6.5 Butte County

6.5.1 Introduction and Summary

The following summarizes the local setting, current and future land and water use, and primary recommendations in the Butte County area. Butte County officials were interviewed and consulted as part of the development of this IRWMP and identified the following key and/or highest priority water- and land use related issues:

- Development of agricultural lands in the rural areas of the county, and the need for water and sewer services to these areas
- Potential groundwater impacts from urban development and protection of county groundwater resources
- Potential development of the Lower Tuscan Formation and protection of recharge areas
- Groundwater quality protection in the City of Chico
- Continued protection of water quality
- Continued monitoring of the groundwater BMOs

6.5.1.1 Local Setting

Butte County is located on the eastern side of the Sacramento Valley and western Sierra Nevada. The Sacramento River flows along a portion of the western boundary of the county. The Feather River is the largest river within the county. Lake Oroville is located behind Oroville Dam on the Feather River in the foothills above the Town of Oroville (Figure 6.5-1). Oroville Dam is owned by the Department, which operates it, along with Thermalito Forebay and Afterbay, as part of the SWP.

The valley floor portion of Butte County consists of irrigated agriculture with primary crops being rice and orchards. The City of Chico is the largest urban area in this otherwise agricultural county. Other smaller urban areas include Biggs and Gridley on the valley floor, and Oroville and Paradise in the foothills. The current population of Butte County is estimated at 217,200. The population is expected to grow primarily in these urban areas between now and 2030 to about 320,000. Additional growth is also occurring in unincorporated parts of the county, which are more rural agricultural areas. Providing services such as water and sewer is one of the challenges facing the county for these lands resulting from the conversion of agricultural lands to urban uses.

The water needs of Butte County are met with a combination of surface water and ground-water from the alluvial groundwater subbasins of the Sacramento Valley Groundwater Basin. The Lower Tuscan Formation is the primary groundwater-producing aquifer in the county.

The larger public water supply wells extract water from the Lower Tuscan Formation and many smaller private domestic and agricultural wells rely on the overlying alluvial deposits.

Most of the recharge areas of the Tuscan Formation are located along the base of the Sierra Nevada foothills in Butte County. Groundwater quality is generally good, but there are some areas of concern. The City of Chico has some groundwater quality issues including high nitrates (from septic systems), tetrachloroethylene/trichloroethylene plume (from dry-cleaner releases), and petroleum plume. Portions of the south part of Butte County have elevated arsenic levels.

Some local water purveyors contract for SWP water through their settlement agreements with the Department. Much of the surface water use in the county is for agriculture. Groundwater is also used to supplement surface water supplies for agricultural uses in the areas not supplied with district water. Currently, most of the urban and domestic water needs are met with groundwater, although some surface water supplies are in the foothill areas. Paradise Irrigation District, Thermalito Irrigation District, South Feather Water and Power, Del Oro Water Company, and California Water Service in Oroville all use surface water supplies to help meet their needs.

6.5.1.2 Local Water Resources Management

In July 1999, the Butte County Board of Supervisors approved the formation of the DW&RC. The mission of the DW&RC is "…to manage and conserve water and other resources for the citizens of Butte County," thereby defining Butte County as its "Planning Region" for the evaluation of water resources management issues. Since its inception, the DW&RC has focused on coordinating local water resource management. To gather the information necessary to set a course for protection and management of resources, the DW&RC initiated an Integrated Water Resources Program. Part of this program is the *Integrated Water Resources Plan* (Butte County IWRP), which presents policy recommendations developed through close collaboration with a diverse stakeholder group. The IWRP is intended to provide direction for resource management and protection into the future.

In June 2004, Butte County adopted the IWRP that was prepared for the DW&RC to develop water resources policy recommendations for consideration by the Butte County Board of Supervisors (CDM, 2004). This plan is part of Butte County's proactive Integrated Water Resources Program. Some of the results of the Butte County IWRP are summarized in this analysis. Additional details and supporting information are available from the Butte County IWRP and the supporting documents.

In addition to the DW&RC, over 15 agencies have water resources management responsibilities and land use planning responsibilities in Butte County. They are listed below

and shown on Figure 6.5-2. The following agencies, along with other stakeholders and interested parties, participated in the preparation of the Butte County IWRP:

- **Water and Irrigation Districts**
  - Biggs-West Gridley Water District
  - Butte Water District
  - California Water Service Company (Oroville Area)
  - Del Oro Water Company
  - Durham Mutual Water District
  - Oroville-Wyandotte Irrigation District
  - Lake Madrone Water District
  - Magalia County Water District
  - Paradise Irrigation District
  - Ramirez Water District
  - Durham Irrigation District
  - Richvale Irrigation District
  - Thermalito Irrigation District
  - Western Canal Water District
- **Flood Management Agencies (not shown on Figure 6.5-2)**
  - Maintenance Area No. 5
  - Maintenance Area No. 7
  - Maintenance Area No. 13
- **Land Use Planning Agencies**
  - Butte County
  - City of Chico
  - Biggs
  - Gridley
  - Paradise

6.5.1.3 Existing and Future Land and Water Use Conditions

The IWRP relied upon the *Butte County Water Inventory and Analysis* (Water Inventory) (CDM, 2001) to estimate water supply and water demands analysis for agricultural, urban, and environmental demands in average and dry water years. As part of the Water Inventory, the county developed agricultural and urban water demand forecasts and an initial environmental demand assessment. Different methodologies were used for each sector to address specialized needs to account for various water factors that affect each sector. The findings show that future agricultural water demand will decline slightly, urban demand will

increase, and additional monitoring and research is needed to project future environmental demand.

This section presents the results and conclusions of land and water use analysis completed in the Water Inventory and summarized in the Butte County IWRP.

Recent preliminary updates on development and regional growth projections for the 2006 to 2030 period prepared by the Butte County Association of Governments describe the overall growth within Butte County. The population of the City of Chico is expected to increase by about 48,000 to about 127,000 by 2030. This represents an annual growth rate of about 2.5 percent. The Cities of Biggs, Gridley, and Oroville are expected to have an annual growth rate of around 5 percent each, representing an increase in population of about 2,200, 7,200, and 15,000 respectively. These growth rates do not include annexations. The unincorporated parts of the county area are expected to grow at about 1 percent per year, adding about 24,300 people by 2030.

Agricultural Demand

Existing Agricultural Demand

The Butte County IWRP identified about 230,500 acres of irrigated cropland in a fully cropped normal year, with rice accounting for about 110,000 acres or 48 percent of the irrigated acreage. Other major crops in the county include orchards, grains, and pasture. The 2005 Butte County Agricultural Crop Report shows that harvested rice acreage has reduced to 96,400 acres. In addition, the Crop Report also showed almonds as the highest valued crop in the county due to increased yield and unit value.

For water planning purposes, the Water Inventory characterized the agricultural demands in the county in average and dry years. The report estimates the water demand using the Department's 1997 land use data, Agricultural Commissioner Reports, and discussions with landowners and water purveyors regarding irrigated crop acreage and irrigation requirements.

The total agricultural water demand in the county is estimated at about 1 million ac-ft in a normal year and about 1.1 million ac-ft in a drought year (about 70 and 73 percent of the county demand, respectively).

The Butte County IWRP states that the county has an adequate supply of surface water and groundwater to meet current agricultural demands.

Future Agricultural Demand

Future agricultural water demands will vary from current demands because of changes in economic, land use, and hydrologic conditions. In the Butte County IWRP, future agricultural water demands were evaluated using potential reasonable scenarios for future

agricultural water use. The scenarios are summarized in Table 6.5-1 and described as follows:

- **Agricultural Land Conversion** – This scenario reflects the recent trends that show agricultural land conversion for urban and environmental uses.
- **Increased Crop Prices** – This scenario reflects the changing market demands, competition from other production regions, and government programs.

TABLE 6.5-1
Summary of Agricultural Demand Forecast Scenarios

Scenario	Implementation Method	Analytical Representation
Land Conversion	Decrease total land in production	Decrease irrigated land – 3% in Vina and West Butte Decrease irrigated land – 1% in East Butte
Crop Idling	Decrease surface water used for crop production	Decrease surface water delivery – 10%
Crop Prices	Increase relative crop prices	Increase rice and orchards price – 10%
Water Conservation	Increase crops irrigation efficiency	Set target irrigation efficiencies for each crop
Combination Scenario – Average and Dry Years	Combines land conversion, crop idling, and conservation scenarios	Decrease irrigated land – 3% in Vina and West Butte Decrease irrigated land – 1% in East Butte Decrease surface water delivery – 10% Set target irrigation efficiencies for each crop

- **Increased Crop Idling** – This scenario reflects the opportunity to idle land to develop a water source to meet new and increased water demand for environmental resource protection and water supply reliability.
- **Conservation** – This scenario reflects water conservation as an important component of managing water demands and supplies in the future. Increased irrigation efficiency would provide additional water supplies from savings associated with onfarm irrigation systems and management.
- **Combination Scenario** – This scenario forecasts likely changes in agricultural water demand, taking into account a combination of the most probable land and water use changes.

The agricultural demand forecast analysis indicates that most of the reasonably foreseeable changes would not result in significant long-term changes in agricultural water demand in Butte County. In the combination scenario, individual regions would see a reduction in agricultural water demand ranging from a minimum of 0.6 percent to a maximum of 8.75 percent. The total water demand in the county decreases by 60,500 ac-ft (6.0 percent) in an average year and 71,300 ac-ft (6.3 percent) in a dry year under the combination scenario.

Urban Water Demand

The urban water demand in Butte County was evaluated for the six study areas listed in Table 6.5-2 for the years 2000, 2010, 2020, and 2030. Urban water use includes household uses, commercial and industrial uses, and landscape irrigation.

TABLE 6.5-2
Forecast Model Study Area

Study Area	Water Purveyor(s)
Biggs	City of Biggs
Chico	California Water Service Company, Chico
Gridley	City of Gridley
Oroville	California Water Service Company, Oroville Oroville-Wyandotte Irrigation District Thermalito Irrigation District
Paradise	Paradise Irrigation District
Unincorporated Areas	Several small water purveyors (not listed) Private wells

Existing Urban Demand

The 2000 annual urban and domestic water demand totaled about 67,400 ac-ft for the county. Chico and the unincorporated areas of the county have the largest demands. The existing urban demands are summarized in Table 6.5-3.

TABLE 6.5-3
Annual Urban Water Demands

City	2000 Urban Demand (ac-ft)	Percent Increase in Urban Demand[a]	2030 Estimated Urban Demand (ac-ft)
Biggs	600	44	800
Chico	25,800	96	46,000
Gridley	1,600	33	2,000
Oroville	5,500	77	9,000
Paradise	7,600	11	8,300
Unincorporated Areas	26,300	Slight decline	25,000
Total	**67,400**		**91,100**

[a]Percent increase in single housing family units from 2000 to 2030.

Future Urban Demand

Future urban water demands vary from current demands because of changes in development, population, economic, and hydrologic conditions. The complete analysis is available in the *Butte County Urban Water Demand Forecast Report*. The urban water demand forecast analysis used IWR-MAIN Water Demand Management Suite© to perform the urban water demand forecast with the adjusted rate of water use forecasting method.

As shown in Table 6.5-3, the urban demand of the entire county is estimated to increase by about 50 percent between 2000 and 2030. The county's urban growth is primarily due to increases in residential and commercial uses in Chico. The unincorporated areas would decline somewhat because of the urban annexation of existing housing developments that are currently in unincorporated areas.

Environmental Demand

During the preparation of the Butte County IWRP, the DW&RC performed preliminary environmental demand calculations as a frame of reference for water resource planning, recognizing that additional data were needed to provide a more detailed estimate of actual environmental water demand.

The Water Inventory calculated environmental water demand for managed wetlands and rice decomposition in Butte County. Total environmental water demand is approximately 139,000 ac-ft in a normal year and 161,000 ac-ft in a dry year. The report also calculates conveyance losses, which can be considered an environmental water use. Conveyance losses were 230,100 ac-ft during a normal year and 185,100 ac-ft during a dry year. The Water Inventory did not calculate environmental demands associated with riparian and terrestrial vegetation or instream demand.

6.5.1.4 Existing and Ongoing Planning

Butte County has been working for many years to more effectively manage and protect its water resources. Some of the existing and ongoing planning efforts are as follows:

- Groundwater Conservation Ordinance (Chapter 33)
- Well Spacing Ordinance (Chapter 23B)
- Update of Butte County Water Inventory and Analysis
- Groundwater Management Plan (AB3030 Plan)
- Groundwater Monitoring Program
- Update of Butte Basin Groundwater Model
- Urban Stormwater Management Plan

In addition, the IWRP has initiated the following efforts:

- Drought Management Plan
- Water Resources update of the Conservation Element in the General Plan
- Preliminary design for an Environmental Monitoring Program
- Basin Management Objectives

Some of the relevant Butte County water resources planning documents are identified in Table 6.5-4.

TABLE 6.5-4
Existing and Relevant Butte County Water Resource Planning Documents

Planning Document	Description	Lead Agency and Date Published
Butte County Water Inventory and Analysis	Contains water supply and demand data.	Butte County DW&RC (2001)
Butte County Groundwater Inventory	Contains groundwater data and groundwater setting.	Butte County DW&RC (2001)
Integrated Water Resources Program	Provides outline to establishing water management policy for county.	Butte County DW&RC (2004)
Butte County Groundwater Management Plan	AB3030 Groundwater Management Plan.	Butte County DW&RC (2001)
Drought Management Plan	Contains plan to reduce short- and long-term impacts of drought to Butte County.	Butte County DW&RC (Ongoing)
Groundwater Management Ordinance 3869	Documents county's approach to managing groundwater resources.	Butte County Board of Supervisors (2004)
Groundwater Status Report	Summarizes groundwater level and land subsidence data collected through October 2004.	Butte County Water Commission by the Butte Basin Water Users Association (2005)
Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document	Contains water quality information from the Counties of Butte, Glenn, Colusa and Tehama.	Glenn County Department of Agriculture (2005)
BMOs Groundwater Management In Butte County, California	Describes BMOs within Butte County.	Butte County (2006)

6.5.1.5 Plan Areas

The Water Inventory organized the county into planning subareas to evaluate land and water use conditions based on the following considerations:

- Water use
- Topography
- Land use

- Geological setting
- Proximity to water source
- Water district boundaries

As a result of these considerations, the county was organized into the following five subareas shown on Figure 6.5-3:

- Vina Subarea (Chico)
- West Butte Subarea
- East Butte Subarea (highly agricultural)
- North Yuba Subarea
- Mountain/Foothill Subarea

Much of the analysis included in the Butte County IWRP is based on these subareas and includes evaluation of agricultural land use and water demands. Additional information regarding the land and water use analysis is available in the Water Inventory.

6.5.1.6 Local Water Management Issues and Strategies

Water Management Objectives

The Butte County IWRP identified planning objectives that describe what the county should achieve with regard to water management. These objectives serve as expressions of the variety of ideas and concerns held by the stakeholders and provide a reference for the evaluation and comparison of the water management strategies. The primary objectives identified by the stakeholders and the steering committee during the development of the Butte County IWRP follow, along with the relative rankings of each objective:

- **Local Control**
  - Barriers to local control (11)
  - Seek consistency and applicability at the regional level (2)
- **Water Supply**
  - Protect water rights (8)
  - Improve water management (13)
  - Meet future in-county water demands (23)
  - Meet county urban, agricultural, and environmental needs first (11)
  - Protect public health and safety (7)
- **Economy**
  - Maintain and enhance economic health of the county (14)
  - Minimize cost effects (5)

  - Minimize third-party impacts (8)
  - Protect rural way of life (6)

- **Natural Resources**
  - Protect and enhance biological resources (17)
  - Improve water quality (18)
  - Increase understanding of existing environmental conditions (9)
  - Integrate watershed management programs (8)

The Butte County IWRP weighted and ranked the planning objectives to show their relative importance.

Water Management Options

The Butte County IWRP identified 30 options that might help to meet Butte County objectives (listed above). An "option" is a project, program, or policy that could be implemented to help meet the county's future water management needs. The options were grouped into six categories based on their function. These categories are as follows:

1. Environmental
2. Water Use Efficiency
3. Ridge Supplies
4. Coordinated Management
5. Policies
6. SWP Allocation Management

Environmental

This category includes options that address environmental concerns in Butte County relating to special-status species habitat, water quality, and environmental water demand. Water resources-related actions that benefit environmental resources generally fall into three categories: (1) increasing flows to improve habitat, (2) restoring more natural flow patterns in rivers and creeks, and (3) increasing understanding of water quality and environmental resources.

Other options in this category propose to improve the understanding of the county's water quality and environmental resources. Increased monitoring would help the county understand surface water and groundwater quality and how the quality affects both environmental resources and water supplies.

Water Use Efficiency

Increasing water use efficiency can provide additional available water for future drought protection or other in-county beneficial uses. Public education programs would help people understand the effects of their actions on water quality and quantity, and understanding these

effects could lead to more efficient practices. The county or local water districts could work with the California Urban Water Conservation Council, the Agricultural Water Management Council, or CALFED to implement efficient water management practices.

Ridge Supplies

This option category proposes projects to address potential future water shortages in the Ridge communities, including the Town of Paradise and surrounding developments. The Ridge area has a growing population, and the water supply must be increased to meet future needs, particularly during dry years. The Ridge area water purveyors are investigating options to increase supplies, and the options within this plan are derived from those local investigations.

Coordinated Management (Conjunctive Use)

Coordinated management of groundwater and surface water enables better management of both resources. This category would help manage groundwater fluctuations to ensure future county water supplies. Coordinated management includes several components: (1) recharge, or placing water into the aquifer; (2) monitoring groundwater levels, groundwater quality, and subsidence; and (3) recovery of water from the aquifer.

Policies

The policy options propose to improve water management within the county, address regional water issues, and improve the county's water quality. These options do not identify on-the-ground projects, but rather identify policies that the DW&RC could adopt to help meet the planning objectives.

State Water Plan Allocation Management

This category includes one general option to develop a mechanism for managing the unused portion of its SWP allocation. The county could use the allocation as part of other options, many of which rely on a portion of the SWP allocation for implementation.

Options represent potential means of accomplishing the planning objectives. The options were screened for their general feasibility, which included an assessment of the technical, legal, political, financial, and environmental feasibility. Only the feasible options were carried forward for evaluation. Figure 6.5-4 reflects the results of the screening process. An "X" indicates that a criterion was not met and the option was screened out of the process. The options were combined into reasonable packages that have an ability to achieve multiple complementary objectives.

Water Management Packages

A total of 30 options passed the screening criteria, but no single option was capable of addressing all of the county's water management issues on its own. As a result of this, "packages" of options were developed that would meet multiple objectives. The packages were created by organizing the options according to their combined ability to address specific problems (called Problem Statements), which described potential issues the county could face in the future. The six Problem Statements are as follows:

- The Ridge area is projected to have water supply shortages during dry years.
- The county faces a potential reduction in its 27,500-ac-ft SWP allocation if it is not put to beneficial use, but using the entire allocation in the county could be problematic because it is very expensive.
- Water quality degradation could affect future supplies and biological resources.
- Outside interests might attempt to use county water resources that are not used beneficially within the county.
- The county must cope with fiscal challenges.
- The county faces historical and ongoing threats to its terrestrial and aquatic habitats.

The option packages were formed to focus on a single Problem Statement. Additional options were then added to an option package to address multiple Problem Statements, while maintaining the primary focus on the original, single Problem Statement. Two of the guidelines when grouping options into packages included the following:

- The package must pay for itself.
- The SWP allocation quantity must not be exceeded.

During the development of the option packages, it was found that several options were included in each package. These were eventually identified as base options and included as part of each package. The following four-option packages were identified through this process are described in detail in the Butte County IWRP:

- Economic Health Package
- Threat of Outside Interest Package
- Environmental Package – Focus on Butte Creek
- Environmental Package – Focus on Feather River

After reviewing the option packages, it was determined that none of them fully met the plan objectives. As a result, a "hybrid" package was developed that could achieve a more favorable overall rating than the initial packages. The hybrid package was then used to develop the policy recommendations as described in the following section.

Policy Recommendations

The policy recommendations of the Board of Supervisors, presented in the Butte County IWRP, were developed using the evaluation results of the hybrid package and other option packages. The hybrid package evaluation results were used to develop the First Tier Policies characterizing the policy directives necessary to implement the option combinations. Policies generated from the remaining options fell into the Second Tier of recommendations. The First Tier and Second Tier Policies are briefly described below. A more complete description is included in the Butte County IWRP.

First-tier Policies

The First Tier Polices identified in the Butte County IWRP are listed and summarized as follows:

- **Continue Ongoing Water Resources Efforts** – Butte County has been working for many years to more effectively manage and protect its water resources. Some of these efforts are listed in Section 1.4 of this analysis.
- **Improve Water Management of the SWP Allocation** – The county must develop a mechanism for managing the unused portion of its SWP allocation and other water that might be available.
- **Increase Agricultural and Urban Water Use Efficiency** – The county recognizes that improved water use efficiency can provide additional supply for future drought protection or other in-county beneficial uses.
- **Recommend that BMOs Support Native Vegetation** – Sustaining natural vegetation above recharge zones is important for managing groundwater levels, because natural vegetation enhances riparian areas and wetlands that recharge the aquifer.
- **Protect Recharge Areas through Zoning –** Land use practices on recharge areas can affect the quality and quantity of recharge into the aquifer. Protecting habitat areas and limiting activities that could degrade water quality would reduce the potential for these effects.
- **Inform and Educate the Public about Water** – Fostering public knowledge and understanding regarding water resources can help to create a culture of resource stewardship. The county will increase public education to inform residents about local water resources and issues.
- **Increase Support for Butte County Resource Conservation District (RCD)** – The Butte County RCD can play an important role in managing water resources by fulfilling its mission to "…conserve the resources of Butte County for the benefit of its citizens, its environment, and its economy." The county will maintain administrative support for the RCD and help to coordinate activities with local watershed groups through the RCD.

- **Support Solutions to Potential Future Water Shortages in the Ridge Community** – The county will provide institutional support to help the Ridge community implement a solution to potential future water shortages.
- **Implement a Coordinated Management Program** – A coordinated management program could improve the flexibility and reliability of county water resources. A coordinated management program would include a recharge component to place water into the aquifer, a recovery component to extract water from the aquifer, a monitoring program to assess the aquifer behavior, and an institutional framework within which the program would function. The county will study the feasibility of a coordinated groundwater-surface water management program and will seek to implement programs that are feasible and environmentally beneficial.
- **Take Steps to Understand and Improve Butte County Water Quality** – Understanding threats to water quality and improving water quality in Butte County are important aspects of resource stewardship. Known constituents affecting the county's water quality include nitrates, organic chemicals, sediment, and heavy metals. The county will support investigations to improve understanding of Butte County's surface water and groundwater quality.
- **Serve as an Advocate to Improve Understanding of and Conditions for Special-status Species in Creeks and Rivers** – Many creeks and rivers in Butte County provide valuable habitat for special-status species (i.e., state- and federal-listed species). The presence of these species, their requirements, and the threats to their health are not fully understood. A need exists for a better understanding of these species' location-specific requirements and for identification and implementation of actions to improve conditions for these species. The county will use Service and DFG documents to identify the type and location of special-status species and the habitat needs of these species. The county will initiate actions and participate in ongoing efforts to protect special-status species in creeks and rivers.
- **Coordinate Regional Watershed Management** – The county recognizes the efforts and progress made by the Butte County RCD and local watershed groups to meet distinct organizational and resource challenges. These local efforts could, in some cases, be enhanced through coordination and exchange of information and through sharing of staff and funding resources. Likewise, at the regional level, coordination of watershed management planning among Butte, Plumas, Yuba, and Lassen Counties could achieve mutual benefits. The county will support watershed planning and management through the RCD.
- **Implement an Environmental Monitoring Program** – Although the county has developed demand projections for municipal and agricultural water use, the county's environmental water needs are less well quantified. Better quantifying current and projected environmental water needs will allow the county to plan for its future water

needs and to protect the potential for beneficial, in-county use of its water resources. The county will implement an environmental monitoring program to increase knowledge regarding environmental resources and water demands.

- **Enhance a Multi-county Cooperative Outreach Effort** – Because management of the county's water resources affects – and is affected by – resource management in adjacent counties, opportunities might exist for the county to improve local, statewide, and federal understanding of regional water management issues and needs through a multi-county, coordinated outreach effort. The county will initiate a multi-county effort to cooperate with neighboring entities that share water resources.

Second-tier Policies

The Second Tier Polices identified in the Butte County IWRP are listed and summarized as follows:

- **Investigate the Potential for Water Storage in Former Mines** – Mining activities leave a pit that might have potential for use as a water storage reservoir. The county will investigate the potential for future water storage projects in former mines.
- **Expand Groundwater Level and Extraction Monitoring** – Increased monitoring of the groundwater aquifer will help the county protect the resource for the future. Butte County DW&RC and the Department, Northern District, have focused on characterizing the groundwater aquifer under Butte County, but additional information is needed in areas where significant volumes of groundwater are extracted each year. Increased ground-water level and extraction monitoring in these areas would provide information that could help the county and Department better understand the aquifer. The county would increase monitoring efforts to further this goal.
- **Commit to a Periodic and Coordinated Update of Water Management Plans, Ordinances, Resolutions, and Policies** – Water use and available supplies change regularly, especially with increasing development or changes in land use. Water management tools lose effectiveness if they are not updated as these changes take place. The county will commit to regularly updating water management plans, ordinances, resolutions, and policies, including management objectives.
- **Support Restoration of a More Natural Flow Regime on the Sacramento River** – The flow patterns and geomorphology of the Sacramento River vary from historical patterns of high flows during rainfall and snowmelt. Fish and riparian vegetation use flows to cue various behaviors, such as spawning and migration. Channel geomorphology also plays an important role in the river's suitability for riparian species. Butte County will provide institutional and political support to restore a more natural flow regime and geomorphology on the Sacramento River.

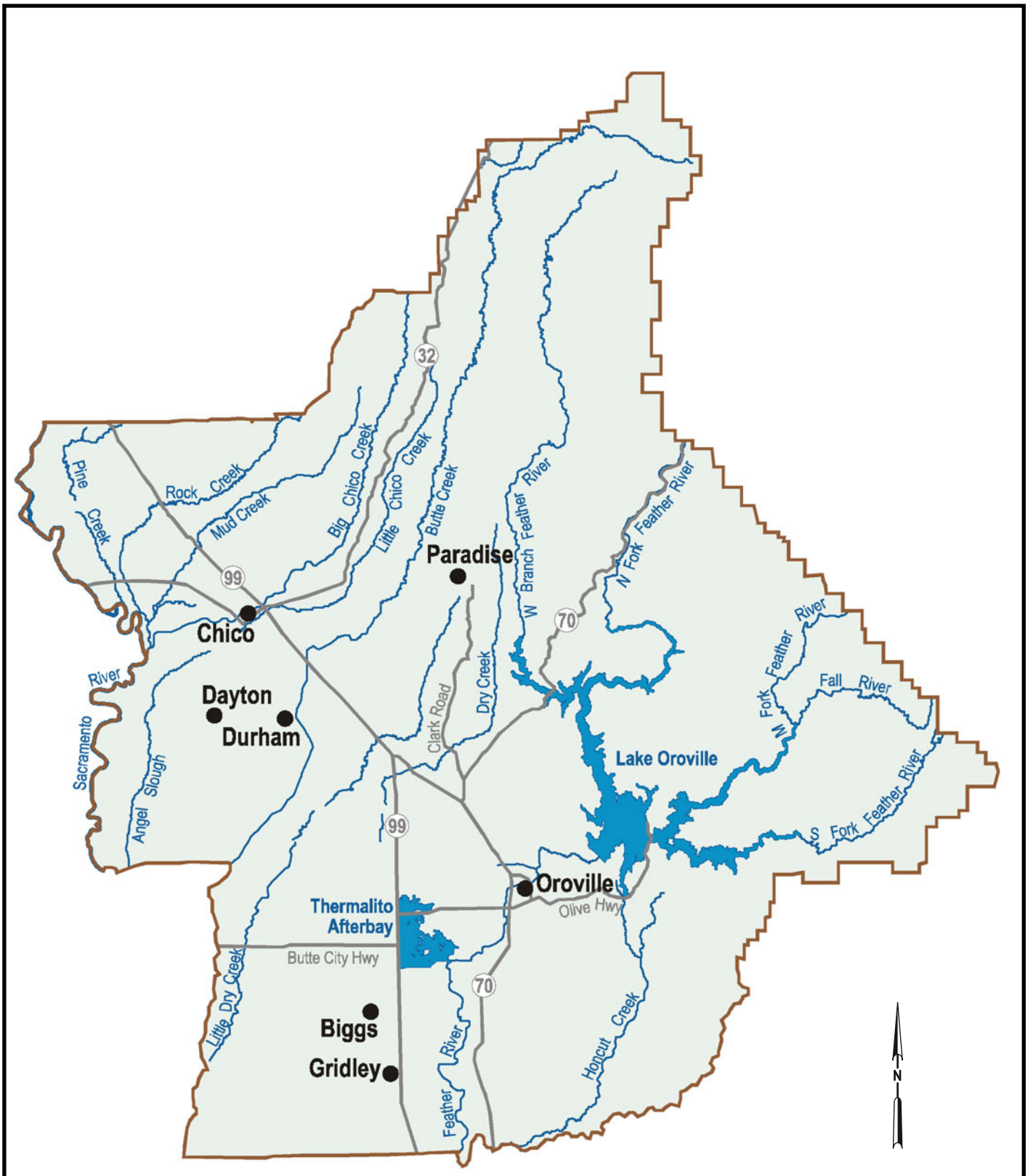

FIGURE 6.5-1
BUTTE COUNTY
HYDROLOGY MAP
SACRAMENTO VALLEY IRWMP

WB082006010RDD_46 (8/30/06)

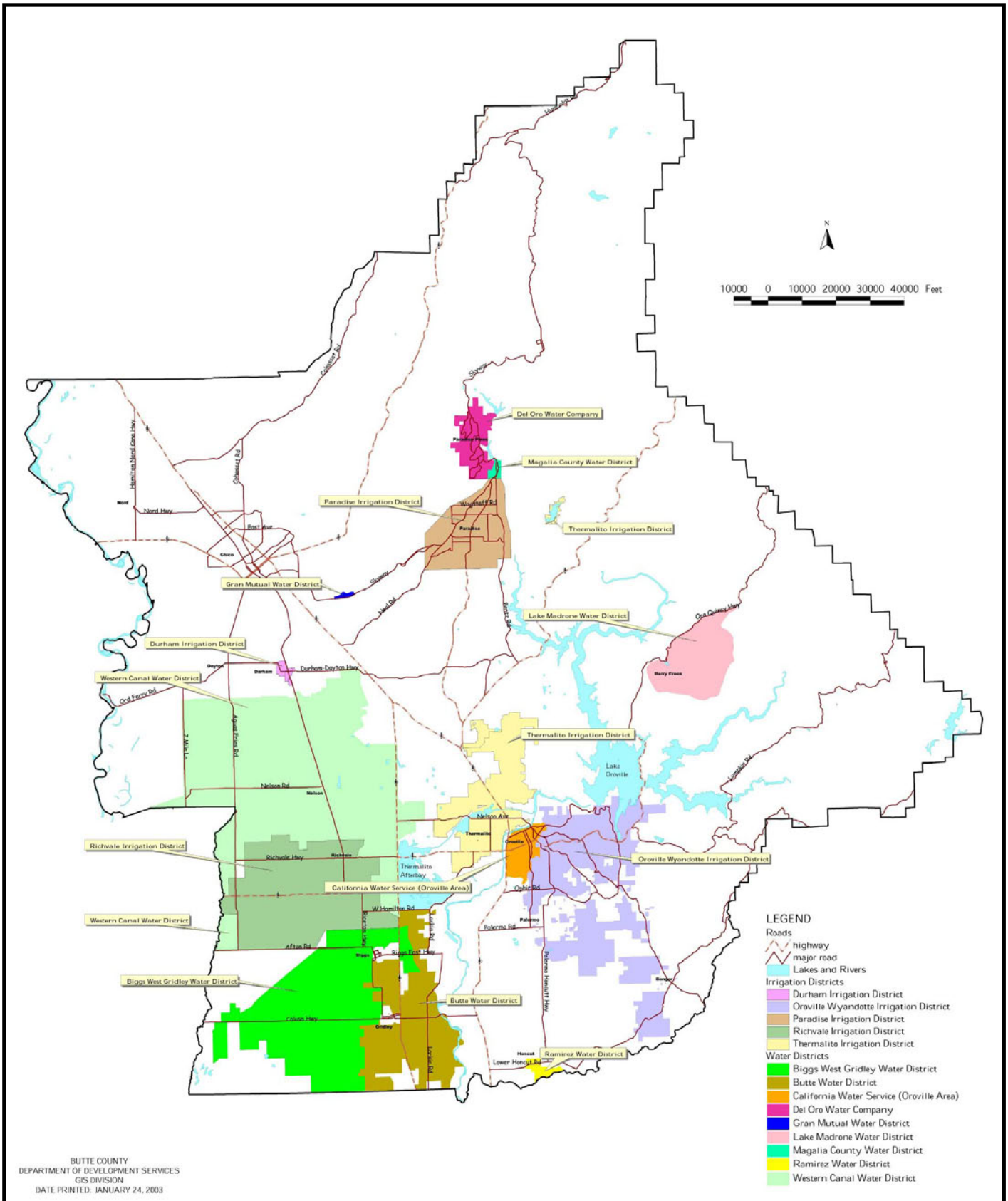

FIGURE 6.5-2
WATER DISTRICTS AND IRRIGATION DISTRICTS OF BUTTE COUNTY
SACRAMENTO VALLEY IRWMP

FIGURE 6.5-3
SUBAREAS FOR BUTTE COUNTY USED IN WATER PLANNING
SACRAMENTO VALLEY IRWMP

WB082006010RDD_48 (8/30/06)

	Option Number/Name	Screening Criteria: Technical	Legal	Political	Financial	Environmental	Benfits	Notes
Environmental	1. Increase fish flows in Upper Butte Creek							
	2. Increase fish flows in Lower Butte Creek							
	3. Restore a more natural flow regime on the Feather River							
	4. Develop a coordinated water quality database							
	5. Develop a coordinated and expanded water quality monitoring program							
	6. Implement an environmental monitoring program							
	7. Provide guidance in development of basin management objectives that support vegetation							
	• Increase flow on Big Chico Creek	X						*Big Chico Creek does not have upstream storage facilities or diversions that could be reoperated to increase flows*
Wtr Use Efficiency	8. Expand urban water efficiency measures							
	9. Expand agricultural water efficiency measures							
	10. Inform and educate the public about water							
	• Meter water use in Chico						X	*Redundant to expand urban water use efficiency measures option*
Ridge Supplies	11. Divert water from Miocene and Hendricks Canals to supply the Ridge							
	12. Build the Lime Saddle Pipeline to deliver water to the Ridge							
	13. Strengthen Magalia Dam to increase storage capacity							
	14. Raise Paradise dam to increase storage capacity							
Coordinated Management	15. Implement a coordinated management program							
	16. Identify and deepen shallow groundwater wells							
	17. Build a canal to deliver surface water to Cherokee and Esquon							
	18. Build the Oro-Chico conduit for in-lieu and direct recharge in Cherokee and Esquon							
	19. Construct groundwater recharge basins							
	20. Investigate a storage reservoir in Table Mountain's former basalt mine							
	21. Enhance natural recharge from local waterways through environmental restoration activities							
	22. Expand groundwater level and extraction monitoring							
	• Divert water from Miocene Canal to Dry Creek for groundwater recharge						X	*Redundant to Option 21 (enhance natural recharge)*
	• Construct tanks to store extracted groundwater				X		X	*Above-ground storage is expensive and not necessary; the groundwater aquifer can function as a storage facility*
	• Retire land in recharge areas			X				*County residents would likely not accept retiring land over recharge areas*
	• Adjudicate groundwater basin			X			X	*Adjudicating the groundwater basin would be unpopular and would not benefit County residents*
Policies	23. Create a groundwater replenishment district							
	24. Protect recharge area water quality through zoning							
	25. Commit to a periodic and coordinated update of water management plans, ordinances, resolutions and policies							
	26. Initiate a multi-county cooperative outreach effort							
	27. Increase support for the Butte County Resource Conservation District							
	28. Coordinate regional watershed management							
	29. Support restoration of a more natural flow regime on the Sacramento River							
	• Establish a no-growth policy for cities			X				*Cities would not be likely to accept no-growth policies*
	30. Improve management of unused SWP allocation							

X *Option is unacceptable in this category*

Source: Butte County Integrated Water Resources Plan, Table 4-1 (June 2004)

FIGURE 6.5-4
OPTION SCREENING
SACRAMENTO VALLEY IRWMP