COVER REPORT

The Basin Management Objective, or BMO, concept was developed to overcome many of the usual problems of defining safe yield and overdraft in the Sacramento Valley. The California State Department of Water Resources (DWR), Northern District Groundwater Section formulated the concept when they assisted Glenn County in developing their groundwater management ordinance, Ordinance No. 1115. The BMO concept defines acceptable groundwater levels, groundwater quality, and land subsidence conditions required to meet management objectives. For a more detailed explanation see the BMO concept paper prepared by DWR and included here under Appendix A, Supporting Technical Documents.

The objective of these BMOs is to maintain the groundwater surface elevation at a level that will assure an adequate and affordable irrigation water supply. It is the intent of this objective to assure a sustainable agricultural water supply now and into the future. The objective also assures an adequate groundwater supply for all domestic users in Glenn County. Key BMO Wells are comprised of selected wells from water district and municipal independently monitored wells and DWR's groundwater level monitoring network. This summary document describes the BMOs for groundwater surface elevations at these BMO Key Wells.

METHODS FOR DETERMINING BMOs

There are various methods for determining the BMO for groundwater levels. There is no definitive method that should take precedence over the others because of the uncertainty in the data. However, some methods may be preferable based on variability of the data, simplicity, operating procedures, or availability of data. The methods used to calculate BMOs for Glenn County sub-areas are described below.

Method 1 – Regression Method (Used by Sub-areas 9 and 10)

All existing groundwater level monitoring wells within the BMO area were identified. For all wells with a record dating back to at least 1976[1], groundwater levels were obtained using the Department of Water Resources' groundwater level website (wwwdpla.water.ca.gov/nd). The surface water deliveries and annual precipitation data were also obtained from the appropriate websites and water districts. With the built-in correlation function in Microsoft Excel, the correlation between surface water deliveries plus precipitation was calculated. A scatter plot of groundwater elevation vs. surface water deliveries plus precipitation was created. A trendline was then added to create the Stage 1 & 2 alert line that was parallel to the trendline, but lower by half of the average deviation. The Stage 3 alert was determined as the minimum acceptable groundwater elevation, which is based on the level at which pumping efficiency is noticeably reduced.

[1] In 1976 the Tehama-Colusa Canal became operational, changing the relative surface water supply and groundwater supply mix in sub-areas served by the canal. The Glenn County Technical Advisory Committee concluded that groundwater levels from this date forward are representative of recent historical conditions and when possible this historical period of record should be used for developing groundwater level BMOs in these sub-areas.

Method 2 – Standard Deviation (Used by Sub-areas 5, 10, 15, and 17)

All existing groundwater level monitoring wells within the BMO area were identified. For all wells with a record dating back to at least 1976[1], groundwater levels were obtained using the Department of Water Resources' groundwater level website. The Spring data for groundwater surface elevation (WSE) was further analyzed. The average and standard deviation were then calculated for these data. The Stage 1 & 2 alerts were determined to be the average of the Spring data minus one standard deviation. The State 3 alert was the average minus two standard deviations.

Method 3 – (Used by Sub-area 11)

All existing groundwater level monitoring wells within the BMO area were identified. For all wells with a current record, groundwater levels were obtained using the Department of Water Resources' groundwater level website. The average and standard deviation were then calculated for the wells' entire period of record (using Spring and Fall data). The Stage 1 & 2 alerts were determined to be the average of the data minus one standard deviation. The State 3 alert was the lowest Spring record dating back to 1976.

Method 4 – 20% of Range (Used by Sub-area 8)

All existing groundwater level monitoring wells within the BMO area were identified. For all wells with a record dating back to at least 1976[1], groundwater levels were obtained using the Department of Water Resources' groundwater level website. The Spring data for groundwater surface elevation (WSE) was furthered analyzed. The Stage 1 & 2 alerts were determined to be the average of the data minus 20% of the range. The Stage 3 alert was the lowest Spring record dating back to 1976. However, one well had a Stage 3 alert that was not the lowest historical elevation due to data anomalies.

Method 5 – (Used by Sub-areas 12 and 14)

All existing groundwater level monitoring wells within or near the BMO area were identified. For all wells with a record dating back to at least 1976[1], groundwater levels were obtained using the Department of Water Resources' groundwater level website. The Spring data for groundwater surface elevation (WSE) was furthered analyzed. The Stage 1 & 2 alerts were determined to be the average of the Spring data. The State 3 alert was the lowest Spring record dating back to 1976.

Method 6 – (Used by Sub-area 13)

The groundwater surface elevation was obtained for the examined well dating back to 1983. The data are mostly from late summer and early fall. The Stage 1 & 2 alerts were determined to be the average of the data. The State 3 alert was the lowest record dating back to 1983.

1. See previous page.

The following table summarizes the sub-areas and the method used to determine their respective groundwater level BMO. Each sub-area's groundwater level BMO is presented in standard format in the following sections. A map of Glenn County shows the sub-area boundaries and the locations of DWR monitoring wells on the following page (Exhibit A).

Sub-area No.	**Sub-area Name (see Exhibit A)**	**Method(s) for Calculating BMO**
1	West Corning Basin Private Pumpers Area	Not applicable (a)
2	Stony Creek Water District Area	Not applicable (a)
3	West Colusa Basin Private Pumpers Area	Not applicable (a)
4	Orland Unit Water Users' Association Area	Other (c)
5	Orland-Artois Water District Area	Method 2
6	Glide Water District Area	Other (c)
7	Kanawha Water District Area	Other (c)
8	East Corning Basin Private Pumpers Area	Method 4
9	Board of Supervisors District Five Private Pumpers Area	Method 1
10	Board of Supervisors District Three Private Pumpers Area	Method 1 and 2
11	Glenn-Colusa Irrigation District Area	Method 3
12	Provident Irrigation District Area	Method 5
13	Willow Creek Mutual Water Company Area	Method 6
14	Princeton-Codora-Glenn Irrigation District Area	Method 5
15	Reclamation District 2106 Area	Method 2
16	Reclamation District 1004 Area	Not applicable (b)
17	Western Canal Water District Area	Method 2 and Other (c)

(a) No monitored wells currently exist and no BMO has been established at this time.
(b) BMO's have not explicitly been developed at this time. Sub-area 15 and its BMO will serve as a surrogate BMO until a BMO is established.
(c) See the corresponding sub-area's BMO Standard Form for discussion of *Other* method used to determine the BMO.