BUTTE COUNTY RECHARGE ACTION PLAN

Prepared by:
Department of Water & Resource Conservation

Adopted: February 13, 2024

Prepared by Dr. Christina Buck, Assistant Director
Department of Water and Resource Conservation

In consultation with:
Water Commission Ad Hoc
Tovey Giezentanner, Aimee Raymond, Donnie Stinnett, Ernie Washington
Technical Advisory Committee Ad Hoc
Joe Connell, Jeff Davids, Kyle Morgado

Adopted by the Butte County Board of Supervisors
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Introduction

California experienced a remarkable shift from the past few years with the arrival of 31 atmospheric river storms between October 1, 2022 and April 2023, in contrast to the preceding driest three-year period in the state's recorded history. While by some measures the drought is now over, continuing impacts of drought and the recent shift in conditions highlights just how much we need to prepare for wetter wet and drier dry years.

Butte County recognizes the need to address declining groundwater levels, particularly in the Vina Subbasin (Figure 1), and is engaged with Groundwater Sustainability Agencies (GSAs) to pursue solutions using a five-pronged approach.

1. Reducing groundwater demand through increased conservation activities
2. Increasing groundwater recharge during wet periods
3. Increasing use of available surface water supplies when economical
4. Land use management to manage water demands, and:
5. Inter-basin coordination

As part of the state's response to California's unprecedented amount of rain during the 2023 water year, Governor Newsom issued Executive Order (EO) N-4-23 that enabled local water agencies and other water users to capture water from storms to recharge groundwater supplies. The order suspended regulations and restrictions on permitting and use to enable water agencies and water users to divert flood stage water for the purpose of boosting groundwater recharge. Subsequently, Senate Bill 122 put into law the bulk of EO N-4-23 as Water Code Section 1242.1.

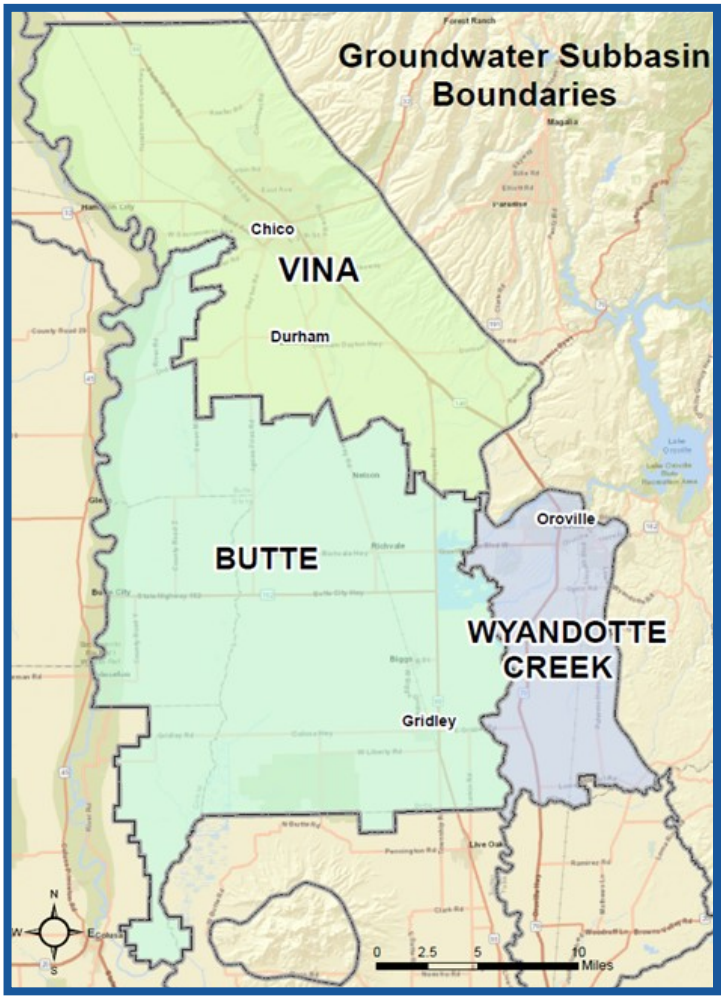


Figure 1. Groundwater Subbasins in Butte County

However, given the local precipitation conditions and timing of the EO, Butte County was unable to implement actions under the EO. In a letter to the California Department of Water Resources, Butte County communicated its approach and intent to pursue enhanced natural recharge. The letter outlined a series of activities to pursue, including the creation of a Butte County Groundwater Recharge Action Plan ("Recharge Action Plan").

This Recharge Action Plan satisfies this commitment and outlines actions the County plans to pursue, directly or through partnerships, to participate in the sustainable management of local groundwater resources.

Why Set a Recharge Goal?

In August 2022, the Newsom Administration released *California's Water Supply Strategy-Adapting to a Hotter, Drier Future* which charted actions to offset the water supply that will be lost to a changing climate. It describes an anticipated 10% reduction in California Water Supply driven by hotter, drier weather that consumes a greater share of the rain and snow-fall absorbed by dry soils, thirsty plants, and evaporation into the air.

Locally a similar increase in evaporative demand was estimated for the Vina Subbasin (7.5%). Although in recent decades a slightly smaller agricultural footprint county-wide, increased irrigation efficiency, and urban conservation has reduced groundwater demands, a warming climate means agricultural, urban, and native lands will be thirstier and demand more water[1]. The climate change modeling scenario used for the Vina Groundwater Sustainability Plan suggests groundwater pumping demands and the imbalance of net recharge in the future will be similar to conditions observed during 2000-2018. This period and more recent years have seen a decline in groundwater storage of about 20,000 acre-feet per year resulting in cumulative storage decline of about 550,000 acre-feet. This is evidenced by declining groundwater levels and historical lows in some areas of the subbasin[2]. The recent past reflects the anticipated extremes of dry and wet years the future may hold. Therefore enhancing natural recharge during wet years and also during big storms within dry years becomes a key strategy in leveling off declining groundwater levels and managing groundwater sustainably through droughts and floods.

In addition, in the Butte Subbasin potential future changes to inflows to Lake Oroville could lead to an increase in the frequency of cutbacks to water districts in the County using Feather River water supplies for irrigation. Reduced availability of surface water in some years will increase groundwater demand (an estimated 29%). However, in the Butte Subbasin change in groundwater storage is projected to decline only about 2,000 acre-feet per year[3].

Groundwater levels in the Wyandotte Creek Subbasin have declined through the recent dry years, but longer-term

RECHARGE DEFINED

"Groundwater Recharge" means a process where water moves down from the ground surface or the bottom of a waterway and infiltrates an underlying aquifer. Groundwater recharge actions include increasing the amount of raw, treated or recycled water in the groundwater basins through human-controlled means, including, but not limited to, use of aquifer storage and recovery wells, injection wells, surface spreading basins, field flooding, storm water capture, flood managed basins, and in-lieu recharge." Water Code 10004.7

Implementation steps in this Recharge Action Plan focus on field flooding, storm water capture, and in-lieu recharge.

1 Vina Subbasin Groundwater Sustainability Plan-Section 2.3 Water Budget (Table 2-8)
2 Annual Report 2022 submitted to Department of Water Resources for Vina Subbasin
3 Butte Subbasin Groundwater Sustainability Plan- Section 2.2.3 Water Budget (Table 2-8)

trends show relatively stable conditions with variability associated with wet and dry year cycles and generally no appreciable change in groundwater storage over time[4].

The Vina Subbasin is the focus area for pursuing recharge activities, although continued creative water management and projects in the other two subbasins will be important for maintaining groundwater sustainability there. The problem in Vina is three fold: 1. Currently there is an estimated 550,000 acre-foot deficit of groundwater in storage (i.e. potential space in the aquifer to refill), 2. Ongoing average annual decline of 20,000 acre-feet of groundwater in storage, and 3. Anticipated increasing water demand (7.5-10%) by a warming climate.

In Butte County, the main driver of groundwater level increases or declines is the balance of wet and dry years that occur. Therefore, groundwater demand and recharge in the County must, on a decadal time scale, be in balance with local climate conditions. This means that recharge (and conservation) efforts must be implemented in a way that scale up or down to reflect drought or wet periods that occur. ***Given the recent consecutive severe drought periods (2013-2016 and 2020-2022), a scaled up effort is required now to return the Vina Subbasin to a balanced condition.***

The Goal: Expand average annual groundwater recharge by at least 20,000 acre-feet

Due to recent declines in groundwater levels in some areas of the Vina Subbasin, capacity exists (~550,000 acre-feet) in the groundwater system to store additional water underground. Increasing recharge will provide benefits to the shallow groundwater system that in some places supports groundwater dependent ecosystems. Where recharge increases groundwater levels, it will also increase reliability of domestic wells providing drinking water supplies to rural households and will decrease pumping costs for all groundwater users. In addition, increasing recharge may also increase stream flows at later times that could provide benefits to creeks and streams or to the Sacramento River.

The average annual recharge goal mirrors the 20,000 acre-feet of average decline in groundwater storage in the Vina Subbasin over the past couple decades. However, efforts to increase recharge will recognize that some wet years will bring opportunities to recharge upwards of 90,000 acre-feet while other years will provide limited opportunities for recharge. The scale of projects should recognize this wide swing of opportunity driven by the whiplash of wet and dry periods. Additionally, in most years there is an opportunity to increase use of surface water supplies for irrigation in the County and thereby achieve in-lieu

4 Annual Report 2022 submitted to Department of Water Resources for Wyandotte Creek GSA

recharge. A goal of 20,000 acre-feet will go a long way to reverse the declining trend, but more will be required to begin to fill the "hole" that currently exists.

The goal is to recharge as much as possible in as many ways as possible to both flatten the downward trend and bring groundwater levels back up.

GROUNDWATER CONDITION OVERVIEW IN THREE BUTTE COUNTY SUBBASINS IN 2023

- *Groundwater levels in many monitoring wells in the Vina Subbasin have improved with the wet year conditions of water year 2023. However, many wells have a significantly declining trend line since roughly the year 2000.*
- *Groundwater levels in the Butte Subbasin improved with wet year conditions of water year 2023 which included full surface water allocations. Longer-term trends show that conditions are relatively stable and shallow.*
- *Groundwater levels in the Wyandotte Creek Subbasin improved with wet year conditions of water year 2023 and longer-term trends show relatively stable conditions with variability associated with wet and dry year cycles.*
- *Monitoring of subbasins is ongoing and additional monitoring specific to any future recharge activities will be critical for building a greater understanding of aquifer response to recharge actions.*

Building on a Foundation of Data and Recent Work

Increasing recharge has been building momentum statewide over the past eight years, gaining steam since the passage of the Sustainable Groundwater Management Act in 2014 and most recently gaining additional attention with the desire to capture historically high flows coming out of the Sierra into the Tulare Lake Basin in 2023, where some of the most extreme declines in groundwater levels and land subsidence have occurred. This statewide focus has resulted in efforts by the Department of Water Resources through their Flood Managed Aquifer Recharge (Flood-MAR) Program[5] to conduct pilot projects, develop modeling tools, and provide technical assistance to local agencies working to recharge groundwater basins.

In addition, a number of guidance documents have recently been released by numerous entities:

1. *On-Farm Recharge Methods Manual (2023)*
2. *District Recharge Program Guidance (2023)*
3. *Central Valley Groundwater Recharge Incentives and Strategies (2023)*

5 https://water.ca.gov/Programs/All-Programs/Flood-MAR

4. *Coordinating Flood & Groundwater Management- Considerations for Local Flood Managers (2023)*
5. *Introduction to Groundwater Recharge (2021)*

These documents provide an opportunity to learn from the activities of others throughout the state to mold a strategy that fits the unique needs and values of our community, industries, and environment.

Locally, over the past 10 years Butte County has led a number of data collection and scientific studies to better characterize the groundwater system and recharge processes[6]. These studies along with the Basin Setting sections of the Groundwater Sustainability Plans describe the current understanding of groundwater flows, recharge areas, and water budgets. The following highlight what we've learned about groundwater recharge in Butte County:

- Recharge from rainfall is a more significant source of recharge than seepage from streams in the Vina Subbasin (34% of total inflows compared to 7%) [7]. Water soaking into the ground over a large area is a primary mechanism of recharge suggesting that increasing the area or time by which water can soak into the ground could be an effective means of increasing recharge and inflow to the aquifer system.
- There is significant recharge potential of the shallow alluvial aquifer to deeper Lower Tuscan aquifer materials[8].
- Tuscan Formation characteristics are variable throughout the valley and some areas are more connected from the shallow to the deeper zones of the aquifer than others. Expanding our understanding of these pathways will be important in conducting recharge in the basin.

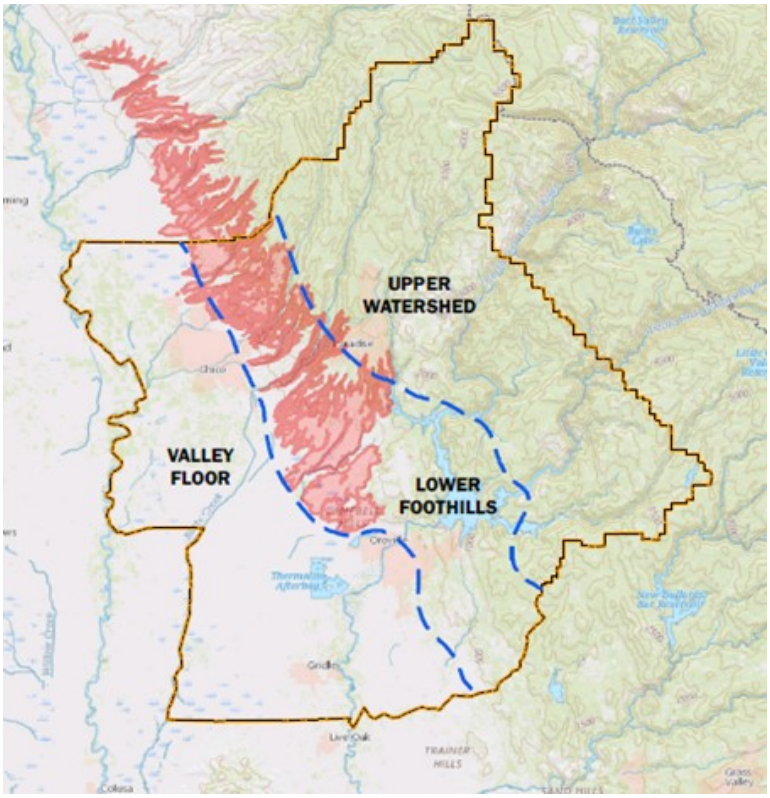


Figure 2. Precipitation falling in the lower foothills is an important source of recharge

- Precipitation falling on the Valley Floor and Lower Foothill areas, roughly the elevation of Paradise and lower, is an important source of recharge to the Butte and Vina subbasins[9] (Figure 2).
- Precipitation occurring in the Upper Watershed enters the groundwater system via rivers and streams that cross the valley and seep water into the basin (i.e. Sacramento River, Butte Creek, and Feather River). This water recharges the upper portions of the aquifer in the vicinity of the waterways and in some areas could find pathways to move into deeper zones of the aquifer.

6 Recap of Concept. Model of Recharge in the Vina & Butte Subbasins. Buck Presentation 2023
7 Vina Groundwater Sustainability Plan Water Budget
8 Lower Tuscan Aquifer Investigation, 2013
9 Stable Isotope Recharge Study, 2017

- Deep zones of the aquifer system are generally recharged by water sourced from the Lower Foothills.
- Applied water from the Feather River is a source of recharge in the shallowest portions of the aquifer in the Butte Subbasin.
- The *Evaluation of Restoration and Recharge within Butte County Groundwater Basins* (2018) completed an assessment to identify optimal places for groundwater recharge and to evaluate the availability of surface water supplies that could be used to provide recharge, including for in-lieu.
- Clearest opportunities for promoting groundwater recharge make use of surface water now available within the County. This includes encouraging agricultural water users to install dual-source irrigation systems and policies to incentivize urban developers and property owners to install semipermeable pavements. In addition, efforts to identify and advance local in-lieu recharge projects would provide areas now primarily reliant on groundwater access to surface water supplies from willing local partners, such as Rancho Esquon located along Butte Creek in the Vina subbasin.

THERE IS NO SINGLE SOURCE OF GROUNDWATER RECHARGE THROUGHOUT BUTTE COUNTY

Different parts of the basin are recharged from one or more of the following resources:

a) Rain falling on the Lower Foothills (intermediate and deep zones);

b) Butte Creek (shallow zones);

c) Sacramento River (shallow zones);

d) Local rain falling on the valley floor (shallow, intermediate and deep zones in the Butte Subbasin area)

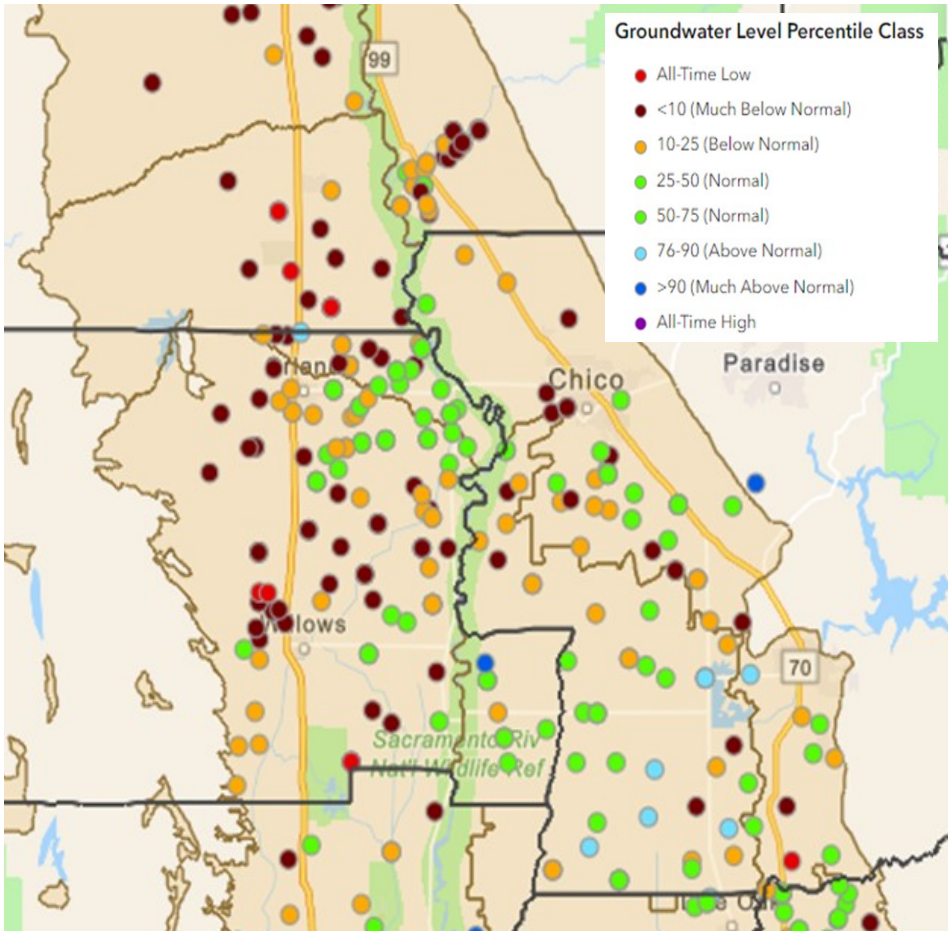
e) Irrigation water (shallowest portion of the Butte Subbasin)

Recharge and Neighboring Subbasins

If we recharge water in Butte County will we just lose it to neighboring subbasins? No, like us, our neighbors are required to manage groundwater sustainably.

There are many factors to consider. It is true groundwater is not a stagnant resource, but instead moves slowly, generally from the northeast to the southwest and toward the Sacramento River. This means groundwater historically flows from the Vina Subbasin to the Butte Subbasin, for example. If Vina does not address its declining water levels and decreased groundwater storage, less groundwater will naturally flow to the Butte Subbasin and could affect that subbasin's ability to maintain sustainability. Flow between eastern and western subbasins in the valley is dynamic: changing direction in some years and having significant changes in magnitude between years and over different time periods. Understanding this better, particularly as it relates to Vina's neighboring subbasins to the west,

will be part of a grant funded project to support inter-basin coordination. Inter-basin coordination is crucial. However, concerns about groundwater's destination should not stop us from addressing our own imbalances. Any recharge project will have one or more identified objectives and potential benefits such as increasing groundwater levels (thereby increasing water supply reliability of nearby wells), flood risk reduction, drought preparedness, aquifer replenishment, and/or ecosystem enhancement. One could design a recharge project to increase water flow to the main aquifer to help bring the subbasin into balance. Or a project could be designed to recharge water near a creek to increase flows in the creek during critical times for habitat or for the benefit of a shallow aquifer system that supports groundwater dependent ecosystems. Recharge activities will provide benefits in the vicinity of where the recharge occurs first, and then may provide additional benefits as the recharged water migrates into the aquifer system or pops out as streamflow at some later time and place. Whether or not another subbasin also benefits, is not a reason to avoid enhancing recharge locally.



Groundwater levels are not at historical lows everywhere.

Recharge efforts should focus on areas experiencing low levels relative to historical conditions. For example, monitoring wells displayed in the map are categorized by percentile class comparing the most recent measurement at that well to the last 10-years of measurements for that month. Orange and maroon wells are below or much below normal for the time period (2013-2023).

Figure 3. Groundwater Levels measured in monitoring wells

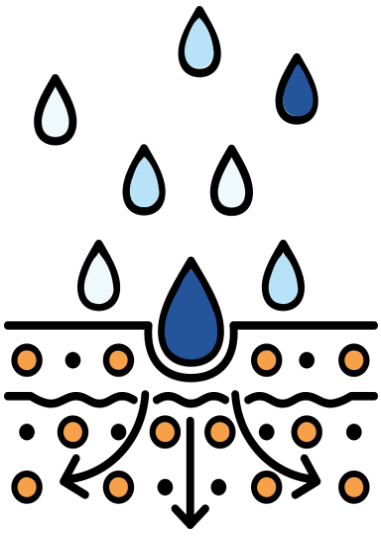
Taking Action to Advance Recharge

Increasing groundwater recharge can happen through a number of different approaches. Near term strategies for advancing recharge in Butte County focuses on enhancing natural recharge and by maximizing the place and use of available surface water supplies to meet water demand (i.e. in-lieu recharge). By "enhancing natural recharge" we mean increasing the extent to which recharge occurs via natural processes by extending the amount of time and/or expanding the area over which water has an opportunity to seep into the ground. The following actions describe specific approaches that will be pursued by Butte County and partnering local agencies.

SURFACE WATER SUPPLIES DEFINED

Water districts and agencies in Butte County hold water rights to Butte Creek or the Feather River, for example, to be utilized for drinking water or irrigation. In some cases, agencies do not fully utilize or deliver the entirety of their water right in every year. It is these surface water supplies held under existing water rights that we refer to as "Existing and Underutilized Surface Water Supplies."

ACTION 1 *SPREAD OUT AND SLOW DOWN FLOOD FLOWS*



Spread out and slow down flood flows. Managing flood events or high flows in a way that also increases groundwater recharge presents an opportunity for multi-benefit water management. When creeks, streams, and rivers are surging with high flows and either threatening properties or flooding roadways, providing targeted areas for the water to spread out, slow down, and soak in can reduce flood risk and help increase natural movement of water to the groundwater system. Recent cycles of extreme drought and flood, and the passage of the Sustainable Groundwater Management Act (SGMA) make thinking about managing high flows this way ever more important.

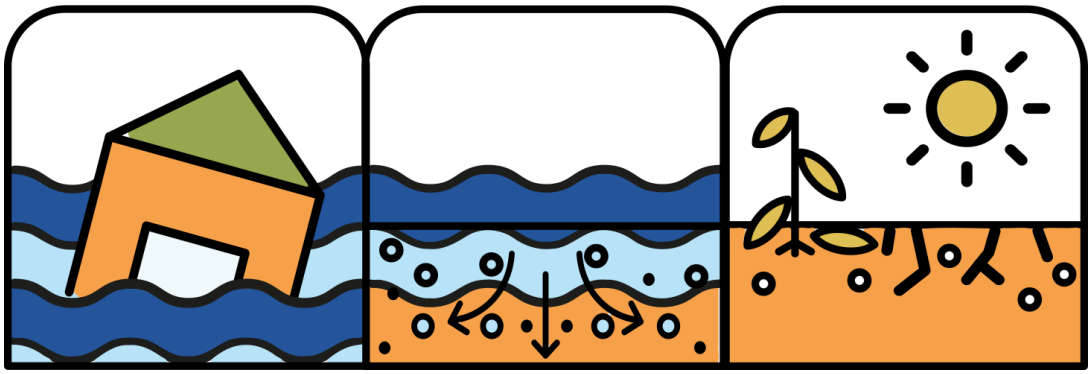
"What's needed is a distributed solution, says Graham Fogg, a University of California, Davis, professor emeritus of hydrogeology: many small projects scattered across the landscape that slow water, allowing it to infiltrate underground for storage. This would re-create nature's method for refilling groundwater, which human development has largely eradicated."[10]

10 Depleted Groundwater Could Be Refilled by Borrowing a Trick from Solar Power - Scientific American

1.1 Connect flood managers with groundwater and drought managers

Connect flood managers with groundwater and drought managers.

Thinking, planning, and implementing actions with a more integrated and multi-benefit approach will help reduce flood risk and improve drought resilience. Adapting to weather whip lash will require flood and drought managers to collaborate more closely. Senate Bill 122 passed in July 2023 amends the Water Code to provide that "the diversion of flood flows for groundwater recharge do not require an appropriative water right if specified conditions regarding the diversion are met, including, among other things, if a local or regional agency that has adopted a local plan of flood control or has considered flood risk as part of its most recently adopted general plan has given notice via its internet website…or another means of public notice, that flows downstream of the point of diversion are at imminent risk of flooding and inundation of land, roads, or structures."[11] The law also outlines the conditions for which such diversions can occur and specifies reporting requirements to the State Board for activities conducted under its provisions. Recognition of flood flows as a source of recharge to address drought impacts and groundwater sustainability necessitates a closer relationship between these water management sectors.



1.1 IMPLEMENTATION STEPS

a. **Butte County Department of Water and Resource Conservation (WRC) will coordinate with Butte County Public Works to understand existing data sets and opportunities.**

b. **WRC will work with local flood managers to identify flow rates (i.e. thresholds) on local creeks and streams that would trigger local flood response actions. Take advantage of technical assistance available through State Water Board and/or Department of Water Resources to assist with establishing triggers.**

c. **Establish a County process that would trigger action to divert flood flows for recharge.**

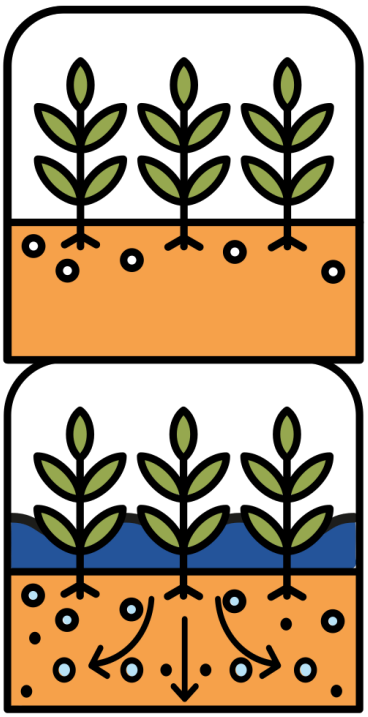
d. **Tap into local knowledge through agencies and landowners.**

11 Water Code 1242.1

1.2 Spread flood waters on working ag lands

Spread flood waters on working ag lands.

The concept is to divert water off a channel during high-flow events and deliver it to agricultural fields or fallowed fields where it can soak into the ground and increase groundwater storage or provide later benefits to shallow groundwater or streamflow. Opportunities along Pine Creek, Rock Creek, Big Chico Creek, Little Chico Creek, and Butte Creek will be prioritized to benefit groundwater conditions in those areas.



Flood-MAR is an integrated and voluntary resource management strategy that uses flood water resulting from, or in anticipation of, rainfall or snowmelt for groundwater recharge on agricultural lands, working landscapes, and managed natural lands, including but not limited to refuges, floodplains, and flood bypasses.[12]

1.2 IMPLEMENTATION STEPS

a. **Determine which creeks or water bodies adjacent to working lands periodically flood roadways and other infrastructure during high rainfall events. Examples include Chico River Road and Ord Ferry Road.**
b. **Identify landowners willing to divert water to their working lands (prioritize lands with soils with high recharge rates) and develop incentive programs to encourage participation.**
c. **Identify where historical flood irrigation infrastructure still exists that could be utilized to facilitate field flooding.**
d. **Develop pilot program of "flood fighters" to activate diversions during flood flows**

1.3 Slow the flow in lower foothill rangeland areas

Slowing the flow of excess flood flows in lower foothill rangeland areas aims to reduce the downstream maximum water height of a flood and delay the arrival of the flood peak downstream, thereby reducing flow rate in the valley during storm events. The goal of this strategy would be to implement projects that result in natural recharge of at least 20,000 acre-feet during years where there is excess flood flow.

12 Coordinating Flood & Groundwater Management – Considerations for Local Flood Managers

This strategy could be pursued in several ways, including:

1. Increasing soil infiltration and allowing water to soak into the soil.

2. Storing water by using natural features such as existing ponds, ditches or low lying land or by creating new ponds and areas to hold back water.

3. Slowing water by increasing resistance to flow. For example, by planting trees, introducing beavers, or constructing “leaky rock weirs” in upstream channels.

4. Identifying historical ponding in pasture lands and increase how often they are filled.

1.3 IMPLEMENTATION STEPS

a. **Perform a desktop analysis to better understand topography and which tributaries, creeks or water bodies in Butte County are most likely to provide opportunities to reduce flow rate in the valley under storm events. Examples may include Rock Creek, Mud Creek, Keefer Slough, Comanche Creek, Hamlin Slough, Little Dry Creek, Clear Creek, and Dry Creek.**

b. **Identify landowners willing to divert water to rangelands (prioritize lands with soils with high recharge rates)**

c. **Identify where historical flood or pond infrastructure may exist that could be utilized to facilitate spreading of flows.**

d. **Utilize Sustainable Groundwater Management grant program funding to further explore prioritized Slow the Flow concepts and/or opportunities.**

e. **Conduct additional research along the foothills to understand connectivity to the aquifer system**

f. **Identify the local/regional experts on “Beaver Reintroduction” efforts and host a workshop to better understand if reintroduction is a viable option to slow the flow in seasonal creeks/drainages.**

g. **Identify local/regional experts on “leaky rock weir” and other natural recharge management in and off-stream structures and host a workshop to better understand the opportunities, strengths and weaknesses to this strategy for slowing the flow.**

ACTION 2

RETAIN STORMWATER RUNOFF ON AGRICULTURAL FIELDS

Retain stormwater runoff on agricultural fields.

The idea is to slow runoff from properties and agricultural fields and allow it to fill up a deep ditch or small retention basin adjacent to a cultivated field to encourage rainfall run-off to soak into the ground and reduce runoff from entering already swollen channels.

2 IMPLEMENTATION STEPS

a. **Inventory existing ditches and estimate what rain events result in runoff from orchards to estimate recharge potential of the approach**
b. **Identify willing landowner to pilot the concept (prioritizing areas where runoff occurs and infiltration is likely to provide benefits to groundwater conditions)**
c. **Preliminary design of retention basin or installation of weirs within existing ditches for pilot project**

ACTION 3

MANAGE FLOWS IN NATURAL CHANNELS TO INCREASE RECHARGE

Manage flows in natural channels to increase recharge.

Figure 4: Box culverts regulating flow on Big Chico Creek into Lindo Channel

Lindo Channel is the perfect example of an opportunity to utilize the natural landscape and stream system to increase recharge and provide benefits to shallow groundwater and groundwater storage. Lindo Channel is an existing flood control channel that runs through Chico to the north of Big Chico Creek; when the flow in Big Chico Creek increases during periods of heavy rainfall and runoff, water is diverted into Lindo Channel to prevent Big Chico Creek from overtopping its banks. There is also a flood control channel connecting Big Chico Creek and Lindo Channel to Sycamore Creek and Mud Creek, ephemeral streams farther north. This project would divert water from Big Chico Creek when flow exceeds a defined threshold (to be determined) to Lindo Channel. The aim would be to have water in the channel more frequently than occurs under current operations of the existing flood control infrastructure at 5 mile in Bidwell Park.

3 IMPLEMENTATION STEPS

a. **Coordinate with Butte County, California Department of Water Resources, Department of Fish and Wildlife, the Vina Groundwater Sustainability Agency, City of Chico, Mechoopda Tribe, and other interested parties to integrate interests of various stakeholders**

b. **Develop the flow threshold for diversion from Big Chico Creek to Lindo Channel, based on water rights, habitat, and downstream beneficial users**

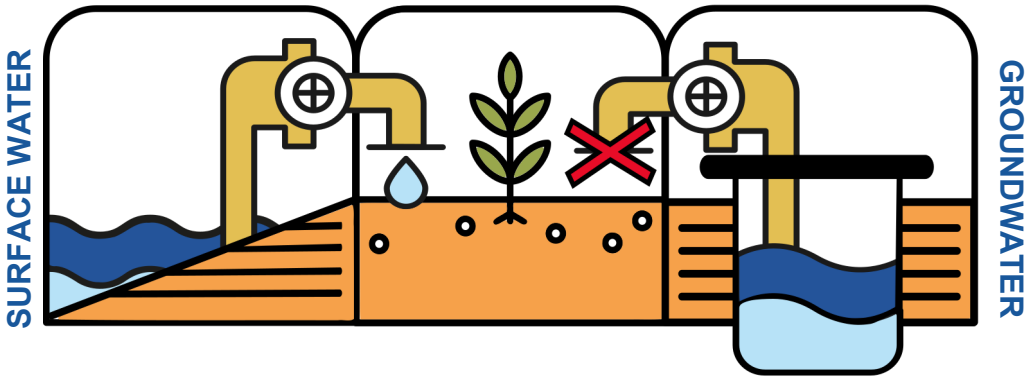
c. **Compute the expected recharge yield and conduct monitoring to understand recharge amounts and processes**

d. **Evaluate other opportunities to utilize natural channels and manage flood flows for increased recharge**

ACTION 4

MAXIMIZE USE OF EXISTING AND UNDERUTILIZED SURFACE WATER SUPPLIES

Maximize use of existing and underutilized surface water supplies. Using surface water in-lieu of (*i.e.*, in place of) groundwater when and where it is available is an essential component of groundwater sustainability. All else being equal, every unit of increased surface water translates to a net benefit to the subbasin. Therefore the goal is to maximize the use of available surface water supplies in the County to help meet water demands. In groundwater dependent areas this means pursuing dual source irrigation systems for orchards and introducing, or in some cases, reintroducing the use of surface water for irrigation. The aim would be to utilize an additional 15,000-25,000 acre-feet of surface water supplies to offset groundwater demand. With a number of different potential local water supply sources, this is possible.



The ***Evaluation of Restoration and Recharge within Butte County Groundwater Basins*** (2018) study evaluated and described several project alternatives to utilize additional surface water in the County, with some including cost estimates in 2017 dollars. Any project involving construction of major infrastructure to move water from one place to another

has a huge price tag. More promising is to pursue water exchange agreements between local parties and utilize natural water ways to the greatest extent possible. Diversions from the Sacramento River have been conceptualized to provide additional water supplies either for irrigation in the northern portion of the Vina Subbasin or to provide for urban demands in the City of Chico. Alternatively, diversions from the Sacramento River could be used for direct recharge activities on working ag lands. In any case, pursuing any of these actions requires determining how realistic an exchange agreement and new diversion off of the Sacramento River would be. Other possible projects could involve landowners with existing riparian or appropriative rights to surface water such as Rancho Esquon, Gorrill Ranch, Durham Mutual Water Company, Western Canal Water District, Butte Water District or others.

4 IMPLEMENTATION STEPS

a. **Identify two most promising surface water supply projects in the Vina Subbasin and complete feasibility analyses**

b. **Educate and incentivize growers to install dual source irrigation systems**

c. **Identify agricultural users in the Wyandotte Creek Subbasin that could use surface water supply in-lieu of groundwater and conduct feasibility and initial design of needed infrastructure to expand surface water use**

d. **Explore opportunities to utilize treated urban wastewater for direct recharge or irrigation supply**

e. **Explore the viability and practicality of an exchange agreement with the Bureau of Reclamation for diversion off the Sacramento River instead of the Feather River**

Potential future agricultural surface water supplies from various existing sources

Existing Surface Water Supply Source	Surface Water Conveyance	Surface Water Use
Miocene Canal (PG&E)	Miocene Canal; Feather River	Southeast Vina Subbasin near the intersections of Highways 70, 99, and 149
Butte County Table A (Lake Oroville)	Butte Creek; TBD	South Vina
Feather River Diverters (ex. Western Canal Water District, Butte Water District)	Butte Creek; TBD	South Vina
Sacramento River (ex. riparian water rights)	TBD	North or South Vina
Recycled water (e.g. City of Chico wastewater)	Existing conveyance	South Vina
Paradise Irrigation District (Butte Creek)	Butte Creek; TBD	South Vina
Durham Mutual Water Company (DMWC) (Butte Creek)	Existing DMWC conveyance; new conveyance	DMWC service area; Rancho Esquon (South Vina)

ACTION 5

IDENTIFY POLICY NEEDS TO ADDRESS CONCERNS OF OWNERSHIP AND WATER RIGHTS

Identify policy needs to address concerns of ownership and water rights.

During development of the Vina Groundwater Sustainability Plan, concerns were raised about the legal implications of conducting recharge projects. These concerns highlighted the fact that recharged surface water does not become "native groundwater" but is "surface water stored underground" available to the water right holder that put it there[13]. For water recharged using a water right, currently the State Board prefers a "last in, first out" approach of accounting and is largely leaving it to Groundwater Sustainability Agencies to define how much is "lost" and therefore the amount that must be left behind, or how recharge plays into an allocation system, in cases where one exists. It will be important for legal aspects of ownership to be addressed for any project that uses a new or existing water right for the project.

Importantly, Senate Bill 122 (signed July 2023 and incorporated as Water Code 1242.1) outlines conditions under which an agency can divert flood flows for groundwater recharge and specifies that, ***"The person or entity making the diversion for groundwater recharge does not claim any water right based on that diversion and recharge." This creates a clear situation in which recharge conducted with flood flows under the conditions of Water Code 1242.1 is free from ownership concerns of recharged water.***

5 IMPLEMENTATION STEPS:

a. **Identify and clarify legal implications of recharge projects and what policies/ ordinances (i.e. Leave Behind) will effectively address vulnerabilities locally**
b. **Clarify the legal aspects of in-lieu recharge**
c. **Track development of the State's recommended "legal and regulatory requirements for recharge projects" per Senate Bill 659**
d. **Evaluate any recharge project for risks of groundwater ownership**

Conservation and Land Management Strategies

Conservation and Land Management Strategies Will Play a Role in Reaching and Maintaining Groundwater Sustainability.

Long term sustainability in a subbasin that is out of balance can be achieved by either reducing groundwater demands or increasing flows into the groundwater system (i.e. via recharge actions). Although increasing inflows is the focus of this Recharge Action Plan, conservation and reduced groundwater demand will also be an important part of the solution portfolio throughout the County. An Extend Orchard Replacement Pilot Program aims to reduce groundwater pumping demand from the Vina Subbasin through increased

13 Vina GSA Memo from Legal Counsel: Legal Implications of Potential Projects and Management Actions

land fallowing. In addition, an Agricultural Irrigation Efficiency Pilot and Education Program will focus on identifying and implementing irrigation interventions that can reduce non-beneficial water consumption[14]. ***Flexible programs that can respond proportionally to the swings in hydrology will build drought resilience and support sustainable supplies.***

Who will carry out these actions?

Butte County seeks to lead, set goals, and provide vision to advance recharge actions. In a highly decentralized system, numerous other water districts and entities play a role in water management and delivery locally. Implementation of this Plan will require partnerships since Butte County and Groundwater Sustainability Agency (GSA) leaders, state partners, farmers, other business owners, and water districts are all essential actors in carrying out this plan. Primary agencies to advance actions outlined in this plan will be Butte County Department of Water and Resource Conservation (in coordination with Public Works, Public Health-Division of Environmental Health, and Office of Emergency Management), the Vina GSA, Rock Creek Reclamation District GSA, and Wyandotte Creek GSA. Partnering with other entities and agencies will be crucial as well. State funds and technical assistance will play a role in carrying out these actions. State policy currently emphasizes prioritizing funds and human resources to support local projects and local agency efforts to build water resilience. Capturing these funds and utilizing available resources will be important to reduce local costs.

Near Term Opportunities

Identified actions will be advanced via funding from State grants received by the Vina and Wyandotte Creek GSAs through the Sustainable Groundwater Management grant program. Butte County will partner with the GSAs to implement these projects. A valuable outcome of carrying out this Plan and completing these projects will be a better understanding of costs associated with different recharge approaches. This will help to prioritize future efforts.

Action	Vina Grant	Wyandotte Creek Grant
#1 Spread out and Slow Down Flood Flows	**Surface Water Supply and Recharge Feasibility Study ($725,000)**	
#2: Retain Stormwater Runoff on Agricultural Fields	**Surface Water Supply and Recharge Feasibility Study ($725,000)**	
#3: Manage Flows in Natural Channels to Increase Recharge	**Lindo Channel Surface Water Recharge Project ($330,000)**	
#4: Maximize Use of Existing and Underutilized Surface Water Supplies	**Surface Water Supply and Recharge Feasibility Study ($725,000)**	**Regional Conjunctive Use Project ($380,000)**
#5: Identify policy needs to address concerns of ownership and water rights	**Legal Implications of Recharge Analysis ($125,000)**	

14 Workshop Presentation on Agricultural Efficiency and Extend Orchard Replacement Pilot Programs

Conclusion

Ensuring a sustainable aquifer and drought resilient groundwater supplies in Butte County will require action and coordination by GSAs, partnering local agencies, and the County. Local agencies and our communities are up to the task of protecting and managing local and regional water supplies that are crucial for our rural communities, environment, and agricultural industry. Recognizing the warmer, drier climate that is likely to dominate our future, we will pursue these action steps and continue to encourage the State to make additional funds and technical assistance available to non-critically over-drafted subbasins. The enhancement of groundwater recharge within Butte County subbasins will greatly help in providing not only essential water supply resilience, but it will also address drought impacts that have affected groundwater dependent households, communities, and ecosystems over recent decades.

Appendix: Recent Studies and Reports

ACWA. A Technical Framework for Increasing Groundwater Replenishment, Nov. 2019

Almond Board & Sustainable Conservation. Introduction to Groundwater Recharge, 2021

Butte County. Evaluation of Restoration and Recharge within the Butte County Groundwater Basins, Jan. 2018

Butte County. Stable Isotope Recharge Study Final Report, Sept. 2017

Butte County. Lower Tuscan Aquifer Investigation Final Report, May 2013

California's Water Supply Strategy, Aug 2022

California Water Supply Strategy, Progress Report, Oct. 2023

DWR & Sustainable Conservation. District Recharge Program Guidance, Aug. 2023

DWR & Sustainable Conservation. Central Valley Groundwater Recharge Incentives and Strategies, May 2023

DWR. Coordinating Flood & Groundwater Management, Considerations for Local Flood Managers, 2023

Executive Order N-7-22

Executive Order N-4-23

PPIC. Measuring Groundwater Overdraft in the Sacramento Valley, Nov. 2023

Sustainable Conservation. On-Farm Recharge Methods Manual, A Summary of Strategies and Challenges, Aug. 2023

SWRCB. Fact Sheet for flood control, groundwater recharge, and water rights

SWRCB. Fact sheet: Purposes of Use for Underground Storage Projects, Jun 2020

UCCE & Sustainable Conservation. Guidance in Establishing On Farm Recharge Sites for Groundwater Basins

Water Code 1242.1


Butte County
WATER & RESOURCE CONSERVATION