

# Vineyard Water Management: Best Management Practices

## Sonoma County Water Agency / Advanced Viticulture, LLC

- **Reduce irrigation water usage**
  - **Irrigation avoidance:**
    - Don't start to irrigate too early in the season (wait until shoots stop growing before irrigating – assuming that shoots reach proper length before stopping)
    - Manage cover crop to minimize its competition (closely mowing is best option); disk in if absolutely necessary to maximize water conservation
    - **Limit use of overhead sprinklers for cooling:**
      - Leave some leaves and laterals to protect fruit from direct sunlight.
      - Leave one side of VSP loose to shade fruit.
      - North or northeast row orientations are less sensitive to heat stress than east-west oriented rows.
      - Limit or eliminate late-season sulfur and horticultural oil applications – these materials promote leaf burn during hot weather.
      - Increase trigger temperature for start-up of system.
      - Apply overhead sprinklers in pulses. Allow for evaporation between cycles. Less than 50% duty cycle should be effective.
      - Reduce system pressure for this purpose. Use just enough pressure to get sprinklers to turn.
      - Install a system of low-volume “misting-type” spray heads, instead of impact sprinklers.
  - **Irrigation reduction:**
    - Smaller vines use less water – leaf area transpires water. Begin irrigation later in the season and hedge vines to constrain canopy.
    - Restrain the use of nitrogen fertilizers that induce vegetative growth of vines
    - In most cases, short & frequent drip irrigation is much better than large, infrequent applications – may allow for less overall water application.
    - Install additional drip tubes to selectively irrigate weaker zones in the vineyard earlier in the season without irrigating the entire vineyard block.
    - As above, install a second drip tube to irrigate soil zones with lower total available water holding capacity on a more frequent basis than zones with higher total available water holding capacity.
    - Use soil moisture devices in weakest soils of each block to discover how long irrigation may be applied before water is wasted (i.e. moving past root zone). Soil moisture devices can also help to determine length of intervals between applications, by observing the drying pattern.
    - Employ a moderate deficit irrigation program while monitoring soil and/or vine water status. Vine water status monitoring (using a pressure chamber or Porometer) is highly desirable, since soil moisture instruments are not easily calibrated.
    - **Reduce post-harvest irrigation:**
      - Refrain from using overhead sprinklers for irrigation of vines.

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- Use drip irrigation for post-harvest fertigation and irrigation of the vines.
  - Vine irrigation is not necessary if vines are in senescence. Irrigate only if leaves are green following harvest. Some fertilizers (e.g. potassium and micronutrients) may be applied if vines are not active, but do not apply nitrogen if vines are senescing.
  - Use overhead irrigation only for shallow irrigation of cover crop seeds. Consult local farm advisor for best practices for cover crops.
  - Use permanent (self re-seeding or perennial) cover crop to avoid re-seeding every fall.
- **Improve system and irrigation efficiency:**
- Perform frequent (at least once per week) and repetitive inspections of drip laterals and emitters, valves, filters, etc. Look for leaks in the system. Repair any leaks immediately.
  - Perform system uniformity evaluations at least once per season using timed collection of water output in catch cans. Less than 65% uniformity triggers system flush.
  - Reduce height of drip emitters where possible to reduce evaporative losses from splashing.
  - Apply mulch under the vines (or under drip emitters) to reduce surface evaporation – use caution with mulch cover, however, if voles are a potential pest problem
  - Nighttime irrigation is more efficient than daytime irrigation.
  - Apply short and frequent irrigation applications (as mentioned above).
  - Monitoring vine water status will allow for decisions regarding whether improved efficiency will allow for an overall reduction in irrigation volume.
- **Perform rotational (nighttime) pumping:**
- Pump during the night, when water demand on the river is at its lowest.
  - Recharge ponds at nighttime or irrigate at night, if direct feed.
  - Rotate with neighbor growers or within your own vineyard blocks.
  - Electric pumps: Install time-of-use meter to significantly save PG&E costs.