4/7/09 Bd Wrkshp
Russian River Frost Protect.
Deadline: 4/2/09 by 12 noon

Testimony of Pete Opatz

State Water Resources Board

Workshop regarding: The Need for and Effect of Water Diversions for Purposes of Frost Protection in Mendocino and Sonoma Counties

April 7, 2009

Sent Via E-mail to Jeanine Townsend, Clerk of the Board

Commentletters@waterboards.ca.gov

Good afternoon, my name is Pete Opatz. I am Vice President of Viticulture for Silverado Properties. I have worked along side a large number of wine grape growers in the Alexander, Dry Creek and Knights Valleys of Sonoma County on water conservation and species protection efforts. I, similar to hundreds of other grape growers, call Sonoma County home. These valleys are the grape growing regions of Sonoma County and are crucial to the economic vitality of our region, and indeed our state. The monetary value of grape production, for Sonoma County totals more than $8 billion dollars annually. In addition, the Dry Creek serves as the conduit for delivery of potable water to more than 600,000 northern Californians.

My involvement on salmonid species protection dates back to 2006 when I began participating in the Sonoma County Salmonid Coalition meetings. Since that time, this group has met with the various regulatory agencies and numerous stakeholders to better understand how agriculture can participate in projects and an overarching program that demonstrates net positive and cumulative conservation benefits to fisheries resources while protecting the region's economic viability and provides regulatory certainty for grape growers

As we are all aware, millions of dollars over the last decade have been spent in the Russian River watershed on individual projects with little or no effort to address the cumulative impacts of demands placed on watershed health by water and land use activities. The end result has been that **one conservation or restoration project at a time is constructed but individual projects do not effectively promote the goals of protecting our watershed's natural resources while balancing the need to protect the region's economic viability and provide regulatory certainty.**

Working through the Salmonid Coalition, we gained a significant understanding of the value of cooperation and coordination of activities, including timing of water diversions, the design and siting and construction for winter storm storage, the establishment of best management practices to protect the fisheries, the implementation of frost protection standards, development of beneficial land use practices that we are confident will result in a 4(d) program for incidental take of Steelhead Trout, and a **voluntary agreement with the Sonoma County Water Agency for the purpose of informing a future coordinated management program**. Agriculture producers, working through the Sonoma County Salmonid Coalition, have worked tirelessly to advance water conservation goals. This is why many of the agriculture producers in

theses Valleys were shocked by the letter from Steve Edmondson of NMFS to Ms. Vicky Whitney, dated February 19th.

Ag producers are well aware that comprehensive restoration and enhancement of the tributaries and main stem of the Russian River is critical for long-term persistence of salmonids. That is why in 2007, National Marine Fisheries, California Department of Fish and Game and the Sotoyome RCD **gained access to 86 private property sites** in the three Valleys for assessment of watershed conditions. This unprecedented cooperation was fostered and nurtured by property owning agriculture producers. The end product of this cooperative effort is the NMFS's *Draft Habitat Restoration and Conservation Plan for Anadromus Salmonid Habitat in Selected Tributaries of the Russian River Basin*, **which identifies 102 beneficial conservation** and restoration actions. Currently, several of these projects have been funded and are underway.

To build upon that success, in 2008, **the private property owners in Alexander Valley applied for and received a grant to support future efforts at conservation**. In addition to restoring habitat for salmonids, these dollars will be used to monitor stream flows and provide **real-time data** in the Russian River and key tributaries. In addition, working with the Sonoma County Water Agency and Drs. Adina Merenlender and Matthew Dietch, property owners have started to explore a "smarter" approach to meeting water demands. This approach includes capturing and storing water, **off stream**, in periods of high rainfall for use in dry periods. This model for water storage will help in protecting the quality and quantity of the water we depend on for healthy salmonid populations, human consumption, and agriculture use. We continue to work with Dr. Merenlender and Dr. Deitch, to create a pilot program for utilizing this model. **What we need most to make this a reality is your assistance here at the state water board – embracing this concept and reservoir construction permitting.**

We have also been working together to better understand the impacts of frost protection and irrigation practices. In response to concerns over frost protection impacts, the agriculture producers in these Valleys met, on many occasions, and developed best management practices associated with frost protection water use. These practices include:

1) cover crop and vegetation closed mowed.
2) double-pruning or late pruning to retard bud break.
3) application of copper to reduce ice-nucleating bacteria.
4) monitor thermometers at specific sites – relying on remote weather stations do not always provide adequate and/or accurate data for timing the initiation of frost protection.
5) use dew point values to determine threshold for sprinkler start up.
6) briefly irrigate if soil is dry.
7) use of wind machines to replace or reduce the use of sprinklers for frost protection.

The Sonoma Winegrape Commission has held workshops to inform and educate vineyard managers and owners about these practices. For everyone's use and reference, they are posted on the Winegrape Commission website. We anticipate that we can further develop and refine these practices to promote additional reduction of impacts with BMP's for irrigation initiation and for pre-and post-harvest irrigation. Frequently we have a good idea of approaching frost threats. By tracking the weather coming out of the North, we can predict and be prepared to coordinate water demand and timing with each other and with the Water Agency.

Recognizing the water storage was only a piece of the solution, in 2008, the grape producers began working collaboratively with the Sonoma County Agriculture Commission, the Sonoma Winegrape Commission, the United Winegrowers and regulatory agencies to identify agriculture best management practices (BMPs), that once implemented, will enhance and further protect watershed natural resources from the impacts of land use activities. These "Draft" BMPs include

1) measures to address impacts of farm roads.
2) promotion of the use of cover crops, where and when appropriate.
3) vineyard layout and planning designs that protects resources.
4) drainage techniques that will benefit water quantity and quality.
5) protection of riparian zones.
6) implementation of low impact pest management program.
7) integrated management techniques for all aspects of the vineyard landscape.

A finalized BMP document is expected by the end of 2009.

To further conserve water and create habitat agriculture producers are supporting and participating in the development of a comprehensive arundo removal and riparian habitat re-vegetation plan. This will be coordinated by the local RCD and once concluded will greatly enhance water conservation and fish habitat along the main stem of the Russian River.

Our list of accomplishments and efforts are enormous. It is unfortunate that Mr. Edmunson was unaware of these activities and Mr. Roy did not include Sonoma County representatives on his task force to address concerns about direct diversions during frost protection on stream flow reductions that may imperial salmonids. We feel local representation on an issue this important to our agriculture is needed. Thank you for having me here to day. I look forward to answering any questions that you may have.

Water Conservation: Reducing Irrigation Use in Your Vineyard

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Many north coast growers are being asked to reduce their water consumption this season by 15%. This largely concerns growers in the Russian River basin, which extends from Mendocino County southward through Sonoma County. Grape growers who obtain irrigation water through water rights to the Russian River will be directly affected.

Lower rainfall this winter and spring, combined with reductions in water diversions into Lake Mendocino, which feeds the Russian River, has resulted in insufficient water reserves to maintain flow in the Russian River to support the fall Chinook salmon spawning season.

So, what can growers do to conserve water?
There are numerous ways in which growers can reduce water consumption. It simply comes down to applying only what is needed and applying irrigation in an efficient manner.

Cover crop management
Unfortunately, a big opportunity for water conservation has already passed us by for this season: management of cover crops. Cover crops, especially the native perennial grasses, are thirsty drinkers of water. In most growing seasons, this is very advantageous to growers in the North Coast, as the cover crop is a very effective means of reducing soil water content in order to restrain vine growth. Disking, or better yet, close mowing of the cover crop is an effective means of preserving soil moisture in a dry year, such as this one.

Wait as long as possible before starting the irrigation season
Irrigating too soon is the most common mistake committed by growers. But, deciding when to begin the irrigation season is not that difficult and requires no special equipment. Looking at shoot tip growth is very revealing. Usually, vines do not require irrigation if the shoots are actively growing and need to be irrigated only after they have stopped or have slowed down significantly. However, if they begin to slow down before they have achieved the proper shoot length (3-4 feet or about 18-22 nodes), then irrigation must be applied to maintain continued, but slow, shoot elongation.

Irrigating too early compounds the inefficiency of water management by creating large vines. Large vines use more water than smaller ones because it is the actively-transpiring leaf area that drives water use of the vine and vineyard.

Short and frequent irrigation works best for many vineyards
With drip irrigation, irrigation applications of small volumes with short periods of time between applications benefits vineyards in many ways. The downside is that it is less efficient to apply only small amounts of irrigation, as water is lost by evaporation from the soil surface each time

irrigation is applied. This may be mitigated by avoiding irrigations during the heat of the day. Irrigate early in the morning or during early evening, or even at night.

The important thing is to know the proper volume of water needed that will penetrate no deeper than the weakest soil portion of the irrigation block. By weakest, I mean the shallowest and/or coarsest soils and root zones. That is, the areas that can hold the smallest volume of water. To irrigate any more means that water flows past the root zone and may be wasted. While the areas of the vineyard that have more depth and water holding capacity will not be irrigated with as much water as they can hold, the net result is that the entire vineyard receives as much as it can hold without wasting water.

Irrigating in shorter bursts means that the duration between irrigation events must be shorter. For example, instead of irrigating for 5 gallons per vine twice a week, applying 2.5 gallons four times a week may be more effective and efficient. In this manner, you may find that you have been irrigating too much, and that only 2 gallons per application may be sufficient to maintain a given vine water status.

There are other factors to consider, including use of a greater number of emitters per vine (or per unit length) with smaller discharge rates rather than fewer emitters with higher rates.

Soil moisture sensors, preferably the permanently-installed, electronic type, installed at several depths can assist in determining the proper volume of each irrigation application. Apply different volumes to the vineyard and find out how much can be applied without seeing much change in water content of the sensor below the root zone. If you don't know the depth of your root zone, get a backhoe out there and look.

As far as scheduling how much to apply on a weekly basis, sometimes trial and error works just fine, especially in California where the weather does not change much from day to day and week to week (relative to most of the rest of the world). However, there is nothing wrong with using an ET (Evapotranspiration) based approach. Reference ET values are readily available.

See how little you can irrigate your vineyard

The term "deficit irrigation" seems to be getting a bum rap lately, perhaps because viticulturists and winemakers have been pushing the limits too far. But gently "teasing" the grapevine with mild stress at times during the season can produce higher quality wines with the side benefit of water conservation. The amount and timing of the gentle stressing of the vines depends on many factors, including variety, stylistic goals, rootstock and climate.

The key is that if deficit irrigation is to be used, water status monitoring is an essential component of such a practice. While I have used the pressure chamber for years (and will continue to do so), my current tool of choice is the porometer. The porometer measures stomatal conductance: how open or closed are the leaf stomata (pores). Closed leaf pores mean that the vine is experiencing some stress (among those is water stress, but low humidity and wind can also close stomata). While not a measurement of photosynthesis, stomatal conductance may imply a relative measurement of same.

Until recently, a practical and cost-effective porometer was not available to the agricultural and viticultural world, outside of the research community. But the leaf porometer from Decagon Devices in Pullman, Washington, has broken through that limitation.

The important thing is that, no matter what you use to measure vine water status, logs must be kept of vine water status throughout the season. Sometimes patterns of water status are more revealing than absolute numbers. Keep records of visual indicators, like leaf senescence or sun-avoidance. Note the values of water potential or stomatal conductance at those times and make sure that you don't hit those stress levels again.

Victims of our own success?

As an industry, wine grape growers have already done many of the right things to conserve water in their vineyards. So, asking for further reductions may seem like punishment for our good behavior. But opportunities like this provide an opportunity for our industry to demonstrate to our communities that we are willing and able to improve our practices even further. Maybe you are running a tight ship. But is your neighbor?

Extracted from an article in Wine Business Monthly - July 2007.

Frost Protection and Water Conservation

Recent winter rains have alleviated concern for early spring water deficits in vineyards. However, shortages in public reservoir storage are likely to remain after this rainy season is over. Flow in the Russian River may be severely limited by late summer, making it important for vineyard owners to conserve water this year. Consequently, it is important to minimize the use of overhead sprinklers for frost protection this spring to preserve public and private reserves for late-season irrigation. Remember that the public is watching us to share in water conservation.

Best management practices for frost control:

- Keep cover crops and other vegetation closely mowed to the ground. Moderate or tall vegetation lowers vineyard temperatures at night and increases frost risk.
- Double-pruning or late pruning will retard budbreak. Conduct the final pruning after the more apical buds have pushed.
- Apply copper to reduce ice-nucleating bacteria.
- Use your own thermometer. Frost is very site-specific, so don't rely on a remote weather station or your neighbor's thermometer. Measure well away from your neighbor's vineyard if it has sprinklers in operation.
- Better yet, use a bulb-type, aspirated psychrometer (wet and dry bulbs), like a Psychro-Dyne, available online ($165) at www.forestry-suppliers.com. The wet bulb is very useful. Portable electronic types are available, but are less accurate at low dew points than are bulb-types. Sling psychrometers may also be used.
- Use dew point values to determine your threshold for sprinkler start-up. Use a psychrometer and associated look-up tables, if possible. If not, using publicly-available dew point information within your region is better than using nothing.
- Guidelines[1]:
    - Dew point greater than 35°F — Little chance of frost damage[2]
    - Dew point of 24°F or higher: — Turn on sprinklers at 34°F air temp.
    - Dew point between 20 and 23°F: — Turn on sprinklers at 35°F air temp.
    - Dew point of 19°F or lower: — Turn on sprinklers at 36°F air temp.
    - These apply only when frost is predicted. Turn off sprinklers when air temperatures rise back to 34°F, ice is melted, or wet bulb temperature exceeds 32°F.
- If using a wet-bulb device, frost control must be active for wet bulb temperatures of 32°F or lower.
- Wet soil surfaces conduct and store heat better than dry ones. If soil dries out by late spring and frost is forecast, brief irrigations (1-2 gallons per vine) periodically may help.
- Use wind machines to assist in frost control, where available and applicable.

Prepared by Mark Greenspan, Advanced Viticulture, with input from Sonoma County winegrape growers.

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[1] Snyder, R. (2000) Principles of Frost Protection. University of California Regents.
[2] Glen McGourty, Oral presentation. UC Cooperative Extension.