



Exploring the Soil Resource Online

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The UC Davis Soil Resource Laboratory has developed an online soil survey tool (<http://casoilresource.lawr.ucdavis.edu/soilsurvey>) designed to deliver soil survey information through a web interface. The soil survey web browser is a seamless collection of soils information, roads and aerial photography for California, Nevada, and Arizona. Users can access soils information by navigating across the region with point-and-click operations, local street address, or GPS coordinates. Data is organized into critical land use information, geology, detailed soil characterization data and educational summaries on concepts of soil science. It is designed for a wide range of users including growers, K-12 students, government agencies, academics and land managers.

The main navigation page consists of a map of California, Nevada, and Arizona depicting geographic regions of these states where detailed soil survey data are available (Figure 1). Regions which do not yet have detailed soil survey data are colored gray, with a note that only general soil survey data is available. The user can interact and navigate through this portion of the Online Soil Survey in the following ways: 1) a local address, 2) GPS coordinates, 3) legal location (township and range), or 4) point and click operation with the mouse on an area of interest in the map.

Once the user has clicked on a region of interest or submitted coordinates they will be taken to an interactive map-based interface to soil survey data. Various thematic geographic layers are included to help the user further navigate and explore soil survey information. Color satellite imagery is used as the landscape back drop at broad scales. Urban areas,

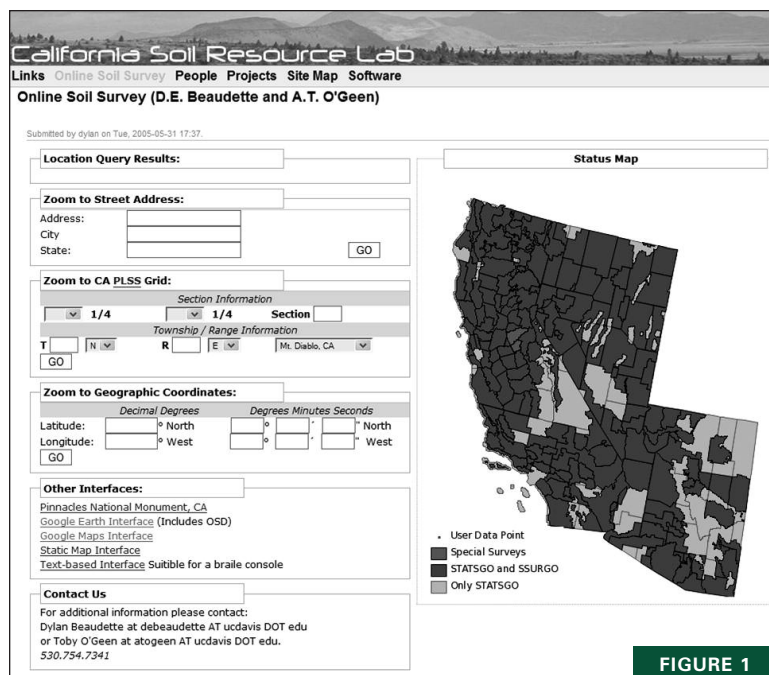


FIGURE 1

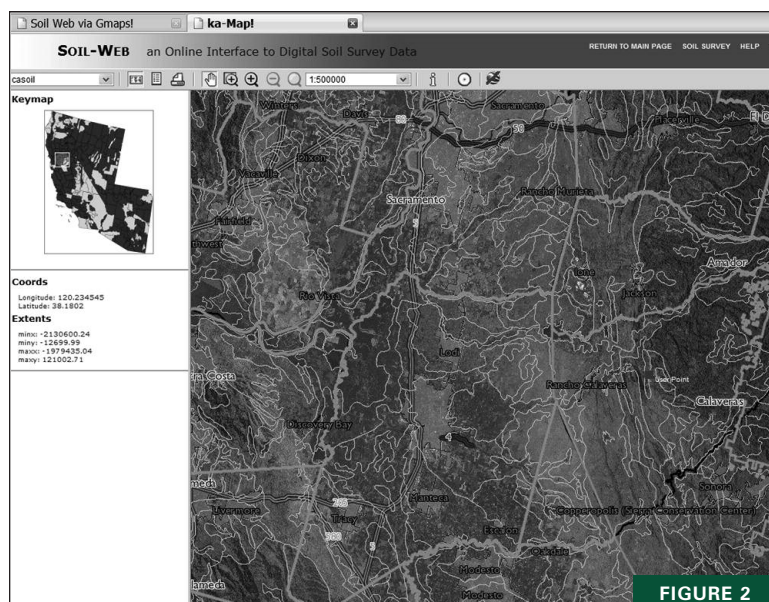
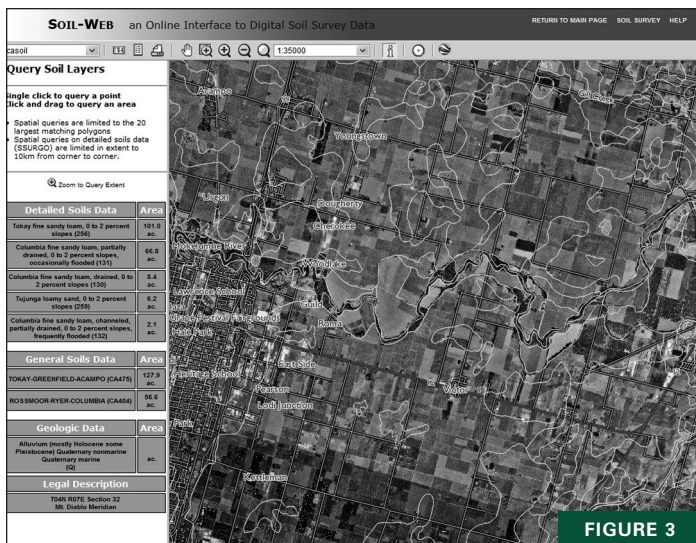


FIGURE 2



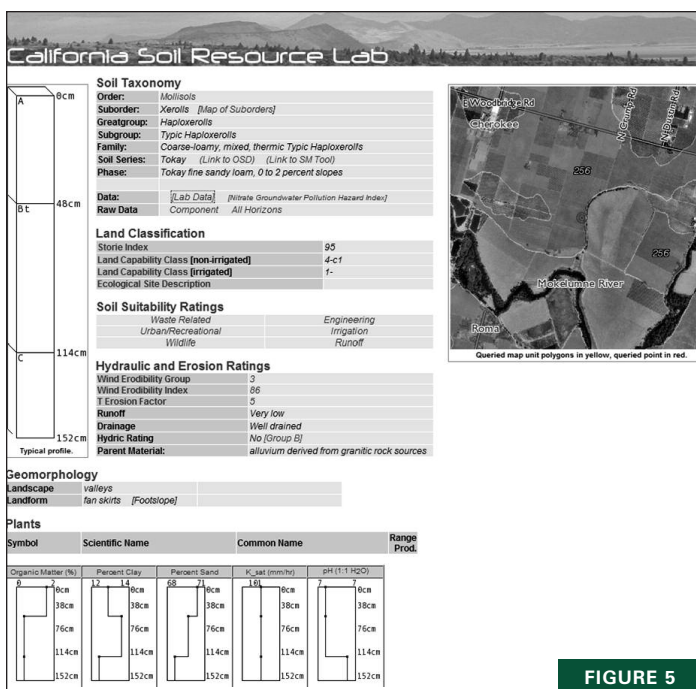
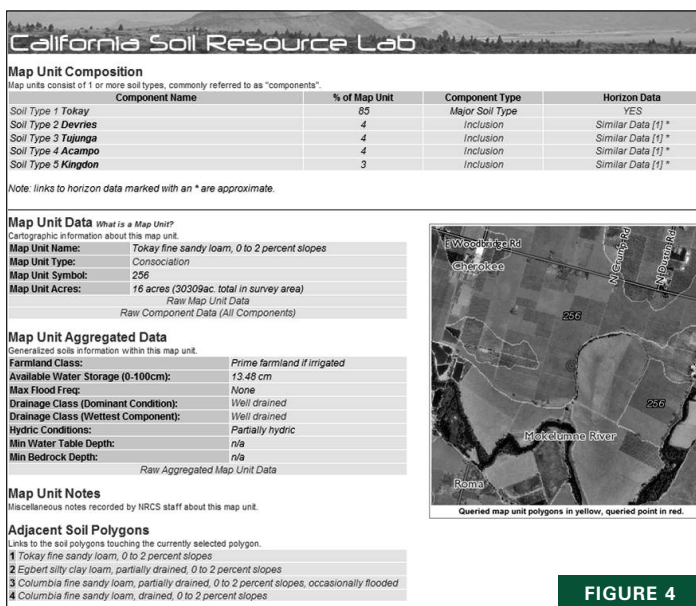
major highways, and soil survey area boundaries with associated county names also appear to orient the user. The state-wide coverage of general soil survey information is also visible at broad scales as gray map unit delineations (soil line-work).

Navigation tools are present at the top of the map that enables the user to zoom in and out, pan, and query (Figure 2). The pan tool (small hand-shaped icon) allows users to drag the visible frame of the map in any direction to view a new area. The zoom tools (magnifying glass icon) are used to change scales. The panning and zooming controls are very similar to other online mapping applications (such as Google Maps or Yahoo Maps), allowing most users to use Soil-Web without any training. Several additional icons in a toolbar, located above the map image, are available for common operations such as linking to the current map view, clipping and saving data for display in Google Earth (Figure 2).

After zooming in to finer scales (1:35,000 and finer), new sets of contextual spatial data appear. Black and white digital ortho-photo-quads represent the landscape backdrop because they have a finer resolution (1-meter), fine enough to identify individual farms. Local roads and streets turn on along with streams and rivers. General soil survey data are no longer visible at finer scales but detailed soils data are visible as yellow map unit linework (Figure 3). In instances where detailed soil survey data is not present for an area, general soils data remains visible.

Soils information can be queried at any scale using the identify tool (small “i” icon) located at the top of the map (Figure 2 and 3). The identify tool works in two ways: 1) a single click with the mouse will query information for the exact point that was clicked on or 2) dragging a box with the mouse to query all soil polygons within that drawn area. After querying with the identify tool the user can access general or detailed data by clicking with the mouse on the links that appear on the left side of the map after a query is made (Figure 3). Clicking on one of these links will open a new window that contains a map unit summary page (Figure 4).

This information contains map unit wide information. Second, component level (soil series names) information is presented on a standard “Component Summary Page”, which can be accessed by clicking on soil names within the Map Unit Summary Page. Component level information refers to specific soil types (soil names) that can be clicked with the mouse on in the “Map Unit Summary Page” (Figure 5). This information contains details on specific soil types identified within a map unit, along with links to associated soil horizon information. These pages contain a summary of frequently accessed and widely used soil properties and interpretations.



The component summary page contains detailed properties and interpretations specific to a single component (soil type) within a map unit. This aspect of the online soil survey separates it from any other web-based soils product available. Soil data are portrayed on this page in a variety of ways conducive to learning about soils. An example soil profile with horizon designations and depths is generated to help users visualize the vertical structure of the selected soil (Figure 5). This profile sketch is dynamically created from horizon boundary and designation information, extracted from the current component's horizon data.

Several commonly accessed soil physical and chemical properties are presented in graphical format (Figure 5). These depth profile plots are well suited toward visual extraction of important trends, such as subsurface accumula-

tion of clay, salinity and permeability. Clicking on one of the graphs (Figure 5) brings up a tabular version of the same data. Each profile graph heading is linked to its definition in the Soil Survey Handbook.

The ability of the online soil survey to link to other websites offers a powerful means of delivering information. There are multiple examples of how this is accomplished in the online soil survey. We encourage you to explore this virtual soil resource tool. Recently we have established a way to view soils information in Google Maps and Google Earth. Access to these applications is available at the main web page (Figure 1). It is our hope that the flexibility of our website, combined with the ability to connect with new internet applications will promote greater use of soil survey information by the public.

GROWER PROFILE

Lee Caton

It is likely that many of you have not yet met Lee because he has been hard at work since arriving in Lodi in 2006 growing high quality winegrapes with Gary Paterson at Nestor Enterprises in the northeastern part of the district. He lives on one of the company's ranches with his wife Vanessa and two month old daughter, Brynn, so he doesn't naturally just run into many LWC members in his daily activities. While he spent several years working in Napa vineyards he can be considered a local because he grew up in Escalon on a family dairy/farming operation, now run by his father and brother.

His interest in farming led him to University of California Davis to get a degree in some aspect of agriculture. He started out majoring in Managerial Economics but he got interested in winegrapes when a friend, who graduated a couple of years before he did, took a vineyard manager job at St. Supery Vineyards and Winery. During weekend visits to the vineyard to see his friend he became interested in viticulture and the possibility of making it a career. These weekend visits led to a summer internship at St. Supery, which really cemented his desire to work in the industry. This inspired him to take the necessary science pre-requisites, which is no easy task, so he could then take as many viticulture and pomology classes as would fit into his



ACRES FARMED:
over 2,000 Acres

YEARS IN WINE INDUSTRY:
8

VARIETIES:
Touriga Nacional, Teroldego,
Petite Sirah, Petit Verdot, Pinot Noir,
Cabernet Sauvignon, Chardonnay, Merlot,
Zinfandel, Syrah, Malbec, Sauvignon Blanc

schedule.

Speaking of schedules, Lee had an extremely busy one during his time at UC Davis. Not only was he a full time student but he was also a starting offensive lineman for the UC Davis football team, spending two seasons as guard and two seasons as center. UC Davis had an outstanding football team during those years, making the playoffs every season. Their skill level was such that they traveled the country to find teams to play so he got to see a good part of the US traveling to other Universities. He graduated in 2001 with a Bachelor of Sciences in Agricultural Systems and the Environment.

After graduation Lee took an Assistant Vineyard Manager position at St. Supery Vineyards and Winery farming in Saint Helena and Pope Valley.

Fresh out of school, he and a fellow graduate had the unique opportunity of being able to apply their viticultural knowledge and techniques that Dr. Andy Walker had taught them while at UC Davis. Management was happy to entertain their ideas and experimentation so long as they produced quality winegrapes at harvest. Not only were they free to try techniques learned in school, but the winemaker kept vineyard blocks separate so they could taste the results of their work. Lee felt this was a wonderful
continued on page 4.

experience that helped shape the kind of viticulturist he is today.

After working at St. Supery for a couple of years he then took a Vineyard Manager position with the vineyard management company Jack Neal and Son. This was another wonderful educational experience for Lee because they managed vineyards for clients that were up and down Napa Valley. He got to experience all the different regions of the Valley and observe how the different climatic conditions affected quality, pest management and irrigation. Some of the company's clients were The Hess Collection, Grgich Hills, Heitz Cellars and Charles Krug. Grgich Hills vineyards are Biodynamically farmed and most of Charles Krug's vineyards are organically farmed, with the rest of the clients' vineyards managed both conventional and organic. That meant Lee had direct experience in farming using the complete range of approaches. As you can imagine, he also got to meet some very interesting people and learn their views on viticulture. The last 6 months of his three year stint with Jack Neal and Son was as their in-house PCA for some 50 ranches covering 1800 acres of vineyards.

Lee's wife, whom he married in 2006, was originally from Martinez. As their interest in starting a family took more of a center stage in their lives they made the decision to move back closer to family. Lee began looking for work in the northern interior wine region, as Lodi and Clarksburg are called now, and found out from Stan Grant about an open job with Gary Paterson at Nestor Enterprises. He interviewed with Gary, was very excited about his approach to growing high quality winegrapes in the Lodi region, and liked his science-based approach. Gary offered him the job and he began working for him in 2006.

Lee feels that one of the biggest challenges in practicing viticulture in Lodi is the constraints of winegrape prices. Meaning the price is going to dictate how much viticulture can be applied to the vineyard. Lee's goal is producing the highest quality winegrapes possible but contract prices are such that he must try to maintain a certain yield per acre. This is an interesting contrast to his days in Napa where cropping level was not a factor due to the high price of grapes. However, as the bumper sticker says, a challenge is also an opportunity. Working in the economic environment of Lodi vineyards has allowed him to take his field experiences and really learn how to achieve quality at a lower farming cost. This situation has helped make Lee and other Lodi growers very innovative in their viticulture, some of the best in California. Of course we all hope for sustainable prices so that we can allow Lodi to achieve the quality it is capable of.

Lee is also involved in contract negotiations with Gary, to sell the grapes they grow. It is the first time in his career that he has had the opportunity to sell grapes and he likes the challenge.

Once Lee got comfortable with his new job and new home he let it be known he would like to become more involved in the grower community and LWC activities. The outcome is that he joined the Research Committee about a year ago and has become a very valuable member. One of his concerns is that the results from the research funded by LWC are made readily available to all grower members.

Lee has been a great addition to the Lodi winegrowing community so if you run into him take some time to get to know him better.

IN THE VINEYARD

BY PAUL S. VERDEGAAL

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Cooperative Extension Farm Advisor

TOPICS:

Spring Start • Nitrogen Balance • Irrigation
Pest Management and Invasive Species
Heat Stress Regulations

A mild spring started very dry, but was alleviated by a very substantial rain in early May. That helped bring total seasonal rainfall to about 85% of average. However, it still left vineyards with a dry soil profile in the deep root zone below two feet. The May rain encouraged shoot growth to almost vigorous levels, at least compared to the last two years. Overall cluster counts and size look good, but don't indicate a huge crop as with each year there are exceptions by variety and by site.

Insects, mite and disease pressure appear to be average or light. Even Vine Mealybug (VMB), which continues to spread, was late in showing activity. Irrigation has already been of interest because of the dry season, but mild spring conditions reduced vine demand and stress. Because of the below average rainfall, vines have used most soil moisture and care should be taken to avoid severe water deficits as hot weather has arrived as I write. There have been some yellow basal leaves showing, and irrigation schedules should be adjusted to meet full vine water use during any heat spikes, especially if you are using on a Regulated Deficit Irrigation (RDI) strategy.

In review of nitrogen needs, there are three main questions: "When should I apply nitrogen?" "How much nitrogen is needed?" And "What is the best form of nitrogen?" Research and field experience over the last 10 to 15 years indicates that the best use of your nitrogen fertilizer dollars is between bloom and veraison, earlier is better than just before veraison when nitrogen and potassium may be preferentially directed by vines to the clusters; both to the concern of vintners.

Shoot growth from budbreak to bloom relies almost exclusively on stored reserves and there is little to no feeder (new) root growth until about bloom. So the window for the best time to apply nitrogen has been open and remains open as irrigation needs begin. *continued on page 5.*

This optimum period ends as veraison or color and berry softening occur, which is fast approaching (around the 4th of July). With ripening it is best to avoid application of nitrogen or potassium that will go straight into the clusters.

The other good opportunity for nitrogen application is immediately after harvest. In the case of potassium, just about any time before early July or after harvest is okay. While foliar sprays may provide some an opportunity for some uptake of potassium, nitrogen or other macronutrients, it is an expensive way to fertilize. There has been a lot of testimonial to foliar nutrient sprays, but never any replicated data that I have seen to suggest improved quality or sugar accumulation as long as long term replacement of nutrient demand is part of a nutrient application program. So be careful of spending a lot of money to “improve quality” with a foliar spray. Although it is possible to see immediate effects, that really suggest that vines are extremely deficient and will show immediate response in their desperate conditions.

Soil texture and irrigation strategy will have some effect on nutrient availability, so how you irrigate along with your soil type need to be considered.

Well water nitrogen levels as measured by nitrates should be checked at some point in the life of a vineyard and can fluctuate from year to year. For every foot of applied water, a one ppm nitrate-nitrogen (NO₃-N) water provides 2.73 pounds of actual nitrogen! Some labs report nitrates as just NO₃, which translates to 0.61 pounds of N per acre-foot. So be careful to read how your water analysis is reported. In any case, you may save some nitrogen and some money, as it is not uncommon for some local wells to have 10 to 15 ppm of NO₃-N. If you put on just 6 inches of water, at 10 ppm NO₃-N, that would be 13.7 pounds of nitrogen during the year by just turning the pump on. Bottom line, maybe it's worth checking your well.

Tissue analysis is very good for monitoring most nutrients, except unfortunately for nitrogen. Nonetheless, annual petiole

samples are good. Leaf blades DO NOT provide better samples than petioles. Soil analysis is good for long-term base lines, but shouldn't be used for fertilizer assessment unless you are growing row crops.

A third question is often, “What kind of fertilizer is best?” Generally the vine doesn't care. But long term use of ammonium base fertilizers can acidify the soil and may short change the vine on a lot of little things. Which leads to the question “Is compost or cover crops better nitrogen for vines?” We seem to care more than the vines does, but it is good to consider compost, cover crops, nitrate-based materials, sometimes manure or a combination. What organic forms of fertilizer are able to provide is a little bit of everything in a time release form. The very nature of organic matter can help improve, on a temporary basis, soil structure and encourages some beneficial microbes. Anyway you may be able to save some money on nitrogen, and if so put it towards other nutrients and improve fruit quality without a loss in yield. However, don't severely short your vines on N. There may be affects on not only the vine's health, but also wine fermentation. Talk it over with your PCA and your winery about nitrogen and potassium levels of fruit delivered.

Irrigation is still one of the biggest steps towards improving wine quality, while saving on field pumping costs. As I finish checking this the first 100 degree days are at hand, which means the pumps should be running. On extremely deep soils, especially in wet years like 1998 a post harvest might be all that is needed. There are some sites in the district, which in some years may be (and are) “dry farmed”, but yields may also be reduced. A drought year or extreme hot spells such as the current one may require some irrigation, regardless of your strategy.

Vine shoot tip and tendril growth are much more sensitive to water stress than either the vine itself or the fruit being carried. There is an artful skill of observing vine growth to determine water stress, but monitoring vine status by pressure bomb is

becoming more common. A pressure bomb provides an objective method to measure the actual vine water status and can be a fairly reliable indicator of when to start.

“How much do I need to irrigate?” As with nitrogen, grapevines get by with much less than most other crops. For the Lodi area, vine water needs seem to be met with a seasonal total of 18 acre inches of water that is about 65 to 70 percent of what the vine could use if allowed. This total seasonal need includes available water in the soil from winter rains, any rainfall after budbreak and irrigation. Actual irrigation that may be needed depends on soil, rootstock, variety, trellis system, irrigation system efficiency, spacing, vine health and of course, winery goals. A very general example might start with a deep sandy loam soil and an average winter rainfall of 17 inches. For Zinfandel (red program) on a vigorous rootstock, a seasonal schedule could total about 120 to 175 hours of actual run time, using two ½ gallon emitters per vine. Chardonnay may be a little more at 175 to 225 total hours. This year we may need to add the extra water by the end of the season to make up for the dry spring. A little extra water during any Extreme hot spells of 100 degrees F over several days is good to keep in mind. The topic of fruit quality, distinctive wines and irrigation will continue to be discussed. These items will also be a part of presentations Terry Prichard hopes to make, in summarizing local research.

The threat of Glassy Winged Sharp Shooter (GWSS) is still a cause for some concern, but locally the Ag Commissioner Staff has kept the GWSS a very distant threat. However, the Vine Mealybug (VMB) introduced during the period of 1998 to 2002, continues to spread to new locations and within vineyards. If you haven't attended a meeting or seen photos of this pest pick some up at the LWC office, the Ag Commissioner's office or the UCCE office in Stockton.

Recently, a new potential pest to be on the lookout for is the Light Brown Apple Moth (LBAM). It has been found in several

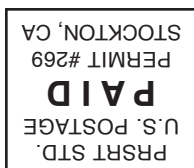
Bay Area counties, in Napa and Sonoma. It is an Australian hitchhiker that could pose a threat for many crops including grapes. It is similar to OLR in many respects, but as a potential new pest could cause major problems and increase pest management costs once again. Be on the lookout for all three pests as the season progresses.

And just as of the last couple of weeks another pest is raising concerns. The cherry growers have been facing a new threat as their harvest wrapped up this year. A species of Vinegar fly, *Drosophila susukii*, which attacks sound fruit, is being found in many cherry orchards. This is different to the long time recognized vinegar or *Drosophila* fruit fly we see only on fruit (including grapes) first damaged by other insects, bunch rot or physical damage. The new species seems to be attracted to cherry fruit and has been found in strawberries and raspberries in the Central Coast. It was first identified in Japan in 1924 and has been reported in Spain, but not on grapes that we are aware. Be on the lookout for unusual fruit fly activity especially near cherry orchards. More information and meetings will be announced. If you have any questions or concerns give one of our offices a call or the Ag Commissioner's office or the CDFA web site.

Heat stress regulations have been changing and if you have crews working in temperatures above 85 F even with labor contractor crews, check out the CalOSHA website, or the web site www.laborcounselor.com that LDGGA has contracted with to provide information and updates. Or check with Farm Bureau and their Farm Employment Law Service. Good luck in 2009.

WEATHER FORECASTS AND OTHER GREAT WEATHER SERVICES FOR LWC GROWERS

The Lodi Winegrape Commission contracts with Western Weather News Inc. in Chico to provide an excellent set of weather services free of charge to all Lodi growers. It includes an excellent locally focused daily forecast, released at about 7am every day, as well as access to a great deal of other valuable weather information such as hourly and daily detailed weather data from all 15 stations in the district, summaries of weekly or monthly weather data from archives, results of the Powdery Mildew forecast model, links to insect degree day models, etc. This service has been in place for a couple of years now, is accessible through LWC's website www.lodiwine.com under 'Grower News'. Look for 'Lodi Wine Country Weather' on the popup menu. However, not all Lodi growers are aware of it so be sure and tell your friends and neighbors about it.



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