COUNTY OF LAKE **WATER RESOURCES DEPARTMENT**

M E M O R A N D U M

TO: Board of Supervisors

FROM: Scott De Leon, Director
by Tom Smythe, Water Resources Engineer

SUBJECT: Groundwater Conditions
Spring 2015

DATE: March 30, 2015

Due to the current drought conditions, staff measured 83 water wells in the major groundwater basins between January 23 and 27, 2014. These are the wells that are normally measured in April and October of each year to assess groundwater conditions. The status of groundwater levels based on these measurements was provided to the Board in February 2014.

We measured these wells again between March 24 and April 3, 2014. Based on the spring measurements, conditions within each groundwater basin were summarized in our memorandum of April 10, 2014. While not a miracle, sufficient rains have fallen since early February to recharge most of the major groundwater basins sufficiently to provide adequate water supplies for 2014, however, some shortages may still occur, particularly with shallower wells.

We measured these wells again between September 30 and October 7, 2014. Groundwater levels in Lake County were below normal, however, the deviation from average conditions were not excessive. Compared to other areas of California, especially those areas south of the Delta, Lake County's groundwater impacts in the major aquifers from the drought appear to be limited.

During the period March 18 through March 23, 2015 we measured 81 wells Based on the Spring 2015 measurements, conditions within each groundwater basin are summarized. These summaries are general statements and due to varying aquifer conditions do not cover all conditions. Individual well owners may experience conditions substantially different than the general condition (some of our wells show markedly different conditions than other nearby wells) and problems are more likely with shallow wells. This does not include other smaller aquifers and water bearing formations, such as the Clear Lake Volcanics, within Lake County. Approximately 70% of the groundwater use in the County is extracted from the measured groundwater basins.

Attached are maps of each major groundwater basin showing the wells measured. Each well is labeled as follows:

- Well Number: This is a number assigned by the State, for instance 14N-09W-32M1. The well number identifies the well by Township, Range, Section number and by lot within the section (there are 16 lots).
- S Avg: This is the average spring (April) water level, typically the highest of the year. Most

wells were measured since the early or mid-1960's, however, some wells have data going back to the late 1940's and new wells have been added to the network. The long record can document changes in the physical groundwater condition (i.e. down cut stream channels lower the maximum possible groundwater level), changes in irrigation practices (i.e. changes in crop types and irrigation demands), and seasonal impacts (i.e. droughts).

- F Avg: This is the average fall (October) water level, typically the lowest of the year.
- S2015: This is the water level measured during the period of March 18 through 23. If no number is provided, this indicates we were unable to measure the well for some reason (i.e., the pump house was locked).

These maps only tell part of the story of each groundwater basin, as long term groundwater conditions due to changing water use and aquifer conditions can have a substantial effect the average spring and fall levels. Conditions are also different within different areas within a basin. We evaluated numerous hydrographs (plots of groundwater levels over time) within each basin to prepare the following summary. Well hydrographs are available on the Lake County Water Resources website under Drought Information at: (http://www.co.lake.ca.us/Government/Directory/Water_Resources/Drought_Information.htm).

Big Valley

Big Valley is the largest groundwater basin and the most complicated due to its geology (there are numerous aquifers, some of which have limited connection to adjacent aquifers), recharge characteristics (there are multiple sources of recharge) and differing land use and groundwater use patterns. From the maps, it looked like most of the basin has decent groundwater levels, considering the severity of the current drought.

Wight Way: We have measurements on three wells along Wight Way. The westernmost well was lower than normal, however, it had recovered nearly 30 feet from our Fall 2014 measurement. The two wells near the center of Wight Way were within the normal range, primarily due to limited groundwater pumping in the area. Hydrograph 13N-09W-28J2 was felt to be most representative of the area.

Kelseyville Bench/Gold Dust Drive: This area is served by a deep aquifer of volcanic ash. Groundwater is showing a several year decline. Recharge of this aquifer is from runoff over the exposed ash layer, which is very limited in extent and in drought conditions gets very little recharge. Groundwater levels are near normal spring levels, however, the two wells measured near Renfro Drive were below average fall levels, indicating a problem with recharge in this area of the aquifer (the furthest from the presumed recharge areas). This area will probably require several normal runoff years to fully recover from the drought. Hydrograph 13N-09W-22M1 was felt to be most representative of the area.

Western Valley Floor: This is the main portion of the valley floor to the west of Kelsey Creek including areas along McGaugh Slough, Adobe Creek and Manning Creek. Most of the wells were within 2 feet of the average spring level. One well on Smith Lane is substantially below average for unknown reasons, however, it may be tied to the wells off of Renfro Drive discussed above. Hydrographs 13N-09W-16E2, 13N-09W-07A3 and 14N-09W-32G2 were felt to be most

representative of the area.

Eastern and Northeastern Valley Floor: This is the area east of Kelsey Creek and north of Soda Bay Road east of Lakeside County Park. Current levels are generally less than 3 feet below average for Spring, with the greatest departure from average west of Kelsey Creek. Hydrographs 13N-09W-02C2 and 13N-09W-12M2 were felt to be most representative of the area.

Collayomi Valley

Groundwater levels recovered very well, with several wells above the average spring water level. Well 11N-07W-33M1 has not recovered and Well 10N-07W-03M1 was dry, indicating some isolated problems in the valley. Wells 10N-07W-03L4, 10N-07W-01A1 and 11N-07W-35E1 represent typical conditions within the basin.

Coyote Valley

Coyote Valley has several sub basins, including the main basin (includes Hidden Valley Lake), Crazy Creek basin and the east basin (Comstock and Luchetti).

Most of the water intensive development, including HVLCSD's water wells, is within the main basin. Groundwater levels are near average. Groundwater shortages may still occur in some areas, as occurred last year. Wells 11N-06W-19P2 and 11N-06W-29M1 are representative of this sub-basin.

Groundwater pumping has increased substantially in the Crazy Creek basin in the last 15 years, so it is difficult to determine potential impacts (11N-06W-25P1). Current groundwater levels are higher than those experienced from the mid to late 2000's..

The east basin is normal for the last 15 years of history (Well 11N-06W-27M1), although lower than the pre-2000 levels. This is probably due to irrigation changes. No shortages are anticipated.

High Valley

The wells are near the normal; spring levels experienced in the past 8-10 years, however, they are still substantially higher than levels experienced in the 1960. Due to irrigation changes over the last five decades, comparison to long term averages must be carefully considered. Well 14N-08W-24B2 represents the conditions in the central portion of the basin.

Scotts Valley

The main groundwater storage in in Scotts Valley is at the south end of the valley. All four wells have near average water levels. The relatively high levels are probably due to reduced pumping since most of the pears have been removed from Scotts Valley. Well 14N-10W-14E2 shows the conditions at the southern end of the valley.

Upper Lake Valley

Bachelor Valley wells are within one foot of the Spring average. Well 15N-10W-03D1 s representative of the wells measured.

Groundwater levels in the Upper Lake area are less than 4 feet below the spring average. Well 15N-09W-06K1 represents conditions in the Upper Lake area.

Conclusion

Groundwater levels in Lake County are below normal, however, the deviation from average conditions is generally small. Compared to other areas of California, especially those areas south of the Delta, the impacts of the drought on Lake County's groundwater appear to be limited. No significant groundwater shortages are anticipated in the major aquifers.

Our measurements only occurred in the seven largest groundwater basins in the County. Approximately 70% of the groundwater extracted in the County is from these basins. Our analysis does not include other smaller aquifers and water bearing formations, such as the Clear Lake Volcanics, within Lake County.

Lake County has small aquifers which are able to refill quickly with slightly below to normal precipitation. This permits much of Lake County to recover from drought conditions quickly. However, our smaller aquifers do not have much carryover into subsequent years, therefore, droughts that extend over several years, such as occurred in 1987-1992 can have greater impact on groundwater levels than one or two extremely dry years, such as 1976-77 and 2013-2014.

We encourage all water users to use water wisely and conserve our precious supplies for future use and generations, and to protect our limited water supplies if the drought persists.