Updated Hydrogeologic Conceptualization and Characterization of Conditions Report and the *Napa County Groundwater Monitoring Plan 2013*

April 19, 2013 --- Cliff Notes

Overarching Interests for the Report *Updated Hydrogeologic Conceptualization and Characterization of Conditions* (Report) and the *Napa County Groundwater Monitoring Plan 2013* (Plan)

- Groundwater and surface water are highly important natural resources in Napa County.
- Important sources of water include both groundwater and surface water of good quality and sufficient quantity to meet future urban, rural, and agricultural water demands.
- Long-term, systematic monitoring programs are essential to provide data that allow for improved evaluation of water resources conditions and to facilitate effective water resources planning.

Purpose of the Updated Hydrogeologic Conceptualization

- Understanding the hydrogeology of Napa County is essential to determine how much water is available and to what extent it can be sustainably produced.
- Most previous hydrogeologic studies are more than 30 years old and have focused on the Milliken-Sarco-Tulucay (MST) Subarea or northern portion of the Napa Valley. As such, they have not considered data from hundreds of water well drillers' reports completed since 1970 and have not incorporated plate tectonics theory in their analysis, thus limiting the interpretation of geologic units and related structures (faults, folds, and fractures) that can affect groundwater availability and movement.

Groundwater Monitoring Recommendations in the Report and the Plan

- As part of the updated hydrogeologic characterization, existing monitoring well construction data from all available public sources were reviewed to determine the distribution of aquifer-specific monitoring data in Napa Valley. This effort addresses previous recommendations (LSCE, 2011) to identify and fill data gaps that will allow for analysis of groundwater occurrence and flow as a more robust understanding of the extent of groundwater resources in Napa County is developed, including improving the interpretation of groundwater monitoring results and the understanding of surface water/groundwater interactions.
- Since no such sites were identified within a quarter mile of the mainstem Napa River that are screened exclusively in the shallow Quaternary alluvium aquifer, six (6) monitoring sites are recommended to provide data for groundwater/surface water monitoring (i.e., these are the 6 sites in the DWR grant application). These facilities are planned to be located near to existing stream gauging stations and/or near areas where stream monitoring can also be conducted.
- Eighteen (18) areas of interest (AOI) were identified to fill higher priority groundwater monitoring needs and monitoring objectives. The GRAC and the County will launch outreach efforts in April and May 2013 that encourage volunteered participation in the countywide monitoring program. Volunteered wells outside of the 18 AOI will also be considered for inclusion as appropriate (i.e., lower priority monitoring needs are also identified in the Groundwater Monitoring Plan 2013).

Importance of Improving the Understanding of Groundwater/Surface Water Interaction

- Characterizing the relationship between surface water elevations and groundwater elevations is important for understanding the nature of groundwater/surface water interaction, especially given projections for increased demand for water resources in the future.
- When and where the groundwater elevation is higher than the surface water elevation, then groundwater is expected to flow into the surface water body. Conversely, when the surface water elevation is higher than the groundwater elevation, surface water is expected to flow into the groundwater system providing recharge.
- Historical groundwater levels and trends through 2009 are comprehensively discussed in the report on *Napa County Groundwater Conditions and Groundwater Monitoring Recommendations* (LSCE, 2011).
- Depths to groundwater show generally shallow groundwater throughout much of the Napa Valley, particularly in the northern end of the valley. Overall, groundwater levels have been stable in the main Napa Valley Floor.
- Historical groundwater level declines are described for the MST area and are also noted for the northeastern Napa Subarea. There are four pumping depressions that have developed in the northern, central, southern and northwestern parts of the MST subarea. The latter pumping depression extends west of the Soda Creek fault.
- Monitoring wells completed in the alluvium and located west of the Napa River in the northeastern Napa Subarea have shown stable groundwater level trends. It appears that the extent of the pumping depression beyond the MST subarea may be limited to the northeastern Napa Subarea east of the Napa River.
- There are no currently monitored wells west of the Napa River, which are completed in the deeper Tertiary Quaternary sedimentary basin deposits. As described in the Report (and also in the Plan), additional monitoring locations are recommended in the Napa Subarea to address this data gap.

Groundwater Recharge – Key Component of Water Budget of a Groundwater Basin

- Understanding recharge and other fluxes is important in evaluating groundwater conditions and understanding the effects of land development on groundwater resources. The Report characterizes groundwater recharge with an emphasis on the Napa Valley Floor.
- The groundwater recharge process begins when precipitation or applied water infiltrates below the ground surface. At shallow depths within plant root zones, some of the infiltrated water is consumed by plant evapotranspiration. When soil moisture exceeds its holding capacity, water percolates below the root zone as groundwater recharge. A root-zone water balance model was used to estimate recharge for the Napa River Basin Watershed and sub-watersheds using detailed precipitation, streamflow, and land use data. Model results and model testing indicate that the model reliably considers these factors. This model does not include groundwater pumping, subsurface groundwater outflow from the underlying aquifer system, or direct streamflow infiltration (seepage) along stream channels. The overall watershed water balance, which can be used to observe the quantity of groundwater flowing into and out of the groundwater basin and the change in groundwater storage, can be estimated with the addition of these components.
- Most recharge occurs in the Napa River watershed.
- In the upper part of the Main Napa Valley Floor and Angwin areas, approximately 43 percent of the Napa River watershed consists of geologic units that have the greatest recharge potential.