California Envirothon
2017 Current Topic
Agricultural Soil and Water Conservation Stewardship

Setting

The Rio del Rey is a river in Northern California, approximately 60 miles long with a number of small tributaries. Its 450 square miles of watershed encompasses a world renowned wine growing region. Its headwaters are in the Mayacamas Mountains and its terminus, San Pablo Bay. The climate is ideal for growing wine grapes as the days are typically dry, sunny and warm, followed by cool nights allowing grapes to ripen slowly and evenly. Average annual precipitation is 20.39 inches.

The Rio del Rey provided habitat for the once abundant and richly diverse anadromous salmonid populations specifically chinook salmon (*Oncorhynchus tshawytcha*) and steelhead trout (*Oncorhynchus mykiss*). It historically supported a spawning run of 2,000 to 4,000 coho salmon (*Oncorhynchus kisutch*). Several large and small dams were built between 1924 and 1959 which became impassable barriers to salmon and steelhead seeking their historic spawning grounds. As a result, the coho salmon were extirpated from the watershed in the late 1960s and the steelhead population significantly reduced to less than a few hundred adults from a historic spawning run of 6,000-8,000.

Despite the losses of robust salmonid populations, the Rio del Rey watershed continues to support a fish community of uncommon diversity (e.g., steelhead, fall-run Chinook, river lamprey, white sturgeon, etc.). It is because of this that the Rio del Rey is a priority for special protections by both the state and federal fisheries agencies.

Background

Agriculture in the watershed was once as diverse as the fish. Fruit and nut trees (primarily prunes and pears) were the root of the economy. Following World War II and until late in the 20th century, wine grapes became the primary crop. Vineyards were planted on well over 90% of county agricultural land.

In 1990, the local regional water quality control board listed Rio del Rey as water quality impaired due to increased sedimentation (pursuant to the federal Clean Water Act). There was evidence of widespread erosion and concern regarding adverse impacts to fish habitat and the decline (since the 1940s) in abundance and distribution of steelhead and salmon in the Rio del Rey and its tributaries. An analysis was conducted to document the impacts of erosion and sedimentation on habitat for chinook salmon and steelhead trout, and other threatened species whose populations have declined substantially in recent decades. The findings were as follows:

- Channel incision in the main stem of the Rio del Rey
- Spawning gravel and pools blanketed with sediment
- Reduced habitat diversity
- Reduced food supply for fish
- Increased instream water temperature

A river sediment and habitat enhancement plan was prepared to examine the water quality problems, identify pollutant sources (including pesticides), and specific actions to restore a healthy fishery in the Rio del Rey watershed. Included among the sources to sediment loads were eroding roads, river bed and bank erosion, grazing impacts, stormwater runoff and vineyards.

The Rio del Rey watershed endured the recent years of prolonged and extreme drought. Unusual restrictions were imposed on citizens, cities, and agriculture. Conservation measures were instituted to require more efficient and precise use of water to conserve a finite supply of surface and groundwater. On-farm stewardship practices were identified and implemented to manage and stretch available water supplies (e.g., soil moisture and crop water status monitoring, timing of water applications, vegetated filter strips, off-stream storage ponds, etc.).

Mourning Dove Vineyards and Winery (or Ranch)

Fiona Birdsong is fifth generation of a California ranching family in the Rio del Rey watershed. The Birdsong family recently converted 60 acres of cattle grazing lands to vineyards. This gives them a higher value use of the land and piqued their interest to try and learn something new. The family has long been interested in sustainable winegrowing to demonstrate their commitment to social consciousness, conservation of natural resources, and environmental thinking. They believe sustainable farming as a moral imperative as well as a marketing advantage.

Fiona, as lead manager in developing plans for the Mourning Dove Vineyards and Winery, is aware of the water quality issues regarding sedimentation and fish habitat in the Rio del Rey. The Mourning Dove Ranch is located on Borracho Creek, a tributary to the river. A sediment load assessment conducted by the local regional water board identifies Borracho Creek as contributing a medium input of sediment supply. In the strong interest of being good stewards of the land as well as good neighbors to those downstream, the family is looking at reducing and preventing sediment loads from sources on their property to Borracho Creek. Their hope is to avoid the imposition of any further restrictions or regulations by the local regional water board and the local district of the fish and wildlife agency.

The family is interested in sustainable water management to protect water quality, improve fish and wildlife habitat, conserve a finite resource, and earn a reputation for conservation stewardship for the Mourning Dove Winery label. Also important is optimizing the value and success of the Ranch. Fortunately, grapevines can be grown with minimal irrigation for which they have a drip irrigation system. They are mindful to carefully oversee use of their water supply and to water with precision especially with a view to drought and climate change impacts.

Scenario

As staff resource experts to the Borracho Creek Resource Conservation District, the Birdsong family is seeking your advice and knowledge to develop a vineyard conservation plan. The plan must identify and inventory erosion in all its forms and the associated sediment loads (e.g., high, medium, low), recommend management practices for reduction and prevention, and how to more efficiently manage water supply. Given that the former land use was cattle grazing over many decades, the plan needs to take into account and address the legacy impacts to the watershed such as loss of riparian vegetation, stream bank erosion, and eroded sites.

The plan shall include goals and measures for restoring and protecting habitat for fish and wildlife, improving water quality, and cultivating biodiversity. The conservation plan must also recommend specific on-farm water stewardship practices to reduce, control or mitigate erosion and sediment runoff (e.g., vineyard erosion control practices such as the use of permanent vegetative ground cover), provisions for wildlife habitat including restoration of riparian vegetation and tree canopy, and practices to manage, conserve, or augment the supply of water (e.g., conservation, irrigation efficiency practices, soil or plant moisture sensors, recycled wastewater, off-stream storage, groundwater recharge, etc.).

The plan should further identify sources of sheet and rill erosion and sedimentation such as roads and gullies, and assess the degree of slope which contributes to soil runoff during a storm event. Other types of soil erosion must be identified and methods utilized to estimate and predict soil erosion to assess land use impacts (such as roads, use of farm equipment, etc.).

The Birdsongs ask that the plan's scope include findings of the quality of the vineyards soil and whether there are soil quality issues beyond loss of soil material by erosion, such as compaction of layers near the surface, infiltration reduction, nutrient loss or imbalance, infestation of weeds or pathogens, excessive wetness, and loss of organic matter.

In addition, the family is keenly interested in forging public/private partnerships to protect and restore the watershed collaboratively and holistically. They are interested in available technical and financial assistance from trusted public agencies such as the USDA-Natural Resources Conservation Service and Farm Bill programs (e.g., Environmental Quality Incentives Program). They want to know more about available grant funds from the 2014 California Proposition 1 (Water Bond) for multi-benefit ecosystem and watershed protection and restoration, and whether they are eligible for funding of priority projects they wish to implement as part of the vineyard conservation plan. They ask the BCRCD for recommendations of resource agency specialists and the technical assistance they may offer (e.g., site-specific erosion analysis at vineyards, cost-sharing, alternative practices, runoff patterns, aerial photographs, soil surveys, etc.) to advance implementation of their vineyard conservation plan.

Lastly, a feedback mechanism, such as monitoring, is necessary and important to inform and/or confirm the effectiveness of the selected suite of practices the Birdsong family will implement to reduce sedimentation and improve water conservation stewardship. They want the BCRCD to recommend the variety of methods for monitoring such as ambient water quality, biological indicators, vegetative monitoring, and BMP effectiveness monitoring to be included in the vineyard conservation plan.