



Water & Land Resource Manager

TEHAMA, GLENN, COLUSA, AND SHASTA COUNTIES
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A newsletter from the University of California Cooperative Extension seeking to support wise and judicious use of limited water and land resources in the Northern Sacramento Valley.

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FALL IRRIGATION CONSIDERATIONS FOR ORCHARD CROPS

Walnut

Protect this year's new shoot growth

Green walnut shoots that have not had enough time to harden-off are susceptible to injury from autumn frosts. Frost causes the foliage to drop prematurely and leave the green shoots exposed to the sun and heat during bright days in the fall and winter. Moisture loss from the green shoots is more rapid than from mature, hardened shoots and increases the risk of permanent injury to the new shoots. Severe die-back of the current year's shoot growth slows progress in developing and training young orchards into bearing orchards. To lessen this risk, good water management is encouraged from May through August to achieve enough shoot growth for developing and training the orchard. Then beginning in September and continuing through October, modest cutbacks in irrigation and modest levels of crop water stress are suggested to terminate new shoot growth and allow ample time to harden the existing shoot growth. The pressure chamber and midday stem water potential is one tool available to help manage fall season irrigations. Shoot growth in walnut will be more vigorous from May through August if stem water potentials are maintained from -4 to -7 bars tension while shoot growth slows between -7 and -9 bars crop stress. Midday stem water potential levels from -9 to -12 bars tension in September through October will stop shoot growth, promote hardening-off of new shoots, and help protect them from injury from autumn frosts. Sustained crop stress levels in September through October in the range of -12 to -16 bars tension may be too extreme.

Prevent dormant season injury to older fruit wood

Dormant season, winter injury in mature, bearing walnut trees has long been documented and associated with dry fall and winter soil moisture conditions. Two theories help explain winter injury and how to prevent it. First, after the current walnut crop reaches physiological maturity (packing tissue brown) in late summer or early fall, the crop is no longer the primary draw upon the carbohydrates and sugars produced from photosynthesis. Instead, the root system becomes the primary demand to prepare the trees for over-wintering and next year's bud break. If there is not sufficient fall irrigation, leaf drop tends to occur earlier and less carbohydrate is stored for over-wintering. Second, dormant trees lose some moisture through their limbs and twigs by evaporation. If, for a prolonged period in the winter, there is not enough soil moisture

available to the roots the trees are unable to obtain sufficient water to offset the evaporation and desiccation of the thin bark is more likely to occur.

Die-back associated with dry fall and winter soil moisture conditions is fairly distinguishable from frost injury. Frost injury is usually confined to one-year-old wood, but die-back from low winter soil moisture conditions may kill large, older wood. Post-harvest irrigations are effective to help prevent the risk of dormant season cold injury. Mature walnut trees consume about 0.5 to 1.0 inch of water per week in October and November, so enough post-harvest irrigation to replenish this demand will help sustain the canopy and assure sufficient carbohydrate storage in the root system and prevent extremely dry soil profiles entering into the winter dormant season.

Almond

University of California field research has shown post-harvest soil moisture to be very important in bearing almonds. Almonds differentiate their fruiting buds during and after harvest. In some areas of the central valley, imposing complete post-harvest irrigation cutoff resulted in as much as 800 lbs/ac less almond meat yields the next season. In the northern Sacramento Valley, almond water consumption in September and October typically approaches about 6 or 7 inches total. This water may be supplied as some combination of irrigation, rainfall, and use of soil moisture reserves. If a pressure chamber is used as a management tool, midday stem water potential measurements ranging between -12 to -20 bars crop tension in September through October indicate adequate irrigation management.

Prune

Prune harvest has been completed for about a month. After harvest, the main concern is to maintain adequate soil moisture and orchard canopy so that carbohydrates from photosynthesis are stored in the root system to ensure healthy over-wintering and a strong bud-break next spring. Similar to almonds, prune water consumption in September and October typically approaches about 6 or 7 inches total. This water may be supplied as some combination of irrigation, rainfall, and use of soil moisture reserve. If a pressure chamber is used as a management tool, midday stem water potential measurements ranging between -12 to -20 bars crop tension in September through October indicate adequate irrigation management.

Update: local groundwater management efforts

Colusa County

In March 2007, Colusa County began developing a county groundwater management plan. The planning process is overseen by Steve Hackney of the Colusa County Planning and Building Administration and Fran Borcalli of Wood Rodgers Consulting. Several advisory committee meetings and public workshops have been held since then. Past meetings have focused on understanding the groundwater resources underlying Colusa County and knowledge gaps. Reasons for developing a county groundwater management plan and the scope of the plan have also been discussed. The goal is to complete the plan by approximately February 2008.

The next public advisory committee meeting will be held on **Wednesday, October 17, 2007 from 1:00 to 3:00 p.m. at the Colusa Industrial Park Conference Room**. Current discussions are focused on developing basin management objectives (BMO's) as part of the plan. BMO's are an important part of the overall plan because they represent the priorities and measurable criteria intended to guide the management of the groundwater resource. BMO's formalize the goals that the people in Colusa County want to achieve with groundwater management. Public participation in framing of these BMO's is encouraged because there are several possible ways to structure and define them.

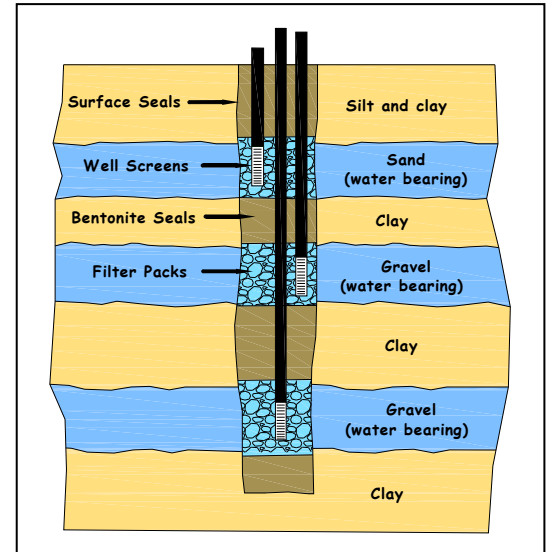
More information is available about the Colusa County groundwater management planning process at <http://colusagroundwater.ucdavis.edu>.

Tehama County

In the past three years, the Tehama County Flood Control and Water Conservation District has used grant funds to install five new dedicated, multi-completion groundwater monitoring wells in areas of Tehama County. These monitoring wells are part of Tehama County Groundwater Management efforts. General locations of the monitoring wells are described below:

1. Near the intersection of Hall and Capay Roads;
2. Nearby the intersection South Avenue and Hall Road;
3. Northwest of Rolling Hills Casino in the vicinity of Rawson Road and South Avenue;
4. Southeast of the intersection of Highway 99 West and Gerber Road; and
5. Near Evergreen School on Bowman Road

Figure 1 illustrates the general concept of a multi-completion groundwater monitoring well. A group of small diameter (usually 2 inch) PVC well casings are constructed within a single borehole. Each casing, also called a "completion", extends to a different depth and has a well screen near the end of the casing. This enables monitoring of groundwater levels and water quality from specific zones in the aquifer formation. These wells are strictly for monitoring purposes and are not used for production purposes. There are at least two completions and as many as five completions per well for the five monitoring wells described above. They are used to monitor groundwater levels and quality from different strata ranging from about 150 to 900 feet deep. Data can be viewed at <http://www.tehamacountywater.ca.gov>.



Glenn County

In February 2000, Glenn County initiated their groundwater management plan in the form of Ordinance No. 1115. Since then, they have actively pursued local groundwater management. They have established a local institutional structure to facilitate county-wide groundwater management and an extensive groundwater monitoring network to guide local management decisions. The monitoring network includes about 20 dedicated monitoring wells, of which most are multi-completion wells, distributed throughout Glenn County. A few of the dedicated monitoring wells include extensometers for measuring land subsidence. A network of survey monuments has also been established across the valley floor in Glenn County to monitor land subsidence. For more information about groundwater management in Glenn County refer to: <http://glenncountywater.org>.

Groundwater Ambient Monitoring Assessment (GAMA) Program

The GAMA program is a comprehensive statewide assessment of groundwater quality. It was developed in response to the Groundwater Quality Act of 2001, a public mandate to assess and monitor the quality of groundwater used as a public supply for municipalities in California. The lead agencies overseeing this program are the State Water Resources Control Board and the United States Geological Survey. A total of 116 groundwater sub-basins in California that account for 75 percent of the states municipal groundwater supply are included in the GAMA program. These 116 sub-basins have been combined into 35 study units that will be sampled initially between 2004 and 2010. The Middle Sacramento Valley and the North Sacramento Valley are included among the 35 study units. The Middle Sacramento Valley unit includes Colusa, Glenn, and Butte Counties, and the Vina and Corning portions of Tehama County. Groundwater samples were collected from 108 wells from June 2006 and March 2007. Summary of the data is in

progress. The North Sacramento Valley unit includes Los Molinos, Tehama, Rancho-Tehama, Red Bluff, Cottonwood, Anderson and Redding areas. Groundwater sampling was initiated October 1, 2007 and is expected to be completed in about one month. The constituents analyzed include pH, temperature, salts, nutrients, metals, and pathogens and more exotic measurements of pesticides, pharmaceutical products, and naturally occurring radioactive isotopes. For more information on GAMA refer to <http://ca.water.usgs.gov/gama/>.

Reminders:

1. Northern Sacramento Valley Water Forum. **A Discussion Regarding An Isolated Facility for the Delta: Is the Peripheral Canal Back on the Table?** October 10, 2007. 2:00 to 4:00 p.m. Colusa Casino Bingo Room. 3770 Highway 45. Colusa, CA 95932.
 2. **Application Deadline:** Friday, November 2, 2007. 2008 Environmental Quality Incentives Program (EQIP). For more information on-line refer to: <http://www.ca.nrcs.usda.gov/programs/eqip/2008/eqip2008.html>. Local telephone contacts include:
 - Shasta County – (530) – 226 - 2560
 - Tehama County – (530) – 527-3013 x 118
 - Glenn County – (530) – 934 – 4601
 - Colusa County – (530) – 458 - 5131
 3. **Tehama County Farm-City Night.** Monday, November 5, 2007. Tickets: \$25. For more information contact Windy Wilson, Tehama County Farm Bureau, 527-7882 or e-mail tcfb@sbcglobal.net.
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Cooperative Extension, University of California

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Allan Fulton
UC Farm Advisor

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