Vina Groundwater Sustainability Agency (GSA)
Stakeholder Advisory Committee (SHAC)
Meeting

Date: Wednesday, March 25, 2026

Time: 9:00 AM -12:00 PM

Location: Butte County Library, Chico Branch, 1108 Sherman Avenue, Chico, CA 95926

Or Join the Vina GSA SHAC Meeting via Zoom

Meeting ID: 814 0243 0033

Join via phone: +1 669 900 6833

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MEETING AGENDA

March 25, 2026

1. Call to Order and Roll Call

a. Election of Chair and Vice Chair.

2. Business from the Floor

The public and Stakeholder Advisory Committee (SHAC) members will have an opportunity to comment on items not on the agenda and that are relevant to the SHAC. Committee members and Management Committee staff are not required to respond to any issues raised during the public comment period. Commenters are asked to respect differing perspectives and to keep remarks within three minutes.

3. *Review and Approval of 12/3/2025 SHAC Meeting Minutes

Requested Action: Approve the 12/3/2025 meeting minutes.

4. ***Annual Status of the Vina Subbasin Brochure**

The SHAC will receive a presentation on the Annual Status of the Vina Subbasin brochure for the 2025 water year which highlights information contained in the 2025 Annual Report developed per Sustainable Groundwater Management (SGMA) requirements. ***(Report – Eddy Teasdale, Luhdorff & Scalmanini, Consulting Engineers)***

Requested Action: Accept as information.

5 *Consideration of Approach to Projects and Management Actions for the GSP Periodic Evaluation

The SHAC will receive a presentation on Projects and Management Actions (PMAs) as part of the Vina Groundwater Sustainability Plan (GSP) Periodic Evaluation work. The presentation will review the PMAs identified in the 2022 Vina GSP and introduce a proposed approach for categorizing PMAs to improve tracking

and reporting in future Annual Reports and the Periodic Evaluation. The discussion will focus on identifying projects that represent the GSA's Plan Implementation strategy and distinguishing them from other projects that may provide ancillary groundwater benefits. **(Report – Christina Buck, Butte County; Ryan Fulton, Larry Walker Associates)**

Requested Action: Review and discuss the proposed PMA classification and provide feedback to staff and consultant team.

6. Sustainable Groundwater Management Grant Program Project Recap Presentations

6.1 *Feasibility of Enhanced Recharge in the Lindo Channel - Project Recap

The SHAC will receive a final project update on the Lindo Channel Groundwater Recharge Alternative Feasibility Analysis, including field results, modeling, recharge potential, flow thresholds, and potential infrastructure, permitting, and operational considerations for future implementation. The study concludes March 31, 2026. ***(Report – Becky Fairbanks, GSA Project Manager; Joe Turner, Geosyntec; David Jaffee, West Yost Associates)***

Requested Action: Accept as information.

6.2 *Demand Reduction Strategies Project Recap

The SHAC will receive a presentation of the main outcomes from the Demand Reduction Strategies two pilot projects: Extended Orchard Replacement and Precision Irrigation**.** The study concludes March 31, 2026. ***(Report – Tovey Giezentanner, AGUBC Project Manager; Joel Kimmelshue, Land IQ)***

Requested Action: Accept as information.

6.3 *Surface Water Supplies Feasibility Analysis Recap

The SHAC will receive a presentation on the main outcomes from the feasibility analysis of two water supply projects: 1. South Vina Extension - would utilize Western Canal Water District or Table A water to irrigate parcels in south Vina, 2. Ridge to Valley **–** would utilize Paradise Irrigation District water to irrigate parcels along Comanche Creek south of Chico. The report is available on the project webpage. ***(Report – Christina Buck, Butte County; Maddie Munson, Water and Land Solutions)***

Requested Action: Accept as information.

6.4 *Inter-Basin Coordination Analysis Recap

The SHAC will receive a presentation on highlights from the Joint Groundwater Sustainability Plan (GSP) Evaluation for the North Sacramento River Corridor as reported in the finalized Technical Memo and webinar available online: Inter-Basin Coordination Analysis and Modeling Project - Implemented by Butte County - Vina Groundwater Sustainability Agency**. *(Report – Christina Buck, Butte County)***

Requested Action: Accept as information.

7. **GSA Program Manager Update** ***(Verbal Report – Kamie Loeser, Management Committee on behalf of the Program Manager)***

8. **SHAC Future Agenda Requests** – SHAC members may verbally request an item to be agendized at a future meeting. After stating what the item would be, a majority vote of the SHAC is needed in order for the Management Committee to agendize the item. SHAC members may also submit requests in writing to the GSA Program Manager to bring forward to the SHAC for consideration on a future agenda.

9. **ADJOURNMENT:**

   The Committee will adjourn to their next meeting**, Wednesday, April 22, 2026.**

   *Materials included in agenda packet

Vina Groundwater Sustainability Agency (GSA)
Stakeholder Advisory Committee (SHAC)
Special Meeting Minutes

Date: Wednesday, December 3, 2025
Time: 9:00 AM -12:00 PM
Location: Butte County Library, Chico Branch,

1108 Sherman Avenue, Chico, CA 95926

1. **CALL TO ORDER AND ROLL CALL** – meeting was called to order at 9:00 am.

   Committee members present: Greg Sohnrey, Samantha Lewis, Joanne Parsley, Jim Graydon, Holly Swan, Evan Markey, and Todd Greene.

   Committee Members absent: Anne Dawson, Bill Chance, and Danny Paiva.

   Staff Present: Dillon McGregor, GSA Program Manager; Becky Fairbanks, SGM Grant Manager; Kamie Loeser, Butte County Water & Resource Conservation.

2. **BUSINESS FROM THE FLOOR**

   The public and SHAC members had an opportunity to comment on items not on the agenda and that are relevant to the SHAC. Committee members and Management Committee staff were not required to respond to any issues raised during the public comment period. Commenters were asked to respect differing perspectives and to keep remarks within three minutes.

   Public Comment(s):

   - Jim Brobeck

3. ***REVIEW AND APPROVAL OF 9-24-25 SHAC MEETING MINUTES**

   Action: Approve the 9-24-25 meeting minutes

   Public Comment(s): None

   Motion: Committee Member Markey made a motion to approve the 9/24/25 meeting minutes. Committee Member Greg Sohnrey seconded that motion.

   The motion passed as follows:

   AYES: Committee Members Sohnrey, Swan, Graydon, Markey, Greene, Vice Chair Parsley, and Chair Lewis.
   ABSENT: Committee Members Dawson and Chance.

4. ***GROUNDWATER SUSTAINABILITY PLAN (GSP) STAKEHOLDER MEETING FEEDBACK**

   The Committee received a presentation summarizing feedback from the Fall 2025 stakeholder meetings conducted as part of the Vina GSP Periodic Evaluation process. The update provided an overview of the topics shared with stakeholders, the key themes and perspectives gathered across the domestic well, agricultural, and environmental groups, and how this feedback will inform upcoming technical work, Minimum Threshold (MT) considerations, Representative Monitoring Site (RMS) refinements, and potential

development of a Domestic Well Mitigation Program framework. **(Report – Becky Fairbanks, GSA Project Manager)**

Requested Action:
Feedback and public perspectives received from the SHAC and other stakeholder meetings will be provided to both the Vina GSA and Rock Creek Reclamation District GSA Boards of Directors during a joint meeting to inform the approach and next steps in the Periodic Evaluation process. Staff is seeking SHAC input and direction on the following items:

1. **Next Steps regarding Minimum Threshold (MT) Methodology and RMS Network Development**
   Provide direction to staff and Larry Walker Associates (LWA) on whether to proceed with calculating Minimum Thresholds (MTs) for both Groundwater Levels (GWL) and Interconnected Surface Waters (ISW), using the two MT-setting approaches developed for the GWL SMC:
   - **Option 1:** Recalculate MTs using the updated domestic well inventory and revised RMS polygons; and
   - **Option 2:** Set MTs based on historical minimum groundwater levels minus an agreed-upon buffer.

Staff and LWA would document the results of the analysis and make them available for the public to digest in advance of bringing the topics to the SHAC and GSA Boards for recommendations and decision-making in the coming months.

2. **Domestic Well Mitigation Program Framework**
   Provide direction on the near-term development of a framework for a Domestic Well Mitigation Program. Discuss possible scope options, timing, cost implications, and anticipated level of effort.

Public Comment(s):

- Jim Brobeck
- Bruce Smith
- Lester Mecena
- Susan Shrader
- Ron Alexander

Action: Staff provided a presentation to the Committee and discussion ensued. The committee provided feedback that will be presented at the December 10th Board Meeting.

5. *SUSTAINABLE GROUNDWATER MANAGEMENT (SGM) GRANT PROJECT UPDATE (Written Report)

Informational item only. Accepted as information.

6. GSA PROGRAM MANAGER UPDATE (Verbal Report – Dillon McGregor, Vina GSA Program Manager)

The program manager provided an update on the following items:

- Open SHAC positions.
- Non-Agricultural Domestic Well User Stakeholder Board position vacancy.
- Change in location for the Vina GSA Board meeting on December 10th and that the meeting would be a joint meeting with Rock Creek Reclamation District GSA.
- The Vina GSA Fee Appeal Process is active and on the website.
- The GSA has new educational materials that are being distributed.

7. SHAC FUTURE AGENDA REQUESTS – SHAC members could verbally request an item to be agendized at a future meeting.

No requests were received.

8. ADJOURNMENT:

The meeting adjourned at 10:20 AM to their next meeting on Wednesday, **January 28th, 2026.**

Water Year 2025 (October 2024 - September 2025)

ANNUAL STATUS OF THE VINA SUBBASIN

Status of Groundwater in Our Community

The Vina and Rock Creek Groundwater Sustainability Agencies (GSAs) are responsible for monitoring, tracking and annually reporting on groundwater levels, storage and quality in the basin. The GSAs are also required to understand whether groundwater pumping is causing land subsidence and affecting creeks, streams and other surface water.

The 2022 Vina Subbasin Groundwater Sustainability Plan (GSP) is a comprehensive, dynamic plan that is guiding sustainable groundwater management efforts in the Vina Subbasin from 2022 - 2042. It establishes a standard for sustainability of groundwater management and use and determines how the basin will achieve this standard by 2042.

The sustainability goal of the subbasin is to ensure that groundwater is managed to provide a water supply of adequate quantity and quality to support rural areas and communities, the agricultural economic base of the region, and environmental uses now and in the future. Groundwater management must also be adaptive. As conditions change and more is learned, the GSP will be amended. New information will also be documented in GSP Periodic Evaluations that are completed at least every five years.

Each year the GSAs must provide an Annual Report to comply with the Sustainable Groundwater Management Act (SGMA), and provide a snapshot of groundwater conditions from the previous water year (Oct. 1 - Sept. 30). The Annual Report tracks the subbasin's progress towards meeting defined sustainability goals and provides a status update on project implementation.

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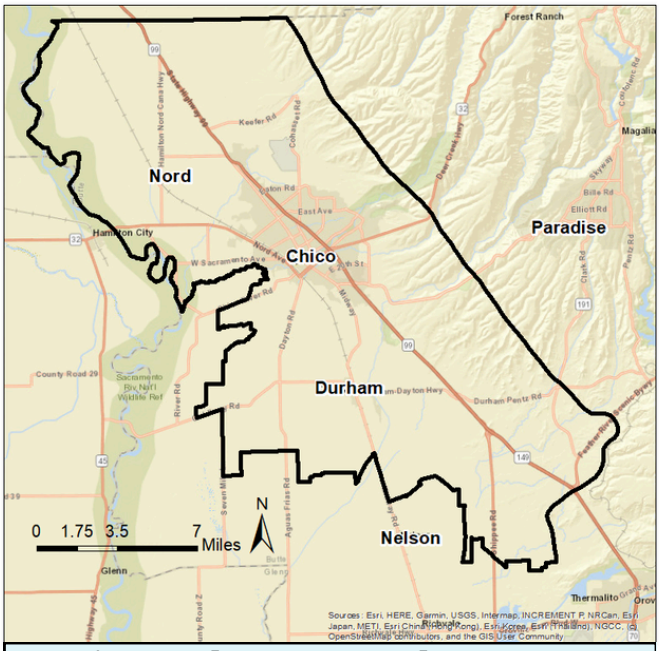


2025 - An Above Normal Water Year

Water Year 2025, classified as an Above Normal year, marked the third non-dry water year in a row. Coming off the heels of an intense and severe 3 year drought, the past 3 years have brought some much-needed relief to our region and a valuable boost to groundwater levels.

This wet pattern stands out is a unique occurrence in the region's climate history, and although uncommon, consecutive wet years are especially valuable because they offer extended opportunities for surface water use and groundwater recharge. Also, with more surface water available, there is a reduced reliance on groundwater pumping for agricultural needs. In wetter water years, the water demand needed by crops is met further into the growing season through surface water supplies, before groundwater is used. Ongoing groundwater level monitoring helps the GSA track groundwater storage in the aquifers, providing critical data to guide adaptive management and support more resilient water supplies.

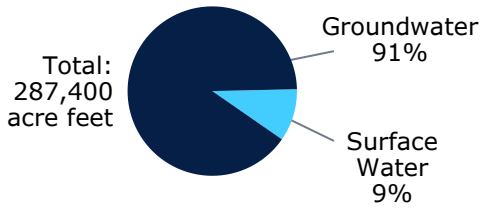
WATER USE IN THE SUBBASIN

The majority of residents within the subbasin use groundwater for irrigation, drinking water and commercial needs, although some areas depend on surface water for irrigation.

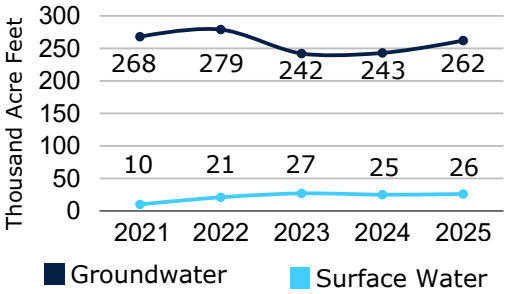
Groundwater in the subbasin is primarily used for irrigation, followed by the municipal sector (Cal Water - Chico and the Durham Irrigation District). A small percentage is also used by the rural residential sector representing those with private wells. Since the first annual report developed for the 2020 Water Year, this trend has remained consistent.

Surface water supplies, such as those from Butte Creek, are primarily used for irrigation when accessible. Maintaining or expanding access to surface water supplies is crucial for preserving the subbasin's sustainability.

2025 Water Use by Type



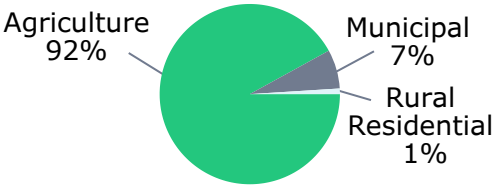
2021 - 2025
Groundwater vs. Surface Water Use



Total Groundwater Use

Total groundwater use within the subbasin was estimated to be about 262 thousand acre-feet (TAF) in 2025, a little higher than the historical 25-year average of 245 TAF. The total annual groundwater extraction volumes were estimated using the water use analysis approach based on land use, described in detail in the report. The remaining volumes were estimated using pumping reports where available.

2025 Groundwater Use by Sector

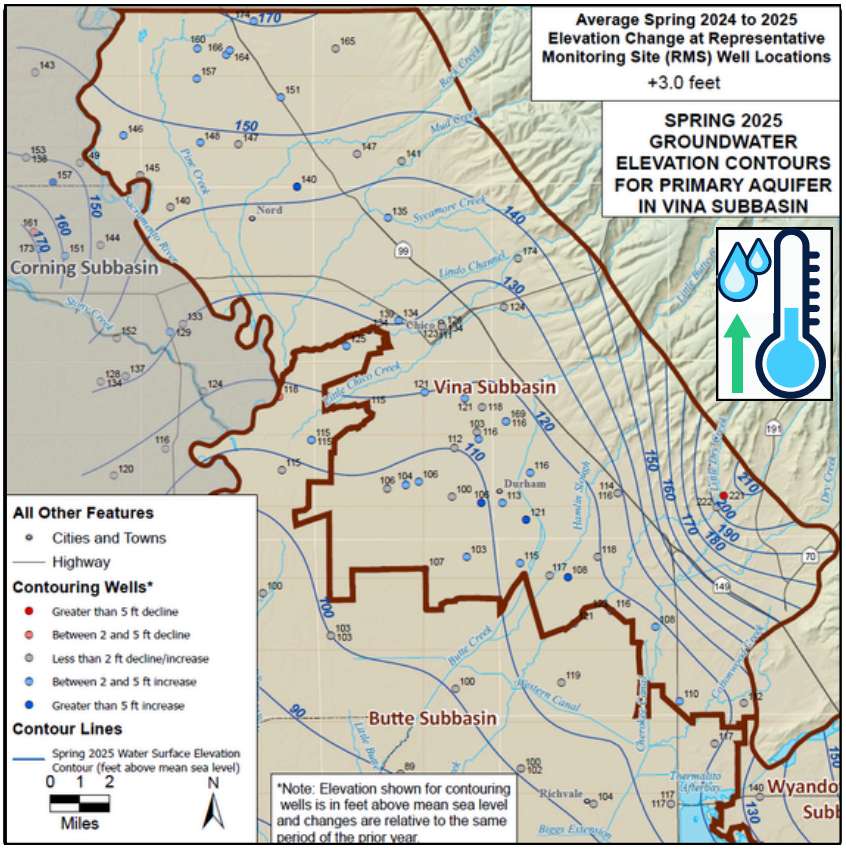


Groundwater Levels

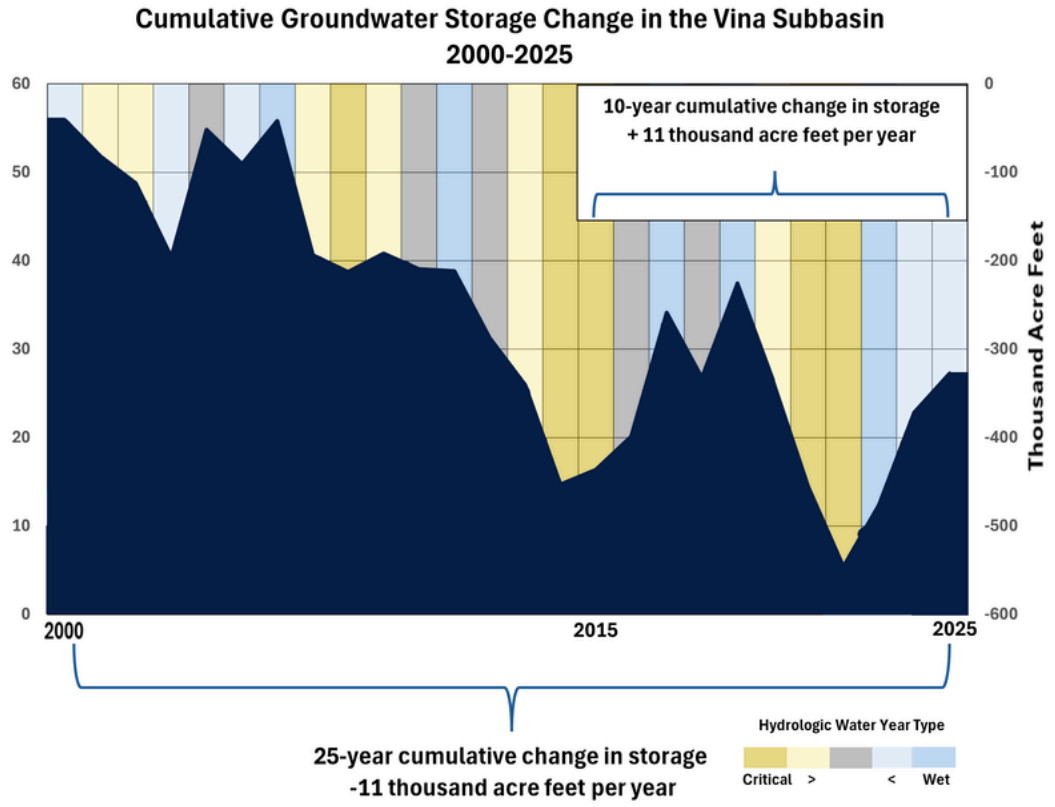
Groundwater levels are measured in 17 wells throughout the subbasin at the representative monitoring sites (RMS).

Overall RMS groundwater levels were approximately 3 feet higher in the spring of 2025 compared to spring of 2024 and exceeded their measurable objectives in spring of 2025. All spring groundwater levels in the RMS wells were well above their measurable objectives. Across both spring and fall, all RMS wells had water levels well above their minimum thresholds. In fall 2025, groundwater levels at the RMS were, on average, 11 feet above their historical fall lows.

Groundwater levels in the Vina Subbasin have generally shown a declining trend over the past 21 years, particularly in and around Chico and Durham where wells have recorded declines of 18 to 35 feet during this period. The GSA is taking steps to address this issue, as detailed in the GSP implementation section of this report.



Observations indicate that groundwater conditions are on track to meet the first 5-year interim milestones set for 2027.The above average conditions and availability of surface water supplies in 2025 contributed to increased groundwater levels across much of the subbasin compared to 2020 - 2022, driven by enhanced natural recharge, reliable surface water availability, and reduced groundwater extractions.



Did you know?

One acre-foot of water is approximately 326,000 gallons, or enough to meet the annual consumption of two families of four in Butte County.

Groundwater Storage

The changing amount of groundwater stored in the subbasin over time is estimated based on changes in groundwater levels. As groundwater levels fluctuate, the volume of groundwater stored in the subbasin changes accordingly. Over the past 10 years, there has been an average increase of approximately 11 TAF (thousand acre-feet) per year.

In 2025, it is estimated that groundwater storage increased by about 44 TAF. Historically, wet water years have resulted in an average increase of 73 TAF, while critically dry water years have seen an average decline of about 65 TAF.

Depletion from Creeks, Streams and Other Surface Water

Determining if, when and where groundwater pumping depletes creeks, streams, and other surface water, also referred to as interconnected surface water is highly complex. The GSAs collaborated with scientists to develop a proxy for monitoring the depletion of interconnected surface water demand found no exceedances of minimum thresholds in Water Year 2025. The GSA is on track to meet the first five-year Interim. Milestones set for 2027 and avoid undesirable results for these criteria. Ongoing and planned activities aim to address data and information gaps related to this indicator as part of the sustainability plan's implementation.

Groundwater Quality

The GSA monitors the basin's salinity by measuring specific conductivity (SC) to assess whether GSA projects or groundwater pumping are impacting water quality. Groundwater is tested annually in monitoring wells to compare SC concentrations against the measurable objectives and minimum thresholds established in the GSP. The GSA considers groundwater quality to be degrading if SC levels in two wells exceed the minimum thresholds for two consecutive non-dry years. In Water Year 2025, there were no exceedances of the minimum thresholds for water quality.

Subsidence

Land subsidence (i.e., negative vertical land displacement) is generally tied to, though not exclusively caused by groundwater level decline. There have been no indications of inelastic subsidence in the Vina Subbasin.

GROUNDWATER SUSTAINABILITY PLAN IMPLEMENTATION

The Vina Subbasin is in compliance with SGMA and on track to meet 2027 interim milestones.

The Groundwater Sustainability Plan was submitted to the California Department of Water Resources (DWR) in 2022. In July 2023, the GSP was approved by DWR, which included five key recommended corrective actions. The GSA received funding from the state to begin implementing projects outlined in the plan to address these corrective actions effectively through the Periodic Evaluation of the GSP, which is due in January 2027.

Project Spotlight - Long-term Funding

- The GSA initially adopted a uniform acreage-based fee to fund SGMA compliance and operations, with plans to conduct a new fee study to better reflect the diversity of groundwater users. The study began in the previous water year, and in WY 2025 the GSA adopted a two-part SGMA fee for implementation in fiscal year 2025–26.

$5.5 M

awarded by DWR

In 2024, the GSA launched SGM implementation grant-funded projects to advance groundwater sustainability. Ongoing projects include:

- Outreach Program
- Lindo Channel Recharge Feasibility
- Demand Reduction Strategies
- Long-Term Fee Study Project
- Inter-basin Coordination Analysis and Modeling
- Water Supply and Recharge Project
- Groundwater Sustainability Plan (GSP) Updates, Data Gaps, & Monitoring Network Enhancements

More Information

The complete 2025 Vina Subbasin Annual Report is available at **www.vinagsa.org**

To access the data, scan or visit wdl.water.ca.gov/waterdatalibrary

Contact us: vinagsa@gmail.com

Ongoing activities of the GSA

Communications and Stakeholder Engagement

- Holding public GSA Board, Advisory Committee and community meetings
- Ongoing intra- and inter-basin coordination

Monitoring and Reporting

- Annual reporting of subbasin conditions and submission to DWR as required by SGMA
- Monitoring and recording groundwater level and groundwater quality measurements
- Maintaining and updating the Data Management System (DMS) with newly collected data

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MEMORANDUM

To: Vina Stakeholder Advisory Committee

From: Becky Fairbanks, GSA Project Manager and Christina Buck, Asst. Director Butte County Water and Resource Conservation

Date: March 25, 2026

Subject: Consideration of Approach to Project and Management Actions (PMAs) for the GSP Periodic Evaluation

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Background

California enacted the Sustainable Groundwater Management Act (SGMA) in 2014 to establish a statewide framework for the long-term sustainable management of groundwater resources. SGMA requires local agencies to form Groundwater Sustainability Agencies (GSAs) and develop Groundwater Sustainability Plans (GSPs) for medium- and high-priority groundwater basins.

The Vina GSA and Rock Creek Reclamation District GSA approved the Vina Groundwater Sustainability Plan (GSP) in December 2021 and submitted it to the California Department of Water Resources (DWR) in January 2022. The GSP was approved by DWR in July 2023. Under SGMA, GSAs are required to complete a Periodic Evaluation of their GSP every five years, with the first evaluation due in January 2027.

The Periodic Evaluation is intended to document groundwater conditions, evaluate progress toward achieving sustainability, and describe the status of Projects and Management Actions (PMAs) that support implementation of the GSP. To support preparation of the Periodic Evaluation, the Vina GSA contracted with Larry Walker Associates (LWA) and the work is funded by the DWR Sustainable Groundwater Management (SGM) grant program.

Summary

The purpose of today's agenda item is to support development of Section 4: Status of Projects and Management Actions of the Periodic Evaluation (see Attachment 1).

Specifically, the Stakeholder Advisory Committee (SHAC) is asked to:

- Review the PMAs identified in the 2022 Vina GSP, and
- Provide feedback on the categorization of PMAs for future annual tracking and reporting.

Projects and Management Actions included in a GSP describe the types of activities and projects that the GSAs or their partners may implement over time to help achieve and maintain groundwater sustainability in the subbasin.

The list of PMAs should reflect the level of effort that may be required to manage groundwater resources under expected water demands and changing hydrologic conditions. Not all PMAs will necessarily be implemented, but together they illustrate the range of actions that support sustainable groundwater management over the planning horizon.

This discussion will help ensure the PMA section of the Periodic Evaluation clearly reflects the projects that are actively supporting groundwater sustainability in the Vina Subbasin.

Summary of Grant Funded Studies/Pilots Associated with Projects in the GSP

The Vina GSA was awarded SGM grant funding to conduct feasibility studies and pilot projects/programs for a number of projects listed in the GSP. The components and tasks of the grant agreement, however, do not always use the same project names as listed or described in the GSP. The table below provides a summary of which GSP Project was advanced with the SGM funding and the grant "component" as it appears in the grant agreement. Since the grant funded work conducted the planning phase of these projects, it is a good time to reassess the GSP projects and categorize them as appropriate based progress that has been made. Other GSP projects that were previously identified as "planned" or "potential" in the GSP, have not yet been initiated or new information has been learned by the project lead. It is therefore a good time to reassess their status as well.

Table summarizing GSP Projects and the associated grant funded study. References the section of the GSP describing the GSP Project.

GSP Project Name	SGM Grant Component #	SGM Grant Component Name	Grant Project Name/Pilot
Agricultural Irrigation Efficiency (5.2.3.1)	3	Demand Reduction Strategies	Precision Irrigation Pilot Program
Extend Orchard Replacement (5.2.5.1)	3	Demand Reduction Strategies	Extend Orchard Replacement Pilot Program
Surface Water Supply and Recharge (5.2.4.8)	4	Feasibility of Enhanced Recharge in the Lindo Channel	Feasibility of Enhanced Recharge in the Lindo Channel
Scoping for Flood MAR/Surface Water Supply and Recharge (5.2.3.3)	5	Surface Water Supply and Recharge Feasibility Study	Two parts: 1. Surface Water Supplies Feasibility Analysis 2. Recharge Feasibility Analysis and Pilots
Agricultural Surface Water Supplies (5.2.4.2)	5	Surface Water Supply and Recharge Feasibility Study	Surface Water Supplies Feasibility Analysis (same as #1 above)
Rangeland Management and Water Retention (5.2.4.6)	5	Surface Water Supply and Recharge Feasibility Study	Recharge Feasibility Analysis - Recharge pilot #1: Resource Conservation District/Big Chico Ecological Reserve implementation of process-based restoration techniques in Big Chico Creek watershed.

Proposed PMA Categorization

In addition to progress made through the grant funded work, recent updates to SGMA Annual Reporting requirements require GSAs to provide annual status updates on PMAs through the SGMA Portal in a newly developed PMA Module. Maintaining a long list of conceptual or inactive projects can

make tracking and reporting more difficult and less meaningful. In addition, the PMA Module requires and includes a high level of detail for each project. See Attachment 3 for example of all attributes associated with each project.

To improve how PMAs are tracked and reported moving forward, staff is proposing to organize the GSP Project list into two primary categories, as described below. Initial categorization of GSP Projects has been done for discussion - see Attachment 4, Presentation Slides for proposed project categorization. The two primary categories are:

<u>GSA Prioritized PMAs</u>
Projects that the GSAs, Member Agencies (i.e. Butte County, City of Chico) or its partners are actively pursuing, or intend to pursue, to maintain or achieve groundwater sustainability in the subbasin. These projects represent the core implementation strategy of the GSP and would be further categorized as:

- Completed
- In-Progress
- Potential

<u>Other Projects</u>
Projects led by other agencies or entities that may provide ancillary benefits to groundwater conditions but are not currently critical to achieving sustainability in the subbasin. These projects would continue to be tracked by the GSAs, as feasible, but are not relied upon to meet sustainability objectives.

The proposed categorization is intended to focus annual report updates on projects that have already been completed, as well as those that are actively being pursued or considered by the GSAs and their partners.

Projects categorized as Other would remain part of the broader planning framework of the GSP, but would not be the primary focus of near-term tracking and reporting and therefore not included in the DWR PMA module. They would continue to be included in the Periodic Evaluation and evaluated every five years for SGMA applicability.

SHAC's and public input is requested to help review the PMA list through this lens and provide feedback on the categorization of projects. As further background, the Wyandotte Creek subbasin and Butte Subbasin are conducting a similar evaluation of their projects as part of their Periodic Evaluations and are discussing this same approach.

This approach is meant to:
- Reduce the burden of required annual tracking and reporting in the DWR PMA module
- Create more clarity around which projects are being pursued and/or implemented to achieve sustainability in the subbasin

Requested Action

Staff is requesting SHAC review and provide feedback on the proposed PMA classifications, including:
1. The projects proposed as **GSA Prioritized PMAs**, and
2. The projects proposed to be categorized as **Other Projects**, including whether any should be moved to other categories.

Attachments for Reference:
1. Section 4 of the Periodic Evaluation Annotated Outline
2. Vina GSP Chapter 5: Project and Management Actions
3. PMA Module Example Spreadsheet
4. Presentation slides (slides 7 and 8 show categorized GSP Projects for discussion)

4 STATUS OF PROJECTS AND MANAGEMENT ACTIONS

The purpose of this section is to summarize the GSA implementation activities related to projects and management actions that took place over the course of the evaluation cycle. The summary should include descriptions of ongoing projects that have carried over during the evaluation cycle and projects that broke ground but have not become operational. In addition, significant new information should be discussed, such as whether a GSP project was considered no longer necessary and was dropped, a new project was added, or a project has been delayed. New information that affects project development, such as hydrologic changes relative to a drought or wet year should be described. The description should include anticipated projects to be developed over the next evaluation cycle(s). The discussion of the projects should include evaluations and reporting on the quantified benefits of each project and anticipated benefits of the projects that broke ground or were completed during the evaluation cycle.

A GSA should summarize how it is tracking and administering the various projects and management actions within its basin. The summary should describe interactions with the project proponents and member agencies implementing the projects. Table 2 shows an example of this summary.

Table 2. Project and Management Action Summary Table

Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Expected Schedule	Benefits Observed to Date or Anticipated Benefits	Estimated Accrued Benefits at Completion

A GSA should assess the projects and management actions outlined in the original GSP and explain whether those are still relevant and feasible, including estimates of cost and potential funding sources and whether permitting and CEQA requirements need to be met. The Periodic Evaluation should describe if there is a need to revisit or re-evaluate the priority of certain projects. Additionally, for the various projects and management actions outlined in the GSP, the GSA should describe the process for public notice and engagement of interested parties.

For projects and management actions that are currently ongoing or have already been completed, the Periodic Evaluation should provide an evaluation and status update including realized benefits, expected benefits, and benefits and impacts to beneficial uses and users. The description should include how these projects and management actions are helping the basin achieve sustainability through the assessment of the groundwater conditions in relation to the measurable objectives for the relevant sustainability indicators. A description of the monitoring network and data related to projects and management actions that are showing progress toward sustainability, and documentation that the project is not impacting nearby beneficial users, should be included.

For projects and management actions that have yet to begin or are still conceptual, assess the need for those based on the current conditions and expected outcomes of the existing projects and management actions. Describe the potential timeline to get those projects and management actions implemented or what may be needed to take them from the conceptual or as-needed phase to the “shovel ready” phase.

The GSA should describe the challenges or setbacks that have prevented or delayed implementation of projects and management actions. If a planned project is not going to be implemented, the GSA should consider re-evaluating projected water budgets and groundwater conditions without the project.

5. PROJECT AND MANAGEMENT ACTIONS

This section includes relevant projects and management actions information to satisfy CCR Title 23 § 354.42 and 354.44. The projects and management actions described in this section will help achieve the Vina Subbasin's sustainability goal.

5.1 Projects, Management Actions, and Adaptive Management Strategies

The objective and purpose of the GSP is to achieve groundwater sustainability in the Vina Subbasin. This will require projects and management actions aimed at avoiding undesirable results, achieving measurable objectives, and responding to changing conditions in the basin. The Vina GSA and the RCRD GSA have identified projects and management actions tailored to benefit the Vina Subbasin's groundwater supply and quality for the benefit of rural areas, communities, agricultural users and the environment. The approach targets both identifying and increasing alternative sources of supply and reducing groundwater demand. The GSP identifies groundwater monitoring programs to monitor groundwater conditions, investigation of additional water sources to supplement the use of groundwater, and conservation and educational programs to reduce groundwater demand.

5.2 Projects

5.2.1 Project Identification

Projects were identified through a lengthy outreach effort involving the SHAC and the GSAs. The process included soliciting input from governmental agencies, water purveyors, and local landowners. The Vina GSA's website allowed project proponents to input the available information on each project.

The majority of projects submitted were proposed by the Vina GSA, with some being a joint effort with the RCRD GSA. Some of the projects also include other proponents, such as CSUC, PG&E, Cal Water, local agricultural farmers, and others. The list of proponents and other entities involved in the projects is included in Table 5-1 below. The schedule to implement the projects is likely to vary depending upon Subbasin conditions, and the expected benefits of PMAs may also vary year to year.

The provided project information was compiled into an initial draft list with similar and overlapping projects combined as appropriate. The draft list was presented to the Vina GSA Stakeholder Advisory Committee in their July 15, 2021, meeting and to the GSA Boards at their August meetings. The projects were then evaluated based on the following criteria:

- Project addresses one or more of the Undesirable Results
- Project is implementable with respect to technical complexity, regulatory complexity, institutional consideration, and public acceptance
- Project is implementable within the SGMA timeframe
- Project benefits Underrepresented Communities (URCs)
- Project is in an area where water quality is suitable for use

5.2.2 Project Implementation

The purpose of planning and implementing projects is to ensure the Vina Subbasin achieves sustainability. Projects are categorized in three categories - Planned, Potential, and Conceptual – based on current stage of planning or implementation. This section includes Planned, Potential, and Conceptual projects. Additional projects may be added in the future once identified. The specific projects included in the GSP will be implemented, operated, and owned by the individual project proponent(s). Through annual reports, GSP updates, and the evaluation of IMs, MT, and MO, the GSAs will evaluate whether the implementation of projects is sufficient to achieve sustainability. Depending on how projects are achieving sustainability, or otherwise impacting the ability of the Vina Subbasin to achieve sustainability, the GSAs may prioritize the development of projects, seek funding for prioritized projects, or develop guidelines for existing projects.

5.2.2.1 List of Projects

Several projects to achieve the Vina Subbasin's sustainability goal were identified. The initial set of projects was reviewed by the SHAC. A final list of 15 possible projects is included in this GSP, and they are categorized into several project types, including direct and in-lieu recharge, intra-basin water transfers, water recycling, demand conservation, and monitoring. Projects are further classified into three categories based on project status: Planned, Potential, and Conceptual, as defined below. All projects, regardless of status, remain subject to available funding, any required CEQA compliance, and any required approvals. The list of possible projects identified in this GSP are an initial list that may be further expanded or modified as the GSAs work toward sustainability by 2042.

- Planned Projects – Currently, five Planned Projects have been identified. Projects in this category are anticipated to move forward to help achieve the region's sustainability before 2042.
- Potential Projects – Currently, eight Potential Projects have been identified. Projects in this category are currently in the initial planning stages and may move forward as feasibility and project requirements are determined. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects.
- Conceptual Projects – Currently, two Conceptual Projects have been identified. Projects in this category are in the early conceptual planning states and would require significant additional work to move forward. Conceptual Projects represent potential future projects that could conceptually provide a benefit to the Vina Subbasin in the future, but that would need to be further developed.

This subsection of the GSP satisfies the requirements of CCR title 23 § 354.44. Consistent with SGMA requirements, the project descriptions for projects contain information regarding:

- The MO benefitted by the project
- Permitting and regulatory processes
- Timetable for initiation and completion

- Expected benefits
- How the project will be accomplished
- Legal authority
- Estimated costs and plans to meet costs
- Implementation circumstances
- Public noticing

Table 5-1 provides a summary of the 15 projects. Full descriptions are included below.

Table 5-1: List of Sustainable Groundwater Management Act Projects

Project Name	Project Type	Identified Project Proponent and Other Potential Participating Entities	Measurable Objective Expected to Benefit	Current Status	Timetable (initiation and completion)	Estimated Costs	Expected Groundwater Demand Reduction (Acre-Feet/year)
Planned Projects							
5.2.3.1 Agricultural Irrigation Efficiency	Conservation	Vina GSA; local landowners, other entities to be determined	Groundwater Levels, Groundwater Storage	Planning Stage	2024-2030	To be determined	Up to 4,000 (based on a reduction up to 2%)
5.2.3.2 Residential Conservation	Conservation	Cal Water Chico, Vina GSA, local landowners, other entities to be determined	Groundwater Levels	Planning Stage	2022-2025	To be determined	100
5.2.3.3 Scoping for Flood Managed Aquifer Recharge (FloodMAR)/Surface Water Supply and Recharge	Direct Recharge, In-lieu Recharge	Vina GSA, RCRCD GSA, local landowners, other entities to be determined	Groundwater Levels	Planning Stage	2022-2032	To be determined	Not applicable
5.2.3.4 Community Water Education Initiative	Education and Outreach	Vina GSA, CSUC, CWE, Chico State Enterprises, local landowners, other entities to be determined	Groundwater Levels, Groundwater Storage, Water Quality, Land Subsidence, Surface Water Depletion, Education and Outreach	Ready for Implementation	Currently ongoing, expansion by 2023 depending on funding	Component 1: $50-100K annually Component 2: $10,000-$200,000 annually Component 3: $10,000-$25,000 annually	To be determined
5.2.3.5 Fuels Management for Watershed Health	Conservation	Vina GSA, CSUC, Chico State Enterprises, local landowners, other entities to be determined	Groundwater Levels, Groundwater Storage, Water Quality, Surface Water Depletion	Part of project currently ongoing, rest in planning stage	450 acres ongoing; 4,000 acres 2021-2030; 6,000 to 10,000 acres 2025-2040	$8.0 million - $14.0 million	To be determined
Potential Projects							
5.2.4.1 Paradise Irrigation District Intertie	In-Lieu Recharge	Vina GSA; PID, Cal Water, local landowners, other entities to be determined	Groundwater Levels	Planning Stage	To be determined, after Spring 2022	To be determined	5,000
5.2.4.2 Agricultural Surface Water Supplies	Intra-Basin Water Transfer	Vina GSA, RCRD, local landowners, other entities to be determined	Groundwater Levels	Planning Stage	2025-2032	To be determined	2,000 – 3,000
5.2.4.3 Streamflow Augmentation	Direct Recharge, In-Lieu Recharge	Vina GSA, RCRD GSA, PID, PG&E, local landowners, other entities to be determined	Groundwater Levels, Surface Water Depletion	Initial Planning Stage	2022-2025	$50-$100 per acre-foot	1,000-5,000
5.2.4.4 Community Monitoring Program	Monitoring	Vina GSA, CSUC, Chico Ecological Reserves, local landowners, other entities To be determined	Groundwater Levels	Planning Stage	2022-2025	To be determined	Not applicable
5.2.4.5 Recycled Wastewater	Direct Recharge, Water Recycling	Vina GSA, City of Chico, local landowners, other entities to be determined	Groundwater Levels	Planning Stage	2030-2038	To be determined	5,000
5.2.4.6 Rangeland Management	Conservation	Vina GSA, CSUC, Chico State Enterprises, other entities to be determined	Groundwater Levels	Planning Stage	Baseline data collection (2021-2022) Development of Master Management Plan (2022-2024)	To be determined	To be determined

Project Name	Project Type	Identified Project Proponent and Other Potential Participating Entities	Measurable Objective Expected to Benefit	Current Status	Timetable (initiation and completion)	Estimated Costs	Expected Groundwater Demand Reduction (Acre-Feet/year)
5.2.4.7 Removal of Invasive Species	Conservation	Vina GSA, CSUC, Chico State Enterprises, other entities to be determined	Groundwater Levels, Groundwater Storage	Planning Stage	Inventory and mapping of properties: 2022-2023 Development of invasive management for water retention plan: 2023-2024 Identify and secure funding: 2022-2026 Implement projects and measure results: 2025 and beyond	To be determined	To be determined
5.2.4.8 Surface Water Supply and Recharge	Direct Recharge	Vina GSA, RCRD GSA, local landowners, other entities to be determined	Groundwater Levels	Planning Stage	Sand Creek / Lindo Channel – 2022-2032; Other projects – 2022 – 2042	To be determined	1,000 / project
Conceptual Projects							
5.2.5.1 Extend Orchard Replacement	Conservation	Vina GSA, local landowners, other entities to be determined	Groundwater Levels	Conceptual Planning Stage	To be determined	To be determined	4,000-8,000
5.2.5.2 Recharge from the Miocene Canal	Direct Recharge	Vina GSA PG&E, Butte County, local landowners, other entities to be determined	Groundwater Levels	Conceptual Planning Stage	After 2025	To be determined	2,000 based on 10,000 acre-feet available for recharge (20% efficiency)

5.2.3 Planned Projects

Projects categorized as Planned Projects are expected to move forward and be completed to achieve the Vina Subbasin's sustainability goal by 2042. The estimated groundwater supply from these projects is expected to offset the projected overdraft of 10,000 AFY.

5.2.3.1 Agricultural Irrigation Efficiency

A survey is currently being conducted in North and South Vina by the Vina GSA, Agricultural Groundwater Users of Butte County, and Butte County Farm Bureau in order 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. The results of this survey are expected to be available in September 2022, with implementation of the project expected to be initiated between 2024 and 2030. Recommendations from the survey will be made available to the local agricultural community, and implementation of the practices will be voluntary. The Vina GSA along with participating partners will pursue grant funds to help implement these practices. It is estimated that the adoption of more efficient practices could reduce groundwater demand by up to 2%, which translates to a reduction in groundwater demand of up to 4,000 AFY.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA; local landowners, other entities to be determined
Project Type:	Conservation
Estimated Groundwater Offset and/or Recharge:	–Up to 4,000 acre-feet/year

Measurable Objective Expected to Benefit: This project will address declining water levels and the declining volume of groundwater stored in the aquifer. The main objective of the project is to reduce groundwater demand by modifying irrigation practices.

Project Status: This project is in the planning stages.

Required Permitting and Regulatory Process: None

Timetable for Initiation and Completion: Project will be initiated in 2024

Expected Benefits and Evaluation: A survey that consolidates data on the adoption of irrigation methods and practices by agricultural groundwater users will identify where more efficient practices can be implemented. This can help focus efforts and finances on areas where a reduction in overall groundwater demand is needed and feasible.

How Project Will Be Accomplished/Evaluation of Water Source: This project is a demand-side conservation project. No additional water source will be utilized for this project.

Legal Authority: The project would be under the authority of Vina GSA and potential future participating partners.

Estimated Costs and Plans to Meet Costs: To be determined, funding via Proposition 1, Proposition 68, USDA, Drought Resiliency Grants

Circumstances for Implementation: This project is a Planned Project that is anticipated to move forward.

Trigger for Implementation and Termination: The project will be initiated after the recommendations from the initial survey results are available.

Process for Determining Conditions Requiring the Project to Occur: As mentioned above, the survey is already underway and once analysis is complete, recommendations based off the results will be made available for voluntary implementation.

5.2.3.2 Project: Residential Conservation

Cal Water Chico, which provides water to the City of Chico via groundwater, proposed a series of conservation projects under their 2020 UWMP, including toilet replacement, urinal valve and bowl replacement, clothes washer replacement, residential conservation kits, smart controllers, high efficiency irrigation nozzles, and turf buy-back.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Cal Water Chico, Vina GSA, local landowners, other entities to be determined
Project Type:	Conservation
Estimated Groundwater Offset and/or Recharge:	100 AFY

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is in the planning stages.

Required Permitting and Regulatory Process: None

Timetable for Initiation and Completion: 2022-2025

Expected Benefits and Evaluation: The implementation of several different conservation projects for residential areas is expected to reduce groundwater demand by 100 AFY in Chico.

How Project Will Be Accomplished/Evaluation of Water Source: This project is a demand-side conservation project implemented by Cal Water in residential areas. No additional water source will be utilized for this project.

Legal Authority: The project would be under the authority of Vina GSA and Cal Water Chico. Cal Water Chico would initiate the conservation programs.

Estimated Costs and Plans to Meet Costs: To be determined, funding via Proposition 1, Proposition 68, Drought Resiliency Grants, Cal Water.

Circumstances for Implementation: This project is a Planned Project that is anticipated to move forward.

Trigger for Implementation and Termination: Increased groundwater demand due to an increasing number of planned residential developments in Chico (according to the City of Chico and Butte County General Plans).

Process for Determining Conditions Requiring the Project to Occur: This is a Planned Project that is anticipated to move forward.

5.2.3.3 Project: Scoping for Flood MAR/Surface Water Supply and Recharge

Under this project, Vina GSA and RCRD GSA will expand on the Flood MAR initiative, which was originally developed by DWR to promote recharge programs that use fields, recharge basins, 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.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, RCRCD GSA, local landowners, other entities to be determined
Project Type:	Direct Recharge, In-Lieu Recharge
Estimated Groundwater Offset and/or Recharge:	Not applicable

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: Not applicable

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: To be determined, 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

e This is a Planned Project that is anticipated to move forward.

5.2.3.4 Project: Community Water Education Initiative

The Community Water Education Initiative, proposed by CSUC's CWE, would consist of two main components:

Community Water Education Project – The CWE would lead this component of the project to expand on community outreach and education associated with water-related topics and issues of the region. CWE would focus on topics such as regional groundwater issues, connectivity of surface and groundwater, decision-making during drought years, basic aquifer knowledge, and more, and target agricultural well users, domestic well users, and municipal customers. The scope would also include technical seminars and field trips, as well as creating educational materials such as fact sheets, printed materials, and website content.

Big Chico Creek Watershed Tour – CWE currently hosts a Big Chico Creek Watershed Tour every year that lasts for four days (2 weekends in March and April) and that takes participants from the watershed's headwaters to the Big Chico Creek Ecological Reserve, through CSUC campus, and to its confluence with the Sacramento River. During the program, participants learn about the watershed, explore various water issues, and help CSUC faculty research the health of the watershed. Under this project, CSUC proposes to expand the program to include community members and more groundwater education, with a focus on the Vina Subbasin, with the goal to help community members better understand their role in sustainable groundwater management.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, CSUC, CWE, Chico State Enterprises, local landowners, other entities to be determined
Project Type:	Education and Outreach
Estimated Groundwater Offset and/or Recharge:	Not applicable

Measurable Objective Expected to Benefit: Groundwater Levels, Groundwater Storage, Water Quality, Land Subsidence, Surface Water Depletion, Education and Outreach

Project Status: This project is ready for implementation. Possible expansion by 2023 depending on funding.

Required Permitting and Regulatory Process: None

Timetable for Initiation and Completion: Currently measuring and providing community education with the possibility of expansion by 2023 depending on funding.

Expected Benefits and Evaluation: This project would expand the education and outreach on important watershed and groundwater issues in the region, helping community members better understand their role in sustainable water management.

How Project Will Be Accomplished/Evaluation of Water Source: This is an education and outreach project provided through CSUC that does not require a water source.

Legal Authority: The project would be under the authority of CSUC's CWE.

Estimated Costs and Plans to Meet Costs: $50-100K annually (Component 1); $10,000-$200,000 annually (Component 2); $10,000-$25,000 annually (Component 3). Funding via Proposition 1 and Proposition 68

Circumstances for Implementation: This project is a Planned Project that is anticipated to move forward.

As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management. Implementation of Potential Projects will be based on long-term management or changing needs of the GSA or Subbasin. Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Subbasin.

5.2.3.5 Project: Fuel Management for Watershed Health

This project would involve fuel management in the Upper Watershed, including multiple sites on the 3,950-acre Big Chico Creek Ecological Reserve, 1,500 acres above the Reserve in the Big Chico Creek Watershed, and on private land within the watershed. Fuel reduction projects are currently ongoing at 460 acres. Further fuel reduction is planned for an additional 4,000 acres between 2021 and 2030 and another 6,000 to 10,000 acres for 2025 through 2040 with the City of Chico Parks Department and other private landowners.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, CSUC, Chico State Enterprises, local landowners, other entities to be determined
Project Type:	Conservation
Estimated Groundwater Offset and/or Recharge:	To be determined
Other Potential Participating Entities	CSUC, Chico State Enterprises

Measurable Objective Expected to Benefit: Groundwater Levels, Groundwater Storage, Water Quality, Surface Water Depletion

Project Status: Part of this project is currently ongoing, with other parts in the planning stages.

Required Permitting and Regulatory Process: CEQA

Timetable for Initiation and Completion: 450 acres have ongoing fuel reduction; 4,000 acres planned for 2021-2030; 6,000 to 10,000 acres planned for 2025-2040

Expected Benefits and Evaluation: Improved fuel management would prevent inadvertent spillage and the degradation of water quality.

How Project Will Be Accomplished/Evaluation of Water Source: This project is a demand-side conservation project conducted by CSUC. No additional water source will be utilized for this project.

Legal Authority: The project would be conducted by CSUC.

Estimated Costs and Plans to Meet Costs: $8.0 million -$14.0 million (based on $2,000 and $3,500 per acre with a target of 4,000 acres); funding via CAL FIRE, Sierra Nevada Conservancy, California Fire Safe Council, other state, and federal funding agencies

Circumstances for Implementation: This project is a Planned that is anticipated to move forward.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Subbasin.

5.2.4 Potential Projects

Projects categorized as Potential Projects are currently in the initial planning stages and may move forward as feasibility and project requirements are determined. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects.

5.2.4.1 Project: Paradise Irrigation District Intertie

After the devastation of the 2018 Camp Fire in Paradise, California, PID lost 95% of their customers. To help PID sustain their business, this project proposes that PID supply Cal Water, which serves the City of Chico, with water from one of their surface waters sources. Currently, Chico's only water source is groundwater, and their annual demand is 25,000 AF. The additional water source would help offset the groundwater demand and help groundwater levels stabilize in the Vina Subbasin. The SWRCB is currently conducting a study through Spring 2022 to help PID evaluate their options for long-term sustainability. This study will include the feasibility of the PID-Cal Water Intertie project.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA; PID, Cal Water, local landowners, other entities to be determined
Project Type:	In-Lieu Recharge
Estimated Groundwater Offset and/or Recharge:	5,000 AFY

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is in the initial planning stages.

Required Permitting and Regulatory Process: County encroachment permit, CEQA.

Timetable for Initiation and Completion: To be determined, after Spring 2022

Expected Benefits and Evaluation: An additional source for Chico from surface water would help offset the demand on groundwater in the Vina Subbasin and allow groundwater levels to stabilize. In addition, this would help PID's business after they lost customers during the Camp Fire.

How Project Will Be Accomplished/Evaluation of Water Source: This project will allow PID to provide a surface water source to the City of Chico to help offset groundwater demand. Groundwater is currently the only source of water for Chico.

Legal Authority: The project would be under the authority of Vina GSA, PID, and Cal Water.

Estimated Costs and Plans to Meet Costs: To be determined, funding via Proposition 1, Proposition 68, State Revolving Fund, Federal Infrastructure Funds

Circumstances for Implementation: The decision to move forward with the project will based on discussions with PID.

Trigger for Implementation and Termination: PID's loss of customers from the Camp Fire, decreasing groundwater levels in the Vina Subbasin, increasing groundwater demand in Chico

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSA or Subbasin.

5.2.4.2 Project: Agricultural Surface Water Supplies

Under this project, surface water from water right holders in the neighboring Butte Subbasin and the upper watershed would provide water for the Vina North and South areas. Some of these surface water sources would include the Sacramento River and Lake Oroville. Surface water would help agricultural users reduce their groundwater usage. Agricultural users may need to install a dual irrigation system that allows them to switch between groundwater and surface water depending on the availability of the surface water. Implementation of some of the projects could also lead to recharge opportunities, as additional water may be available during the off-peak irrigation season.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, RCRD, local landowners, other entities to be determined
Project Type:	Intra-Water Basin Transfer
Estimated Groundwater Offset and/or Recharge:	2,000 to 3,000 AFY

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is in the initial planning stages.

Required Permitting and Regulatory Process: Projects with diversions of surface water will require a SWRCB Water Right Permit, CEQA, others to be determined.

Timetable for Initiation and Completion: 2025-2032

Expected Benefits and Evaluation: Surface water sources from neighboring basins would decrease the Vina Subbasin's dependence on groundwater and allow groundwater levels to stabilize.

How Project Will Be Accomplished/Evaluation of Water Source: The water sources for this project would include available surface water from the Butte Subbasin and upper watershed (Sacramento River, Lake Oroville, etc.).

Legal Authority: The project would be under the authority of Vina GSA, the RCRD GSA, local landowners or other entities to be determined.

Estimated Costs and Plans to Meet Costs: To be determined, funding via Proposition 1 and Proposition 68.

Circumstances for Implementation: This project is a Potential Project, meaning it is currently in the planning stages. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects. As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Vina Subbasin.

5.2.4.3 Project: Streamflow Augmentation

Under the management of the Vina GSA, this project would transport excess untreated surface water from PID, PG&E, and / or other water right holders in the upper watershed to various parts of the Vina Subbasin through creeks and streams. The goal of the project would be to provide additional water sources to riparian water holders such as Durham Mutual, Rancho Esquon, M&T Ranch, and Gorrill Ranches as well as increase stream flows and direct and in-lieu recharge. Prior to the start of the project, Vina GSA would conduct an investigation and feasibility study to ensure that enough surface water would be available. The project would primarily take place at Comanche Creek, Butte Creek, Little Chico Creek, and Big Chico Creek.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, RCRD GSA, PID, PG&E, local landowners, other entities to be determined
Project Type:	Direct Recharge, In-Lieu Recharge
Estimated Groundwater Offset and/or Recharge:	1,000 – 5,000 acre-feet/year

Measurable Objective Expected to Benefit: Groundwater Levels, Surface Water Depletion

Project Status: This project is in the initial planning stages.

Required Permitting and Regulatory Process: SWRCB Water Right Permit, CEQA

Timetable for Initiation and Completion: 2022-2025

Expected Benefits and Evaluation: Additional sources of surface water would help to increase surface water levels in creeks and streams, groundwater levels via direct and in-lieu recharge, and overall water availability for riparian water holders.

How Project Will Be Accomplished/Evaluation of Water Source: The additional water sources would come from any available surface water from PID, PG&E, and other water right holders in the upper watershed.

Legal Authority: The project would be under the authority of Vina GSA.

Estimated Costs and Plans to Meet Costs: $50 - $100/acre-foot, funding via California Wildlife Conservation Board, Resource Renewal Institute, Proposition 1, Proposition 68, Vina fees

Circumstances for Implementation: This project is a Potential Project. As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management. Implementation of Potential Projects will be based on long-term management or changing needs of the GSA or Subbasin.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSA or Subbasin.

5.2.4.4 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.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, CSUC, Chico Ecological Reserves, local landowners, other entities to be determined
Project Type:	Monitoring
Estimated Groundwater Offset and/or Recharge:	Not applicable

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is in the initial planning stages.

Required Permitting and Regulatory Process: None.

Timetable for Initiation and Completion: The establishment of these new monitoring programs is planned to take place between 2022 and 2025.

Expected Benefits and Evaluation: Routine water table monitoring programs will track overall water table trends in the region and provide important, up-to-date data for making decisions on water management.

How Project Will Be Accomplished/Evaluation of Water Source: CSUC and Chico Ecological Reserves will implement the monitoring programs on a routine basis through their university programs. No additional water source will be utilized for this project.

Legal Authority: The project would be under the authority of CSUC and Chico Ecological Reserves.

Estimated Costs and Plans to Meet Costs: To be determined, funding sources to be determined.

Circumstances for Implementation: This project is a Potential Project, meaning it is currently in the planning stages. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects. As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Vina Subbasin.

5.2.4.5 Project: Wastewater Recycling

The City of Chico currently operates a wastewater treatment plant with a treatment capacity of 12 million gallons (36 AF) per day and discharges 13,000 AFY of the treated wastewater into the Sacramento River (in accordance with their waste discharge permit from the California Water Resources Control Board). Under this project, the city would review the feasibility of diverting some of their recycled wastewater from the Sacramento River to recharge ponds and/or non-crop vegetation in Chico. Existing regulations will be reviewed for the use of the recycled water for crop production.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, City of Chico, local landowners, other entities to be determined
Project Type:	Direct Recharge, Water Recycling
Estimated Groundwater Offset and/or Recharge:	5,000 AFY

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is in the initial planning stages.

Required Permitting and Regulatory Process: SWRCB Water Right permit, CEQA, National Pollutant Discharge Elimination System permit, others to be determined.

Timetable for Initiation and Completion: 2030-2038

Expected Benefits and Evaluation: This project would divert treated wastewater, that would otherwise be pumped into the Sacramento River, towards recharge ponds and non-crop vegetation. This would increase groundwater recharge, decrease groundwater demand for farming, and help groundwater levels stabilize in the region.

How Project Will Be Accomplished/Evaluation of Water Source: This project would be initiated by the Vina GSA and the City of Chico, and the water source for this project would be the treated wastewater from the City of Chico's wastewater treatment plant.

Legal Authority: The project would be under the authority of Vina GSA and the City of Chico.

Estimated Costs and Plans to Meet Costs: To be determined, funding via Proposition 1, Proposition 68, and SWRCB, and other sources to be determined.

Circumstances for Implementation: This project is a Potential Project, meaning it is currently in the planning stages. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects. As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Vina Subbasin.

5.2.4.6 Project: Rangeland Management and Water Retention

Under this project, CSUC and Chico State Enterprises would initiate a study of adaptive/ regenerative grazing practices on 2,000 or more acres in the region. The study, which would take place between 2021 and 2022, would measure soil compaction, erosion, groundwater retention, and biological diversity. If this study finds that water retention engineering projects would be feasible in the region, based on the collected data on local soil, then CSUC would create a master management plan and take necessary steps to complete the water retention projects.

This project would take place in two locations across 3,850 acres of historical rangeland between Musty Buck Ridge and Cohasset Road.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, CSUC, Chico State Enterprises, other entities to be determined
Project Type:	Conservation
Estimated Groundwater Offset and/or Recharge:	To be determined

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is currently in the initial planning stages.

Required Permitting and Regulatory Process: CEQA and/or National Environmental Policy Act (NEPA), depending on project impact.

Timetable for Initiation and Completion: Baseline data collection (2021-2022); Development of Master Management Plan (2022-2024).

Expected Benefits and Evaluation: This project would evaluate characteristics of local soil and the feasibility to initiate water retention projects. Water retention would help increase the overall water supply for the region.

How Project Will Be Accomplished/Evaluation of Water Source: This project is a demand-side conservation project through CSUC. No additional water source will be utilized for this project.

Legal Authority: The project would be conducted by CSUC.

Estimated Costs and Plans to Meet Costs: To be determined, funding via state funding through watershed health grants, federal funding through USDA, private funding sources to be determined.

Circumstances for Implementation: This project is a Potential Project, meaning it is currently in the planning stages. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects. As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management.

Trigger for Implementation and Termination: Once the study is complete on soil compaction, erosion, groundwater retention, and biological diversity, and it shows that water retention is feasible, then a master management plan will be developed.

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Vina Subbasin.

5.2.4.7 Project: Removal of Invasive Species

Invasive species negatively impact the natural ecosystem in several ways, including consuming water and hampering recharge. Under this project, invasive species and native grasses in meadows and oak savannahs would be mapped between 2022 and 2023. This would then be followed by the development of an invasive management for water retention plan between 2023 and 2024, the acquisition of funding between 2022 and 2026, and the implementation of invasive species removal projects after 2025. This project would take place in the Upper Watershed at approximately 8,000 acres between lower Forest Ranch and the Chico Airport, including the Big Chico Creek, Sheep Hollow, and Cabin Hollow drainages.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, CSUC, Chico State Enterprises, other entities to be determined
Project Type:	Conservation
Estimated Groundwater Offset and/or Recharge:	To be determined

Measurable Objective Expected to Benefit: The project will address declining water levels and the declining volume of groundwater stored in the aquifer.

Project Status: This project is currently in the initial planning stages.

Required Permitting and Regulatory Process: CEQA and/or NEPA, depending on project location and impact.

Timetable for Initiation and Completion:

- Inventory and mapping of properties: 2022-2023
- Development of invasive management for water retention plan: 2023-2024
- Identify and secure funding: 2022-2026
- Implement projects and measure results**:** 2025 and beyond.

Expected Benefits and Evaluation: The removal of invasive species would benefit the natural ecosystem and prevent them from negatively affecting the amount of available water and the ability for water to recharge.

How Project Will Be Accomplished/Evaluation of Water Source: This project is a demand-side conservation project conducted through CSUC. No additional water source will be utilized for this project.

Legal Authority: The project would be conducted by CSUC.

Estimated Costs and Plans to Meet Costs: To be determined, funding via state and federal wildfire resiliency grants.

Circumstances for Implementation: This project is a Potential Project, meaning it is currently in the planning stages. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects. As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Vina Subbasin.

5.2.4.8 Project: Surface Water Supply and Recharge

Projects under this category would involve activities that increase the surface water supply to the Vina Subbasin through: 1) direct application of surface water to crops along the lines of the Agricultural Surface Water Supplies Project described above; 2) application of surface water and/or flood water to land surface (i.e. existing orchards) for recharge purposes, sometimes referred to as Flood MAR projects; 3) surface water and/or flood water application to recharge basins and/or recharge ponds; or 4) other applications.

The following are examples of potential projects in the Vina Subbasin:

Sand Creek Project – This project would take place in the North Chico and Nord areas and would involve obtaining data that would later be used to develop mitigation measures for flooding and recharge. The data may also be used to decide future actions towards habitat

restoration and runoff management to sustain groundwater. This project is currently developing a Decision Support Tool to determine future construction scope and feasibility.

Lindo Channel – This project would divert water from Big Chico Creek when flow exceeds 75 cfs and store the water in the Lindo Channel. The Lindo Channel can then be used as a recharge source for other areas and potentially provide 2,000 AF.

Other additional recharge projects would be developed by the Vina GSA, the RCRD GSA, local landowners, and/or entities to be determined.

Estimated Groundwater Offset and/or Recharge:1,000 AFY per project.

Measurable Objective Expected to Benefit: increase of groundwater levels by enhancing in-lieu recharge opportunities.

Project Status: The Sand Creek project and Lindo Channel project are in the initial planning stages. Other projects to be developed in the future.

Required Permitting and Regulatory Process: Projects with diversions of surface water will require a SWRCB permit; CEQA and others to be determined.

Timetable for Initiation and Completion: Sand Creek and Lindo Channel – 2022-2032; Other projects – 2022 – 2042.

Expected Benefits and Evaluation: This project would reduce reliance on native groundwater supply.

How Project Will Be Accomplished/Evaluation of Water Source: Evaluate and analyze results of scoping project for potential locations of recharge activity. The Sand Creek project and Lindo Channel project are in the planning stages. The Lindo Channel project is anticipated to divert water from Big Chico Creek to the Lindo Channel, which can then be used as a recharge source on-site or at other locations. The Sand Creek project is anticipated to divert water from the creek to a recharge basin.

Legal Authority: The projects would be under the authority of the Vina GSA, the RCRD GSA, local landowners and / or other entities to be determined.

Estimated Costs and Plans to Meet Costs: To be determined, potential funding via Proposition 1 and Proposition 68.

Circumstances for Implementation: These projects are Potential Projects to bring additional resources for adaptive management. Potential Projects represent a "menu of options" for the Vina Subbasin to achieve long-term sustainability and offset the remaining imbalance above and beyond implementation of the Planned Projects. As scenarios change, the Potential Projects can come online to bring additional resources for adaptive management.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: The Sand Creek project and Lindo Channel project are in the planning stages and will be implemented, assuming that

feasibility is determined. Implementation of Potential Projects will be based on long-term management or changing needs of the GSAs or Vina Subbasin.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, RCRD GSA, local landowners, other entities to be determined
Project Type:	Direct Recharge, In-Lieu Recharge
Estimated Groundwater Offset and/or Recharge:	1,000 acre-feet/project

5.2.5 Conceptual Projects

Projects categorized as Conceptual Projects are in the early conceptual stages and would require significant additional work to move forward. Conceptual Projects represent potential future projects that could conceptually provide a benefit to the Vina Subbasin in the future, but that would need to be further developed.

5.2.5.1 Extend Orchard Replacement

Under this project, various funding sources would incentivize local growers to increase the duration of their current fallowing practice between orchard removal and replanting by one growing season. The extra time would allow the soil to fallow and decrease the overall demand on groundwater and other water sources. Additionally, this program may also reduce the need for soil treatments such as fumigation and expand recycling options for the previous orchard. This project has the potential to fallow between 1,600 and 3,200 acres per year in North and South Vina. As envisioned, this project would be dependent on the availability of financial incentives and willingness of landowners to participate. Participation in the program would be voluntary.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA, local landowners, other entities to be determined
Project Type:	Conservation
Estimated Groundwater Offset and/or Recharge:	4,000 – 8,000 acre-feet/year

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is still in the early conceptual planning stages.

Required Permitting and Regulatory Process: None

Timetable for Initiation and Completion: To be determined. The timetable would be dependent on the availability of financial incentives and willingness of farmers to participate.

Expected Benefits and Evaluation: By increasing the time between orchard removal and replanting, the soil may be allowed to fallow, restoring its fertility, and decreasing its water demand. This would decrease the overall use of groundwater in the Subbasin.

How Project Will Be Accomplished/Evaluation of Water Source: This project is a demand-side conservation project. No additional water source will be utilized for this project.

Legal Authority: The project would be under the Vina GSA, local landowners and other entities to be determined.

Estimated Costs and Plans to Meet Costs: To be determined; funding via Proposition 1, Proposition 68, USDA, National Resource Conservation Service (NRCS)

Circumstances for Implementation: This project is a Conceptual project in the early conceptual planning stages and would require significant additional work to move forward.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: The project proponents are in the process of determining the feasibility of this project including the possibility of securing the necessary finances to move forward.

5.2.5.2 Recharge from the Miocene Canal

During the 2018 Camp Fire, the upper Miocene Canal, which is operated by PG&E, was destroyed. Under this project, the upper canal would be rebuilt and re-watered. Additionally, PG&E would sell the Miocene Canal system by mid-2022 and modify the system to increase water supply reliability. One such modification might include establishing recharge ponds along the west side of the Miocene Canal in areas conductive to recharging the Vina South Subbasin.

Project Summary	
Identified project proponent(s) and other potential participating entities:	Vina GSA PG&E, Butte County, local landowners, other entities to be determined
Project Type:	Direct Recharge
Estimated Groundwater Offset and/or Recharge:	2,000 acre-feet/year based on 10,000 acre-feet available for recharge (assuming a 20% efficiency)

Measurable Objective Expected to Benefit: Groundwater Levels

Project Status: This project is still in the early conceptual planning stages.

Required Permitting and Regulatory Process: CEQA, SWRCB Water Rights Permit

Timetable for Initiation and Completion: After 2025

Expected Benefits and Evaluation: Rebuilding the upper Miocene Canal and making improvements to the overall system would increase recharge into the Vina South Subbasin and surface water availability for other uses.

How Project Will Be Accomplished/Evaluation of Water Source: This project would be initiated by PG&E, who would obtain water from the same water sources that currently supply the Miocene Canal.

Legal Authority: The project would be under the authority of Vina GSA and PG&E.

Estimated Costs and Plans to Meet Costs: To be determined, funding via state and federal grants

Circumstances for Implementation: This project is a Conceptual Project, meaning it is in the early conceptual planning stages and would require significant additional work to move forward. Conceptual Projects represent potential future projects that could conceptually provide a benefit to the Subbasin in the future. As scenarios change, Conceptual Projects can come online to bring additional resources for adaptive management. The project proponents are in the process of determining the feasibility of this project including the possibility of securing the necessary finances to move forward.

Trigger for Implementation and Termination: None

Process for Determining Conditions Requiring the Project to Occur: Implementation of Conceptual Projects will be based on long-term management or changing needs of the GSA or Subbasin.

5.2.6 Notification Process

The GSAs will continue to conduct public outreach and will be responsible for notification of the projects. Regular updates will be provided to the GSA Boards and presented on the websites www.vinagsa.org and rockcreekreclamation.com as projects are implemented. Outreach is likely to include public notices, meetings, website, social media, and email lists.

5.3 Management Actions

To achieve sustainable groundwater management, management actions can be implemented to focus on reduction of groundwater demand. The management actions can include increased data collection, education and outreach, regulatory policies, incentive programs, and enforcement actions.

An evaluation of potential GSA actions (projects or management actions) will occur on an annual basis relying on information reported in the annual report. The following sections will present a suite of management action options that the GSA may consider during GSP implementation. The schedule to implement the management actions is likely to vary depending upon Vina Subbasin conditions and the expected benefits of PMAs may also vary year to year.

5.3.1 General Plan Updates

The GSA(s) will cooperate with Butte County and the City of Chico with updates to their General Plans. The GSA(s) will participate and collaborate as appropriate with land use agencies during general plan updates to ensure that land use planning recognizes the Vina GSP. The GSAs will collaborate to ensure that the important components of the GSP are addressed in the general plans. The recognition and use of groundwater sustainability practices would remain consistent.

5.3.2 Domestic Well Mitigation

If an increasing number of domestic groundwater wells go dry in the Vina Subbasin, the GSAs could propose a series of steps to help mitigate this issue. The following steps are proposed under this management action:

1. Establish a voluntary registry of domestic wells.
2. Compile domestic well logs, screen depths, and locations.

3. Secure financial resources to improve, deepen or replace select domestic wells.
4. Provide emergency response to homes with dry domestic wells, including supplying bottled water and potable water for sanitation. Priority would be given to disadvantaged communities dependent on groundwater as a drinking water resource.

Creating a registry of domestic wells in the region, with information on well location and screen depths, would help the GSAs compile important data into a centralized location. This would allow the GSAs to determine which wells need to be updated to the current standards and which may need to be deepened, as well as to help them prioritize certain communities for emergency response.

5.3.3 Well Permitting Ordinance

According to the current Butte County code, domestic wells are required to be screened below the groundwater levels measured during the 1989 to 1994 drought. This management action proposes that the GSAs will work with Butte County to amend the well ordinance as it relates to small and large diameter wells to take into consideration the HCM based on best available data (i.e. AES data), adopted SMC, historical groundwater conditions, and impacts of new wells on existing wells. The code could be amended with requirements for well screens to account for MT established for the Vina Subbasin. This would improve water supply reliability of future agricultural and domestic wells.

5.3.4 Landscape Ordinance

Butte County and/or the City of Chico would enact an ordinance requiring new residential, commercial, and industrial development to use drought-resistant species for landscaping and to limit the size of grass lawns that require regular irrigation. The ordinance would focus efforts and money on reducing the amount of water used for landscape irrigation and swimming pools while promoting xeriscaping. The reduction in irrigation for landscaping and swimming pools would allow groundwater use for other purposes in the Vina Subbasin.

5.3.5 Prohibition of Groundwater Use for Ski (Recreational) Lakes

In the Vina Subbasin, there are several ski lakes that are currently supplied with groundwater. The Vina GSA would encourage Butte County to amend the zoning ordinance to prohibit the use of groundwater for future ski lakes.

5.3.6 Expansion of Water Purveyors' Service Area

The Vina GSA would encourage the expansion of water purveyors' service area to areas across the Vina Subbasin that are reliant on private groundwater wells. This would require action by individual water purveyors, support of residents, and governmental approval. By expanding the service area of water purveyors, areas that rely solely on groundwater would have another source of water and would reduce groundwater extraction.

5.3.7 Groundwater Allocation

SGMA requires that GSPs describe the projects and management actions to be implemented as part of bringing the Vina Subbasin into sustainability. As a last resort, in the event that the proposed projects fail to achieve IMs and the Vina Subbasin is projected to not be able to

achieve sustainability goals by 2042, the GSAs may need to consider implementation of groundwater allocations to manage groundwater demand. The implementation of this management action would be based on an evaluation by the Joint Management Committee. The consideration of groundwater allocation would be based on the groundwater budgets and updated monitoring data throughout the Vina Subbasin, as presented in annual reports.

Groundwater allocation management actions could include, but are not limited to, targeted maximum extraction levels to address specific MT violations or Vina Subbasin-wide adjustments to extractions to address overall chronic lowering of groundwater levels. Should the GSAs determine that groundwater allocation management actions are necessary, the GSAs will consider such management actions through a public process ultimately decided by the GSA Boards.

5.4 Data Collection

5.4.1 County Contour Mapping

As part of the efforts to collect the information necessary to fill the information needs and data gaps identified in Section 3, this project proposes to expand the existing monitoring program to include Butte, Glenn, 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 these 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.

Routine water table monitoring programs will track overall water table trends in the region and provide important, up-to-date data for making decisions on water management. Establishing these programs amongst the four counties will aid in the exchange of data and improve regional coordination on various water projects. The expanded water monitoring programs will be established by the Vina and RCRD GSAs, with assistance from the four counties.

5.4.2 Update the Butte Basin Groundwater Model

The existing BBGM covers the Vina, Butte, and Wyandotte Creek Subbasins. This project will help fill the identified data gaps by 1) updating the BBGM with newly acquired data; and 2) using the updated version of the model to run simulations to support evaluation of projects or GSP updates as appropriate and warranted. Some of the new data to be incorporated is the AEM data and data on the different hydraulic conductivities of each layer of the aquifer. The AEM data will be used, among other things, to adjust the various surfaces in the model to better represent the aquifer's hydrogeologic layers.

Once the model has been updated with the new data, it will be better suited for running simulations of different water or land use management scenarios as well as predictions for climate and precipitation fluctuations. Lateral and vertical connectivity between aquifer layers and connections to surface water features will be more accurate and help identify areas of the basin where groundwater recharge may be needed. Overall, this will help shape management actions by focusing efforts on those particular areas. Ongoing updates to the model will emphasize the importance of accurate and up-to-date data and help continue monitoring efforts

such as measuring water levels and stream flows. It is expected that at least two updates to the model will be prepared as the GSP is implemented and additional data is collected.

An updated groundwater model is vital for running accurate simulations that may be used to make important decisions regarding groundwater allocation, pumping, recharge, and other activities. The model should contain the most up-to-date data to represent the basin realistically and accurately.

5.4.3 Community Monitoring Program

As discussed in Section 4.10, the MT for groundwater levels is based on the depths of domestic wells. The dataset used for this assessment is limited and likely includes wells no longer in use or poorly maintained wells. To resolve this data gap, the GSAs will conduct surveys of domestic wells within the Vina Subbasin to assess if the wells are still active and collect the well construction details. As domestic well construction information may be limited, selected wells may be video logged to obtain additional information.

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 MO and MT over the implementation period, as appropriate.

5.4.4 Interconnected Surface Water/Associated Impacts on Groundwater Dependent Ecosystems

Also discussed in Section 4.10 and in Section 3.8 is the lack of sufficient data to analyze the interaction of streams and groundwater pumping within the primary aquifer system. Additional wells and other monitoring networks will be installed, as appropriate, following the framework discussed in Section 3.8.

5.5 Adaptive Management Strategies

The GSAs will be requesting annual reports from the project proponents to evaluate progress on implementation. If the projects are not progressing or if monitoring efforts demonstrate that those projects are not achieving their targets, the GSAs will evaluate the need for additional or modified projects and to begin implementation of management actions.

5.6 Potential Available Funding Mechanisms

As listed above in the individual project descriptions, several funding mechanisms have been identified to help with the planning and implementation of the GSP projects. The following is an abbreviated list of some of the funding mechanisms proposed:

Project Type	Funding Type	Program	Dates
IRWM (projects included in an adopted IRWM Plan)	Implementation Grant	Proposition 1, Water Quality, Supply, and Infrastructure Improvement Act of 2014	Round 2 solicitation expected in late 2021
Recharge Projects	Planning and construction grants	Proposition 68, California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018	Round 2 solicitation to be released early 2022
Wastewater treatment for underrepresented communities projects	Planning and construction grants	Small Community Grant Fund	Applications accepted continuously
Public water systems improvement	Planning and construction grants	Drinking water grants	Applications accepted continuously
Land Conservation	USDA Farm Service Agency	Conservation Reserve Program	Applications accepted continuously

EXAMPLE of Project Attributes included in the PMA Module (only two GSP Projects shown, for example only)

Project DB ID	279	281
PMA ID	5-021.57_PMA_1	5-021.57_PMA_3
Basin / Subbasin	5-021.57 VINA	5-021.57 VINA
GSP(s)	5-021.57 VINA	5-021.57 VINA
A.1 - Project or Management Action? *	Project	Project
A.2 - Project or Management Action Name *	Agricultural Irrigation Efficiency	Project: Scoping for Flood MAR/Surface Water Supply and Recharge
A.3 - Subcategory	Planned Projects	Planned Projects
A.4 - Brief Description *	Adoption of more efficient irrigation practices.	Initial scoping and identify recharge opportunities
A.5 - Project or Management Action Type(s) *	Water Conservation/Efficiency	Other;Study or Investigation;Administrative Activities
A.5(a) - Type - Other Description **		Scoping and identifying recharge opportunities
A.5(b) - PMA Subtype(s) ** (Direct Aquifer Recharge, Demand Management, Coordination PMA Type Only)		
A.6 - Lead Implementing GSA(s) *	Vina GSA	Vina GSA;Rock Creek Reclamation District GSA
A.7 - Other Implementing GSA(s)		
A.8 - PMA Point of Contact Name		
A.8(a) - PMA Point of Contact Agency Name		
A.8(b) - PMA Point of Contact Email		
A.8(c) - Point of Contact Phone		
B.1 - Is the location known? *	No	No
B.1(a) - Explain why the location is unknown **	The project is in the planning stages	Project efforts on areas with the greatest need for recharge, but no specific location is available at the moment.
B.2 - Location(s) Description **		
B.3 - Covers Entire Basin? **		
B.5 - Location Name 1		
B.5 - Latitude 1		
B.5 - Longitude 1		
B.5 - Location Name 2		
B.5 - Latitude 2		
B.5 - Longitude 2		
C.1 - Describe the circumstances under which the project or management action shall be implemented *	Project is anticipated to move forward with implementation	Project is anticipated to move forward with implementation
C.2 - Does the PMA have an expected initiation and completion date? *	Yes	Yes
C.2(a) - If no expected initiation and/or completion date is provided, describe the conditions that would trigger implementation and/or termination of the PMA, and provide how the GSA will determine when these conditions become present. **		
C.3 - Expected initiation year **	2024	2022
C.4 - Expected completion year **	2030	2032
D.1 - Are estimated costs known? *	No	No
D.1(a) - Describe why estimated costs are not known. **	To be determined	To be determined

D.2 - Provide an Estimated Cost **		
D.3 - Describe the estimated costs and how these costs will be met **		
D.4 - Select potential funding sources. **	State Funding (Grant);Federal Funding (Grant)	State Funding (Grant)
D.4(a) - Describe potential funding sources **	Proposition 1, Proposition 68, USDA, and Drought Resiliency Grants	Proposition 1 and Proposition 68
D.5 - Select confirmed funding sources **	State Funding (Grant)	State Funding (Grant)
D.5(a) - Describe confirmed funding sources **	SGM Grant Program, SWEEP	SGM Grant Program
E.1 - Select applicable benefited sustainability indicators *	Groundwater Levels;Groundwater Storage	Groundwater Levels
E.1(a) - If no sustainability indicators are selected, please provide an explanation **		
E.2 - PMA Benefit(s) *	Reduction in Groundwater Demand/Reduced Pumping	Reduction in Groundwater Demand/Reduced Pumping;Increased Groundwater Supply;In lieu Use
E.3 - Does the PMA provide water supply benefits? *	Yes	No
E.3(a) - Provide the estimated projected benefits in acre-feet per year (AFY)	4,000	
E.3(b) - Provide a description of the water supply benefits **	The project will address declining water levels and the declining volume of groundwater stored in the aquifer. The main objective of the project is to reduce groundwater demand by modifying irrigation practices.	
E.4 - Describe any other non-water supply related benefits. **		Initiating first stages of FloodMAR efforts in Vina.
E.5 - Explain how benefits will be evaluated *	A survey that consolidates data on the adoption of irrigation methods and practices by agricultural groundwater users will identify where more efficient practices can be implemented. This can help focus efforts and finances on areas where a reduction in overall groundwater demand is needed and feasible.	Not provided in GSP.
E.6 - Is the PMA dependent on a water supply source? *	No	No
E.7 - Select all applicable water source(s). **		
E.7(a) - "Other" water source description **		
E.8 - Explain the water source(s) and the reliability of each source. **		
Status	Planning	Planning
Last Updated	2/25/2026 12:52 PM	2/25/2026 12:52 PM

March 25, 2026

Vina Subbasin: Projects and Management Actions (PMAs)

Prepared by:

The LWA Team in coordination with the Vina GSA

Funding provided by the California Department of Water Resources

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Vina GSA

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Agenda

- Discussion of Projects and Management Actions (PMAs)
- **Request for Feedback**

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Topics for SHAC Consideration

1. Provide feedback on proposed PMA classifications:
   I. GSA Prioritized PMAs – projects to be included in the SGM Portal PMA Module
      I. Completed
      II. In-Progress
      III. Potential

   II. Other Projects – projects that provide other ancillary benefits to groundwater or are not currently part of the GSAs' active strategy to achieve/maintain sustainability

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2022 GSP Projects and Management Action (PMA) Categorization

- PMAs aim to address overdraft within the Subbasin by (1) decreasing pumping or (2) increasing groundwater storage via recharge
- The scale and number of PMAs in the GSP should be aligned with the level of effort anticipated to maintain/achieve sustainability in the subbasin
- In the 2022 GSP, PMAs are categorized into four groups:
  - **Planned Projects**: Projects in this category are anticipated to move forward to help achieve the region's sustainability before 2042.
  - **Potential Projects**: Projects in this category are currently in the initial planning stages and may move forward as feasibility and project requirements are determined.
  - **Conceptual Projects**: Projects in this category are in the early conceptual planning states and would require significant additional work to move forward.
  - **Management Actions**: Actions that can be implemented to focus on reduction of groundwater demand including increased data collection, education and outreach, regulatory policies, incentive programs, and enforcement actions.

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2022 GSP Projects and Management Action (PMA) Categorization

Table 1. PMA Summary from the 2022 GSP.

Planned Projects	Potential Projects	Conceptual Projects	Management Actions
1. Agricultural Irrigation Efficiency	1. Paradise Irrigation District Intertie	1. Extend Orchard Replacement	1. General Plan Updates
2. Residential Conservation	2. Agricultural Surface Water Supplies	2. Recharge from the Miocene Canal	2. Domestic Well Mitigation
3. Scoping for Flood MAR, Surface Water Supply, and Recharge	3. Streamflow Augmentation		3. Well Permitting Ordinance
4. Community Water Education Initiative	4. Community Monitoring Program		4. Landscape Ordinance
5. Fuel Management for Watershed Health	5. Wastewater Recycling		5. Prohibition of Groundwater Use for Ski (Recreational) Lakes
	6. Rangeland Management and Water Retention		6. Expansion of Water Purveyors' Service Area
	7. Removal of Invasive Species		7. Groundwater Allocation
	8. Surface Water Supply and Recharge		

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Proposed PMA Categorization

Goal: clarify which Projects are needed to achieve / maintain sustainability.

- **GSA Prioritized PMAs:**
  - **Completed:** a finished project and benefits have been reported
  - **In-progress:** a project in planning, design, or implementation phase – may require funding to proceed
  - **Potential:** a project that has been developed – to be implemented as needed/funded
- **Other Projects:** Potentially led by other agencies and not critical to achieving sustainability. Status will be tracked by the GSA as feasible (not to be included in the PMA Module of the SGM Portal for annual tracking).

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GSA Prioritized PMAs – initial categorization for discussion

Projects the GSAs are or will pursue to maintain / achieve sustainability in the subbasin. These projects would be actively tracked in Annual Reports and updates reported on in the PMA Module.

Completed Projects
N/A

In-Progress Projects	Potential Projects
1. Agricultural Irrigation Efficiency (5.2.3.1) 2. Residential Conservation (Cal Water) (5.2.3.2) 3. Scoping for Flood MAR/Surface Water Supply and Recharge (5.2.3.3) 4. Extend Orchard Replacement (5.2.5.1) 5. Rangeland Management and Water Retention (BCCER) (5.2.4.6)	1. Agricultural Surface Water Supplies Project (5.2.4.2) 2. Surface Water Supply and Recharge (includes Lindo Channel)* (5.2.4.8)

* This is non-specific project that describes various types of activities related to utilizing surface water in the subbasin (includes description of Sand Creek Project and Lindo Channel as examples).

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Other Projects

For Consideration: The following projects are listed as "Other Projects."

They may have benefits to groundwater conditions but are not part of the GSAs' active strategy to maintain / achieve sustainability. Projects will be tracked, as feasible.

Should any of these be elevated/moved to one of the other project categories (previous slide)?

Other Projects
1. Wastewater Recycling (City of Chico) (5.2.4.5) 2. Paradise Irrigation District Intertie (5.2.4.1) 3. Community Water Education Initiative (5.2.3.4) 4. Fuel Management for Watershed Health (5.2.3.5) 5. Removal of Invasive Species (5.2.4.7) 6. Streamflow Augmentation (5.2.4.3) 7. Recharge from the Miocene Canal (5.2.5.2) 8. Community Monitoring Program (CSUC) (5.2.4.4)

lwa

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8

Management Actions

All Management Actions are currently in the PMA Module and could be reported on annually.

Management Actions
1. General Plan Updates
2. Domestic Well Mitigation
3. Well Permitting Ordinance
4. Landscape Ordinance
5. Prohibition of Groundwater Use for Ski (Recreational) Lakes
6. Expansion of Water Purveyors' Service Area
7. Groundwater Allocation

lwa

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9

Summary and Questions for Discussion

1. Provide feedback on proposed PMA classifications:
    I. GSA Prioritized PMAs – projects to be included in the SGM Portal
        I. Completed
        II. In-Progress
        III. Potential
    II. Other Projects

Q1. Scoping for Flood MAR/Surface Water Supply and Recharge – should we consider this project complete based on the completion of the grant funded Surface Water Supply and Recharge Feasibility Study, to be completed mid-2026? Or not?

Q2. Should any of the projects in the **Other Projects** category be moved to the GSA Prioritized categories?

lwa

10

10

SGM Grant Funded Project Recap Presentations

Wednesday, March 25, 2026

Vina Stakeholder Advisory Committee Meeting

Approach to Groundwater Sustainability

Butte County
WATER & RESOURCE CONSERVATION

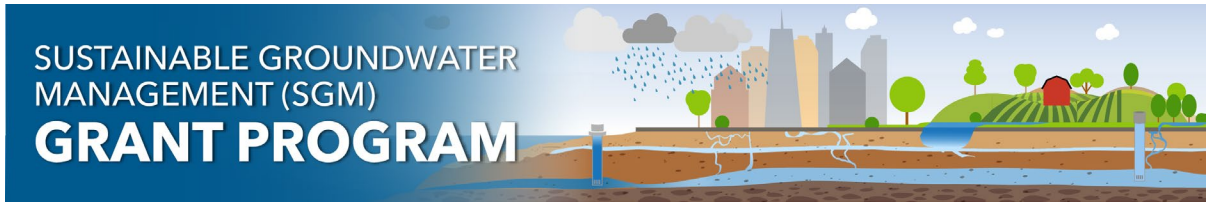
Vina GSA

Grant Projects 2024-2026

Background

- California Department of Water Resources Sustainable Groundwater Management Grant Program
  - Vina Groundwater Sustainability Agency (GSA) awarded $5.5M

- Butte County Department of Water and Resource Conservation is leading portions of the grant funded work and administering the grant on behalf of the GSAs



Grant Funded Projects

Vina GSA

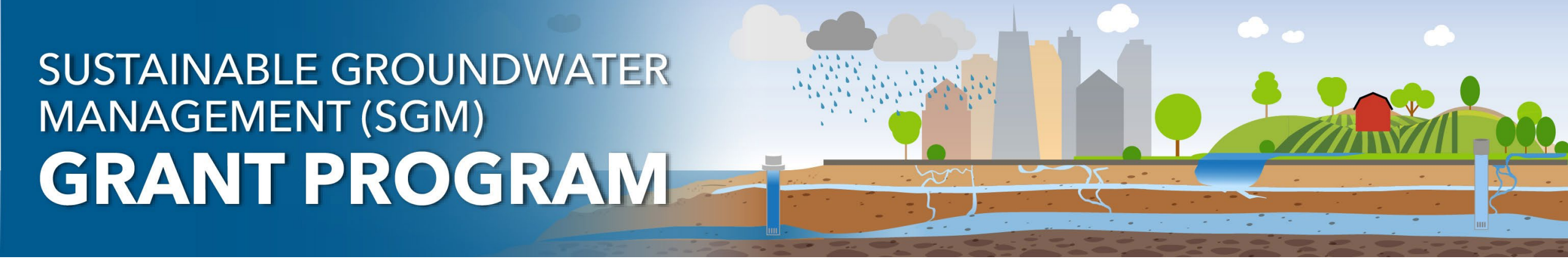
Funding End Date:
January 2027

Butte County
WATER & RESOURCE CONSERVATION

★ Today!

- Data Gap Identification and Data Improvement
- ★ Demand Reduction Strategies
- ★ Lindo Channel Recharge Feasibility
- Long-Term Fee Study
- ★ Water Supply and Recharge Feasibility
- ★ Inter-basin Coordination Analysis and Modeling
- Outreach Program
- Grant Administration

https://www.vinagsa.org/sustainable-groundwater-management-grant-funded-projects



Vina GSA

Lindo Channel Recharge Feasibility

Agenda

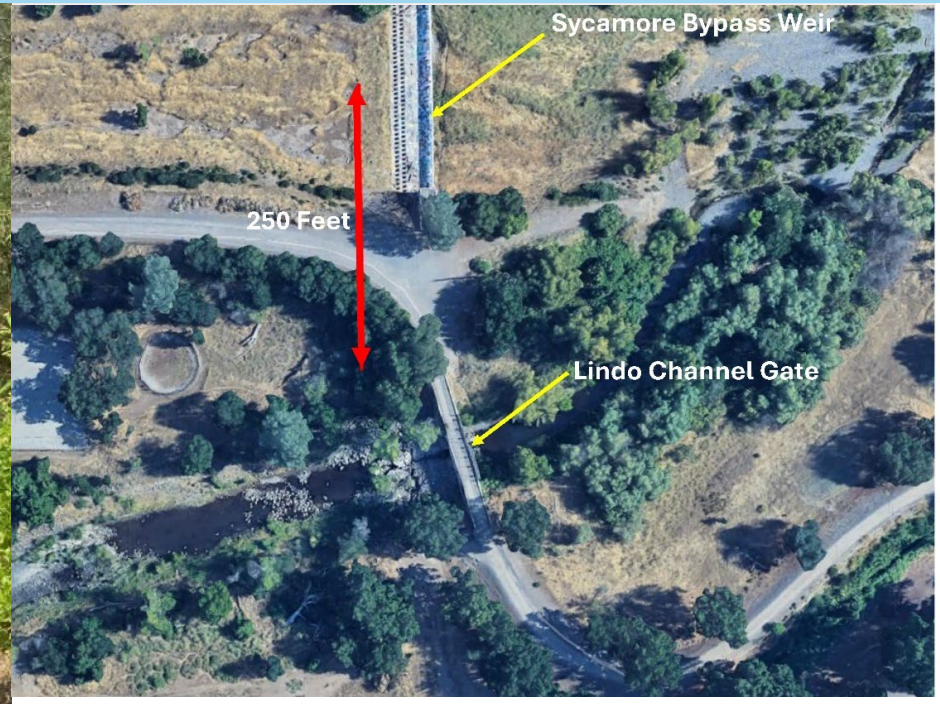
- Overview
- Scope of Work
- Physical Setting
- Field Programs and What we Learned
- Questions
- Modeling
- Takeaways
- Next Steps
- Questions

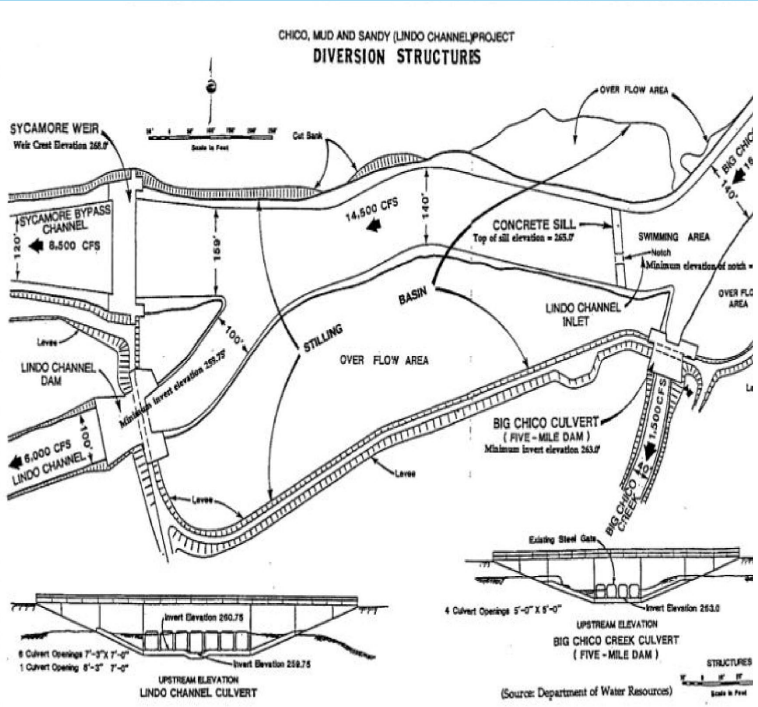
Lindo Channel Recharge Feasibility

Overview

- Component 4 of Vina GSA Implementation Grant
- Working with City of Chico and State Agencies
- Assessing Feasibility of Increasing Natural Recharge Along Lindo Channel

Overview


Sycamore Bypass Weir
250 Feet
Lindo Channel Gate


CHICO, MUD AND SANDY (LINDO CHANNEL) PROJECT
DIVERSION STRUCTURES
SYCAMORE WEIR
SYCAMORE BYPASS CHANNEL
8,500 CFS
14,500 CFS
CONCRETE SILL
SWIMMING AREA
BASIN
STILLING
OVER FLOW AREA
LINDO CHANNEL INLET
LINDO CHANNEL DAM
5,000 CFS LINDO CHANNEL
BIG CHICO CULVERT
(FIVE - MILE DAM)
UPSTREAM ELEVATION
LINDO CHANNEL CULVERT
BIG CHICO CREEK CULVERT
(FIVE - MILE DAM)
(Source: Department of Water Resources)

Scope of Work

Develop Flow Thresholder

- Water Rights, habitat, downstream beneficial users

Estimate Expected Recharge Yield

Evaluate Infrastructure or Stream Improvement Needs

Assess Percolation (Infiltration) Rates

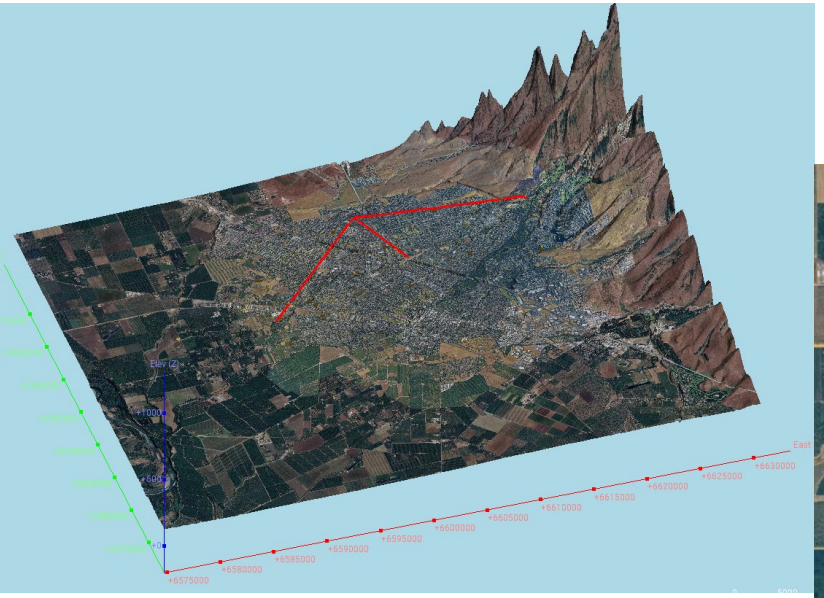
Prepare Project Draft Implementation Plan

Assess Environmental and Regulatory Permitting Needs

Assess Operational requirements

Monitoring Program

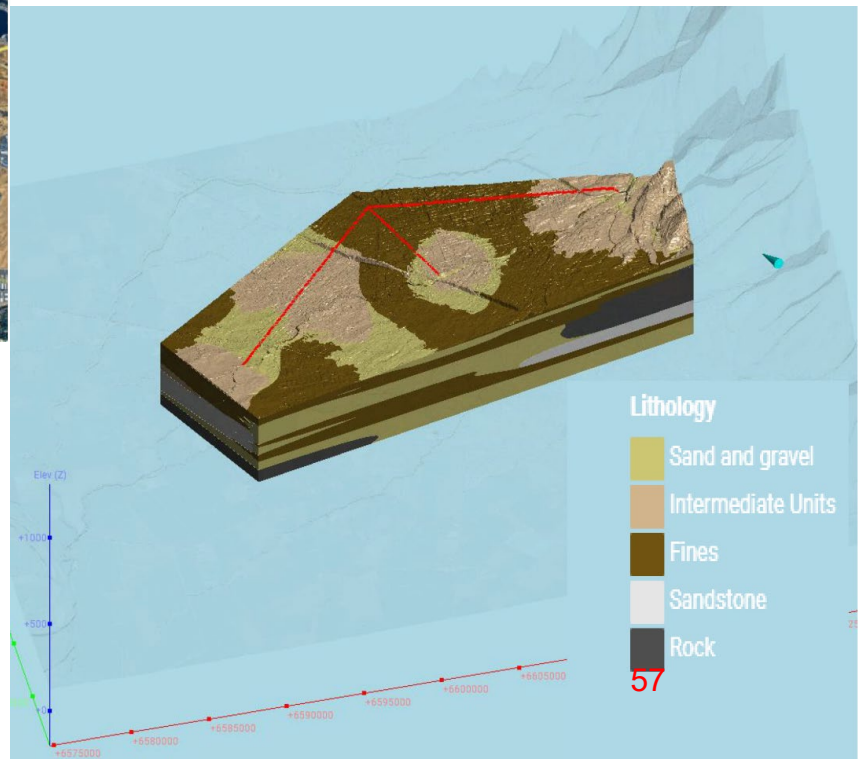
Physical Setting



Topography

Hydrology

Hydrogeology



Field Programs

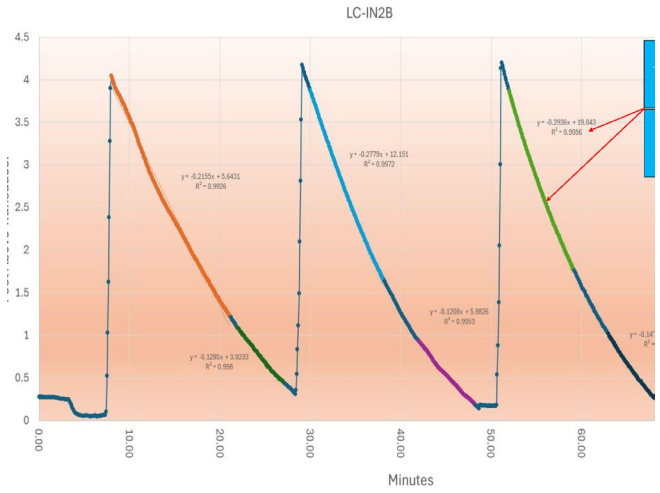
Designed to Understand How Water Flows From Lindo Channel To Groundwater.

INFILTRATION TESTS

FLOW RATES

CONTINUOUS WATER LEVELS

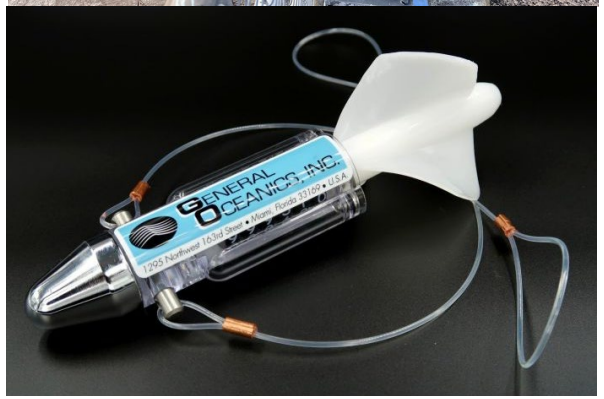
WATER QUALITY TESTING

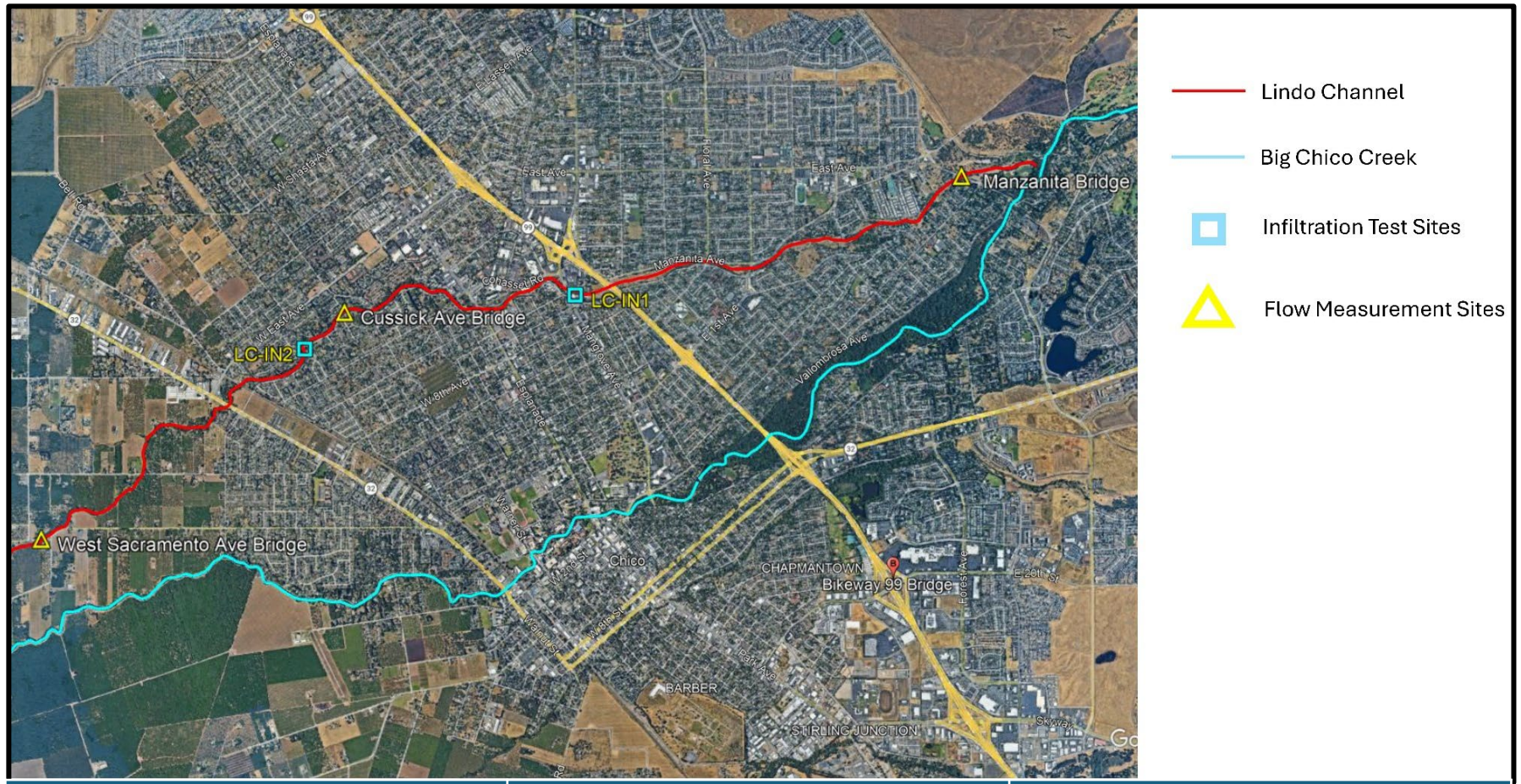


Infiltration Tests

- Maximum – 491 Feet per Day
- Minimum – 13 Feet per Day
- Average – 262 Feet per Day
- Model used 24 Feet per Day

Flow Rates





Manzanita Avenue	Cussick Drive	West Sacramento
827 cfs	667 cfs	529 cfs

Questionable Data due to High Flow Rates and Debris

Does show decrease in flows going downstream

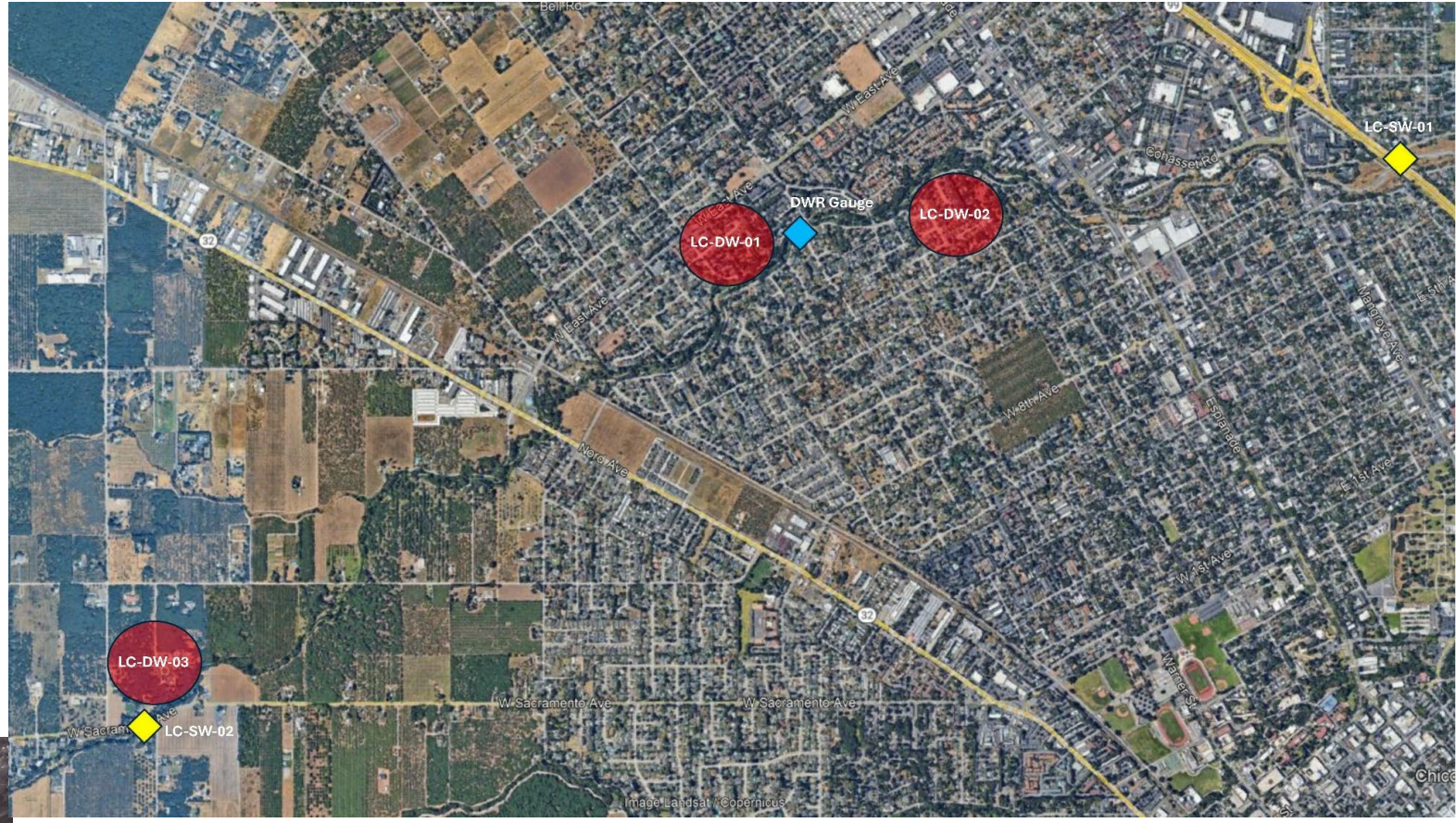
Confirms groundwater recharge

Calculated Groundwater Recharge > 100 AFD

Continuous Water Levels

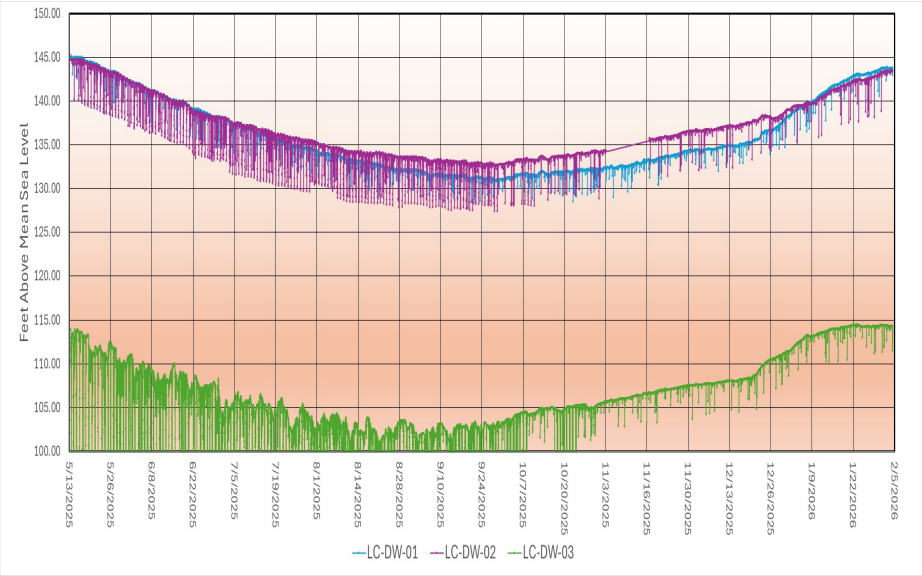
Stilling Wells

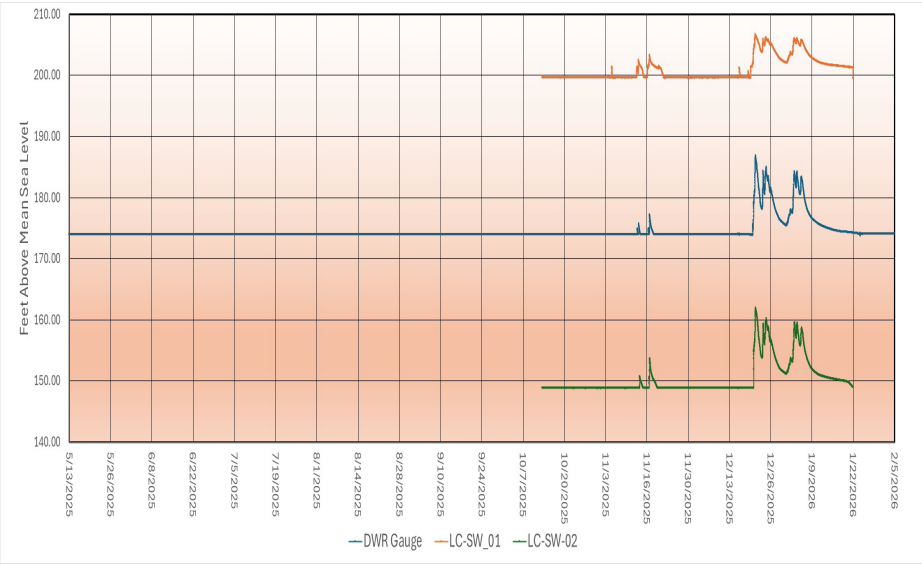
Domestic Wells

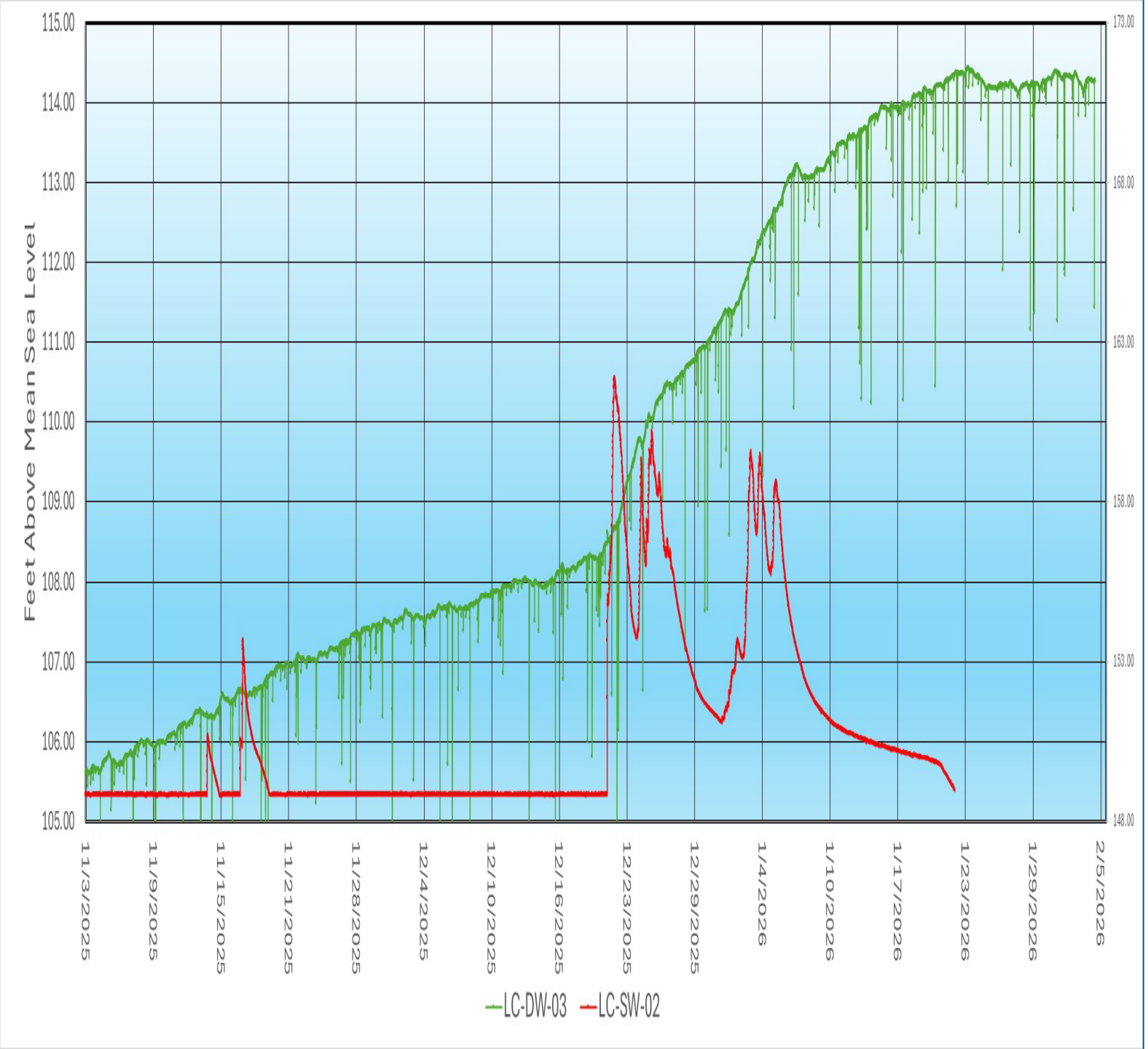


Interactions Between Lindo Channel Water and Groundwater

- From May 2025 to September 2025 Water Levels Dropped 12 to 13 Feet
- Water Levels Recovered to May 2025 Levels by February 2026
- Water Levels in Domestic Wells Clearly Show Response to Water in Lindo Channel





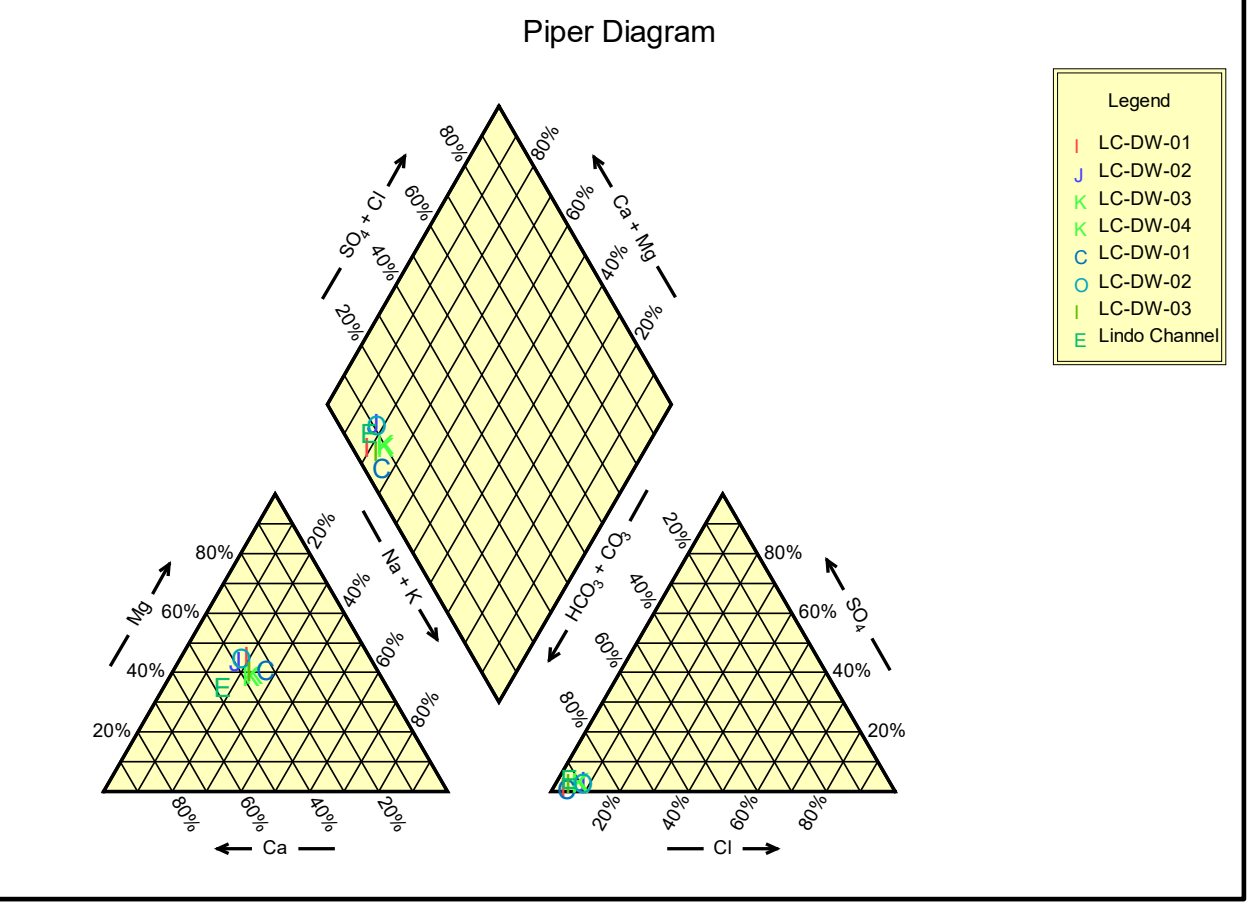


Hydrographs Definetly show groundwater is being recharged by water in Lindo Channel.

Using simple assumptions infiltration rates 4 to 62 feet/day

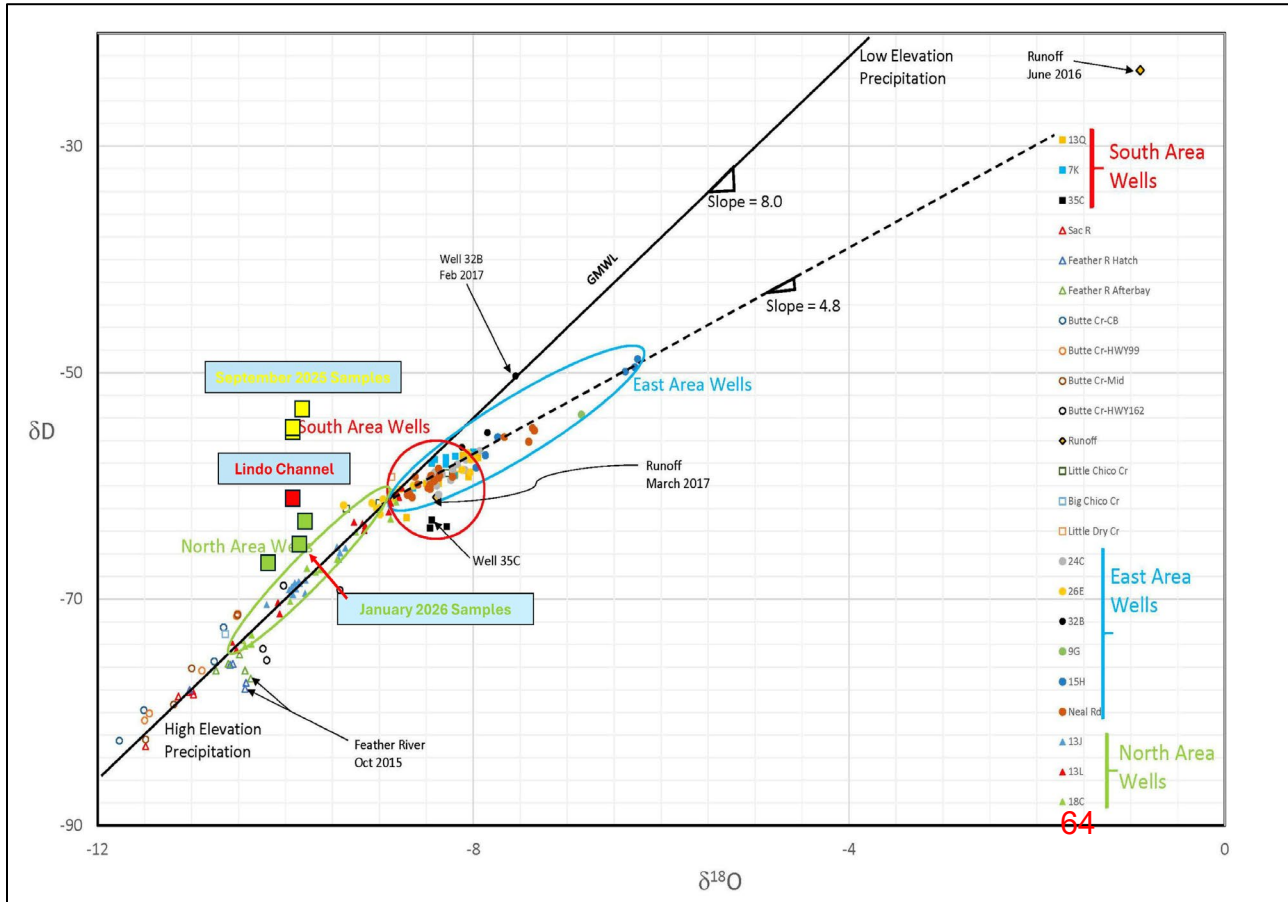
With same assumptions groundwater recharge when water flowing 31 to 992 acre-feet/day

Water Quality

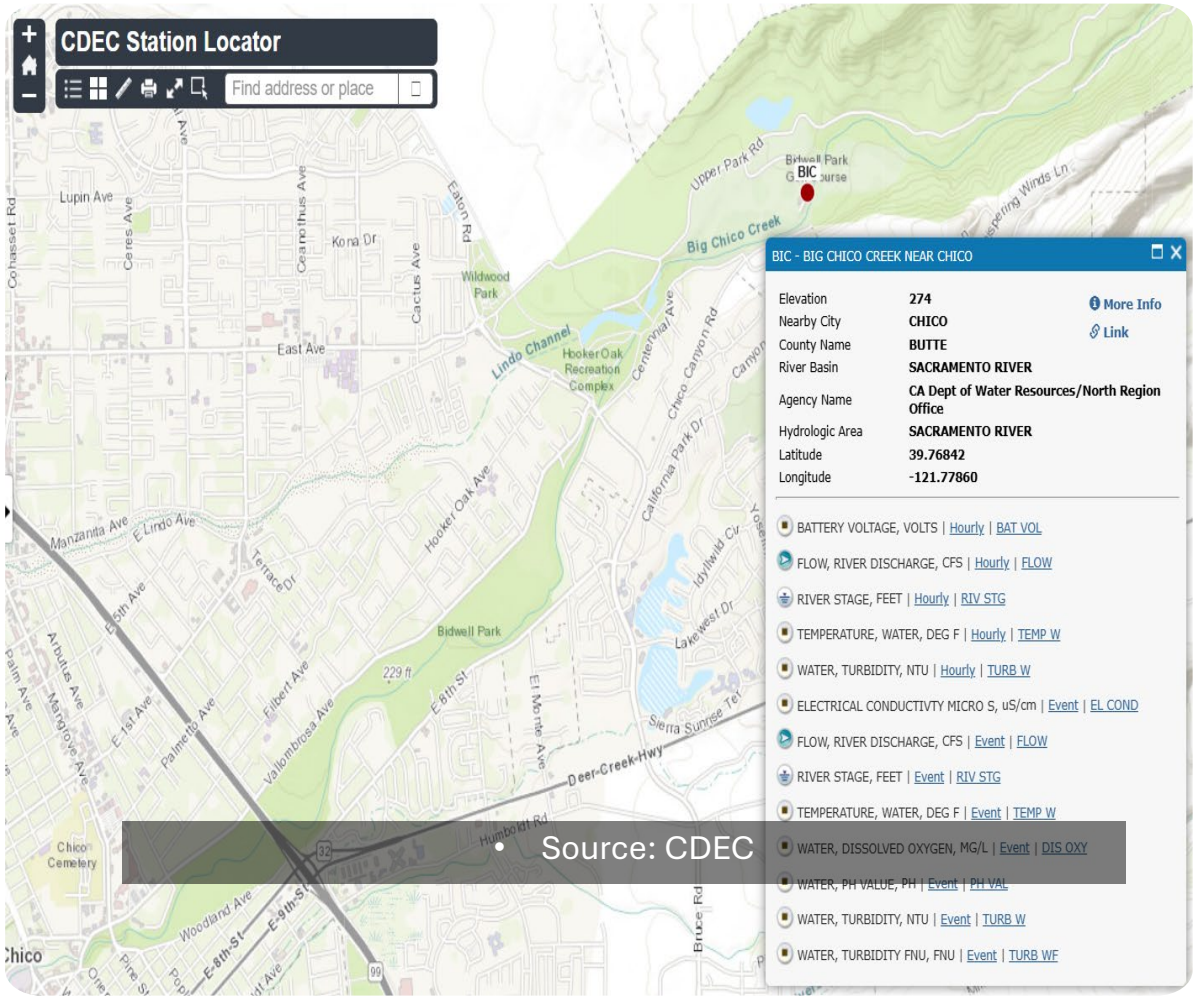


- All wells Mg-HCO3 Water Type – Shallow Fresh Groundwater.
- After Flow in Lindo Channel modest increase in HCO3 and slight reduction in SO4 – Consistent with recharge pulse
- Slight NA+K increase – minor cation exchange – also supports recharge signal

Isotope data Supports Quick Infiltration of Lindo Channel Water in Shallow Groundwater



FLOW MODELING



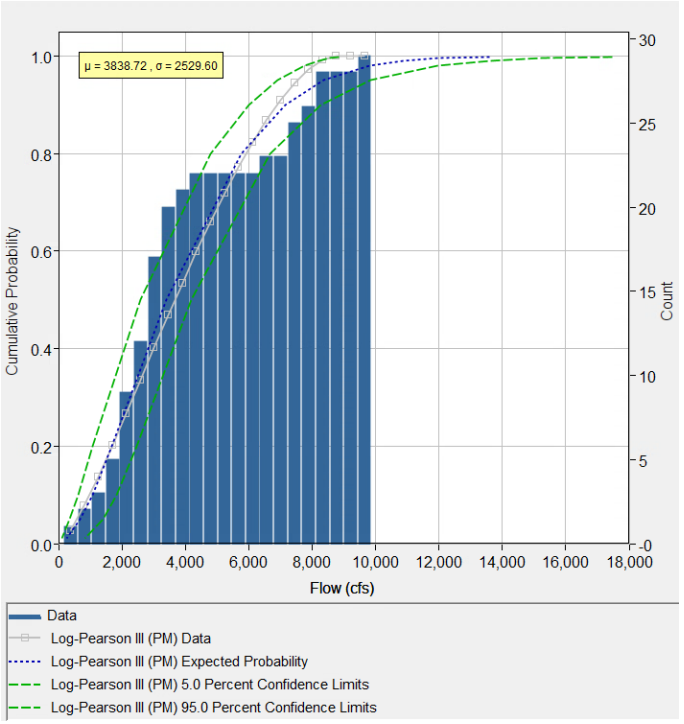
- Source: CDEC

Approach

- Ecological flows assessment (not described here)
- Flood flow frequency analysis at BIC
- Flow split two-dimensional numerical modeling at Big Chico/Lindo
- Lindo Channel one-dimensional numerical modeling
- Infiltration calculations
- Concurrent hydrogeologic analysis

Flood flow frequency analysis

- BIC gage
- 28 years of record (1997-present)
- HEC-SSP (Bulletin 17C)
- Discharges for 1-, 2-, 5- and 10-year return periods
- Log-Pearson III distribution vs. Gumbel distribution
- Representative historical runoff event selected for each return period event for numerical modeling

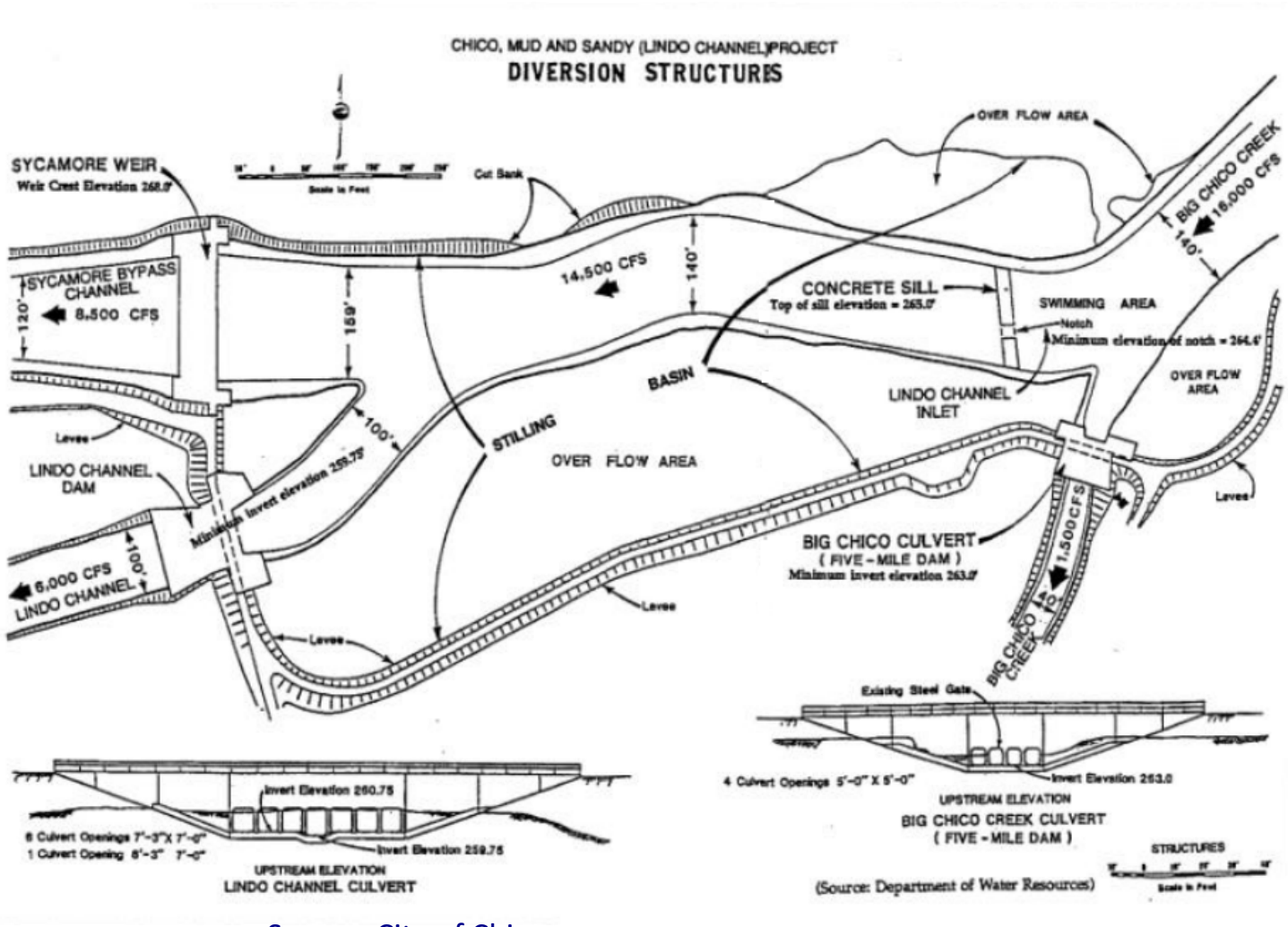


Frequency Curves

Percent Chance Exceedance	Median Curve	Expected Probability
	Flow in cfs	Flow in cfs
0.2	8521.5	13602.6
0.5	8399.0	12007.5
1.0	8248.3	10889.1
2.0	8017.7	9810.7
5.0	7513.9	8359.6
10.0	6887.5	7151.8
20.0	5912.3	5751.4
50.0	3672.5	3392.3
80.0	1693.5	1684.5
90.0	986.5	1070.5
95.0	585.5	694.7
99.0	181.5	257.9

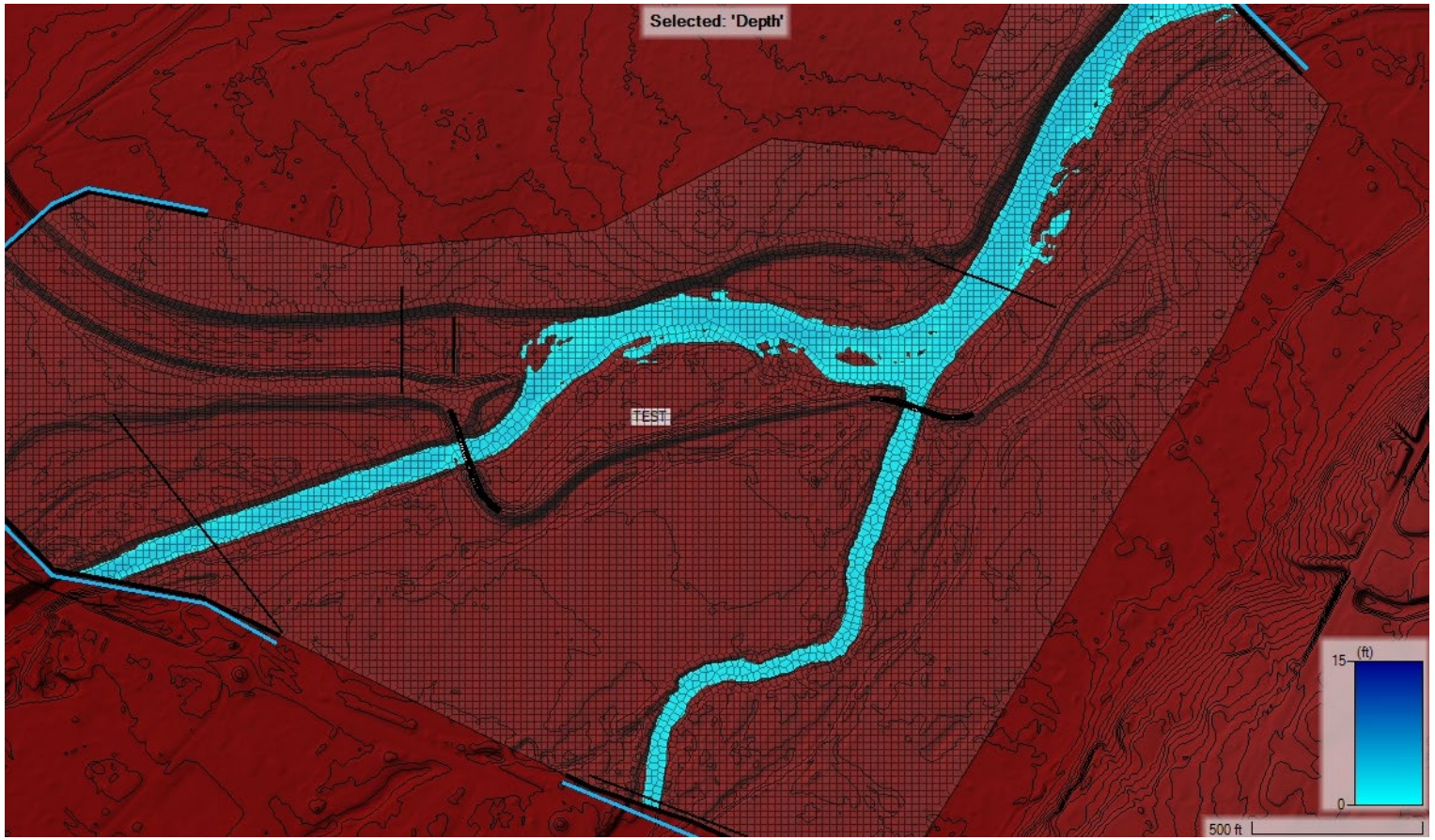
2D flow split modeling

- HEC-RAS
- Two terrains: existing and as-built
- Hydrology from HEC-SSP
- **Goal** – determine flow distribution between Big Chico (main channel), Lindo (distributary) and overflow channel (Sycamore Bypass).

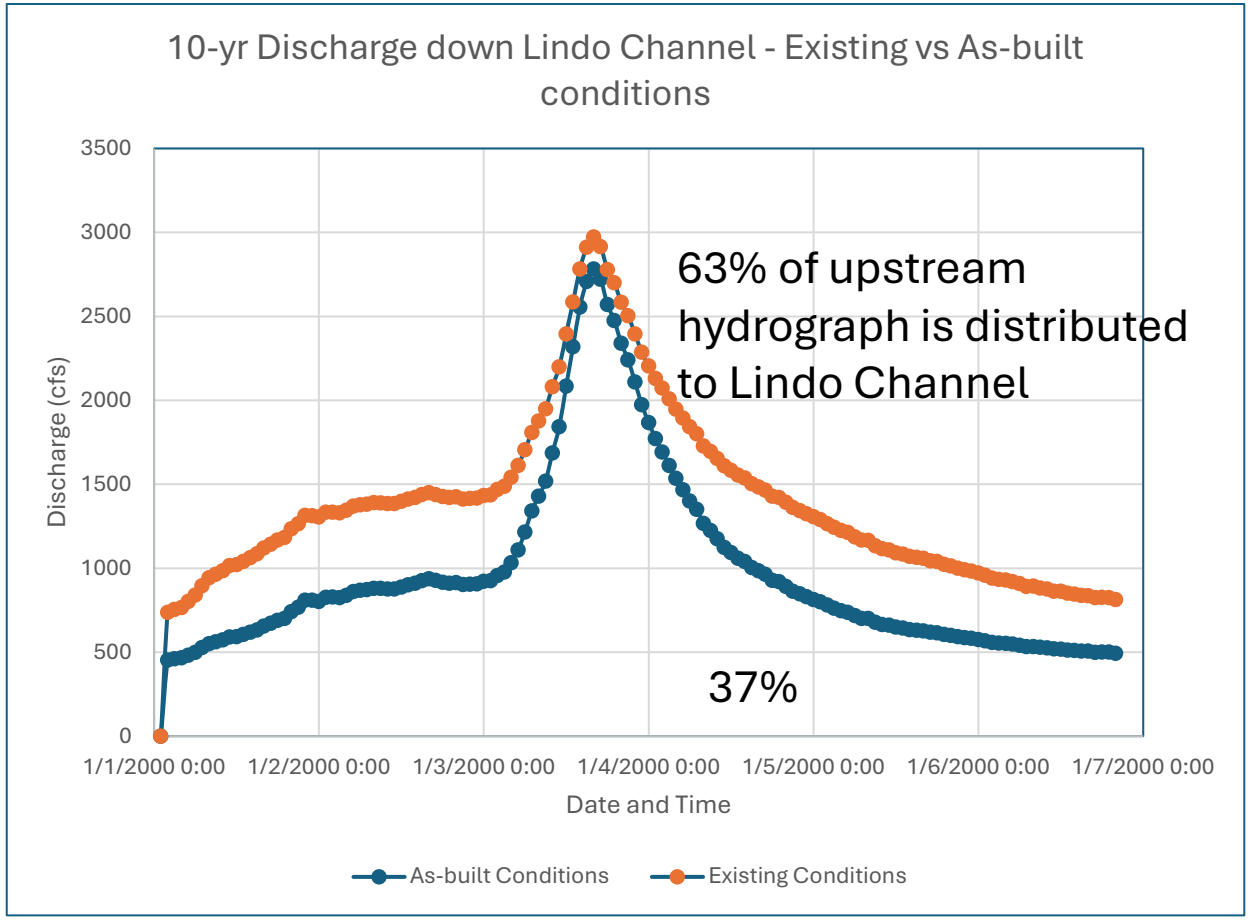


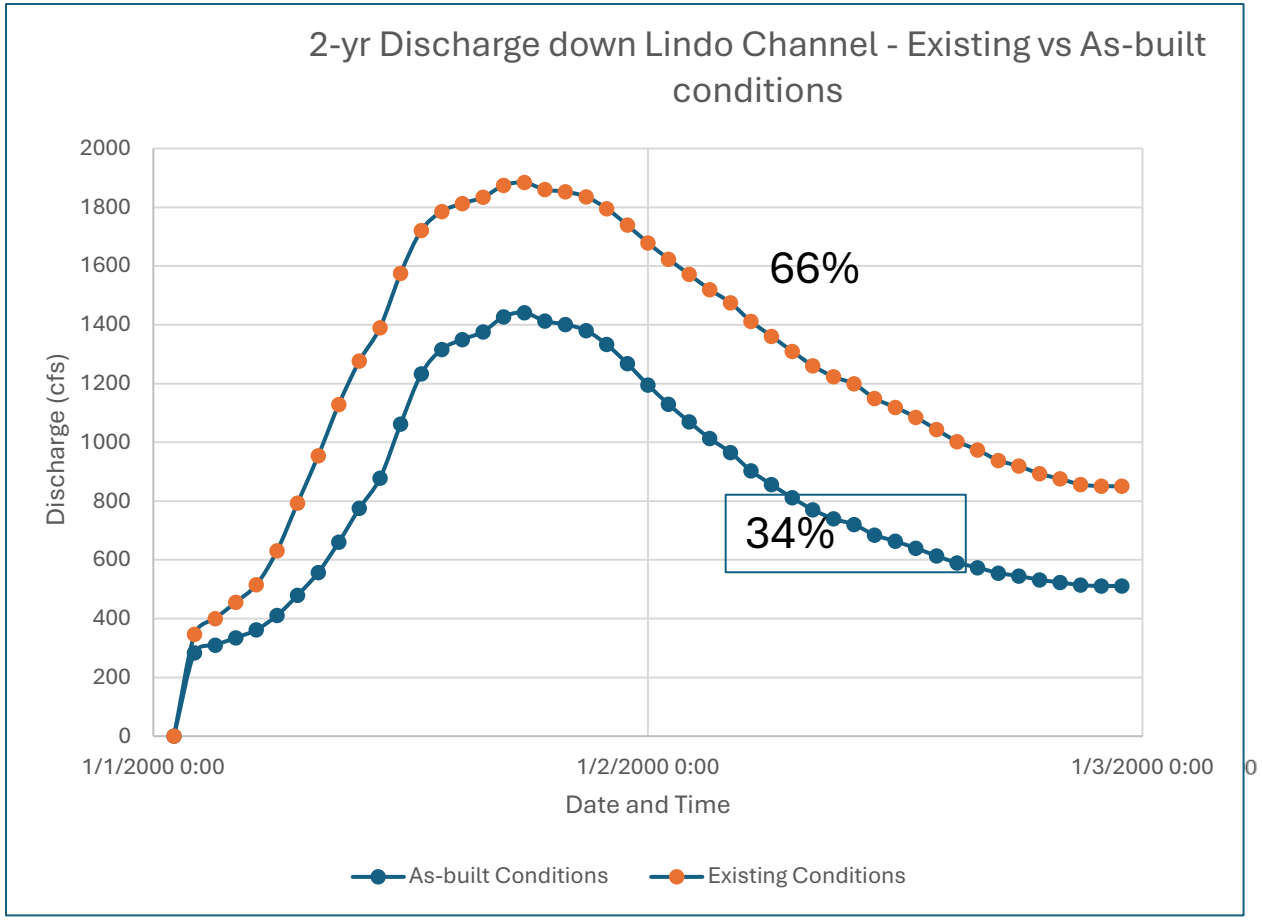
- Source: City of Chico

Lindo Channel 2D flow split model

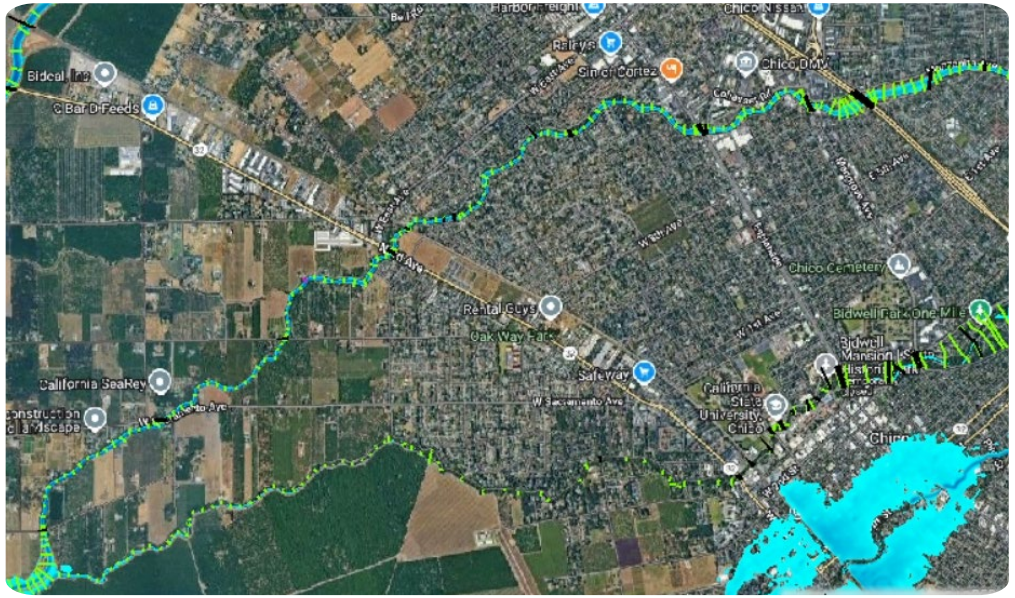


Flow split model Hydrographs





1D Lindo Channel modeling



- 1D HEC-RAS Model developed by others
- 1D modeling goal is to determine top width and wetted perimeter for each section along the channel between Highway 99 and the Big Chico confluence at each model time step
- Area available for infiltration is:

$$A = RL^* WP \text{ (or B)}$$

Infiltration calculations

- Python script written to organize results from HEC-RAS
- Volume = A Δt IR
- Assumptions: no saturated soils, constant infiltration rate in space, constant infiltration rate in time, sufficiently low groundwater table, no anisotropy
- Did not use other methods (i.e., Green-Ampt) which require calibration
- Calculations use 1 inch/hour

Varies with Discharge

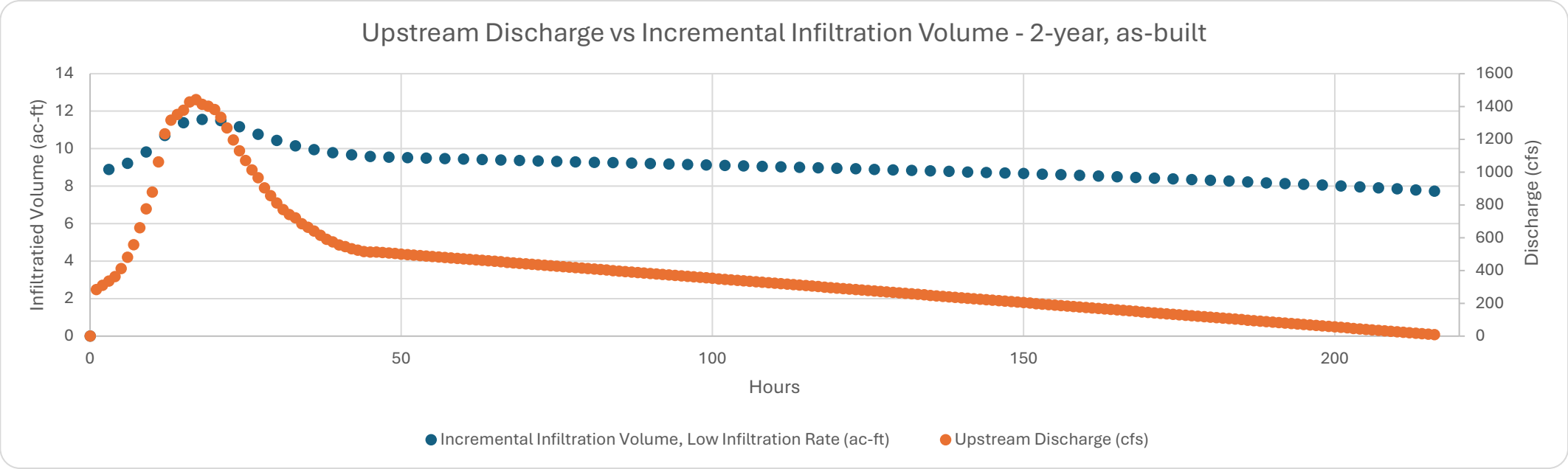
River Station	Top Width (ft)	Length of Channel (ft)	Time Step (s)	Infiltration Rate (ft/s)	Area (ft2)	Infiltration Volume (ac-ft)
5.49	61.5	114	10800	2.31481E-05	=H4*F4	0.040

River Station	Top Width (ft)	Length of Channel (ft)	Time Step (s)	Infiltration Rate (ft/s)	Area (ft2)	Infiltration Volume (ac-ft)
5.49	61.5	114	10800	2.31481E-05	7000.9	=(O4*I4*J4)/43560

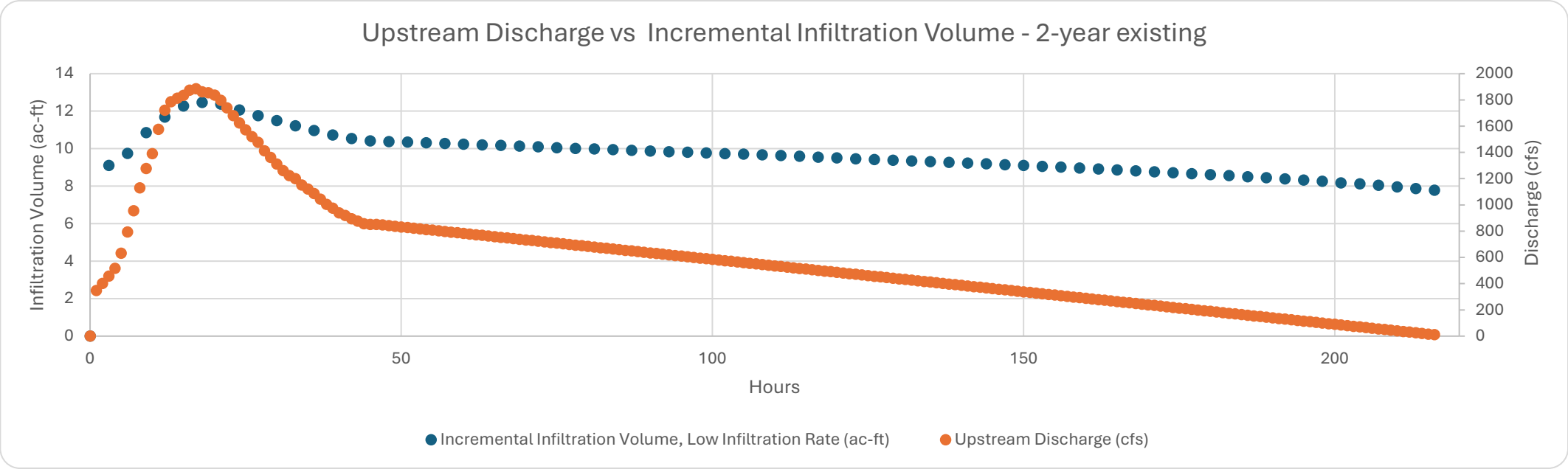
Σ Infiltration Volume at each River Station at one Time Step = Total Infiltration Volume at Time Step

Σ Infiltration Volume at Each Time Step = Total Infiltration Volume during Storm Event

Results – 2-year, as-built

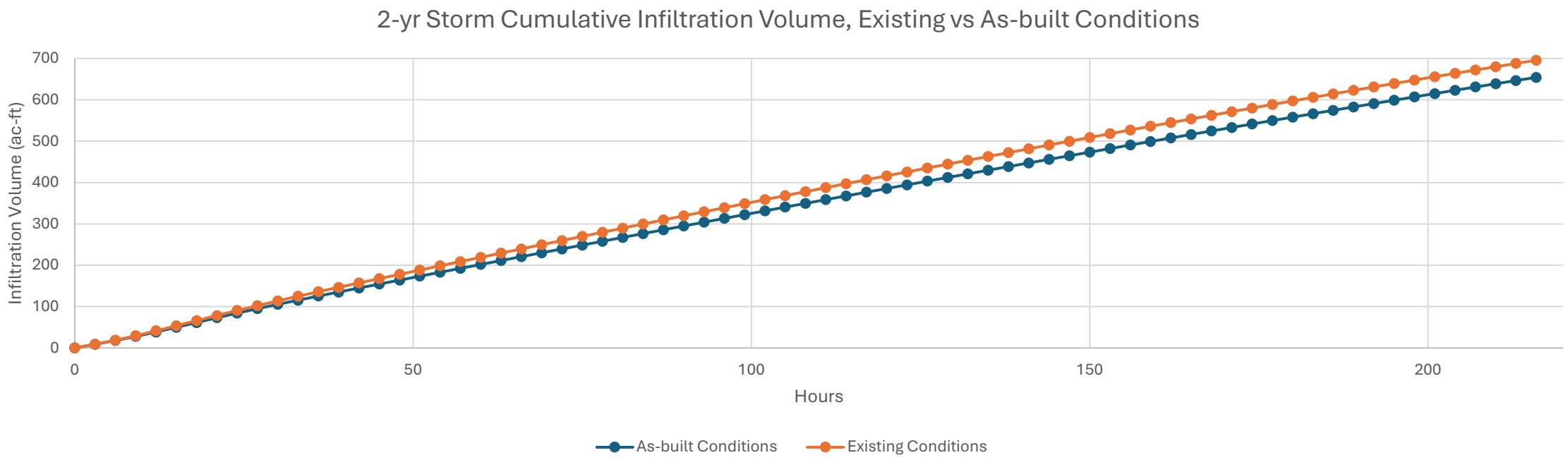


Results – 2-year, existing



Results – 2-year, existing vs. as-built

- D=-0.067, 1867 ACFT



Takeways

- Infiltration in-stream provides a valuable source of groundwater recharge
- Modeling indicates in-stream diversions can substantially increase groundwater recharge when considering more frequent, lower discharge storm events
- Modeling indicates that in-stream diversions of frequent events can infiltrate groundwater more efficiently than storage basins in some systems
- Long infiltration times for small, frequent runoff events are more efficient for recharge design than scalping high volumes for large, less frequent runoff events**
- Field Investigations and Monitoring support these findings

Next Steps

1. Install Monitoring Well System
2. Plan for raising Concrete Sill in Sycamore Bypass

Demand Reduction Strategies

Extend Orchard Replacement (EOR) Pilot Study

Precision Irrigation (PI) Pilot Study

Vina GSA Board of Directors – March 11, 2026

Joel Kimmelshue, PhD, Land IQ

Cooperators

- Land IQ
  - Project Manager: Stephanie Tillman, MS
  - Principal Scientist: Joel Kimmelshue, PhD
  - Technical Advisors:
    - Allan Fulton, MS – Retired Irrigation/Crop Production Specialist
    - Tom Devol, BS – Retired Irrigation and Water Resources Specialist
- Independent Technical Advisor
    - Joe Connell, MS – Retired UCANR Farm Advisor
- ERA Agricultural Economics
    - Duncan MacEwan, PhD
    - Tori Laird, BS
    - Josh Virene, MS

Demand Reduction Strategies - Background

- Grant funded through DWR
- Conducted to show progress on GSP implementation actions
- For the purpose of addressing estimated 10,000 ac-ft annual overdraft
- Specifically, this is to address two main demand reduction strategies:
  - Extend Orchard Replacement
  - Precision Irrigation

LAND IQ

Project Approach

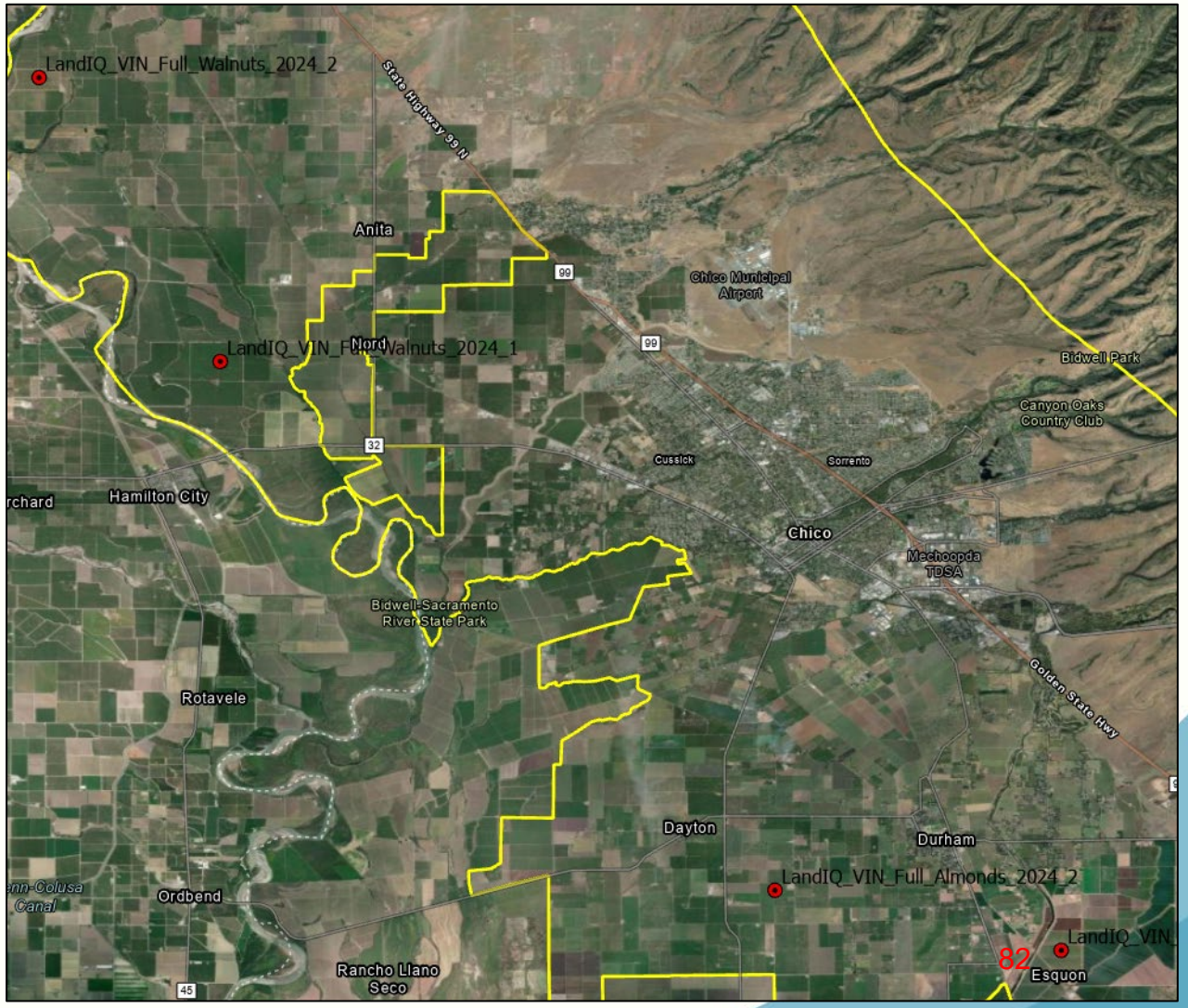
- Both projects followed the same approach, except:

Extend Orchard Replacement Only

Step 1	•**Preparation** - Install field stations to measure field data for ET remote sensing modeling and review current knowledge on potential sources of non-beneficial ET.
Step 2	•**Preliminary analysis** - Use spatial crop/age map data to Identify orchard crop type and age, condition, and removal status
Step 3	•**Pilot orchard selection** - Select pilot orchards that represent different former crop type (almonds or walnuts), fallow periods, and/or fallow interim practices.
Step 4	•**Field data collection** - Collect information on fallow period and practices from growers.
Step 5	•**Consumptive use data collection** - Process consumptive use (ET) data on all orchards in basin using remote sensing modeling.
Step 6	•**Data analysis** - Analyze historical and current year ET data and interpret using grower information.
Step 7	•**Economic analysis** - Evaluate costs, benefits, return on investment and other economic considerations.
Step 8	•**Conclusions** - Estimate costs, water savings, and co-benefits of extending orchard replacement using different practices throughout the Subbasin.
Step 9	•**Recommendations** - Recommend strategies and show results of potential scenarios to reduce non-beneficial consumptive use in the subbasin

Spatial Data for Pilot Studies - ET

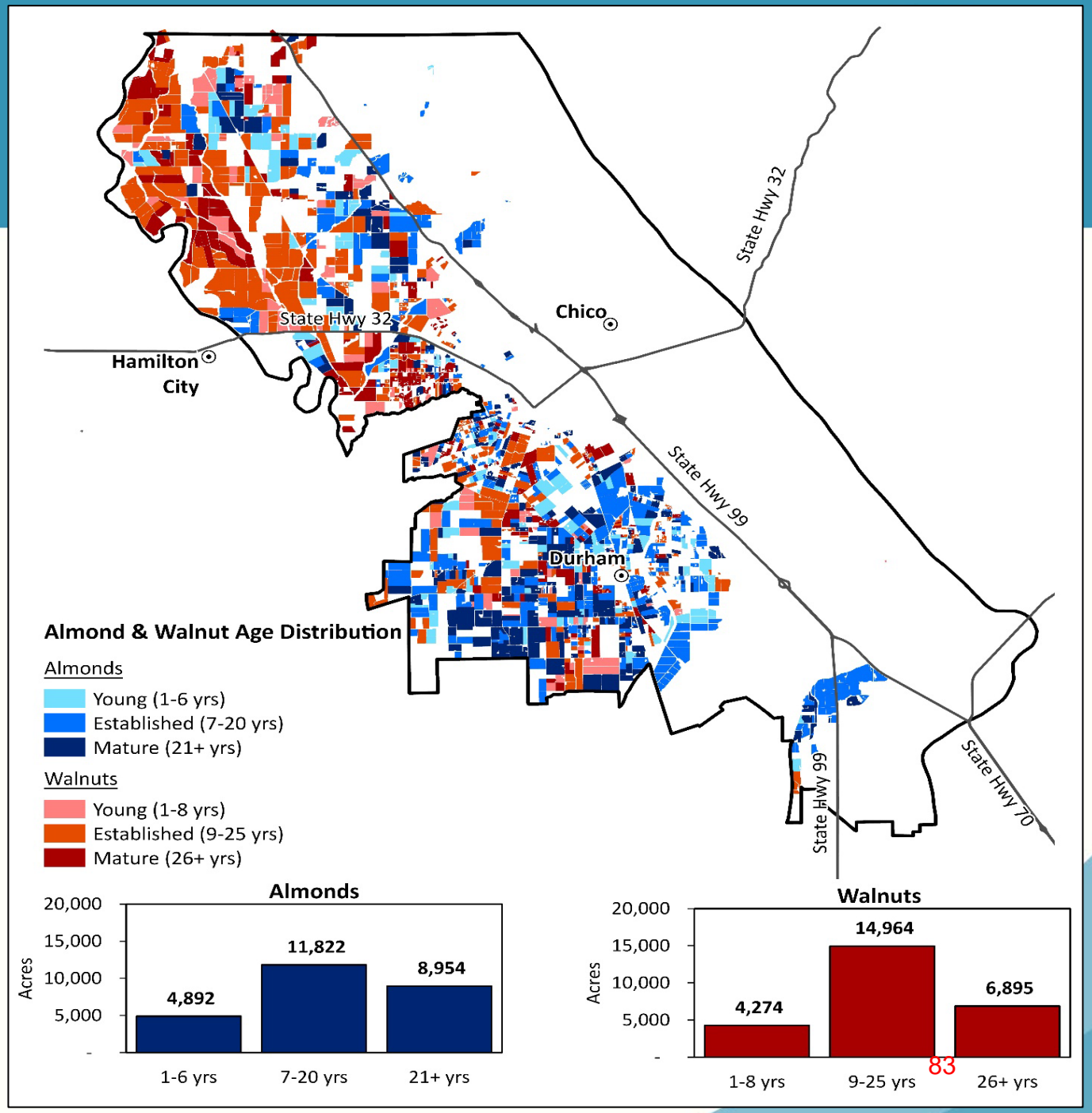
- Evapotranspiration: Fundamental Measurement Approach
  - Walnuts: 2 stations
    - 20-year old orchard in northwest
    - 9-year old orchard in west central
  - Almonds: 2 stations
    - 15-year old orchard in southwest
    - 8-year old orchard in the southeast
  - ET then modeled for every block in the subbasin from Jan-Oct
- Other variables measured or observed:
  - historical ET (2019-2024), precipitation, irrigation method and management, cultural practices, orchard condition, orchard size, soil type, crop rotations, removal status, root stock, spacing, variety, yield, etc.



LAND IQ

Spatial Data

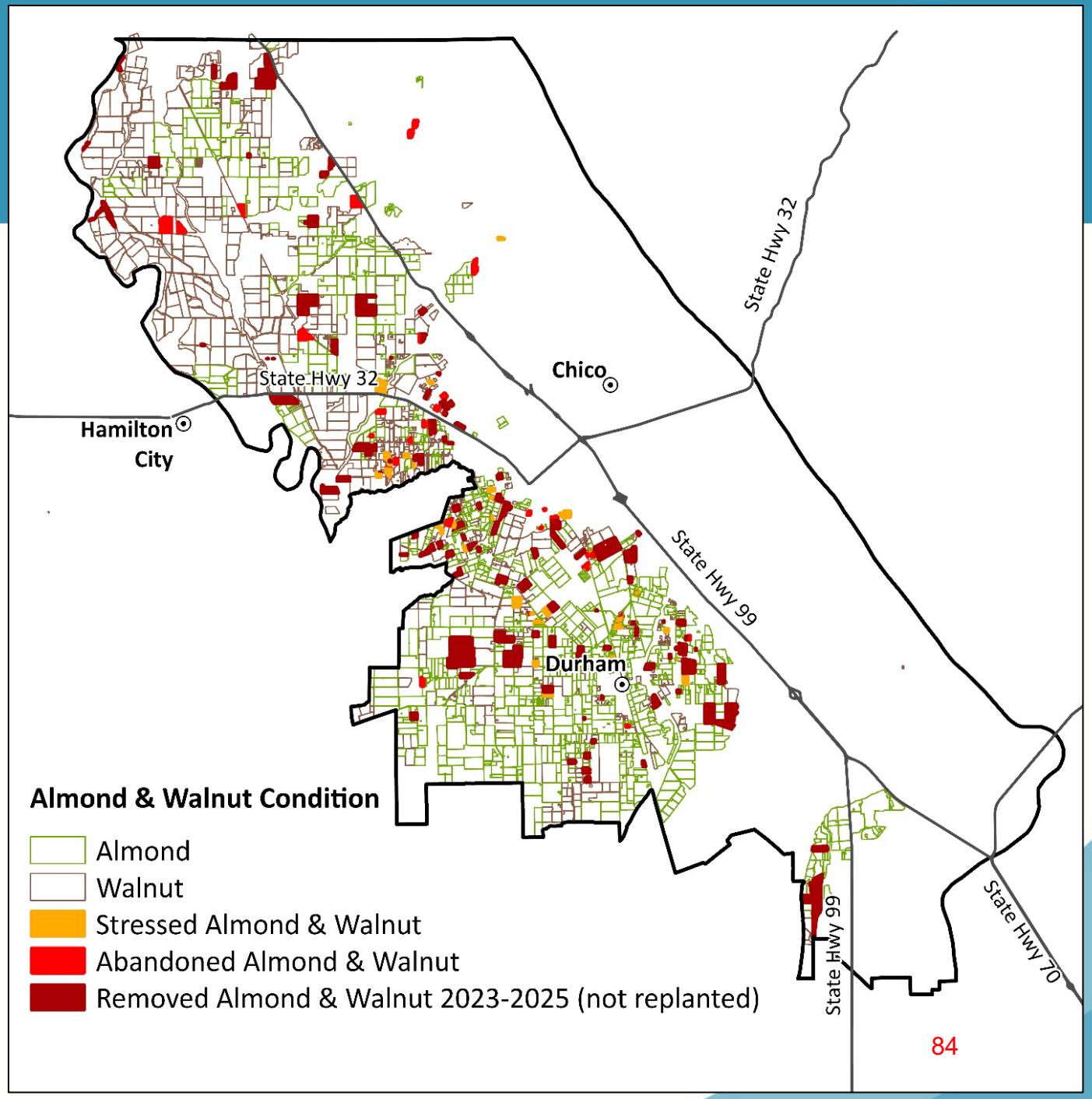
- Crop type and age
  - Almonds: 25,668 acres (~35%)
  - Walnuts: 26,133 acres (~35%)
  - Other Crops/Fallow: about 20,000 acres (~30%) depending on year
    - Rice
    - Prunes
    - Tomatoes
    - Dry Beans
    - Pistachios
    - Grain and Hay



LAND IQ

Spatial Data

- Condition
  - Fully Productive
  - Stressed
  - Abandoned
  - Removed
- Historical Mapping – about 10 years
  - Allows for observing trends in acreage change and crop shifts



LAND IQ

Spatial Data

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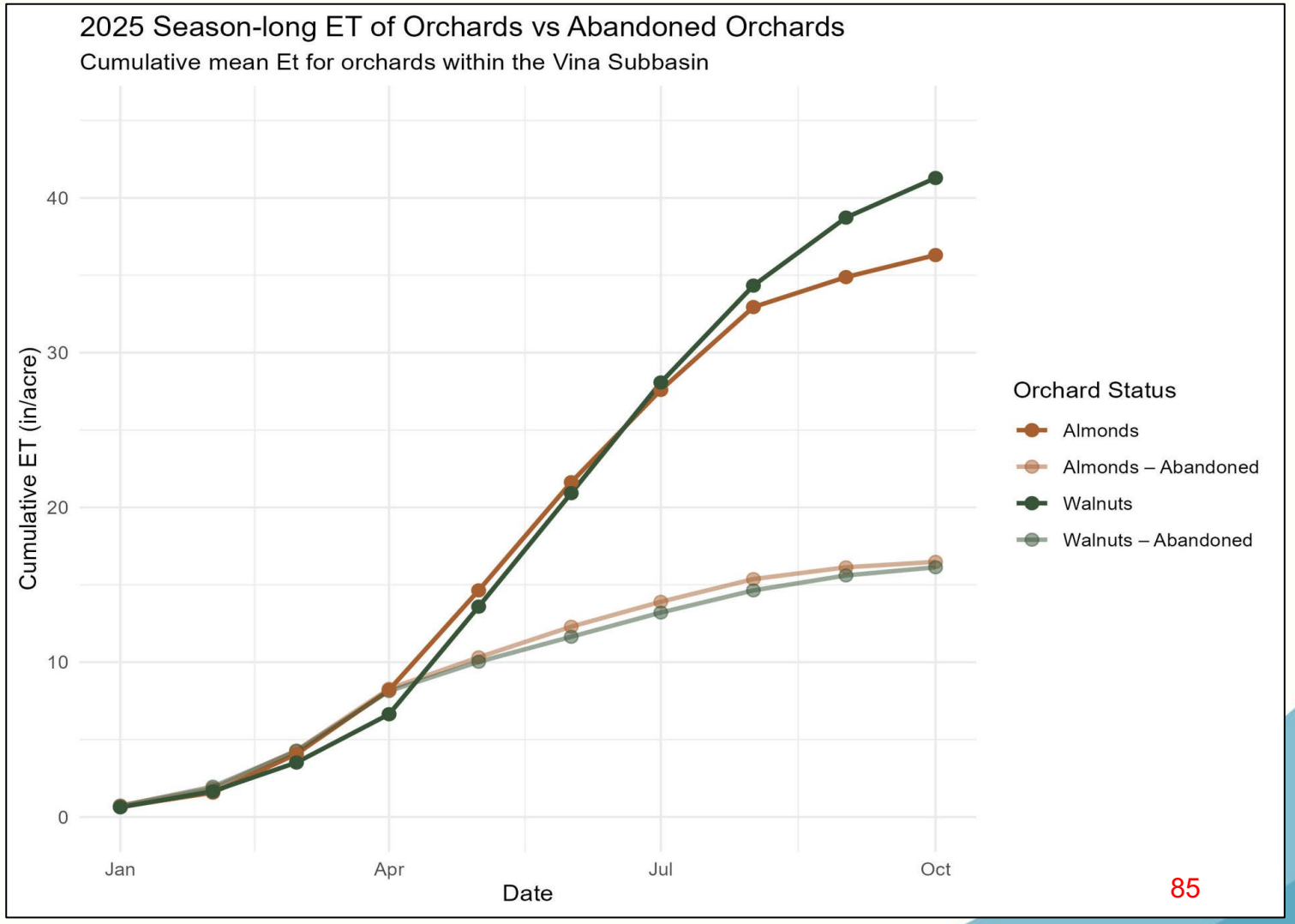
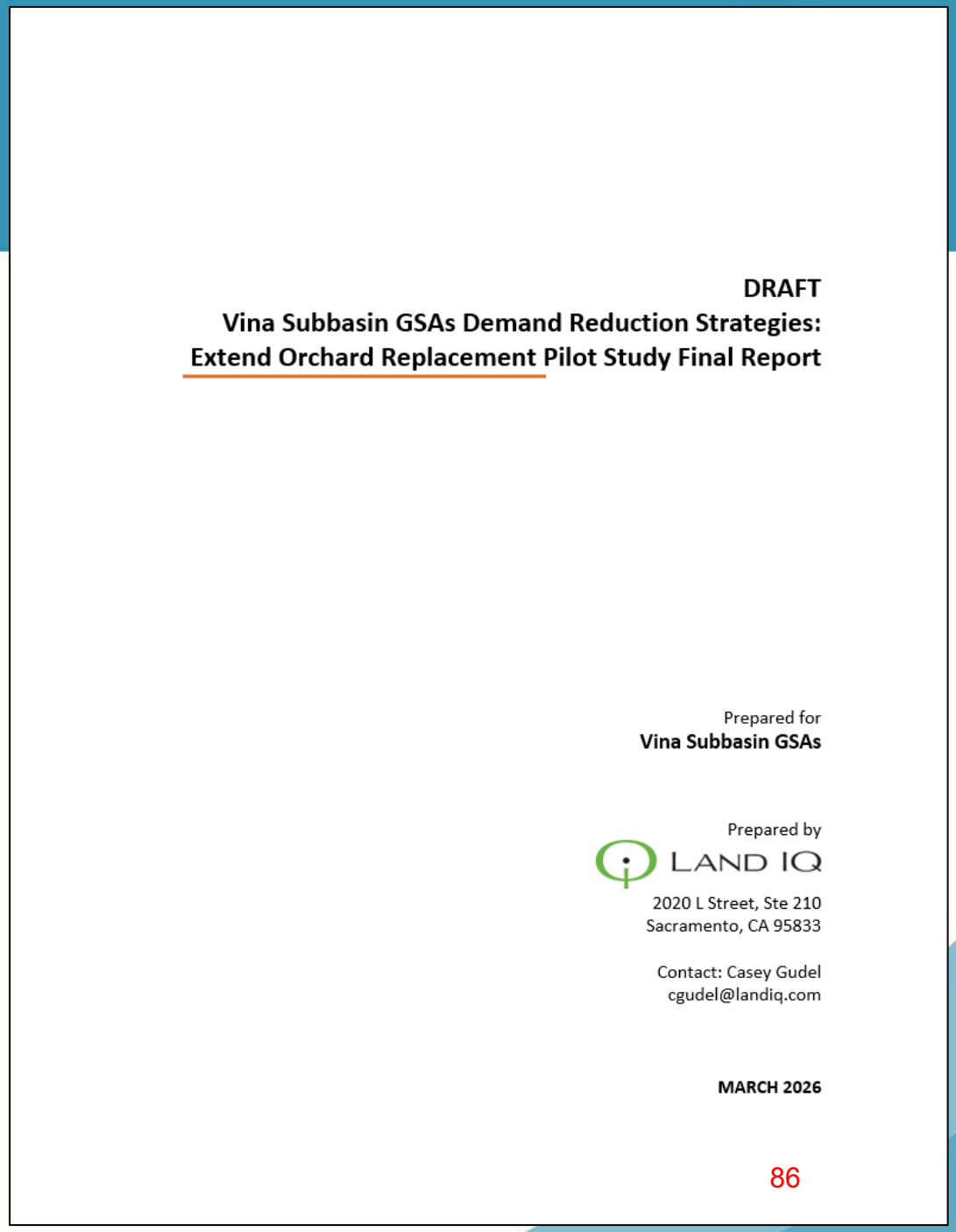


Extend Orchard Replacement: Pilot Study Questions

- What types of practices/systems (e.g. interim or cover crops) are used on idle orchard ground and how much water do they consume?
- What are the costs, co-benefits and water savings of an extended orchard replacement period over the life of an orchard?
- How can this knowledge be used to guide the GSA in implementing programs that realize the benefits of extend orchard replacement?



DRAFT

Vina Subbasin GSAs Demand Reduction Strategies:
Extend Orchard Replacement Pilot Study Final Report

Prepared for
Vina Subbasin GSAs

Prepared by
LAND IQ
2020 L Street, Ste 210
Sacramento, CA 95833

Contact: Casey Gudel
cgudel@landiq.com

MARCH 2026

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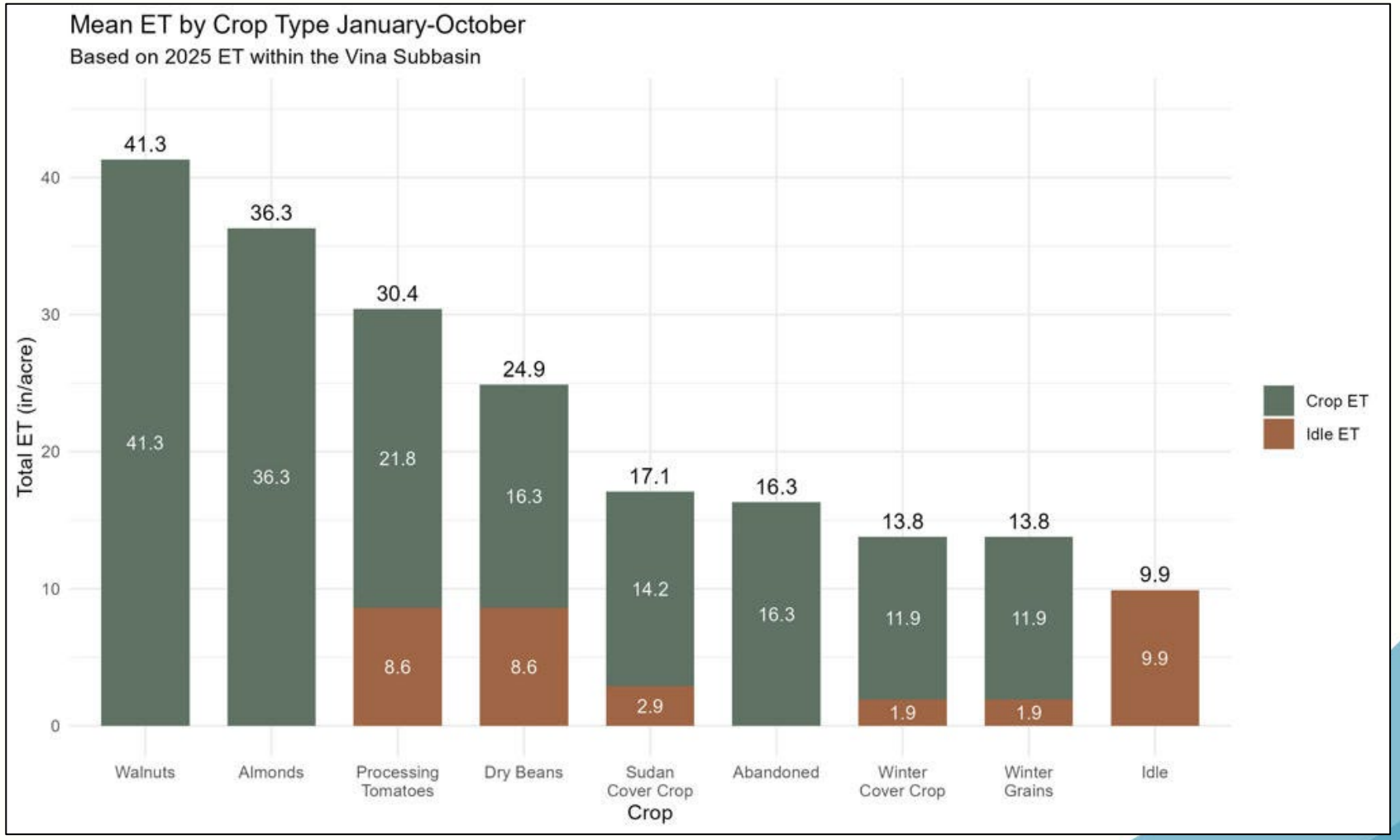
Extend Orchard Replacement: ET Analysis By Land Use

- Different crops have different consumptive use
- Growing lower water use crops still saves water
- Some crops rely solely on precipitation as their water source



Consumptive use of walnut and almond orchards compared to alternative land uses during the extended replant period.

Extend Orchard Replacement: ET Analysis By Land Use

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- Some crops rely solely on precipitation as their water source

Footprint					
	Acres Removed Per Year	Percent Practicing EOR	Percentage of 2025 Acerage	Historical 2024 Acres	Historical 2025 Acres
Almonds	1000	95%	4%	977	2,214
Walnuts	700	95%	3%	582	917
Total Acres in EOR	1615				

EOR Land Utilization				
	Historical 2024 Acres	Historical 2025 Acres	Percent of Total Fallow Acres	Acres
Abandoned	181	284	0%	0
Idle			50%	808
Dry Beans	281	628	10%	162
Processing Tomatoes	650	463	10%	162
Sudan Cover Crop			10%	162
Winter Cover Crop			10%	162
Winter Grains	2,965	2,049	10%	162
Total			100%	

Overall Use and Expected Water Savings Compared to an Average Orchard					
	Overall Use		Savings Compared to an Orchard (walnut and almond average)		
	ET (ac-ft)	Applied Water (ac-ft)	ET (ac-ft)	Applied Water (ac-ft)	Orchard Use Percent
Abandoned	0	0	0	0	0%
Idle	666	0	1,945	1,844	25%
Dry Beans	335	335	187	34	64%
Processing Tomatoes	409	450	113	-81	78%
Sudan Cover Crop	230	0	292	369	44%
Winter Cover Crop	186	0	336	369	36%
Winter Grains	186	0	336	369	36%
Total	2,012	785	3,209	2,903	

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Extend Orchard Replacement: Case Studies

Extended Orchard Replacement (EOR) Case Study
Winter Cover Crop - Winter Mix

DEFINITION

Here an EOR winter cover crop is assumed to be a cool-season grass and legume mixture that is planted in the fall, terminated in the spring and incorporated for green manure.

WATER USE

Winter mix cover crops consumed 11.9 inches of water during their growing season in 2025. For months when the land was idle, another 1.9 inches of water was consumed, for a total of 13.8 inches of consumed water for this land use January to October 2025.

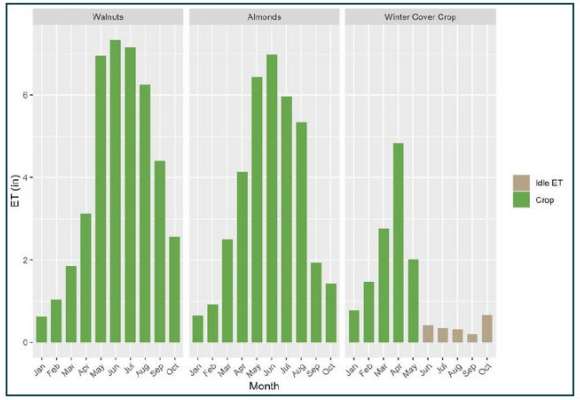

Figure 1. Mean ET by Crop Type January - October

Extended Orchard Replacement (EOR) Case Study
Winter Grain Crop

FINANCIAL ANALYSIS

ers an almond orchard that is removed and the land is left idle for a period of 1, 2, or to almonds. During the idle period, under this scenario, winter wheat for grain is This creates water savings, provides a harvestable crop, and provides some soil and n analysis was developed to compare the net income (revenue minus costs) to the eplanting versus delaying replanting by 1, 2, or 3 years.

d orchard is removed in Year 0. If it is immediately replanted to almonds the next roduce the first crop in Year 3 (3rd leaf). It would generate positive net cash flow in nting by 1 year means the block produces its first crop in Year 4 and generates in Year 7. Similar logic applies to delaying replanting by 2 or 3 years. For delayed at crop is planted and harvested for grain generating around $570 per acre in

chard is removed in Year 0 at a cost of approximately $2,800 per acre for tree , composting, ripping for root removal, disc, and roll. Replanting costs include trees, blishment. These costs are incurred in Year 1 if the block is immediately replanted, rs 2, 3, or 4 if replanting is delayed. For delayed replanting, winter wheat is planted re, excluding overhead.

. Delaying replanting may provide additional soil and pest management benefits. ation of the replanting period some growers may be able to avoid fumigation for t. Other soil and crop productivity benefits may provide cost savings through or increased productivity.

d orchards average evapotranspiration (ET) of 2.66 acre-feet per acre over a 25- r crop ET is assumed to be 1.67 acre-feet per acre. ET savings are 0.88, 1.77, and re in the 1-year, 2-year, and 3-year replanting delay scenarios. The corresponding re $601, $589, and $578 per acre-foot of water saved, respectively.

esentative costs, yields, and returns. Actual costs and returns will vary by farming rower that is also a handler, will have different access to cash and borrowing that utcomes. Almond prices fluctuate based on market conditions and would affect the nalysis applies to representative almond yields and a price of $2.25/lb. for almonds.[1]

nd sensitivity scenarios are available in the full Vina Subbasin Extend Orchard Replacement Program

Extended Orchard Replacement (EOR) Case Study
Abandoned Orchards

FINANCIAL ANALYSIS

abandoned, and it poses a public nuisance due cy states that growers must first receive notice then have thirty (30) days to rectify the issue. If enalty is removed. If the grower does not take e (45) days, however, the penalty amount is 1,000 per acre. Examples of actions that would nd fallowing, a minimal management scenario, or

Penalties for Abandoned Orchard Scenario
30-days
$0 - 500
45 days
$1,000

ve costs, yields, and returns. Actual costs and returns will vary by farming operation. A handler, will have different access to cash and borrowing that may affect operations ctuate based on market conditions and would affect the values in this analysis. The almond yields and a price of $2.25/lb. for almonds.[1] Table 1 compares the financial nt decisions a producer could make at the end of the previous orchard's productive

rison by Management Scenario in Year 0

ed Orchard $/ac	Minimal Management $/ac	Bare Ground Idle* $/ac	Replanting $/ac
$0	$0	$2,800	$2,800
190	$364	$364	$364
$0	$200	$0	$430
$0	$0	$0	$4,000
$0	$0	$0	$2,300
190	$564	$3,164	$9,894
-$1,000	$0	$0	$0
to $1,190	$564	$3,164	$9,894

scenarios are available in the full Vina Subbasin Extend Orchard Replacement Program Report.
er is in noncompliance, the amount depends on the timeline and grower response following notice of violation.
nd Fallow Case Study

March 2026

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Extend Orchard Replacement: Key Findings

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- Extended replanting incentives vary depending on how the land is used …
- Harvested cover crops partially offset idling costs …
- Short-season cash crops can substantially reduce or eliminate incentive payments …
- As an alternative to removal, some growers have been abandoning orchards …

Extend Orchard Replacement: Recommendations

- Update scenario budgets and incentive payments periodically …

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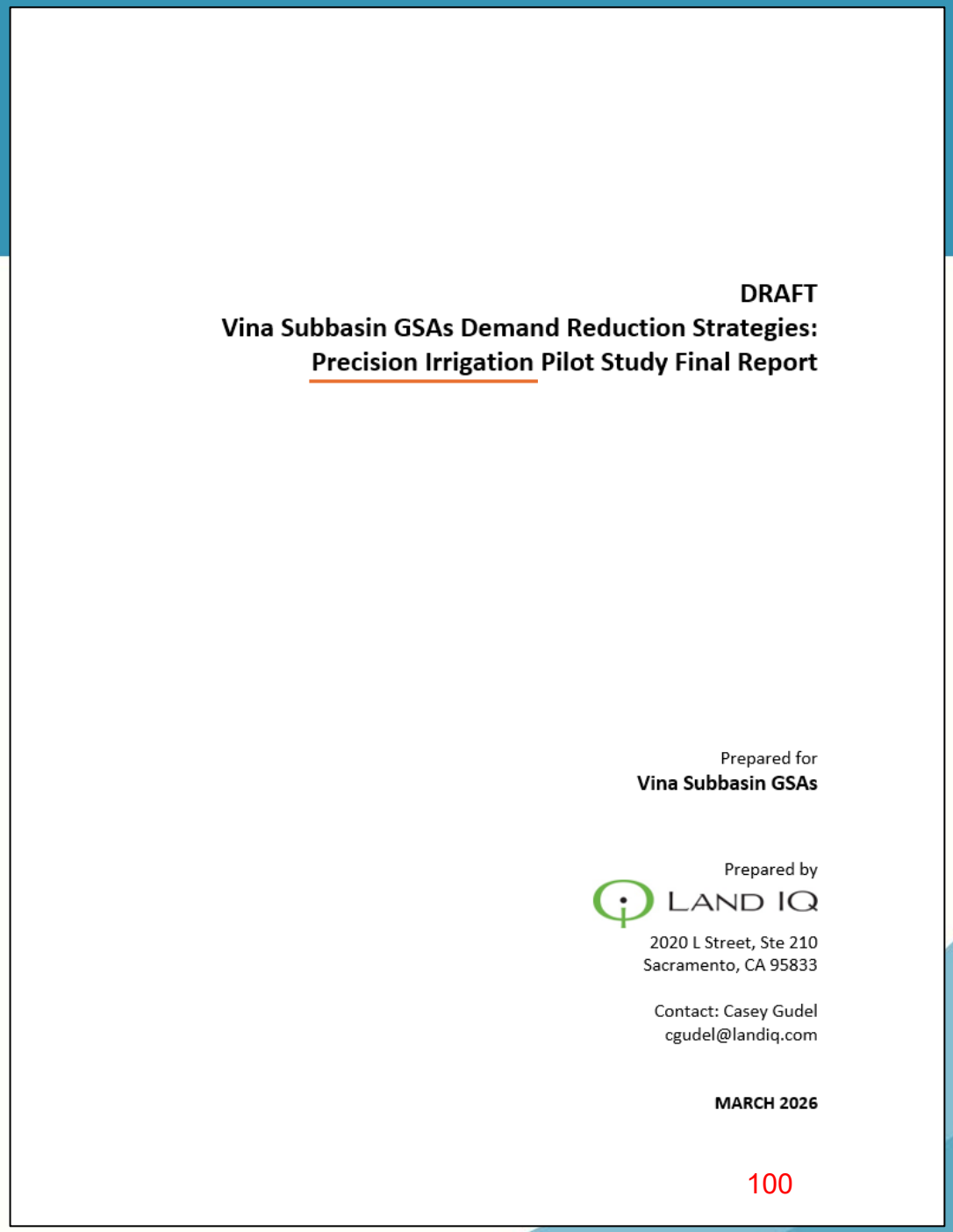
- Improve water use and ET estimates and apply to the cost-per-acre-foot-saved …
- Refine time of use electrical rates …

Precision Irrigation: Pilot Study Questions

- What are the irrigation scheduling approaches and technologies in use?
- What is the potential for demand reduction using precision irrigation?
- How can this knowledge be used to guide the GSA in implementing demand reduction programs?



DRAFT
Vina Subbasin GSAs Demand Reduction Strategies:
Precision Irrigation Pilot Study Final Report

Prepared for
Vina Subbasin GSAs

Prepared by
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MARCH 2026

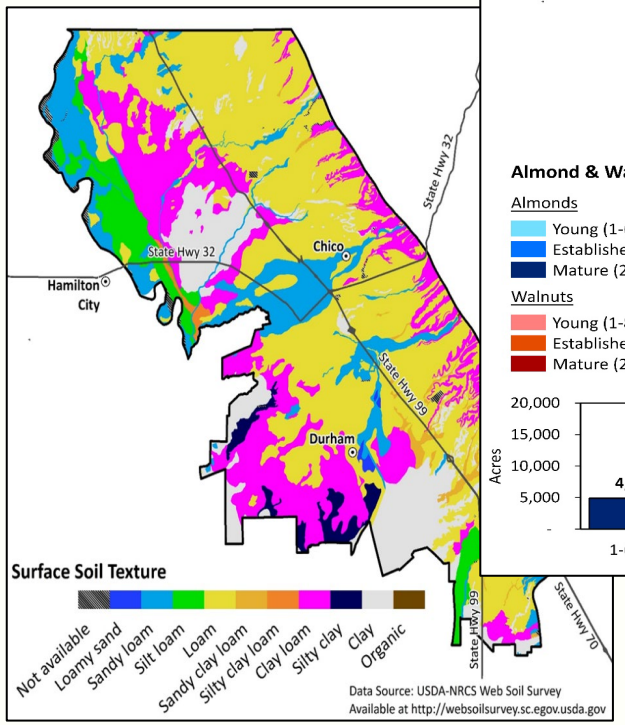
Precision Irrigation: Analysis

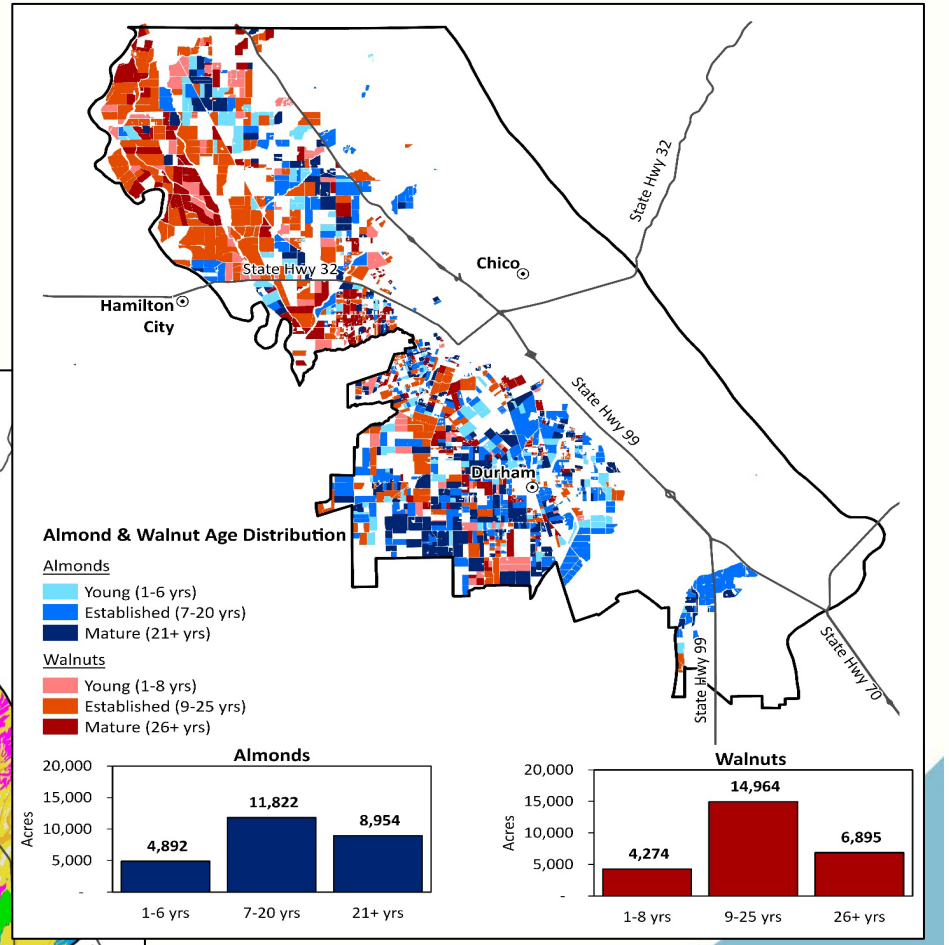
Pilot orchards used for analysis

- Pruning practices
- Irrigation types
- Irrigation scheduling technologies
- ET
- NDVI
- Yield
- Applied Water
- Soil type

All orchards used to explore potential relationships between

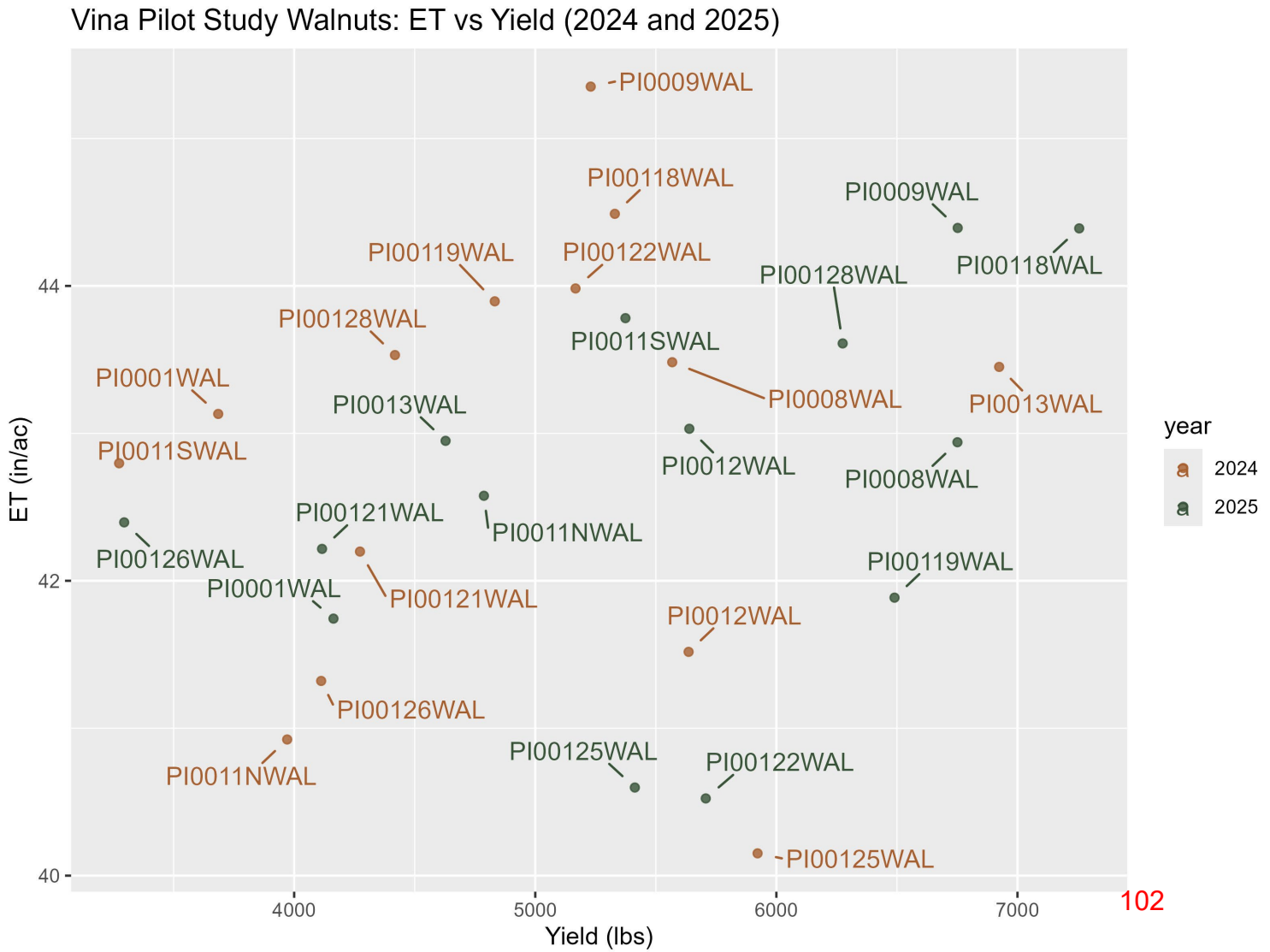
- Crop type and age
- Irrigation methods
- ET
- NDVI





Precision Irrigation: Analysis

- Almonds & Walnuts:
  - No correlation between yield and ET.
  - Few, if any orchards are purposely deficit irrigated
  - Yields are affected by many factors



Precision Irrigation: Analysis

- Butte County Survey (2021) - these technologies are not used as much on small farms.
- 70% of farms are <100 ac and account for 30% of acreage.
- Highest barrier to pressure chamber adoption overall is labor.

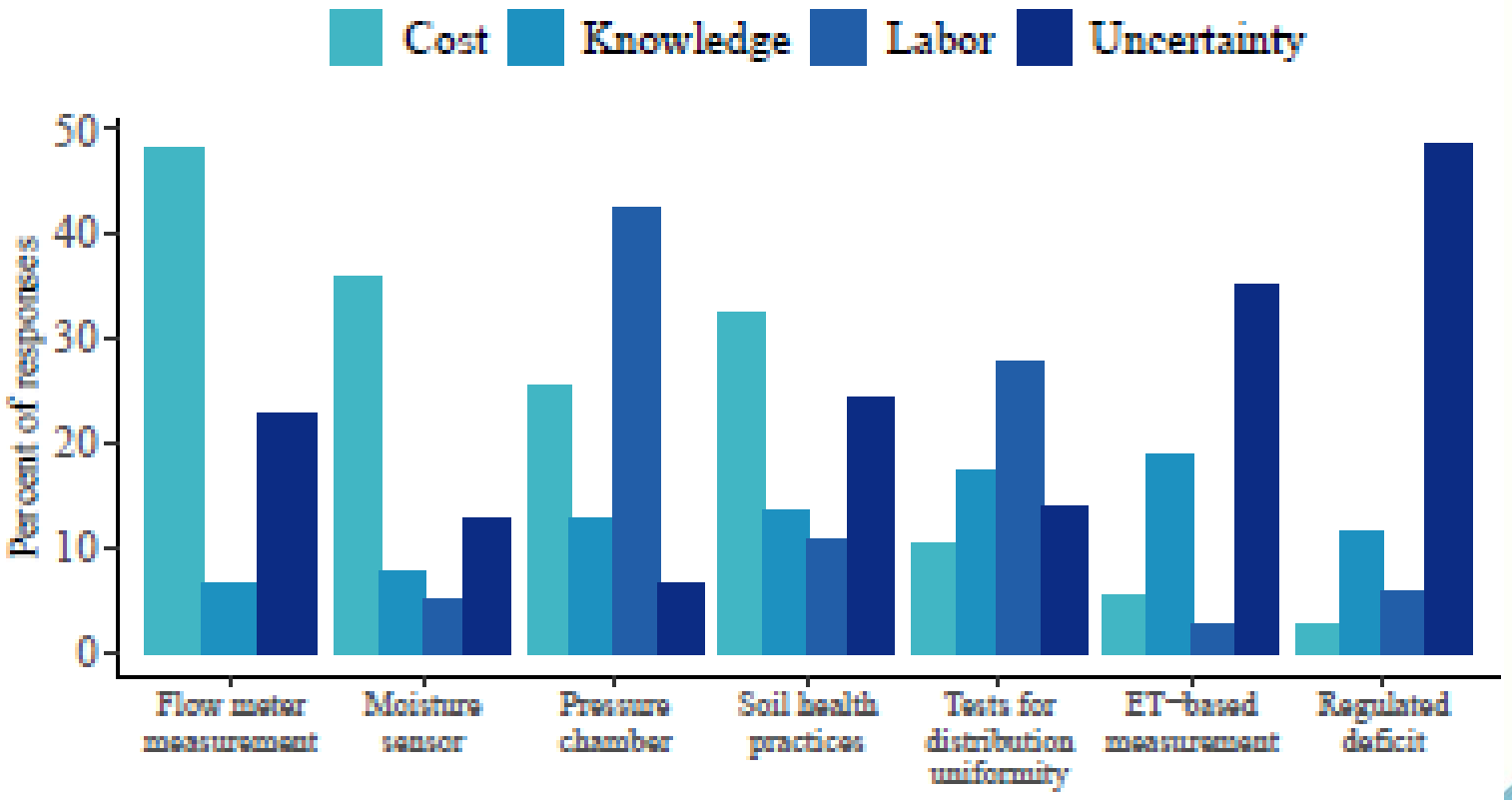


Figure 6. When considering these irrigation management practices, which of the following issues do you consider a challenge for implementation?

Precision Irrigation: Technical Bulletins

Precision Irrigation Technical Bulletin

Vina GSA

Integrating Field Technologies into Irrigation Decision Support

INTRODUCTION

As described in the section, Growers participating in the pilot project used a range of tools and approaches to address the questions of when to irrigate and how long to apply water (see **PI Case Study:** Methods for Determining Irrigation Timing and Application Duration). Selecting appropriate tools and techniques is an important decision for both small and large operations.

Each operation faces a unique combination of constraints and opportunities, including staff expertise, financial resources, existing irrigation infrastructure, and orchard layout. As a result, no single approach is appropriate for all situations. Developing a plan prior to selecting specific tools or technologies helps ensure that the chosen approach meets current operational needs while remaining adaptable to future conditions.

Developing a Framework for Success
Four key steps can help ensure that irrigation scheduling tools deliver meaningful value and support irrigation decision-making:

1. Develop an **irrigation management plan**.
2. Choose a lead person or **"champion"**.
3. Select **appropriate tools**.
4. **Validate results** with field observations.

STEP 1: DEVELOP AN IRRIGATION MANAGEMENT PLAN

With the wide range of irrigation and monitoring technologies currently available, it is increasingly important for operations to begin with a **clear irrigation management plan** before selecting and installing new tools. Bringing the full management team together to discuss goals, expectations, and constraints is strongly encouraged prior to implementation.

Although this planning step is sometimes overlooked, a well-defined irrigation management plan can lead to a more effective monitoring strategy, improved communication among staff and advisors, and more consistent use of collected data in irrigation decisions.

1

Precision Irrigation Case Study

Vina GSA

Methods for Determining
on Timing and Application Duration in Pilot Orchards

INTRODUCTION

of tools and approaches were used by growers in the Precision Irrigation pilot study to inform rigation timing and duration. These methods ranged from relatively simple techniques, such as crop evapotranspiration (ETc) estimates provided jointly by University of California Agricultural and ces (UC ANR) and California Department of Water Resources (DWR) and making field-level ations, to more advanced approaches that integrated ET data, pressure chamber measurements, il and plant-based sensing technologies (Figure 1).

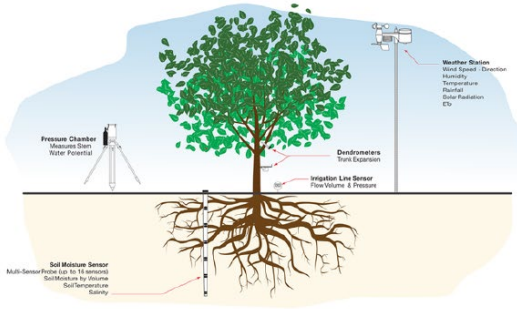


Figure 1. Example of sampling tools used to determine irrigation timings and duration.

l by Pilot Study Growers:

- nd Experience Based Scheduling
- otranspiration (ETc)
- re Sensors
- er Potential Measurements
- Dendrometers
- Combination of Methods
- Consultants

1

Precision Irrigation Technical Bulletin

Vina GSA

Field Level Measurements of Applied Water and Opportunities for Improvement

INTRODUCTION

d reliable applied water data is a fundamental component of effective irrigation management. pplied water enables managers to determine whether irrigation events are delivering the intended ter to the orchard, both on an event basis and over the course of the season.
r records also help verify that irrigation systems are operating as designed. Comparing applied water crop evapotranspiration, ETc, provides insight into whether irrigation applications are adequately p water use.

ed with soil moisture measurements and plant-based indicators, such as stem water potential, SWP, a pressure chamber or data from tree-based sensors, applied water information helps confirm that ts are aligned with management objectives and supporting overall irrigation plan performance.

for calculating applied water are addressed in this section. The most used approach is installation of at the pumping station. An alternative method involves a monitoring station equipped with either a ch or pressure transducer.This station may also be equipped with other types of sensors such as soil weather instruments.

ERS

percent of growers participating in the pilot had flow ed at their pumping stations. Among those, there was an tween meters that were manually read and meters that ata remotely through software platforms.

f meters can monitor real-time flow, typically displayed as inute (GPM), and record cumulative flow totals expressed acre-feet. However, differences between manually read monitored meters can significantly affect the accuracy, d usefulness of flow records.

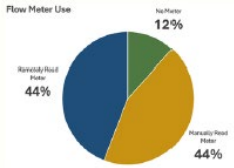


Figure 1. Flow Meter Use

1

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Precision Irrigation: Key Findings

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- … more potential for improved water management … on small farms
- … potential to reduce the evaporation portion of ET by using more nighttime irrigation

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Precision Irrigation: Recommendations

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- … focus efforts related to specific irrigation management practices on the use of pressure chambers … particularly in walnut production
- … education and outreach would be needed on the associated financial savings of automation and nighttime irrigation

Demand Reduction Strategies

Extend Orchard Replacement (EOR) Pilot Study

Precision Irrigation (PI) Pilot Study

Vina GSA Board of Directors – March 11, 2026

Joel Kimmelshue, PhD, Land IQ

LAND IQ

Vina Subbasin Surface Water Supply Feasibility Analysis

Maddie Munson

With contributions from Jenny Scheer

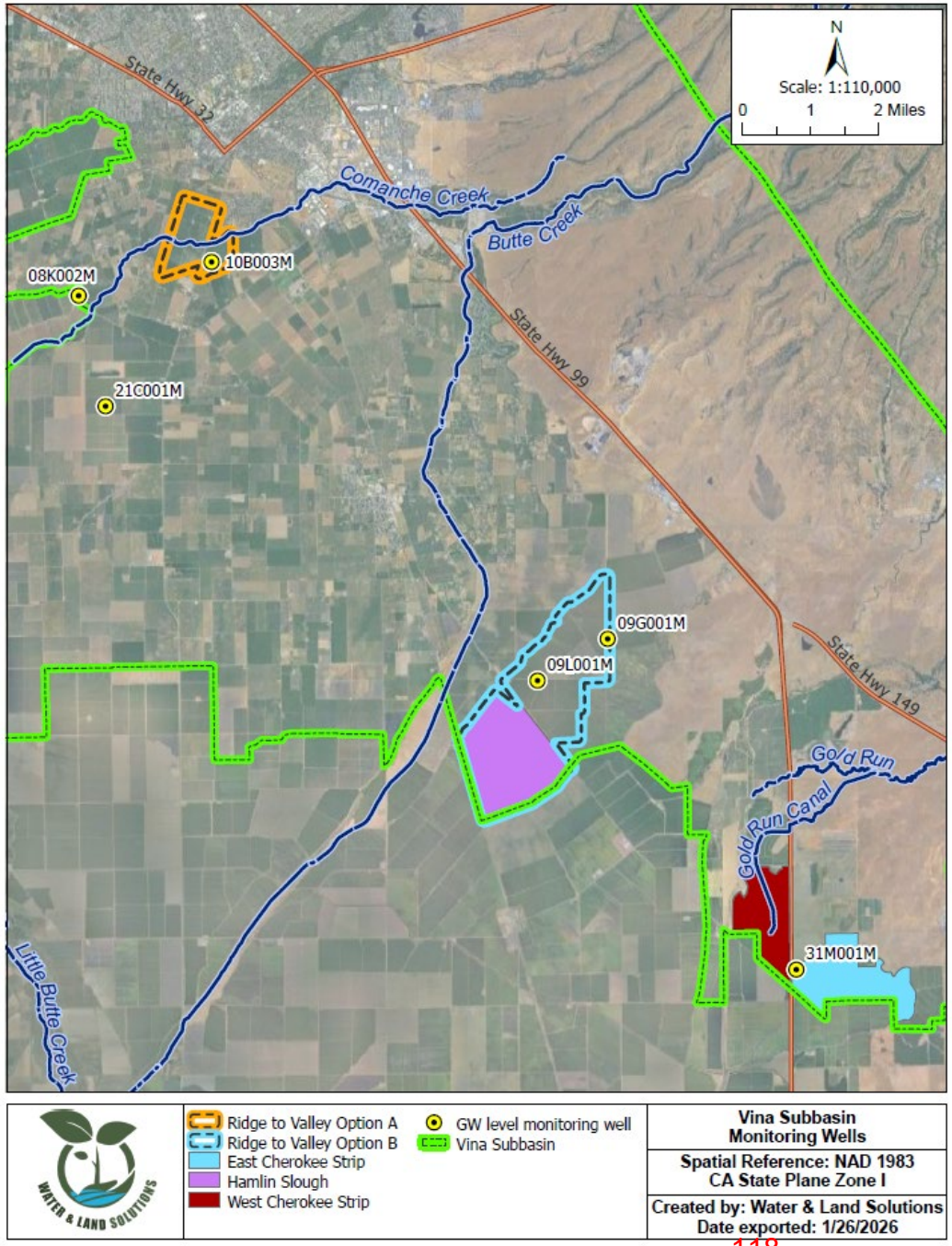
WATER & LAND SOLUTIONS

Project Background

- Sustainable Groundwater Management Grant Surface Water Supply Project
- Initial Project List
  - Sacramento/Feather River Exchange
  - Feather River/Butte Creek Exchange
  - South Vina Extension
  - Maximize existing Butte Creek water rights
  - Oroville-Chico Pipeline
  - Paradise-Chico Intertie (became Ridge to Valley)
  - Local Creeks
  - Sacramento River Riparian Rights
  - New Water Right
- Water Commission narrowed to four on December 4, 2024 for Fatal Flaw Analysis
- Water Commission recommend final two on April 2, 2025 and BOS concurred on May 9, 2025

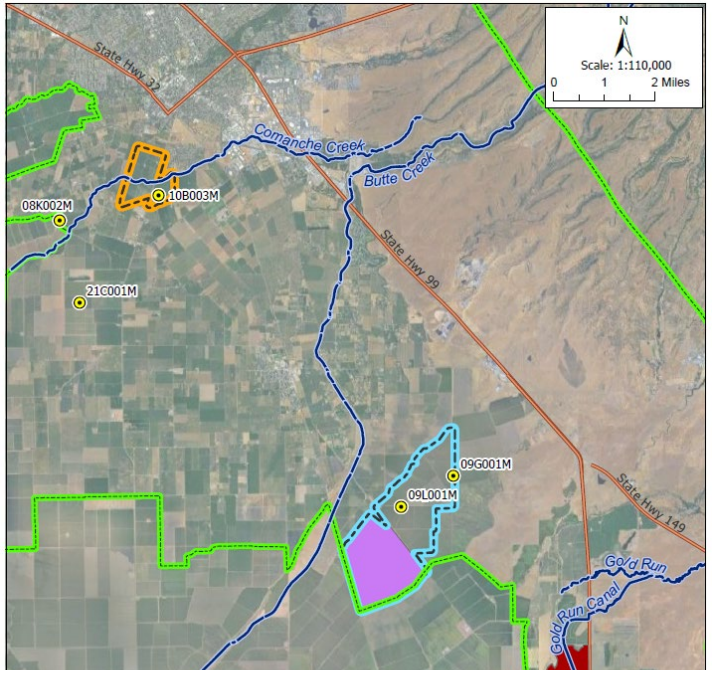
Final Project Options

- South Vina Extension
  - Western Canal Water District deliver water into Vina Subbasin
  - 2,476 acres across three landowners
  - ~6,970 AF/yr from WCWD or Butte County Table A
- Ridge to Valley
  - Convey underutilized Paradise Irrigation District water through Butte Creek to farmland in Vina Subbasin.
  - 1,500 – 3,500 AF/yr

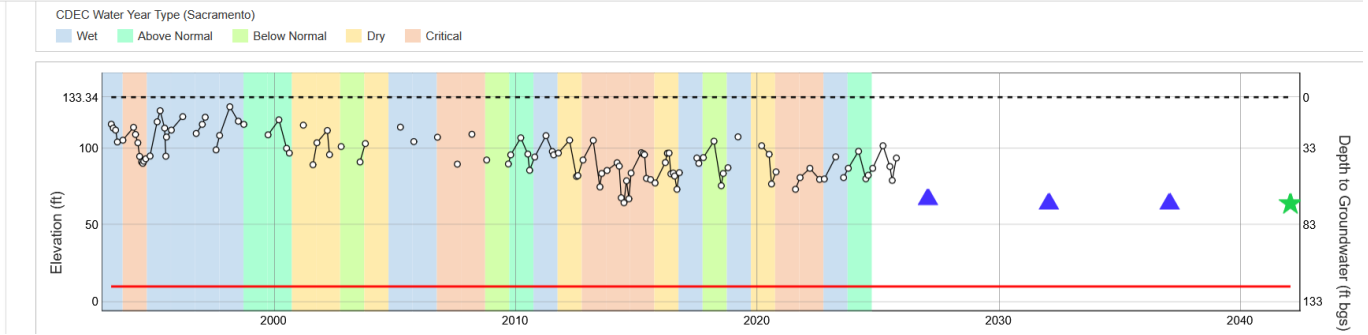


Project Benefits

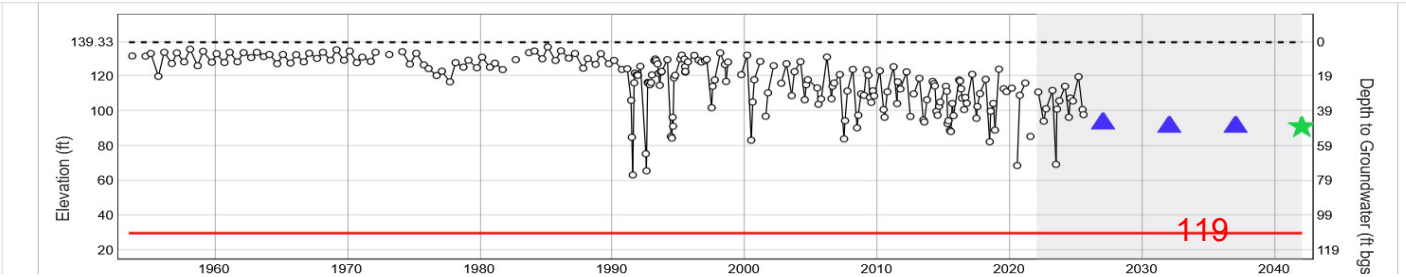
- Groundwater level benefits commensurate with the amount of surface water delivered
  - South Vina Extension - 6,970 AF/yr
  - Ridge to Valley – 1,500 – 3,500 AF/yr



Site Code: 396654N1218780W001 **State Well Number:** 21N01E21C001M **Local Well Name:** 21N01E21C001M

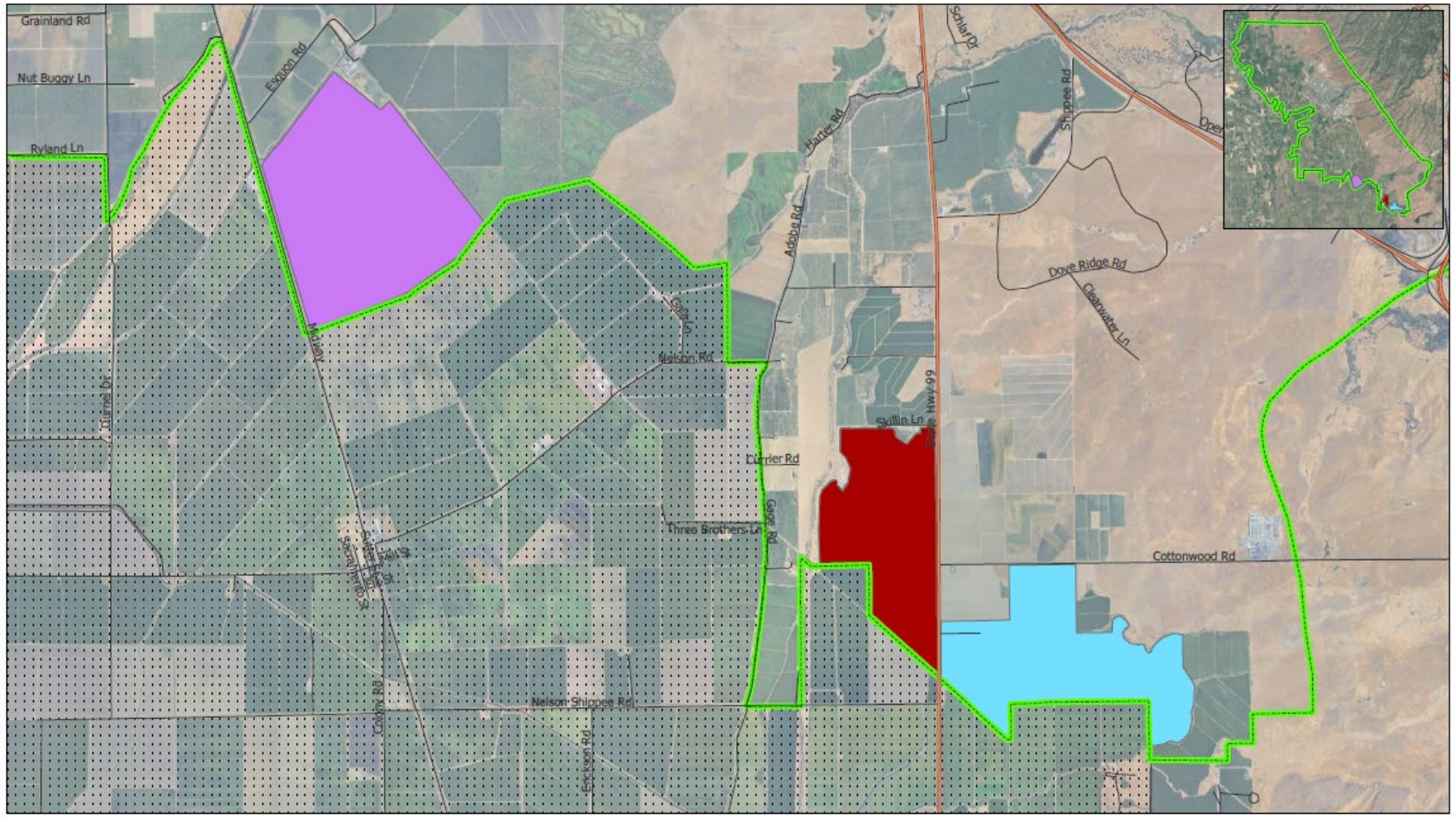


Site Code: 396066N1217586W001 **State Well Number:** 20N02E09L001M **Local Well Name:** 20N02E09L001M



South Vina Extension

6,970 AF/yr



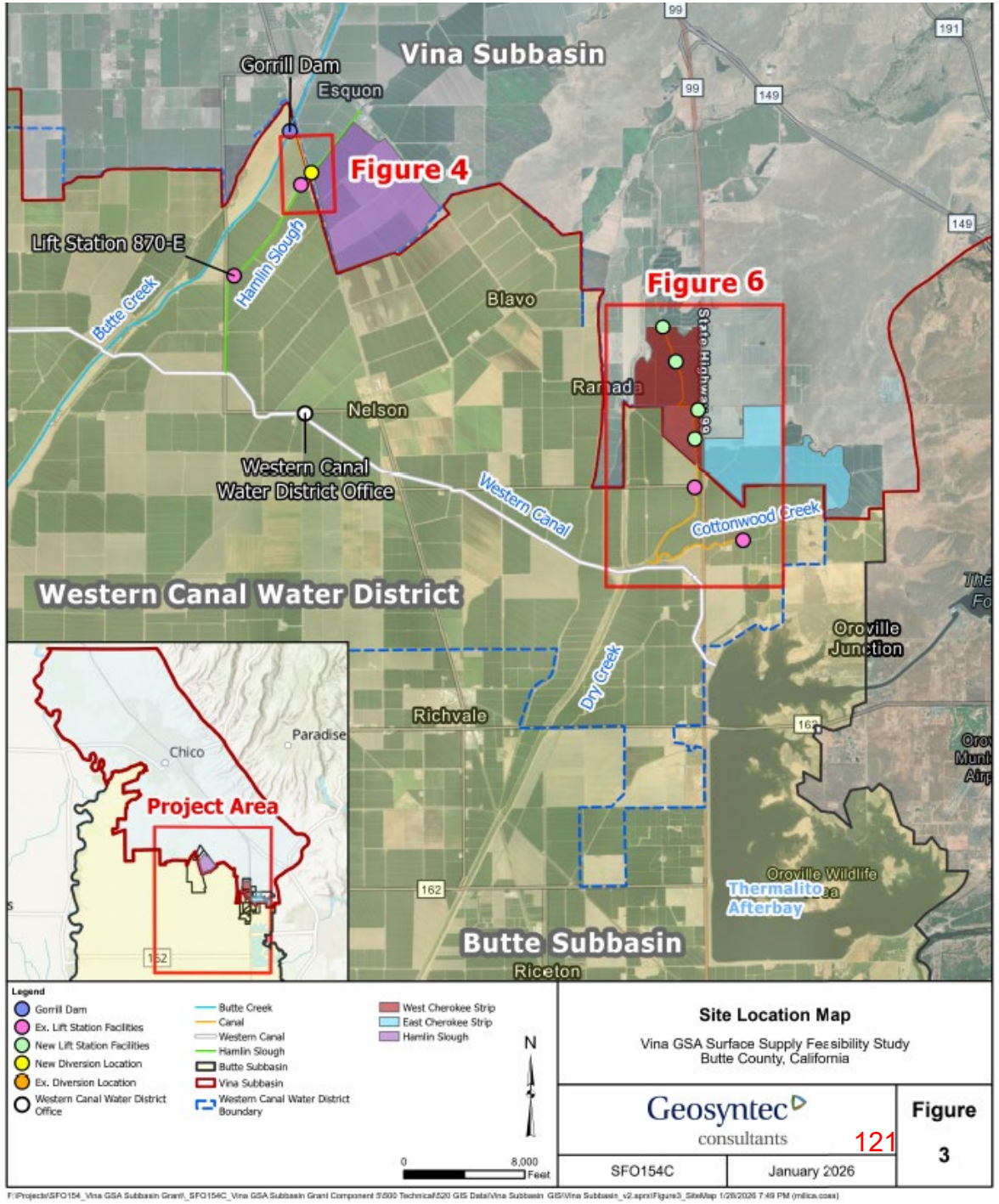
East Cherokee Strip - 782 acres
Hamlin Slough - 1052 acres
West Cherokee Strip - 642 acres
Western Canal Water District
Vina Subbasin

N
Scale: 1:40,000
0 0.25 0.5 Miles

Vina Subbasin
Surface Water
Spatial Reference: NAD 1983
CA State Plane Zone I
Created by: Water & Land Solutions
Date exported: 1/23/2026

Infrastructure Needs

- 9 new or upgraded lift pumps
- 12 new meters
- Pipe through Cottonwood Creek levee
  - Significant permitting: 18 months, $215,000
- $5M+ in construction costs



Cost Estimates – Capital

- Preliminary capital costs per AF for infrastructure, including permitting, design, and construction amortized over 10 years

Project/Site	Total Estimated Construction Cost	Acre-feet (7 in 10 yrs)	$/AF
Hamlin Slough	$749,000	15,687	$ 47.75
West Cherokee Strip	$3,298,000	17,395	$ 174.60
East Cherokee Strip	$1,091,000	15,708	$ 56.82
TOTAL	$5,067,200	48,790	$ 105.31

Cost Estimates – Water Cost

- To be determined by water supplier and project implementer
- **WCWD:** likely higher than current out of district fee of $14/AF
  - Additional wheeling charge for Hamlin Slough project
- **Table A:** $106.60/AF or $176/AF
  - Additional wheeling charges from WCWD and private landowners
- **O&M:** $51/AF

Total Cost Benefit

Table A* Costs per Acre-foot					
Property	Total AF/yr	Water Rate	O&M'	Capital	**Total Cost**
Hamlin Slough^	2,240	$ 141.55	$ -	$ 47.75	**$ 189.30**
West Cherokee Strip	2,485	$ 141.55	$ 204.00	$ 174.60	**$ 520.15**
East Cherokee Strip	2,244	$ 141.55	$ 102.00	$ 56.82	**$ 300.37**

*If public funding were secured for capital costs, total costs would be reduced to:

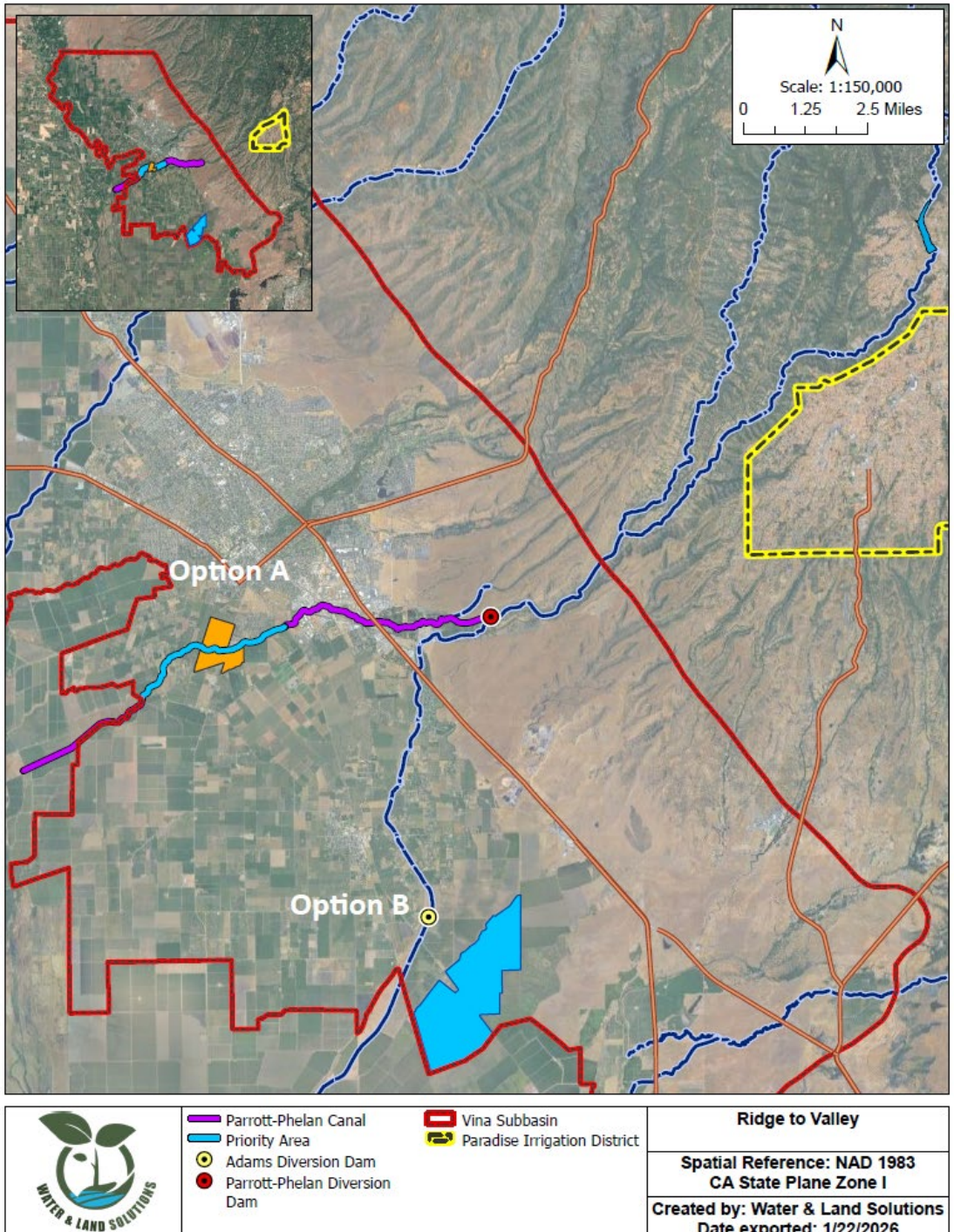
- $141.55/AF/year for the Hamlin Slough projects,
- $345.55/AF/year for the West Cherokee Strip projects, and
- $243.55/AF/year for the East Cherokee Strip properties

South Vina Extension Recommendations

1. Define project implementer
2. Pursue grant funding to reduce capital costs and improve financial feasibility
3. Initiate permitting early
4. Determine water rates to determine funding needs and project strategy
5. Develop financial incentives for landowner participation as needed

Ridge to Valley

1,500 - 3,500 acre-feet (AF)



Infrastructure Needs

- Conveyance – existing natural infrastructure
- Diversions – no additional
- Delivery to farm – no additional
- On-farm improvements
  - For option A, up to 3 pump stations with filters, etc needed to create a dual source system for walnuts
  - For option B, no additional improvements needed to flood irrigate rice

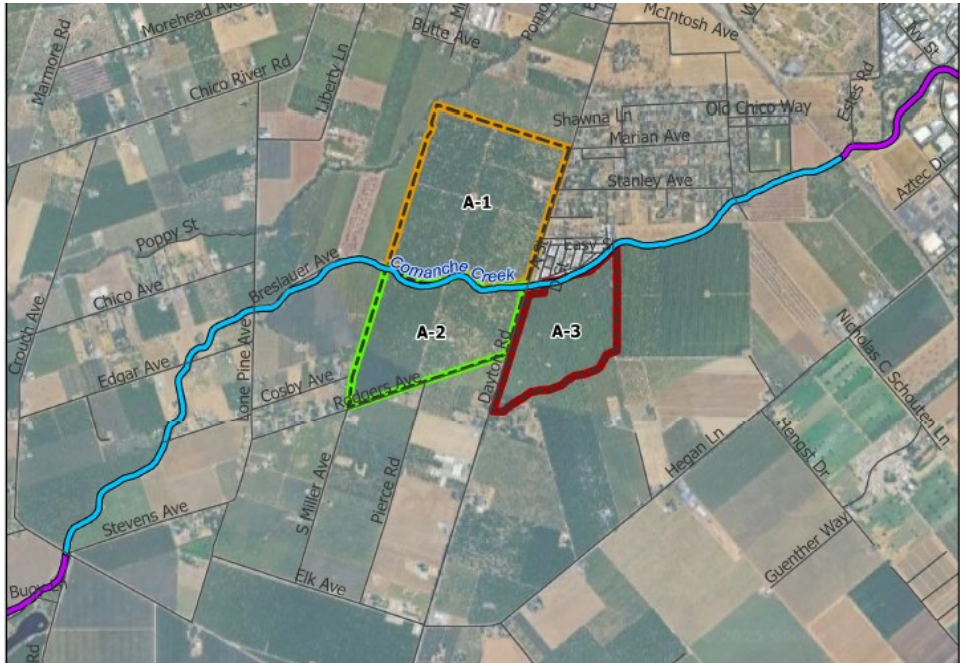
Transfer Process

- SWRCB – temporary v long-term transfer
- Court Approval for amendments for Butte Creek adjudication
- CEQA Review

Cost Estimates – Upfront Costs

- On-Farm Improvements – Option A

	Total Capital	Total AF	Annual Capital ($/AF)
A-1	$202,300	700	$35
A-2	$134,867	400	$41
A-3	$110,977	300	$45
TOTAL	**$448,144**	**1,400**	**$40**



- On-Farm Improvements – Option B

N/A

Cost Estimates – Water Costs

- Cost of water – TBD by PID Board
- Median price here is $297.50/AF, rounded to $300/AF
- Additional cost for legal expenses & CEQA
- Option A wheeling cost: $25/AF

Seller	Buyer/Leasee	$/AF	Amount (AF)	Year	Location
Glenn Colusa Irrigation District	Sutter Mutual Water Company	$55.07	20,000	2024	North-of-Delta
Butte County	Del Oro Water Company/Cal Water-Oroville	$106.70	668	2025	North-of-Delta
Butte County	Palmdale Water District/Westside Districts	$176.40	24,000	2025	South-of-Delta
Yuba County Water Agency	Healthy River and Landscape Program	$290	41,000	2025 - 2033	In-Delta
South Sutter Water District	Woodland-Davis Clean Water Authority	$550	2,000	2024-25	North-of-Delta
Butte Water District	Santa Clara Valley Water District	$650+	21,000	2025	South-of-Delta
Western Canal Water District	Metropolitan Water District of Southern California	$600	Up to 26,400	2025	South-of-Delta

Total Cost Benefit

PID* Total Costs per Acre-foot					
Property	Total AF/yr	Water Rate	O&M^	Capital±	Total Cost
A	1,400	$ 300.00	$ 86.07	$ 39.05	**$ 425.12**
B	3,500	$ 300.00	$ 0.00	$ 0.00	**$ 300.00**

- Funding options:
  - On-farm improvements: State, Federal, local, private
    - Could reduce total costs to $386.07/AF/year for Option A
  - Cost of Water: private and local

Ridge to Valley Recommendations

1. Adopt a Phased Approach:

   Phase 1: 1,500 AF to Option B for three years, with temporary annual transfers

   Phase 2: Up to 3,500 AF with a long-term multi-year transfer

2. Cost Share

3. Option B is most cost effective and most easily implementable, but there may be other benefits to Option A

4. Consider further exploration of groundwater level benefits of the two project areas potentially using the Butte Basin Groundwater Model to evaluate effects on groundwater levels.

Thank you

Maddie Munson
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Groundwater Sustainability Implications

- GSP showed downward trend in groundwater levels
- Groundwater levels are a 2022 GSP proxy for storage, subsidence, and interconnected surface waters
- No known in-elastic subsidence
- GSP tracks high calcium, high nitrates and total dissolved solids in the Chico area.
- Seawater intrusion not relevant to Vina

Inter-basin Coordination Analysis and Modeling Project Recap

Christina Buck, Ph.D.
Assistant Director
Dept. Water and Resource Conservation

Vina GSA and RCRD GSA Joint Board Meeting
March 11, 2026

Butte County
WATER & RESOURCE CONSERVATION

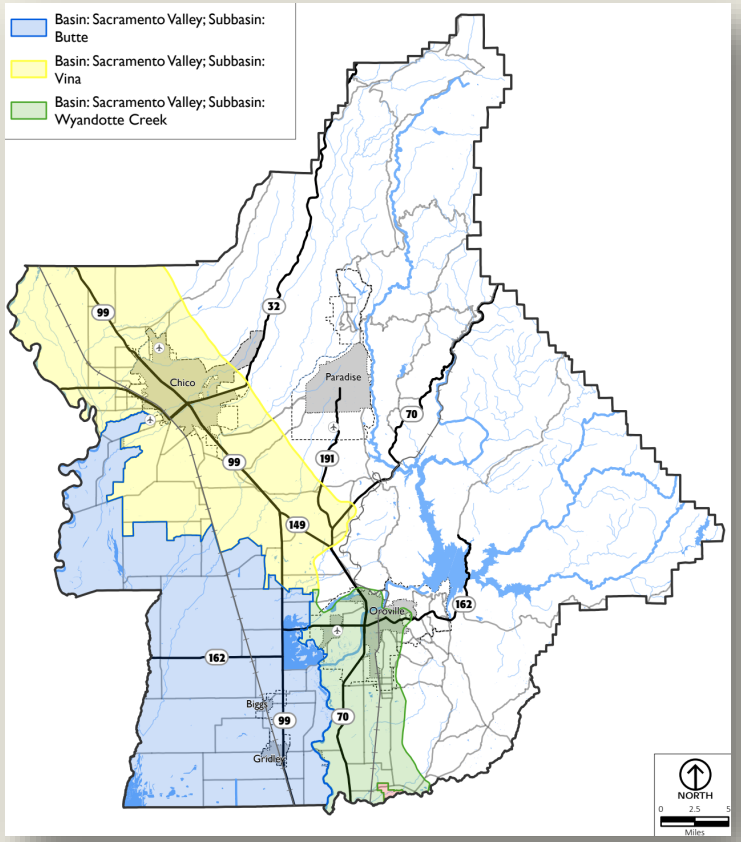
MONTGOMERY & ASSOCIATES
Water Resource Consultants

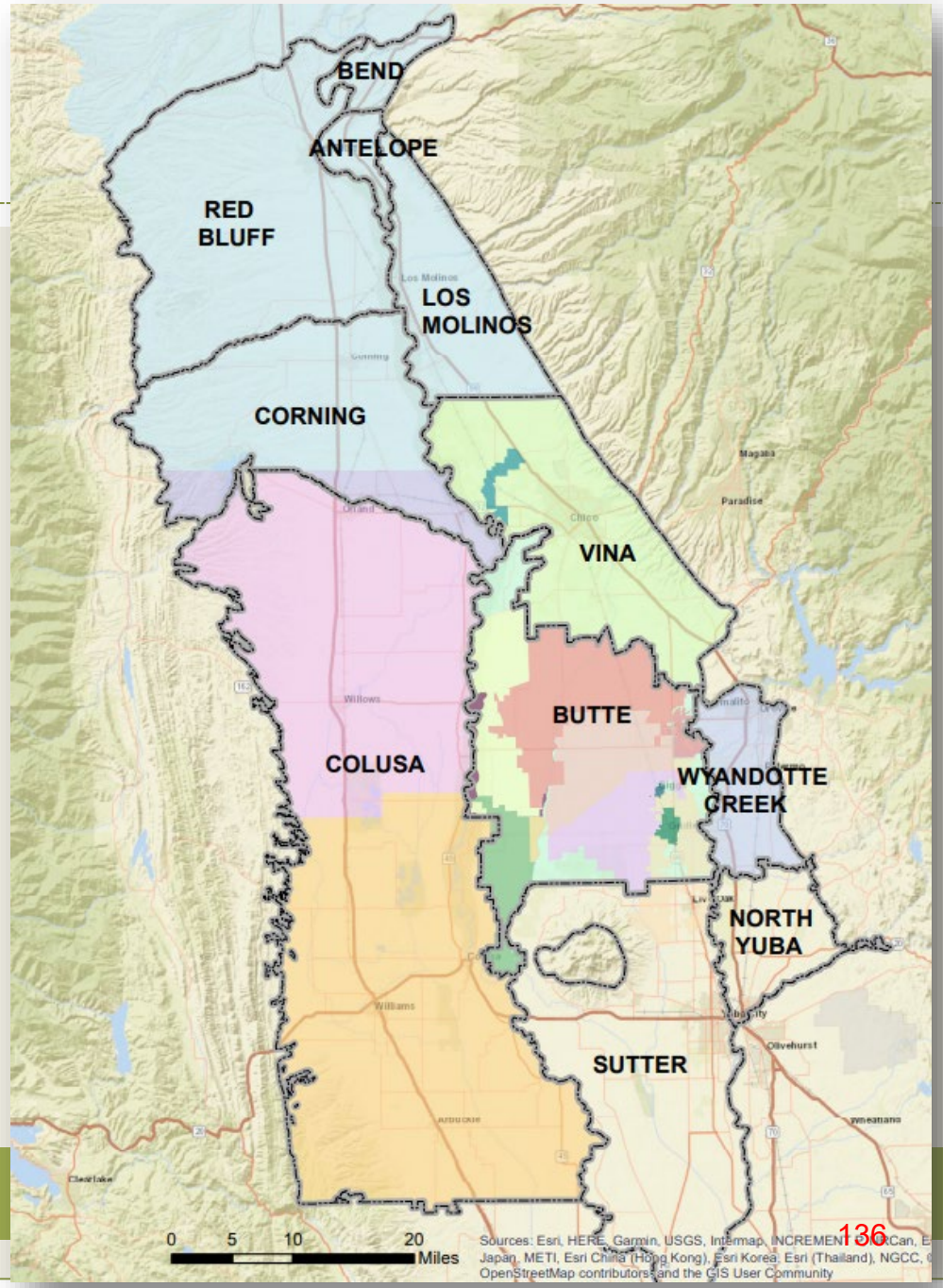
Subbasins in the Northern Sacramento Valley (NSV)

2

Butte County:

- 3 subbasins
- 14 Groundwater Sustainability Agencies (GSAs)





Butte County
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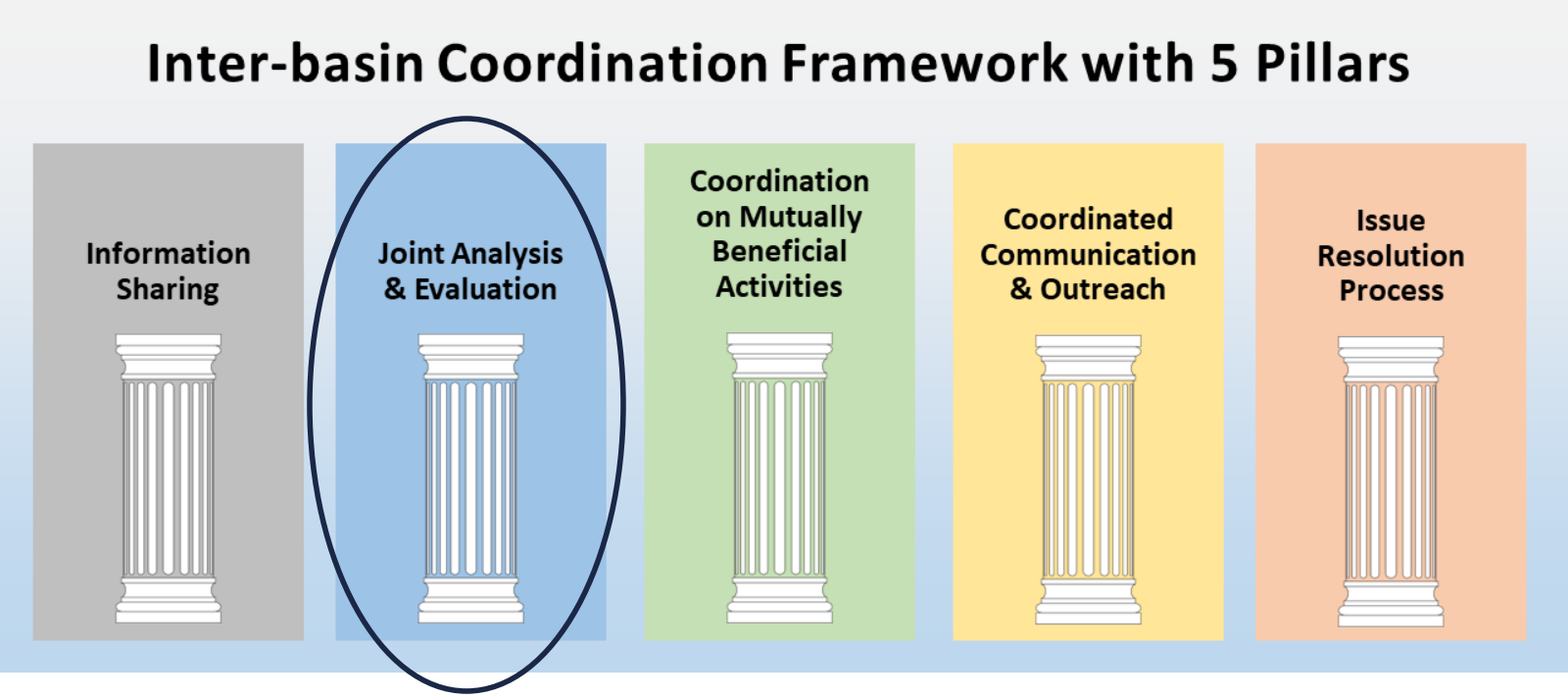
NSV IBC Framework Report identified 5 Elements/Pillars for Implementation of IBC

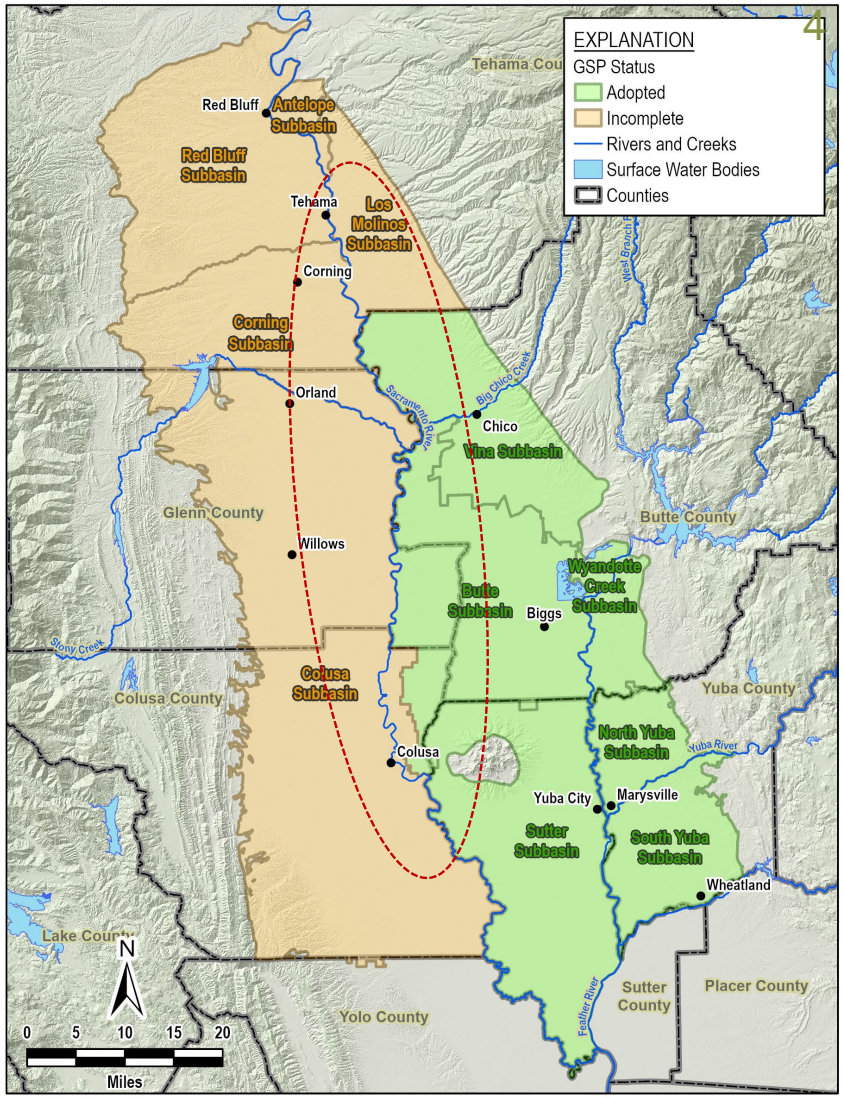
Coordination occurs across multiple time horizons and at different levels of geographic scale.

Framework Report was outcome of Inter-basin Coordination during Plan Development (2020-2021)

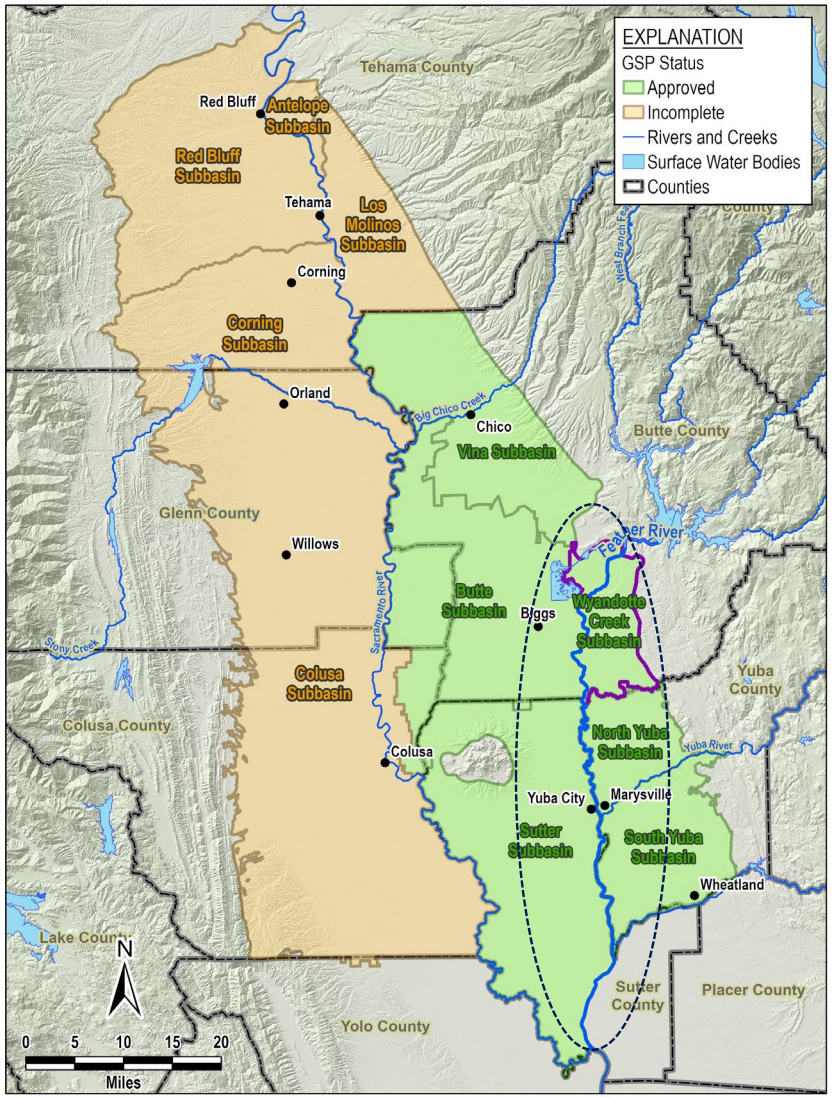


Website: https://www.buttecounty.net/1234/Inter-Basin-Coordination

North Sacramento River Corridor



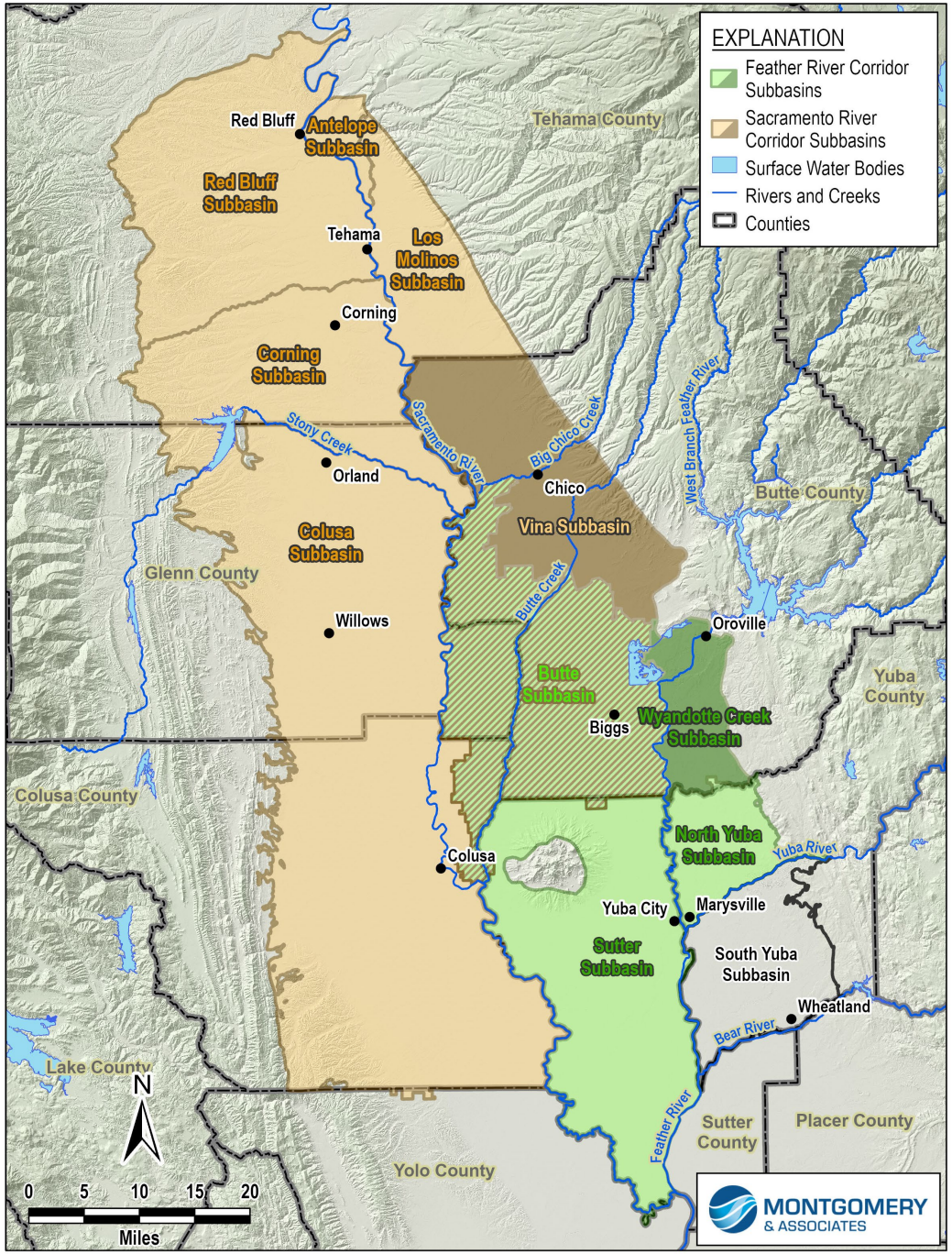
Feather River Corridor



Butte County
WATER & RESOURCE CONSERVATION

Inter-Basin Coordination Analysis & Modeling

- Led by Butte County
- Funded through DWR-SGMA grants for Vina and Wyandotte Creek Subbasins
- Focus on technical analysis
- Develop outreach and summary materials to communicate with the public
- Provide information to support long-term coordination among Northern Sacramento Valley GSAs



Project Deliverables

- Documents all available on project webpage:

https://www.vinagsa.org/inter-basin-coordination-analysis-and-modeling-project-implemented-by-butte-county

Includes Tech Memos and Webinar Recording/Slides for both:

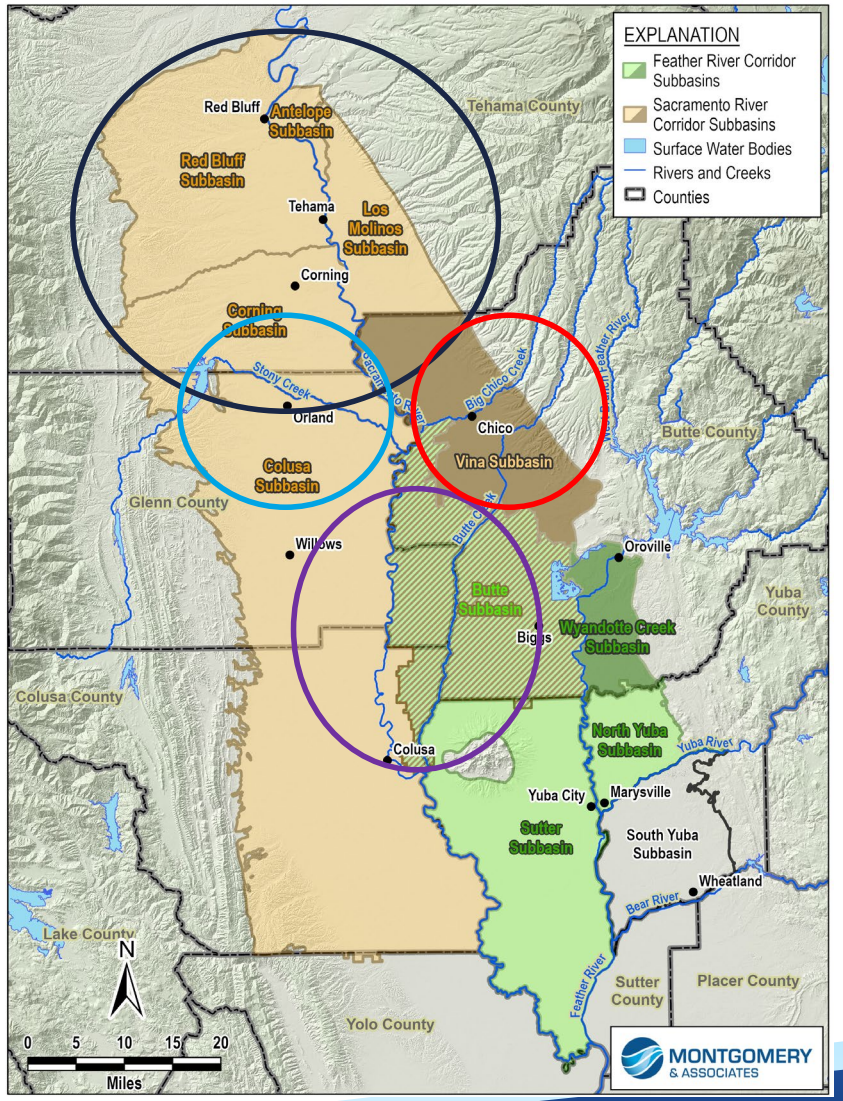
- North Sacramento River Corridor Results of GSP Evaluation
- Inter-Basin Boundary Flows and Water Budget Results

Butte County
WATER & RESOURCE CONSERVATION

Tech Memo Highlights for Sacramento River Corridor

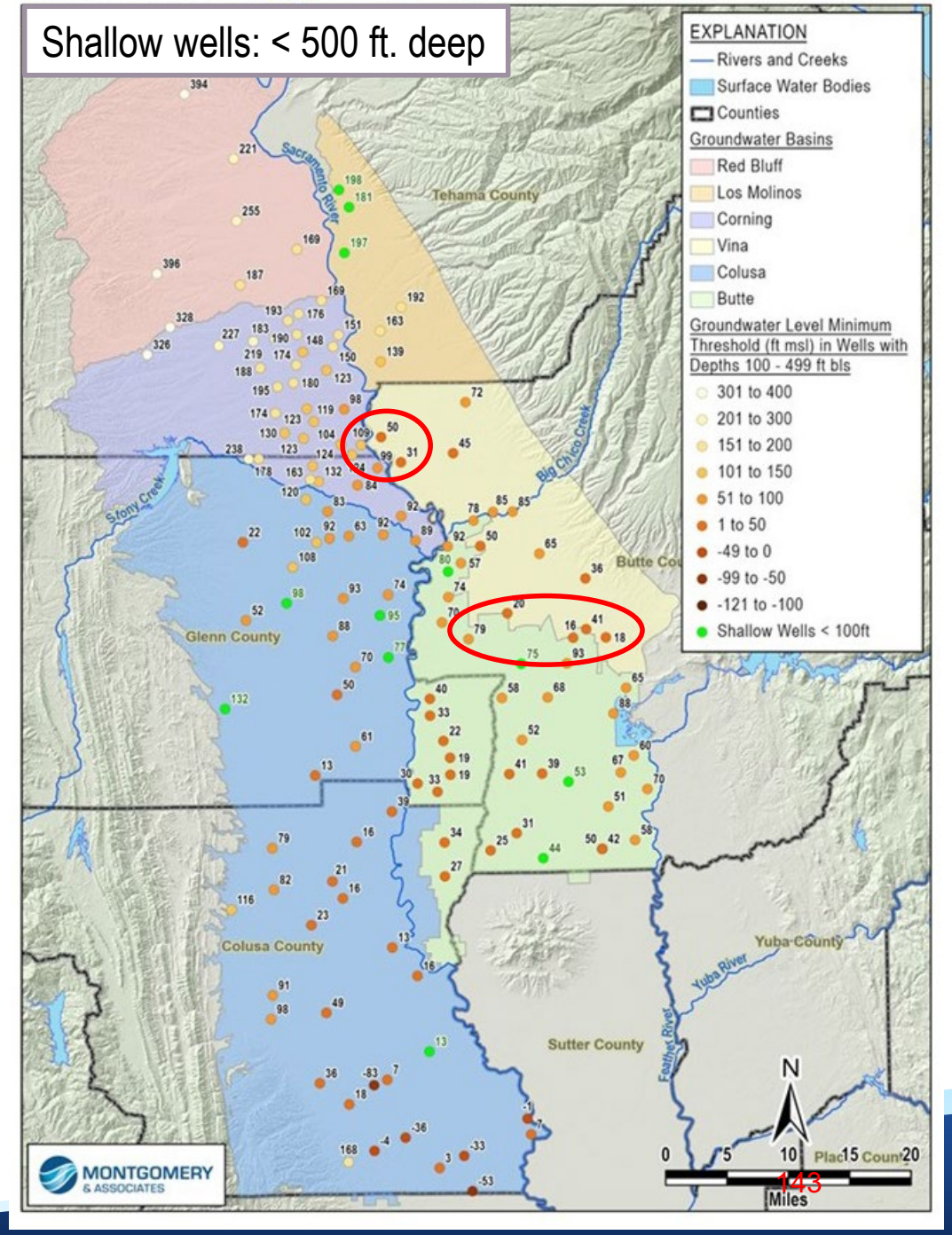
Butte County
WATER & RESOURCE CONSERVATION

North Sacramento River Corridor – Overarching Observations



Groundwater Levels - Observations: Minimum Thresholds

- Differences in selected MT criteria and approaches results in different levels between subbasin boundaries
- MTs at boundaries that are different include Vina boundary with both the Corning and Butte Subbasins
  - Vina's MT levels are up to more than 60 feet lower than MTs in Corning Subbasin
  - At Vina-Butte Subbasin boundary, Vina's MT are 25 to 59 feet lower than Butte
- MT exceedance frequency is used to quantify undesirable results – Subbasins used different approaches which can lead to to varying policy outcomes



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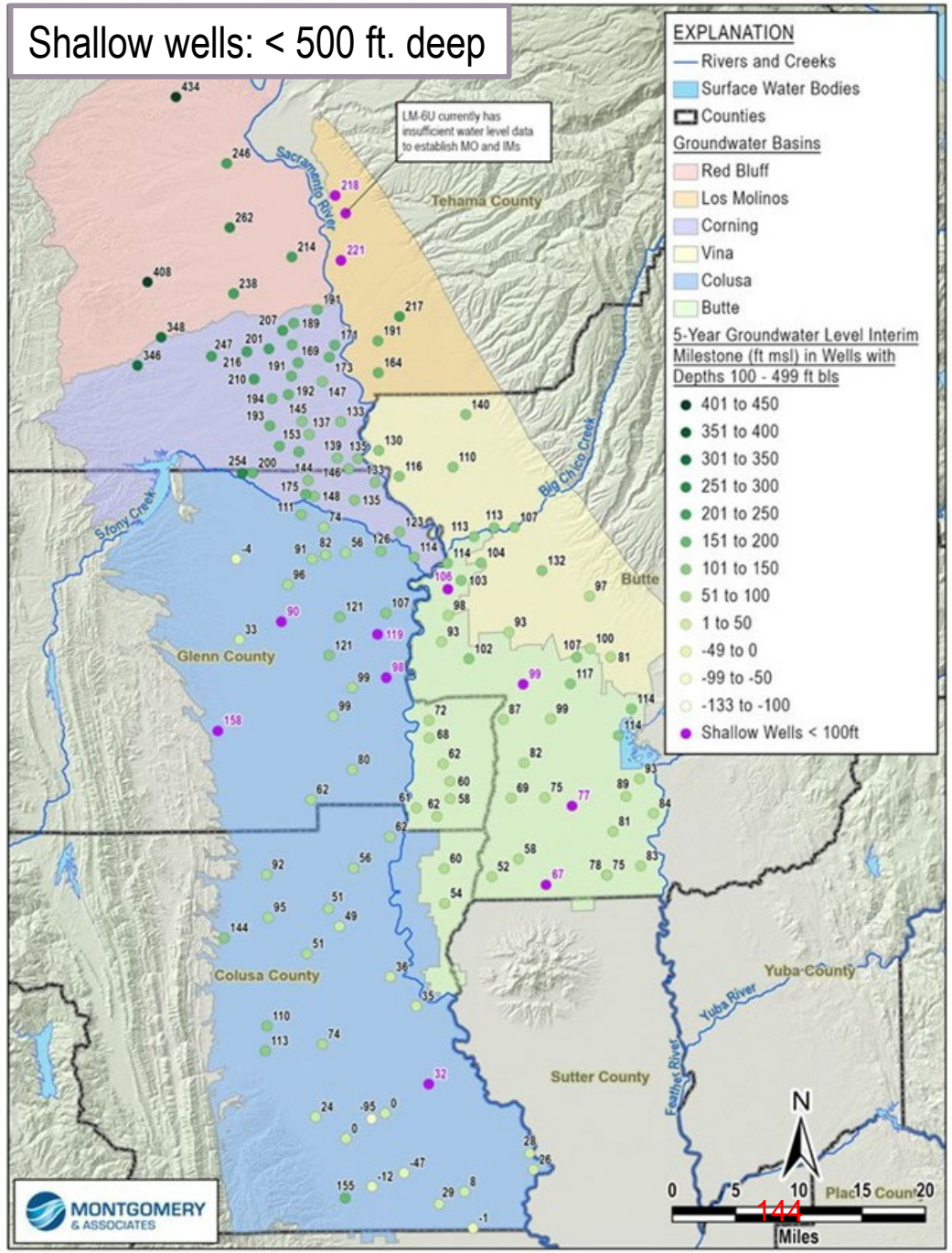
Groundwater Levels - Observations: 2027 Interim Milestones

- At the Vina and Corning border, IMs differ between 5 and 17 feet
- At the Vina and Butte border, IMs differ by ~10 feet
- At the Colusa and Butte border, differences in IMs are less than 10 feet

→ *Differences not likely to need attention*



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Land Subsidence – Summary Observations

- Colusa is the only Subbasin with measurable subsidence
- Vina is the only Subbasin using groundwater levels as a proxy – did not use a specific subsidence monitoring network
- Butte, Red Bluff, Los Molinos and Corning have the same MTs, but different MOs (goals) and URs
- Subbasins to the west of the Sacramento River (e.g. Red Bluff, Corning, Colusa) are a focus area to avoid subsidence in the future due to lowering of groundwater levels

Subbasin	Minimum Thresholds	Undesirable Results	Measurable Objective
Vina	*GWL Used as Proxy*	*GWL Used as Proxy*	*GWL Used as Proxy*
Butte	0.5 ft. over a 5-year period	25% of monitoring locations fall below MT	0.25 ft over 5-yr period
Red Bluff	0.5 ft. over a 5-year period	0.5 feet over a 5-year period	1 ft over 20 years
Los Molinos	0.5 ft. over a 5-year period	0.5 feet over a 5-year period	1 ft over 20 years
Corning	0.5 ft. over a 5-year period	0.5 feet over a 5-year period	0 ft/yr
Colusa	Total of 2 ft. in 1m^2, *or* >0.1 ft/year across 10 contiguous square miles for 2 consecutive years	>2 ft. total subsidence in 1m^2 , *or* >0.1 ft/year across 10 contiguous PLSS sections for 2 years	0 ft/yr

DWR is taking a very strict and prescriptive approach to subsidence with the BMP coming out this year

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Recommendations for Further Coordination

- Butte and Vina Subbasins are asked to evaluate groundwater level MT impacts on beneficial users and look at effects on other SMC
- Butte County Subbasins need to review their subsidence monitoring approach and revise SMC
- Interconnected surface water characterization and SMC: consider a regional approach within the North Sacramento River Corridor following the release of guidance by DWR in late 2025, especially as it relates to the Sacramento River

Recommendations for Further Coordination

Extra Slides

Importance of Inter-basin Coordination

Interconnection means we cannot work in isolation

- Subbasins are hydrologically interconnected → water management decisions and actions in subbasins (i.e., groundwater pumping and processes affecting recharge) could influence aquifer conditions.
- Local control, with shared understanding and lines of communication across boundaries will be important for achieving sustainability in each subbasin.
- Opportunity to learn from each other, and collaborate on shared approaches when it makes sense to do so.

DWR is Required to Review Potential Impacts on Adjacent Basins

Results from this project can support these efforts

Summary of Recommended Corrective Actions (RCAs) – Key Themes

Groundwater Levels SMC	Land Subsidence SMC	Interconnected Surface Water SMC	Water Quality SMC	Water Budget	Monitoring Networks	HCM	Projects and Management Actions
1. Vina	1. Vina	1. Vina	1. Vina	1. Vina	1. Corning	1. Los Molinos	1. Corning
2. Butte	2. Butte	2. Butte	2. Corning	2. Corning	2. Los Molinos	2. Colusa	2. Colusa
3. Corning	3. Corning	3. Corning	3. Los Molinos	3. Colusa	3. Red Bluff	3. Red Bluff	3. Red Bluff
4. Los Molinos	4. Los Molinos	4. Los Molinos	4. Colusa	4. Red Bluff			
5. Colusa	5. Colusa	5. Colusa	5. Red Bluff				
6. Red Bluff	6. Red Bluff	6. Red Bluff					