

ATTACHMENT 4: PROJECT DESCRIPTION

The County of Glenn, Department of Agriculture, on behalf of the WAC proposes to model the groundwater activities in western Glenn County (County) and to install one multi-completion monitoring well in an area identified as an information gap in the California Statewide Groundwater Elevation Monitoring (CASGEM) network and the monitoring network for the County's GWMP. A dedicated monitoring network provides valuable data to support management decisions as the County and water purveyors within the basin work to meet current and future water demands. This supports the maintenance of safe yield as defined in the GWMP and monitoring for BMO compliance. The modeling component will be the basis for predicting groundwater depletion/changes over time and lay the foundation for potential recharge facilities. In addition, the modeling will help examine the assumptions made during the development of the current BMOs, enhance the background information for decisions relating to GWMP and BMOs, and help identify sensitive areas with regard to monitoring for BMO compliance.

Dedicated Monitoring Well Installation

The proposed project further incorporates the ongoing activities of the County, WAC member organizations, and the ongoing efforts of the Colusa Basin Drainage District (CBDD) to further implement their Integrated Water Management Plan of 2002 (IWMP). The project is consistent with the goals of the Glenn County GWMP and the objectives identified within the plan. Since the adoption of the County's GWMP and the formation of BMOs for water level, water quality, and land subsidence, the WAC and their cooperative entities have installed 28 dedicated monitoring well since 2001, which monitor 86 aquifer zones throughout the County. The initial focus of water levels for BMO compliance were formulated by utilizing wells monitored by DWR with at least a 20 year history in an effort to show a range of response to water levels over wet and dry periods. More recently, efforts have been undertaken to more accurately correlate land and water use decisions on the groundwater resource. Since the establishment of BMOs, land and water use changes have come to the forefront and present challenges that were not anticipated at the time. These changes coupled with curtailments of Central Valley Project water supplies in the western portion of the County have begun to show a downward trend in groundwater levels which may have further implications in the future.

A further intent of the WAC is to move forward in this process by collecting water level data from distinct aquifer zones, isolated during construction of the dedicated well to avoid measuring groundwater levels from wells screened over multiple zones. In this process, a much more accurate method of groundwater level response to pumping can be obtained. The placement of at least one additional well in an area identified as an "information gap" in our monitoring network for the County's GWMP will provide much needed information in the County's continuing role in groundwater management.

In addition to filling in a gap in high quality monitoring for the County's GWMP, the installation of a

multi-completion monitoring will also help to meet the requirements of SBx7 6, CASGEM (See **Attachment 4.1**) and assist in responding to increased pressure on the utilization of groundwater resources.

An important component of high quality groundwater level monitoring is the ability to continuously monitor water levels during the year and during anticipated aquifer performance testing in areas that may be susceptible to planned groundwater management activities. Therefore, additional data loggers and a data logger reader will be necessary for continued monitoring of the new, and other dedicated wells, in the event the County becomes the sole monitoring entity.

The preliminary design of a multi-completion monitoring well is based upon work previously performed by the County in cooperation with DWR Northern Region Office.

This proposed multi-completion monitoring well will also provide information and data of scientific interest regarding the hydrogeologic systems in Glenn County and the northern Sacramento Valley Region that will assist in the planning and/or execution of current and future coordinated groundwater management programs. Cutting samples and geophysical logs generated from the drilling and construction of the well will provide characterization of the stratigraphy of the freshwater bearing strata underlying the County. The information derived from this work will also help DWR in defining the vertical and lateral extent of the hydrogeology of the Sacramento Valley. These data will be incorporated with ongoing analysis of the Northern Sacramento Valley region being performed by DWR Northern Region Office, Groundwater & Geologic Investigations Section. Where possible, monitoring well test boreholes will go as deep as funding allows assisting DWR in these efforts.

Recently, the Lower Tuscan Formation has been regarded as a potentially large source of new water. If this formation is encountered, all the relevant data will be forwarded to the most knowledgeable sources and incorporate their findings with the interaction of the overlying Tehama Formation. The additional dedicated monitoring well and the lithologic information it produces will clearly be of value during any aquifer performance test proposed in the future.

The multi-completion monitoring well to be constructed under this project would be incorporated into the County's monitoring network for the GWMP (See **Figure 4.1**, Dedicated Monitoring Network) and for CASGEM (See **Figure 4.2**, CASGEM network). In the past, new dedicated monitoring wells have typically replaced other monitoring wells (domestic, irrigation, unused, etc.) and have provided higher-quality data. As such, construction of the new monitoring well is somewhat offset by abandonment of older monitoring well. In spite of this offset, construction of the proposed monitoring well would result in an increase in monitoring locations within the County. This could require additional effort and funds to monitor water levels on an ongoing basis. The project also includes installation of data loggers in the new monitoring well and the purchase of a data logger reader to use with the new monitoring well and existing wells. The data produced by using data loggers will produce additional and higher quality data than the hand measurements that have previously been conducted on average

three times per year. A hand measurement will also be taken periodically to verify the data loggers are functioning properly. The procedures used for hand measurements are outlined in the CASGEM report (See **Attachment 4.1**). The existing funding for groundwater level monitoring would be able to accommodate the new monitoring well.

A high quality monitoring network is critical to the GWMP and implementing a successful CASGEM network. Constructing a new multi-completion monitoring well will fill a data gap identified in the GWMP and CASGEM networks (See **Figure 4.3**, Glenn County Monitoring Wells) and will improve the capability to monitor compliance with the BMOs and thus improve groundwater management.

Modeling

In 2003 the WAC adopted the Preliminary Plan for Groundwater and Coordinated Water Management (Preliminary Plan) (See **Attachment 4.2**) with the assumption that a better understanding of the Glenn County groundwater resources would be well served by looking into the model available at the time. The Board of Supervisors recognized the value of the Preliminary Plan and adopted its principals in 2006 as a foundational framework for an organization for water management activities in the future.

Item D from the Preliminary Plan suggests using the most currently available predictive modeling tool to perform “what if” scenarios that can greatly improve the overall understanding of the groundwater basin and general response to hypothetical changes in land use and water management. Below are objectives of the modeling project:

- Re-examine the assumptions made during the development of the BMOs.
- Enhance the background information of an existing decision or a revised decision related to the GWMP or the BMOs.
- Identify sensitive areas where additional monitoring may be required to verify compliance with the BMOs.
- Develop general response characteristics and/or sensitivity ranges among different physical and operational elements.
- Enhance the understanding of the groundwater system behaviors, characteristics, and constraints.

Over the past few years there has been a steady decline in the north-west to west-central portion of the county creating “stage alerts” described within the BMO process of the GWMP. With the declines over time, it can only be assumed that the agricultural production demand will not relax to provide for adequate recharge where the depletion is taking place. It is anticipated that a greater portion of the affected area will be in a higher “stage alert” in the coming years. (See **Figure 4.4** Change in

Groundwater Elevation Map Summer 2004 to Spring 2011, shallow well depth from DWR, Northern Region Office and **Figure 4.5** Change in Groundwater Elevation Map Summer 2004 to Summer 2011, intermediate well depth from DWR, Northern Region Office).

When low groundwater levels reach the highest “stage alert” some investigation and/or action must be taken according to the GWMP. We are currently sensing that the original BMOs may be too restrictive and prior to taking any action more investigative work must be conducted, and modeling seems to be the most practical choice.

The project will initiate the use of a predictive model such as SACFEM to investigate the drawdown over time in the western portion the County (**See Figure 4.6**) and at the same time research the potential for recharge and groundwater depletion or changes in the future. This model is capable of predicting groundwater movement based on surface water application, groundwater extraction and groundwater/surface water interaction. The model will forecast what the continued use of groundwater may look like in 5, 10, 20 years from now based on current and possible projected land and water use.

It is anticipated that there will be no continuing costs associated with the modeling portion of this project beyond that grant period.

Ongoing Use

Glenn County has recognized the value of water management projects and is in the process of developing additional funding mechanisms for ongoing monitoring. Examples of this include; cost share proposals to WAC member water and irrigation districts, federal appropriations for ongoing coordinated groundwater projects of interest to Bureau of Reclamation, and additional funding requests to the Northern Sacramento Valley Integrated Regional Water Management Plan’s project submittal database. During discussion of water related items at the Board of Supervisors meetings, possible assessments to water users throughout the County may be recommended and the potential for fees to be placed on water transfers that involve groundwater substitution.

It is anticipated that the costs for the monitoring associated with the multi-completion monitoring well can be absorbed in the existing funding allocated for monitoring associated with the GWMP and CASGEM. There are no expected costs associated with the modeling portion of this project beyond the grant period.

CASGEM Monitoring Plan

To meet the requirements of SBX7 6

**Submitted by the Glenn County Department of Agriculture
on behalf of the Glenn County Water Advisory Committee**

August 2011

Glenn County CASGEM Monitoring Plan

Glenn County has applied to be a monitoring and reporting entity for the geographic area within the boundaries of the county where alluvial groundwater basins identified in Bulletin 118 are located. In 2000, Glenn County adopted a Groundwater Management Plan in where 17 groundwater management sub-areas were identified. For CASGEM, not all sub-basins qualify for monitoring as described in the legislation. Monitoring and reporting will be accomplished through cooperative agreements with all groundwater subareas throughout the County. The cooperating agencies that conduct monitoring will submit the data to Glenn County. The County will submit the monitoring data to Department of Water Resources (DWR). Information on the monitoring plan will be available to the public at www.glenncountywater.org

Monitoring Plan Overview

Groundwater monitoring in Glenn County is currently performed by the DWR. They collect data from 156 groundwater data points, 82 of those are discreet zones from the network of 26 dedicated monitoring wells. For the purposes of CASGEM, monitoring will be from selected zones in the dedicated network and irrigation wells where needed to fill in a monitoring gap. The wells (zones) selected should adequately characterize the basin.

The valley portion of the County is mostly in the Colusa Basin (5-21.52), a small portion in the north is in the Corning Basin (5-21.51) and a small portion in the east is in the West Butte Basin (5-21.58). These areas will be adequately represented in the monitoring network. The western portion of the Colusa Basin has limited water resources development and is considered low priority at this time. There are very few wells in the area and a small population base. No monitoring will occur in this area at this time, but will be reassessed on an as needed basis.

The groundwater sub-basins outside of the valley consist of shallow wells constructed in shale and rock formations and are not considered alluvial, although the basins are listed in Bulletin 118, and will not be included in the monitoring network. There are limited water resources development with minimal yield per well (typically averaging less than 5 gallons per minute), and are considered low priority. These areas include Chrome Town Area (5-61), Elk Creek Area (5-62), Stony Gorge Reservoir (5-88), Squaw Flat (5-89), Stonyford Town Area (5-63), and Funks Creek (5-90).

Cooperating entities with the County consist of:

- Glenn Colusa Irrigation District
- Orland Unit Water Users Association
- Orland/Artois Water District
- Kanawha Water District
- Glide Water District
- Provident Irrigation District

- Princeton-Codora-Glenn Irrigation District
- Western Canal Water District
- Reclamation District 2106
- Reclamation District 1004
- Willow Creek Mutual Water Company

Groundwater elevations in Glenn County fluctuate greatly from north to south and east to west. With the introduction of the Tehama Colusa Canal (TC), land and water use has changed dramatically. The TC service areas, north central and the west side of the County, has shifted from flood irrigation on row crops from surface supplies to micro sprinkler irrigation from groundwater on tree crops. The south and eastern portions of the County continue to be flood irrigated with surface water for rice production, the north eastern and central portion of the County is tree and row crops solely dependent on groundwater. In general, there is approximately 1,000,000 acre feet of water with a 70-30% split of surface water to groundwater applied to 265,000 acres for agricultural purposes in the County.

In 2001, the County and irrigation districts started to install a series of dedicated monitoring wells in areas identified as economically sensitive to groundwater use. Since that time other dedicated monitoring wells have been installed to provide information for aquifer interaction and potential conjunctive use programs.

The dedicated monitoring zones range from shallow (under 100 feet) to deep (over 1000 feet) and well zones selected for CASGEM will take into consideration land and water use in the general area as well as agricultural, municipal, industrial, and domestic demand. In reviewing the data it appears that it makes the most sense to select a dedicated monitoring well from an area of the County and monitor and report all zones available. Having a dedicated monitoring network with a high level of sophistication, should not place an undo burden on the County to over monitor aquifer zones that do not provide for the overall protection of the majority of water users.

The major geologic/aquifer systems of Glenn County consist of the Tehama Formation, the Upper and Lower Tuscan Formations, and the Stony Creek alluvium. All of the dedicated wells have discreet monitoring zones within one or many of the formations. Previous work has indicated a substantial influence of up gradient surface application of water for irrigation and stream flow from Stony Creek provides down gradient groundwater users with an adequate supply for the irrigation season.

Maps

Figure 1 shows the selected dedicated monitoring wells discussed above that will adequately characterize the County's groundwater resources and provides the most comprehensive coverage available.

Schedule

The major groundwater use in the County is for agricultural purposes and follows traditional seasonal trends of spring highs to fall lows over a long period of time. Therefore measurements will be taken from all selected wells in the end of March and in mid-October to coincide with typical pre and post irrigation seasons.

Field Methods

Field methods for the collection and documentation of groundwater elevation data in the County will be standardized and meet all CASGEM basic requirements:

- Reference Point has been established by DWR staff previously
- Measurements will be recorded in a field data book and transferred to an electronic spread sheet and submitted to DWR with the following information:
 1. State Well Number
 2. Date of Measurement
 3. Reference Point Elevation
 4. Land Surface Elevation
 5. Reference Point to Water Surface
 6. Method of Measurement
 7. No measurement and Questionable Measurement Codes (same as DWR Water Data Library)
 8. Agency ID
 9. Comments

Table 1 is a template of the field data recording form.

- A visual assessment of possible groundwater pumping in surrounding areas will confirm static groundwater conditions
- An electronic well sounder will be the measurement instrument, typically lowered two times at the water surface and compared for consistency

Well Information

Table 2 contains all of the data listed below:

- Map Location Number
- State Well Number
- Use
- Well Completion Type
- Top Perforation
- Bottom Perforation
- Total Depth
- Ground Surface Elevation

- Method of Determining Elevation
- Accuracy of Elevation Method
- Reference Point Elevation
- Reference Point Description (Reference Point is top of casing)
- Well coordinates (decimal lat/long, NAD83)
- Method of determining coordinates
- Accuracy of coordinate method
- Entity Responsible for Monitoring
- Groundwater basin
- Well Completion Report number
- Geologic Formation if known
- Written Description of Well Location
- Additional Comments (if needed)

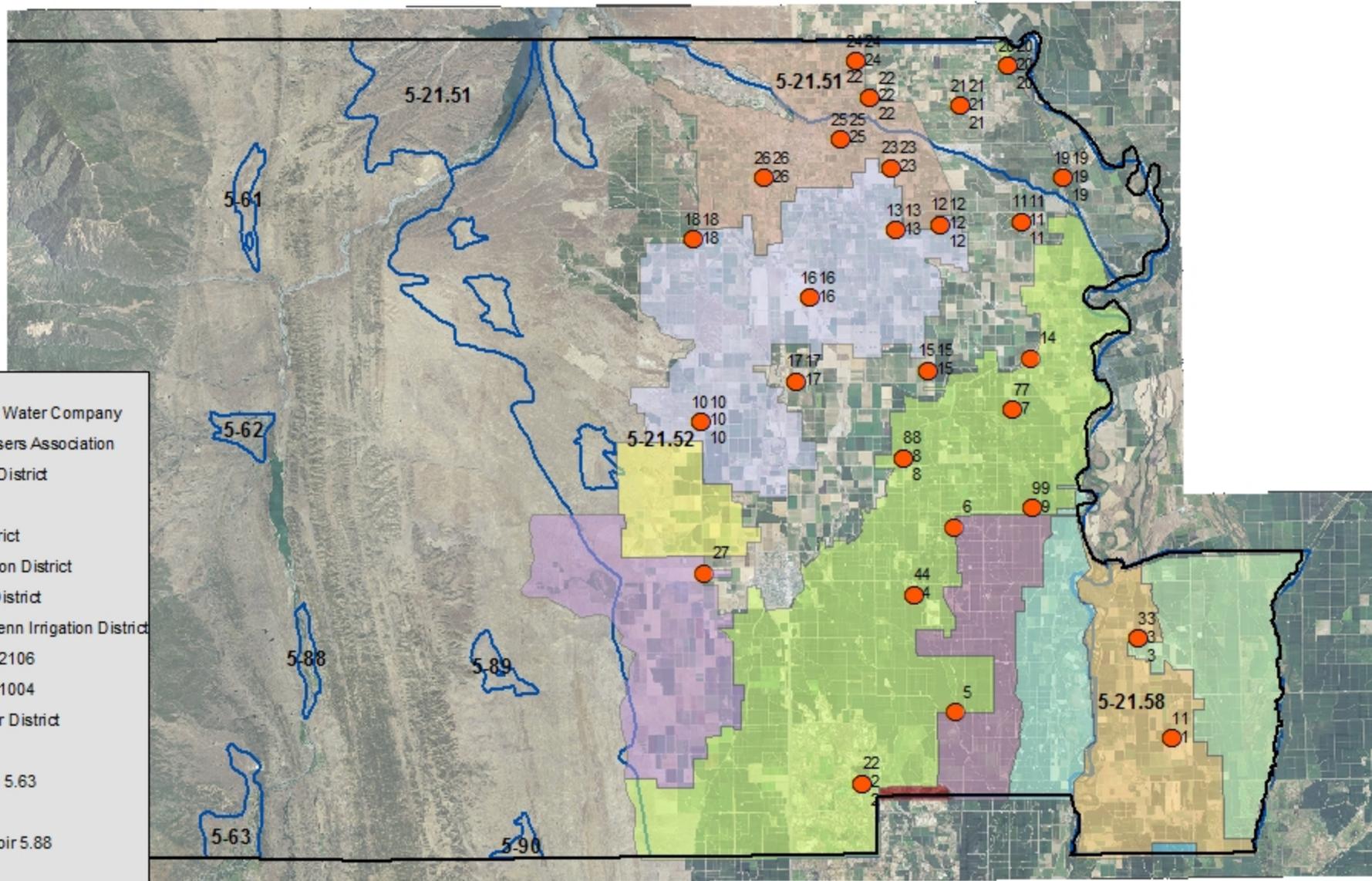
Written Descriptions of Well Locations Included in Table 2 are as follows:
(numbers correspond to map locations)

- 1 – Approximately 2 miles south of Highway 162 and ½ mile east of Road Z
- 2 - Approximately ½ mile north of Road 68 and east of Sac Refuge Boundary
- 3 - Approximately 2 miles north of Highway 162 and 200 feet east of Road Y
- 4 - Approximately 1 mile south of Highway 162 and ¼ mile east of Road R
- 5 - Approximately ¼ mile south of Road 61 at Road SS
- 6 - Approximately 1 mile south of Road 44 at Road TT
- 7 - Approximately at the SE intersection of Road 35 and W
- 8 - Approximately ¼ mile north of Highway 162 and west of Road Pat GCID Canal
- 9 - Approximately 200 feet north of Road 44 and ¼ mile east of Road WW
- 10 - Approximately ½ mile south of Road 35 and 50 feet east of Road D
- 11 - Approximately ½ mile south of Road 24 and 1.5 miles west of Highway 45
- 12 - Approximately ¼ mile north of Road 25 and ¼ mile west of Road U
- 13 - Approximately ¼ mile northeast of the intersection of Road 25 and QQ
- 14 - Approximately ¼ mile north of Road 32 and east of Road WW at the GCID Canal
- 15 - Approximately ¼ mile north of Road 33 and 500 feet east of Road S
- 16 - Approximately 1 mile north of Road 30 and 200 feet east of Road M
- 17 - Approximately 1 mile east of Highway 99 and 50 feet north of Road 33
- 18 - At the southwest corner of the intersection of Road 25 and Road D

- 19 - Approximately $\frac{3}{4}$ mile north of Road 23 on the east side of Highway 45
- 20 - Approximately 200 feet southeast of the intersection of Capay and 1st Avenues
- 21 - Approximately $\frac{1}{4}$ mile south of Road 9 and east of 4th Avenue
- 22 - Approximately 500 feet east of Road P south of Road 9
- 23 - Approximately $\frac{1}{2}$ mile east of Road P and 50 feet north of Road 18
- 24 - Approximately $\frac{1}{4}$ mile west of Road P and 25 feet south of Road 6
- 25 - Approximately $\frac{1}{10}$ mile east of Road N and 50 feet north of Highway 32
- 26 - Approximately $\frac{1}{4}$ mile north of Road 20 and east of Road HH
- 27 - Approximately $\frac{1}{4}$ mile north of Highway 162 and 180 feet east of Road D

Figures

Figure 1.
CASGEM Wells Located Within Glenn County



- CASGEM Wells
- Willow Creek Mutual Water Company
- Orland Unit Water Users Association
- Orland-Artois Water District
- Glide Water District
- Kanawha Water District
- Glenn Colusa Irrigation District
- Provident Irrigation District
- Princeton Codora Glenn Irrigation District
- Reclamation District 2106
- Reclamation District 1004
- Western Canal Water District
- Funks Creek 5.90
- Stonyford Town Area 5.63
- Squaw Flat 5.89
- Stony Gorge Reservoir 5.88
- Elk Creek Area 5.62
- Chrome Town Area 5.61
- SacValley West Butte 5.21.58
- SacValley Colusa 5.21.52
- SacValley Corning 5.21.51

Tables

Table 2.
CASGEM Well Information

Map Location Number	SWN	Use	Status	Well Comp Type	Top Perf	Bottom Perf	Total Depth	GSE	Method Det Elev	Accuracy Elev (ft)	RPE	RP Desc	Datum	Easting	Northing	Units	Zone	Method Det Coordinates	Accuracy Coordinates	Entity	Basin	WCR#	Formation	Written Desc	Additional Comments
1	18N01W02E001M	Observation	active	multi-completion	719	729	760	78.5	surveyed to a benchmark	0.01	80.9	top of casing	NAD83	590918	4366345	meters	10	surveyed to a benchmark	0.01	Glenn Co	West Butte	726833	Tuscan C	Approximately 2 miles south of Highway 162 and ½ mile east of Road Z	
1	18N01W02E002M	Observation	active	multi-completion	450	460	470	78.5	surveyed to a benchmark	0.01	81.3	top of casing	NAD83	590918	4366346	meters	10	surveyed to a benchmark	0.01	Glenn Co	West Butte	726833	Tehama	Approximately 2 miles south of Highway 162 and ½ mile east of Road Z	
1	18N01W02E003M	Observation	active	multi-completion	100	110	120	78.5	surveyed to a benchmark	0.01	81.4	top of casing	NAD83	590918	4366347	meters	10	surveyed to a benchmark	0.01	Glenn Co	West Butte	726833		Approximately 2 miles south of Highway 162 and ½ mile east of Road Z	
2	18N02W18D001M	Observation	active	multi-completion	975	985	1000	80	surveyed to a benchmark	0.01	80.6	top of casing	NAD83	573529	4363826	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	E045412	Tuscan A	Approximately ¼ mile north of Road 68 and east of Sac Refuge Boundary	
2	18N02W18D002M	Observation	active	multi-completion	620	680	700	80	surveyed to a benchmark	0.01	81	top of casing	NAD83	573529	4363826	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	E045412	Tuscan C	Approximately ½ mile north of Road 68 and east of Sac Refuge Boundary	
2	18N02W18D003M	Observation	active	multi-completion	510	520	530	80	surveyed to a benchmark	0.01	81.6	top of casing	NAD83	573529	4363826	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	E045412	Tehama	Approximately ½ mile north of Road 68 and east of Sac Refuge Boundary	
2	18N02W18D004M	Observation	active	multi-completion	246	256	266	80	surveyed to a benchmark	0.01	82	top of casing	NAD83	573529	4363826	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	E045412	Tehama	Approximately ½ mile north of Road 68 and east of Sac Refuge Boundary	
3	19N01W22D004M	Observation	active	multi-completion	780	790	820	85	surveyed to a benchmark	0.01	87.3	top of casing	NAD83	589015	4371966	meters	10	surveyed to a benchmark	0.01	Glenn Co	West Butte	816274	Tuscan C	Approximately 2 miles north of Highway 162 and 200 feet east of Road Y	
3	19N01W22D005M	Observation	active	multi-completion	520	530	555	85	surveyed to a benchmark	0.01	87.5	top of casing	NAD83	589015	4371966	meters	10	surveyed to a benchmark	0.01	Glenn Co	West Butte	816274	Tuscan C	Approximately 2 miles north of Highway 162 and 200 feet east of Road Y	
3	19N01W22D006M	Observation	active	multi-completion	340	350	380	85	surveyed to a benchmark	0.01	87.8	top of casing	NAD83	589015	4371966	meters	10	surveyed to a benchmark	0.01	Glenn Co	West Butte	816274	Tuscan	Approximately 2 miles north of Highway 162 and 200 feet east of Road Y	
3	19N01W22D007M	Observation	active	multi-completion	80	90	120	85	surveyed to a benchmark	0.01	88	top of casing	NAD83	589015	4371966	meters	10	surveyed to a benchmark	0.01	Glenn Co	West Butte	816274		Approximately 2 miles north of Highway 162 and 200 feet east of Road Y	
4	19N02W08Q001M	Observation	active	multi-completion	857	877	940	99	surveyed to a benchmark	0.01	103.4	top of casing	NAD83	576381	4374412	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	726952	Tehama	Approximately 1 mile south of Highway 162 and ¼ mile east of Road R	
4	19N02W08Q002M	Observation	active	multi-completion	208	218	228	99	surveyed to a benchmark	0.01	99.8	top of casing	NAD83	576381	4374413	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	726952	Tehama	Approximately 1 mile south of Highway 162 and ¼ mile east of Road R	
4	19N02W08Q003M	Observation	active	multi-completion	77	87	97	99	surveyed to a benchmark	0.01	100.2	top of casing	NAD83	576381	4374414	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	726952	Tehama	Approximately 1 mile south of Highway 162 and ¼ mile east of Road R	
5	19N02W33K001M	Observation	active	single completion	160	260	260	85	surveyed to a benchmark	0.01	85.3	top of casing	NAD83	578711	4367831	meters	10	surveyed to a benchmark	0.01	Provident	Colusa	581475		Approximately ¼ mile south of Road 61 at Road SS	
6	20N02W33B001M	Observation	active	single completion	100	320	320	103	surveyed to a benchmark	0.01	104.6	top of casing	NAD83	578687	4378239	meters	10	surveyed to a benchmark	0.01	Provident	Colusa	3686		Approximately 1 mile south of Road 44 at Road TT	
7	20N02W11A001M	Observation	active	multi-completion	70	90	90	123	surveyed to a benchmark	0.01	123	top of casing	NAD83	581990	4384821	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	3669	Tehama	Approximately at the SE intersection of Road 35 and W	
7	20N02W11A002M	Observation	active	multi-completion	140	160	160	123	surveyed to a benchmark	0.01	123	top of casing	NAD83	581990	4384821	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	3669	Tehama	Approximately at the SE intersection of Road 35 and W	
7	20N02W11A003M	Observation	active	multi-completion	490	510	510	123	surveyed to a benchmark	0.01	123	top of casing	NAD83	581990	4384821	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	3669	Tehama	Approximately at the SE intersection of Road 35 and W	
8	20N02W18R005M	Observation	active	multi-completion	920	980	1000	131.4	surveyed to a benchmark	0.01	132.5	top of casing	NAD83	575826	4382128	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	801448	Tuscan AB	Approximately ¼ mile north of Highway 162 and west of Road Pat GCID Canal	
8	20N02W18R006M	Observation	active	multi-completion	635	655	675	131.4	surveyed to a benchmark	0.01	133	top of casing	NAD83	575826	4382128	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	801448	Tehama	Approximately ¼ mile north of Highway 162 and west of Road Pat GCID Canal	
8	20N02W18R007M	Observation	active	multi-completion	450	526	545	131.4	surveyed to a benchmark	0.01	133.4	top of casing	NAD83	575826	4382128	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	801448	Tehama	Approximately ¼ mile north of Highway 162 and west of Road Pat GCID Canal	
8	20N02W18R008M	Observation	active	multi-completion	140	180	201	131.4	surveyed to a benchmark	0.01	134	top of casing	NAD83	575826	4382128	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	801448		Approximately ¼ mile north of Highway 162 and west of Road Pat GCID Canal	
9	20N02W25F002M	Observation	active	multi-completion	420	470	490	102.2	surveyed to a benchmark	0.01	104.1	top of casing	NAD83	583103	4379315	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	782025	Tehama	Approximately 200 feet north of Road 44 and ¼ mile east of Road WW	
9	20N02W25F003M	Observation	active	multi-completion	190	260	280	102.2	surveyed to a benchmark	0.01	104.6	top of casing	NAD83	583103	4379316	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	782025	Tehama	Approximately 200 feet north of Road 44 and ¼ mile east of Road WW	
9	20N02W25F004M	Observation	active	multi-completion	55	65	85	102.2	surveyed to a benchmark	0.01	105.1	top of casing	NAD83	583103	4379317	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	782025	Tehama	Approximately 200 feet north of Road 44 and ¼ mile east of Road WW	
10	20N03W07E001M	Observation	active	multi-completion	984	1014	1030	179.2	surveyed to a benchmark	0.01	180.8	top of casing	NAD83	564420	4384159	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E057712	Tehama	Approximately ½ mile south of Road 35 and 50 feet east of Road D	
10	20N03W07E002M	Observation	active	multi-completion	616	636	656	179.2	surveyed to a benchmark	0.01	181.1	top of casing	NAD83	564420	4384159	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E057712	Tehama	Approximately ½ mile south of Road 35 and 50 feet east of Road D	
10	20N03W07E003M	Observation	active	multi-completion	380	485	505	179.2	surveyed to a benchmark	0.01	181.5	top of casing	NAD83	564420	4384159	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E057712	Tehama	Approximately ½ mile south of Road 35 and 50 feet east of Road D	
10	20N03W07E004M	Observation	active	multi-completion	118	128	138	179.2	surveyed to a benchmark	0.01	181.8	top of casing	NAD83	564420	4384159	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E057712	Tehama	Approximately ½ mile south of Road 35 and 50 feet east of Road D	
11	21N02W01F001M	Observation	active	multi-completion	547	557	578	160.9	surveyed to a benchmark	0.01	162.1	top of casing	NAD83	582444	4395389	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726740	Tuscan C	Approximately ½ mile south of Road 24 and 1.5 miles west of Highway 45	
11	21N02W01F002M	Observation	active	multi-completion	297	307	318	160.8	surveyed to a benchmark	0.01	162.3	top of casing	NAD83	582444	4395390	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726740	Tehama	Approximately ½ mile south of Road 24 and 1.5 miles west of Highway 45	

Table 2.
CASGEM Well Information

Map Location Number	SWN	Use	Status	Well Comp Type	Top Perf	Bottom Perf	Total Depth	GSE	Method Det Elev	Accuracy Elev (ft)	RPE	RP Desc	Datum	Easting	Northing	Units	Zone	Method Det Coordinates	Accuracy Coordinates	Entity	Basin	WCR#	Formation	Written Desc	Additional Comments
11	21N02W01F003M	Observation	active	multi-completion	109	119	124	161.8	surveyed to a benchmark	0.01	162.8	top of casing	NAD83	582444	4395391	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726740	Modesto	Approximately ½ mile south of Road 24 and 1.5 miles west of Highway 45	
11	21N02W01F004M	Observation	active	multi-completion	55	65	75	161.9	surveyed to a benchmark	0.01	163.2	top of casing	NAD83	582444	4395392	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726740	Modesto	Approximately ½ mile south of Road 24 and 1.5 miles west of Highway 45	
12	21N02W04G002M	Observation	active	multi-completion	928	938	948	176	surveyed to a benchmark	0.01	177.8	top of casing	NAD83	577925	4395225	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E044112	Tuscan B	Approximately ¼ mile north of Road 25 and ¼ mile west of Road U	
12	21N02W04G003M	Observation	active	multi-completion	673.5	703.5	713	176	surveyed to a benchmark	0.01	178.1	top of casing	NAD83	577925	4395225	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E044112	Tuscan C	Approximately ¼ mile north of Road 25 and ¼ mile west of Road U	
12	21N02W04G004M	Observation	active	multi-completion	165	279	289	176	surveyed to a benchmark	0.01	177.9	top of casing	NAD83	577925	4395225	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E044112	Tehama	Approximately ¼ mile north of Road 25 and ¼ mile west of Road U	
12	21N02W04G005M	Observation	active	multi-completion	57	67	77	176	surveyed to a benchmark	0.01	178.8	top of casing	NAD83	577925	4395225	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	E044112	Modesto	Approximately ¼ mile north of Road 25 and ¼ mile west of Road U	
13	21N02W05M001M	Observation	active	multi-completion	442	452	473	186.5	surveyed to a benchmark	0.01	188	top of casing	NAD83	575379	4394921	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	801406	Tehama	Approximately ¼ mile northeast of the intersection of Road 25 and QQ	
13	21N02W05M002M	Observation	active	multi-completion	122	132	153	186.5	surveyed to a benchmark	0.01	188.5	top of casing	NAD83	575379	4394921	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	801406	Modesto	Approximately ¼ mile northeast of the intersection of Road 25 and QQ	
13	21N02W05M003M	Observation	active	multi-completion single	44	54	75	186.5	surveyed to a benchmark	0.01	189.9	top of casing	NAD83	575379	4394921	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	801406	Modesto	Approximately ¼ mile northeast of the intersection of Road 25 and QQ	
14	21N02W36A002M	Observation	active	multi-completion	120	140	155	133	surveyed to a benchmark	0.01	133.8	top of casing	NAD83	582979	4387714	meters	10	surveyed to a benchmark	0.01	GCID	Colusa	315497		Approximately ¼ mile north of Road 32 and east of Road WW at the GCID Canal	
15	21N02W33M001M	Observation	active	multi-completion	869	890	974	148.9	surveyed to a benchmark	0.01	151.7	top of casing	NAD83	577199	4387045	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726724	Tuscan AB	Approximately ¼ mile north of Road 33 and 500 feet east of Road S	
15	21N02W33M002M	Observation	active	multi-completion	540	550	571	148.9	surveyed to a benchmark	0.01	150.6	top of casing	NAD83	577199	4387046	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726724	Tuscan C	Approximately ¼ mile north of Road 33 and 500 feet east of Road S	
15	21N02W33M003M	Observation	active	multi-completion	140	150	171	148.9	surveyed to a benchmark	0.01	151.3	top of casing	NAD83	577199	4387047	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726724	Tehama	Approximately ¼ mile north of Road 33 and 500 feet east of Road S	
16	21N03W23D001M	Observation	active	multi-completion	362	372	393.5	202.3	surveyed to a benchmark	0.01	203.4	top of casing	NAD83	570561	4391143	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	801404	Tehama	Approximately 1 mile north of Road 30 and 200 feet east of Road M	
16	21N03W23D002M	Observation	active	multi-completion	142	170	191.5	202.3	surveyed to a benchmark	0.01	204	top of casing	NAD83	570561	4391143	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	801404	Modesto	Approximately 1 mile north of Road 30 and 200 feet east of Road M	
16	21N03W23D003M	Observation	active	multi-completion	42	72	93.5	202.3	surveyed to a benchmark	0.01	204.5	top of casing	NAD83	570561	4391143	meters	10	surveyed to a benchmark	0.01	O/AWD	Colusa	801404	Modesto	Approximately 1 mile north of Road 30 and 200 feet east of Road M	
17	21N03W34Q002M	Observation	active	multi-completion	930	960	980	166.2	surveyed to a benchmark	0.01	167.1	top of casing	NAD83	569764	4386421	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	816224	Tehama	Approximately 1 mile east of Highway 99 and 50 feet north of Road 33	
17	21N03W34Q003M	Observation	active	multi-completion	620	690	721	166.3	surveyed to a benchmark	0.01	167.4	top of casing	NAD83	569764	4386422	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	816224	Tehama	Approximately 1 mile east of Highway 99 and 50 feet north of Road 33	
17	21N03W34Q004M	Observation	active	multi-completion	60	70	108	167.6	surveyed to a benchmark	0.01	163.3	top of casing	NAD83	569764	4386423	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	816224		Approximately 1 mile east of Highway 99 and 50 feet north of Road 33	
18	21N04W12A002M	Observation	active	multi-completion	247	257	278	247.9	surveyed to a benchmark	0.01	249.9	top of casing	NAD83	564019	4394413	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	726739	Tehama	At the southwest corner of the intersection of Road 25 and Road D	
18	21N04W12A003M	Observation	active	multi-completion	955	1050	1070	247.5	surveyed to a benchmark	0.01	250.1	top of casing	NAD83	564009	4394400	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	E0103388	Tehama	At the southwest corner of the intersection of Road 25 and Road D	
18	21N04W12A004M	Observation	active	multi-completion	520	640	659	247.5	surveyed to a benchmark	0.01	249.6	top of casing	NAD83	564009	4394400	meters	10	surveyed to a benchmark	0.01	Glenn Co	Colusa	E0103388	Tehama	At the southwest corner of the intersection of Road 25 and Road D	
19	22N01W29N001M	Observation	active	multi-completion	859	1135	1156	146.3	surveyed to a benchmark	0.01	151	top of casing	NAD83	584796	4397844	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	E0103616	Tuscan A	Approximately ¾ mile north of Road 23 on the east side of Highway 45	
19	22N01W29N002M	Observation	active	multi-completion	549	641	661	146.3	surveyed to a benchmark	0.01	150.7	top of casing	NAD83	584796	4397844	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	E0103616	Tuscan B/C	Approximately ¾ mile north of Road 23 on the east side of Highway 45	
19	22N01W29N003M	Observation	active	multi-completion	189	380	400	146.3	surveyed to a benchmark	0.01	150	top of casing	NAD83	584796	4397844	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	E0103616	Tehama	Approximately ¾ mile north of Road 23 on the east side of Highway 45	
19	22N01W29N004M	Observation	active	multi-completion	89	99	109	146.3	surveyed to a benchmark	0.01	149.1	top of casing	NAD83	584796	4397844	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	E0103616	Modesto	Approximately ¾ mile north of Road 23 on the east side of Highway 45	
20	22N02W01N001M	Observation	active	multi-completion	812.75	1050	1060	159.2	surveyed to a benchmark	0.01	161.1	top of casing	NAD83	581674	4404172	meters	10	surveyed to a benchmark	0.01	GCID	Corning	E038764	Tuscan A	Approximately 200 feet southeast of the intersection of Capay and 1 st Avenues	
20	22N02W01N002M	Observation	active	multi-completion	698.75	708.75	730	159.2	surveyed to a benchmark	0.01	161.3	top of casing	NAD83	581674	4404172	meters	10	surveyed to a benchmark	0.01	GCID	Corning	E038764	Tehama, Tuscan C	Approximately 200 feet southeast of the intersection of Capay and 1 st Avenues	
20	22N02W01N003M	Observation	active	multi-completion	209.25	367.5	440	159.2	surveyed to a benchmark	0.01	161.5	top of casing	NAD83	581674	4404172	meters	10	surveyed to a benchmark	0.01	GCID	Corning	E038764	Tehama	Approximately 200 feet southeast of the intersection of Capay and 1 st Avenues	
20	22N02W01N004M	Observation	active	multi-completion	70.6	80.6	108	159.2	surveyed to a benchmark	0.01	161.6	top of casing	NAD83	581674	4404172	meters	10	surveyed to a benchmark	0.01	GCID	Corning	E038764	Tehama Stony Creek Alluvium	Approximately 200 feet southeast of the intersection of Capay and 1 st Avenues	
21	22N02W15C002M	Observation	active	multi-completion	760	781	880	189.5	surveyed to a benchmark	0.01	194.2	top of casing	NAD83	579035	4401917	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	726790	Tuscan A	Approximately ¼ mile south of Road 9 and east of 4 th Avenue	

Table 2.
CASGEM Well Information

Map Location Number	SWN	Use	Status	Well Comp Type	Top Perf	Bottom Perf	Total Depth	GSE	Method Det Elev	Accuracy Elev (ft)	RPE	RP Desc	Datum	Easting	Northing	Units	Zone	Method Det Coordinates	Accuracy Coordinates	Entity	Basin	WCR#	Formation	Written Desc	Additional Comments
21	22N02W15C003M	Observation	active	multi-completion	370	380	444	189.2	surveyed to a benchmark	0.01	192	top of casing	NAD83	579035	4401918	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	726789	Tuscan B	Approximately ¼ mile south of Road 9 and east of 4 th Avenue	
21	22N02W15C004M	Observation	active	multi-completion	210	220	240	189.3	surveyed to a benchmark	0.01	192.3	top of casing	NAD83	579035	4401919	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	726789	Tehama	Approximately ¼ mile south of Road 9 and east of 4 th Avenue	
21	22N02W15C005M	Observation	active	multi-completion	60	70	90	189.4	surveyed to a benchmark	0.01	192.7	top of casing	NAD83	579035	4401920	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	726789	Modesto	Approximately ¼ mile south of Road 9 and east of 4 th Avenue	
22	22N02W18C001M	Observation	active	multi-completion	989	1029	1049	221	surveyed to a benchmark	0.01	222.2	top of casing	NAD83	573962	4402387	meters	10	surveyed to a benchmark	0.01	OUWUA	Corning	E044014	Tuscan A	Approximately 500 feet east of Road P south of Road 9	
22	22N02W18C002M	Observation	active	multi-completion	414	434	455	221	surveyed to a benchmark	0.01	222.4	top of casing	NAD83	573962	4402387	meters	10	surveyed to a benchmark	0.01	OUWUA	Corning	E044014	Tuscan BC	Approximately 500 feet east of Road P south of Road 9	
22	22N02W18C003M	Observation	active	multi-completion	165	175	185	221	surveyed to a benchmark	0.01	223.1	top of casing	NAD83	573962	4402387	meters	10	surveyed to a benchmark	0.01	OUWUA	Corning	E044014	Tehama	Approximately 500 feet east of Road P south of Road 9	
22	22N02W18C004M	Observation	active	multi-completion	55	65	75.4	221	surveyed to a benchmark	0.01	223.5	top of casing	NAD83	573962	4402387	meters	10	surveyed to a benchmark	0.01	OUWUA	Corning	E044014	Modesto	Approximately 500 feet east of Road P south of Road 9	
23	22N02W30H002M	Observation	active	multi-completion	850	880	930	202	surveyed to a benchmark	0.01	202.8	top of casing	NAD83	575147	4398437	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	726922	Tuscan C	Approximately ½ mile east of Road P and 50 feet north of Road 18	
23	22N02W30H003M	Observation	active	multi-completion	130	260	291	202	surveyed to a benchmark	0.01	201.3	top of casing	NAD83	575147	4398438	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	726922	Tehama	Approximately ½ mile east of Road P and 50 feet north of Road 18	
23	22N02W30H004M	Observation	active	multi-completion	45	70	88	202	surveyed to a benchmark	0.01	202	top of casing	NAD83	575147	4398439	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	726922	Modesto	Approximately ½ mile east of Road P and 50 feet north of Road 18	
24	22N03W01R001M	Observation	active	multi-completion	470	480	490	226	surveyed to a benchmark	0.01	228.2	top of casing	NAD83	573171	4404425	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	726839	Tuscan C	Approximately ¼ mile west of Road P and 25 feet south of Road 6	
24	22N03W01R002M	Observation	active	multi-completion	270	280	290	226	surveyed to a benchmark	0.01	228.5	top of casing	NAD83	573171	4404426	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	726839	Tehama	Approximately ¼ mile west of Road P and 25 feet south of Road 6	
24	22N03W01R003M	Observation	active	multi-completion	60	70	80	226	surveyed to a benchmark	0.01	229	top of casing	NAD83	573171	4404427	meters	10	surveyed to a benchmark	0.01	Glenn Co	Corning	726839	Modesto	Approximately ¼ mile west of Road P and 25 feet south of Road 6	
25	22N03W24E001M	Observation	active	multi-completion	800	820	850	230.5	surveyed to a benchmark	0.01	231.7	top of casing	NAD83	572311	4400036	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	726923	Tehama	Approximately 1/10 mile east of Road N and 50 feet north of Highway 32	
25	22N03W24E002M	Observation	active	multi-completion	128	178	225	230.5	surveyed to a benchmark	0.01	231.9	top of casing	NAD83	572311	4400037	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	726923	Modesto	Approximately 1/10 mile east of Road N and 50 feet north of Highway 32	
25	22N03W24E003M	Observation	active	multi-completion	49	59	81	230.5	surveyed to a benchmark	0.01	232.4	top of casing	NAD83	572311	4400038	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	726923	Modesto	Approximately 1/10 mile east of Road N and 50 feet north of Highway 32	
26	22N03W28P001M	Observation	active	multi-completion	390	400	421	255.8	surveyed to a benchmark	0.01	257	top of casing	NAD83	567946	4397861	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	801439	Tehama	Approximately ¼ mile north of Road 20 and east of Road HH	
26	22N03W28P002M	Observation	active	multi-completion	270	290	311	255.8	surveyed to a benchmark	0.01	257.5	top of casing	NAD83	567946	4397862	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	801439		Approximately ¼ mile north of Road 20 and east of Road HH	
26	22N03W28P003M	Observation	active	multi-completion	30	50	71	255.8	surveyed to a benchmark	0.01	258.1	top of casing	NAD83	567946	4397861	meters	10	surveyed to a benchmark	0.01	OUWUA	Colusa	801439		Approximately ¼ mile north of Road 20 and east of Road HH	
27	19N03W06N002M	Irrigation	active	single completion	90	272	282	154	GPS	unknown	154.3	top of casing	NAD83	564578	4375632	meters	10	GPS	unknown	KWD	Colusa	581432		Approximately 1/4 mile north of Hwy 162 and 180 feet east of Road D	



WOOD RODGERS

MEMORANDUM

TO: Glenn County Water Advisory Committee

FROM: Francis E. Borcalli, P.E.

DATE: November 13, 2003

SUBJECT: Preliminary Plan for Groundwater and Coordinated Water Management – Discussion Document

INTRODUCTION

The Glenn County Water Advisory Committee (WAC) retained the services of Wood Rodgers, Inc. in February 2003, to assist in facilitating a planning process to document and preserve what has been accomplished and provide a direction for the future of the WAC.

In carrying out this assignment, Wood Rodgers interviewed representatives of water districts, agricultural support entities, and agriculturists; reviewed documents describing completed as well as relevant work in progress, city/county general plans, and county codes and ordinances. Additionally, Wood Rodgers attended meetings of the WAC and Technical Advisory Committee (TAC).

Based upon information assimilated, Wood Rodgers prepared this Memorandum to initiate discussion aimed at facilitating the management of water resources “available” to Glenn County. Use of the term “available” is purposeful in that Glenn County, not necessarily as a jurisdiction but as a community, has the innate responsibility of being stewards of those resources for the community of Glenn County as well as the region and State as a whole.

By virtue of the geographic and hydrologic setting of Glenn County and the foresight and actions of people in years past, Glenn County is in an enviable position in relation to many other areas of the State. More importantly, Glenn County has, in recent years, continued to demonstrate foresight by virtue of measures implemented to safeguard its groundwater resources. Measures that are being implemented in Glenn County are being used to set standards statewide by virtue of being incorporated into legislation of statewide significance.

The efforts of Glenn County relative to formulating and codifying measures to safeguard its groundwater resources and the progress made in implementing stipulated monitoring programs are commendable. This effort to chart the “next” step to facilitate improved management of the available water resources is commendable as well.

BACKGROUND

Glenn County is clearly an agricultural community with nearly 30 percent of its 850,000 acres in agriculture and one percent devoted to urban uses (Table 1). Over the 10-year period from 1988 to 1998, land devoted to agricultural use decreased from 283,517 acres to 263,503 acres, or seven percent, while land devoted to urban use increased from 6,114 acres to 11,314 acres, or 85 percent. Virtually all land suitable for irrigated agriculture is developed, thus, increases in water use for agriculture would be attributed to changes in crop mix and/or intensity of farming or improved reliability in supply.

The land within the incorporated cities of Orland and Willows is approximately 3,400 acres although the land within the planning area or Sphere of Influence of the two cities is approximately 12,400 acres. The latter represents approximately 4.7 percent of the land in agriculture in 1998. The total county population in 2012 is projected at 47,000, which represents an increase of nearly 22,000 people above the 1993 population.

In establishing the WAC and TAC; adopting Ordinance No. 1115; developing and adopting initial Basin Management Objectives (BMOs); and implementing programs to monitor groundwater levels, water quality, and land subsidence monitoring programs represents very significant accomplishments that separates Glenn County from most other counties. Having “tested” the BMO process for addressing conflicts reinforces the utility of the process established for safeguarding groundwater resources.

GOALS FOR WATER MANAGEMENT

To identify the goals for water management in Glenn County, certain documents were reviewed to determine the extent to which the community is unified in this regard. The respective documents and specified goals are presented below. Where deemed appropriate, some commentary or comments are provided that relate to the purpose of this assignment.

Basin Management Objective (BMO) for Groundwater Surface Elevations in Glenn County, California, August 21, 2001

The vision set forth by the WAC in submitting the Basin Management Objectives to the Board of Supervisors for adoption, is *“that sufficient and affordable water of good quality be available on a sustainable basis to meet the needs of agricultural, industrial, recreational, environmental, residential, and municipal users within the County, both now and in the future.”*

The intent of the vision is well meaning; however, at this time the water needs and affordability of the respective users are not known. Absent some quantification of the needs and affordability, it is very difficult to formulate water resource projects and programs to fulfill the vision.

Policy Plan Glenn County General Plan Volume I, June 1993

Goals and policies are set forth in the General Plan that relate to the subject of this Memorandum. A relevant goal and policies were selected from the document and are presented below.

Goal:

NRG-2 Protection and management of local water resources.

Policies: It shall be the policy of Glenn County to:

NRP-22 Oppose the exportation of groundwater resources outside the county.

NRP-23 Support legislation which will provide for a locally controlled Glenn County groundwater management district.

NRP-24 Recognize the following local priorities when dealing with questions of ground and surface water use:

- Highest*
- (1) Household/Domestic
 - (2) Agriculture
 - (3) Industrial/Commercial
 - (4) Wildlife/Conservation

Lowest (5) Exportation

NRP-25 Protect groundwater recharge areas in the county from overcovering and contamination by carefully regulating the type of development that occurs within these areas.

Other policies and implementation strategies are presented in the General Plan, however, are not presented here.

It is recognized these policies were developed in 1993, and that a great deal of work and effort were expended since then to better understand and manage water resources available to the Glenn County. Nevertheless, these policies are not necessarily consistent with current management strategies.

Feasibility Report, OUWUA AND TCCA Regional Water Use Efficiency Project, January 2003

The long-term management goals for the OUWUA and TCCA as stated in the feasibility report include the following:

- Insure a long-term reliable water supply to the OUWUA, and improve conveyance system and on-farm water use efficiency by modernizing the existing open channel distribution system
- Support the long-term Stony Creek environmental restoration and fishery resource management objectives of the various state and federal resource agencies
- Provide supplemental water supply to the TCCA service area
- Provide supplemental water supply and operating flexibility to support other beneficial water uses within the Sacramento Valley

Glenn-Colusa Irrigation District Water Transfer Policy, February 16, 1995

The Glenn-Colusa Irrigation District (GCID) adopted its water transfer policy in February 1995. The policy articulates a priority to allocate its water supplies. Summarized below is GCID's policy to allocate water supplies available after meeting the needs within the District. Water available in excess of the District's needs would be marketed as follows:

1. A portion of the available water to other agricultural areas within the Sacramento River watershed with consideration given to the buyers "ability to pay,"
2. To environmental purposes.
3. To urban water agencies north of the Delta.
4. To agricultural or urban water users south of the Delta.
5. To the USBR/DWR on a case-by-case basis with the same priority as south of the Delta water users.

It is not essential that goals and policies of entities involved with water management be the same, however, it is important from the standpoint of the message delivered to people within and outside the county, that:

- The goals and policies from a countywide perspective be consistent.
- The goals and policies at the countywide level facilitate sound water management by local entities.

ORGANIZATION FOR WATER MANAGEMENT

Existing organization for addressing water-related issues in Glenn County includes the WAC and TAC, the membership of which are both appointed by the Board of Supervisors. The WAC and TAC have been instrumental in implementing groundwater monitoring programs to address groundwater levels, water quality, and land subsidence and in assessing compliance with the BMOs. Additionally, meetings of the respective committees have provided a forum for discussing a variety of water-related matters. More important, or at least equally important, to the work accomplished, is the strength of the organization, which comes from successfully dealing with contentious and controversial issues. The WAC is comprised of 22 members, 17 of which represent specific geographic subareas, four individually representing the cities of Orland and Willows, the Resource Conservation District, the Glenn County Farm Bureau, and one ex-officio member from the Board of Supervisors. The subareas and geographic locations are identified on Map 1. The area of each subarea is presented on Table 2. A further definition of each subarea in terms of land use for years 1993 and 1998 is presented on Table 3. The TAC is a nine-person committee nominated by the WAC and appointed by the Board.

Work of the WAC/TAC is at a threshold in that a milestone has been reached in terms of the initial focus of groundwater management being achieved. This is not to say that the work is completed but rather, the program for groundwater monitoring, an important element of the BMOs, is being implemented. This will be an ongoing effort in terms of the monitoring network and the data compiled.

The question being addressed at this time is, “What is the next step toward advancing the management of water resources available to Glenn County?” In other words, what is the role of the WAC/TAC and what activities should be implemented to build on the good works completed to date. Improved water management is accomplished one step at a time. Each step should build on work completed from the previous step. Clearly, each step will be followed by another, as the task of water management is never completed. Instead, it becomes more refined with well-directed effort over time. An essential element of ongoing success is the unconditional cooperation and partnerships formed to implement well-conceived programs and projects. Accordingly, the roles and responsibilities of the involved parties need to be clearly defined.

A specified purpose of the County in adopting the BMOs is to work cooperatively with interested local agencies to further develop and implement joint groundwater management practices. To this end, to the extent efforts are directed to facilitate improved management of available water resources by local agencies or entities, the people of Glenn County will be well served.

Management of available water resources by local agencies or entities can be improved with information that is more global in scope or countywide, readily accessible, and provides the foundation for monitoring conditions and identifying opportunities for improved water management and partnerships for implementing particular programs and projects.

For purposes of advancing the management of water resources available within Glenn County, it is suggested that the role of the WAC be expanded to include the coordination of other water resources activities that are countywide. Thus far the effort of the WAC has been directed

primarily at administering the BMOs. The composition of the existing committees, although considered by some as not well balanced, does provide a good cross section of the water community of Glenn County. Furthermore, the ability to work together to deal with contentious issues has been demonstrated.

The water resource activities or tasks should be aimed at formulating a Glenn County Groundwater and Water Coordination Plan. The activities undertaken that are of a countywide nature should in no way interfere with the day-to-day operations of local entities, long term planning, or management of resources. On the other hand, the effective implementation of such activities should facilitate more effective planning, implementation, and management of local entities individually and/or jointly.

To reflect a broader role, the WAC could be referred to as the Water Advisory and Coordination Committee or other name as may be deemed appropriate. The duties related to the BMOs would not change.

PROGRAM TO FACILITATE GROUNDWATER AND COORDINATED WATER MANAGEMENT

Tasks have been identified as components of a program to facilitate the management of water resources by local entities within Glenn County. The product from the respective tasks would provide information that can be used to facilitate improved water management and benefit Glenn County. It is suggested implementing the tasks with oversight of the WAC in its expanded role as discussed above. The respective tasks, together with a brief description, are presented below.

A. Formulate Countywide Water Management Goals

As noted previously, goals for water management at the county level are not consistent and in some sense contradict the goals and policies of local entities. For the benefit of the community at large and entities responsible for water management, it would be beneficial to revisit this matter to develop water management goals that would serve to unify the governing and regulatory bodies and those responsible for water management.

B. Perform Water Needs Analysis

Having the water needs of Glenn County as a priority for water management is certainly endorsed by all parties. A difficulty is that the water needs for Glenn County are not identified. Addressing this priority in a responsible manner could be done if the water needs for the various water uses were quantified in terms of amount, location, timing, and quality. Addressing the water needs, or better stated, unmet water needs, dictates that water supplies also be quantified.

C. Prepare Water Delivery and Distribution Infrastructure Map

Having a map that displays all existing infrastructure for the delivery and distribution of irrigation water would be beneficial for identifying opportunities to interconnect or extend

facilities to exchange or transfer water within the county. This information would be helpful to identify opportunities meeting water needs in particular areas, and/or providing service in the event of an emergency situation.

D. Determine Groundwater Utilization Opportunities and Constraints

BMOs have been set for various sub-areas in the county. To a large extent the BMOs were established using historic groundwater level data. The BMOs and the applied methodology provides safeguards for protecting the groundwater basin, however, it may also be limiting the opportunity for managing the available water resources. A better understanding of the extent to which the groundwater basin can be utilized without causing adverse impacts could aid substantially in meeting the water needs of the county under normal or emergency conditions.

Glenn County is fortunate to have a groundwater model that was prepared for the Orland-Artois Water District, the Orland Unit Water Users' Association, and Glenn-Colusa Irrigation District. Water Resources & Information Management Engineering, Inc. (WRIME) developed the Stony Creek Fan Integrated Groundwater and Surface Water Model (SCFIGSM) in coordination with the California Department of Water Resources. By virtue of having the model, Glenn County, again, sets itself apart from most other counties. Although the model was developed for the Stony Creek Fan Conjunctive Water Management Program, the model is a "public domain" model and it is understood that the model is available for use by other entities in Glenn County.

The SCFIGSM is a "tool" that can be used to simulate groundwater flow, streamflow, reservoir operations, rainfall runoff processes, land use processes, unsaturated zone flow, and land subsidence. The utility of the SCFIGSM, as stated in WRIME's report, is that it can be used to:

1. Re-examine the assumptions made during the development of the BMOs.
2. Enhance the information background of an existing decision or a revised decision related to the Groundwater Management Ordinance or the BMOs.
3. Identify sensitive areas where additional monitoring may be required to check compliance with the BMOs.
4. Develop general response characteristics and/or sensitivity ranges among different physical and operational elements.
5. Enhance the understanding of the groundwater system behaviors, characteristics, and constraints.

The SCFIGSM can perform "what if" scenarios that can greatly improve the overall understanding of the groundwater basin and general response to hypothetical changes in land use and water management.

E. Complete Comprehensive Groundwater Monitoring Program

Through the efforts of the WAC and TAC, Glenn County has initiated a sound groundwater monitoring program consistent with the BMOs that includes groundwater levels, groundwater quality, and land subsidence. The program is not complete and will be improved and refined with time as additional information is obtained and the needs and understanding of the basin are better known. This program should be completed to the extent existing data and information permits to expand and refine the program and network over time as funding permits. The groundwater model discussed above could be useful in refining the program.

F. Formulate Potential Projects

It would be useful to conduct “brainstorming” sessions to identify, at a conceptual level, potential projects and programs that could help to improve water reliability, quality, or mitigate the impact of extended droughts. Attention should be given to seeking multiple benefits such as reducing impacts from flooding/storm drainage, environmental enhancements, etc.

The benefit of such an exercise would be twofold. First, it would establish a potential list of projects that could be considered for advanced study when funding opportunities are available. Second, it would provide a broader understanding of the potential projects in which participants might consider being a partner in at a future time.

G. Evaluate Water Transfer Guidelines

Glenn County, by virtue on its physical and hydrologic setting and foresight of its residents in the past, enjoys an enviable water supply situation in relation to many counties in California. The fact that water transfers within and/or outside the county can be considered is a fortunate circumstance.

As stewards of the water resources available to Glenn County the resource should be managed to meet the needs of Glenn County, the Sacramento Valley, and California, to the extent practicable. Water law and guidelines or parameters for water use exist. It would be helpful to the community to have guidelines documented that represent established water law and water use parameters that represent the basis for particular types of water transfers. Types of water transfers that should be considered include:

- Surface water with groundwater substitution.
- Surface water with fallowing.
- Groundwater.

To the extent water transfers are configured consistent with adopted guidelines, there should be no need for discussion of a mitigation fund or third party impacts. Having water transfer guidelines in place can facilitate the management of water resources within the county.

H. Formulate Drought Preparedness Plan

The results of tree-ring studies performed on behalf of DWR indicate the occurrence of dry periods of greater duration and severity than the recorded history much of the water planning is based upon. It is not practical to develop or have water supplies available to cover severe events. Nevertheless, such events should be anticipated and measures identified in advance to prepare a community for managing the resources for the well being of the community.

The groundwater model provides an excellent tool by which “what if “ scenarios can be examined to identify the most sensitive areas from the standpoint of potential adverse impacts to the groundwater basin. Measures and protocol for response in such events can be used to refine the BMOs.

I. Formulate Public Information and Education Program

The WAC, with an expanded role, could be very effective in disseminating water resource information on a regular basis and facilitating public involvement for projects in which local agencies are involved. Utilizing the excellent relationship with the U.C. Extension Service and DWR could be very effective as a cooperative effort.

J. Prepare Groundwater and Coordinated Water Management Plan

Implementing the tasks described above could help to facilitate the management of water resources available to Glenn County.

These activities lend themselves to being addressed at a countywide level and will support the work of local entities and facilitate management of supplies for which each is responsible. Opportunities for partnerships locally and regionally to improve water management could emerge from the work as well.

SUMMARY

The information presented above is intended to provide a basis for discussion of items Wood Rodgers views as important to strengthen and build on the product of very significant efforts expended by numerous individuals in the county to date. From Wood Rodgers’ standpoint, the work product from the program can facilitate improved management of water resources for the overall benefit of the county.