

## **Sacramento Valley Groundwater: An Approach to Better Understand and Manage the Lower Tuscan Groundwater Resources for Northern California**

“The Sacramento Valley is recognized as one of the foremost groundwater basins in the State, and wells developed in the sediments of the valley provide excellent supply to irrigation, municipal, and domestic uses.” (Department of Water Resources (DWR) Bulletin 118-2003, p. 159.) DWR estimates that “groundwater provides about 31 percent of the water supply for urban and agricultural uses in the region” and the “groundwater quality is generally excellent.”

As water demands and the various pressures on Northern California water increase, water users will continue to seek groundwater to meet local needs, augment supplies, and increase system flexibility to provide water for a range of uses, including urban, agricultural and environmental demands in the Sacramento Valley. Recent attention has been focused on the Lower Tuscan Formation (Lower Tuscan), an aquifer that underlies a significant part of the Sacramento Valley (see attached map). There are currently more than 335 wells extracting water from the Lower Tuscan. Most of these wells are located on the east side of the valley in Butte County, including domestic wells in Durham-Dayton and Rancho Esquon, wells for the City of Chico and various wells along Highway 99 north of Highway 162, locally referred to as the Cherokee Strip. Several agricultural wells are also located in the Lower Tuscan on the west side of the valley, including Glenn-Colusa Irrigation District, El Camino Irrigation District, Maxwell Irrigation District and Orland-Artois Water District.

This “Approach to Better Understand and Manage the Lower Tuscan Groundwater Resources for Northern California” (Approach) is intended to better inform policy makers throughout Northern California about the region’s groundwater resources, including the Lower Tuscan. The Approach will also describe and coordinate the various efforts that are either underway or being developed to better understand and manage the Lower Tuscan formation for the benefit of Northern California. Each of the following processes and activities provides a unique perspective and will individually add to the knowledge of the Lower Tuscan and groundwater in the Sacramento Valley. Together, these various actions will help foster a mutual understanding of the Lower Tuscan and significantly enhance the ability of all of the water managers overlying the Lower Tuscan to cooperatively manage the shared resources in a manner that is economically and environmentally sustainable.

### **PLANNING AND MANAGEMENT ELEMENTS**

#### **Hydrologic Investigations**

The Department of Water Resources’ (DWR) Department of Planning and Local Assistance has conducted extensive research and monitoring of the Lower Tuscan led by Toccoy Dudley, Chief of the Groundwater Section of DWR’s Northern District. These studies have formed a better understanding of the size, location and characteristics of this groundwater aquifer. Continuation of this monitoring and study is critical to refine data and to better understand and manage the Lower Tuscan. Sacramento Valley Regional Plan participants support and urge DWR to pursue:

- 1) The continuing study and investigation of the Lower Tuscan and ongoing funding for this

purpose; 2) A Bulletin 118 supplement for the Lower Tuscan with broad public input and peer review; and 3) Strategically-placed production and monitoring wells to conduct aquifer performance tests in the Lower Tuscan.

### **High Quality Drinking Water for Northern California**

A number of counties in the Sacramento Valley have been actively monitoring and investigating groundwater, including the Lower Tuscan. The installation of multi-completion wells by Butte, Glenn and Tehama Counties with AB 303 grant funding has particularly helped to increase knowledge regarding the Lower Tuscan and other Sacramento Valley aquifers. Sacramento Valley counties and cities will continue to contribute to the understanding of the Lower Tuscan by using AB 303 and other funding sources to expand the groundwater monitoring grid in the Sacramento Valley.

Northern California urban water purveyors and many domestic water users pump groundwater from the Lower Tuscan. The human consumption of water from the Lower Tuscan requires that a high level of water quality monitoring be conducted.

The Legislature has found that “the greater portion of the water used in the state is obtained from underground sources and those waters are subject to impairment in quality and purity, causing detriment to the health, safety and welfare of the people of the state.” As a result, “the people of the state have a primary interest in the location, construction, maintenance, abandonment, and destruction of water wells, cathodic protection wells, groundwater monitoring wells, and geothermal heat exchange wells, which activities directly affect the quality and purity of underground waters.” (Water Code section 13700.) The Legislature has granted counties and cities important responsibilities to administer and enforce local groundwater well construction standards as part of the statewide effort to protect groundwater quality. (Water Code section 13803.)

In addition, as part of the important function to protect groundwater quality, Butte, Colusa, Glenn and Tehama Counties developed the Northern Sacramento Valley (Four County) Drinking Water Quality Strategy (Strategy) to assure high quality drinking water supplies are available for their citizens. The Strategy will also expand the overall understanding of the Lower Tuscan, particularly as a source of drinking water quality.

### **Environmental Enhancement**

The rivers and streams that are tributary to the Sacramento River provide important riparian habitat that is critical for many aquatic and terrestrial species, including the spring-run Chinook salmon, winter-run Chinook salmon and Central Valley steelhead. This region is the only known area for the winter-run Chinook. The valley floor region adjoining the river provides some of the most important wintering areas along the Pacific Flyway for many varieties of waterfowl. The region also houses several wetland and waterfowl preserves that provide nesting and migration areas for threatened avian species including the bald eagle and Swainson’s hawk and numerous species of neotropical birds. All of these valuable resources are vital components of the ecosystem and contribute to the ecological health of the entire state.

As the region moves toward integrated water resources management, there will be opportunities for significant environmental enhancements in parallel with other benefits to water users in the

area. Creative water management can make additional surface water available for environmental enhancements such as wetland, riparian habitat and environmental flow restoration in the Sacramento River and its tributaries. This water could be managed in a sequence of uses to improve environmental flows in the rivers and then be diverted and used consumptively by water users or to improve water quality. Overall, a key environmental objective will be to restore more natural flow dynamics in cooperation with local landowners and water users to achieve net environmental benefits as well as economic benefits from improved water management practices.

### **Recharge Investigations**

Initial technical work conducted by DWR shows that a major recharge area for the Lower Tuscan is located in the foothill regions within Butte and Tehama Counties. To better understand the recharge areas and to assist in preserving these areas of source-water protection for recharge, Butte and Tehama Counties have jointly proposed a Groundwater Recharge Monitoring Project to identify, and continuously evaluate, high quality recharge zones for the Lower Tuscan in their respective counties. The project will include 40 test wells, 20 monitoring wells, 250 infiltration tests and stream flow monitoring where necessary. This project will provide valuable information for the Butte County Groundwater Model and will contribute to a better understanding of the recharge areas for the Lower Tuscan. This information will help inform and guide the Boards of Supervisors and County Planning Departments regarding the appropriate land use decisions for these areas.

### **Water Supply Reliability**

Several proposals are underway to ensure water supply reliability in Northern California and to explore the conjunctive management of the Lower Tuscan as part of broader water management objectives within the Sacramento Valley.

In Butte County, the Biggs-West Gridley Water District and Richvale Irrigation District, as part of the Butte County Integrated Water Resources Plan, have developed a water supply reliability and water quality project proposal. This project would evaluate the potential use of groundwater from the Lower Tuscan aquifer as additional water supply and for uses such as rice germination. In addition, the proposal includes monitoring for Basin Management Objectives (BMOs) and evaluating the potential for reduced costs from solar powered pumping installations.

The Glenn-Colusa Irrigation District, Orland Unit Water Users Association, Orland-Artois Water District and the Natural Heritage Institute have proposed to develop an integrated regional water management planning process that will investigate regional integration of the Lower Tuscan into the Sacramento Valley surface water system through conjunctive water management. The proposal would explore conjunctive management to improve local water supply reliability, improve Central Valley system-wide water supply reliability, and enhance river ecosystems in the Sacramento Valley. If conjunctively managed, water from the Lower Tuscan could increase the flexibility of the water system, help to satisfy local unmet needs, and help make surface water available for multiple uses downstream. For example, Orland-Artois Water District plans to use Lower Tuscan wells to augment their existing Central Valley Project (CVP) water supply, which on average meets only 65% of its needs.

## **A NESTED APPROACH TO INTEGRATED REGIONAL WATER MANAGEMENT PLANNING**

With these numerous independent processes and activities being carried out or planned by various agencies in the region, it is important to develop a framework for coordination and planning purposes. The “Sacramento Valley Integrated Regional Water Management Plan” (Regional Plan) describes a “Nested Approach to Integrated Regional Water Management Planning in the Sacramento Valley” that will help advance these various efforts for the Lower Tuscan. For diverse and vast areas like the Sacramento Valley, planning efforts are necessary on both the regional and sub-regional level. These sub-regional efforts are nested within the regional Sacramento Valley Regional Plan, providing focused, locally-driven and more detailed plans that complement and enhance the region-wide planning effort. The efforts to explore and monitor the Lower Tuscan on a regional basis are critical to better understand and responsibly manage these important groundwater resources. These programs, when coordinated as part of the larger Sacramento Valley Regional Plan, will establish a comprehensive program for continued use and monitoring of the Lower Tuscan and other groundwater resources in the region.

Most importantly, this nested approach is intended to avoid conflicts among Sacramento Valley groundwater pumpers, ensure local guidance in the further development of local groundwater management, and coordinate local activities to address regional and statewide issues, thereby increasing the flexibility and benefits provided through sound management of the Lower Tuscan.

### **LOWER TUSCAN COORDINATING GROUP**

An informal coordinating group, consisting of county governments, DWR, groundwater pumpers, water districts, and other parties involved in the investigation and monitoring of the Lower Tuscan, will meet quarterly to provide updates on recent progress of the individual program activities. The coordinating group will support these various activities and the funding necessary to carry them out. Efforts will continue to be made to coordinate and formalize these efforts as part of the Regional Plan for the Sacramento Valley.

### **OUTREACH**

As these programs are further developed, the coordinating group and project proponents will continue to provide information to all interested persons and will host and participate in numerous forums regarding the Lower Tuscan. This will include the development of more detailed maps of the Lower Tuscan formation and the dissemination of data from the studies and production testing.

As an example, outreach regarding the Lower Tuscan over the past four years has included:

- ❑ Water district newsletters – (i.e. Orland-Artois newsletter on Stony Creek Fan investigations and other activities and periodic articles in the NCWA Week in Review)
- ❑ Groundwater, Water Wells, and Pumping Plants Informational Series. A six issue series prepared by the University of California Cooperative Extension and California Department of Water Resources, Northern District and distributed to about 2000 water users in Tehama, Glenn, Butte, and Colusa counties. Relevant topics included: 1) Understanding the Groundwater Aquifer Systems in the Northern Sacramento Valley; 2)

Incentives for Groundwater Management; 3) Possible Approaches to Groundwater Management; and 4) Groundwater Level Monitoring: What is it? How is it done? Why Do it?

- Groundwater Management Workshops: 1) Red Bluff, CA – November 2002. Sponsored by University of California Cooperative Extension; 2) Orland, CA – November 2003. Co-sponsored by the Glenn County Water Advisory Committee, University of California Cooperative Extension, and California Department of Water Resources, Northern District; and 3) Groundwater Management Workshop: Maxwell, CA – March 2005. Co-sponsored by UC Cooperative Extension and California Department of Water Resources, Northern District.

Additional outreach will occur over the next several years, including:

- The Lower Tuscan Aquifer – What’s Down There? A Panel Discussion About Groundwater. September 29, 2005. Chico, CA. Sponsored by the Northern Sacramento Valley Water Forum.
- Groundwater Informational Series Continuation. Topics: 1) Seeking an Understanding the Groundwater Aquifer Systems in the Northern Sacramento Valley: An Update; 2) What Are Conjunctive Water Use and Conjunctive Water Management; 3) Land Subsidence: What is it? How does Groundwater Management Prevent It? 4) Proof of Sufficient Groundwater for Domestic Use; and 5) Groundwater Quality in the Northern Sacramento Valley. Informational Series Co-sponsored by Northern Sacramento Valley (Four County) Groundwater Water Quality Committee, University of California Cooperative Extension, and California Department of Water Resources, Northern District.