **We support the overall approach for Minimum Thresholds (MT) and Measurable Objectives (MO) for the Chronic Lowering of Groundwater Levels.**

The polygon approach to define areas related to the selected representative monitoring sites (RMS) helps to avoid overlap of information and tie in land and aquifer characteristics with the RMS. We anticipate that this polygon approach may be further refined with more information. Further, the MTs and MOs that have been established for the Vina North and Vina South management areas provide sufficient operating flexibility to help the landowners realistically achieve the goal of the MOs and protect sustainably constructed domestic wells, while allowing for flexibility to weather the next 20 years as we endeavor together to reach sustainability. Consequently, we concur with the approach taken in establishing the Sustainable Management Criteria (SMC) for chronic lowering of groundwater levels and encourage continued application of the methodologies expressed in the draft GSP for all management areas.

2. **The draft GSP contains numerous data gaps affecting future GSP implementation.**

While we appreciate the time and effort the GSAs have committed to preparing this draft GSP, there are still numerous data gaps that must be addressed, which is acknowledged in several places in the draft GSP. Moreover, some of these data gaps exist in crucial areas of the draft GSP. For example, Section 3.8 of the SMC chapter regarding the Interconnected Surface Water SMC lacks: (1) the "definition of stream reaches and associated priority habitat;" (2) "streamflow measurements to develop profiles at multiple time periods;" and (3) "measurements of groundwater levels directly adjacent to stream channels, first water bearing aquifer zone, and deeper aquifer zones." (Pg. 113; Lines 3707 – 3711.) This one section alone is missing three crucial points of information that will likely dramatically change this SMC once developed. Furthermore, the draft GSP acknowledges in the SMC chapter that additional data regarding domestic well information will be needed to refine the data set in monitoring the chronic lowering of groundwater levels criteria. (Pg. 104; Lines 3445 – 3454.) These are just two examples of the data gaps contained (and acknowledged) throughout the draft GSP.

We look forward to the GSAs addressing and filling in the data gaps throughout the draft GSP and request that the GSAs provide ample opportunity for stakeholders to engage with the GSAs as they address these data gaps and revise the GSP in the coming years. Such engagement should not be limited to discussions with the Vina Stakeholder Advisory Committee (Vina SHAC) but should involve workshops and targeted discussions with stakeholder groups, where

applicable (such as the Butte County Farm Bureau and the AGUBC), to get important feedback. To that end, the draft GSP should be revised to reflect that commitment.

3. The draft GSP should provide additional clarity regarding how groundwater allocations will be imposed, if at all.

We thank the GSAs for including a public review component as part of the groundwater allocation implementation process. While we understand that implementation of groundwater allocations is a "last resort" (Pg. 160, Line 4992), we believe that public participation will be a crucial component of this management action, should it ever be explored.

Currently, Section 5.3.7 of the Projects and Management Actions chapter regarding Groundwater Allocations provides, in relevant part, that "[t]he implementation of [groundwater allocations] would be based on an evaluation by the Joint Management Committee (see Appendix X)." (Pg. 160, Lines 4995 – 4996.) This section then goes on to provide that "the GSAs will consider [groundwater allocations] through a public process ultimately decided by the GSA Boards." (Pg. 160, Lines 5002 – 5004.)

While we are supportive of this process, we note that the draft GSP does not include an "Appendix X." We assume that "Appendix X" was meant as a placeholder until the GSAs knew exactly which appendix number would be used for the coordination agreement between the two GSAs. We request that the GSAs confirm whether this assumption is correct, and, if so, that the GSAs revise the draft GSP to reflect the correct appendix number. If, however, this assumption is not correct, then we are left unsure as to the contents of this document. And to the extent that "Appendix X" describes the factors the Joint Management Committee will evaluate in making its determination regarding this management action and how the Joint Management Committee will weigh those evaluations, we request that the GSAs include that information in the draft GSP.

4. The draft GSP should remove its use of the phrase "suitable habitat."

In our August 23, 2021 letter, we brought to the GSAs' attention its use of the undefined phrase "suitable habitat." In that letter, we requested that the GSAs remove this phrase and instead reflect the language used in other GSPs that DWR has already approved. In response to that letter, the GSAs removed this phrase from Section 3.4 of the SMC chapter regarding the Groundwater Storage SMC. While we appreciate that revision, we believe additional language is necessary to provide clarity regarding the scope of the term "environmental uses." To alleviate this concern, we recommend that the GSAs revise Section 3.4 to provide as follows:

Revised Section 3.4

"Sustained groundwater storage volumes are insufficient to support rural areas and communities, the agricultural economic base of the region, and environmental uses *of groundwater*."

Further, the phrase "suitable habitat" is still used in two other sections of the draft GSP. In describing the emphasis of management objectives for SMCs, Section 3.1 provides that:

"Sustainable management criteria within the Vina Subbasin emphasize management objectives related to domestic, municipal, and agricultural wells as well as *suitable habitat*."

(Pg. 101; Lines 3333 – 3335; emphasis added.)

Additionally, Section 3.5 of the SMC chapter regarding the Water Quality SMC still relies on this phrase in describing undesirable results. Specifically, Section 3.5.1 provides, in relevant part, that an undesirable result coming from degraded water quality is experienced if:

"Groundwater pumping compromises the long-term viability of rural areas and small communities, the agricultural economic base of the region, and environmental uses for *suitable habitat*. . . ."

(Pg. 108, Lines 3556 – 3558; emphasis added.)

We again request that the GSAs remove the phrase "suitable habitat" from both Sections 3.1 and 3.5.1. As an alternative, we recommend that the GSAs revise these two sections to reflect the recommended revision to Section 3.4:

Revised Section 3.1

"Sustainable management criteria within the Vina Subbasin emphasize management objectives related to domestic, municipal, and agricultural wells as well as *environmental uses of groundwater*."

Revised Section 3.5.1

"Groundwater pumping compromises the long-term viability of rural areas and small communities, the agricultural economic base of the region, and *environmental uses of groundwater*."

While not a perfect resolution, we believe these recommended revisions would help focus the issue and allow for further discussion as data gaps are filled and monitoring conducted as described in the draft GSP.

5. There are some portions of the draft GSP that require further clarification and/or modification to avoid confusion.

Finally, there are several additional areas of the draft GSP that require further clarification and/or modification. Attached is a "comment tracking sheet," as provided by the GSAs, detailing these requests for clarification and/or modification. Of these comments, we believe the two following comments deserve highlight:

(i) Comment Regarding Chapter 2, Lines 3212 – 3225; and
(ii) Comment Regarding Chapter 5, Lines 4477 0 4506.

Thank you for the opportunity to provide these comments. We appreciate the significance of the considerations and decisions the GSAs must undertake, and we look forward to working with you further regarding these matters.

Very truly yours,

Richard McGowan,
On behalf of the AGUBC Board of Directors

Audubon | CALIFORNIA

October 19, 2021

Butte County Department of Water & Resource Conservation
RE: Vina Subbasin GSP
308 Nelson Avenue
Oroville, CA 95965

Sent via email to: VinaGSA@gmail.com

Re: Comments on the Draft Groundwater Sustainability Plan for the Vina Groundwater Sustainability Agency

To Vina Subbasin Groundwater Sustainability Agencies,

Audubon California appreciates the opportunity to provide public comment on the draft Groundwater Sustainability Plan (GSP) for the Vina Subbasin. Audubon California is a statewide nonprofit organization with a mission to protect birds and the places they need. Our organization has a long history of solutions-focused work in the Central Valley in collaboration with state and federal agencies, water districts, non-profits, and landowners. Audubon is reviewing draft GSPs as a stakeholder for the environment with a particular focus on managed wetlands. We are commenting on draft GSPs to provide technical assistance to Groundwater Sustainability Agencies (GSAs) to improve their GSPs prior to their final submission to the Department of Water Resources in January 2022. Audubon would also like to identify areas of opportunity to partner with landowners and GSAs to provide groundwater and wildlife habitat benefits in the implementation of the Sustainable Groundwater Management Act (SGMA).

Over 90 percent of historic wetlands in the Central Valley have been replaced with agriculture or urban development. Disconnected from natural water sources as a consequence of surface water diversions and groundwater over-pumping, wetland landowners must utilize surface water deliveries or pump groundwater to provide flooded habitat. But managed wetlands provide outsized public trust benefits for their minor water use.

The remaining wetlands in the Central Valley are a critical component of the Pacific Flyway, supporting millions of migratory waterfowl, hundreds of thousands of shorebirds, and state listed species like the Tricolored Blackbird. Central Valley managed wetlands are part of California's commitment to national and international Pacific Flyway agreements and provide significant public trust benefits, including habitat for migratory birds, recharge of overdrafted aquifers, carbon sequestration, and recreation opportunities for birders, hunters, and disadvantaged communities.

Managed wetlands require specific consideration in GSPs under SGMA statute and regulations, as detailed below. GSAs are required to identify managed wetlands as beneficial users of groundwater and as land uses and property interests and should recognize this land use consistent with other active users of surface and groundwater. The overall basin water budget must include managed wetlands as a specific water use sector and the GSP is required to consider the effects of the GSP on managed wetlands as a beneficial user or land use.

When GSPs fail to adequately consider the water needs and recharge contributions of managed wetlands, projects and management actions may ignore managed wetlands, their need for protection as public trust resources, and their potential to be part of sustainability solutions. If future actions include groundwater allocations, managed wetlands face the potential of being excluded if not recognized in the GSP, risking further loss in critical wetland acreage.

SGMA Requirements Related to Managed Wetlands

A primary requirement for GSAs during GSP development is the consideration of the interests of "all beneficial uses and users of groundwater" [Water Code Section 10723.2], which includes "[e]nvironmental users of groundwater" [Water Code Section 10723.2(e)].

Articulated into the SGMA regulations, the concept of beneficial uses and users of groundwater is first represented in CCR, Title 23, Section 354.10. Notice and Communication, which directs the GSP to "…include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following: (a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties." [emphasis added].

Furthermore, the SGMA regulations provide a definition that explicitly includes managed wetlands as a beneficial user where:

> "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." CCR, Title 23, Section 351(al) [emphasis added].

GSAs are then directed to include all water user sectors in the description of the GSP area and to quantify groundwater use by these sectors in the historic, current and projected budgets [emphasis added]:

> CCR §354.8. Description of Plan Area: Each Plan shall include a description of the geographic areas covered, including the following information:
>
> (a) One or more maps of the basin that depict the following, as applicable:
>
> (4) Existing land use designations and the identification of water use sector and water source type.
>
> and,
>
> CCR §354.18. Water Budget:
>
> (b) The water budget shall quantify the following, either through direct measurements or estimates based on data:
>
> (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow.

Given these explicit requirements, GSAs are required to identify and map managed wetlands and include their water needs in water budgets in the GSP.

Furthermore, each GSP is also required to describe "undesirable results" where such included:

> "Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." CCR, Title 23, Section 354.26(b)(3) [emphasis added]

Comment Overview

GSAs are required to consider public trust resources in their GSPs, including managed wetlands. In reviewing the Vina Subbasin draft GSP, we see VGSA is working hard to minimize the impacts to it growers in the subbasin. It is essential these efforts also include the managed wetlands. As beneficial users of water these habitats provide essential waterbird food and critical habitat, often requiring the application of surface or groundwater similar to cropped lands.

While the Butte Basin Groundwater Model (BBGM) used to prepare historic, current and future water budgets includes reference to managed wetlands acreage and demand (a draft version of the BBGM model documentation, as provided in October 2021, was reviewed), the resulting representation in the GSP is limited and leads to confusion regarding the future of managed wetlands in the Vina Subbasin. This is most prominently represented in *Table 2-7: Water Budget Summary: Land and Surface Water System*, on page 80, but further described for the historic and current conditions in Table 2A-1, on page A-3.[1] As represented in both the inflow and outflow portions of the table, quantities listed for managed wetlands under the "historical" heading are significantly greater than quantities listed under the "current" and various future conditions. We are unable to find any basis for this reduction beyond anecdotal references in the BBGM about a recent model update affecting hydraulic conductivity.[2]

Absent additional explanation as to why these quantities are significantly lower, the GSP appears to anticipate a reduction in managed habitat acres and function. Clarification regarding total assumed acres and expected applied water requirements would address this concern.

Our comments are summarized as follows:

1. Identification of managed wetlands: Audubon appreciates that VGSA has identified and specifically included managed wetlands in maps and water budgets. However, details regarding managed wetland acres and assumed evapotranspiration (ET) rates are lacking.
2. Water budget: Inclusion of managed wetlands as a specific component of the water budgets (e.g. Table 2-7) is appreciated. While reference is made to the BBGM regarding assumptions, review of the BBGM model documentation did not reveal details regarding the assumed managed wetland acres within the Vina subbasin under historic, current, or future water budgets nor the assumed ET and related details that would drive the calculation. As such, Audubon is concerned that the future conditions inadequately account for the water needs of managed wetlands, which are likely increasing under climate change.
3. Identification of data gaps: The lack of information regarding the water needs for managed wetlands should be identified as a data gap in the GSP. Specifically, on page 74, the GSP notes that agricultural demands (including managed wetlands) and groundwater pumping were estimated using the BBGM. The BBGM indicates ET was determined using remote sensing data

[1] Table 2A-1 provides annual values for the water budget for 2000 through 2018. Inflow and outflow quantities for managed wetlands are consistent across this period until 2015 through 2018 when values are significantly reduced with no explanation.

[2] "*…a reduced hydraulic conductivity value was assigned to each element for ponded land uses (rice and wetlands) to avoid unreasonably high applied water estimates due to high deep percolation rates*." Butte Basin Groundwater Model: Model Documentation v1.0, August 2021, page 18.

and corresponding crop coefficients, but does not list a crop coefficient for managed wetlands. The appropriate water needs of managed wetlands do not appear to have been adequately represented in the water budgets, particularly given the unexplained reduction in water demands for managed wetlands in current and future water budgets.

4. Consideration of managed wetlands: While managed wetlands are appropriately included in the GSP separate from groundwater dependent ecosystems, there is no discussion of the impacts of the GSP on managed wetlands. Again, the reduction in water from the historic to current and future water budgets points to a serious reduction in habitat acreage or function, but there is no discussion of wetland impacts. The GSP would also be strengthened by including information on the role managed wetlands can have as part of projects and management action solutions. Managed wetlands provide opportunities for multi-benefit recharge and need to be part of any investigations into groundwater allocations and resulting policies.

Draft Groundwater Sustainability Plan Page-by-Page Comments

Additional page-by-page comments on VGSA's draft GSP are detailed below. We welcome any follow up questions and look forward to seeing the issues raised below addressed in the final GSP submission in January 2022.

Figure 1-6: Land use map should also show the location of managed wetlands.

P. 22: Does the category "surface water users" include any managed wetlands that apply surface water to meet the managed wetland water needs or are managed wetlands only included in the category "environmental users of groundwater"?

P. 68: The category "Not Likely a GDE Due to Supplemental Water Supplies" indicates a determination was made for managed wetlands that rely on supplemental water to meet applied water needs. Elsewhere in the GSP, information regarding whether this supplemental water is pumped groundwater or applied surface water is lacking (see related comment for page 22). Additional details regarding the managed wetland acres, applied water needs, and water sources should be referenced. As noted previously in this comment letter, review of the BBGM indicates the information is not clearly documented in this referenced document either.

P. 73, Table 2-6: Why were surface water diversions for the current condition baseline water budget limited to 2015 and 2016? These years reflect low surface water availability due to drought constraints and State Water Resources Control Board imposed water right curtailments. For managed wetlands that may rely on surface water, this would be a misrepresentation of current and long-term needs. Combined with information in Table 2-7 and Table 2A-1 where the water budgets for these two years show significantly lower inflow and outflow quantities for managed wetlands than for prior years, there is concern that the current budget underestimates managed wetland water needs. Since the current condition assumptions regarding water supplies are carried forward to the future conditions, the misrepresentation of managed wetland water supplies due to limiting to 2015 and 2016 may incorrectly affect future water budgets and results.

P. 74: The bullets explaining the water budget procedures do not provide the necessary details regarding assumptions specifically made for managed wetlands. For instance, groundwater pumping is estimated by estimating total demand then subtracting applied surface water quantities – referencing the BBGM as the source document for the assumptions. Upon reviewing the BBGM draft documentation, the details regarding these assumptions are also not provided so it is

unclear what assumptions were made to calculate managed wetland demands and what surface water quantities were available. There needs to be improved documentation in the BBGM if it is a primary source for the water budgets presented in the GSP.

P. 80, Table 2-7: Inflow and outflow components for the row labeled "managed wetlands" shows a significant decrease in quantities between the historic water budget and the current and future water budgets. As noted in prior comments, the basis for this significant reduction in unclear and raises concerns that the total acres or the total water needs are misrepresented or otherwise artificially decreased.

P. 82, Table 2-8: The same concern as expressed for Table 2-7 is presented in this table.

P. 83: The GSP notes that evapotranspiration (ET) is from several beneficial uses, including managed wetlands. However, details regarding the ET assumptions for managed wetlands are lacking. These special habitats can have several different water needs depending on how they are managed and the target species they are intended to benefit (e.g. fall flood up for habitat versus spring irrigation for waterbird feed). This same statement is repeated for each water budget condition on subsequent pages in the GSP (e.g. future conditions). This comment applies to each.

P. 145, Flood MAR/Surface Water Supply and Recharge Scoping: Please include Audubon as a participant in scoping for recharge opportunities. Managed wetlands can provide unique opportunities to create recharge and habitat benefits.

P. 160, Groundwater Allocation: This potential action should indicate that considerations of public benefit needs, such as managed wetlands, will be included when evaluating any groundwater extraction limits.

Thank you for your consideration of Audubon California's comments. If you would like to discuss these comments as you update your GSP, please do not hesitate to contact me at (916) 737-5707 or via email at samantha.arthur@audubon.org.

Sincerely,

Samantha Arthur
Working Lands Program Director
Audubon California

October 19, 2021

Vina DRAFT GSP
Comment A5

Butte County Department of Water & Resource Conservation
RE: Vina Subbasin GSP
308 Nelson Avenue
Oroville, CA 95965
VinaGSA@gmail.com

Thank you for the opportunity to comment on the Vina GSA GSP.

The Butte Environmental Council (BEC) represents hundreds of members, most of whom are Butte County voters, and thousands of followers on digital media. BEC's stance on the issue is outlined below, and also speaks for the thousands of local voters and stakeholders that will be affected by this issue should it come to pass.

Below please find the details addressing the **matters of concern** of the Vina GSA GSP submitted on behalf of the Butte Environmental Council:

1. **Overestimating Water Supply**

   The Butte Environmental Council is concerned that the basin settings does not take into account climate change and the changing water supply. With warmer weather, we will have reduced water supply from the Sierra Snowpack, with up to 48-65% by the end of the century[1]. Droughts will likely become more frequent and persistent in the 21st century. With precipitation changes, and extreme events, there are projected to be more intense rainfall, and more intense flooding that will change how much water percolates down into our aquifers. With these changes, the Vina GSA needs to be conservative with the estimates of water that the subbasin will recharge annually. With the potential overestimation of the water supply, undesirable results will occur.

2. **Groundwater Dependent Ecosystem & the City of Chico Urban Forest**

   The Butte Environmental Council is concerned that the City of Chico Urban Forest is not included as a potential Groundwater Dependent Ecosystem, to be protected and ensure healthy groundwater levels. The Urban Forest, which is a climate change adaptation and mitigation strategy, used to draw down carbon, shield residents from the scorching heat on sidewalks, and reduce residents energy bills, utilizes the shallow portion of the Tuscan Aquifer after establishment. This critical green infrastructure needs to be protected and the groundwater levels need to reach the roots of the Urban Forest.

3. **Prioritization of Demand Management**

   Demand management and reuse of water need to be prioritized and a central part of our groundwater management toolkit, not just supply expansion. The Butte Environmental Council does not support taking surface water to use instead of groundwater, especially from PID. There could be complications once the Town of Paradise has rebuilt, and has the increased water demand. With the fact that the subbasin is only in 10,000 acre feet of overdraft, and that the Chico residents

[1] https://water.ca.gov/Programs/All-Programs/Climate-Change-Program/Climate-Change-and-Water

were able to conserve 32% during the last drought, demand management projects need to be implemented before any water supply expansion projects are implemented.

Below please find the details addressing the **matters of support** of the Vina GSA GSP submitted on behalf of the Butte Environmental Council:

1. **Wastewater Recycling Project**

   Wastewater recycling is a great project that reduces the demand and stress on the groundwater supply, and needs less treatment than water used for potable use.

2. **Residential Conservation Project**

   Demand management through residential conservation is an excellent strategy to stay within the groundwater supply boundaries of the basin. The City of Chico/CalWater was able to reduce their water consumption by 32%[2] by way of residential conservation.

3. **Agricultural Irrigation Efficiency Project**

   Agricultural irrigation efficiencies can also protect water quality, and reduce demand on the aquifer. Water conservation and efficiencies within agriculture in the subbasin needs to be a key component of reaching groundwater sustainability. With adoption of efficient irrigation practices that could reduce groundwater demand up to 4,000 acre feet annually, and that the Vina subbasin is in overdraft of 10,000 acre feet, this project alone could be a major element of getting the basin to sustainable groundwater levels.

4. **Community Monitoring Program and Community Water Education Initiative**

   Educating the community on what is happening with water and bringing awareness to the importance of water in Butte County is critical to creating buy-in on water conservation practices, and ensuring groundwater sustainability.

5. **Rangeland Management and Fuel Management for Watershed Health Projects**

   Regenerative grazing practices improve water holding capacity and can improve recharge ability within the basin by increasing organic matter in the soil. Regenerative farming practices, such as cover cropping, no-till, and compost application can further improve water utilization on farmland. The Butte Environmental Council supports the rangeland management, but encourages the Vina GSA to include regenerative farming practices in the menu of projects to get to sustainable groundwater levels. Each 1% increase in soil organic matter would increase water holding capacity by 27,000 gallons of water per acre, thereby improving water utilization and reducing water demand on both rangeland and farmland[3].

   Fuel reduction and management can improve groundwater recharge and water quality.

6. **Removal of Invasive Species Project**

   This is an excellent project. Removal of high water consuming invasive species like arundo can reduce water demand, increasing the amount of water available for groundwater recharge.

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[2] http://projects.scpr.org/applications/monthly-water-use/california-water-service-company-chico-district/
[3] https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1082147.pdf

7. **Inclusion of Valley Oaks in the Sustainability Indicators**

Groundwater-dependent ecosystems are an important consideration under SGMA, and it is important to protect the shallowest positions of the aquifer upon which critical groundwater dependent ecosystems rely. The valley oaks are a keystone species in the area, and the canopy of the urban forest is vital for climate adaptation and mitigation. We seek to ensure that groundwater dependent ecosystems are protected in the region, and support the inclusion of Valley Oaks in the minimum thresholds for declining groundwater levels in the Vina GSA GSP.

Butte Environmental Council (BEC) has been a leading 501(c)(3) environmental non-profit in Butte County since 1975, dedicated to environmental issues that threaten the land, air, and water of our communities. BEC is a grassroots organization supported by over 200 paying members, hundreds of volunteers and donors, dozens of local business sponsors, over 3,500 followers on social media, and over 4,000 subscribers to our monthly electronic newsletter. Throughout each year, BEC offers citizens many chances to engage in environmental education, advocacy and stewardship. BEC provides position statements when the organization's leaders recognize a regional environmental threat to citizens.

Thank you for the opportunity to provide comments on this important project. Please contact our Executive Director, Caitlin Dalby, at caitlin.dalby@becnet.org with any questions.

Board of Directors
Butte Environmental Council
(530) 891-6424
www.becnet.org

AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

October 17, 2021

Vina GSA
Vinagsa.org

RE: Comments on the draft *Vina Groundwater Sustainability Plan*

Executive Summary

The summary states:

"*The interests and vulnerability of stakeholders and groundwater uses in these Management Areas vary based on the nature of the water demand (agricultural, domestic, municipal)*" Water demand for the environment must be included. GDEs include upland and riparian valley oak groves, small stream flow, GD urban forests.

"*groundwater use has increased and as forces ranging from population growth to climate change play out*," This sentence ignores the fact that increased cross-boundary flows that may result from expanded demand west of the river (primarily agriculture and water-market-driven aquifer exercise) is at play. This threat to meeting our management goals must be acknowledged and addressed in interbasin coordination/communication process yet to be developed.

"*Groundwater storage in Subbasin is relatively stable except in the areas noted above with depressions.*" The identification of localized cones of depression is valid but it is important to recognize long-term basin declines that occur due to cross-boundary flows influence the baseline water levels. In general (depending on soil conditions and strata) the greater the distance or depth of groundwater pumping and water levels in the VGSA, the lower the magnitude but the longer the timescale of depletions. Consequently, the ultimate effects in the Vina of pumping west of the river can occur significantly after pumping starts, or even after pumping has ceased. The timescales involved in aquifer responses to pumping and other stresses can be on the order of decades, making it difficult to associate cause with effect. As such, monitoring must account for this lag in impacts. In general, the longer the timeframe for effects to be observed at a given monitoring point once they become evident, the longer those effects will persist.

"*If the water table beneath the stream lowers as a result of groundwater pumping, the stream may disconnect entirely from the underlying aquifer.*" A stream that ceases to flow once it enters the alluvial basin is entering the aquifer at that point. The deeper the aquifer level the more of the streambed is dewatered and the earlier. So while a stretch of the creek may be "disconnected" the creek itself is still connected. Mr. Toccoy Dudley, a Department hydrogeologist with the Northern District in Red Bluff, wrote in 2000:At any location in the basin, the gradient between the surface water and groundwater system is directly proportional to the head differences (water surface elevation difference) between the two hydrologic systems. The larger the head differences the higher the gradient and the higher the recharge rate....The shorter the horizontal distance over which the head change occurs increases the recharge rate dramatically. An example of this would be pumping next to a river would induce a much higher recharge rate from the surface water system than the same pumping many miles away.....increased extraction causes the groundwater levels to decline, which increases the head

difference between the groundwater and surface water systems, and consequently increases the gradient and recharge rate. In short, the more you pump, the more you can pump, to a point. Anecdotal and archeological evidence indicates the small streams of the Vina SB were perennial during pre-pumping eras.

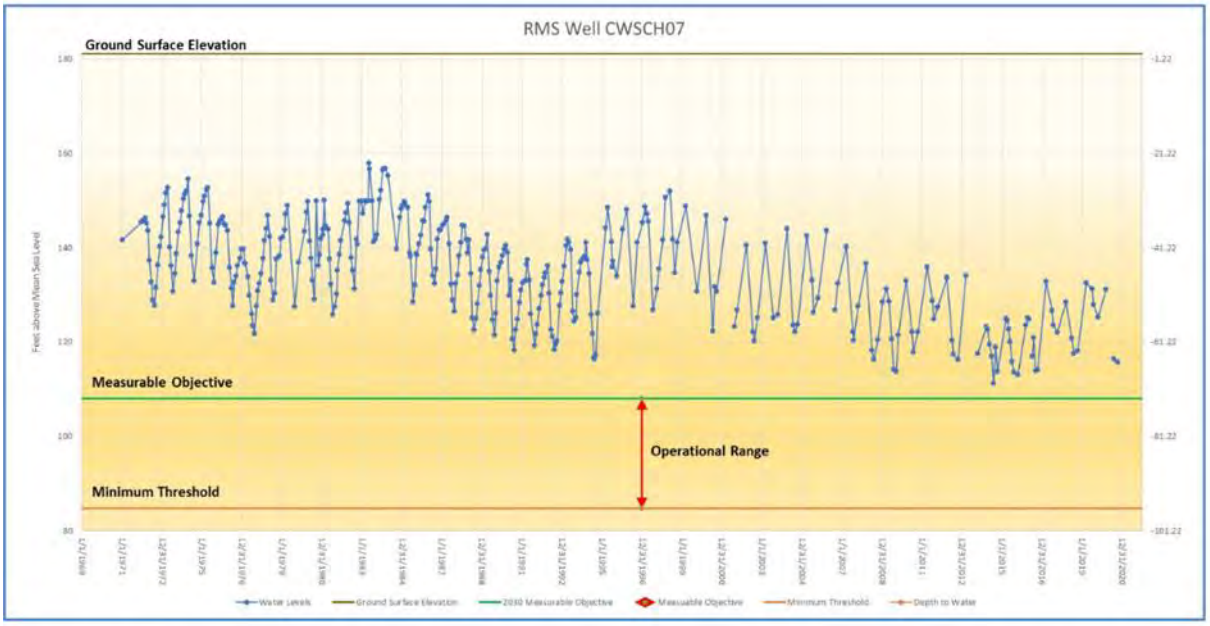


Figure ES-7: Representative Monitoring Site For Groundwater Levels With Relationship Of Measurable Objectives, Minimum Thresholds and Operational Range

The sample hydrograph is one of several that I have reviewed in Appendix 3-b of the GSP that have disturbing MO and MT levels. The MO is below the historic low, not the appropriate level to designate the top of the operational range. The MT as defined in other parts of the GSP, is purported to designate "*the point at which Undesirable Results may BEGIN to occur.*" But undesirable results will begin much earlier in the operational range. The historic low of this hydrograph is above the 80' max rooting depth of native phreatophytes. The MT is significantly lower than 80' bgs. Furthermore, the lower water table will dewater longer reaches of streams earlier in the season and persist later in the year. The operational range proposed is pessimistic in meeting goals that would avoid triggering Undesirable Results. Wise resource management strives to improve conditions that have been degraded by human development. Accepting degraded status quo or planning for increased degradation may be realistic given the human inclination to ambitiously convert resources into useful products. But the term "sustainable" implies we have the capacity to identify and honor carrying capacity while devising demand flexibility strategies to meet evolving climate conditions. Robust Management Objectives reduce the probability of careening toward Management Thresholds. Our MO levels can strive to improve conditions without risk of State management takeover. Water code § 354.30. Measurable Objectives (g) An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan.

Chapter 2 Basin Setting

2.3.4 Water Budget Estimates

2831 “Other components are more difficult to measure or do not have measured values readily available (e.g., deep percolation, subsurface flows, groundwater pumping, surface water-groundwater interaction, etc.) and are estimated using the BBGM.” It is unclear how the BBGM estimates Western Boundary Net Outflows 56,100- 65,000 AFY.
This map from the first draft of the Vina Water Budget presentation last year estimated a total of 200k AFY flowing from the east out of Butte into Colusa. The first draft of the Butte Subbasin Preliminary Basin Setting Results indicated 261k AFY of water flow from the west into the Butte basin from Colusa. These large discrepancies in outflow estimates do not inspire confidence in the Water Budget, the identification of who is responsible for GW declines or the efficacy of proposed recharge efforts.
“the ultimate effects of pumping can occur significantly after pumping starts, or even after pumping has ceased. The timescales involved in aquifer responses to pumping and other stresses can be on the order of decades, making it difficult to associate cause with effect. As such, monitoring must account for this lag in impacts. In general, the longer the timeframe for effects to be observed at a given monitoring point once they become evident, the longer those effects will persist, even if the pumping causing the effects is halted immediately.” Davids Engineering 2014. Prepared for NCWA, Sacramento Valley Groundwater Assessment Active Management – Call to Action, pp. 14-15.
We know that interbasin flows are dependent on conditions in adjacent basins. "3014 Western boundary net outflows represent Sacramento River gains from groundwater and subsurface outflows to the Corning Subbasin. The split between these outflows is uncertain at
this time and identified as a data gap." This significant data gap will present challenges as the impacts of GW pumping are not immediate and can take months or years to occur. The emerging California Water Market is a factor that is going to complicate regional water budget estimates.
BCWRC’s Drought Task Force intention to evaluate the cumulative impacts of Water Transfer Programs (including GW Substitution water market transactions) and Supplemental Groundwater Pumping Operations in the Northern Sacramento Valley is essential to understand sub basin water budgets.3251 The failure of the GSP to attempt an estimate of interbasin subsurface flow along the Western Boundaries invalidates the Water Budget on which much of the GSP uses as a foundation. It is inappropriate to explain that "*Characterization of Interbasin Flows and Net Outflows along Western Boundary*" is placed in the "Next Steps" category. Water Code § 354.16 explains "Groundwater Conditions Each Plan shall provide a description of current and historical groundwater conditions in the basin, including data from January 1, 2015, to current conditions, based on the best available information that includes the following: (a) Groundwater elevation data demonstrating flow directions, lateral and vertical gradients, and regional pumping patterns, including: (1) Groundwater elevation contour maps depicting the groundwater table or potentiometric surface associated with the current seasonal high and seasonal low for each principal aquifer within the basin." Code § 354.18. “Water Budget (a) Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions...(3) Outflows from the groundwater system by water use sector, including ... subsurface groundwater outflow." Early basin-setting drafts of the Vina, Butte and Colusa sub-basins showed large discrepancies in the modeled subsurface aquifer outflow patterns. The Butte Basin Groundwater Model has no capacity to quantify subsurface GW flow out of the western boundary of the sub-basin. The present draft recognizes the data gap and inadequacy of regional modeling that characterizes the water budget of inflow and outflow.

SGMA regulations require Each Plan to contain a water budget for the basin that identifies discharges including subsurface groundwater outflow. The Butte County Drought Task Force recognizes that Groundwater extractions outside the Vina boundaries such as the past and present Water Transfer Programs and Supplemental Groundwater Pumping Operations in the Northern Sacramento Valley may have enduring cumulative impacts on Vina's water budget.

2.1.2.4 **Groundwater Recharge Areas**

"*Groundwater recharge is the downward movement of water from the surface to the groundwater system*." Some recharge occurs from upward movement. Piezometric pressure from the semi-confined portions of the Tuscan System allows water to move upward recharging into or supporting alluvial unconfined aquifers if sufficient pressure exists. Line 1940 explains; "*In locations where groundwater levels in the shallower wells are lower than in the deeper wells, the gradient indicates upward movement of groundwater, with a similar relationship defining the volume of upward flow*." Conversely the alluvial shallow aquifer can leak downwards if the piezometric elevation is reduced. Line 1937: "*When groundwater levels in the shallower wells are higher than in the deeper completions, the gradient indicates downward movement of groundwater. The volume of downward flow is proportional to the gradient and the hydraulic conductivity between the shallow and deep measurement points*." The USDA groundwater atlas [https://pubs.usgs.gov/ha/ha730/ch_b/B-text3.html] explains this well-known water fact: "By the early 1960's, intensive ground-water development had significantly lowered water levels and altered ground-water flow patterns in the Central Valley aquifer system. By far the most dramatic impact of development was in the San Joaquin Valley, where water-level declines in the confined part of the aquifer system were locally more than 400 feet. Although predevelopment flow was toward the San Joaquin River throughout most of the basin, large withdrawals from deep wells in the western and southern parts of the aquifer system changed the direction of horizontal flow in the confined part of the system until the water moved toward the withdrawal centers. Also, because the magnitude of the withdrawals caused hydraulic heads in the confined parts of the aquifer system to fall far below the altitude of the water table, the vertical hydraulic gradient was reversed over much of the San Joaquin Valley. As a result, much of the water in the upper unconfined zone of the aquifer system that flowed laterally toward the river under predevelopment conditions leaked downward through the confining beds into the lower confined aquifer after development...Ground-water development in the San Joaquin Valley has reduced the effectiveness of the confining beds within the aquifer. Thousands of wells with casings perforated for much of their length have been drilled through the clay confining units. Where these wells are open to the unconfined and confined aquifers, they allow virtually unrestricted vertical flow through the well bore. The amount of water that flows downward through one large-diameter well has been estimated to be equivalent to the natural leakage through the "E-clay" over an area of approximately 7 square miles. During the peak of the withdrawal season, the net downward flow may be, on average, as much as 0.3 cubic foot per second per well." Significant Depressurization of the regional confined aquifer can take place within and outside of the Vina sub basin. Well-casings that have perforations at shallow and deep levels interrupt the confining layers and increase the vertical flow. Lines 1456-1460 indicate there is this type of potentially interbasin leakage in the Vina SB "*Aquifer testing conducted as part of the Lower Tuscan Aquifer study (Brown and Caldwell, 2013) indicated there is also the potential for Upper Watershed recharge in the shallow aquifer interval to move down to greater depths due to irrigation pumping, causing a mixing of recharge sources in the intermediate and possibly deeper aquifer zones in the Vina South Management Area.*" Line 1469 discusses "*Additional*

recharge through management activities of flood flows or irrigation practices has potential in the Vina Subbasin..." but does not discuss how the recharged water can migrate through the deep aquifer into adjacent sub-basins that are being pumped.

2.1.5 Groundwater Producing Formations presents an incomplete overview of the producing geology and fails to quantify the robust yields of the Tuscan even while quantifying the production amounts available in less important aquifer units, line 1614: "*Wells penetrating the sand and gravel units of the Riverbank and Modesto Formations produce up to about 1,000 gallons per minute (gpm)*" The Update on the Stony Creek Fan aquifer Performance Testing [http://cetehama.ucdavis.edu/files/135217.pdf] indicated that that Lower Tuscan can produce 2,500-3,000 gpm. The GCID and others are exploiting/depressurizing this extremely productive aquifer. The cumulative demand of the wells exercising the lower Tuscan is undoubtably impacting water levels in all aquifer layers in the 4-county basin.

2.1.8.2 Beneficial Uses "*Water produced from the principal aquifer is primarily used to meet irrigation, domestic, and municipal water demand*." This sentence should include "*environmental demand*". Groundwater and surface water are historically and, in many cases, currently connected. Beneficial uses must include the benefits to ecosystems including Groundwater Dependent upland vegetation. According to the State Water Board delineation of beneficial uses: [https://www.waterboards.ca.gov/rwqcb2/water_issues/programs/planningtmdls/basinplan/web/bp_ch2.html]

2.1.3 COLD FRESHWATER HABITAT (COLD)
Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

2.1.14 PRESERVATION OF RARE AND ENDANGERED SPECIES (RARE)
Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.

2.1.18 FISH SPAWNING (SPWN)
Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

2.1.19 WARM FRESHWATER HABITAT (WARM)
Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

2.1.20 WILDLIFE HABITAT (WILD)
Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

Beneficial uses of streams that have intermittent flows, as is typical of many streams in the region, must be protected throughout the year and are designated as "existing."

2.2 Groundwater Conditions; • "*Wells showing depths to first encountered groundwater deeper than 500 feet were eliminated from the data set*." The rationale behind this limitation is unclear. If there is significant piezometric pressure identified in the water encountered below 500' it should be included in the analysis. The hydrographs in this section measure a shallow portion of the system. It is likely that the groundwater flow volumes would be stimulated when the pressurized portion of the aquifer is

depressurized by major production operations. The cumulative effect of these extractions may be the cause of the decline in the seasonally fluctuating regional aquifer levels. The failure to evaluate the effect of confined/semi-confined piezometric pressure dynamics on groundwater conditions must be remedied. line 2143 identifies the existence and importance of this pressure in relation to subsidence but there is no other mention of piezometric pressure. "*As the pressure created by the height of water (i.e., head) declines in response to groundwater withdrawals, aquitards between production zones are exposed to increased vertical loads*." The measurement of piezometric pressure is important for groundwater monitoring. It allows us to determine the level and flow patterns of the groundwater. Omitting a discussion of piezometric pressure when discussing groundwater conditions in our region is like ignoring blood pressure during a human physical exam.

Line 1996

"*Since the year 2000, there has been a cumulative decline in March 1 groundwater storage of about 400,000 acre-feet (AF). This indicates the cycles of groundwater pumping are not in balance with the cycles of recharge that replenish the aquifer, and that groundwater depletion has occurred consistent with long-term decline in groundwater levels*." Without a regional GW model and a record of pumping throughout the Tuscan basin it is impossible to identify pumping in the VGSB as the sole demand resulting in the decline in GW storage.

Line 2017

"Development of groundwater quality-related Sustainable Management Criteria for the Vina Subbasin is not intended to duplicate or supplant the goals and objectives of ongoing programs including those by Butte County, the SVWQC and the State Drinking Water Information System (SDWIS) [SWRCB Geotracker/GAMA website, the California Department of Toxic Substances Control (DTSC) EnviroStor website, and the Environmental Protection Agency's (EPA) National Priorities List (NPL)]." GW pumping stimulates the movement of toxic plumes through the aquifer system. Advection is the movement of dissolved solute with flowing groundwater. The amount of contaminant being transported is a function of its concentration in the groundwater and the quantity of groundwater flowing, and advection will transport contaminants at different rates in each stratum. Who are the personnel in the VGSA that will be tracking these data and correlating it to various GW pumping regimes and flow patterns?

Line 2298

"*There is no indication in the streamflow data to suggest groundwater interactions that contribute to the streamflow behavior. Similar conditions would be expected for other creeks that traverse the Vina Subbasin (Little Chico, Sycamore, Rock, and Butte Creek) since they flow across a similar fan topography and similar shallow subsurface geology. The overall conclusion from this study in relation to interconnected surface water is that, for significant portions of the year, the upland creeks in the Vina Subbasin would be classified as disconnected streams and the surface water would be considered "completely depleted" as defined under SGMA*." Water code chapter 23 explains "(o) "Interconnected surface water" refers to surface water that is hydraulically connected <u>at any point</u> by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted." As I read Water Code it is clear that streams flowing out of the foothills are hydraulically connected until they reach a point where the aquifer has been depleted below stream level at which point the stream looses as it recharges the evacuated aquifer. As the GW level declines the stretch of dewatered stream expands. Spatial and temporal dewatering monitoring is a critical GDE function of a GSA. The California

Department of Fish and Wildlife has specific GDE recommendations that must be implemented in the VGSA: [https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=170185&inline]
"GROUNDWATER DEPENDENT ECOSYSTEMS (GDES)
1. How will groundwater plans identify GDEs and address GDE protection?
2. How will GSAs determine if GDEs are being adversely impacted by groundwater management?
3. If GDEs are adversely impacted, how will groundwater plans facilitate appropriate and timely monitoring and management response actions?
INTERCONNECTED SURFACE WATERS (ISW)
1. How will groundwater plans document the timing, quantity, and location of ISW depletions attributable to groundwater extraction and determine whether these depletions will impact fish and wildlife?
2. How will GSAs determine if fish and wildlife are being adversely impacted by groundwater management impacts on ISW?
3. If adverse impacts to ISW-dependent fish and wildlife are observed, how will GSAs facilitate appropriate and timely monitoring and management response actions."
According to a study on small streams flowing through the Vina SB: "Nonnatal rearing of juvenile Chinook salmon was documented in several intermittent tributaries to the Sacramento River. Condition factors and length measurements of juvenile chinook captured in the intermittent tributaries were compared with those captured in the mainstem Sacramento River. The data suggests that juvenile chinook rearing in the tributaries grew faster and were heavier for their length than those rearing in the mainstem. Faster growing fish smolt earlier, and may enter the delta earlier in the year before low water and pumping degrade rearing habitat." Intermittent Streams as Rearing Habitat for Sacramento River Chinook Salmon.
https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/exhibits/swrcb/swrcb_maslin1997.pdf

The unregulated streams that flow into the Sacramento River are leaking into drained aquifers. Dan Wendell of The Nature Conservancy, a panelist at a workshop held by the California Natural Resources Agency, explained "since the 1940s, groundwater discharge to streams in the Sacramento Valley has decreased by about 600,000 acre-feet per year due to groundwater pumping, and it's going to decrease an additional 600,000 acre-feet in coming years under status quo conditions due to the time it takes effects of groundwater pumping to reach streams."
https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_282.pdf

2.2.7 Groundwater Dependent Ecosystems
2488 Not Likely a GDE Due to Adjacency to Irrigated Agricultural Fields
2504 Not Likely a GDE Due to Dependence on Agricultural-dependent Surface Water
GDEs were incorrectly removed in areas adjacent to irrigated fields due to the presence of surface water. However, GDEs can rely on multiple water sources – including shallow groundwater receiving inputs from irrigation return flow from nearby irrigated fields - simultaneously and at different temporal/spatial scales. Basins with a stacked series of aquifers may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage

groundwater resources in shallow principal aquifers, that support springs, surface water, and groundwater dependent ecosystems. Areas in proximity to irrigated land can still potentially be reliant on shallow groundwater aquifers, and therefore should not be removed solely based on their proximity to irrigated fields.

3014 "*Western boundary net outflows represent Sacramento River gains from groundwater and subsurface outflows to the Corning Subbasin. The split between these outflows is uncertain at this time and identified as a data gap*." The subsurface outflow analysis must be expanded to include outflows into other nearby sub basins including Butte and Colusa. Increased GW extractions due to crop changes, "emergency" supplemental GW pumping, and GW substitution transfers is likely to increase subsurface flows over time. Butte Counties nascent Drought Impacts Analysis Study plans to compile the 2021 water transfer programs (April 2021-December 2021) from Butte, Tehama, Glenn, Colusa, Yuba and Sutter counties.
The report will include a brief description of the programs, amount of water transferred, recipient of water, whether surface water or groundwater substitution is utilized, destination of transferred water, etc. including maps. Analysis of the transfer programs will evaluate the cumulative impacts of the programs' impacts on water supplies and demands. This type of annual evaluation must be ongoing as demand/supply conditions evolve and consider "timescales involved in aquifer responses to pumping and other stresses can be on the order of decades, making it difficult to associate cause with effect. As such, monitoring must account for this lag in impacts. In general, the longer the timeframe for effects to be observed at a given monitoring point once they become evident, the longer those effects will persist, even if the pumping causing the effects is halted immediately." [1]
[1] Davids Engineering 2014. Prepared for NCWA, Sacramento Valley Groundwater Assessment Active Management – Call to Action.

Line 3016 **Water Banking Stimulation of sub surface flows** "*It is anticipated that this data gap* [sub surface flows] *will be addressed through future refinements to the BBGM and through coordination and collaboration with neighboring subbasins as part of GSP implementation*." The coordination and collaboration with neighboring subbasins is, at best, an forthright sharing of information and unbiased evaluation of model results. However, the VGSA would be naïve to ignore the special interests of key players in the Northstate Water World that may inspire some purveyors to profitably engage in the emerging California Water Market with less regard to the interests of GDEs and water users that are not participating in Transfer/sales that "exercise" the shared regional aquifer while promising to use PMAs to refill drained aquifer water banks.

3181 **Habitat Monitoring Deficit** "It is anticipated that these uncertainties will be reduced over time through monitoring and additional data collection, refinements to the BBGM and other tools, and coordination with neighboring basins." The DGSP is deficient because significant monitoring infrastructure has yet to be funded and built in the shallowest portion of the aquifer system that GDEs rely upon. According to the 2007 DWR/NCWA Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework; "The long-term health of riparian vegetation, wetland species, and number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels and an appropriate level of interaction between surface water and groundwater resources. The lowering of groundwater levels due to natural climatic changes or the interception of

groundwater underflow to surface water systems due to the increased groundwater extraction associated with water management programs, have the potential to impact the native habitat areas. Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. In order to identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. In evaluating impacts to certain wetlands species, it is important to discern both the rate of groundwater level change, as well as the cumulative change over the entire year. Data collection and monitoring frequency should be appropriately selected to support the temporal and long-term evaluations."
https://www.waterboards.ca.gov/waterrights//water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_280.pdf

3266 3. SUSTAINABLE MANAGEMENT CRITERIA

3298 • "*MT– Quantitative threshold for each Sustainability Indicator used to define the point at which undesirable results may begin to occur.*" The stated definition is the most egregious violation of common sense in the DGSP. Undesirable results BEGIN to occur even before historic low levels (the approximate upper reach of the operational range) are occur. Domestic well failures, destruction of GDEs and chronic lowering of groundwater levels occur at historic GW levels and would be exacerbated if the aquifer is managed within the Operational Ranges being proposed. I find the Plan to be deficient in protecting beneficial uses. Historic low GW levels shown in most of the Appendix 3-B hydrographs are still above the 80' max rooting depth of native and urban forest trees. The Minimum Threshold as defined in the GSP, is purported to designate "the point at which Undesirable Results may BEGIN to occur." But undesirable results will begin much earlier in the proposed operational range shown in most of the hydrographs. These MTs are significantly deeper than 80' bgs. Furthermore, the lower water table will dewater longer reaches of streams earlier in the season and persist later in the year. Dan Wendell of The Nature Conservancy, a panelist at a workshop held by the California Natural Resources Agency, explained "since the 1940s, groundwater discharge to streams in the Sacramento Valley has decreased by about 600,000 acre-feet per year due to groundwater pumping, and it's going to decrease an additional 600,000 acre-feet in coming years under status quo conditions due to the time it takes effects of groundwater pumping to reach streams." The operational range proposed will not avoid triggering this and other significant irreversible Undesirable Results.
SGMA Regulations define "Measurable objectives" as "specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions.." Setting GW level MOs below historic low levels does not meet this requirement. Most of the proposed MOs are below historic low levels. This is not the appropriate level to designate the top of the operational range. SGMA Water Code § 354.30 explains "An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan." The managers assure the public that the goal of the VGSP is to maintain GW levels above or near the MOs or that if the MT is approached/transgressed PMAs would be employed to bring water levels back to the MO or higher. The definition of the MT shows the "Operational Range" as the defined goal. The proposed broad

operational ranges fit the prescription for market driven groundwater banking but would result in many undesirable impacts to water users not participating in the rapidly emerging California Water Market.

3415 **Water Bank Prescription** "*The quantitative Vina Subbasin Undesirable Result for the Chronic Lowering of Groundwater Levels occurs when: Two RMS wells within a management area reach their MT for two consecutive years of non-dry year-types.*" Two years of operating at the MT level would destroy GDEs including the urban forest of Chico. The insulting caveat that it would be acceptable to forgive the extreme MT levels if they occur during 2 consecutive dry years would allow GW levels to decline below the MT and implies that artificial recharge during "wet" years is a mitigating option. This is another example of an operation prescription for conjunctive use water bank marketing.

3477 **Cumulative impacts of regional pumping** "*Groundwater levels are typically lower during dry years and higher during wet years. Superimposed on this four- to seven-year short-term cycle is a long-term decline in groundwater levels. In other words, groundwater levels during more recent dry-year cycles are lower than groundwater levels in earlier dry-year cycles*." The DGSP fails here to identify the cumulative impacts of increased pumping in the regional shared Tuscan aquifer system that is driving the long-term trend in driving down the fluctuating hydrograph record. Management of connected groundwater systems is challenging for several reasons. First, the cumulative GW depletions caused by pumping depends on the spatial scale: in general (depending on soil conditions and strata) the greater the distance or depth between groundwater pumping and a monitoring well, the lower the magnitude but the longer the timescale of depletions. Consequently, the ultimate effects of pumping can occur significantly after pumping starts, or even after pumping has ceased. The timescales involved in aquifer responses to pumping and other stresses can be on the order of decades.

3703 **Outside Hydrologic Influence** "*hydrologic impacts outside of the Vina Subbasin, such as upper watershed development or fire-related changes in run-off, could result in impacts to streamflow, riparian areas, or GDEs that are completely independent of any connection to groundwater use or conditions within the Vina Subbasin.*" Since the deep Tuscan Aquifer System is recharged from the eastern basin foothills it is certainly appropriate to recognize impacts to groundwater use and conditions within the Vina SB resulting from fire related soil conditions and streamflow in the recharge area. [https://www.buttecounty.net/waterresourceconservation/SpecialProjects/StableIsotopeRechargeProject.aspx]

Additionally, conditions in the down-gradient portion of the Tuscan System are worthy of evaluation as the VGSP evolves. The lower Tuscan Aquifer system is being developed as a water source west of the Sacramento River and is being evacuated with vigor especially during dry years. This may accelerate the rate of subsurface flow out of the Vina SB. The Glenn Colusa Irrigation District board pumped over 25K af of Tuscan groundwater for 2-3 months this summer to supplement their river allocation. This is on top of 10k af of groundwater substitution water transfers and even more surface water sales from "willing sellers" to "willing buyers" South Of Delta. The 35k/a/f is more water in 3 months than the Chico Urban Area pumps in a year. The State emergency declaration allows water purveyors like GCID to sidestep laws that require environmental review. GCID used district wells located 5-10 miles west of Chico that can pump 3KAF/minute. The Butte County Drought Task Force recognizes the importance of evaluating cumulative impacts of programs on water supplies and demands on the Vina SB may be significant and is

initiating a “Drought Impacts Analysis Study” that will compile and analyze the 2021 Water Transfer Programs and the Supplemental Groundwater Pumping Operations in the Northern Sacramento Valley. https://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=1006&meta_id=157029

3776 Upland GDE Designation “*The Vina Subbasin specifically recognizes deep-rooted tree species, such as Valley Oak, that are common along riparian corridors in both upland streams and the Sacramento River. This connectivity is not well measured or understood in the Vina Subbasin at this time.*” The failure of the DGSP to accept the well-documented fact that deep rooted trees are not exclusively located along riparian corridors but are nonetheless dependent on the shallow aquifer.
US Forest Service Index of Species Information for Valley Oak explains the wide distribution of the Valley Oak ecosystem: https://www.fs.fed.us/database/feis/plants/tree/quelob/all.html
“Valley oak typically has several vertical roots that tap groundwater and extensive horizontal root branches. Vertical root depth has been measured as deep as 80 feet (262m) in some individuals. Best growth is attained when water tables are about 33 feet (10 m) below the surface. Historically, these forests extended 0.6 to 5.0 miles (1-8 km) on each side of major rivers. Valley oak cover was once extensive, extending through lowlands and into foothills.”
Limiting GDE evaluation to measurable impacts to interconnected streamflow is insufficient.
California Code of Regulations, Title 23 § 351. Definitions.
“(g) Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information.
(m) “Groundwater dependent ecosystem” refers to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.”
The DGSP, like other planning documents, promises on line 3785 “to fill these data gaps and the GSAs are committed to addressing these issues and develop appropriate SMCs for the Vina Subbasin.” But like other co-equal goals that assure balancing water supply with ecosystem health it is meeting the demand that takes precedence. In 2007 the DWR, NCWA and the State Water Board recognized the importance of habitat monitoring in their Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework
https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_280.pdf
“The lowering of groundwater levels due to natural climatic changes or the interception of groundwater underflow to surface water systems due to the increased groundwater extraction associated with water management programs, have the potential to impact the native habitat areas….In order to identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer.”
But there has been no investment in creating the network needed to collect baseline conditions or to monitor declines in this critical GDE preservation goal.

5. PROJECT AND MANAGEMENT ACTIONS

4412 5.2.3.1 **Agricultural Irrigation Efficiency**
4414 Butte County agriculture is a keystone feature of culture in the Vina SB. The importance of maintaining the viability of irrigated agriculture is of paramount importance. The results of the Vina GSA,

Agricultural Groundwater Users of Butte County, and Butte County Farm Bureau survey to evaluate current irrigation methods and practices, identify opportunities and methods to improve irrigation efficiency, determine potential issues preventing the adoption of efficiency practices, and provide recommendations for increasing participation in these practices were expected to be available in September 2021. A summary of the results would be helpful in evaluating opportunities to stabilize or reduce demand. Incentives to invest in efficient GW irrigation through grant funding and tax rebates are needed to maximize benefits. According to Valerie Kincaid "A project proponent maintains the right to water that is recharged whether it results from recharge projects or groundwater demand reduction projects (e.g., conservation, recycling)." Why is this not listed as a recharge project?

4449 5.2.3.2 Project: Residential Conservation The Estimated Groundwater Offset and/or Recharge: 100 acre-feet/year is certainly below the potential for urban efficiency. The voluntary expansion of xeriscape replacement of turf is evident and the adoption of efficient water using appliances is inevitable. The managers should review the successful urban conservation data from last decade to evaluate more realistic estimates of potential offset amounts.

4079 " *As discussed in Section 4.1, the GSAs in the Vina Subbasin intend to further evaluate the SMC for interconnected surface waters to avoid undesirable results to aquatic ecosystems and GDEs. As additional data are collected and evaluated, the Vina Subbasin commits to developing additional SMC and installation of monitoring points, as appropriate, for specific stream reaches and associated habitat where there is a clear connection to groundwater pumping in the principal aquifer*." Restricting monitoring points and GDE considerations to riparian proximities is insufficient for the protection of deep-rooted vegetation, both native trees and the Chico urban forest. According to the USDA Forest Service "Urban forests help to filter air and water, control storm water, conserve energy, and provide animal habitat and shade. They add beauty, form, and structure to urban design. By reducing noise and providing places to recreate, urban forests strengthen social cohesion, spur community revitalization, and add economic value to our communities."
[https://www.fs.usda.gov/managing-land/urban-forests]
The shallowest portion of the aquifer system that sustains this vegetation extends beyond riparian corridors. The Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework 2007 DWR NCWA
https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/CSPA%20et%20al/part2/aqua_280.pdf] recognizes the importance of establishing a monitoring network in the shallowest portion of the aquifer for this purpose: "The long-term health of riparian vegetation, wetland species, and number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels and an appropriate level of interaction between surface water and groundwater resources. The lowering of groundwater levels due to natural climatic changes or the interception of groundwater underflow to surface water systems due to the increased groundwater extraction associated with water management programs, have the potential to impact the native habitat areas. Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. In order to identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be

developed to detect changes in water levels over the shallowest portion of the aquifer. In evaluating impacts to certain wetlands species, it is important to discern both the rate of groundwater level change, as well as the cumulative change over the entire year. Data collection and monitoring frequency should be appropriately selected to support the temporal and long-term evaluations."

4477 5.2.3.3 Project: Streamflow Augmentation

"*The project would primarily take place at Comanche Creek, Butte Creek, Little Chico Creek, and Big Chico Creek*." It is unclear how Little Chico Creek and Big Chico Creek would be integrated into this program since they are, apart from flood control infrastructure, unregulated by dams. If a project includes the application for a new right to recharge water, it will need to obtain a water right permit from the State Water Resources Control Board (SWRCB) through a surface water right application and a supplemental groundwater recharge form. The water right permit application would need to identify the "beneficial use" that the project intends to meet. Recharging groundwater is not considered a beneficial use, however, meeting the sustainable management criteria in a GSP may be determined to be a beneficial use.

Since this project is in the "Planned" category and is expected to move forward and be completed there must be more detailed information available to the public. The project description should be clear on permits that would be required to be negotiated with regulatory agencies such as CFW and the State Water Board.

4507 **5.2.3.4 Flood MAR/Surface Water Supply and Recharge Scoping**

This planned scoping project must include a detailed evaluation of the efficacy of up-gradient recharge efforts that may enhance extraction opportunities in down-gradient sub-basins that are developing new groundwater exploitation infrastructure to supply expanding permanent crop acres and engaging in water transfers that integrate the shared aquifer system into their transfer portfolio and have a history of using the same aquifer as an "emergency" supplemental water supply. The legal consequences of attempting MAR have been summarized by Ms. Kincaid and issues of aquifer privatization and potential water bank extirpation of Butte Chapter 33 protection remain unresolved and exacerbated by the expert analysis presented by the Public Policy Institute of California. "**County export ordinances prevent beneficial trades.** In the absence of state regulation of groundwater, county ordinances have protected local parties against injury from groundwater-related exports. But their export permitting hurdles are so high that they impede any transfers, including those that present no significant risk to local groundwater sustainability. In Butte County, for instance, it would take 18 months to go through all the steps to obtain a permit for a same-year groundwater substitution transfer. Once GSAs establish sustainability plans that address undesirable impacts of pumping, it should be possible to ease the coarser restrictions on this practice found in most county ordinances—which effectively preclude trades if they entail water leaving the county. If counties with restrictive groundwater export ordinances fail to amend their laws to conform to SGMA, the legislature should consider preempting local laws that discriminate against out-of-county uses or place undue burdens on groundwater and groundwater-substitution transfers that would not jeopardize sustainable groundwater management of the source aquifer."
https://www.ppic.org/publication/improving-californias-water-market/

All the projects outlined in lines 4408-4663, as well as 4870 5.2.4.11 Project: Surface Water Supply and Recharge, whether they are conservation (demand reduction) or recharge (supply augmentation)

projects have the potential to carry the legal consequences of artificial recharge efforts. According to Kincaid [https://www.vinagsa.org/files/4441577c7/PMA+Legal+Implications+Discussion+Paper.pdf]

“A project proponent maintains the right to water that is recharged whether it results from recharge projects or groundwater demand reduction projects (e.g., conservation, recycling). If a project uses or obtains a surface water supply and recharges into the aquifer, the project proponent would have a legal right to the recharged water. Water does not legally become “common” or “native” supply available to overlying groundwater right holders unless it is abandoned by the project proponent.” The contentious issue of privatization of the aquifer that is used as a water bank must be resolved at the State level because local ordinances may be overridden by SGMA jurisdiction. The strategy of integrating the Tuscan Aquifer System into the State Water Supply is a long-standing threat to the balance of uses required to maintain the quality of life in the Vina SB. According to the Public Policy Institute of California, “County export ordinances prevent beneficial trades. In the absence of state regulation of groundwater, county ordinances have protected local parties against injury from groundwater-related exports. But their export permitting hurdles are so high that they impede any transfers, including those that present no significant risk to local groundwater sustainability. In Butte County, for instance, it would take 18 months to go through all the steps to obtain a permit for a same-year groundwater substitution transfer.

“Streamline transfer reviews while maintaining protections. Approval delays by federal, state, and local authorities often reflect uncertainties about the physical impact of a surface or groundwater transfer on other water users or the environment. Yet there are various ways to streamline the process while maintaining protections, for instance by conducting more up-front analysis of impacts through programmatic reviews, developing a “fast lane” for transfers below a certain size, developing a structured evaluative process for reviews, and establishing an after-the-fact process for balancing accounts to enable quicker approvals of time-sensitive activities.

"Develop more equitable local rules for groundwater substitution transfers. Well-run groundwater substitution programs can expand long-term water availability by more actively using local groundwater storage. Once GSAs establish sustainability plans that address undesirable impacts of pumping, it should be possible to ease the coarser restrictions on this practice found in most county ordinances—which effectively preclude trades if they entail water leaving the county. If counties with restrictive groundwater export ordinances fail to amend their laws to conform to SGMA, the legislature should consider preempting local laws that discriminate against out-of-county uses or place undue burdens on groundwater and groundwater-substitution transfers that would not jeopardize sustainable groundwater management of the source aquifer."

The State may use emergency proclamation or legislative action to neutralize local control of water policy such as the Chapter 33 ordinance in Butte County. The broad operating range and historic low-level starting point (MO) that the VGSA consultants and staff have inserted into the VGSP will create the storage space needed to bank/sell water stored in the Butte Basin. The Kincaid white paper explains that Potential Management Actions “would allow the Vina GSA to protect the Vina subbasin and the implementation of the GSP from negative implications from artificial recharge projects through enactment of rules, ordinances and/or policies.” But her estimation that ordinances or policies that the GSA may adopt to ensure recharge projects are operating without adverse impact to the basin offer no assurance that the VGSA would have the capacity to successfully navigate the State prerogative to manipulate the emerging water market that intends to “Streamline groundwater substitution and water transfer permitting and approval processes by allowing consolidated basin-level environmental reviews

to facilitate water market transactions," [https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118]

4664 **5.2.4.5 Community Monitoring Program** "*This project would create routine water table monitoring programs for approximately 8,000 acres of Ecological Reserves in the region between lower Forest Ranch and Cohasset Road near Chico Airport, including the Big Chico Creek, Sheep Hollow, and Cabin Hollow tributaries.*" This project should be required to be implemented yesterday! Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. To identify potential habitat impacts associated with potential changes in water management practices, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. In evaluating impacts to certain GDE species, it is important to discern both the rate of groundwater level change, as well as the cumulative change over the entire year. Data collection and monitoring frequency should be appropriately selected to support the temporal and long-term evaluations.

4691 **5.2.4.6 Project: Wastewater Recycling**

While this project requires time consuming permitting and coordination with regulatory agencies as well as significant infrastructure installations it will be helpful in keeping Chico's GW demand from expanding along with the urban development that is anticipated. Focusing purple pipe infrastructure on athletic field irrigation is a good target during dry seasons.

4722 **5.2.4.7 Project: Community Water Education Initiative**

A population that is well informed on watershed health, water use conservation and water policy is an excellent education goal. This project should identify regional responsible water use and climate responsive flexibility. The political science portion should dive into the history of California water policy; how it has shaped regional water infrastructure and the need for local vigilance in defending the hydrologic balance from insatiable demand from unfettered urban and agricultural expansion south of the Delta.

4768 **5.2.4.8 Project: Rangeland Management and Water Retention**

4802 **5.2.4.9 Project: Fuel Management for Watershed Health**

4833 **5.2.4.10 Project: Removal of Invasive Species**

Investments in the health of ecosystems that provide the water recharge for the Tuscan Aquifer System have been, like in the rest of the Sierra Cascade watershed, unwisely underfunded. An excerpt from the Sierra Nevada Ecosystem Project lays out the imbalance of resource extraction vs reinvestment. These projects would begin to address that imbalance.

"Based on estimates of direct resource values as one input (not the total revenue produced by resource dependent activities), the Sierra Nevada ecosystem produces approximately $2.2 billion

worth of commodities and services annually. Water accounts for more than 60% of that total value. Other commodities [timber and grazing] account for 20% as do services.
"Public timber and private recreation are the largest net contributors of funds to county governments both in total dollars and as a percentage of their total value. Around 2% of all resource values are presently captured and reinvested into the ecosystem or local communities through taxation or revenue sharing arrangements. The declining status of some aspects of the Sierra Nevada ecosystem suggests that this level of reinvestment is insufficient to ensure sustainable utilization of the ecosystem."
https://pubs.usgs.gov/dds/dds-43/VOL_III/VIII_C23.PDF

4870 **5.2.4.11 Project: Surface Water Supply and Recharge** While it is suggested that these projects will require a SWRCB permit; CEQA and others the State is on a path of "streamlining and acceleration of managed aquifer recharge and groundwater banking permitting processes" and to "Streamline groundwater substitution and water transfer permitting and approval processes to optimize the economic value of groundwater".
https://data.ca.gov/dataset/californias-groundwater-update-2020-bulletin-118/resource/94f3a5f6-23f3-4aec-ab84-b546bf211bab
It is unclear if the legal and environmental consequences of this project will be adequately considered. The preservation of undisturbed critical vernal pool habitat is an ecological priority in some of the presumed areas of inundation.

4973 **5.3.4 Landscape Ordinance**
4980 **5.3.5 Prohibition of Groundwater Use for Ski (Recreational) Lakes**
These two common sense regulations would help meet our goals.

4984 **5.3.6 Expansion of Water Purveyors' Service Area**
Assuming that this is exclusively for residential development it is critical that service area expansion does not stimulate urban sprawl that intrudes on either green-line or gold-line open space.

4990 5.3.7 Groundwater Allocation
The consideration of groundwater allocation must be scientifically connected to the actual cause of failure to achieve sustainability goals by 2042. If cross-boundary water flows are causing declining levels in up-gradient portions by extractions in the down-gradient portion of the shared regional aquifer system, there must be well designed/implemented monitoring/modeling systems in place that have the confidence of all involved.

5005 5.4 Data Collection

5006 5.4.1 County Contour Mapping
"*As part of the efforts to collect the information necessary to fill the data gaps identified in Section 3, this project proposes to expand the existing monitoring program to include Butte, Glen, Colusa, and Tehama counties and conduct these groundwater elevation surveys in the spring, summer, and fall. The monitoring program would gather data used to produce groundwater contours and estimates of lateral and vertical flow direction and volume. Producing this data for the four counties will help to identify interbasin flow patterns and*

influences on surface water flows and replenishment locations, thereby improving coordination between counties and water management decision-making." This inter-basin effort must be implemented ASAP! A reliable inter-basin GW modeling is also at the top of the management list.

6. PLAN IMPLEMENTATION

5135 Table 6-5: Estimated Costs for Implementing Data Gaps

"*Interconnected Stream Monitoring $100,000 – $250,000*" As mentioned in previous comments the immediate implementation of a network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. Baseline habitat monitoring is an important data collection objective because it allows for a better understanding of the existing water resource requirements of the native habitat and the evaluation of potential impacts associated with potential changes in water resource management practices. The long-term health of riparian vegetation, wetland species, and number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels. Limiting the data gap to Interconnected Stream Monitoring would leave out GDEs that are outside of designated riparian zones. The shallow aquifer has an important role to play in keeping deep rooted trees, including the large trees in the Chico Urban Forest, that survive the regional dry months without supplemental irrigation.

The USDA also recognizes that Urban Forests such as exists in Chico and other Butte County towns provide a range of valuable ecosystem services. I posit that the groundwater dependent trees of our towns ARE ecosystems. Many environmental challenges are exacerbated within the urban landscape, such as stormwater runoff and flood risk, chemical and particulate pollution of urban air, soil and water, the urban heat island, and summer heat waves. Chico's urban forest canopy mitigates these challenges. Research shows that urban trees are integral to the environmental quality of cities and towns.
In April of 2007 Butte County resolved to adopt an oak woodlands management plan.
"Butte County supports significant acreage of oak woodland habitat. The historical importance of oaks is apparent in the names of towns, cities, streets and residential complexes throughout California. Butte County's oak woodlands enhance the natural and scenic beauty of the area, provide forage and shelter for more than 300 species of wildlife, facilitate nutrient cycling, moderate temperature extremes, reduce soil erosion, sustain water quality and increase the monetary and ecological value of property."
http://www.buttecounty.net/Portals/10/Docs/Planning/Projects/OakWoodland/Chapter53_ButteCounty_OakWoodlandMitigationOrd_2018-10-29.pdf?ver=2018-10-29-165211-350

Water Code § 113: "It is the policy of the state that groundwater resources be managed sustainably for long-term reliability and multiple economic, social, and environmental benefits for current and future beneficial uses."

5253 6.7 Interbasin Coordination
5271 1. Information Sharing
"*This will continue throughout GSP implementation and may include:*

1. Inform each other on changing conditions (i.e., surface water cutbacks, land use changes, policy changes that inform groundwater management)
2. Share annual reports and interim progress reports
3. Share data and technical information and work towards building shared data across and/or along basin boundaries (e.g., monitoring data, water budgets, modeling inputs and outputs, and Groundwater Dependent Ecosystems)"

Information Sharing must include the water-market/emergency GW pumping volumes/locations/timing that members of the North Sac River Corridor group intend to implement and a report on the final v/l/t of these extra demands on the shared aquifer system. These extra pumping demands are not unprecedented and have become a routine component of California's plan to use the Northern Sacramento Valley as a "reliable" source of supply.

Butte County is on the verge of conduction a Drought Impacts Analysis Study that will evaluate the numerous 2021 Water Transfer Programs in Northern Sacramento Valley including the Supplemental Groundwater Pumping Operations. The study portends to accomplish an evaluation of cumulative impacts of programs on water supplies and demands in the inter-basin, but focus on the Vina Subbasin"
https://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=1006&meta_id=157029 pdf Pg 42-43
The report will include a brief description of the programs, amount of water transferred, recipient of water, whether surface water or groundwater substitution is utilized, destination of transferred water, etc. including maps. This report should be conducted every year, funded by SGMA interbasin coordination parties and be included in the VGSA Annual report submitted by April 1 for the prior year's activities.

5295 3. **Coordinate on mutually beneficial activities**
GSAs that overlie the Tuscan Aquifer Formation should provide cooperative funding for mutually beneficial watershed management in the recharge areas located in the foothills east of the valley floor.

5314 **5. Issue Resolution Process**
"Vina Subbasin will pursue development of an issue-resolution process with neighboring subbasins in the North Sac River Corridor group."

This single sentence description of the process to identify and resolve "issues" belies the potential for regional conflict over water management issues. The drama surrounding the nascent Tuscan Water District and the unpopular "Operational Range[s]" proposed in the DVGSP are examples of "issues" that have already emerged in this process. Conflict arising from expanded GW demand in the North Sac River Corridor group are being litigated between stakeholders and agencies. Achieving sustainability requires local agencies, stakeholders, and water users to make many difficult and potentially contentious decisions. These decisions are prone to conflict, particularly when pumping restrictions are viewed as infringing on property rights, or when fees are charged to support local management. Newly formed GSAs have additional layers of potential conflict. Questions regarding authority, streamlined legal and regulatory timelines, a lack of existing precedents and the need to represent agency and constituent interests have the

potential to exacerbate conflicts under SGMA. In some cases, where authoritative interpretations of legal authority and limits have not been established yet, litigation may be necessary and warranted. The State prefers the Northern Sacramento Valley to quietly comply with the myth that this region is a source of "surplus" water that can peacefully serve the accelerating water market through conjunctive-use water banking. However, it is likely that conjunctive-use water banking would degrade the groundwater basin and groundwater users who are not involved in conjunctive use but are reliant on the same groundwater basin.

Chapter 4: MONITORING NETWORKS

4218 Well "Construction Data – Well data such as perforation depths, construction date, and well depth was considered for selection." Many of the selected wells to not meet the above criteria for selection:
4262 Table 4-5. Groundwater Levels RMS Well Construction Details
North MA: 3/6 of the wells do not have listed screen intervals. This makes it difficult to know what layer of aquifer is being monitored. Scientifically constructed multi-completion wells with defined screen depths/elevations is needed. The other 3 have screen intervals ranging from about 70' to almost 500'. While this type of well construction is suitable for production it is unsuitable for transparent depth/elevation monitoring of the aquifer system.
Chico MA The well depths are undefined as are the screen depths. There is a notable lack in monitoring the shallow aquifer that supports the unirrigated Chico Urban Forest.

In summary:
The VGSP must strive to develop and use the best modeling/monitoring processes that recognize the influence of the upland recharge area and the downslope aquifer extraction that influences the ability of this GSA to achieve a robust sustainability goal that does not collapse during the inevitable dry periods that the historic record reveals and the climate destabilization models predict. The hydrologic and geologic science used must not be cast aside by the political science that drives California Water Policy that views the Butte County as an underutilized export source that can be "exercised" by conjunctive water banking. The environment, the urbanites and the rural community require a reliable water table that can't be displaced, even during consecutive dry years.

Jim Brobeck, Water Policy Analyst, AquAlliance

Glenn-Colusa Irrigation District
Serving Our Lands and Environment Sustainably
Water Rights Established in 1883

DATE: October 25, 2021

TO: Colusa Groundwater Authority
Glenn Groundwater Authority
Corning Subbasin Groundwater Sustainability Agency
Tehama County Flood Control & Water Conservation District Groundwater Sustainability Agency
Butte Subbasin Groundwater Sustainability Agencies (all eleven)
Vina and Rock Creek Reclamation District Groundwater Sustainability Agencies

FROM: Holly Dawley, GCID Water Resources Manager

SUBJECT: Support for Groundwater Sustainability Plans and Concern about Groundwater Surface Water Interactions

Glenn-Colusa Irrigation District (GCID) is located in the heart of the Sacramento Valley; we are the largest and one of the oldest diverters of water from the Sacramento River. GCID diverts water from the Sacramento River through a 65-mile long irrigation canal into a complex system of nearly 500 miles of laterals. The water is delivered to more than 1,200 families who farm approximately 141,000 acres of valuable, productive agricultural land. More than $270 million of agricultural products are produced annually on Glenn-Colusa Irrigation District farms, helping to sustain an estimated 12,000 jobs in the region. GCID is also the sole source of surface water deliveries for three wildlife refuges – the Sacramento, Delevan and Colusa National Wildlife Refuges that comprise over 20,000 acres of critical wildlife habitat. Winter water supplied by GCID to thousands of acres of rice land also provides a rich oasis for migrating waterfowl.

GCID is an active member of the Colusa Groundwater Authority, the Glenn Groundwater Authority, and the Corning Subbasin Groundwater Sustainability Agency.

Support for Groundwater Sustainability Plans

GCID appreciates the opportunity to provide comment to your agency for Groundwater Sustainability Planning in the Sacramento Valley (Valley). As a member of three Groundwater Sustainability Agencies (GSAs) within the Valley, GCID staff have valued our participation in the development of two Draft Groundwater Sustainability Plans (GSPs) and support a collaborative approach to management across a shared resource. We support the adoption of the GSPs by each of the GSAs to meet the January 31, 2022, deadline and we look forward to continued participation during implementation.

Concern about Groundwater Surface Water Interactions

While we support the adoption of the GSPs, this communication serves as a formal written comment to highlight and express a particular area of concern that could lead

to the development of an incomplete decision framework and compromise the stability afforded to groundwater users in the various Sacramento Valley subbasins and more specifically to surface water users and senior water right holders which includes our District. We are writing to express deep concern regarding the lack of consideration in the GSPs about stream-aquifer interactions and impacts from unrestricted groundwater pumping.

This year in response to historically dry conditions, GCID and our fellow Sacramento River Settlement Contractors (SRSCs) took a multitude of voluntary actions significantly reducing the supply to our water users. These actions collaboratively supported watershed objectives in the face of declining storage and identified environmental concerns. While GCID and its partners were working daily for months with Central Valley Project (CVP) operators and State resource agencies to reduce surface water use and stabilize flows in the Sacramento River to help with Delta outflows and environmental needs, groundwater pumpers accessed the resource unabated impacting the stream flows we were actively working to stabilize.

As a significant contributor to groundwater recharge within the Valley, we only utilize that resource in years of shortage. We contribute every year to over 100,000 acre-feet (*Colusa GSP Draft, Appendix 3D, pg. 27*) of groundwater recharge even in Shasta critically dry years. However, we only utilize the resource when our surface water supplies are diminished by drought. Even with all of our voluntary surface water reductions in 2021, we only utilized 20,000 ac-ft of groundwater, while taking over 20,000 acres of land out of production to balance our supply and demand.

According to the Draft GSPs for Vina, Butte, Corning, and Colusa Subbasins, current year estimates of groundwater pumping, summarized in the table below, are over 1 million acre-feet per year (ac-ft/yr) in the region that surrounds our District.

Table 1, Groundwater Pumping in Subbasins in and around GCID (TAF)

	Historical	Current	Future, No Climate Change	Future, 2030 Climate Change	Future, 2070 Climate Change
Butte[a]	142.2	162.8	162.6	189.4	210.5
Vina[b]	243.5	209.2	215.8	225.9	238
Colusa[c]	502	499	499	525	559
Corning[d]	132.3	153		159.3	167.3
Totals (TAF)	*1020*	*1024*	*877.4*	*1099.6*	*1174.8*

Notes

[a]Butte Groundwater Sustainability Plan, Public Review Draft, Section 2, pg. 2-65

[b]Vina Groundwater Sustainability Plan, Public Final Draft, Section 2, pg. 82

[c]Colusa Groundwater Sustainability Plan, Final Draft Report, Section 3, pg. 3-96

[d]Corning Groundwater Sustainability Plan, Public Review Draft, Section 4, pg. 4-69

This groundwater pumping impacts groundwater storage as evidenced by declining groundwater levels and impacts surface-groundwater interactions as evidenced by decreased streamflow and more reaches becoming losing streams. These numbers

indicate a need to understand the origin of groundwater pumping and the potential impacts to the subbasins as water users pull from a shared resource. In looking at these pumping numbers, a particular concern that becomes palpable is that all the GSPs identify increased groundwater pumping which will result in groundwater storage impacts and will result in increased streamflow depletion.

After reviewing the documents, senior surface water rights holders and their operations seem to be a minor share of the use of the resource, but a significant contributor to the replenishment of the resource. We ask that as GSAs move from planning to implementation and continue to look for opportunities to leverage surface water over groundwater, you consider those members and partners with senior water rights and stable contracts that contribute to our shared aquifers and provide high quality environmental habitat. We look forward to better identifying and quantifying this benefit for the subbasins during implementation. Further, we ask that GSAs work with their County partners to consider land use planning and accountability.

Thank you for your consideration of these concerns. We urge you to consider language to address or at least acknowledge this issue in the GSPs. We look forward to working through this issue during implementation.

From: Vita Segalla
To: VinaGSA@gmail.com
Subject: GSP comment
Date: Thursday, October 14, 2021 2:20:47 PM

Hello -

I attended the public zoom meeting last night - 10/13. I am in agreement with those who spoke regarding the idea that the minimum threshold is too severe/low. That current suggested minimum threshold could easily present problems - and not only for those with wells. Plants and wildlife have to have accessible water. We need to preserve our urban forest and landscape and the integrity and beauty of our local region - all of which is linked to our groundwater levels and how they are accessed. Natural recharge takes time and we are in a drought period and global warming which threatens the ability to recharge an aquifer that is being extensively drained. Artificial recharging as a proposed possible option is not desirable and would become a giant legal circus.

I also would like to suggest that agriculture - our biggest user of the aquifer - be cut back to meet the need for water retention in the groundwater table. We, the residents, are modifying our usage and so should ag businesses.

Thank you -
Vita Segalla
1448 Normal Ave
Chico, CA 95928

From: Pam Stoesser
To: Vina Groundwater Sustainability Agency & Rock Creek Reclamation District
Cc: Pam Stoesser
Subject: Re: Vina GSP Comments
Date: Monday, October 18, 2021 5:26:46 PM

On Monday, October 18, 2021, 05:07:41 PM PDT, Pam Stoesser <pam.chico@sbcglobal.net> wrote:

Get Tough on Cutbacks & Conservation

I am so worried as I read through your Vina Draft GSP. So much manipulation of our water can't be good. I firmly believe that the more we mess with nature, moving our water here and there, the more damage we are creating. Please stop and reconsider that some of these damaging actions would be better achieved through conservation measures. It's time we all acknowledge the fact that there is less to go around, and we all need to cut back...especially the biggest users, agriculture. The pain of cutbacks must be shared proportionately.

Please prioritize and fund all of the proposed Conservation PMAs presented to the Vina GSA on 02 Sept 2021, including:

- Agricultural Irrigation Efficiency - mandatory
- Residential Conservation - mandatory
- Streamflow Augmentation - so good for the salmon!
- Extend Orchard Replacement - use this incentive now
- Water Recycling - make it happen asap
- Community Water Education Initiative Education and Outreach - mandatory
- Rangeland Management and Water Retention Conservation - mandatory
- Fuels Management for Watershed Health - mandatory
- Removal of Invasive Species Conservation - gradual
- Agricultural Water Allocations - phase in immediately - no pain no gain!

Please make these conservation actions mandatory where noted...NOT voluntary. A voluntary program is really an insult to the precious resource we are trying to save. Show us you are serious...because this is serious, including water allocations for large farmers.

As Amer Hussain discussed at the virtual public workshop, once a goal is set, it's awfully difficult for even the most severely over-drafted districts to reset those goals. There's too much push-back at that point. This plan needs to be tough on standards out-of-the-gate, and then ease up restrictions as we can see our plan is effective....not the reverse.

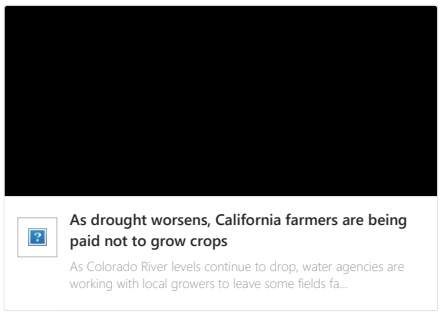
Respectfully,

Pam Stoesser
Chico Resident

From: Pam Stoesser
To: Vina Groundwater Sustainability Agency & Rock Creek Reclamation District
Subject: Vina GSP Comment
Date: Tuesday, October 19, 2021 12:35:00 PM

Very interesting concept...we already pay certain farmers not to grow. Why not try it to reduce demand on water? This could be one of the PMAs.

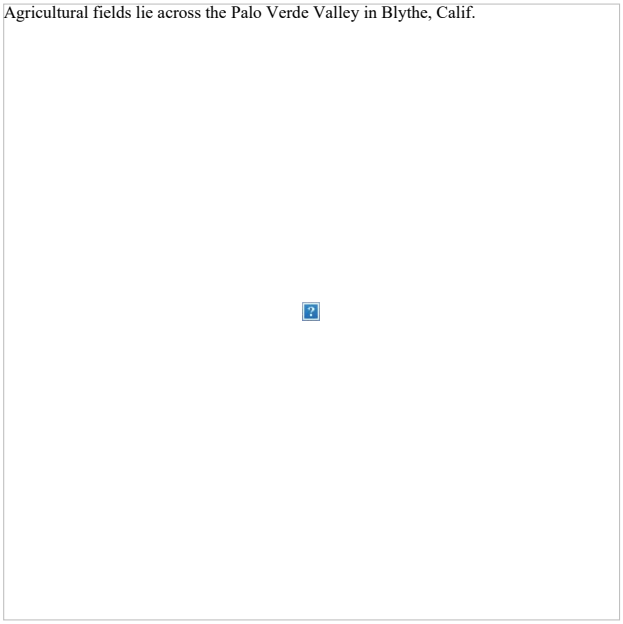
As drought worsens, California farmers are being paid not to grow crops



As drought worsens, California farmers are being paid not to grow crops

As Colorado River levels continue to drop, water agencies are working with local growers to leave some fields fa...

As drought worsens, California farmers are being paid not to grow crops



Agricultural fields lie across the Palo Verde Valley in Blythe, Calif. The Metropolitan Water District of Southern California is working with local growers to leave some fields fallow in exchange for cash payments.(Luis Sinco / Los Angeles Times)

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BY IAN JAMES STAFF WRITER OCT. 10, 2021 6 AM PT

BLYTHE, Calif. — Green fields of alfalfa and cotton rolled past as Brad Robinson drove through the desert valley where his family has farmed with water from the Colorado River for three generations. Stopping the truck, he stepped onto a dry, brown field where shriveled remnants of alfalfa crunched under his boots.The water has been temporarily shut off on a portion of Robinson's land. In exchange, he's receiving $909 this year for each acre of farmland left dry and unplanted. The water is instead staying in

Lake Mead, near Las Vegas, to help slow the unrelenting decline of the largest reservoir in the country.

Robinson and other growers in the Palo Verde Irrigation District are taking part in a new $38-million program funded by the federal Bureau of Reclamation, the Metropolitan Water District of Southern California and other water agencies in Arizona and Nevada. The farmers are paid to leave a portion of their lands dry and fallow, and the water saved over the next three years is expected to translate into 3 feet of additional water in Lake Mead, which has declined to its lowest levels since it was filled in the 1930s following the construction of Hoover Dam.

“Honestly, I think I could make more money farming. But for the sake of the Colorado River, I think it’s the right thing to do,” Robinson said. “The river’s going through a bad time right now.”

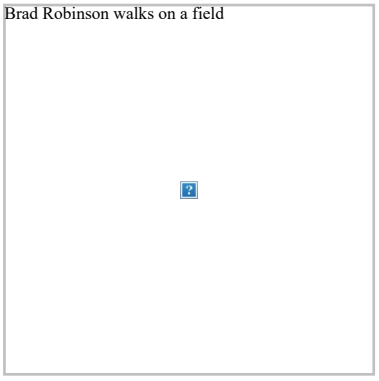
The arrangement is one of a growing number of programs that are springing up along the river to find water savings in agricultural areas. As reservoirs continue to decline, managers of water districts are looking to start or scale up similar land-fallowing programs in other areas, paying farmers not to farm temporarily on some fields and using the water to ease shortages.

Although the program in the Palo Verde Valley amounts to a minuscule boost for the shrinking Colorado River, the approach has been praised by water officials and local growers as one way of adapting to a river that yields less after years of severe drought intensified by the warming climate. Robinson and other growers in Palo Verde say they hope their participation may encourage other water agencies to start similar initiatives and enlist more farmers to fallow land to help address the increasingly dire condition of the river.

Even as they take part in the program, some farmers remain suspicious of the powerful Metropolitan Water District and its intentions in their community. The MWD has bought thousands of acres of farmland around the town of Blythe over the years and has recently agreed to buy more land, eliciting fears among farmers that the water agency in Los Angeles could one day seek to take more water and dry up a larger portion of their valley.

“They’ve got a large portion of this valley. Why do they need more?” asked farmer Charles Van Dyke.

The Colorado River has long been chronically over-allocated, with so much water diverted to supply farms and cities that the river has for decades rarely reached the sea in Mexico. Most of that diverted water — approximately 70% — irrigates farmland, and much of that water flows to thirsty crops such as hay and cotton, which are exported in large quantities.



Brad Robinson walks on a field that he has left fallow in Blythe as part of a program between area growers and the Metropolitan Water District.(Luis Sinco / Los Angeles Times)

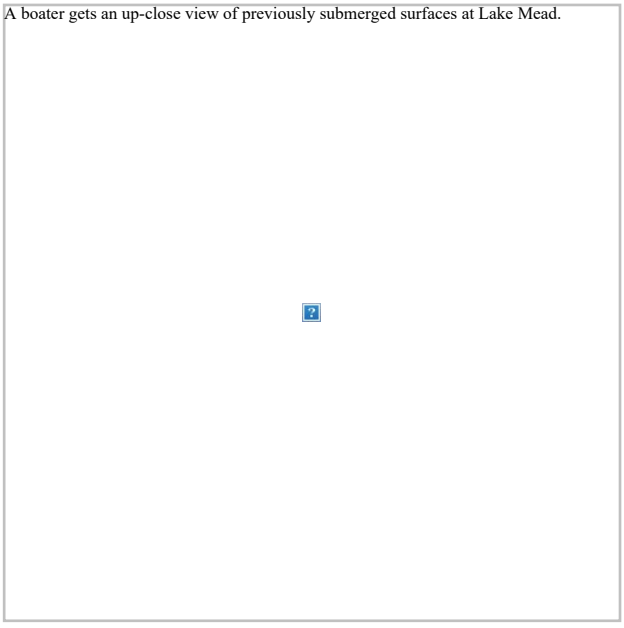
SINCE 2000, THE RIVER’S FLOW HAS SHRUNK DURING ONE OF THE DRIEST 22-YEAR PERIODS IN CENTURIES. SCIENTISTS HAVE DESCRIBED THE LAST TWO DECADES AS A MEGADROUGHT, AND ONE THAT’S BEING WORSENED BY THE HEATING OF THE PLANET WITH THE BURNING OF FOSSIL FUELS. RESEARCHERS HAVE WARNED THAT LONG-TERM “ARIDIFICATION” OF THE COLORADO RIVER BASIN MEANS THE REGION MUST ADAPT TO A RIVER THAT PROVIDES LESS WATER.

Supercharged by climate change, 'megadrought' points to drier future in ...

Global warming turned what would have been a moderate 19-year drought into one of most severe 'megadroughts' of ...

The water level in Lake Mead has declined 27 feet since January 2020. The reservoir now stands at just 34% of full capacity, placing it at a shortage level that will trigger mandatory water cutbacks next year for Arizona, Nevada and Mexico.

A boater gets an up-close view of previously submerged surfaces at Lake Mead.



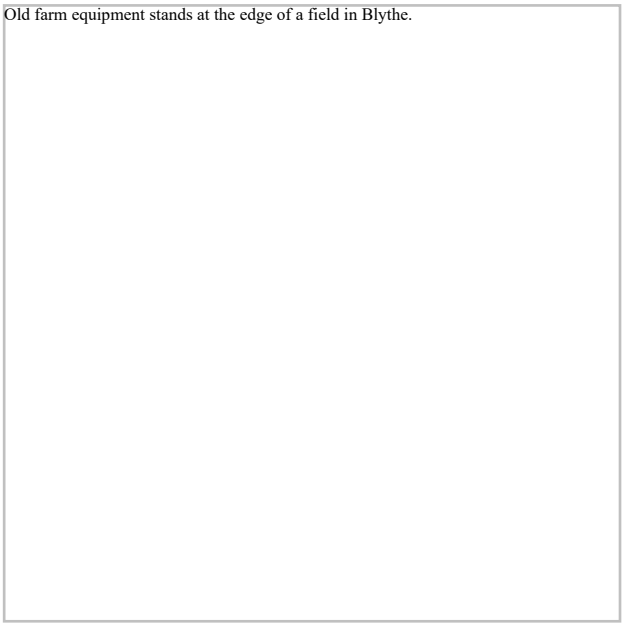
A boater gets a view of previously submerged surfaces at Lake Mead. The lake's water level has dropped 27 feet since January 2020.(Allen J. Schaben / Los Angeles Times)

The lake's water level is projected to continue falling. The latest estimates from the federal government show the water in Lake Mead could drop an additional 30 feet by August 2023, a level that would require water cuts in California.

Since 2005, Robinson and other farmers in the Palo Verde Valley have left portions of their lands dry and unplanted under a 35-year deal with the Metropolitan Water District, which has paid them more than $180 million for water that was sent flowing through the Colorado River Aqueduct to cities in Southern California. Under the new deal, much of the water will instead be left in Lake Mead to try to reduce risks of the reservoir falling to critically low levels.

For managers of the MWD, the program offers flexibility, enabling them to pay for more land-fallowing in years when they need more water.

Each year, the MWD calls for a certain percentage of the valley's farmlands, up to a maximum of 28%, to be left fallow. Starting this year, the water from a portion of those lands is staying in Lake Mead.



Old farm equipment stands at the edge of a field in Blythe. Since 2005, farmers in the Palo Verde Valley have left portions of their lands dry and unplanted under a 35-year deal with the Metropolitan Water District.(Luis Sinco / Los Angeles Times)

Similar programs have taken shape in several areas along the Colorado River.

Last year, the MWD began paying farmers in the smaller Bard Water District not to plant water-intensive crops such as alfalfa in the spring and summer, while they continue growing higher-value winter crops such as lettuce, broccoli and cauliflower.

And the MWD's board is considering paying for seasonal fallowing under another proposed agreement with the Quechan Indian Tribe, whose reservation borders Arizona, California and Mexico, and includes farms that produce hay and vegetable crops.

Other initiatives are underway across the river in Arizona. Under agreements aimed at slowing the decline of Lake Mead, leaders of the Colorado River Indian Tribes have been leaving some farmlands dry, and landowners in the Mohave Valley Irrigation and Drainage District have also been forgoing some water in exchange for payments.

Colorado River water irrigates a farm field in Blythe.(Luis Sinco / Los Angeles Times)

To support more fallowing of land in the Palo Verde Valley, the federal government is contributing half the funding — $19 million — while the rest is coming from the Central Arizona Project, the Southern Nevada Water Authority and the MWD.

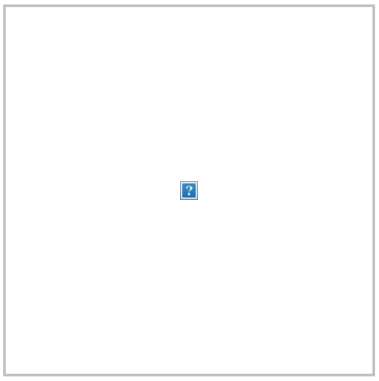
“This is just the beginning,” MWD General Manager Adel Hagekhalil said when the deal was announced in August. “We’re working to develop other innovative ideas to keep as much water as possible in Lake Mead.”

The program demonstrates how urban and agricultural water districts can work together to deal with shortages, said Bill Hasencamp, MWD’s manager of Colorado River resources.

“A lot of other states and other regions are looking to those programs as examples of what can be done elsewhere,” Hasencamp said. “We want to set a good example of how farmland can be productive in the era of shrinking water supplies.”

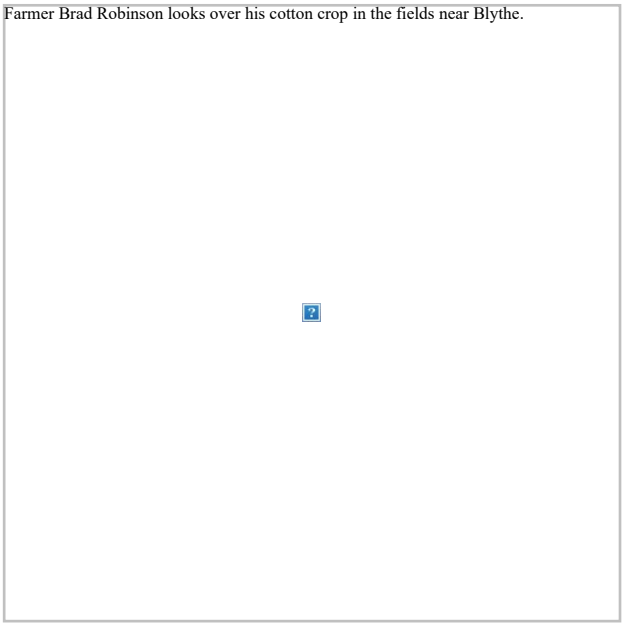
Reducing reliance on the Colorado River, he said, will require bigger water-saving efforts in cities and farming communities alike. The MWD supplies water to cities and water districts across Southern California that serve about 19 million people. The agency’s figures show that between 2011 and 2020, its water use declined about 7% — in part thanks to the lasting effects of conservation campaigns during the 2012-2016 drought.

Because the latest estimates show Lake Mead is likely to continue declining, Hasencamp said, “we’re going to need to do more.”



The Colorado River churns through the Palo Verde Diversion Dam near Blythe. Some river water is channeled from the dam to local farm fields.(Luis Sinco / Los Angeles Times)

Robinson, who is a board member of the Palo Verde Irrigation District, runs a family business that his grandfather founded in 1960. He now farms on about 3,200 acres around Blythe, including land he owns and leases. His fields produce cotton that is exported, alfalfa that is trucked to dairies in California, Bermuda grass that is baled to feed horses, and honeydews and other melons that are sold in supermarkets.



Farmer Brad Robinson looks over his cotton crop in the fields near Blythe.(Luis Sinco / Los Angeles Times)

“In a perfect world, a farmer wants to farm,” Robinson said. “But the reality of the situation is that we have a certain amount of population and people, and don’t have unlimited water. So ... the two sides are going to have to work together.”

The fields that are left dry are rotated every one to five years. And for the farmers, the cash payments provide a stable chunk of income that isn’t subject to price swings.

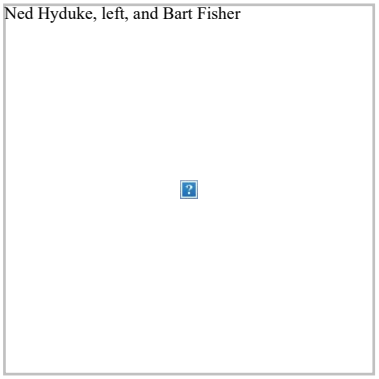
“We’re not getting rich off this. But it helps enough on the bad years,” when crop prices are low, Robinson said. “I’ve never laid anybody off because of the fallow program, and I never intend to do so.”

The program is far from a cure-all, and will need to be combined with other steps, said Chuck Cullom, manager of Colorado River programs at the Central Arizona Project. For example, water agencies in Arizona and Nevada have offered to invest in a proposed water recycling project in Southern California. And Cullom’s agency has been investing in testing water-saving irrigation technologies on Arizona farms.

“We all share the river. We all share risk,” Cullom said. “As the system becomes more vulnerable, we need all of the sectors to work together.”

The sorts of deals that temporarily leave farmland dry help by adding flexibility to the water system, but they also raise questions as the West grapples with the effects of climate change, including hotter, more intense droughts, said Newsha Ajami, director of urban water policy at Stanford University.

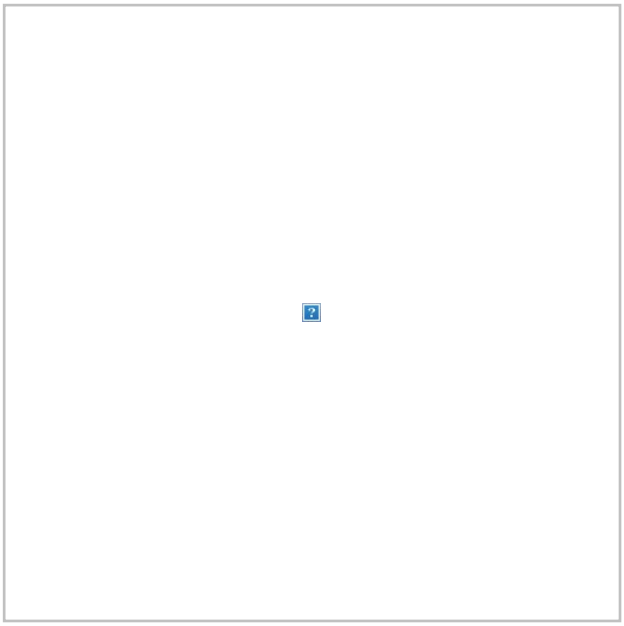
“If you’re experiencing drought after drought, and the droughts are getting hotter and drier, how long can you fallow land?” Ajami said. “I think it’s a Band-Aid. It’s a temporary solution to a more long-term problem we are having.”



Ned Hyduke, left, general manager of the Palo Verde Irrigation District, looks at a map of fallow farm fields around Blythe with Bart Fisher, the vice president of the irrigation district board.(Luis Sinco / Los Angeles Times)

Some Arizona farmers are already facing cutbacks in water deliveries from the river because they hold the lowest-priority water rights.

The farmers in Blythe, in contrast, hold some of the oldest water rights on the river, dating to 1877, when investor Thomas Blythe filed a claim to use water from the river. Based on that history, the growers of the Palo Verde Valley have a first-priority position among California water districts and would be among the last in line for cuts.



Farmer Bart Fisher shares a laugh with a worker while looking over seeding operations at one of his fields in Blythe.(Luis Sinco / Los Angeles Times)

“We should be the last ones to worry about water,” said Bart Fisher, a farmer who is vice president of the irrigation district board. “But if there’s no water in the river, it really doesn’t matter.”

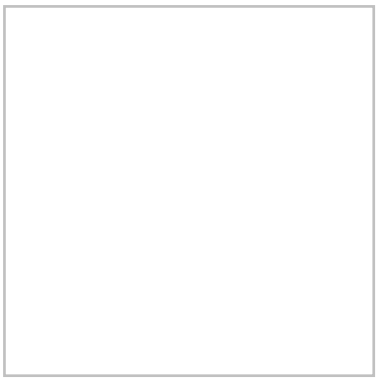
Fisher, who runs a farming business that his grandfather founded in 1917, said even with such solid water rights, he and other growers have reason to be concerned about the river’s worsening crisis.

“It looks grim, actually. I was born in Blythe and I’ve been here all my life, and we’ve never been so threatened,” Fisher said, looking across a dry field where bits of garlic, remnants of the last harvest, were scattered in the soil.

He also grows broccoli, melons, wheat and hay, all of which rely on Colorado River water flowing through the canals.

“We could conceivably come to a place on the Colorado River where there is not water for anybody’s needs,” Fisher said. “We’re going to diminish reservoir levels to levels that we haven’t seen before, and the question then is, how do we respond?”

He said he hopes to see more deals emerge. If four or five other agricultural water districts pitch in, he said, their contributions could quickly add up to 10 feet or 15 feet of additional water in Lake Mead, which would make a big difference.



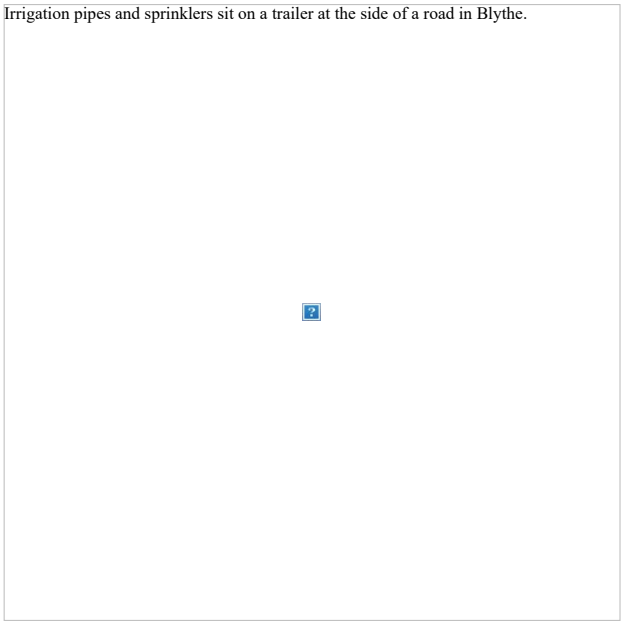
A formerly sunken bench rests on the shore near the Hemenway Harbor launch ramp amid signs of the drought's effect on Lake Mead in Nevada.(Allen J. Schaben / Los Angeles Times)

But even as Fisher and other farmers continue to participate in the MWD program and receive payments, they've also voiced concerns.

Under the deal, the MWD provided $6 million to establish a locally run community improvement fund in Blythe that has provided grants and business loans in an effort to boost the local economy. Fisher said in retrospect, that one-time payment hasn't been enough.

Fisher drove down the main avenue, Hobsonway, where he passed shuttered businesses, including a motel, gas station, restaurant and several stores, all with boarded-up windows.

"I think we would do it a little differently today," Fisher said. "We would ask for more community support" from the MWD.



Irrigation pipes and sprinklers sit on a trailer at the side of a road in Blythe.

Irrigation pipes and sprinklers sit on a trailer at the side of a road in Blythe.(Luis Sinco / Los Angeles Times)

To the farmers' dismay, the MWD has bought large pieces of farmland in the Palo Verde Valley. The largest purchase, 12,000 acres in 2015, made the MWD the largest landowner in the irrigation district. The MWD says it now owns about 29,000 acres in the area.

The agency leases the land that isn't left dry to growers, offering reduced rent to farmers who plant crops that consume less water.

The problem with the MWD owning so much land, Fisher said, is that it ends up paying less to landowners in the valley. He said this deprives the area of approximately $6 million to $8 million annually that would otherwise be going to local businesses and fueling the economy.

"When [the MWD] fallows their own land, they keep the money. So it doesn't make its way into our community. And it's a lot for a little community like this," Fisher said.

Worried by the MWD's land dealings, leaders of the Palo Verde Irrigation District sued the agency in 2017, but then dropped the lawsuit in 2018.

Recently, farmers objected when they learned of an MWD proposal to buy an additional 702-acre property from Cox Family Farms. The MWD board endorsed the purchase last month.

"We've told them that we think it's a very bad idea. It's bad for the community, and frankly, it's a predatory practice on their part," Fisher said. "It's just disappointing. It's sort of counter to the spirit by which we originally engaged with them to negotiate the fallow program."

At the MWD, however, officials have discussed the potential for additional purchases of farmland along the river in areas with high-priority senior rights as a way to reduce water use in agriculture and free up water for urban Southern California in dry times.

"It would allow us to play a long game with climate change by holding and leasing land for decades," Brad Coffey, manager of water resources management, said during a September committee meeting.

Board members discussed whether to actively pursue future land purchases.

"I believe that if someone wants to sell us that land, that we should always answer the door," board member Larry Dick said. "We'll do it responsibly. We're not going to take that land and take it out of production forever."

Russell Lefevre, another board member, asked how the land purchases are viewed by the farmers.

"They did express concern about us buying land," said Hasencamp, MWD's manager of Colorado River resources. "We are working with them to try to alleviate some of those concerns."

Lefevre said he would support seeking out other land deals. He said he wonders "if we can move this methodology to other areas," such as the Coachella and Imperial valleys.

Thomas, Autum

From: Annette Faurote <afaurote@gmail.com>
Sent: Tuesday, October 19, 2021 3:16 PM
To: vinagsa@gmail.com
Subject: Vina GSP Comments

Thank you for considering our comments. Please make these comments part of the permanent public record.

I am concerned that the Vina GSA proposal doesn't go far enough in addressing sustainability. In contrast to the Vina GSA proposal, serious sustainability begins now, today. Not after we have pumped down our water table to dangerous depths. We need to seriously consider the direction we are heading with climate change and longer droughts. (Currently, next year is predicted to be a La Nina year refer to: https://www.climate.gov/news-features/blogs/enso/july-2021-enso-update-la-ni%C3%B1a-watch) which means next year will also likely be a drought). The current VINA proposal does not fully address the climate change reality and the prolonged droughts that accompany climate change.

The figures **on page 107** discussing water surface elevation shows that our water table is trending downward. It discusses the MO and MT. As defined here **the "operation range" is too deep.** With this proposed "operational range" there is the very real possibility that we could lose deep rooted trees, part of the Chico Urban forest. And also, and very seriously, we would lose too many domestic wells. **The operational range is much too deep and should be based on early levels (perhaps 2000 or 2005, at least 2010) before we pumped our aquifer to the current low levels.**

The current proposals heavily favour agriculture, which we all know is important, but equally important are our human community, our domestic wells and urban forest.

Has there been an Environmental Impact Report (EIR)? It would seem by substantially lowering the aquifer as proposed in VINA GSA we are affecting the local ecosystems as well as disrupting homeowners that use wells.

As said in comments by The Nature Conservancy,

> "Potential Effects on Environmental Beneficial Users. SGMA requires that potential effects on GDEs and environmental surface water users be described when defining undesirable results. " Because effects on plants and animals are difficult and sometimes impossible to reverse, we recommend erring on the side of caution to preserve sufficient groundwater conditions to sustain GDEs and ISWs."
>
> 215.5 Says "Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of surface water" must be seriously considered. I don't feel this has been adequately addressed. The report says in line 1740: "Relatively shallow groundwater in some areas of the subbasin support Groundwater Dependent Ecosystems and stream flows".
>
> **Thus, an EIR must be completed to understand the changes we are considering.**

Thank you for addressing all of the above issues.

Sincerely,

Annette Faurote
Chico, Ca 95928

Sent from Mail for Windows

From: David A Eaton
To: vinagsa@gmail.com
Cc: David A Eaton
Subject: comments | draft of Vina Basin Sustainable Groundwater Plan (SGP)
Date: Tuesday, October 19, 2021 11:02:56 PM

Greetings colleagues. Below are my comments on the draft **Vina Basin Sustainable Groundwater Plan** (SGP).
Thank you for the chance to contribute to these deliberations.
Sincerely, David Eaton (1080 East Lassen Avenue, Chico CA 95928)

COMMENTS

A. The "Measurable Objective" of 100 feet above mean sea level for the groundwater level is too LOW. The level of the past twenty years is already diminished from historical 'normals'. The downward trend of the aquifer is evident in the materials provided.
We should not be depleting the aquifer *more* under the Draft SGP. Rather **let us restore our aquifer to** something resembling its historic average: let us say something like **140 feet above sea level**.

B. The hydrological consultants cited estimate **current pumping from the Vina sub-basin is 244k acre-feet per year**, with all but 20k acre-feet for agricultural use. They estimate the **current overdraft as about 10k acre-feet per year**.
They then propose a **sustainable yield estimate at 233k acre-feet per year**. BUT this is **dangerously high**. This estimate is based on a recent period in which the aquifer has been in continued decline, and especially if recent and projected climatic trends continue, pumping at this level will bring **further reduction of the groundwater level**.
Please, **let us adopt a more conservative estimate for this sustained yield**! Using a modest ballpark figure of eighteen percent reduction in overall water use going forward, for example, as recently proposed by Governor Newsom, this could be about **200,000 acre-feet per year**.
Our groundwater is an irreplaceable, finite, and precious resource in our part of California. **Let us protect it effectively for generations to come.**
Thank you for your time and consideration! I look forward to learning what steps the members of your commission take to protect our shared resources, and in the meantime I thank you for your time and consideration.
Sincerely, David Eaton, PhD, MPH (Department of Anthropology, CSU Chico, email daeaton@csuchico.edu)

Thomas, Autum

From: Debra Lucero <debra@debralucero.us>
Sent: Tuesday, October 19, 2021 5:37 PM
To: VinaGSA@gmail.com
Subject: Comments on the Vina GSA Plan

1. I remain concerned about the low levels of the MO's and the MT's in this plan.
This is not an aspirational plan and perhaps one that will further be a detriment to our shared aquifer. It is quite concerning that our beloved valley oaks and other heritage trees that are non-irrigated and are icons of Butte County are not being considered. There will be domestic well failures, chronic lowering of groundwater levels, die-off of groundwater dependent ecosystems.

2. I remain concerned about the 10,000AF water budget.
I would like to understand how this number was arrived at; I was told it was set via DWR's climate change model that actually predicts more rainfall in the upcoming years. I would like to see a drier model utilized as well as a wetter model. We should have at least two options but irregardless - a complete understanding as to how this water budget was set is needed.

3. **I remain concerned about the undue influence of the Rock Creek Reclamation District on the Vina GSA Board when joint meetings are held.**
The balance of power is clearly out of whack - leaning heavily toward industrial agriculturalists leaving 110,000 residents in the City of Chico with little to no voice and small farmers and domestic well owners with even less voice.

4. I remain concerned there are no "triggering" conditions to initiate conservation or demand reduction PMA's.
These need to be spelled out.

5. I remain concerned that the current drought has had no forbearance on this process.
We are told by technical staff and others that this need not be a concern since this is a long-range planning process yet it has been mentioned that we've already hit some of our lowest MT's. Is this true?

6. I remain concerned about the lack of current well data and the timeliness of the data.
There needs to be better coordination between environmental health, BC Water & Resource Conservation Department and DWR.

7. I remain concerned about the lack of current and fluid data regarding output of local water via groundwater transfers, riparian rights, SGMA credits, etc.

8. I remain concerned about the two consecutive dry years in a row to trigger MT's.
This seems irresponsible - particularly in a drought like we're in now. How many domestic wells have to go dry? Is this a loophole? Who is responsible for dry domestic well users or farmers? Who pays for this in the end if the Vina GSA sets MO's and MT's that are so low we begin to see negative effects?

9. I remain concerned about the one well for groundwater quality management in the North Vina subbasin.
Is this enough?

10. I remain concerned there is no mention of the groundwater markets being discussed up and down the state.
There is no analysis of this in the Vina GSP and it is critical to our area. It will be a reality to us in the north state to supply those in the San Joaquin Valley and Southern California with water. How will it affect pumping in our subbasins? How will water rights holders in Butte County participate? What are the possibilities? How will this affect our outflows and our modeling?

11. I remain concerned about the Vina SHAC process.
There have been at least two occasions where significant material was presented to the Vina GSA Board of Directors without review by the SHAC. Several members have expressed discontent with this process.

Debra Lucero
Butte County Supervisor District 2
dlucero@buttecounty.net
www.debralucero.us
530-552-2030

Thomas, Autum

From: gracefultherapy@aol.com
Sent: Tuesday, October 19, 2021 6:44 PM
To: VinaGSA@gmail.com
Subject: Vina GSP Comments

To whom this is directed:

1. I remain concerned about the low levels of the MO's and the MT's in this plan.

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Thomas, Autum

From: Giovanna Bartels <vannanancy@yahoo.com>
Sent: Tuesday, October 19, 2021 5:43 PM
To: VinaGSA@gmail.com
Subject: Vina GSP Comments

As a participant in Vine GSA's. Groundwater Sustainability Plans (Plan) October 13, 2021 Zoom meeting I offer the follow:

Protecting residential wells from running dry should be a top concern of the GSA, yet the Plan actually sets acceptable percentages for their failures. This is unacceptable. Thereby, instituting across the board water conservation actions and raising the Plan's "minimum groundwater level thresholds" to protect residents and the environment must be facilitated. With water conservation plans and methods celebrating decades of use and success it is shocking and absurd that the GSA representatives seemed opposed in supporting them and were solely focused on the Plan.

I was disturbed by the GSA representatives inability to answer a question as to whether groundwater rights holders would have equal access to injected surface water into the aquifer. Clearly, the public is not properly informed on this important issue.

Finally, the public was left confused as to who could be in charge of handling future Plans and updates. It was said several times that residents would have a voice in future plans during review periods,however this would not be the case if a private water district should take over this duty and Institute a 1-vote per acre system. Knowing who and how a public trust resource is managed is essential to the public's rights and it should be mandatory that this be spelled out to current water right's holders.

Respectfully,
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