



BUTTE COUNTY WATER COMMISSION

REGULAR MEETING AGENDA APRIL 2, 2025 1:30 PM

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MEMBERS OF THE COMMISSION
DONNA BAYLISS, DISTRICT 1
TOVEY GIEZENTANNER,
DISTRICT 2
AIMEE RAYMOND, DISTRICT 3
FRED MONGOMERY, DISTRICT 4
MAUNY ROETHLER, DISTRICT 5
DISTRICT WATER LANDOWNERS
MATTHEW TENNIS
PETER RYSTROM
PRIVATE WELL LANDOWNERS
DAVIN ARVONEN
GEORGE "ERNIE" WASHINGTON

MEETING LOCATION
BOARD OF SUPERVISORS CHAMBERS
25 COUNTY CENTER DRIVE, SUITE 205
OROVILLE, CALIFORNIA

1. CALL TO ORDER

2. APPROVAL OF MINUTES

a. *Approval of the Minutes

Action requested: review and approve the February 5, 2025, meeting minutes

3. PUBLIC MEMBERS WISHING TO ADDRESS THE COMMISSION ON ITEMS NOT LISTED ON THE AGENDA

The Water Commission is prohibited by law from taking action on any item presented if it is not listed on the agenda. Comments will be limited to three (3) minutes per person.

4. PRESENTATIONS

a. Update on the Butte County Annual Groundwater Status Report (Kelly Peterson, Butte County Department of Water & Resource Conservation)

Staff will provide an overview of the 2024 Butte County Annual Groundwater Status Report.

Action requested: Provide feedback and accept as an informational item

b. *Consideration of DRAFT Fatal Flaw Analysis Report and Possible Recommendation on Water Supply Projects to Advance to Feasibility Study (Jenny Scheer, Water and Land Solutions).

The Commission will receive a presentation on the draft Fatal Flaw Analysis completed for four projects previously identified and is asked to provide input on the draft report and a recommendation on two of the four projects to proceed to feasibility analysis.

Action requested: Recommend two projects for feasibility study.

- c. ***Consideration and Possible Recommendation on Regional Modeling Coordination Letter to the Department of Water Resources (Christina Buck, Water & Resource Conservation).**

See attached memo for background on this item.

Action Requested: Provide input and approve draft letter.

5. UPDATES

6. OTHER BUSINESS

7. FUTURE MEETING DATES AND AGENDA ITEMS

- a. **Date and Location of the Next Meeting:**
June 4, 2025, 1:30 pm
Butte County Board of Supervisors Chambers
25 County Center Drive, Oroville

- b. **Requests of the Water Commission for Future Agenda Topics**

8. COMMISSIONERS WISHING TO ADDRESS ITEMS NOT LISTED ON THE AGENDA

The Water Commission is prohibited by state law from taking action on any item presented if it is not listed on the agenda.

9. COMMUNICATIONS RECEIVED AND FILED

Copies of all communications are available at the Butte County Department of Water and Resource Conservation, 308 Nelson Avenue, Oroville, California, and are attached in the agenda packet.

- a. ***Communications Received and Referred to the Butte County Water Commission**

10. ADJOURNMENT

Provide Public Comment - Members of the public can submit public comment in one of two ways:

1. In person by attending the meeting at the specified location
2. Email BCWater@ButteCounty.net by noon the day before the meeting is to occur.

When submitting public comment via email, please indicate the item number your comment corresponds to in the subject line.

Email comments submitted before noon the day before the meeting will be sent to the full Water Commission electronically prior to the start of the meeting. Email comments submitted after noon are not guaranteed to reach the Water Commission prior to discussion. All comments will be made part of the record.

Comments are limited to one comment, per item, per attendee and are to be no more than three minutes in length.

Individuals who need special assistance or a disability-related modification or accommodation to participate in this meeting, or who have a disability and wish to request an alternative format for the meeting materials, should contact BCWater@buttecounty.net as soon as possible to ensure arrangements for accommodation.

Agenda items marked with a double asterisk () indicate that supporting materials for these items are included in the agenda packet.



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Vina Subbasin – Surface Water Supply Project Fatal Flaw Analysis

Introduction

Using surface water for irrigation—also referred to as in-lieu recharge—offsets groundwater pumping and can help ensure long-term sustainability in the Vina Subbasin. Maximizing the use of existing surface water rights is also a goal of the [Butte County Recharge Action Plan](#). In-lieu recharge is one component of a portfolio approach to sustainability in the Vina Subbasin, in combination with direct recharge and demand reduction. This report outlines the findings of the Vina Subbasin Surface Water Supply Project Fatal Flaw Analysis and recommends two projects to proceed to feasibility analysis.

Background

The Vina Subbasin received funding from the California Department of Water Resources through a Sustainable Groundwater Management Grant to identify ways to use additional surface water in the subbasin to reduce groundwater pumping. This planning project is being implemented by the Butte County Department of Water and Resource Conservation through Geosyntec and Water and Land Solutions, LLC.

The Vina Subbasin Surface Water Supply Project began with stakeholder meetings and research to develop a list of potential projects. Nine potential projects were presented to the Butte County Water Commission on December 4, 2024 and four potential projects were selected to proceed to fatal flaw analysis. At its April 2, 2025, meeting, the Butte County Water Commission will recommend two of these projects to advance to feasibility analysis. The Butte County Board of Supervisors will make the final selection of two projects at their May 13, 2025 meeting.

This fatal flaw analysis identifies potential challenges that could prevent a project from being implemented. It includes an intermediate level of project information to refine projects and

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ultimately eliminate weaker alternatives. Feasibility analysis will go into greater detail on the critical facets of each project, provide reconnaissance-level designs, develop cost estimates to quantify a dollar per acre-foot cost-benefit ratio, and will be developed so as to be useable for future grant applications for implementation.

Projects Considered

At its December 4, 2024 meeting, the Butte County Water Commission selected four potential Vina Subbasin surface water projects to proceed to fatal flaw analysis. The four projects analyzed in this report include:

1. Feather River -- South Vina Extension
2. Ridge to Valley
3. Feather River -- Sacramento River Exchange
4. Feather River -- Butte Creek Diversion

Key Considerations

For each project, six key considerations were analyzed to identify fatal flaws that would prevent the project from being implemented. The six key considerations include:

- Water availability
- Water right concerns
- Regulatory and legal aspects
- Environmental considerations
- Sustainability goals
- Costs and funding options

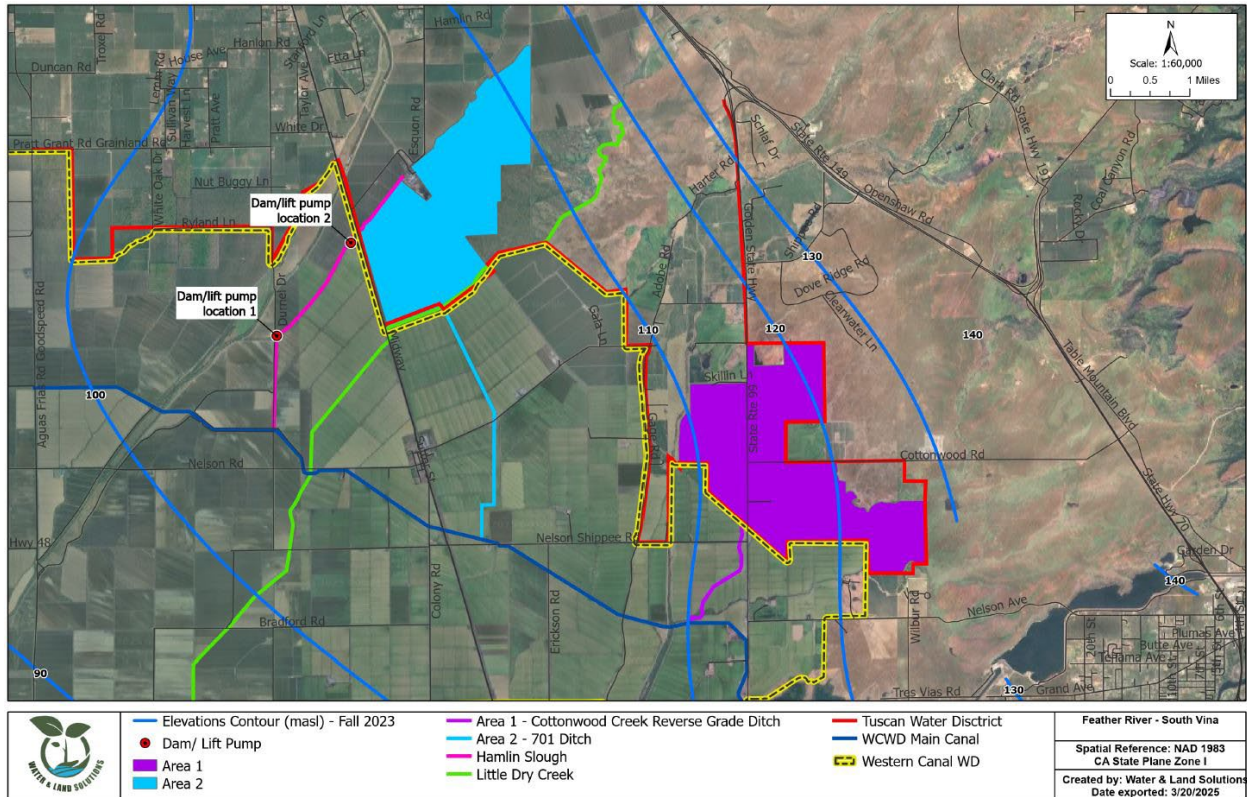
1. Feather River -- South Vina Extension

No Fatal Flaw Identified.

The water for this project would be sourced from the Feather River or Lake Oroville and conveyed through the Western Canal Water District's (WCWD) main canal into the southern Vina Subbasin. The water would be delivered to existing irrigated farmland south of Butte Creek using primarily existing ditches and extending them as needed. This approach minimizes the need for extensive new infrastructure by leveraging existing conveyance facilities, significantly reducing capital costs. Of the irrigated farmland south of Butte Creek and north of WCWD, two areas were selected for further analysis. These two areas are in rice production with existing on-farm ditches that can deliver surface water without the need for filtration. There are three

potential options to deliver water to the north from the Western Canal: Hamlin Slough, 701 ditch, and Cottonwood Creek reverse grade ditch. Figure 1 shows areas that could potentially be irrigated through this project and existing conveyance to reach them.

Figure 1. Feather River -- South Vina project map



1.1. Water Availability

Up to 27,000 acre-feet of Butte County’s State Water Project (SWP)Table A water is potentially available for new uses in Butte County each year, subject to SWP allocations. Table 1 below shows [SWP water allocations](#) since 2014 and compares the allocations to a benchmark of 10,000 acre-feet (AF). Butte County’s SWP Table A contract ensures a minimum of 3,000 acre-feet available even in 0% allocation years. The County currently leases its Table A water to south-of-delta contractors under agreements that expire in 2031. The agreements include provisions that the County can terminate the existing south-of-delta lease agreements if the water is put to use within the county.

Table 1. SWP Allocations for Butte County Table A water, 2014-2025

Year	Allocation (%)	Allocation (AF)	Relative to 10,000 AF benchmark
2014	11	3,000	<10,000
2015	22	6,000	<10,000
2016	100	27,500	>10,000
2017	100	27,500	>10,000
2018	65	17,875	>10,000
2019	100	27,500	>10,000
2020	22	6,000	<10,000
2021	11	3,000	<10,000
2022	11	3,000	<10,000
2023	100	27,500	>10,000
2024	70	19,250	>10,000
2025*	65	17,875	>10,000

*Allocation not yet finalized for 2025

Water from WCWD could also be used for surface water deliveries, subject to availability, as the primary or supplemental source of water supply for this project. As shown in Table 1 above, Table A allocations may be insufficient to meet demand in some years. In those years, WCWD may have water available. However, over the last 10 years, Table A allocations have only dropped below 10,000 acre-feet in three years and WCWD also faced reductions in water supply in two of those three years.

An analysis is needed to determine the amount of available capacity and the timing of such capacity in WCWD’s main canal and in privately-owned ditches. Depending on the findings of the capacity analysis, actions such as vegetation management and sediment removal may be needed to restore capacity.

1.2. Water Right Concerns

All of Butte County is within the SWP Place of Use, which enables any land within the county to legally receive SWP Table A water. Butte County serves as a water wholesaler when its Table A water is used in-county and therefore a water transfer is not required. WCWD’s pre-1914 water right enables them to deliver water outside their boundary and their diversion agreement with the California Department of Water Resources (DWR) allows them to do so. If WCWD is delivering the water as is contemplated in this project, then it is considered a water delivery rather than a water transfer and is not subject to water transfer processes or requirements.

1.3. Regulatory and Legal Aspects

Regulatory and legal considerations in addition to water right concerns addressed above include landowner agreements and potentially California Environmental Quality Act (CEQA) or National Environmental Protection Act (NEPA) compliance if new conveyance is needed and state or federal funding is used. Agreements would be needed with landowners who own and use existing laterals off WCWD’s main canal to determine the terms for access to the laterals. An agreement between WCWD and Vina Groundwater Sustainability Agency (GSA) would also be needed to facilitate this project and would include the cost of water, wheeling charges, provisions for an interruptible supply, and other terms. Vina GSA would in turn develop landowner agreements with those who will receive surface water deliveries under the project.

1.4. Environmental Considerations

If existing ditches are extended to deliver surface water into the southern Vina Subbasin, ground disturbing activities could have minimal impacts on terrestrial species. No impacts to fish were identified in this fatal flaw analysis. Groundwater dependent ecosystems are mapped in these areas and may benefit from the project through improved groundwater levels.

1.5. Sustainability Analysis

This project improves the sustainability of Vina Subbasin by reducing groundwater pumping in the subbasin and offsetting that groundwater use with surface water use. Monitoring wells in these areas show a trend of modest groundwater decline, indicating that reducing groundwater pumping in these areas would be beneficial for the subbasin. Dry wells have also been reported nearby, northwest of these areas. The farmland served by the project would become more climate resilient by limiting their groundwater use in normal and wet years, thereby ensuring sufficient groundwater is available in dry years. Because Butte County’s Table A contract includes a minimum allocation of 3,000 acre-feet, lands served by this project would have at least some surface water available to them even in dry years.

1.6. Costs and Funding Options

Costs for the Feather River-South Vina project include one-time capital costs for infrastructure improvements such as additional pumps and extended ditches. Costs are not yet known at this stage but are expected to be less than \$5 million. The project also includes on-going costs such as the cost of water and wheeling charges, including operations and maintenance charges. One-time capital costs and ongoing operational costs would be further developed in feasibility analysis. Potential grant funding for infrastructure is available through California’s Prop 4 and federal WaterSMART programs.

1.6.1. Proposition 4 funding

California voters approved \$10 billion in bonds through [Proposition 4](#) the “Safe Drinking Water, Wildfire Prevention, Drought Preparedness, and Clean Air Bond Act of 2024” in November

2024. Funding for water infrastructure projects is a major component of the ballot measure, including the funding opportunities below that could be useful for Vina Subbasin projects.

- \$100 million for Integrated Regional Water Management
- \$386 million for Groundwater management
- \$75 million for Regional conveyance projects and repairs

1.7. Conclusion

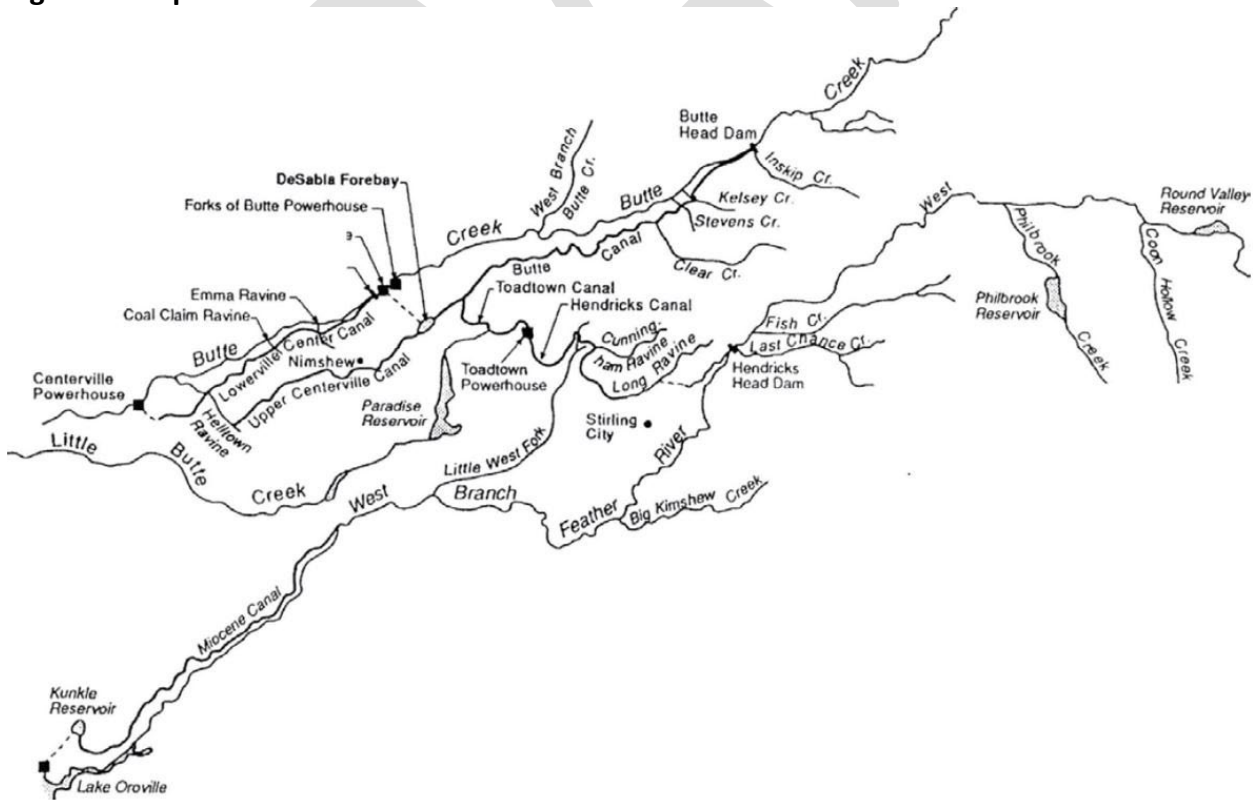
The Feather River – South Vina project option does not have any known fatal flaws that would prevent the project from being implemented.

2. Ridge to Valley

No Fatal Flaw Identified.

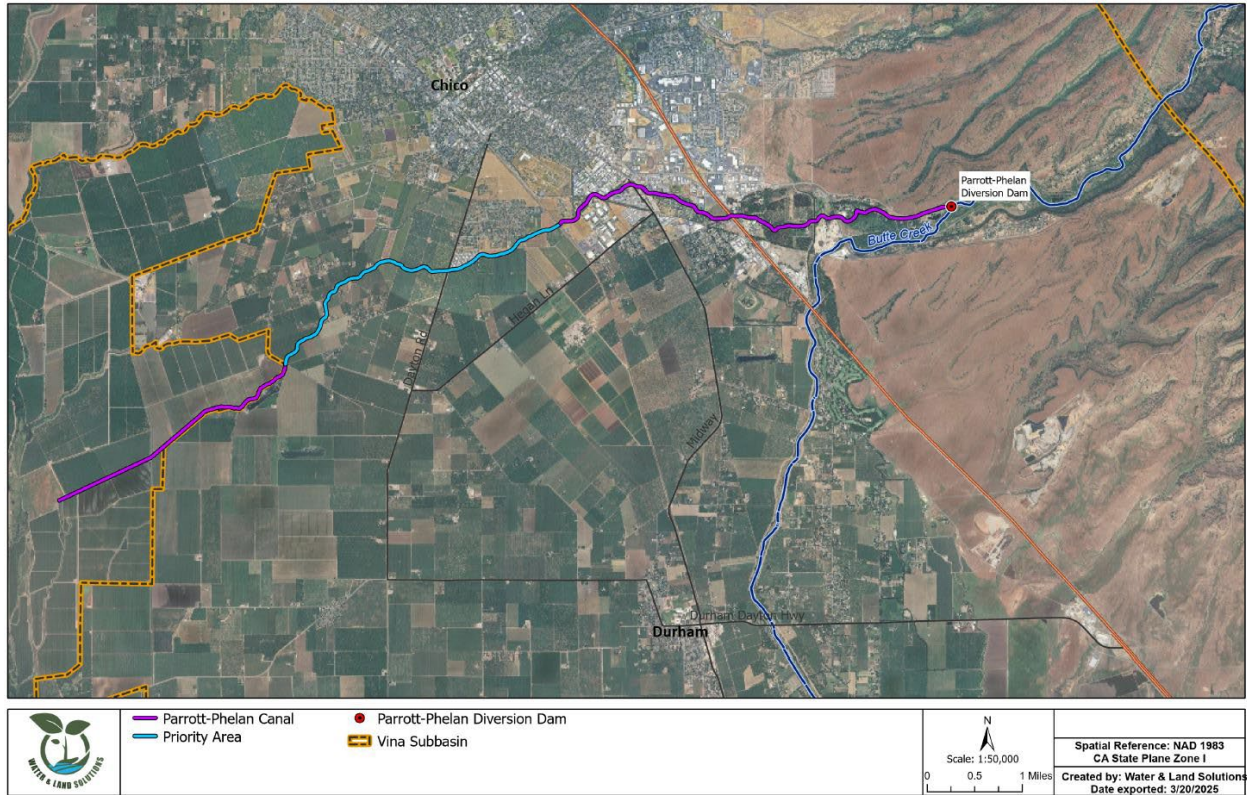
This project option involves transferring surface water from Paradise irrigation District (PID) to the Vina Subbasin. Water stored in Paradise Lake or Magalia Reservoir would be released into Little Butte Creek to reach downstream surface water users on Butte Creek. Figure 2 below shows Paradise Lake and Little Butte Creek.

Figure 2. Map of the West Branch Feather River and Butte Creek infrastructure



There are two options for delivery from Butte Creek. In Option A, water would be diverted at the Parrott-Phelan Diversion Dam into the Parrott-Phelan Canal and ultimately to farmland south and southwest of Chico, as shown in Figure 3 below. Under Option B, the water would continue further down Butte Creek to the Adams Diversion Dam for use on farmland at the southern edge of the Vina Subbasin.

Figure 3. Vicinity map of the Parrott-Phelan Canal



Three additional alternatives involving PID were discussed but not found to be ready for implementation at this time. These include:

Paradise-Chico treated water intertie: This project involves delivering treated surface water to California Water Service Company (Cal Water) for urban use in Chico. This project is included in the [2022 Paradise Options Study](#) and was discussed extensively between PID and Cal Water but ran into non-technical challenges for which conditions have not changed.

Paradise sewer project: The Town of Paradise was considering installing a pipeline to Chico to convey wastewater for treatment at Chico’s water treatment plant, which may have provided an opportunity to co-locate the Paradise-Chico intertie discussed above. The Town of Paradise is now planning to treat wastewater on the ridge rather than developing a pipeline to Chico. If wastewater is treated in Paradise, it is unlikely that it can be discharged into a local waterbody and there is not sufficient land within town to spread the treated wastewater for infiltration. As

plans develop, Paradise may seek a partnership with Vina Subbasin for direct or in-lieu recharge using treated wastewater in the subbasin.

Kunkle Reservoir: Kunkle Reservoir is a small reservoir along Pentz Road, south of Paradise, that was fed by the Miocene Canal before it burned in the Camp Fire. If water could be conveyed to the reservoir, it could be delivered to the Lower Miocene Canal or to the Vina Subbasin.

2.1. Water Availability

Little Butte Creek water stored in Paradise Lake or Magalia Reservoir could be available for 1,000 – 2,000 acre-feet of water transfers in the near term. Upon completion of the Magalia Dam retrofit in 2028, up to 5,000 acre-feet may be available for water transfers.

At the Butte County Water Commission’s February 5, 2025 meeting, Kevin Phillips, PID’s General Manager, noted that PID does not expect to use their full water supply for the foreseeable future, due to a reduced population in Paradise coupled with modern construction and landscape standards to conserve water. Phillips indicated that PID wants to be at the table to discuss potential partnerships with the Vina Subbasin.

A planned repair of Magalia Dam, which will restore PID’s reservoir capacity, could make additional water supplies available for transfer in the summer months. Current California Division of Dam Safety restrictions limit storage in Magalia Dam to 800 AF, compared to a design capacity of 2,250 AF. The estimated project cost is \$69 million, with design costs fully funded and construction costs 60 percent funded. PID is confident the additional funding will be obtained to restore full capacity by 2028.

The Parrott-Phelan Canal (also known as Commanche Creek or Edgar Slough) has available capacity of 30 cubic feet per second (cfs), which could deliver approximately 9,000 acre-feet over the irrigation season to roughly 3,000 acres, if sufficient water supplies were available.

2.2. Water Right Concerns

PID has three water rights as shown in Table 2 below. PID could use their 1916 appropriative right to transfer water to downstream users on Butte Creek, which would require reservoir reoperation. The [water transfer process](#) is governed by the State Water Resources Control Board (State Water Board).

Permit or Agreement Number	Source or Point of Diversion	Permitted Quantity	Availability Timeframe
Statement of Water Diversion and Use No. S008459 (Pre-1914 Appropriative Right)	Butte Creek at Magalia Dam	8 cubic feet per second (cfs) (Estimated at 2,500 AF/yr)	Year-round direct diversion, not storage. Must be used first in priority for PID supply.
Appropriative Water Right Permit 271 (Application A000476) (Priority of Right: 1916)	Paradise Lake and Magalia Res.	9,500 AF total (6,700 AF - Paradise Res.) (2,800 AF - Magalia Res)	Year-round diversion to storage in Paradise Lake and Magalia Reservoir
Appropriative Water Right Permit 16040 (Application 22061) (Priority of Right: 1965)	Paradise Lake	8,800 AF	Wet season diversion to storage in Paradise Lake (October 1 – May 31), Subject to Term 91

Source: [Paradise Irrigation District Amended 2020 Urban Water Management Plan](#)

PID has never participated in a water transfer, though water transfers have been a topic of discussion since the 2022 Paradise Options Study. Conversations with the PID board of directors will be needed to familiarize the board with water transfers and habituate them to the project.

2.3. Regulatory and Legal Aspects

One-year transfers of stored surface water to in-basin uses are exempt from CEQA. Water transfer proponents must provide information to State Water Board staff to demonstrate that the transfer will not result in injury to other water users and will not have an unreasonable effect on fish or wildlife. A water transfer would require posting information to the State Water Board’s website and obtaining approval by the State Water Board.

If Option A is selected, new distribution will be needed to serve farmland near the Parrott-Phelan Canal. This new infrastructure may require easements and environmental review under CEQA or NEPA.

2.4. Environmental Considerations

There may be positive benefits for salmon in Butte Creek from additional flows in the creek—particularly in May and June. If 1,500 acre-feet of water stored in Magalia Reservoir was delivered steadily over 150 days during the irrigation season, flows in Butte Creek would increase by 5 cfs. Additional water in the creek may help returning salmon migrate over barriers such as the Lahar formation on Butte Creek near Highway 99. Option A’s diversion is upstream of the Lahar formation and would not provide additional benefits for fish passage, but Option B’s point of diversion is downstream from the Lahar formation.

2.5. Sustainability Analysis

This project option has potential to increase sustainability for salmon through increased in-stream flows in Butte Creek, particularly in hotter, drier summers. Given the reduced water

demand in Paradise and long-term reduction in demand compared to pre-fire levels from changes in household water use, surface water supplies from PID are reliable into the future. Option A – delivering water southwest of Chico – reduces groundwater pumping for irrigation, which supports the sustainability of domestic and public supply wells in the area.

Another potential benefit specific to Option A is the opportunity to utilize excess winter flows. These excess flows could be diverted through the Parrott-Phelan Canal during periods of high runoff and directed onto fallowed farmland, enabling groundwater recharge through intentional spreading. Such managed recharge practices could further support the subbasin’s sustainability goals by increasing groundwater storage and improving drought resiliency.

2.6. Costs and Funding Options

Costs vary between Option A and Option B. Option A includes additional costs for distribution pipelines to serve farmland, whereas Option B would use existing on-farm distribution systems. Option A would also require on-farm irrigation system improvements for orchards to be able to use surface water, such as booster pumps and filters. Costs are not yet known at this stage but are expected to be less than \$5 million for Option A and less than \$1 million for Option B. The 2018 [Evaluation of Restoration and Recharge within the Butte County Groundwater Subbasins report](#) estimates the cost to install irrigation equipment to use surface water in an existing orchard is \$86,580 for a 100-acre walnut farm. This cost of \$865.80 per acre over 3,000 acres amounts to \$2.6 million for on-farm improvements, according to the 2018 estimate.

Wheeling charges to compensate the operators of the Parrott-Phelan canal for additional operations and maintenance costs would be included in the long-term implementation costs of the project. One-time capital costs and ongoing operational costs would be further developed in feasibility analysis. As discussed in Section 1.6, grant funding may be available for infrastructure for this project.

2.7. Conclusion

The Ridge to Valley project option does not have any known fatal flaws that would prevent the project from being implemented.

3. Feather River -- Sacramento River Exchange

No Fatal Flaw Identified.

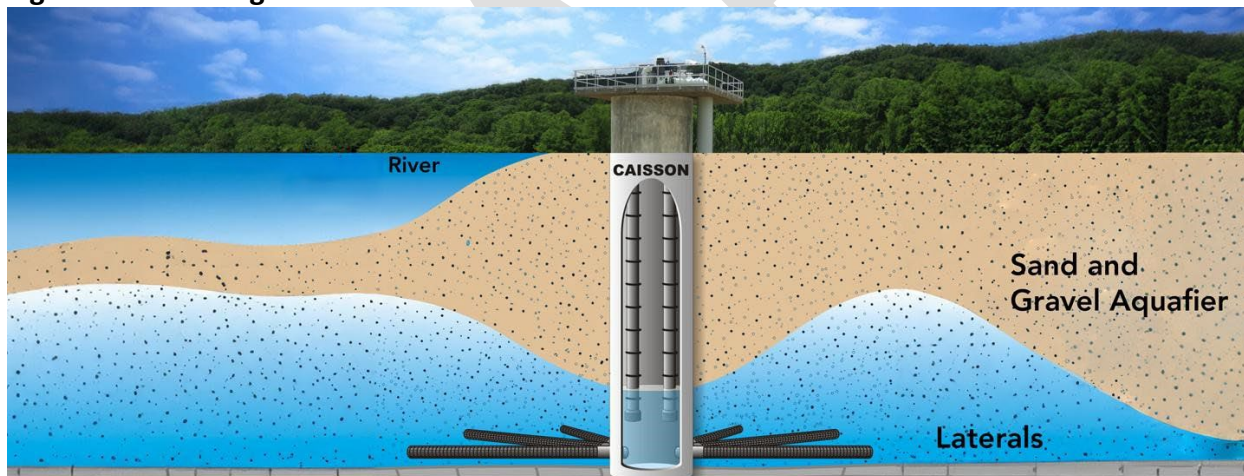
The Feather River – Sacramento River Exchange project involves sourcing water from the Feather River or Lake Oroville by diverting an equal amount from the Sacramento River for irrigation in northern Vina Subbasin. This exchange would occur between Butte County—or another existing Feather River water right holder—and a Sacramento River Settlement Contractor (SRSC) south of the confluence of the Sacramento and Feather River. The exchange would require the SWP to release an amount of water into the Feather River from Lake Oroville

in exchange for a like amount of water provided by the SRSC from Lake Shasta for diversion from the Sacramento River in the Vina Subbasin.

Given the Sacramento River's location along the western edge of the subbasin, this approach moves an existing surface water right closer to groundwater users in Vina Subbasin. An exchange would leverage existing surface water rights in Butte County that are outside of the Vina Subbasin, without the need for new major water conveyance. Existing ditches along farmland north of Chico may be useable to distribute water to farmland, and at least some new pipelines or canals would also be needed.

To reduce environmental impacts, permitting limitations, and maintenance challenges, the project team analyzed the use of a [radial collector well](#) to divert the water rather than a traditional surface water diversion on the river. Radial collector wells, also known as Ranney collector wells, are sited near a river or stream with collector shafts that radiate through different locations in the subsurface to collect water that is interconnected to the nearby river. A rendering of a radial well is shown in Figure 4 below. Large radial wells can divert 40 cfs, which means each radial well could serve 3,000 acres with 10,000+ acre-feet of water per year.

Figure 4. Rendering of radial well



Source: Granite Construction

3.1. Water Availability

Table A water that could be exchanged to be diverted off the Sacramento River is discussed further in Section 1.1. The exchange involves a SRSC and an SWP contractor and water availability would be subject to SWP and CVP allocations. SRSCs are water districts and individuals that hold senior water rights on the Sacramento River that pre-date the Central Valley Project (CVP) who subsequently signed CVP settlement contracts with the U. S. Bureau of Reclamation (USBR).

Alternatively, water supplies from Feather River diverters (such as Butte Water District or Western Canal Water District) could also be used, with an estimated 25,000 AF available from

these districts. Table A and other Feather River water sources could potentially combine to 50,000 AF of exchange water. A local water district would most likely be interested in an agreement between one and five years that would vary based on water availability. Although these water rights holders can transfer water south of the Delta (SOD) for a higher price per acre-foot, transfers through the Delta are increasingly complicated and less reliable. Having a local market for the water with consistent demand every year may be an attractive option.

There are also landowners in the northern Vina Subbasin with riparian water rights. Riparian water rights may only be utilized on the specific parcels associated with those rights and may have been severed over time. Analysis would need to be conducted with these landowners to determine the extent of legal riparian water rights.

Figure 5. Map showing farmland areas with lower elevation than a specified diversion point on the Sacramento River in northern Vina Subbasin

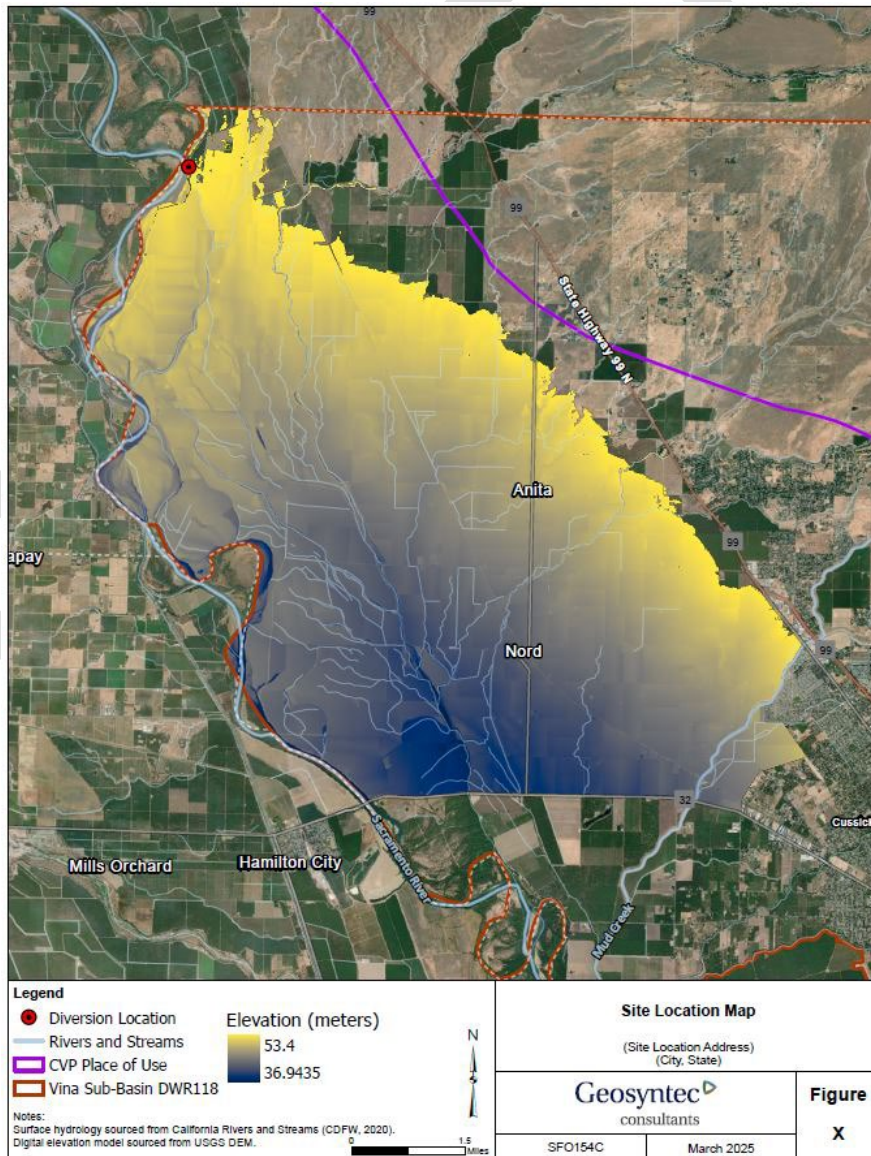


Figure 5 above illustrates a conceptual diversion point off the Sacramento River. The total shaded area on the map encompasses approximately 30,00 acres. Given that each radial well is estimated to serve roughly 3,000 acres, approximately 10% of the northern Vina Subbasin could potentially be served by a single radial well. Acres selected to be served by a radial well could be based on a number of factors including a radial well location with suitable soils, a stable riverbank without erosion, avoidance of impacts to GDEs, existing opportunities for distribution, etc.

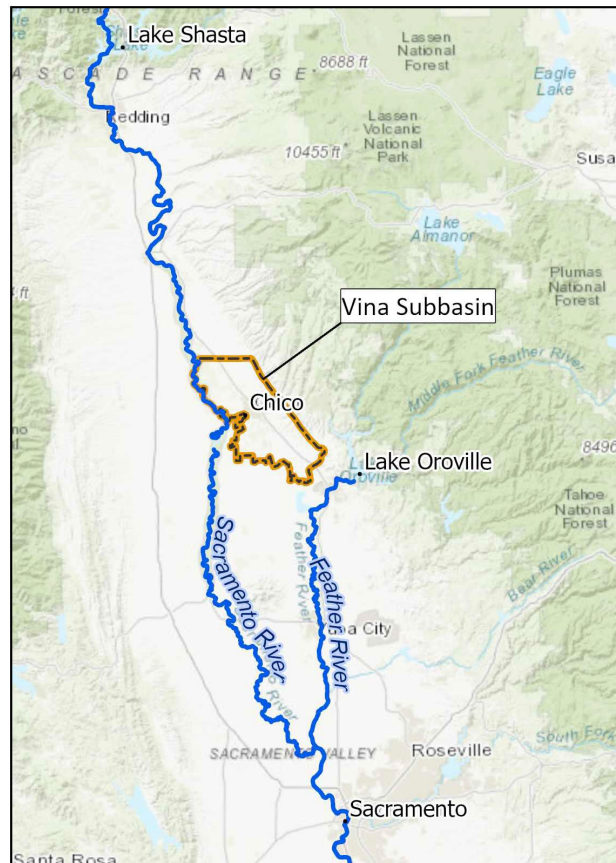
Engineering considerations should also include opportunities for gravity-fed water distribution, minimizing the need for pumping infrastructure and operations. Areas shaded in yellow on the map are at or below the elevation of that specific diversion point. Areas in blue are significantly lower in elevation than the diversion elevation. The eastern boundary of the shaded area has an average fall of 1% per mile.

3.2. Water Right Concerns

An exchange of Table A water to the Sacramento River would require approval from DWR. Article 56.F of Butte County's SWP contract enables a balanced, bona fide exchange such as this where like amounts of water are released from the SWP to the Sac River Settlement Contractor downstream and from the CVP to the SWP users in Vina Subbasin. Figure 6 shows the vicinity of the exchange including key features of the CVP and SWP.

As shown in Figure 5 above, the potential project area is within the CVP Place of Use. Since all of Butte County is within the SWP Place of Use, lands that would receive exchanged water in northern Vina Subbasin are within both the CVP and SWP places of use and therefore the exchange would not require approval from the State Water Board. USBR would be involved in the exchange as the operator of the CVP.

Figure 6. Sacramento River exchange project vicinity map



An appropriate SRSC would need to be identified to facilitate the exchange, and discussions can be initiated if the project proceeds to feasibility analysis. Pleasant Grove Verona Mutual Water Company, Natomas Mutual Water Company, or Conaway Preservation Group are all SRSCs downstream of the confluence of the Feather River and Sacramento River that could potentially facilitate the exchange.

3.3. Regulatory and Legal Aspects

The radial well avoids permitting a diversion on the river and additional permitting for long-term operations and maintenance of the diversion. Consultation and potentially permitting may still be needed with California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the U.S. Army Corps of Engineers. These agencies are responsible for ensuring that impacts to fish in the river and infrastructure on the river are minimized. CEQA analysis is required for the exchange through DWR and NEPA may be required by USBR.

Butte County currently restricts placement of groundwater wells close to the Sacramento River. A waiver may be needed to permit the radial well. Butte County Environmental Health should be consulted to discuss well permitting considerations.

Easements may be needed for extensive new conveyance and distribution. An easement or fee title acquisition would be needed for the pump house above the radial well. CEQA environmental review would likely be needed for new conveyance and distribution.

3.4. Environmental Considerations

Radial collector wells have the benefit of reducing habitat impacts associated with the physical construction of a diversion point in a river with species of concern. Environmental considerations related to the change in water availability to the Sacramento and Feather Rivers would still need to be vetted with USFWS, CDFW, NMFS, and SWRCB. The Sacramento River Basin is home to multiple fish identified as threatened or endangered under the Endangered Species Act (ESA), including Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, California Central Valley steelhead trout, and Southern Distinct Population Segment green sturgeon. Any project option that proposes to alter the habitat of these species through changes in water availability or physical changes to the river itself will require analyses to ensure avoidance of project impacts on these species. If project impacts are unavoidable, mitigation measures will be required.

Lake Shasta is operated with consideration for protecting the cold-water pool in the reservoir to benefit listed species in the Sacramento River with cold water releases. Cold-water pool operations may be prioritized over the fulfillment of an exchange. Additional discussion with USBR staff would be needed to verify the reliability in frequency and amount of water delivered by the proposed exchange.

If new conveyance and distribution pipelines or canals are needed to deliver water to the irrigated farmland in the service area, ground disturbing activities could have minimal impacts on terrestrial species.

3.5. Sustainability Analysis

Diversion through a radial well rather than direct diversion was selected for the proposed project due to the difficulties and expense of developing and maintaining a diversion on the river. A direct diversion from the Sacramento River involves an extensive permitting and mitigation process including consultation with multiple fish agencies. A diversion would need to have an advanced fish screen on the diversion, which increases the cost of the structure. Long-term operation and maintenance of a diversion on the river is also considerably more complex for a direct diversion. The riverbank where the diversion's intake is located can become eroded away, a gravel bar can develop and impede operations, or the river channel can shift away from the diversion and leave it stranded. To fix any of these challenges would require additional work in the river, which would require additional permits. Diverters operating existing diversions on the Sacramento River face uncertainty and complexity in maintaining them.

3.6. Costs and Funding Options

The 2018 [Evaluation of Restoration and Recharge within the Butte County Groundwater Subbasins report](#) estimates the cost of installing two radial collector wells along the Sacramento River with a pipeline to Chico to be \$28 million. The cost estimate is seven years old as of the writing of this report and costs would be significantly higher today. In addition, laterals for water distribution and on-farm irrigation system improvements would further increase the cost of the current project proposal compared to the 2018 cost estimate. The 2018 report estimates the cost to install irrigation equipment to use surface water in an existing orchard is \$86,580 for a 100-acre walnut farm. This cost of \$865.80 per acre over 3,000 acres amounts to \$2.6 million for on-farm improvements. One-time capital costs and ongoing operational costs would be further developed in feasibility analysis.

Without an updated cost estimate, \$15 million per radial well is used in this report for illustrative purposes. A \$15 million radial well serving 3,000 acres equates to \$5,000/acre. Infrastructure costs of \$5,000 per acre are well beyond what landowners would reasonably invest to develop a second source of water supply. Significant grant funding would be required to offset infrastructure costs for landowners, or the project would be infeasible. Potential grant funding may be available through California's Prop 4 and federal WaterSMART programs, as discussed further in Section 1.6.

3.7. Conclusion

The Feather River -- Sacramento River project option does not have any known fatal flaws that would prevent the project from being implemented.

4. Feather River -- Butte Creek Diversion

Fatal Flaw Identified.

This project proposes importing additional water from the Feather River system for re-diversion off Butte Creek. Existing water rights on Butte Creek are fully maximized under almost any conditions during the irrigation season. Butte Creek is also a critically important salmon run in California and additional diversions under current conditions may interfere with salmon restoration requirements. Additional diversions from Butte Creek may be possible if supplementary water is imported to the creek. This would provide multiple benefits, such as water supplies for agricultural users in the Vina Subbasin and additional flows to support salmon.

Water from existing water rights held on the Feather River or stored in Lake Oroville could be imported to Butte Creek through Pacific Gas & Electric's (PG&E) canals—or potentially a new canal—for diversion off Butte Creek. PG&E's Hendricks Canal has moved water from the West Branch Feather River (WBFR) to Butte creek for 100 years. No other existing infrastructure was

identified that could move water from the Feather River to Butte Creek. For this analysis, the focus is on using existing infrastructure i.e. the Hendricks Canal.

The Hendricks Canal is a 9-mile canal constructed in the early 1900s of mostly earthen ditch with several flume and tunnel sections. The canal is owned by PG&E and it conveys water from the WBFR to Butte Creek via Toadtown powerhouse and then into the Toadtown Canal, eventually reaching the DeSabra Forebay, as shown in Figure 7.

Figure 7. Map of DeSabra-Centerville project



4.1. Water Availability

One source of water that could be diverted from the WBFR to Butte Creek is Butte County's Table A water, which is discussed further in Section 1.1. However, according to PG&E, the Hendricks Canal is fully allocated for PG&E operations. The current capacity of the Hendricks Canal is 80 cfs, which is reduced from a design capacity of 125 cfs when the canal was built.

As noted above, no other existing means of transferring water from WBFR to Butte Creek have been identified, making it infeasible to move more water into Butte Creek without using the Hendricks Canal. This constitutes a fatal flaw hindering further analysis of this project at this time.

4.2. Water Right Concerns

As noted in Section 1.2, Butte County's Table A water can be legally delivered anywhere within the county. Butte Creek is an adjudicated stream with a watermaster. Any changes in Butte Creek diversion would be subject to additional oversight from the watermaster. The Butte Creek adjudication addresses "imported water", meaning the existing diversions from WBFR into Butte Creek. Additional water imported to the creek would need to be protected from diversion by existing users with rights to "imported water."

4.3. Regulatory and Legal Aspects

CEQA permitting would likely be required for major upgrades to the Hendricks Canal. If existing Butte Creek diverters in the Vina Subbasin use the additional imported water envisioned in this project, it is not anticipated that additional conveyance or distribution would be needed to deliver the water to irrigated agricultural lands.

4.4. Environmental Considerations

For more than 100 years, summer flows in Butte Creek have been augmented by storage releases from PG&E's DeSabra-Centerville Hydroelectric Project, including an inter-basin diversion from the WBFR. This has created favorable conditions for Central Valley spring-run Chinook salmon, a threatened species under the federal and state Endangered Species Act. The Butte Creek population of Central Valley spring-run Chinook salmon is now the [largest naturally spawning population](#) remaining in the Central Valley.

Additional flows in Butte Creek during the summer months are assumed to be beneficial, particularly in improving fish passage over the Lahar Formation. It is also assumed to be infeasible to divert more water from Butte Creek during the summer months without harming salmon or injuring other Butte Creek water rights holders, unless additional water is imported into the creek.

In discussions related to this project, fishery interests have raised concerns with importation of additional surface water from the WBFR to Butte Creek, as the comingling of foreign water may confuse spawning signals for salmon. Central Valley Constant Fractional Marking/Tagging Program (CFM) [data do not support a hypothesis of a straying problem](#) from the Feather River to Butte Creek. In the last five years for which data are available (2016-2020), there were zero Feather River hatchery fish recorded in Butte Creek. Further, salmon migrating up the Sacramento River from the Pacific Ocean reach the Feather River before they reach Butte Creek. Straying salmon originating from the Feather River would have to pass this larger, stronger waterbody and continue to Butte Creek.

4.5. Sustainability Analysis

Existing diversions through the Hendricks Canal into Butte Creek are critical for salmon survival. Additional flows would further support fish in hotter, drier summers.

The future of the Hendricks Canal and the DeSabra-Centerville project are uncertain. In 2007, PG&E filed an application for a new Federal Energy Regulatory Commission (FERC) license. Their application included plans for a fish ladder and canal fish screen on the Hendricks Dam facilities. In February 2017, PG&E announced that it would withdraw its application for a new FERC license. In May 2017, PG&E proposed a schedule to move forward with the sale of the Project to a new, undisclosed owner. FERC indicated that if negotiations did not result in a sale of the DeSabra-Centerville project, FERC would initiate an “orphaned project” proceeding which [could result in decommissioning](#). If the project is decommissioned at any time in the future, actions must be taken to ensure salmon continue to be supported by diversions from WBFR into Butte Creek. New diversions to provide surface water supplies for irrigation in Vina Subbasin may not be supported.

4.6. Costs and Funding Options

Cost estimates to restore capacity in the Hendricks Canal are not available from PG&E. PG&E staff and PG&E’s online documents library were consulted for information on the nature of capacity reductions on the Hendricks Canal, extraordinary maintenance work needed to restore capacity, and cost estimates for the extraordinary maintenance. However, PG&E does not share non-public data related to the design, operation, or costs of PG&E facilities unless a transaction or regulatory proceeding necessitates or requires a disclosure.

In the absence of cost estimates from PG&E for the Hendricks Canal, costs for the Miocene Canal can be used as a proxy. Although the terrain and design characteristics between the two canals differ, the scale of the costs are likely comparable. The [cost to restore the Miocene Canal](#) after the Camp Fire was estimated at \$40-\$60 million. Annual maintenance costs for the Miocene Canal were estimated at \$1-\$2 million. If the Hendricks Canal was used to deliver irrigation water to the Vina Subbasin, water users would be responsible for some portion of the canal’s maintenance costs.

4.7. Conclusion

The Feather River -- Butte Creek project evaluated existing infrastructure to move additional water into Butte Creek. The existing infrastructure (Hendricks Canal) is fully allocated for PG&E’s operations. PG&E has indicated they are unwilling to share information about the DeSabra-Centerville project. Further feasibility analysis of this project would require a willingness from PG&E to explore possibilities and provide information. An unwilling partner is a fatal flaw.

Recommendations

The fatal flaw analysis indicates the following:

- a. The Feather River -- South Vina Extension, Ridge to Valley, and Feather River -- Sacramento River projects do not have known fatal flaws.

- b. The two least expensive options for bringing additional surface water into the Vina Subbasin are the Feather River -- South Vina Extension and Ridge to Valley project options.
- c. The Feather River -- South Vina Extension and Ridge to Valley projects should proceed to feasibility analysis, considering their potential water availability, regulatory and legal aspects, environmental benefits, long-term sustainability and funding opportunities.
- d. The Feather River—Butte Creek project was found to have a fatal flaw at this time. However, due to the importance of Butte Creek’s salmon fishery and water supplies, it will be important to continue to track developments by PG&E or others that may affect the Butte Creek system.

DRAFT

Vina Subbasin Surface Water Supply Project

Butte County Water Commission

April 2, 2025

Jenny Scheer

Water and Land Solutions, LLC



Project Timeline

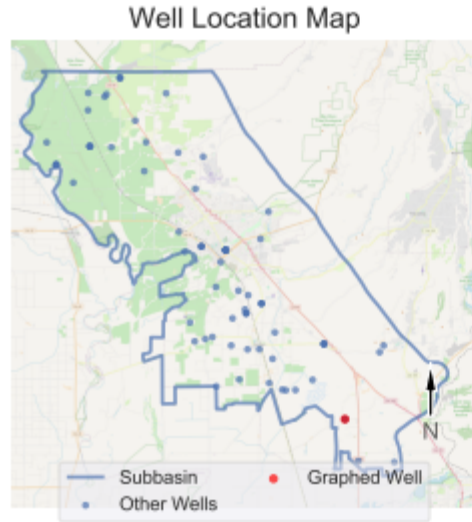
- December 4, 2024 - Butte County Water Commission selected 4 projects for fatal flaw analysis
- **April 2, 2025 – Water Commission will recommend 2 projects to the Board of Supervisors to proceed to feasibility analysis**
- May 13, 2025 - Butte County Board of Supervisors will select 2 projects to proceed to feasibility analysis
- Feasibility analyses will be presented to the Water Commission this fall

Key Considerations

- 15,000-25,000 AF goal for surface water projects
- Each of the four projects would serve existing irrigated farmland with dual-source water to reduce groundwater pumping
- Any project would undergo environmental review prior to implementation
- Fatal flaw analysis considerations:
 - Water availability
 - Water right concerns
 - Legal and regulatory aspects
 - Environmental considerations
 - Sustainability goals
 - Costs and Funding options

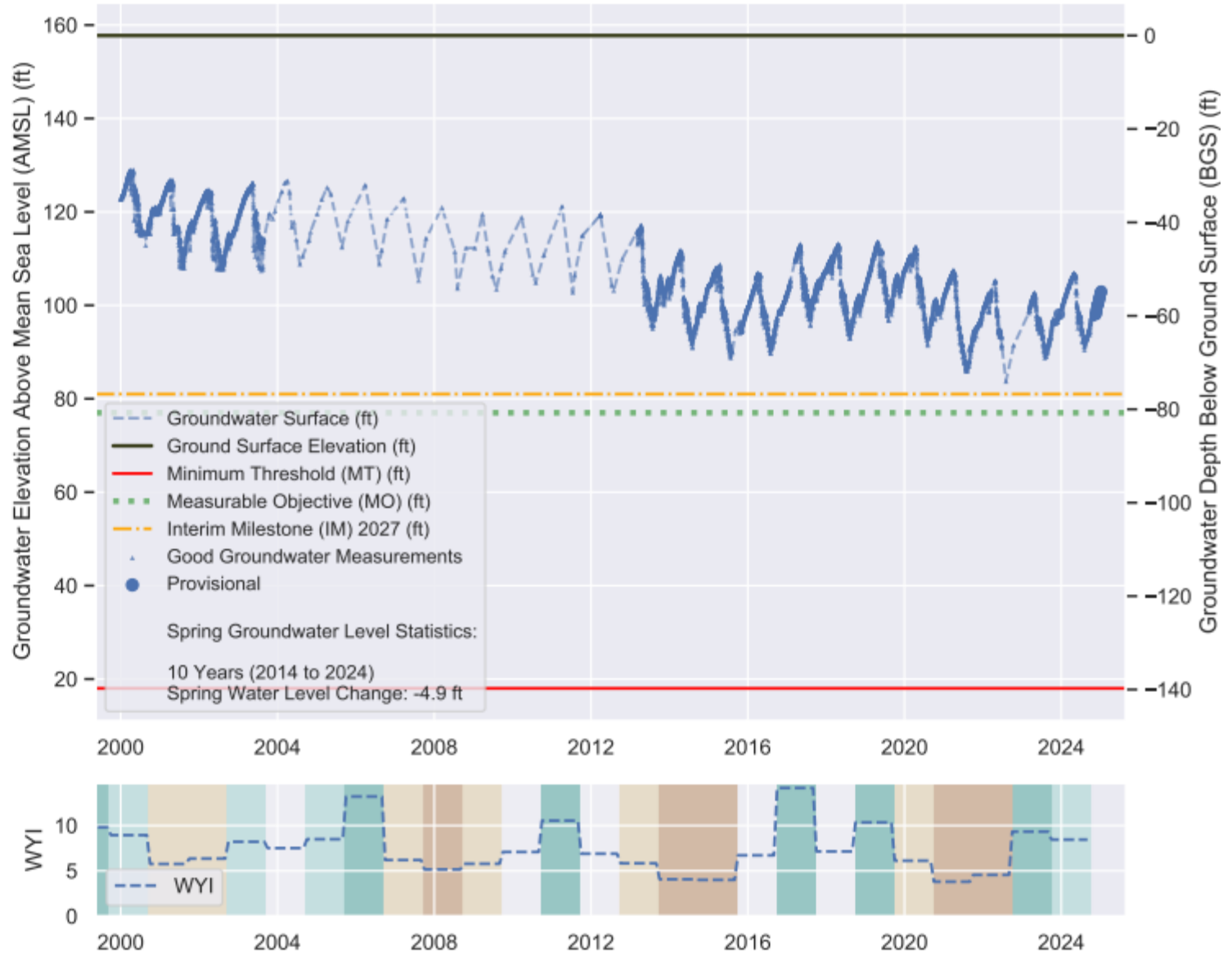
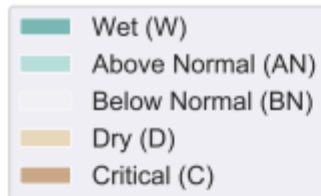
VINA Subbasin - State Well Number (SWN): 20N02E24C001M

Perforation 1: 124.0 - 134.0 ft BGS



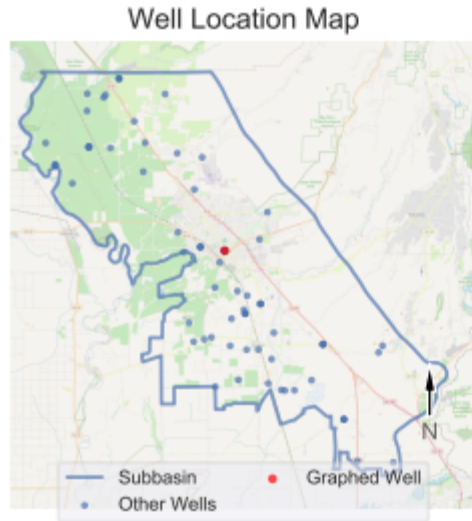
Sustainable Management Criteria:
 IM (2027) = 81.0 ft AMSL
 MO = 77.0 ft AMSL
 MT = 18.0 ft AMSL

Sacramento Valley Water Year Index (WYI) shown on lower right.
 Meaning of colors defined below.



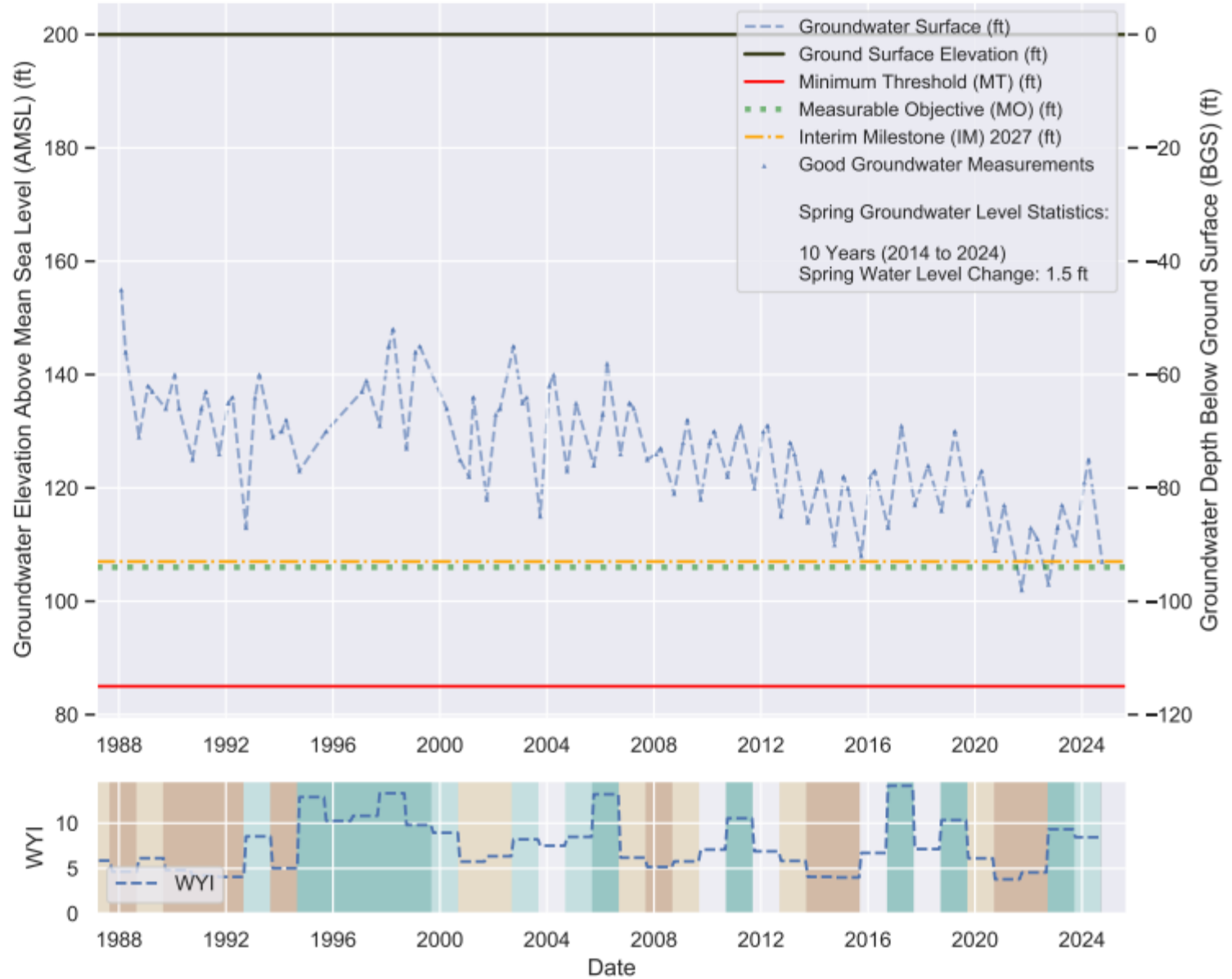
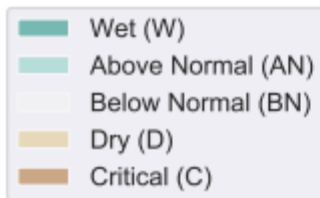
VINA Subbasin - State Well Number (SWN): CWSCH01b

Perforation data not available.



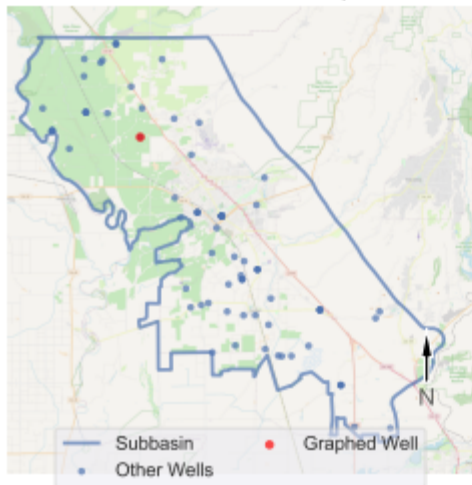
Sustainable Management Criteria:
 IM (2027) = 107.0 ft AMSL
 MO = 106.0 ft AMSL
 MT = 85.0 ft AMSL

Sacramento Valley Water Year Index (WYI) shown on lower right.
 Meaning of colors defined below.



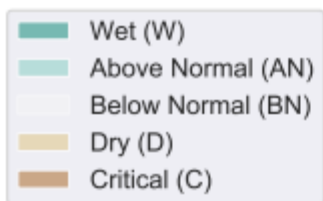
VINA Subbasin - State Well Number (SWN): 23N01W36P001M

Well Location Map

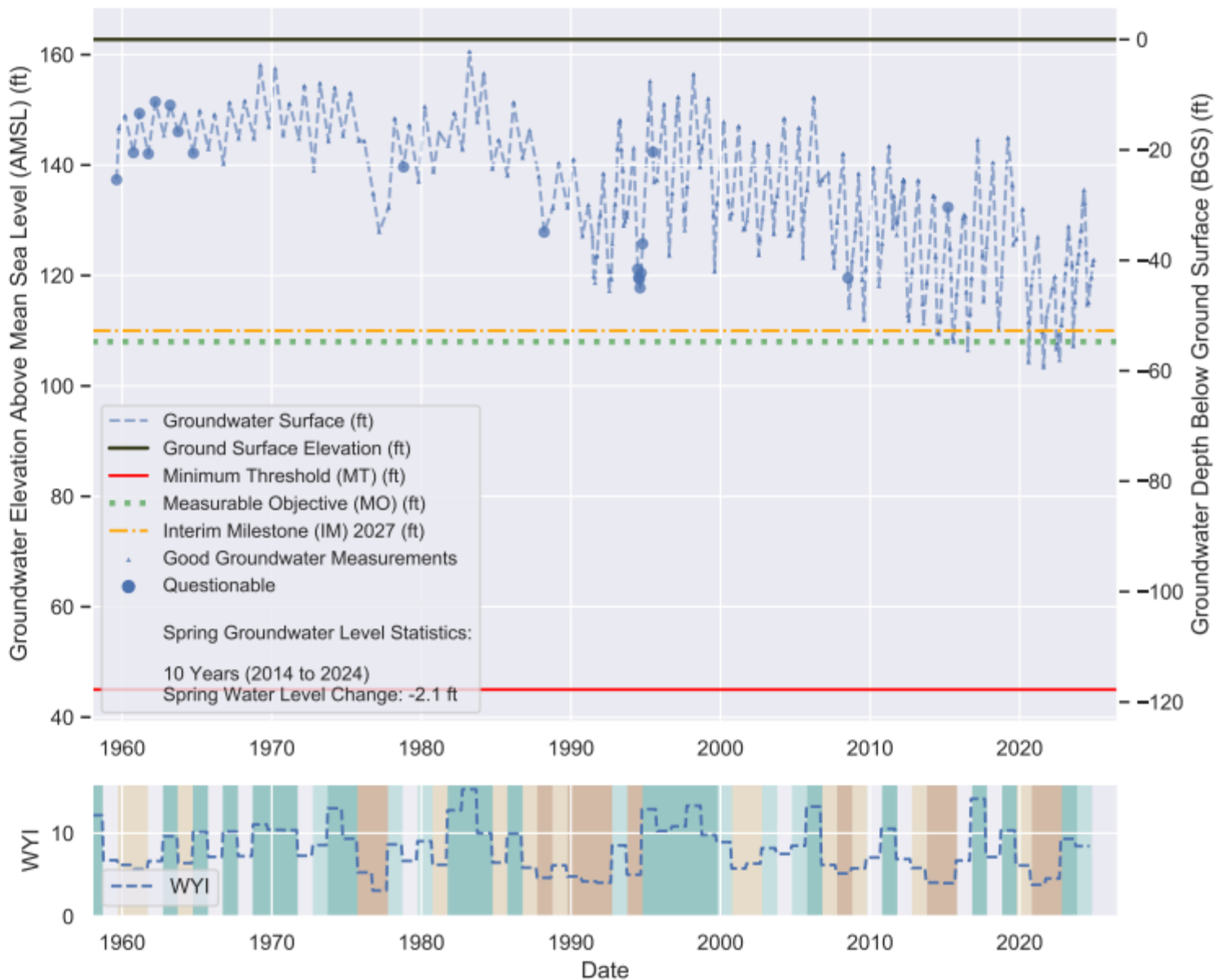


Sustainable Management Criteria:
 IM (2027) = 110.0 ft AMSL
 MO = 108.0 ft AMSL
 MT = 45.0 ft AMSL

Sacramento Valley Water Year Index (WYI) shown on lower right. Meaning of colors defined below.



Perforation data not available.



Most of the subbasin shows a decreasing trend to some degree...



20-Year Groundwater Level Trends

California's Groundwater Live

Select a Filter

County Groundwater Basin

Hydrologic Region

Filter Sub-Selection

SACRAMENTO VALLEY - VINA 5-021.57

Select a Groundwater Level Trend

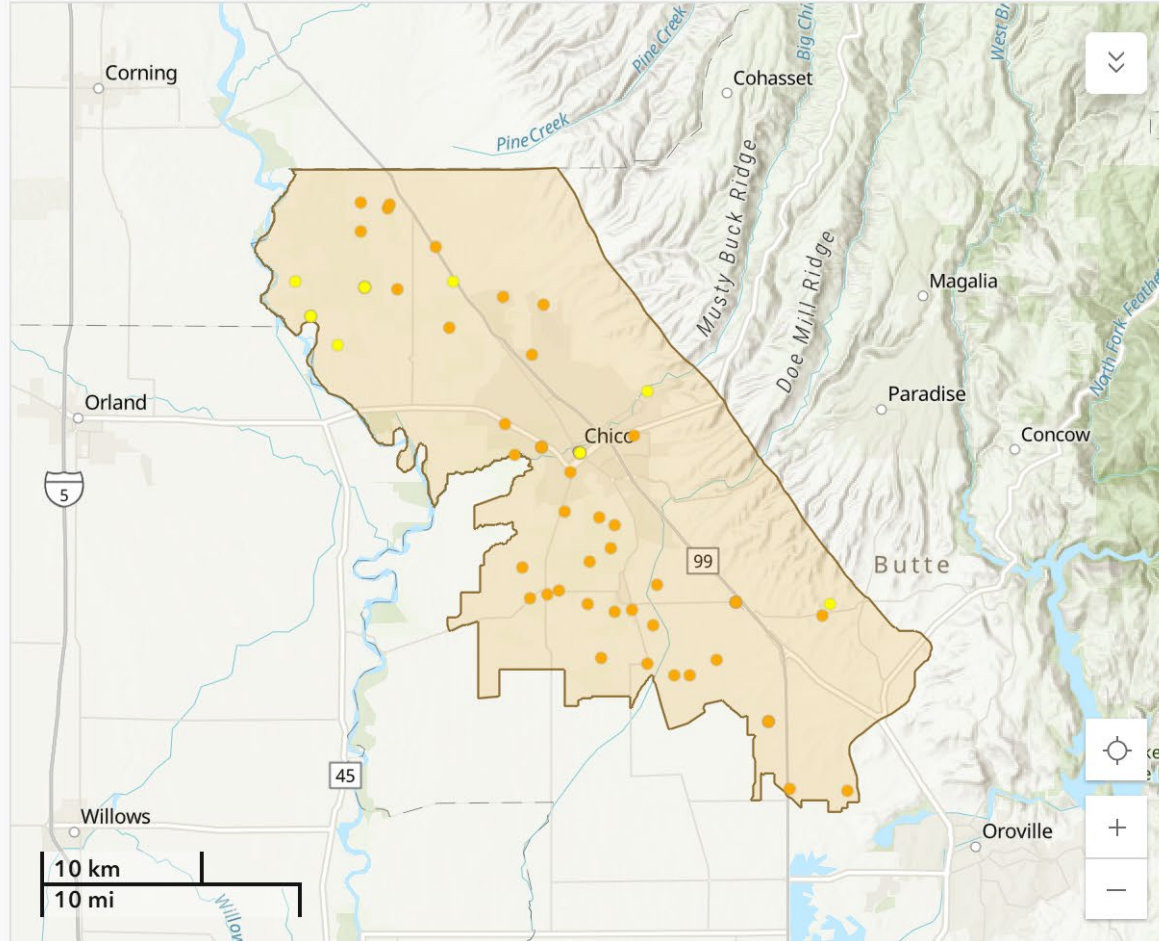
- Increasing Trend > 2.5
- Increasing Trend Up to 2.5
- No Trend
- Decreasing Trend Down to 2.5
- Decreasing Trend > 2.5

Reset

Select all

Filter by Well Depth

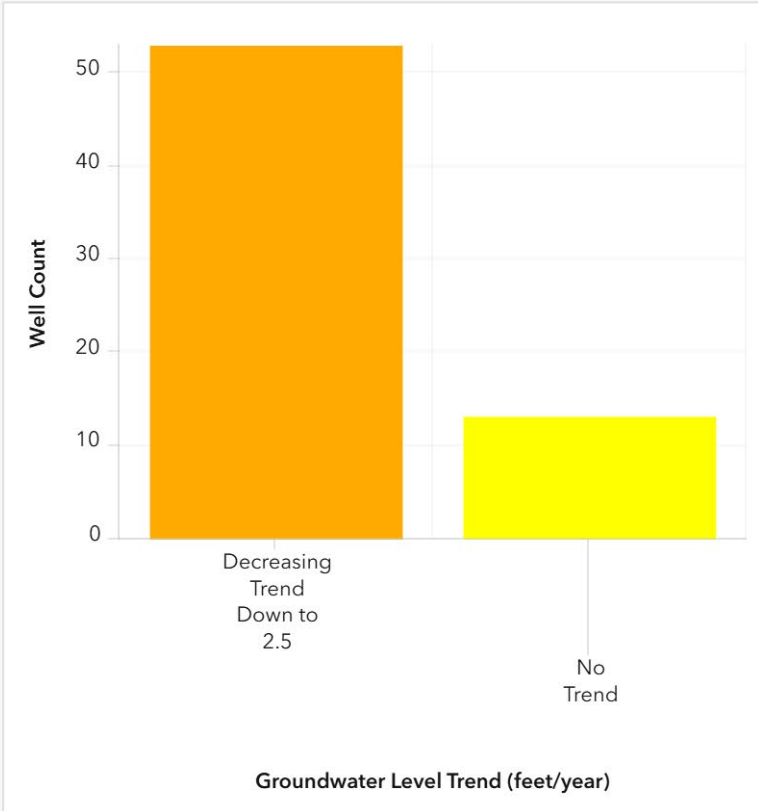
No filter (includes null depths)



Esri, CGIAR, USGS | California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/N... Powered by Esri

[Click here](#) to learn how to use this dashboard.

[Click here](#) to learn more about how this dashboard was created.



Monitoring Wells

4.6k

Total





Monitoring Wells

66

Based on Selection

Legend

Vina Subbasin GDEs

-  Likely A GDE
-  Not likely GDE near rice
-  Not likely a GDE
-  Not likely a GDE within 50' of Irrigated Ag (non rice)




DWR Reported Dry Wells

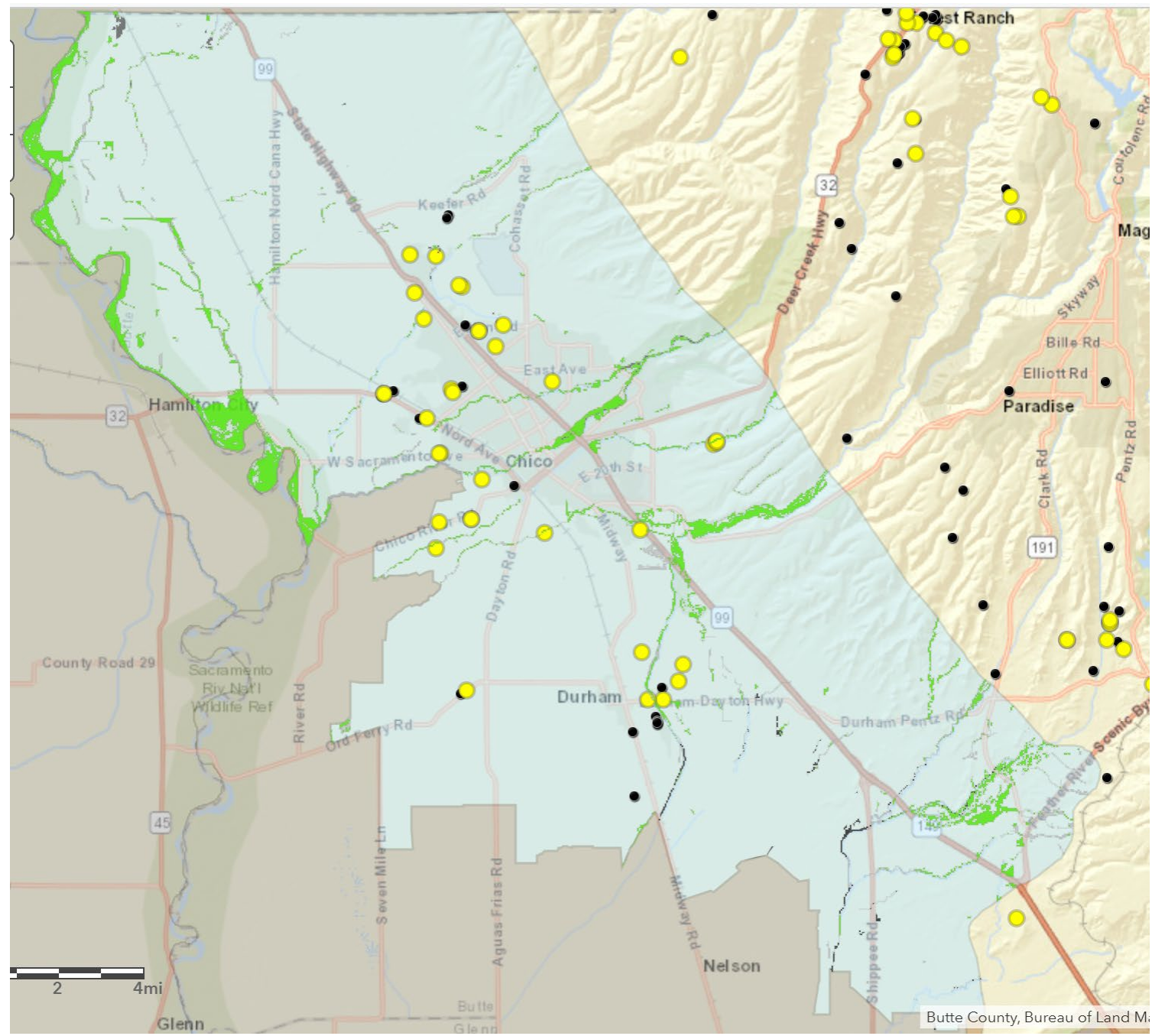
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Dry_Well_Reports_to_OEM_as_of_20240630

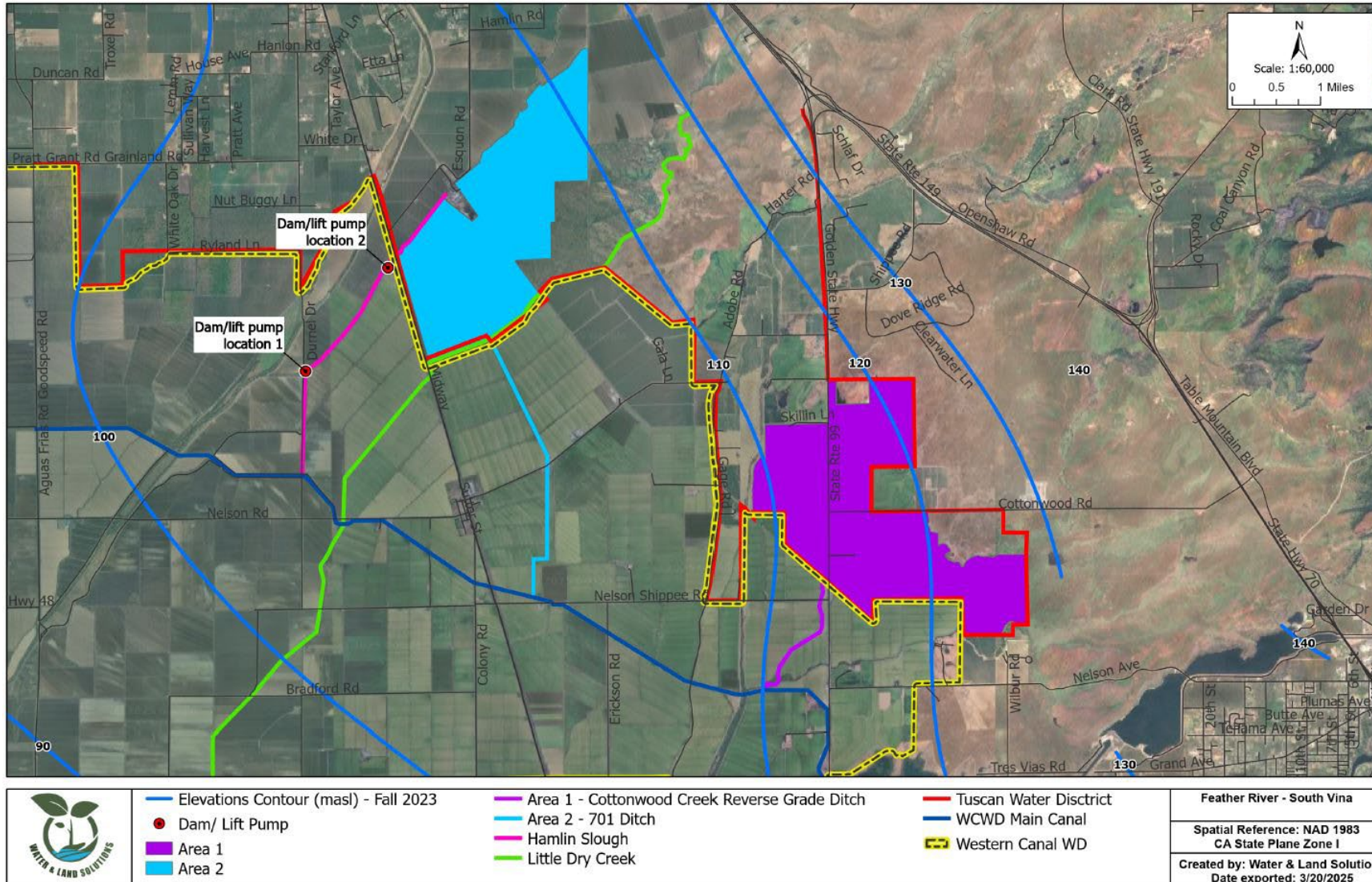
- 

Groundwater Subbasins

-  Wyandotte Creek Subbasin
-  Vina Subbasin
-  Other Subbasins



Feather River – South Vina



No Fatal Flaw Identified

Water availability

- 27,000 acre-feet of Butte County's Table A water potentially available, subject to SWP allocations
- Or water from Western Canal Water District, subject to availability
- Capacity analysis needed

Year	Allocation (AF)	Relative to 10,000 AF benchmark
2014	3,000	<10,000
2015	6,000	<10,000
2016	27,500	>10,000
2017	27,500	>10,000
2018	17,875	>10,000
2019	27,500	>10,000
2020	6,000	<10,000
2021	3,000	<10,000
2022	3,000	<10,000
2023	27,500	>10,000
2024	19,250	>10,000
2025*	17,875	>10,000

Water right concerns

- Pre-1914 water rights enable Western Canal Water District to deliver water beyond its boundary

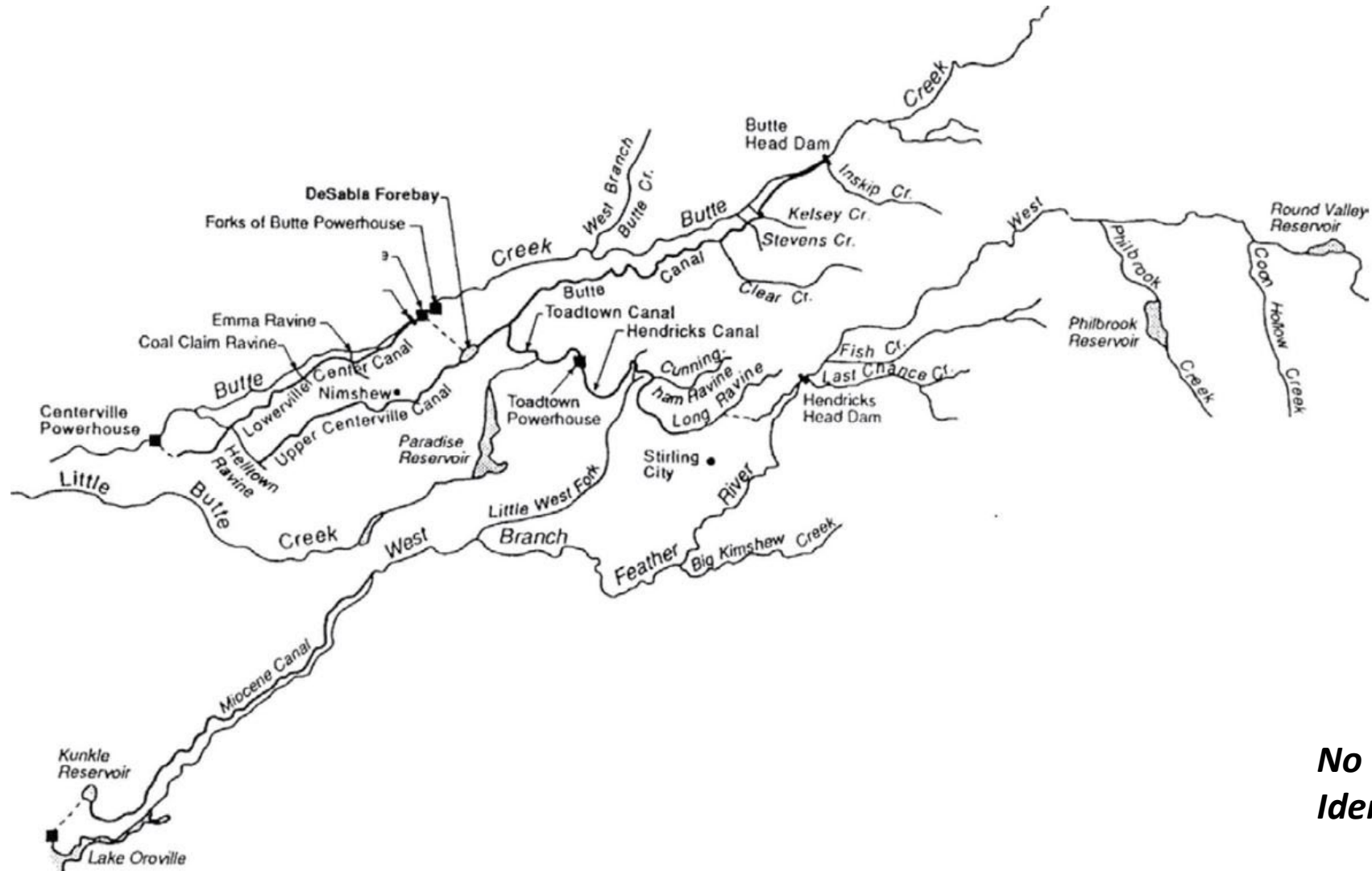
Costs and Funding options

- Wheeling charges
- Costs to extend existing canals, pumps to lift water
- Potential grant funding through California's Prop 4 and federal WaterSMART programs

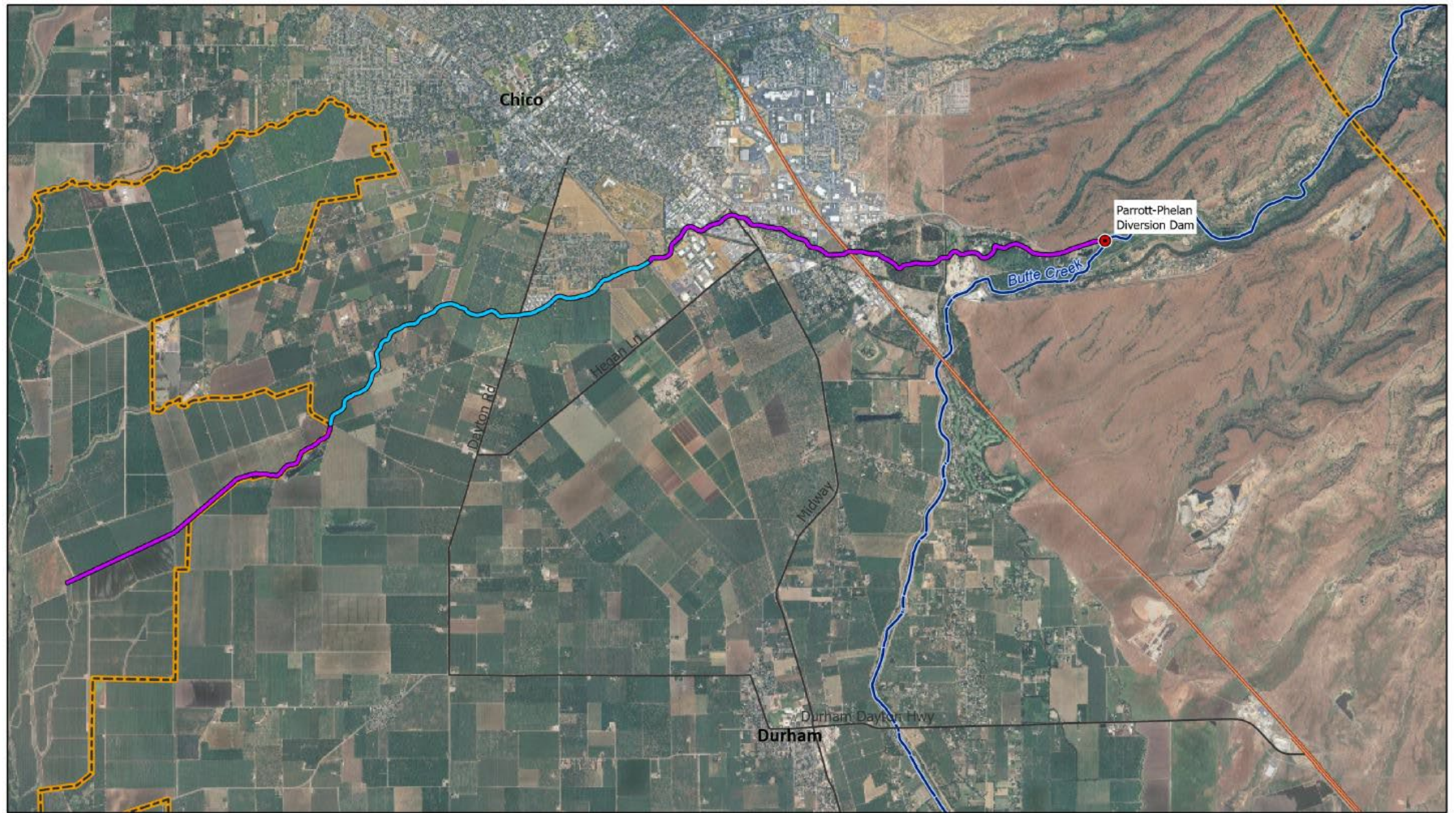
Prop 4 water funding

- California voters approved \$10 billion in bonds through Prop 4 in November 2024
- Funding includes
 - \$100 million for Integrated regional water management
 - \$386 million for Groundwater management
 - \$75 million for Regional conveyance projects and repairs

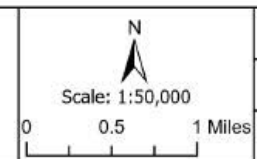
Ridge to Valley



**No Fatal Flaw
Identified**



- Parrott-Phelan Canal
- Priority Area
- Parrott-Phelan Diversion Dam
- Vina Subbasin



Spatial Reference: NAD 1983
CA State Plane Zone I
Created by: Water & Land Solutions
Date exported: 3/20/2025

Water availability

- Little Butte Creek water stored in Paradise Lake or Magalia Reservoir
- 1,000 – 2,000 acre-feet available in the near-term
- Up to 5,000 acre-feet available after Magalia Dam retrofit is completed in 2028

Water right concerns

- Combination of pre-1914 water right, 1916 right, 1965 right
- Includes rights to store water

Environmental considerations

- Option 2: Increased flow to the Lahar formation—particularly in June and July—could improve fish passage

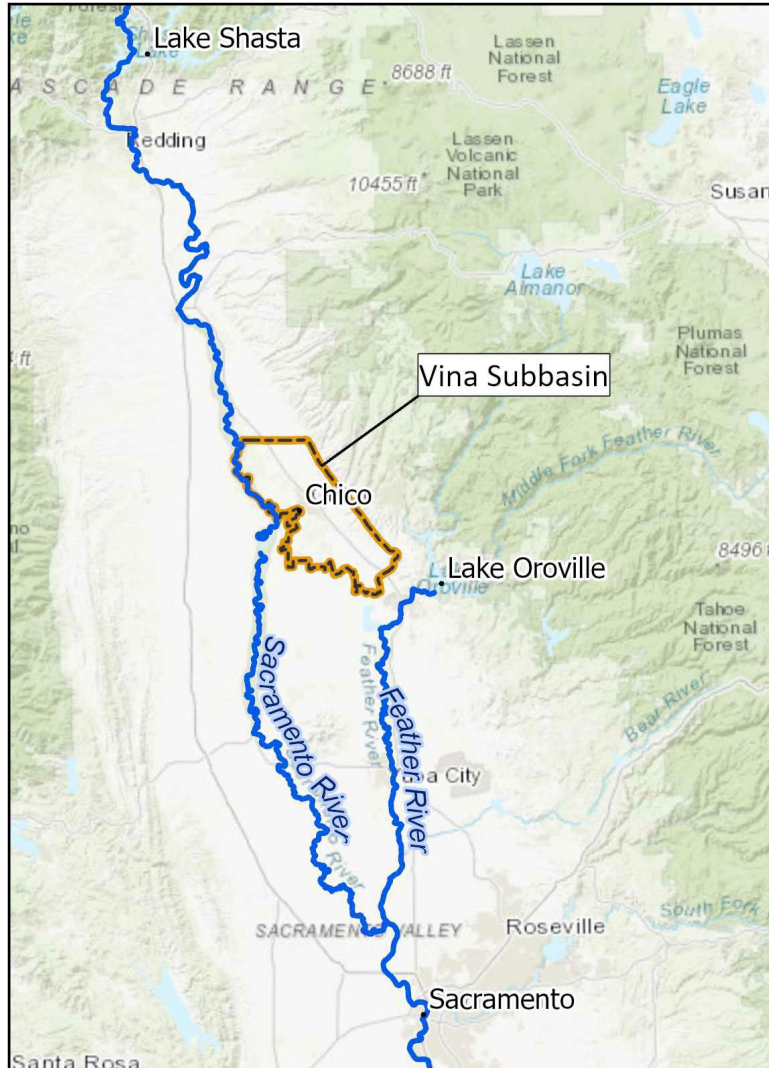
Costs and Funding options

- Option 1
 - Wheeling charges
 - Distribution costs for new pipelines on lands not currently served by Parrott-Phelan Canal
 - On-farm irrigation system improvements may be needed

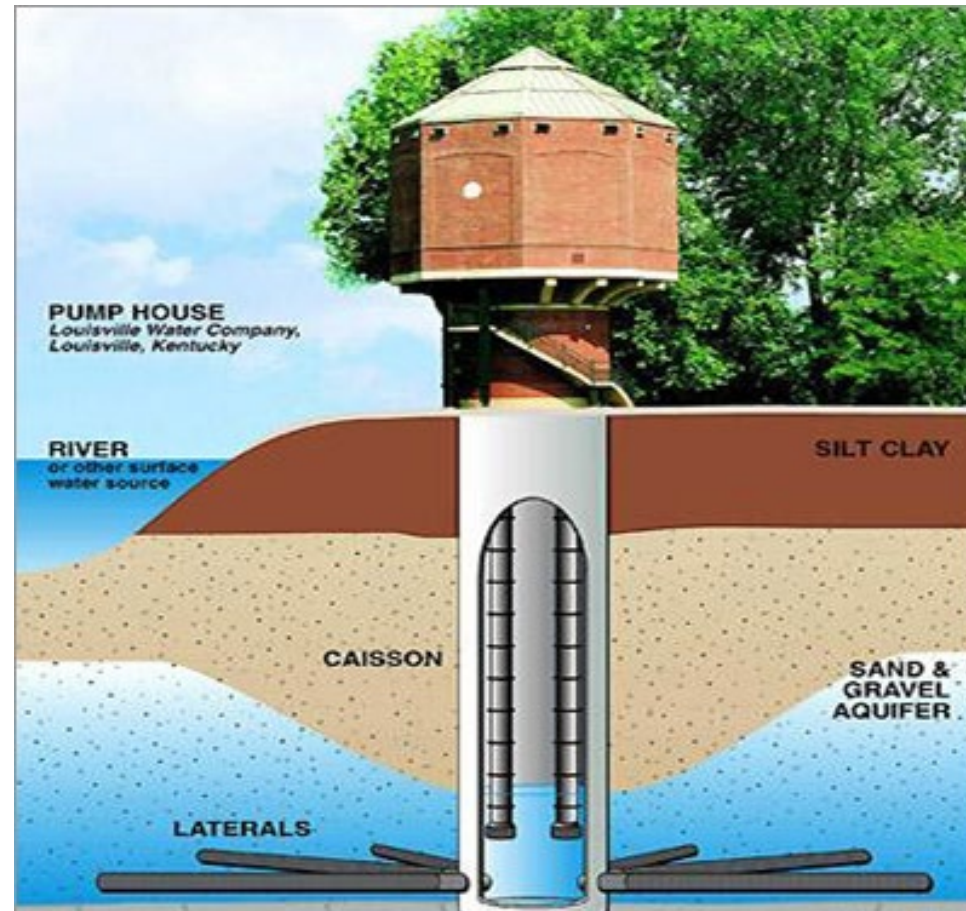
Other options from the Ridge

- Treated water to Chico – infeasible
- Paradise sewer project
- Kunkle Reservoir to Lower Miocene Canal

Feather River -- Sacramento exchange



Radial well



No Fatal Flaw Identified

Water Availability

- Table A water exchanged to be diverted off the Sacramento River
- Subject to SWP and CVP allocations, environmental requirements
- 40 cfs per radial well
- Each radial well could serve 3,000 acres with 10,000+ acre-feet of water

Water right concerns

- Exchange through California Department of Water Resources
 - Would involve CVP contractor and U.S. Bureau of Reclamation
- CEQA would be required

Legal and regulatory aspects

- Radial well avoids permitting a diversion on the river
- Avoids permitting for operations and maintenance of diversion

Environmental considerations

- Aquatic habitat concerns largely avoided by use of radial well
- Potential to use existing ditches for conveyance

Sustainability analysis

- Avoids maintenance of diversion on the river

Costs and Funding options

- \$28 million for two radial wells and pipeline in 2018
- \$15 million / 3,000 acres = \$5,000/acre
- Costs for radial well(s), conveyance, distribution, and on-farm irrigation system improvements
- Significant grant funding would be required to offset costs for landowners

Feather River -- Butte Creek diversion



Fatal Flaw Identified

Water availability

- Butte County's Table A water, subject to SWP allocations
- Hendricks Canal is fully allocated for PG&E operations
- Infeasible to move more water into Butte Creek without using Hendricks Canal
- Without additional information from PG&E, unable to characterize infrastructure improvements needed to restore capacity from current 80 cfs to design capacity of 125 cfs

Costs and Funding optionsh

- Cost estimates to restore capacity in Hendricks Canal are not available from PG&E
- Cost estimate to restore Miocene Canal after the Camp Fire \$40-\$60 million
- PG&E estimates \$1-\$2 million for annual Miocene maintenance

Key Findings

Project Option	Preliminary Cost Estimate	Fatal Flaw Findings
Feather River--South Vina extension	<\$5 million	No fatal flaw identified
Ridge to Valley	\$1-5 million	No fatal flaw identified
Feather River-- Sacramento River exchange	>\$15 million	No fatal flaw identified
Feather River--Butte Creek diversion	N/A	Fatal flaw identified