PROPOSED PROJECTS

Priority	Project Description	Proponent	Acre-Feet	Planned/Potential
1	Agricultural Irrigation Efficiency	Vina GSA, AGUBC, Farm Bureau	4,000	Planned
2	Flood-MAR	Vina GSA, RCRD GSA	3,000	Planned
3	Residential Conservation	California Water Service	100	Planned
4	Paradise Irrigation District Intertie Project	PID	7,000	Planned
5	Additional Water to Creeks and Streams	Vina GSA	1,000	Planned
6	Agricultural Surface Water Supplies	Vina GSA	2,000	Potential
7	Extend Orchard Redevelopment	Vina GSA	2,000	Potential
8	Recharge from the Miocene Canal	Butte County	2,000	Potential
9	Recycled Wastewater	City of Chico	5,000	Potential
10	Community Education Initiative	CSU	TBD	Potential
11	Rangeland Management	CSU	TBD	Potential
12	Fuel Management for Watershed Health	Chico State Enterprise	TBD	Potential
13	Removal of Invasive Species	Chico State Enterprise	TBD	Potential
		Total	**25,000**	
		Total Planned	**15,100**	

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Agricultural Irrigation Efficiency

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530.552.3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Agricultural Irrigation Efficiency

Project or Management Action Type: Project

Project or Management Action Proponent(s): Vina GSA

Project or Management Action Location: Vina North and Vina South

Project or Management Action Status (Planned, Potential, or Conceptual): Planned

Brief Project or Management Action Description (1-2 short paragraphs):

A survey of agricultural groundwater users is being conducted by the Agricultural Groundwater Users of Butte County, Butte County Farm Bureau and the Vina GSA to characterize current irrigation methods and practices and to identify opportunities to improve irrigation efficiency. The survey will determine the extent of adoption of irrigation efficient practices and the barriers to increased adoption. The project will identify recommendations to increase the adoption of efficient irrigation practices and methods that could lead to a reduction in groundwater demand. The survey and results are expected to be completed by July 2021. Agricultural groundwater demand in the Vina subbasin is approximately 200,000 acre-feet per year. Overall agricultural groundwater demand has declined over the past twenty years due to less agricultural acreage and increased irrigation efficiency with new plantings. A 1-2% reduction in groundwater demand from irrigation efficiency would reduce the groundwater demand by 2,000-4,000 acre-feet.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: 2022-2025

Estimated Cost: TBD

Potential Funding Sources: Prop 1, Prop 68, USDA, Drought Resiliency Grants

Required Permitting and Regulatory Process: N/A

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 4,000 acre feet (based on a 2% reduction)

Status of permitting and CEQA/NEPA compliance: N/A

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? Potentially

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Flood MAR

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530.552.3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Flood MAR

Project or Management Action Type: Project

Project or Management Action Proponent(s): Vina GSA, RCRD GSA

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Planned

Brief Project or Management Action Description (1-2 short paragraphs):

Studies have indicated that a number of opportunities exist for recharge projects. In 2018, Butte County prepared a study of recharge opportunities entitled, "Evaluation of Restoration and Recharge within Butte County Basins." The report found opportunities in the Vina subbasin for recharge programs using fields, recharge basins and/or recharge ponds. The report provides the foundation to conduct feasibility studies on specific locations. Groundwater sustainability in the Vina subbasin could benefit from recharge projects utilizing seasonal high flows in various creeks and streams. The Department of Water Resources has developed a Flood MAR initiative to advance recharge programs. The project be an initial scoping of potential recharge opportunities to be conducted by the Vina GSA. The project will build upon previous analyses of potential recharge opportunities in the Vina subbasin to identify specific recharge opportunities. The project will focus on areas of greatest need to achieve measurable objectives, availability of a water supply, local acceptance and regulatory requirements. The Vina GSA will seek grant and other funds to implement the recharge projects. By having the Vina GSA conduct the recharge projects would avoid unintended consequences.

One potential recharge project is the Sand Creek Project in the North Vina area. The project is in the process of developing a Decision Support Tool (Feasibility Study) to determine future construction scope and feasibility for a multi-benefit flood and recharge management project. The intended outcome of this multi-benefit feasibility study is much-needed data that will be used to develop potential mitigation measures for flooding in the North Chico and Nord area, while contributing to a possible course of action to support habitat restoration and runoff

management to sustain groundwater for the future. The Sand Creek Project may be a Flood MAR project implemented in the first five years of plan implementation.

A second project involves utilizing existing flood control facilities such as Lindo Channel as a recharge source. Lindo Channel, located in Vina Chico, is used for flood control from Big Chico Creek when flows go above 1,500 cfs. The project would divert water from Big Chico Creek when flows exceeds the 75 cfs minimum flow requirements. The estimated recharge is 2,000 acre feet.

In addition to the two projects, the Vina GSA will identify and develop other Flood MAR projects in the Vina subbasin.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: 2022-2032

Estimated Cost: TBD

Potential Funding Sources: Proposition 1, Proposition 68

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

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 3,000 acre-feet. Estimated from having 3 projects contributing 1,000 acre feet each.

Status of permitting and CEQA/NEPA compliance: Not initiated

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? No

Additional Information Sources:

"Evaluation of Restoration and Recharge within Butte County Basins" (Butte County, 2018)

Sand Creek Project (2021 IRWM Grant)

"Utilizing Lindo Channel for Artificial Groundwater Recharge", Technical Memo, Davids Engineering (2015)

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Residential Water Conservation

Contact Person: George Barber

Organization/Affiliation: California Water Service

Contact Phone: 530.876.2032

Contact Email: gbarber@calwater.com

Project or Management Action Description and Status

Project or Management Action Name: Residential Water Conservation

Project or Management Action Type: Project

Project or Management Action Proponent(s): CalWater, Vina GSA

Project or Management Action Location: Vina Chico

Project or Management Action Status (Planned, Potential, or Conceptual): Planned

Brief Project or Management Action Description (1-2 short paragraphs):

California Water Service Company, Chico supplies water to the City of Chico. Groundwater is the source of water. The annual demand in the City of Chico has fluctuated from 22,000 acre feet and 28,000 acre feet. The anticipated demand is expected to increase based on planned developments through the City of Chico General Plan and the Butte County General Plan. CWS identified in their 2020 Urban Water Management Plan residential conservation projects including toilet replacement, urinal valve and bowl replacement, clothes washer replacement, residential conservation kits, smart controllers, high efficiency irrigation nozzles and turf buy-back. Programs offered from 2016-2020 yielded an annual reduction of 89 acre-feet of groundwater demand in the Vina Chico area.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: 2022-2025

Estimated Cost: TBD

Potential Funding Sources: Prop 1, Prop 68, Drought Resiliency Grants, CalWater

Required Permitting and Regulatory Process: N/A

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 100 acre feet

Status of permitting and CEQA/NEPA compliance: N/A

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? Potentially

Additional Information Sources:

2020 California Water Service Urban Water Management Plan, Chico-Hamilton City District

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Paradise Irrigation District Intertie

Contact Person: Tom Lando

Organization/Affiliation: Paradise Irrigation District

Contact Phone: 530-624-2939

Contact Email: tlando@paradiseirrigation.com

Project or Management Action Description and Status

Project or Management Action Name: Paradise Irrigation District Intertie

Project or Management Action Type: Project

Project or Management Action Proponent(s): PID, CalWater, Vina GSA

Project or Management Action Location: Vina Chico

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

The California Water Service Company (CWS) serves the City of Chico solely from groundwater. The annual demand in the City of Chico is approximately 25,000 acre-feet per year. Studies have indicated that a number of opportunities exist for recharge projects. In 2018, Butte County prepared a study of recharge opportunities entitled, "Evaluation of Restoration and Recharge within Butte County Basins." A potential in-lieu recharge project involves connecting the California Water Service Chico (CWS) with Paradise Irrigation District (PID). The PID-CWS Intertie Project would provide a surface water source from PID to CWS. By incorporating a surface water source into the CWS system will reduce the groundwater demand in the Vina subbasin. The Camp Fire created an enormous challenge for PID since they lost over 95% of their customers. PID has a water right of approximately 18,000 acre-feet. The water treatment plant and reservoir were not damaged during the Camp Fire.

The Paradise Irrigation District (PID) is participating in a study through the State Water Resources Control Board that is evaluating options for the long term sustainability of PID. One of the options being evaluated is establishing an intertie between PID and CalWater Chico. The options study is expected by the spring of 2022 that may include the potential viability of the PID-CWS Intertie.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: TBD

Estimated Cost: TBD

Potential Funding Sources: Prop 1, Prop 68, State Revolving Fund, Federal Infrastructure Funds

Required Permitting and Regulatory Process: CEQA, County encroachment

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 5,000

Status of permitting and CEQA/NEPA compliance: Not initiated

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? No

Additional Information Sources:

"Evaluation of Restoration and Recharge within Butte County Basins" (Butte County, 2018)

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Streamflow Augmentation

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530.552.3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Streamflow Augmentation

Project or Management Action Type: Project

Project or Management Action Proponent(s): Vina GSA, RCRD, Paradise Irrigation District, PG&E

Project or Management Action Location: Comanche Creek, Butte Creek, Little Chico Creek, Big Chico Creek

Project or Management Action Status (Planned, Potential, or Conceptual): Planned

Brief Project or Management Action Description (1-2 short paragraphs):

Excess untreated surface water available from Paradise Irrigation District, PG&E and other water right holders in the upper watershed would be channeled via certain creeks or streams to portions of the Vina subbasin to increase stream flows and potential recharge (e.g., recharge ponds, in-lieu). The Vina GSA would acquire available surface water supplies and manage the project. Available surface water conveyed in creeks and streams could be made available for riparian water holders such as Durham Mutual, Rancho Esquon, M&T Ranch (Butte subbasin) and Gorrill Ranches. The project could leave significant water in Butte Creek for natural aquifer recharge and enhanced salmon passage. A portion of the available surface water could be diverted to a recharge pond/basin. The initial step would involve the Vina GSA conducting an investigation and feasibility study. Surface water may not be available every year.

Measurable Objectives Expected to Benefit: Depletion of Interconnected Streams, Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: 2022-2025

Estimated Cost: $50,000-$100,000 per 1,000 acre feet ($50-100/acre foot)

Potential Funding Sources:

https://wcb.ca.gov/Programs/Stream-Flow-Enhancement, Resource Renewal Institute

Proposition 1, Proposition 68, Vina fee

Required Permitting and Regulatory Process: CEQA, SWRCB Water Right

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 1,000 to 5,000 acre-feet

Status of permitting and CEQA/NEPA compliance: Not initiated

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? No

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Agricultural Surface Water Supplies

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530.552.3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Agricultural Surface Water Supplies

Project or Management Action Type: Project

Project or Management Action Proponent(s): Vina GSA, Agricultural Groundwater Users of Butte County, Farm Bureau

Project or Management Action Location: Vina North and Vina South

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

In 2018, Butte County prepared a study of recharge opportunities entitled, "Evaluation of Restoration and Recharge within Butte County Basins." The report found opportunities in the Vina subbasin for recharge programs using fields, recharge basins and/or recharge ponds. The report identified sources of surface water supplies in Butte County that could be put to use in the Vina subbasin. The available surface water is held by water right holders in the Butte subbasin and the upper watershed. The report found that over XXX acre feet may be available. The source of the surface water will mostly come through Lake Oroville. The surface water is in close proximity to the Vina South area. For the Vina North area, an exchange off the Sacramento River could provide the means of delivering surface water. Surface water made available to orchards would replace groundwater as a water supply. To incorporate surface water as a source, growers may need to acquire a dual irrigation system. The dual irrigation system would allow growers to use surface water when available and use groundwater when surface water is not available. The major impediment to implementing the project is the lack of conveyance and an organization to manage surface water acquisition and management.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: 2025-2032

Estimated Cost: TBD

Potential Funding Sources: Proposition 1, Proposition 68

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

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 2,000-3,000 acre-feet

Status of permitting and CEQA/NEPA compliance: Not initiated

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? No

Additional Information Sources:

"Evaluation of Restoration and Recharge within Butte County Basins" (Butte County, 2018)

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Extend Orchard Replacement

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa.org

Project or Management Action Description and Status

Project or Management Action Name: Extend Orchard Replacement

Project or Management Action Type: Project

Project or Management Action Proponent(s): Butte County

Project or Management Action Location: North Vina and South Vina

Project or Management Action Status (Planned, Potential, or Conceptual): Conceptual

Brief Project or Management Action Description (1-2 short paragraphs):

Orchards are the largest agricultural land use in the Vina subbasin. As a permanent crop, orchards cannot be fallowed. However, a voluntary program to delay in replanting of orchards could be a fallowing type program. Approximately 2-4% of the 84,000 acres of almond and walnut orchards are redeveloped during a given year. The timing of the removal of the existing orchard to replanting usually occurs within one season to reduce the revenue impact to the farm. If farmers were financially incentivized to voluntarily extend this timeline by an extra growing season, it could effectively fallow between 1,600 – 3,200 acres per year. The extended redevelopment timeline would have the additional benefit of reducing the need for certain soil treatments including fumigation and expand recycling options for the previous orchard.

Measurable Objectives Expected to Benefit: Chronic lowering of groundwater levels.

Implementation Timing/ Criteria for Implementation:

Timing would be dependent upon the availability of financial incentives and the willingness of growers to participate.

Estimated Cost: TBD

Potential Funding Sources: Prop 1, Prop 68, USDA, NRCS

Required Permitting and Regulatory Process: N/A

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year):
4,000-8,000 acre feet

Status of permitting and CEQA/NEPA compliance: None

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)?

Additional Information Sources:
Estimates developed based upon the "20 Year Land and Water Use Change in Butte County and the Vina Subbasin (1999-2019)" prepared by Land IQ

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Miocene Canal Recharge

Contact Person: Paul Gosselin

Organization/Affiliation: Butte County

Contact Phone: 530-552-3590

Contact Email: pgosselin@buttecounty.net

Project or Management Action Description and Status

Project or Management Action Name: Miocene Canal Recharge

Project or Management Action Type: Project

Project or Management Action Proponent(s): PG&E, Vina GSA

Project or Management Action Location: South Vina

Project or Management Action Status (Planned, Potential, or Conceptual): Conceptual

Brief Project or Management Action Description (1-2 short paragraphs):

The Miocene Canal originates west of Magalia, runs along the westside of the Feather River and terminates near Oroville. The upper and middle Miocene Canal are operated by PG&E. The lower Miocene is operated by California Water Service. The 25 miles is made up of open ditches, pipes, flumes and concrete canals. The Miocene Canal system supports PG&E's 53,000 acre feet to primarily support hydropower and 18 agricultural landowners. The water supply demand to meet agricultural needs is about 20,000 acre feet. The upper Miocene was destroyed by the 2018 Camp Fire. PG&E is in the process of restoring the upper Miocene Canal to re-water the system. PG&E is in the process of identifying an entity to acquire the Miocene Canal system by mid-2022. Stakeholders have indicated interest to modify the system to improve water supply reliability. Changes to the Miocene Canal may result in surface water available for other uses. One concept may include establishing recharge ponds along the westside of the Miocene Canal in areas conductive to recharging the Vina South subbasin.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels

Implementation Timing/ Criteria for Implementation: after 2025

Estimated Cost: TBD

Potential Funding Sources: State and federal grants.

Required Permitting and Regulatory Process: CEQA, SWRCB Water Rights

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 2,000 acre-feet based on 10,000 acre feet available for recharge (20% efficiency)

Status of permitting and CEQA/NEPA compliance:

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? Yes

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Recycled Waste

Contact Person: Erik Gustafson

Organization/Affiliation: City of Chico

Contact Phone: 530.894.4202

Contact Email: erik.gustafson@chicoca.gov

Project or Management Action Description and Status

Project or Management Action Name: Waste Water Recycling

Project or Management Action Type: Project

Project or Management Action Proponent(s): City of Chico, Vina GSA

P**roject or Management Action Location:** Vina Chico and Vina North

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

The City of Chico operates and maintains a modern 12 million gallon per day (36 acre feet) capacity, secondary treatment, activated sludge, wastewater treatment plant with future expandability to 15 million gallons per day (46 acre feet) capacity. The plant operates under strict waste discharge requirements permitted by the California Water Resources Control Board. The discharge location for the treated wastewater (effluent) is the Sacramento River. Currently, the treatment discharges 13,000 acre feet per year to the Sacramento River. The City of Chico is undergoing a review of the treatment plant that will include an analysis of a recycling component. If deemed feasible, recycled waste water could be used for recharge ponds and/or used for non-crop vegetation in Chico. Such a project could yield at a minimum 5,000 acre feet of recharge or reduced groundwater demand.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: 2030-2038

Estimated Cost: TBD

Potential Funding Sources: Proposition 1, Proposition 68, SWRCB

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

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 5,000 acre-feet

Status of permitting and CEQA/NEPA compliance: Not initiated

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? No

Additional Information Sources:

"Evaluation of Restoration and Recharge within Butte County Basins" (Butte County, 2018)

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Community Water Education Initiative

Contact Person: Jennifer Rotnem

Organization/Affiliation: CSU, Chico - Center for Water and the Environment

Contact Phone: 530- 898-5205
530-228-1525

Contact Email: jrotnem@csuchico.edu; egoodsell@csuchico.edu

Project or Management Action Description and Status

Project or Management Action Name: Community Water Education Initiative

Project or Management Action Type: Project

Project or Management Action Proponent(s): Eli Goodsell, Ecological Reserves Director, Chico State Enterprises; Dr. Sandrine Matiasek; Science Director, Center for Water and the Environment; Jennifer Rotnem, Managing Director, Center for Water and the Environment; Center for Water and the Environment Faculty Associates

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

The Water Education Initiative will have three components:

1. Water Table Monitoring and Community Education - Water table monitoring occurring on limited locations currently within the Big Chico Creek Ecological Reserve with the potential to design monitoring protocols for nearly an 8,000 acre footprint between lower Forest Ranch and the Chico Airport. Including the Big Chico Creek, Sheep Hollow and Cabin Hollow tributaries.
2. The Community Water Education Project offers public outreach and education about water, targeting agricultural well users, domestic well users, and municipal customers. The education focuses on basic topics important for understanding regional groundwater issues, including understanding groundwater, know your aquifer, connectivity between surface and ground water, decision-making during drought years, and California water 101. The project also offers more technical seminars and fieldtrips planned in collaboration with the Vina GSA, Butte County Department of Water and Resource Conservation, and other regional partners, including groundwater monitoring,

groundwater use modeling, impacts of wildfire on local water sources, and decision-making during drought years. Part of the scope of the project also includes creating educational materials like facts sheets, printed materials, and website content for disseminating information to ground water users within Vina GSA.

The Center for Water and the Environment (CWE) at CSU, Chico is a research center of 45 Chico State faculty focused on water and the environment. CWE experts can educate on a wide-range of water-related topics, including: geology of the water basin; water quality; ground water modeling of regional land use changes; economic and hydrologic impacts of water management scenarios; and life cycle environmental impacts of water management scenarios; green infrastructure for urban stormwater management; effects of wildfire on water quality; and more. CWE is geographically well-positioned within the GSA. CWE provides the organizational structure to oversee, implement, and manage a comprehensive educational program in the Vina subbasin. CWE has an extensive network of partners to draw upon to help contribute knowledge and support of this project. CWE has experience leading water education programs in the region.

3. The Big Chico Creek Watershed Tour is an innovative, multidisciplinary learning experience that engages participants in complex, real-world problem solving using a local watershed as the model for exploring issues in the context of larger, multifaceted environmental and societal systems. CSU, Chico Faculty Associates of the Center for Water and the Environment engage with participants from different backgrounds, use multidisciplinary research techniques, and teach hands-on about the watershed of the creek that runs through Chico. The tour explores the watershed from its headwaters to the Big Chico Creek Ecological Reserve (BCCER), through the heart of campus and the University Farm, and finally to its confluence with the Sacramento River. During the tour, participants engage with faculty in research activities that assess the health of the watershed, including biodiversity, water quality, stream-aquifer interactions, fire ecology, forestry resource management, riparian restoration, climate change, and vegetation assessment. Currently in its 4th year, the watershed tour takes places over 2 weekends in March and April.

   We propose to enhance the watershed tour with more groundwater education and expand it to include community members. Tour participants will learn about stream-aquifer interactions at Chico State's Big Chico Creek Ecological Reserve (e.g., springs), monitor shallow groundwater well levels and quality on the Chico State campus and the University Farm, and learn about groundwater pumping for irrigation at the University Farm. With input from regional partners (e.g., River Partners) and Chico State faculty participating on other PMA's, we can integrate additional groundwater education topics into the Watershed Tour curriculum to more prominently feature the Vina Subbasin GSP and ensure that all tour participants have a thorough, applied understanding of their personal role in achieving sustainable groundwater management.

We also propose to invite members of the Chico and Butte County communities within the Vina GSA to participate in the four watershed tour field days. We propose to include 5-10 community members to participate through an application process. This experiential learning activity would provide an excellent educational opportunity to local residents on the importance of their aquifer as a source of drinking water and the central role of groundwater in sustaining regional landscapes. The Watershed Tour plays an important role in educating Chico State students and community members, who are voters in California, about the importance of a healthy watershed, its relationship to groundwater, and how to monitor the health of the system.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels, Reduction of Storage, Degraded Quality, Land Subsidence, Surface Water Depletion, Education and outreach

Implementation Timing/ Criteria for Implementation:

1. Currently measuring and providing community education with the possibility of significant expansion by 2023 depending on funding.

2. The project is ready for implementation. Educational workshops and technical trainings can occur anytime during the year. CWE plans to work with the Vina GSA, Butte County Department of Water and Resource Conservation, and other regional partners to design a program that serves the needs of the Vina GSA and educates its groundwater users. The project duration is one-year to 5-years depending on the scope of the project. The scope of the project will depend on the demand for educating regional groundwater users and the funds available to implement the PMA.The estimated costs vary depending on the scope of the project, the location of the trainings/ classes, and the frequency of trainings/ classes during the year. Estimated costs are for CWE Directors time, speaker costs, travel, printed materials, supplies, and student assistance time. The PMA costs range from least expensive (i.e. a student assistant hired to coordinate on-campus lectures) to most expensive (i.e. technical groundwater trainings in the field throughout Butte County with paid experts and printed materials.) We envision a mix of educational workshops, technical trainings, and educational materials designed in collaboration with the Vina GSA, Butte County Department of Water and Resource Conservation, and other regional partners to serve the needs of the Vina GSA and educate the subbasin groundwater users.

Estimated Cost:

1. $50-100K annually

2. $10,000-$200,000 annually

3. $10,000-$25,000 annually. The cost to expand the program and include community members is estimated at $10,000-25,000 annually. The estimated annual costs vary depending on the scope of the project and the number of community participants included. Estimated costs are for faculty and student assistants time to plan and implement groundwater-specific activities,

collect data (surface flows, groundwater levels and water quality), prepare and print educational documents, and participant support costs (estimated at $500 per person). The project costs range from least expensive (i.e. one student assistant hired, 5 community participants) to most expensive (i.e. several student assistants, faculty time, 10 community participants). Monitoring equipment is available for use by Chico State faculty and students, including flow measurement devices (ADCP), bailers, sounders, and water quality probes.

Potential Funding Sources: Prop 1, Prop 68

Required Permitting and Regulatory Process: None

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 0

Status of permitting and CEQA/NEPA compliance:

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? Yes. This project is designed to serve Butte County, and can be set up to specifically target areas of the Vina Subbasin identified as a DAC, including the Chapman neighborhood in Chico and parts of Oroville.

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Rangeland Management and Water Retention

Contact Person: Eli Goodsell

Organization/Affiliation: Chico State Enterprises

Contact Phone: 530-228-1525

Contact Email: egoodsell@csuchico.edu

Project or Management Action Description and Status

Project or Management Action Name: Rangeland Management and Water Retention

Project or Management Action Type: Project

Project or Management Action Proponent(s): CSU

Project or Management Action Location: The project would occur in two locations. 3,850 acres of historical rangeland between Musty Buck Ridge and the Cohasset Road

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

Develop, implement, and measure effects of adaptive/regenerative grazing practices on a minimum of 2,000 acres. Measurement of soil compaction, erosion, ground water retention and biological diversity. The project would evaluate assessing the property for potential of water retention engineering projects. If feasible, complete planning, environmental compliance, secure resources and complete projects.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

Implementation Timing/ Criteria for Implementation: Baseline data collection 2021-2022

Development of Master Management Plan 2022-2024

Estimated Cost: TBD

Potential Funding Sources: State funding through watershed health grants, federal funding through department of agriculture, private funding TBD

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

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance: Not initiated

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? No

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Fuel Management for Watershed Health

Contact Person: Eli Goodsell

Organization/Affiliation: Chico State Enterprises

Contact Phone: 530-228-1525

Contact Email: egoodsell@csuchico.edu

Project or Management Action Description and Status

Project or Management Action Name: Upper Watershed Recharge

Project or Management Action Type: Project

Project or Management Action Proponent(s): CSU

Project or Management Action Location: Upper Watershed - Multiple sites on the 3,950 acre Big Chico Creek Ecological Reserve and 1,500 acres above the Reserve in the Big Chico Creek Watershed

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

Over 4,000 acres of CEQA complete or in process for fuel management projects within the Big Chico Creek Ecological Reserve and on private land within the watershed. Potential for 6,000-10,000 more acres with partners such as the City of Chico Parks Department and other private land owners

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels, Reduction of Storage, Degraded Quality, Surface Water Depletion

Implementation Timing/ Criteria for Implementation: 450 acres worth of fuel reduction projects underway with over 4,000 in the planning phase with implementation to take place between 2021-2030. 6,000-10,000 additional acres between 2025-2040.

Estimated Cost: $8.0 million -$14.0 million. (based on $2,000 and $3,500 per acre with a target of 4,000 acres)

Potential Funding Sources: CAL FIRE, Sierra Nevada Conservancy, California Fire Safe Council, and other state and federal funding agencies

Required Permitting and Regulatory Process: CEQA

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance: Complete on 2,000 acres of CEQA with an additional 4,000 acres planned by the end of 2021.

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? Chico, Forest Ranch, other TBD

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Removal of Invasive Species

Contact Person: Eli Goodsell

Organization/Affiliation: Chico State Enterprises

Contact Phone: 530-228-1525

Contact Email: egoodsell@csuchico.edu

Project or Management Action Description and Status

Project or Management Action Name: Removal of Invasive Species

Project or Management Action Type: Project

Project or Management Action Proponent(s): CSU

Project or Management Action Location: Upper Watershed - The approximately 8,000 acres between lower Forest Ranch and the Chico Airport including the Big Chico Creek, Sheep Hollow, and Cabin Hollow drainages

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

Invasive species not only disrupts the natural ecosystem, they consume water and hamper recharge. Removal of invasive species would have multi-benefits on water resources and ecosystem. Mapping of invasive species and/native grasses within meadows and oak savannas. Development of management plan specific to ground water storage goals and invasive species management. Identify and secure funding and implement projects to meet objectives.

Measurable Objectives Expected to Benefit: Chronic Lowering of Groundwater Levels

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

Estimated Cost: TBD

Potential Funding Sources: State and federal wildfire resiliency grants.

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

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance: Not initiated

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? No

Additional Information Sources:

Other:

PROPOSED MANAGEMENT ACTIONS

Priority	Action	Lead Agency
1	Update Butte County & City of Chico General Plan	Butte County
2	Domestic Well Mitigation	Vina GSA and RCRD GSA
3	Amend the Well Permitting Ordinance	Butte County
4	Landscape Ordinance	Butte County & City of Chico
5	Prohibit Ski Lakes	Butte County & Vina GSA
6	Promote expansion of service area of water purveyors	Vina GSA
7	Large Well Moratorium	Butte County
8	Groundwater Allocation	Vina GSA & RCRD GSA

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Butte County and City of Chico General Plan Updates

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: General Plan Updates

Project or Management Action Type: Action

Project or Management Action Proponent(s): Vina GSA and RCRD GSA

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Conceptual

Brief Project or Management Action Description (1-2 short paragraphs): Butte County and the City of Chico are in the process of updating their General Plans. The Action would involve the Vina GSA to evaluate and propose amendments to the respective General Plans to ensure they recognize and support the Vina Groundwater Sustainability Plan.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels

Implementation Timing/ Criteria for Implementation: The action would require action to be taken by Butte County and the City of Chico.

Estimated Cost: TBD

Potential Funding Sources: TBD

Required Permitting and Regulatory Process: N/A.

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance: N/A

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? TBD

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Domestic Well Mitigation

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530-552-3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Domestic Well Mitigation

Project or Management Action Type: Action

Project or Management Action Proponent(s): Vina GSA and RCRD GSA

Project or Management Action Location: North Vina and South Vina

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

There are some domestic wells that may not have been constructed to current standards and/or are screened at or above the Minimum Threshold for their area. It is the intent of the Vina GSA and RCRD GSA to protect domestic water supplies. The project will:

1. Establish a voluntary registry of domestic wells;
2. Compilation of domestic well logs, screen depths and location;
3. Securing financial resources to improve and in some instances deepen domestic wells.
4. Emergency response to mitigate dry domestic wells that may include supplying bottled drinking water (Human Right to water), supplying potable water for sanitation purposes Priority will be given to assessing the security of water supply for any of disadvantaged communities which are dependent on ground water;

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels

Implementation Timing/ Criteria for Implementation: 2022-2025

Estimated Cost: TBD

Potential Funding Sources: State and federal grants, Community Block Development Grant, fees

Required Permitting and Regulatory Process: N/A

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 0

Status of permitting and CEQA/NEPA compliance: N/A

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? Yes

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Well Permitting Ordinance

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Well Permitting Ordinance

Project or Management Action Type: Action

Project or Management Action Proponent(s): Vina GSA and RCRD GSA

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs): The Minimum Thresholds established for the Vina subbasin is based on a small number of domestic wells being dewatered. The Measurable Objective is set sufficiently above the Minimum Thresholds to provide a measure of protection. Current Butte County Code requires that wells be screened below the groundwater levels during the 1989-1994 drought. To be protective of domestic wells, the well ordinance should amended to require that well drillers screen domestic wells below the Minimum Threshold depth for the respective Representative Monitoring Network area. Butte County has sole jurisdiction over well permitting. For this action, the Vina GSA would submit a request to Butte County recommending the amendment to the well ordinance.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels

Implementation Timing/ Criteria for Implementation: The action would require action to be taken by Butte County.

Estimated Cost: TBD

Potential Funding Sources: TBD

Required Permitting and Regulatory Process: County Ordinance Amendment

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): 0

Status of permitting and CEQA/NEPA compliance: N/A

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? TBD

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Landscape Ordinance

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Landscape Ordinance

Project or Management Action Type: Action

Project or Management Action Proponent(s): Butte County and City of Chico

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

1. The City of Chico and Butte County should enact an ordinance that would require new development (residential, commercial and industrial) to focus landscape plantings on species that are highly drought resistant and to limit the size of grass turf lawns that require great amounts of irrigation.
2. Focus domestic conservation efforts and money on reduction of landscape irrigation and swimming pool.
3. Promote xeriscaping

The City of Chico and Butte County have the sole jurisdiction to enact these actions. The Vina GSA will make a request to the City of Chico and Butte County to enact these actions.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels, Reduction of Storage, Degraded Quality, Land Subsidence, Surface Water Depletion, Education and outreach

Implementation Timing/ Criteria for Implementation:

1 Landscape Ordinance creation and implementation associated with new building permits would require a period of planning, public discussion and evolving code enforcement

Estimated Cost: TBD

Potential Funding Sources: N/A

Required Permitting and Regulatory Process: Amend land use ordinances

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance:

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? TBD

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Prohibition of Ski (Recreational) Lakes

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Butte County Zoning Ordinance

Project or Management Action Type: Action

Project or Management Action Proponent(s): Vina GSA and RCRD GSA

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs): There are a number of ski lakes in the Vina subbasin. The ski lakes are supplied by groundwater. Prohibiting ski lakes could be accomplished by having the Vina GSA adopt a rule prohibiting the pumping of groundwater for ski lakes and/or have Butte County prohibit ski lakes in the Zoning Ordinance. The action would have the Vina GSA request that Butte County amend the Zoning Ordinance to prohibit ski lakes.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels

Implementation Timing/ Criteria for Implementation: The action would require action to be taken by the Vina GSA and/or Butte County.

Estimated Cost: TBD

Potential Funding Sources: TBD

Required Permitting and Regulatory Process: Vina GSA Rule and Butte County Zoning Ordinance Amendment

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance: N/A

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? TBD

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Expansion of Water Purveyors' Service Area

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa@gmail.com

Project or Management Action Description and Status

Project or Management Action Name: Water Purveyor Service Area Expansion

Project or Management Action Type: Action

Project or Management Action Proponent(s): Vina GSA and RCRD GSA

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Conceptual

Brief Project or Management Action Description (1-2 short paragraphs): The reliability of domestic drinking water could be improved by expanding the service area of water purveyors to areas reliant upon private groundwater wells. The Vina GSA would promote the expansion of water purveyors into residential areas currently reliant upon groundwater.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels

Implementation Timing/ Criteria for Implementation: The action would require action to be taken by individual water purveyors, support of residents and approval by LAFCO and the CPUC.

Estimated Cost: TBD

Potential Funding Sources: TBD

Required Permitting and Regulatory Process: CEQA, Butte County Local Agency Formation Commission, the California Public Utilities Commission.

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance: N/A

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? TBD

Additional Information Sources:

Other:

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Large Diameter Well Moratorium

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa.org

Project or Management Action Description and Status

Project or Management Action Name: Large Diameter Well Moratorium

Project or Management Action Type: Action

Project or Management Action Proponent(s): Butte County

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs):

Butte County, at the request of the Vina GSA would enact a moratorium on issuing permits for the development of new Large Diameter Production Wells (LDPW) to enhance stabilization and restoration of GW levels. Furthermore, the VGSA would, through voluntary interbasin coordination, encourage adjacent sub-basins to enact a LDPW moratorium while data gaps are identified and rectified.

Measurable Objectives Expected to Benefit: The expected growth of demand associated with expanding groundwater dependent irrigation and urban growth.

Implementation Timing/ Criteria for Implementation:

Landscape Ordinance creation and implementation associated with new building permits would require a period of planning, public discussion and evolving code enforcement

Estimated Cost: TBD

Potential Funding Sources: N/A

Required Permitting and Regulatory Process: Amend land use ordinances

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance: None

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? Yes

Additional Information Sources:
Butte County BMO alert locations 2019:
http://www.buttecounty.net/wrcdocs/Programs/Monitoring/GWLevels/2019/2019_Spring_GWL_Alerts.pdf
NORTHERN SACRAMENTO VALLEY CHANGE IN GROUNDWATER ELEVATION MAP FALL 2004 TO FALL 2020 Deep Wells:
https://data.cnra.ca.gov/dataset/northern-sacramento-valley-groundwater-elevation-change-maps/resource/838109d9-fbc3-4d4d-b23d-f38d2bb5a852

Other:
The Vina GSA can take a lead in enacting a precautionary large diameter production well moratorium and, through the ICG, encourage nearby sub-basins to accept the fact that the shared foundational deep aquifer system has been "exercised" beyond the sustainable carrying capacity of the system.

Vina Subbasin GSP Project and Management Actions

Project or Management Action Name and Contact

Project or Management Action Name: Groundwater Allocation

Contact Person: Paul Gosselin

Organization/Affiliation: Vina GSA

Contact Phone: 530- 552-3590

Contact Email: vinagsa.org

Project or Management Action Description and Status

Project or Management Action Name: Groundwater Allocation

Project or Management Action Type: Action

Project or Management Action Proponent(s): Vina GSA and RCRD GSA

Project or Management Action Location: Basin-wide

Project or Management Action Status (Planned, Potential, or Conceptual): Potential

Brief Project or Management Action Description (1-2 short paragraphs): In the event that other projects and management actions fail to achieve the 2032 interim target and the Vina GSA Board and RCDR Board determines that actions are unlikely to achieve sustainable criteria by 2042, an action will be initiated to regulate demand reduction. The action would occur not before 2032 and contingent upon failing to meet the 2032 interim target and the likelihood of not meeting the sustainable criteria by 2042. The action would be initiated, if appropriate in 2032 with the development of a program to allocate groundwater demand, except for de minimus users, to achieve measurable objectives. The program would be implemented by 2037.

Measurable Objectives Expected to Benefit: Lowering Groundwater Levels, Reduction of Storage, Degraded Quality, Land Subsidence, Surface Water Depletion, Education and outreach

Implementation Timing/ Criteria for Implementation: The action would be not be implemented prior to 2032. The action would be contingent upon failing to meet the 2032 interim target and the likelihood of failing to achieve the measurable objective by 2042. However, if interim targets are being met and the measurable objectives are likely to be met, the action would not occur.

Estimated Cost: TBD

Potential Funding Sources: Fees

Required Permitting and Regulatory Process:

Expected Yield (e.g. water contributed to the groundwater system, acre-feet per year): TBD

Status of permitting and CEQA/NEPA compliance:

Does this Management Action or Project serve a disadvantaged community? If so, which one(s)? TBD

Additional Information Sources:

Other: