



## Chapter 10

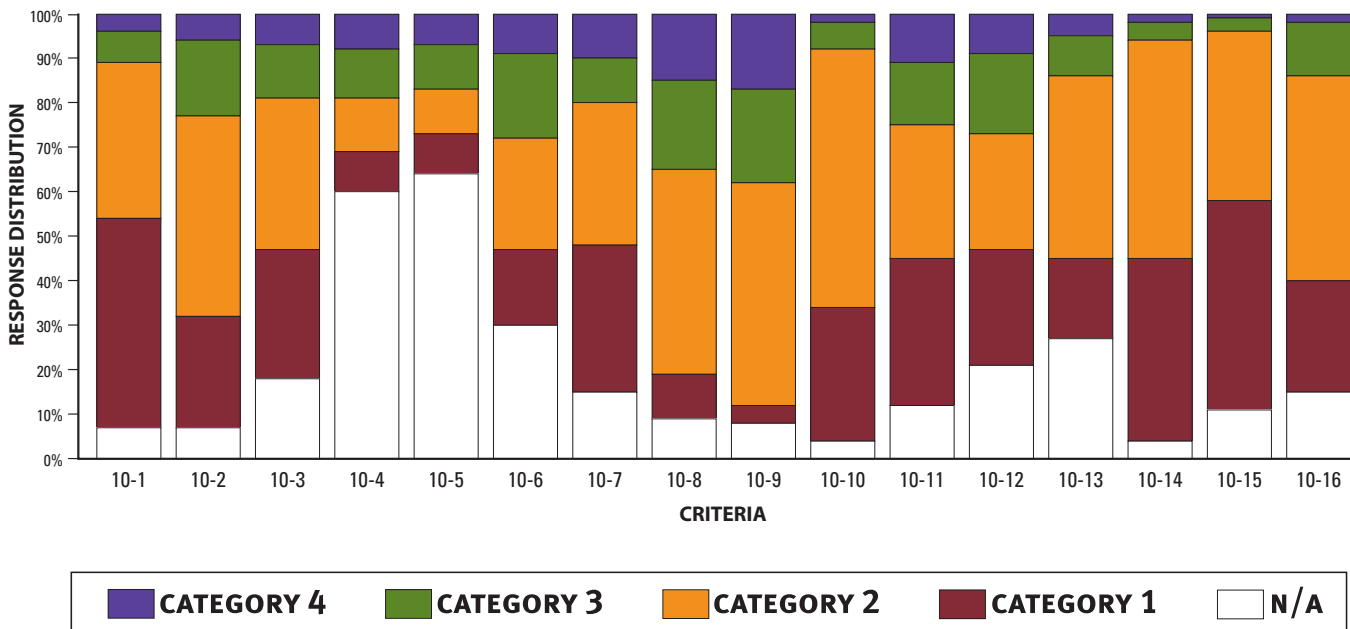
# WINERY WATER CONSERVATION AND WATER QUALITY

# Background

A critical element to the sustainability of the wine community is the ability to affordably acquire, use, process, and discharge water while maintaining its original quality. At every step of the winemaking process, from crushing and pressing through fermentation and aging to the bottling of the finished product, water is required. Water is at the heart of the sanitizing system, making sure that tanks, barrels, and the bottling line are properly clean.

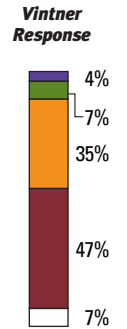
As presented in the Ecosystem Management chapter, the water cycle is just that, a cycle, where water comes into a facility and is discharged back into the environment. The amount and quality of the water used and discharged from winery operations is included within the water cycle. As a steward and user of water resources, it is important to monitor and record the amount and quality of water coming into operations from wells, surface water, and/or municipalities. Some wineries have installed water meters at key operational points to be able to monitor water use during specific operations like crush, fermentation, and bottling. This added information has allowed these operations to track, analyze, and fine-tune the effectiveness of water conservation practices at these key points along the production process. This understanding will help the industry shift from trying to deal with “process water” issues, to identifying ways for reusing this valuable resource.

## WINERY WATER CONSERVATION AND WATER QUALITY BENCHMARK DATA

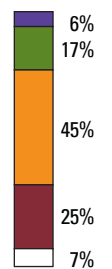


# Benchmark Data

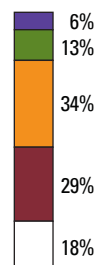
**10-1. WATER CONSERVATION** At the core of any water conservation program is the awareness of how much water is being used. Knowing the total amount of water moving through a winery allows for comprehensive conservation planning with clearly defined goals that can be achieved. 46% of the vintners have conducted a water audit in the last 2 years and 11% have also monitored and recorded total use, set yearly goals and implemented a comprehensive water conservation program that includes a water team. 4% of these vintners have reduced water use by 15% from a per gallon production baseline while the other 7% of these vintners have realized a 10% reduction. 47% have a general idea of their water use and 7% replied N/A, not applicable or information not available.



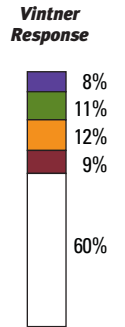
**10-2. WATER QUALITY** Since the final wine product contains about 87% naturally-occurring water, it is important to monitor the quality of the water coming into the facility. The quality of the water leaving the facility and entering the discharge system also needs to be monitored to ensure that the highest possible quality of water is returned to the environment at the end of the process. 23% of the vintners have developed a comprehensive water quality element for their conservation program, test the water quality at least quarterly, record and track testing results, set yearly goals and have selected and implemented a pretreatment option, if needed. 6% of the vintners also test their water quality weekly, compare their quality to industry averages and have improved their water quality during a baseline testing year. 45% of vintners test yearly and are considering pretreatment options, if necessary. 25% of vintners know their water is potable but do not know the quality of their water. 7% replied N/A, not applicable or information not available. Many wineries get their water from a licensed municipality source.



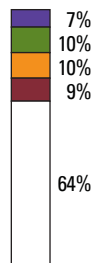
**10-3. WELLS** The primary access point for water for many wineries is their well(s). Water is extracted from the earth and distributed to the winery operations through the use of energy. Once energy is factored into the equation it is even more important to know the amount of water flowing from wells to the winery. 53% of the vintners have meters installed on their wells. In addition, 19% of the vintners monitor the meters at least monthly, record and track water use and quality, use the information as part of their conservation program, and have a separate meter for the winery if wells are also used for irrigation or landscaping. 6% of the vintners take further measures such as monitoring wells weekly in periods of high demand, determining their water use per gallon of wine produced, and using the information in employee training. 29% do not have meters on their wells. 18% replied N/A, not applicable or information not available.



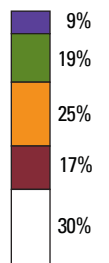
**10-4. WATER TO PROCESS WATER PONDS** The other side of the water cycle for wineries is the amount and quality of water that wineries discharge from their operations. Since the natural biological processes taking place in ponds will affect the water, the first part of this awareness is the amount of water going into the ponds. 40% have flow meters installed at process water ponds. All of these vintners using flow meters conduct regular testing of the process water, know to where the discharge drains and have identified storm drains on site. 31% of the vintners have labeled their storm drains and inspect their sumps annually, while 19% of vintners monitor the meters at least quarterly, record and track the information, and inspect sumps quarterly and clean them annually. 8% monitor weekly, use the information as part of their water conservation program that includes training and cleaning procedures, protect storm drains, and inspect sumps monthly and clean quarterly. 60% replied N/A, not applicable or information not available. Some wineries remove their water through septic systems, discharge to municipalities or hauling off-site.



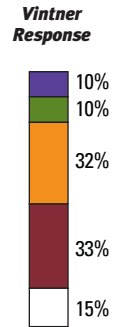
**10-5. WATER FROM PROCESS WATER PONDS** Whether the process water from the winery operations is discharged to the environment from septic systems or ponds, it requires awareness and monitoring. As water leaves the site, it carries with it not only waste from the winery but also the potential for risk and liability. 27% of the vintners have flow meters for their process water discharge, record the results and apply their pond water to the land. 17% of the vintners also monitor monthly to quarterly, apply pond water to landscaping and/or vineyards, and have visited other facilities to investigate alternative disposal methods. In addition, 7% monitor weekly during high-demand periods, have implemented at least one additional alternative disposal method (e.g. fire protection, fountains, wetlands) and serve as a mentor for other wineries seeking options. 9% of the vintners have no flow meters and 64% replied N/A, not applicable or information not available and may be using other methods of discharging water.



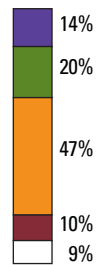
**10-6. SEPTIC SYSTEMS** Some wineries use a septic system to handle their waste water. These systems need to be monitored and maintained to insure that they are adequate to the task. 28% of the vintners have grease traps installed (if applicable), have an operations and maintenance plan in place, and have trained management and staff in the “dos and don’ts” of septic systems. 9% of the vintners also check the system regularly and record the results, have educational posters in the bathrooms, and have a separate leach field for processed water. 25% of vintners have grease traps and randomly check the septic system. 17% have a system but don’t check it, and 30% replied N/A, not applicable or information not available.



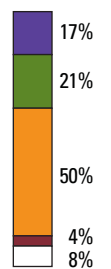
**10-7. STORM WATER** Rain is an important element of the water cycle. When it falls on a winery operation, it can carry material off-site through storm drains to nearby surface water. Because runoff can contaminate surface water, a plan for storm water runoff is critical. 20% of vintners have covered crush and press pads; identified, labeled and documented all storm drains; installed diversion valves with visual above ground indicators; trained management and staff on diversion valve operation; keep unwanted rainfall water out of the processed process water network; and have storm water as part of a water conservation plan. 10% of the vintners also inspect the diversion valves and record the results. 32% have identified and labeled storm drains; installed diversion valves in critical storm drains; minimize unwanted storm water to processed water network; allow storm water from uncovered crush and press pads into process water network only during harvest; and include storm water in water conservation plan. 33% allow storm water from uncovered pads into process water all year, have identified storm drains, and subject the process water network to unwanted water from rainfall. 15% replied N/A, not applicable or information not available.



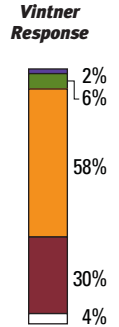
**10-8. CRUSH OPERATIONS** One of the most water intensive procedures at a winery is the crush operations, as cleaning the crush pad requires large amounts of water. The cleaning operation can be enhanced and water conserved if pre-cleaning of the equipment surfaces is done before wash-down. 81% of the vintners pre-clean their equipment and use high pressure/low volume nozzles with shut-off valves. 20% also cover crush operations to reduce “baking” of waste material on equipment; and have cleaning procedures as part of their water conservation program. 14% of the vintners include the cleaning procedures as part of employee training. 47% of these vintners have uncovered crush operations and are in the process of developing cleaning procedures. 10% have crush operations outside, do not pre-clean and use a high volume nozzle with shut-off valve. 9% replied N/A, not applicable or information not available.



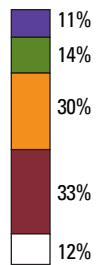
**10-9. PRESS** During crush operations, presses also require large amounts of water for cleaning. 88% of vintners pre-clean their equipment and use high pressure/low volume nozzles with shut-off valves. 38% of the vintners also cover crush operations to reduce “baking” of waste material on equipment; and have cleaning procedures as part of their water conservation program. In addition, 17% include the cleaning procedures as part of employee training. 50% of the vintners have uncovered crush operations and are in the process of developing cleaning procedures. 4% have crush operations outside, do not pre-clean and use a high volume nozzle with shut-off valve. 8% replied N/A, not applicable or information not available.



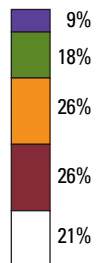
**10-10. FERMENTATION TANKS** During every stage of the winemaking process, cleanliness and sterilization are crucial. The cleaning of tanks and transfer lines consumes large amounts of water to ensure against contamination. 8% of the vintners clean the tanks and transfer lines with known amounts of water; apply water from the top of tanks with a spray ball; monitor and track water information as part of employee training; and reuse tank water for secondary rinses on other tanks. 2% of the vintners also check transfer lines for appropriate diameter, lie out and leak detection, and they have implemented a water-conserving sanitation option (i.e. ozone). 88% of vintners estimate the amount of water used, clean tanks with high pressure/low volume nozzles, and send all process water down the drain. 30% of these vintners don't know the amount of water they use. 4% replied N/A, not applicable or information not available.



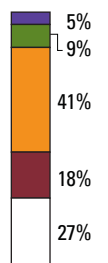
**10-11. BARREL WASHING** The amount of water used for barrel washing can vary. 55% of vintners use high pressure/low volume nozzles with shut-off valves, train employees in barrel cleaning procedures and monitor and track the amount of water used during barrel cleaning as part of a water conservation plan. Of these vintners, 25% clean barrels using temperature controlled hot water, monitor and control the water temperature, incorporate the water use information in employee training and test alternative sanitation and cleaning technologies. 11% of the vintners also control water volume through the use of timers and have implemented one or more alternative technologies. 33% use as much hot water as needed and use a high volume nozzle with a shut-off valve. 12% replied N/A, not applicable or information not available.



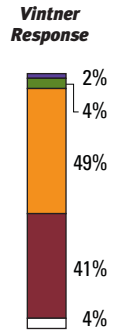
**10-12. BARREL SOAKING** Water is also used to soak the barrels to detect leaks and seal the barrels. 53% of vintners monitor and track the water used in barrel soaking as part of a water conservation plan and empty the barrels with full knowledge of the capacity of their process water system. 27% of the vintners also rotate the barrels to seal and detect leaks, soak heads separately and use the water information in employee training. 9% of these vintners measure the water used and only use cold water. 26% fill the barrels completely to the top and empty them without knowledge of the process water system capacity. 21% replied N/A, not applicable or information not available. Some wineries may use an off-site service to detect leakage.



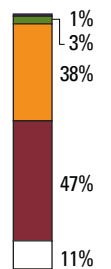
**10-13. BOTTLING** The bottling line must be clean and sterilized for the winemakers. 55% clean the pump and filter with high pressure/low volume equipment with shut-off valves and have developed filler sterilization procedures. 14% also accurately measure and track water use as part of a water conservation plan. 5% take additional measures such as having filler sterilization procedures with set cleaning times; incorporating water use information into employee training and testing at least one alternative cleaning technology on-site. 18% sterilize the filler with hot and cold water for as long as needed, clean the pump and filter with high volume cleaning equipment and do not know their total water use. 27% replied N/A, not applicable or information not available. Some wineries use custom bottling operations.



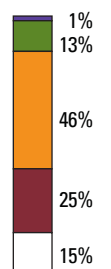
**10-14. CELLARS** Determining the amount of time it takes to clean the cellar and the amount of water necessary to clean can help alleviate wasting water in this area. 55% of vintners use high pressure/low volume cleaning equipment with shut-off valves. Of these vintners, 6% accurately measure and track water use as part of a conservation plan; train cellar workers in water conservation practices; accurately determine clean-up time; and post water awareness information in the cellar. 2% of the vintners also use the information in employee training and have a cellar worker as a member of the water team. 41% of the vintners do not know the amount of water used or the time needed for clean-up, use high volume equipment with shut-off valves and have cellar workers who are unaware of water conservation. 4% replied N/A, not applicable or information not available.



**10-15. LABS** While winery laboratories do not consume large amounts of water, there are practices that can be put in place to conserve water. 4% of vintners have accurately determined rinse time for laboratory samples; trained lab workers in water conservation; measure and record water use as part of a conservation plan; equip sinks and rinse tanks with water-saving devices; and make water awareness information available in the labs. 1% of the vintners also use the information to reduce water consumption; train lab employees in water conservation; have a lab worker as part of a water team; and have implemented a new lab technique to reduce water use. 38% of vintners estimate rinse time and water use while making the lab workers aware of water conservation information. 47% do not know rinse time or water use and the lab workers are unaware of water conservation information. 11% replied N/A, not applicable or information not available.



**10-16. LANDSCAPING** Many wineries have extensive gardens and landscaping as part of the wine country ambiance. Some of these can require large amounts of water to maintain health and appearance. Some wineries use drought-tolerant plants and process water from the winery. 60% of vintners have landscaping that is drip irrigated with automatic irrigation; check irrigation lines at least biannually; have at least 25% drought tolerant plants; and mulch or compost at least once a year. 14% also have moisture sensors or rain shut-off devices; mulch or compost at least twice a year; check irrigation lines at least quarterly; include landscaping as part of a water conservation plan; and use at drought tolerant plants in at least half of the landscaping. 1% of the vintners take additional measures such as incorporating water conservation practices in landscaping as part of employee training; using treated process water in irrigation; checking irrigation lines monthly; and using drought tolerant plants in 75% of the landscaping. 25% of the vintners water by hand or with sprinklers, don't know the percentage of drought tolerant plants, and check irrigation lines annually. 15% replied N/A, not applicable or information not available.



## Best Practices

**Statewide Strengths:** Though the winery water conservation and quality criteria are extremely challenging, more than 25% of vintners reported using the highest level of water conservation and quality practices in their crushing, pressing, barrel washing, and barrel soaking operations.

Clos du Bois in Geyserville treats the process water from its winery with a two-story black box near the vineyards at a rate of 90 gallons a minute. Inside this biodigester, a four-foot layer of bacterial mass resembling black Beluga caviar breaks down organic waste in the water, producing a methane gas byproduct. The gas is captured and burned off into heat and water vapor.

“Because Clos du Bois quadrupled its production in the last decade to 1.5 million cases, we were faced with establishing several acres of new settling ponds and treatment facilities,” says Chuck Stewart, facilities manager at the winery. “We instead chose the biodigester because its footprint of 10,000 square feet simply uses less space and is faster at purifying the water. It has helped the winery grow and will aid us in continuing to grow.”

Before installing the biodigester in 2002, Clos du Bois relied on its ponds to clean the water, using aeration, bacterial treatments and standard dwell times to drop out solids. The biodigester, which holds 130,000 gallons at any one time, treats the same volume of process water that would otherwise take two to three acres of ponds to accomplish. Stewart explained that the biodigester does not require a lot of maintenance. The flows are programmed. One staff person takes tests and samples and monitors the system.

“It’s to our benefit to ensure that our process water from cleaning tanks, barrels and crushers will be clear and clean. The treated water is recycled back through the drip irrigation systems on our property and eventually returns to us from our wells, the source of all of our winery water. We’re just taking care of ourselves and our neighbors.”

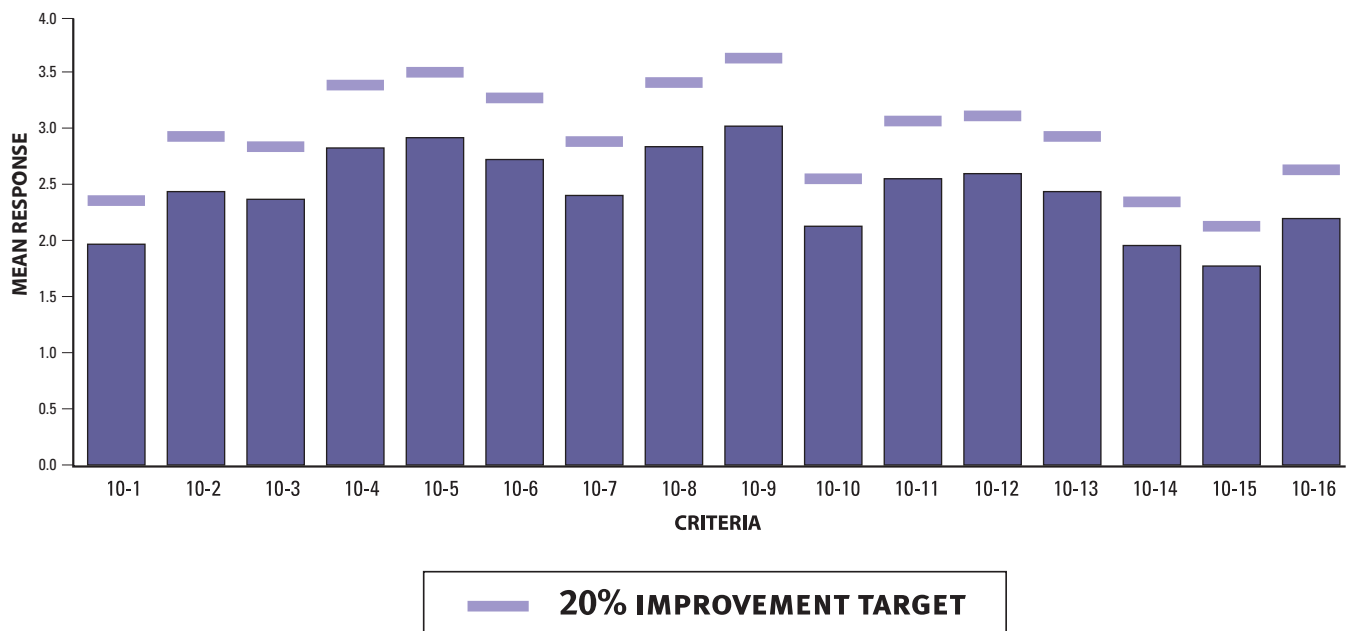


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## Targets and Timetables

**Statewide Opportunities for Improvements:** There are opportunities for the majority of vintners to improve their water conservation plans (criteria 10-1). Opportunities also exist for improving practices in one or more criteria for most vintners.

The California Sustainable Winegrowing Alliance has set a desired goal of demonstrating improvement in the scores indicated below. By harvest 2009, CSWA will strive to move the average scores to the positions marked in purple. When these goals are attained, practices will have improved from the initial benchmark averages by 20%. To reach these goals, CSWA needs partners. If you are interested in improving winery water conservation and quality protection practices, please email [info@sustainablewinegrowing.org](mailto:info@sustainablewinegrowing.org).



*“Finding solutions that people can live with usually reaches beyond compromise to something more like neighborliness — to finding within shared space the possibilities for a shared inhabitation.”*

DANIEL KEMMIS, *COMMUNITY AND THE POLITICS OF PLACE*