



## Enhance Natural Recharge from Local Waterways through Environmental Restoration Activities

This option focuses on environmental restoration of local waterways resulting in enhanced natural recharge. Restoration efforts would focus on areas where stream reaches flow across the principle groundwater recharge locations, for example, where Butte Creek flows directly over the Tuscan B Formation.

The restoration activities would result in the development of restored habitat adjacent to the waterways that would be inundated during high flow. Surface water flowing within the restored areas would recharge underlying alluvial materials, resulting in a temporary increase in the volume of groundwater stored in the stream overbank area. The stored water would both recharge the underlying aquifer bedrock and would contribute to stream baseflow during periods of low flow.

This option would result in both the environmental restoration of local streams and an incremental increase in groundwater recharge. Candidate waterways include the following:

- Dry Creek;
- Butte Creek;
- Big Chico Creek;
- Little Chico Creek; and
- Pine Creek.

### Potential Benefits

- Potential for improved fisheries and riparian habitat.
- Potential to enhance natural recharge of basin aquifers.

### Potential Drawbacks

- Restoration activities may conflict with flood control efforts.
- Local landowner support would be required.



## **Expand Groundwater Level and Extraction Monitoring**

This option would increase groundwater level monitoring, including both new monitoring wells and increased sampling frequency for existing wells. Increased groundwater monitoring provides a greater understanding of how the groundwater aquifer and how extractions affect groundwater levels in different areas.

A number of private and public agencies conduct groundwater level monitoring in the Sacramento Valley Region. Historically, DWR has maintained the most comprehensive, long-term groundwater level-monitoring grid, with approximately 210 different wells monitored over the last 50 years in the Sacramento Valley Region of Butte County. Within this period of time, the annual size of the monitoring grid has fluctuated from as few as 50 wells, to about 180 wells, depending upon the activity of special studies in the area. Until 1989, DWR measured the majority of these wells twice per year, during the spring and fall. Beginning in 1990 the groundwater level monitoring was increased to monthly, before returning to a semi-annual measurement in 1995. In 1997, the Department, in cooperation with DWR, began to expand the number of wells and frequency of groundwater level monitoring in the valley portion of Butte County. The current monitoring grid has 88 observation wells that Butte County DW&RC monitors for groundwater levels during the summer months, when groundwater pumping is at a peak. Butte County DW&RC and DWR have added five wells to the grid since 1997, and DWR continually monitors levels in these wells.

### **Potential Benefits**

- Improved understanding of groundwater aquifer.
- Potential to improve local water management with new groundwater information.

### **Potential Drawbacks**

- Some local landowners may not support program if it focuses on groundwater extractions.



## Create Groundwater Replenishment District

This option would establish a Groundwater Replenishment District to increase groundwater supply for future water demands and protect groundwater sources from contamination. The District could cover any recharge area in the County. The list below includes some of the mechanisms for achieving these goals as outlined in the California Water Code's Division 18. The District would work cooperatively with State and Federal agencies to perform the following:

- "Buy, sell water and exchange water;
- Distribute water to persons in exchange for ceasing or reducing ground water extractions;
- Spread, sink and inject water into the underground;
- Store, transport, recapture, recycle, purify, treat or otherwise manage and control water for the beneficial use of persons or property within the district;
- Build the necessary works to achieve ground water replenishment;
- Acquire water rights within or outside the District; and
- Exercise the right of eminent domain to take any property necessary to supply the district with replenishment water (California Water Code)."

The District would be able to fix rates for sale or exchange of water at rates that would pay, insofar as practicable, the District's operating expenses. The District would also have the power to levy a tax if the revenues from water charges were insufficient to pay for operating expenses.

### Potential Benefits

- Promote cooperation over a larger area.
- Facilitate groundwater management.

### Potential Drawbacks

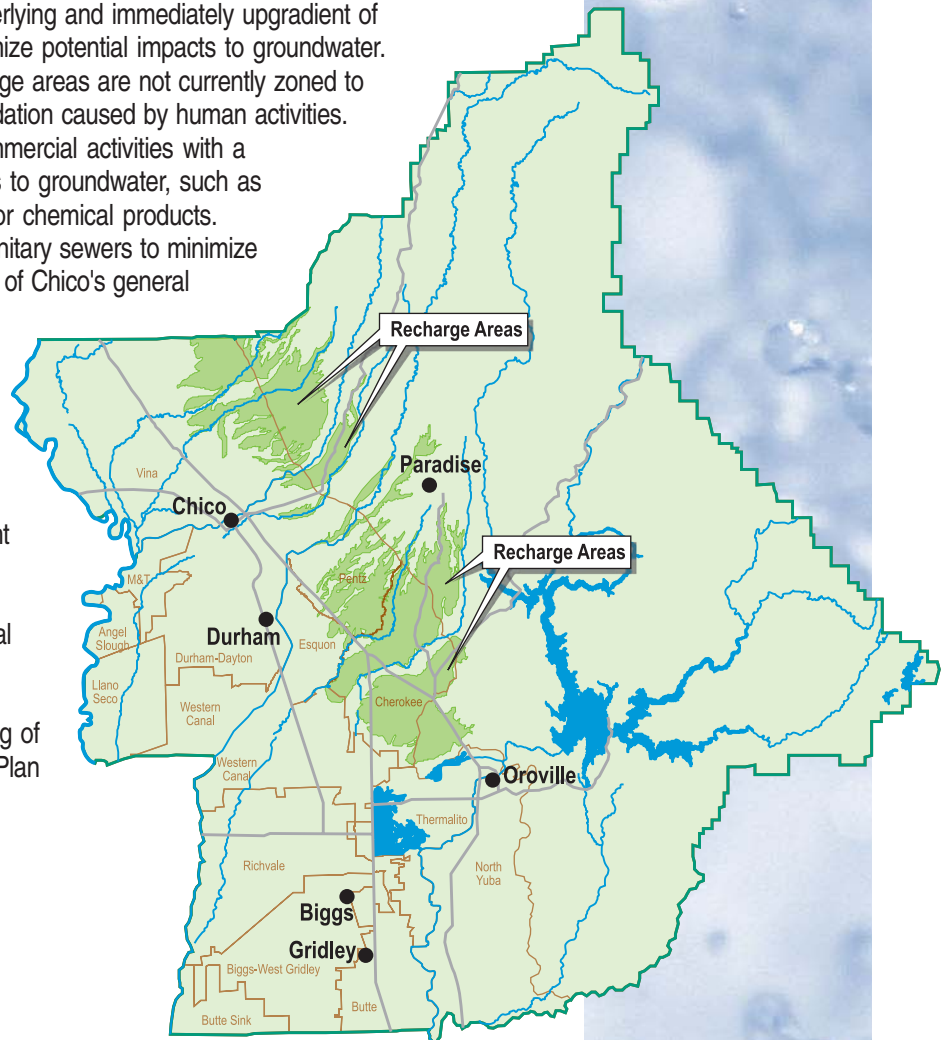
- Perceived threat to management authority of existing local agencies.



## Protect Recharge Area Water Quality through Zoning

This option would include zoning of lands overlying and immediately upgradient of defined groundwater recharge areas to minimize potential impacts to groundwater. Land use practices within groundwater recharge areas are not currently zoned to minimize the potential for water quality degradation caused by human activities. Zoning would prohibit new industrial and commercial activities with a significant potential for anthropogenic impacts to groundwater, such as facilities that produce or manage petroleum or chemical products. New housing in these areas would require sanitary sewers to minimize nitrate pollution from septic systems. The City of Chico's general plan currently designates some recharge areas for development. Paving of areas for streets and sidewalks limits direct recharge from rainfall; however, the current hypothesis is that most area recharge occurs through stream percolation.

The Butte County Department of Development Services is currently completing a technical update of the County's General Plan. Plan policies will be updated following the technical update. The Department of Development Services and Board of Supervisors will be encouraged to consider the appropriate zoning of groundwater recharge areas as the General Plan update is being completed.



**Potential Benefits:**

- Proactively protect groundwater resources by recognition of the relationship between land use and water supply.
- Maintain high quality groundwater required for domestic supply.
- Protect the economic value of the resource.

**Potential Drawbacks:**

- Zoning restrictions limit economic development potential.
- Overlying landowners may pursue remedies for lost opportunity.



## **Commit to a Periodic and Coordinated Update of Water Management Plans, Ordinances, Resolutions, and Policies**

Implementation of this option would include the periodic update of the inventory of water resources in the County. Periodic updates would be similar to the 2001 Water Inventory and Analysis Report prepared by the Department of Water and Resource Conservation. Based on a current understanding of water resources in the County and with consideration of current County priorities, water management plans, ordinances, resolutions, and policies would be updated to ensure that Butte County remains proactive over time in the management of water resources.

Water management plans and associated ordinances, resolutions, and policies reflect the current understanding of the resource and current County priorities at the time that they are developed. Both the understanding of the resource and associated priorities are dynamic, evolving over time. As an example, an improved understanding of the hydrogeology of the Sacramento Valley Groundwater Basin has resulted from recent studies completed by the Department of Water Resources, Northern District. As another example, water transfers during the 1988 - 1994 drought resulted in a heightened County priority for protection of local needs, as evidenced by Butte County's passage and approval of Chapter 33 (the export ordinance).

These update activities would be coordinated closely with other County departments to ensure that County water resource priorities are considered and reflected consistently among the various departments whose actions affect the management and health of the resource. As an example, the Department of Development Services would coordinate closely with the Department of Water and Resource Conservation during activities such as the General Plan update. Under this option, the Butte County Board of Supervisors would require departments to coordinate with the Department of Water and Resource Conservation when considering plans or policy that could conflict with water management objectives.

### **Potential Benefits**

- Develop plans, ordinances, resolutions, and policies with up-to-date information.
- Proactive approach to water management.
- Avoidance of inadvertent impacts to water resource due to lack of coordination.

### **Potential Drawbacks**

- Staff and funding would be required to maintain up-to-date information.
- Commitment of staff and time for interdepartmental coordination would be required.



### **Initiate a Multi-County Cooperative Outreach Effort**

Watershed and groundwater basins typically extend across defined county boundaries. This option would result in Butte County working cooperatively with neighboring counties toward public education on the importance and proper management of shared water resources.

Neighboring counties would be invited to participate in cooperative outreach share watersheds and/or groundwater basins common to Butte County. For example, the Feather River watershed encompasses large areas in both Butte and Plumas counties. The Yuba River Basin in Yuba County drains into the Feather River Basin of Butte County. The lower Tuscan Formation groundwater aquifer includes basin areas in Tehama, Butte, Glenn, Sutter and Colusa counties. Invited counties would include Butte, Plumas, Yuba, Tehama, Glenn, Colusa, and Sutter counties.

Designated county representatives would be encouraged to hold meetings each six months to discuss common watershed and groundwater issues, review current public outreach, and future outreach topics associated with the importance and proper management of shared watersheds and groundwater basins.

#### **Potential Benefits**

- Regional outreach can result in other counties understanding that their actions can have both positive and negative affects on Butte County's water resources.
- Outreach and education promotes intelligent decision-making.
- SB1938 recommends outreach to neighboring areas during development of a Groundwater Management Plan.
- Regional outreach could strengthen future funding.
- Regional cooperation can have influence when dealing with outside parties.

#### **Potential Drawbacks**

- Regional outreach may be perceived as support for regional water management and decreased local control.



### **Increase Support for the Butte County Resource Conservation District**

This option would increase the support for the Butte County Water Resource Conservation District (RCD) to receive grant funding. Butte County formed the RCD in May 2003 with the mission to "conserve the resources of Butte County for the benefit of its citizens, its environment and its economy." The objectives of the RCD include:

- Promoting fire fuel load management and fire safe education;
- Facilitating water quality and water quantity development;
- Improving rangeland health;
- Improving flood control planning;
- Increasing educational outreach; and
- Improving future Butte County land use planning.

The goals of the RCD are listed at <http://www.buttecounty.net/rcd>. The Department of Water and Resource Conservation would provide institutional support and mentoring for the RCD. Currently, the RCD depends on grants for most of its funding. The Department of Water and Resource Conservation would concentrate most of its support in helping the RCD secure funding.

#### **Potential Benefits**

- Provides more flexibility for the RCD to achieve objectives.
- Promote local control of Butte County water resources.

#### **Potential Drawbacks**





## **Coordinate Regional Watershed Management**

This option would coordinate regional watershed management plans in Butte, Plumas, Yuba and Lassen counties. Local groups currently manage the watersheds in their respective counties. Each watershed group has evolved independently to meet distinct organizational and resource challenges. Consequently, the levels of organizational success vary among the groups. All stakeholders recognize that long-term success will require broad-based landowner and stakeholder collaborative efforts that foster community responsibility for the region's natural resources.

The Butte County Resource Conservation District (RCD) could integrate watershed groups into its planning efforts. Furthermore, the RCD works together with the Natural Resource Conservation Service (NRCS), a branch of the USDA, to acquire technical expertise. The RCD has the ability to be the lead agency in coordinating watershed management, and the county can include watershed management issues into its planning structure. The RCD can collaborate with watershed groups and help secure grants and funding for future projects.

### **Potential Benefits**

- Coordinated management reduces duplicative effort and increases potential benefits from individual watershed management plans.
- The Butte County RCD can pursue grant funding that is not available through other departments.

### **Potential Drawbacks**

- Potential conflicts of interest among counties.





## Support Restoration of a More Natural Flow Regime on the Sacramento River

As part of this option, Butte County would provide institutional and political support for restoring a more natural flow regime on the Sacramento River. Changing flow patterns could provide flows at times that would benefit fisheries and riparian habitats by restoring a hydrograph that more closely simulates a natural hydrograph.

The Sacramento River, originating in Siskiyou County in northern California, drains a watershed that extends 300 miles from the Oregon border south to the Delta. The Sacramento River is the largest river in the state, and flows from the northern mountainous areas through the central valley into the Delta, and then out through the San Francisco Bay into the Pacific Ocean.

The Bureau of Reclamation constructed Shasta Dam to store water for the CVP. CVP contractors divert water from the Sacramento as it flows south from the Dam. Shasta Dam captures water when flows are high (typically during the winter and spring) and delivers them to contractors as needed (typically during the dry season). This storage and delivery pattern is different from the historic pattern of high flows on the Sacramento River during rains and snowmelt. Fish and riparian vegetation historically used flows to cue various behaviors, such as spawning and migration. Changing flow patterns at certain times of year could help these species by triggering these behaviors.

The CVP has existing requirements that help species, such as temperature and flow requirements throughout the year. Butte County does not have resources on the Sacramento River to increase flows independently; therefore, the County would offer political and institutional support to other groups that may work to change flow patterns.

### Potential Benefits

- Potential for improved fisheries, riparian habitat, and recreation.

### Potential Drawbacks

- Institutional support alone cannot accomplish objectives; therefore, the County would need to work with partners to supply water and/or funding.



### **Improve Management of Unused SWP Allocation**

This option would improve management of the County's unused surface water supplies. When Lake Oroville was constructed, Butte County received an allocation of 27,500 acre-feet of State Water Project (SWP) water. SWP contracts typically require payment for the full allocation every year. While Butte County has negotiated with DWR to receive and pay for an annual SWP allocation of only 3,500 acre-feet, the County continues to hold a contract for 27,500 acre-feet.

In this option, Butte County would investigate in-County needs for the unused allocation, including some described in other options in the Integrated Water Resources Plan. The County would also negotiate with DWR to amend the current SWP contract to allow for the unused allocation to be transferred or managed in a different fashion. Improved management would allow the County to generate revenue from this allocation, which could be used to support other options within the Plan.

The County will have to pay for the full allocation when it is scheduled to receive the water. The Monterey Amendment specifies terms for sales of SWP water allocation. SWP contractors can transfer any unneeded water to other contractors on a permanent basis or can sell any unneeded supplies on a short-term basis back into a pool for purchase by other contractors. Water that is not purchased by other contractors may be purchased by DWR (or by non-contractors if DWR does not want the water). Unless Butte County obtains an area-of-origin exemption, the Monterey Agreement could limit the ability for flexible management of the SWP allocation.

#### **Potential Benefits**

- Generate additional revenue into the County economy.
- Increase state water supply reliability.
- Provide water for environmental needs.
- Establish partnerships between the County and buyers.

#### **Potential Drawbacks**

- Must work out contractual constraints on sales of SWP water.
- Makes the County liable for the total costs of receiving its full allocation.
- Must be certain that all in-county needs are met before out-of-county transfer.