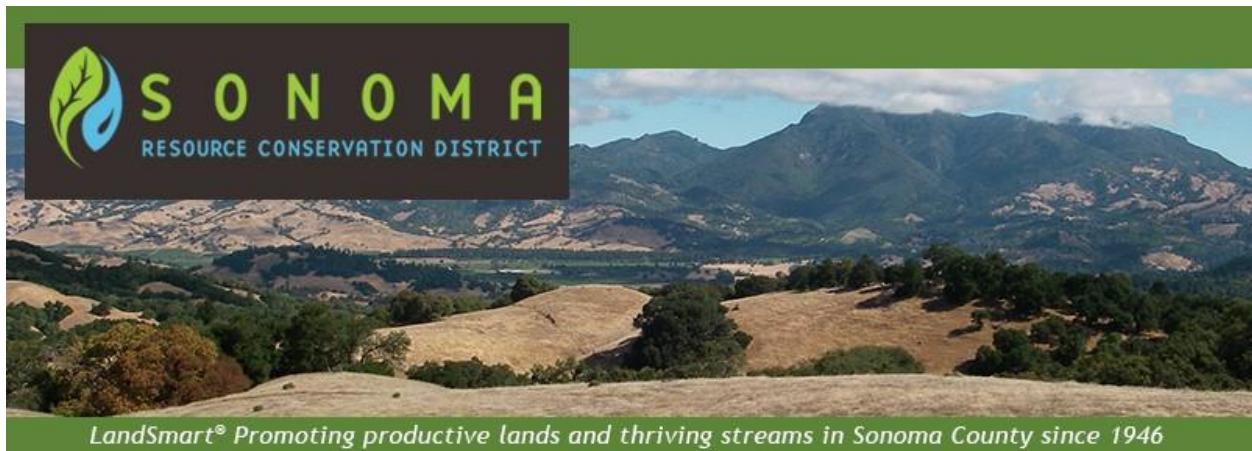


## Free Resources for Frost Protection

Growers need the best and most accurate information possible to make good frost protection decisions. By having the right data at the right time, growers can protect their crops using the least amount of resources. If a grower uses water to frost protect, it is essential to use only enough for crop protection, but no more. Ideally, a grower can frost protect using wind machines or cold air drains without using water. However, all frost protection methods require energy, which uses fuel, costs money, and increases greenhouse gas emissions.

Fortunately, there are several tools available to the grower at no cost to help them maximize the efficiency of their frost protection activities with the minimum amount of run time. Most importantly, managers need to know when it is time to initiate frost activities. If you wait too long, or start too early, you are wasting resources. Knowing the dew point temperature instructs growers on the best time to initiate frost protection. Dew point temperature is determined by factoring air temperature with relative humidity. The lower the relative humidity, the lower the dew point temp and the higher air temperature that frost protection needs to start. This can be determined by referring to the NRCS and Sonoma RCD's Vineyard Frost Protection Guide. This can be found at [www.sonomarc.org/html/publications.htm](http://www.sonomarc.org/html/publications.htm). See the tables on page 14 to know when to turn on your system. This guide provides lots of other useful information on frost protection and alternative techniques as well.

Site specific data from thermometers and weather stations provide the most relevant information for initiating frost protection. However, growers do not always have this information available, and there is always a need to use forecasting to be prepared in advance. The Weather West Group provides a variety of useful information at no cost. Current info and forecasts are available via phone and email. You can call the Weather West Group hotline anytime at (707) 847-5245. Each morning they update current information, forecasts and information specific to growing regions in our area. This service can be useful anytime of the year, but from mid-February to mid-May frost forecasts are posted. You can also obtain a large set of data and forecasting via their email service. To receive this, sign up via the link on the Sonoma County Winegrowers website at [www.sonomawinegrape.org](http://www.sonomawinegrape.org). Hit the grower resources tab, followed by the weather tab. It takes under a minute to sign up and then emails are sent to you each morning. You will get information from several areas in the county including max/min



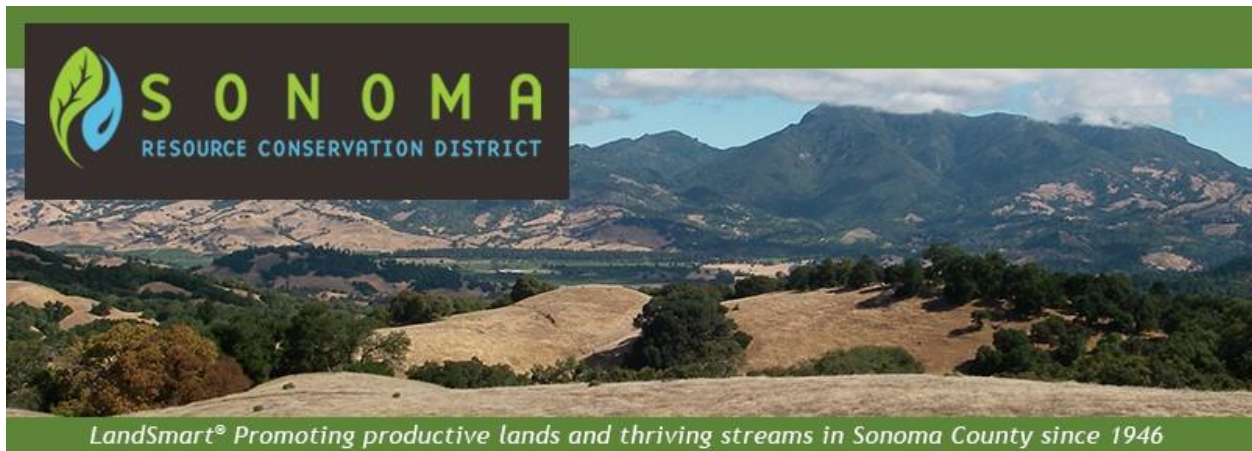
temps, precipitation, dew points, ETo, wind, solar radiation, growing degree days, chill hours, and more. The email also provides a 5 day outlook on several of these variables, along with a short term and extended forecast discussion. Additionally, a powdery mildew index and forecast is available from March thru October.

While you are on the Winegrower's website weather page click the "VIEW Sonoma County weather data here" link. It takes you to Western Weather Group's site for Sonoma County, providing an expansive set of weather data. This includes all the information provided in the emails and on the phone hotline, as well as radar images, long range forecasts, and much more. You can also click on the Wester Weather Mobile Page link to get information updated every 15 minutes from 14 weather stations around the county.

Lastly, growers can sign up for frost protection alerts via the Winegrower's webpage. Alerts go to growers via email or text when thresholds have been hit that tell you it's time to initiative frost protection. Growers can choose which weather station(s) of the fourteen around the county they want alerts from, and the thresholds for alerts for parameters including temperature, wind, dew point, and rainfall.

Be aware that using information from forecasts and other weather stations may or may not be accurate for you. Frost conditions can be very site specific, and change quickly in a short distance. This is especially true in known frost pockets. Try to use your own equipment to monitor on site conditions. However, if this is not possible, do your best to identify nearby weather stations and observe if their conditions tend to reflect yours. Also make correlations between frost forecasts and what happens at your site, and then make decisions accordingly.

Frost protection is a source of anxiety for many growers. It can require significant amounts of water and energy, and needs to be done right to protect sensitive plant tissue. However, it can be managed effectively using a minimum of resources, with tools that are readily available. If you do not have your own weather station, temperature sensors, automated controls, or telemetry equipment, consider tapping into the extensive resources that are available to you at no cost.



## **Frost and Solutions for Prevention this Season**

Spring can be a challenging time for vineyards with frost threatening newly breaking buds. With the drought enduring despite the current rains from El Nino, and more stringent water use regulations in effect in the Russian River watershed specifically, the need to conserve and use water efficiently remains at an all-time high. The RCDs have gathered some tips on how to be best prepared for such events and options available to best suite natural resource and vineyard needs. Here are some things to keep in mind:

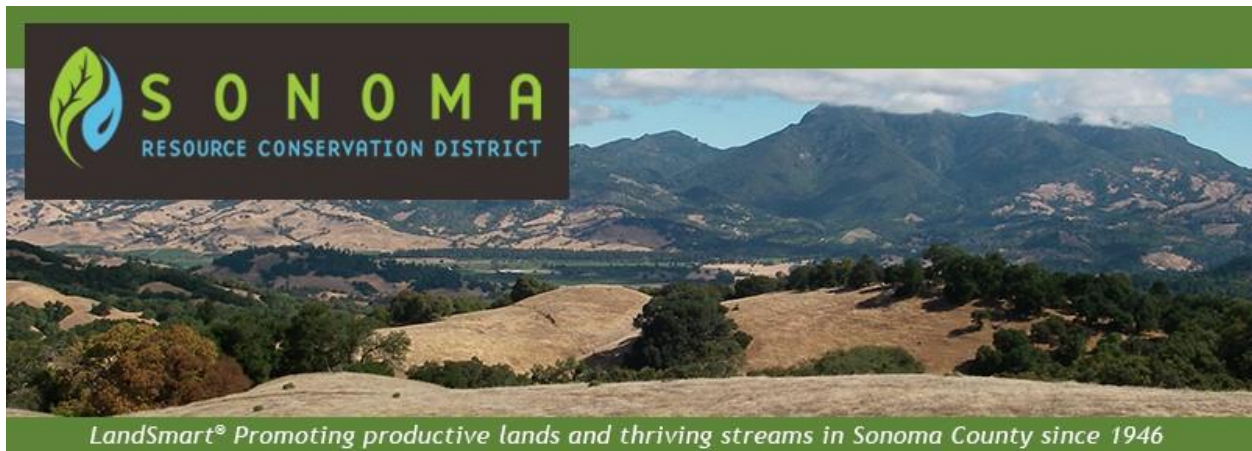
### **Types of frost Sonoma County grape growers should be aware of:**

- **Advective (or Windborne) Freezes:** These are typically rare in California winegrowing regions, and usually only occur during the winter dormant season. Large arctic air masses blow across the landscape covering entire areas and are usually joined by heavy winds. In these cases, it is unlikely that all crop damage can be prevented.
- **Radiation freezes:** are more common for the Sonoma County region and can occur frequently during the spring season, the time when vines are most vulnerable. These freezes can occur on calm, clear nights when the heat from the ground radiates upward, and cold air sinks below and around the vines.

### **Passive and active frost protection solutions can significantly reduce the threat of frost and steward water responsibly:**

- **Passive solutions** include increasing soil water content, cover cropping to buffer the effects of frost, and managing barriers such as vegetation, fences, berms etc. to prevent exposure to cold air, or removing such blocks to increase air flow through vine rows.
- **Active solutions** include using water-overhead impact sprinklers, water-micro sprinklers, wind machines, Cold Air Drains®, and heaters.





**There are several things you can do to manage frost events on your property while conserving water resources:**

- Mow your cover crops low, and reduce cool air pools in your vineyard by designing an open-landscape with hedgerows planted and structures placed at proper angles and distance from the vines.
- If possible, prune later to delay bud break.
- Switch from standard overhead to micro-sprinklers that use a third of the water.
- If your property isn't exposed to very low temperatures, consider using a wind machine, which requires no water.
- Some growers have successfully used waterless Cold Air Drains® to displace cold air where it gathers in lower elevation.
- Weather stations to more accurately know when to start and stop sprinkler frost protection measures.

Frost protection is needed to safeguard crops; however, it is crucial to select practices that also maintain stream flows for fish and wildlife, and in a way that keeps you in compliance with current regulations.

**Water conservation questions to consider for your vineyard:**

- How much water do I use/need for frost protection?
- Are there ways that I could reduce or eliminate the amount of water I use for frost protection?
- Rain-catching ponds are an excellent solution for spring frost protection needs. What types of permits would I need to build a pond?
- How big of a pond would I need to meet my frost protection needs?

Each frost protection system has its advantages and disadvantages. It is important to research and consider the best option for your needs. Technical assistance to grape growers interested in improving their frost protection management is available through your local RCD.