6.3 Glenn County

The following summarizes the local setting, current and future land and water use, and primary recommendations in the Glenn County area. Glenn County officials were interviewed and consulted as a part of the development of this IRWMP and identified the following key and/or highest priority water- and land use related issues (Messina et al., 2006):

- 1. Increasing shift in agricultural water supply source from surface supply to groundwater
- 2. Development, use, reuse, and recharge of the Lower Tuscan Formation
- 3. Groundwater recharge
- 4. Increased residential development in Orland Unit Water User's Association (OUWUA) district area
- 5. Agricultural land conversion to smaller, rural residential parcels (1 to 10 acres)
- 6. Transfers in/out of the basin

6.3.1 Local Setting

Glenn County is located in the west-central portion of the Sacramento River Hydrologic Region. Primarily an agricultural area, Glenn County totals approximately 850,000 acres with 30 percent in agriculture and only 1 percent in urban uses (Wood Rodgers and Associates, 2003). A small portion of western Glenn County lies within the North Coast hydrologic region. In 2000, the population of Glenn County was approximately 26,500, with 50 percent in urban (small community) and 50 percent in rural/farm housing. By the year 2030, Glenn County is expected to see approximately 27 percent growth to about 34,300 (California Department of Finance, 2004).

The majority of irrigated agricultural land is in the eastern third of the county. Major crops include rice, deciduous orchard, and field crops. The largest urban areas are the cities of Willows and Orland, both of which are located along Interstate 5. Surface water provides the majority of supply, with groundwater being the primary source for users outside water districts as well as orchards. Conversely, 98 percent of Glenn County residents get their drinking water from a groundwater source, and the remaining 2 percent from a surface water source.

Numerous water agencies and districts oversee the provision and development of water supplies in Glenn County. These include the following agricultural water purveyors, urban water purveyors, agencies with flood management responsibilities, and agencies with land use management responsibilities:

- Agricultural Water Purveyors
 - Stony Creek Water District

- 4-E Water District
- Provident Irrigation District
- Princeton-Codora-Glenn Irrigation District
- Orland Unit Water User's Association
- Orland-Artois Water District
- Kanawah Water District
- Glide Water District
- Glenn-Colusa Irrigation District
- Hunter Creek Water District
- Urban Water Purveyors
 - California Water Service Company (CWSC)
 - City of Orland
 - Black Butte Water Company
 - Elk Creek Community Services District
 - Butte City Community Services District
 - Artois Community Services District
- Flood Management Agencies
 - U.S. Army Corps of Engineers
 - Glenn County
 - California Department of Water Resources
 - Colusa Basin Drainage District
- Land Use and Resource Agencies
 - Glenn County
 - Glenn County Resource Conservation District
 - Public Trust Agencies

6.3.2 Land Use Patterns

Urban and built-up land in Glenn County makes up only a small portion of overall land use. In 2002, urban and built-up lands accounted for less than 1 percent of total lands within the county (California Department of Conservation, 2002b; see Figure 6.3-1). Glenn County is presently experiencing a relative increase in housing development compared to historical trends.

County planners expect more new development and a number of new subdivisions in the future, including 1,500 residences in and around the City of Orland over the next 5 to 10 years, 60 residences in Hamilton City in the next 2 years, 1,100 residences and 40 acres of commercial development over 10 years in a new urban area between Orland and Artois, and 600 units adjacent to the City of Artois over 7 years (Four-County Document). The Glenn

County Planning Department has recently initiated an analysis of the number of parcels that might be available to develop under the current zoning structure (Walker, 2006). Future zoning regulations are always subject to change, but this analysis indicates that approximately 3,600 potential additional parcels could be created in the future within the present zoning restrictions. New Glenn County development will use groundwater as the primary drinking water source. The Glenn County General Plan is presently being updated and is expected to be completed in 2007.

Agricultural cropping trends are monitored by the county, and agriculture is by far the largest industry in the county. The 2005 gross production of agricultural commodities was valued at \$393.6 million. This represents an increase of 12 percent from the 2004 gross production value of \$347.9 million. For the first time since the 1930s, rice is currently not the number one leading commodity in Glenn County. Almonds have taken the lead with a production value of \$134.5 million. This is a 42 percent jump from 2004 because of a significant increase in value per ton and a slight increase in production. Walnuts and prunes also showed an increase, but olives and pistachios have declined (Black, 2006). Figure 6.3-2 shows the 10 leading agricultural commodities for the county in 2005.

Water from the Sacramento River is diverted into two major canals; the Glenn-Colusa Canal and the Tehama-Colusa Canal. Stony Creek is also an important source of surface water, supporting two reservoirs: Stony Gorge and Black Butte. The eastern portion of the county overlies the Sacramento Valley Groundwater Basin. Groundwater is the primary source of domestic water for the county and is also used for irrigation in some areas (QUAD Consultants, 1993)

Given virtually all land suitable for irrigated agriculture in Glenn County has already been developed, changes in agricultural water use are generally attributed to changes in crop mix and/or need for improved supply reliability. Agricultural water supply source (groundwater versus surface water) is one of the most significant considerations for water management in Glenn County (Messina, 2006). The current source of water for agricultural use is approximately 70 percent surface water and 30 percent groundwater. This ratio is anticipated to continue to move toward a greater proportionate use of groundwater, with county officials projecting an increase in groundwater use by agricultural users in the next 25 years. This increase is primarily because of the anticipated increase in orchards in the county and their typical associated reliance on groundwater, and anticipated in-/out-of-basin transfers by substitution.

Areas historically dependent on groundwater only experienced groundwater level declines during extended (multi-year) drought-year conditions, such as 1961 to 1963, 1976 to 1977, and 1987 to 1994. Following these extended drought periods, however, regional groundwater levels generally recovered. In fact, during and following the most recent drought period, GCID implemented conjunctive water management projects to meet local needs in 1992 and 1994 (up to 74,000 ac-ft of groundwater pumping in 1992, alone). Groundwater levels in

these pumping areas typically returned to pre-pumping conditions subsequent to winter recharge that replenished the groundwater basin.

Regional groundwater levels in the Stony Creek Project Area are currently relatively stable, and, from a regional perspective, the basin is presumed to be full (e.g., natural recharge is in balance or in excess of the basin's ability to accept it). Regardless of regional trends, however, some local areas where groundwater is relied on as a primary supply recover more slowly as a result of extended dry periods and increased pumping.

6.3.3 Water Use and Water Supply Patterns

Orland along the foothills, west of the Orland Artois Water District (OAWD) service area boundary (Department, 2003c). This area has seen large increases in almond acreages in recent years, resulting in a gradual increase in demand for groundwater.

The greatest amount of natural recharge occurs in the Stony Creek area of Glenn County. The area has been a focal point of recent groundwater investigations and studied for possible groundwater recharge programs. Water balances completed for the *Stony Creek Fan Conjunctive Water Management Program Feasibility Investigation* estimate the project area contributes a net recharge to the area of approximately 1.1 ac-ft per acre per year. The Stony Creek partners, being primary surface water users, are largely responsible for this positive net recharge.

Water sources were mapped for the *Glenn County Groundwater Management Plan*. Figure 6.3-3, from the Glenn County Groundwater Management Ordinance, represents 2001 surface water, groundwater, and mixed sources in the county (http://www.glenncountywater.org/BMO.HTM).

6.3.4 Existing and Ongoing Planning

In the past decade, the Glenn County water resource planners have taken several steps toward preparing for future land use changes and their associated water demands. The Glenn County Water Resources Coordinator of the Department of Agriculture acts in a support role for the Board of Supervisors to identify exceedances in BMO water levels, quality, or land subsidence. A Water Advisory Committee and Technical Advisory Committee meet to help guide the decisionmaking process for the county. Members of the Water Advisory Committee and Technical Advisory Committee are appointed by and serve the Glenn County Board of Supervisors. The Glenn County Department of Agriculture is involved in the management of numerous water-related policies and programs, including Ordinance 1115, groundwater level monitoring, AB303-funded projects, and underground storage tank regulation. The Glenn County Department of Agriculture provides implementation support for Ordinance 1115, which adopted the *Glenn County Groundwater Management Plan. The goal of the Glenn County Groundwater Management Plan is* "to ensure the continued availability of groundwater and that extraction of groundwater does not exceed safe yield

based on the established BMOs" (Messina, 2005). The Glenn County Department of Agriculture administers the Water Advisory Committee, which developed the Glenn County Groundwater Management Plan and oversees implementation.

The Four-County Document details the results of an effort by Butte, Tehama, Glenn, and Colusa Counties to collaborate on a regional scale in areas where they currently share common operational practices and physical linkage. County water resource managers are currently facilitating activities in areas such as water resource studies, groundwater management, data and information management, county regulation and ordinance oversight, public education, and stakeholder interaction.

Table 6.3-1 summarizes existing planning documents for Glenn County.

Planning Document	Description	Date Published
Ordinance 1115 BMO Groundwater Management Plan	A six-element BMO program with 17 subareas to monitor groundwater levels, subsidence, and solve disputes with groundwater management.	February 2000
Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document	A Butte, Tehama, Glenn, and Colusa County Document that provides an integrated approach to water quality management in the four-county region.	June 2005
Glenn County General Plan	General Plan (update in progress).	June 15, 1993
Impact of Urbanization in the Vicinity of Orland, California (LEGACI Grant)	A brief report concerning the Orland Unit and conversion in the area.	August 2005
Stony Creek Groundwater Recharge Study	A study along the Lower Stony Creek corridor to determine stream interaction and the effects it might have on recharge in aquifers underlying the county.	2003 and 2005
Lower Stony Creek Fish Monitoring Study	A Reclamation study to aid future water management and determine if entrainment occurs at the North Canal and CHO for the Tehama-Colusa Canal.	2004
Stony Creek Fan Conjunctive Water Management Program Feasibility Investigation	Includes description, supply, demand, and projections for the Stony Creek Fan Partners of GCID, OAWD, and OUWUA.	January 2006
Estimating the Potential for in Lieu Conjunctive Use Water Management in the Central Valley of California	A conjunctive use water management study by the Natural Heritage Institute involving Glenn County.	February 2002

TABLE 6.3-1

Existing and Relevant Glenn County Water Resource Planning Documents

6.3.5 Plan Area

The January 2006 Stony Creek Conjunctive Water Management Feasibility Investigation includes a plan (project) area that encompasses most of the Glenn County portion of this IRWMP (see Figure 1-1; Grant David Associates, 2006). The range of the project Area is defined by the boundaries of the three partners – GCID, OAWD, and OUWUA – and extends from southern Tehama County, across Glenn County, to central Colusa County. The plan includes existing conditions and projections to the year 2025 for each of the partners. Table 6.3-2 summarizes the land and water use information and projections in the document for each area.

6.3.6 Local Water Management Issues and Strategies

6.3.6.1 Groundwater Management

Groundwater management in Glenn County is conducted in accordance with the BMOs in the Glenn County Groundwater Management Plan. The county is highly engaged in protecting and monitoring groundwater resources. County officials are coordinating with surrounding counties in an effort to monitor any potential development of the Lower Tuscan Formation, and to ensure protection of recharge areas and groundwater quality.

6.3.6.2 Conjunctive Management and Groundwater Storage

The Stony Creek project area is defined by the boundaries of the three partners – GCID, OAWD, and OUWUA – and extends from southern Tehama County, across Glenn County, to central Colusa County. The Stony Creek Fan Conjunctive Water Management Program was initiated to evaluate the potential for conjunctive water management in the Stony Creek Fan area of Glenn County. To date, the project sponsors have developed a Phase I agreement to support this effort; an FI work plan was developed and is currently being implemented; development of an Integrated Groundwater and Surface Water Model was started; groundwater monitoring wells for a recharge test were installed; and a recharge test program was conducted. These activities are funded by a mixture of local funding and in-kind services, Conjunctive Water Management Branch service contracts (technical, modeling, and drilling), and by Department contracts with OAWD and GCID.

GCID is continuing to develop a conjunctive water management and monitoring program to supplement current surface supplies and reduce Sacramento River diversions. Water produced as part of this project is proposed to be dedicated to meeting water quality standards in the Bay-Delta and improve local, regional, and statewide water supply reliability depending on year type in accordance with SVWMA. Further detail on the SVWMA and the project is provided in Section 1, Introduction, and Section 4, Assessment of Water Management Strategies, of this IRWMP.

Plan Area	Land Use	Water Use	
GCID	Largest irrigation district in Sacramento Valley	Surface water delivered to 141,000 acres of land (and 20,000 acres of wildlife	
	Approximately 55,000 acres of irrigated land	habitat)	
	Rice is dominant crop (85%)	Primarily Sacramento River diversion, also 17,000 ac-ft of groundwater use	
	By 2025, net irrigated area expected to be about 57,500 acres	2025 change in groundwater pumping to meet SVWMP commitment	
Orland-Artois Water District	29,988 assessed acres (approximately 24,000 irrigated)	Closed pipeline system with virtually no spill	
	2025 net irrigated acreage will be	53,000 af/yr CVP surface supply	
	approximately 25,300 acres; major cropping difference expected to be expansion in permanent crops (almonds)	OAWD is generally water-short, each year OAWD seeks to augment its CVP contract supplies with short-term water transfers	
		OAWD's CVP contract would yield an average of 27,000 ac-ft annually, satisfying less than one-third of the long- term average applied water demand	
		Additional demand met by groundwater pumping from 35,000 to 95,000 ac-ft annually	
Orland Unit Water User's Association 1,099 shareholders within the OUWUA Average size farm is small; less than 25% of farms are greater than 20 acres 21,000 total acres (15,000 to 17,000 irrigated) Pasture is dominant (60 to 70%)	Primarily surface water from East Park and Stony Gorge (see Table 4 in Stony Creek Conjunctive Water Management Eessibility Investigation for details)		
	21,000 total acres (15,000 to 17,000 irrigated)	Average annual diversion of 95 372 af/vr	
	Pasture is dominant (60 to 70%)	Surface water typically sufficient to meet demand; small amount of groundwater use (approximately 3,000 ac-ft)	
Groundwater-only Areas	Approximately 75,000 acres of groundwater- only use area (49,000 acres irrigated average)	Only water supply is private pumping of groundwater	
	2025 projections indicate about 55,000 acres or irrigated land in this area		
	Cropping shift to permanent crops expected		

TABLE 6.3-2
Summary of Plan Areas

Note:

The Stony Creek Conjunctive Water Management Feasibility Investigation contains significantly more detailed descriptions of the supply, demand, cropping trends, and operational considerations for each of these planning areas as well as the assumptions used to make the 2025 projections.

6.3.6.3 Impact of Urbanization in the Vicinity of Orland

The primary source of water for the City of Orland is groundwater. As land is annexed into the city, it is removed from the OUWUA. Over time, land within the city increases, and the OUWUA service area declines. At the same time, the application of surface water for

irrigation will decline, and the extraction of groundwater grows to serve municipal needs (Wood Rodgers Consultants, 2005). Compounding the problem is the fact that over 80 percent of the parcels in the OUWAU are 20 acres or less. Smaller parcels such as this that fall outside the area of annexation are susceptible to development as "ranchettes" that will no longer be eligible for water from the OUWAU.

The *LEGACI Grant Report* found that the long-term impacts to groundwater levels from development in the vicinity of Orland are not significant. The full development of the city would, however, significantly interrupt OUWUA's water distribution system and the operations and maintenance. The OUWAU has done preliminary planning to install a new regional pipeline in lieu of canals passing through the north part of the city and terminating at the Tehama-Colusa Canal. This type of system modification would be beneficial for servicing the eastern portion of the district service area and minimizing the liability risk of having an open channel in an urbanized area.

6.3.6.4 Flood Management in the Colusa Basin Drainage District

State Legislature formed the CBDD in 1987, to address flooding, drainage, and subsidence problems in the Colusa Basin. The Colusa Basin extends into Colusa, Glenn, and Yolo Counties and is primarily used for agricultural production. CBDD commissioned the *Integrated Watershed Management Plan* to reduce flood damage in the City of Willows and surrounding agricultural lands and improve the environment in Willow and Wilson Creek Subbasins in Glenn County (CH2M HILL, 2004). The first flood control detention basin project, located on South Fork Willow Creek, is presently in the design phase.

6.3.7 Next Steps/Recommendations

Next steps/recommendations are as follows:

- 1. Continue the cooperative effort with Tehama, Colusa, and Butte Counties to ensure reliable, high-quality drinking water, and actively participate in ongoing efforts that support prudent management of the underlying aquifer systems. Continue to work with the Coalition to promote management of agricultural runoff and discharge.
- 2. Continue to support proposed projects in Glenn County as detailed in Appendix B to this IRWMP.
- 3. Continue formulating the Water Needs Analysis that will be completed by December 2006. Depending on the findings, further recommendations will be made in the future.
- 4. Support growth within the county, keeping in mind that agricultural water needs to be available to maintain the county's economic base.



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