



Chapter 8

ECOSYSTEM MANAGEMENT

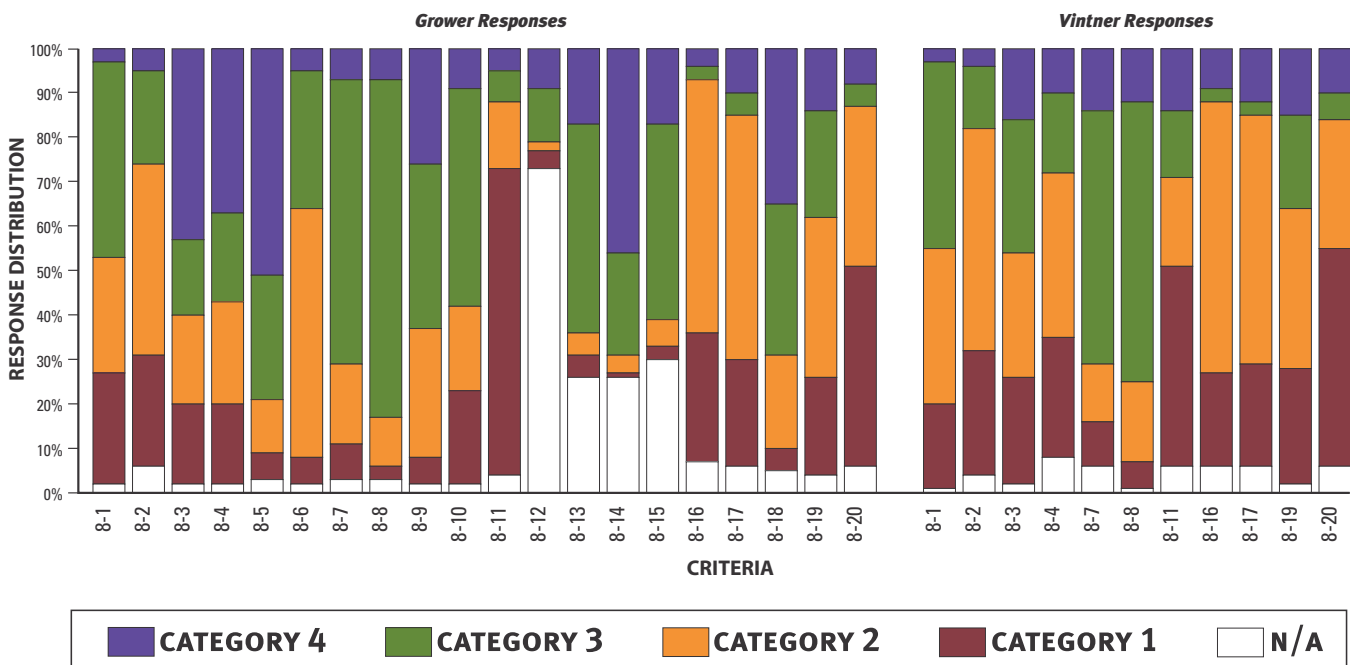
Background

Producing quality winegrapes and wine requires a practical understanding of biological processes and the ability to make sound decisions to interact with these processes. Grapevines, cover crops, and other plants in and around the vineyards and wineries depend on sunlight for energy, water, air, nutrients for growth, and “good bugs” to keep pests in check. Healthy soil depends upon the microorganisms and small animals in the soil, which also need energy, air, water and nutrients in order to thrive.

The investments made by growers and vintners need to take into account the natural capital that is inherent in these biological processes. Personal commitment to stewardship of the land and increasing regulatory requirements are among the reasons growers farm to minimize impacts on the environment while capitalizing on the natural resources that contribute to quality grapes and wine.

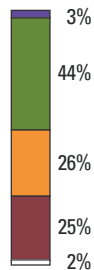
Before it was called “ecosystem management” it was known as farming - integrating human systems into natural systems to provide sustenance for everyone. In today’s world, this is translated as having an ecosystem management approach and perspective, which acknowledges that people are part of and have a significant impact on ecosystem structures and processes, and that people depend upon and are integral to the ecological, economic and social systems where they live.

ECOSYSTEM MANAGEMENT BENCHMARK DATA



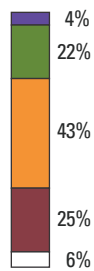
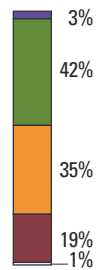
Benchmark Data

Grower Response

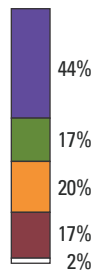
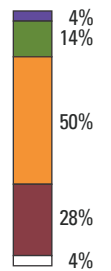


8-1. DEFINING THE RESOURCE BASE Knowledge of the ecosystem and the resource base that is going to be managed is key to planning for sustainable ecosystem management. 47% of the growers and 45% of the vintners know the physical boundaries and condition of their property and have identified the people and the resources — both internal and external to the organization - needed to begin an ecosystem initiative. 3% of the growers and vintners have also assembled a written description of the property that defines the resources to be managed. An additional 51% of the growers and 54% of the vintners know the physical boundaries of their property, and 26% of the growers and 35% of the vintners go the extra step and identify the resources and people within the operation to begin a management initiative. 2% of growers and 1% of the vintners replied N/A, not applicable or information not available.

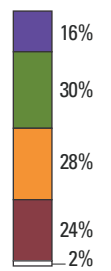
Vintner Response



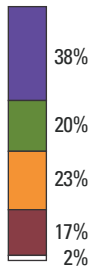
8-2. DEVELOPING A SUSTAINABILITY STRATEGY By examining the resources and understanding the property, a strategy can be developed for sustainable interaction between the ecosystem and the operations of the vineyard and/or winery. 26% of the growers and 18% of the vintners have developed a sustainable business strategy that includes mission, values, and vision statements, and they have shared this strategy with external stakeholders as part of an ecosystem management initiative. 4% of the growers and vintners have also implemented the strategy for at least one year and reviewed it with management. 43% of the growers and 50% of the vintners have a documented mission statement with sustainability elements and are planning to add vision and value statements. 25% of growers and 28% of vintners have no existing plans to develop a company mission, vision, or values statement that includes a focus on sustainability. 6% of growers and 4% of the vintners replied N/A, not applicable or information not available.



8-3. WATER CYCLE Water is a critical element of all natural cycles, and vineyards and wineries are no exception. 81% of the growers and 74% of the vintners understand the amount of water entering the site (monitoring and recording rainfall) as well as the total amount of water used in the vineyard or winery by monitoring and recording water use. 61% of the growers and 46% of the vintners optimize on-site water use while minimizing off-site impacts and practice water conservation in their operations. 44% of these same growers and 16% of these vintners also consider themselves knowledgeable about local surface and groundwater resources. 17% of growers and 24% of vintners do not monitor rainfall or record total water use. 2% of growers and vintners replied N/A, not applicable or information not available.

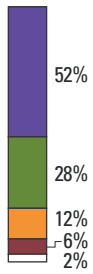
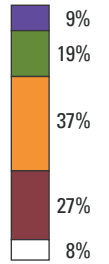


Grower Response

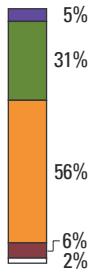


8-4. MINERAL CYCLE Another important component of the ecosystem in the vineyard and around the winery is the nutrient cycle. This cycle is responsible for moving key elements such as nitrogen, phosphorous and potassium through the soil. 58% of the growers and 28% of the vintners have developed nutrient budgeting and are increasing nutrient cycling with composting, cover cropping, and the use of treated water from ponds. 38% of the growers and 9% of the vintners have also developed a comprehensive strategy to balance nutrient budgets and prevent off-site nutrient loss by implementing buffer strips and vegetation along roads and ditches. Another 23% of growers and 37% of vintners are in the process of developing nutrient budgets and are implementing practices to increase nutrient cycling, such as composting and cover cropping. 17% of growers and 27% of vintners do not monitor inputs and outputs of nutrients in an effort to develop nutrient budgets. 2% of growers and 8% of vintners replied N/A, not applicable or information not available.

Vintner Response

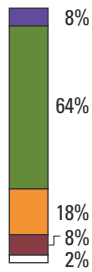


8-5. ENERGY FLOW Energy is the economic currency of ecosystems. Sunlight gives energy to everything in the natural world, and the vineyard's access to this energy is like providing it with access to the natural capital of the ecosystem. This is the concept of energy flow in the vineyard. 80% of growers optimize energy capture and flow with practices like canopy management, soil management and water management, while monitoring yield and fruit quality to evaluate practices on wine quality and costs. 52% of the growers have been monitoring for more than two years and use the results to adapt practices. 12% consider basic energy flows and have begun to monitor fruit yield and quality. 6% do not consider energy flow in their vineyard and 2% replied N/A, not applicable or information not available.



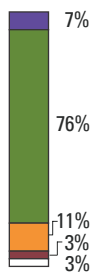
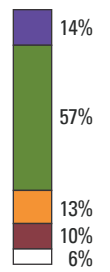
8-6. COMMUNITY DYNAMICS Winegrowing practices within the vineyard ecosystem influence the biodiversity in and around a grower's property. The inhabitants in this area, the "biological community", are affected by vineyard practices that change the resources and conditions in the vineyard ecosystem. It is important for growers to understand their role in this diversity and their impacts on this community. 36% of the growers work to optimize the ecological services in the winegrowing operation, and they monitor and record pest management information. 5% of the growers also monitor indicators of plant and animal diversity around the vineyards. 56% are aware of the ecosystem dynamics and are trying to understand how to optimize these dynamics for their operations. 6% are not aware of how these community dynamics impact winegrowing. 2% replied N/A, not applicable or information not available.

Grower Response

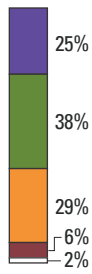
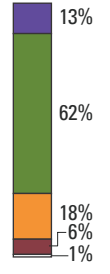


8-7. BIOREGIONS In addition to knowledge of wine regions and appellations, it is important for growers and vintners to know the bioregion that they inhabit. This awareness will help to identify the unique physical, biological and climatic characteristics of the vineyard. 90% of the growers and 84% of the vintners are aware of their bioregion and the characteristics that make it unique. 72% of the growers and 71% of the vintners use this understanding to select the varieties of vines to plant and wine to produce. 8% of growers and 14% of vintners also participate in bioregion planning projects. 8% of growers and 10% of vintners know the bioregion but they don't know the characteristics that make it unique. 2% of growers and 6% of vintners replied N/A, not applicable or information not available.

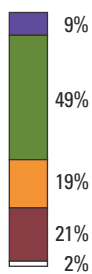
Vintner Response



8-8. WATERSHED MANAGEMENT A major component of bioregions are watersheds within the bioregion boundaries. Water links communities together, making it critical for growers and vintners to know as much as they can about their watershed. Protection of water quality and quantity can help maintain the diversity of the community. 94% of growers and 93% of vintners are aware of the main watershed where their vineyard is located. 83% of growers and 75% of vintners also know the tributary watershed and manage their vineyards to protect the quality and quantity of the water with cover crops, buffer strips and erosion control measures. 7% of the growers and 13% of the vintners also participate in watershed stewardship groups. 3% of growers and 6% of the vintners don't know the main watershed in which they are located. 3% of growers and 1% of vintners replied N/A, not applicable or information not available.

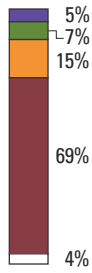


8-9. ENHANCING HABITAT THROUGH VEGETATION In order to maintain diversity in and around the vineyard, many growers practice habitat enhancement. This includes the establishment of cover crops, hedgerows, and native plants and shrubs when appropriate. 92% of growers maintain cover crops while 63% of the growers also maintain hedgerows or use native grasses and shrubs, and 25% maintain both hedgerows and native grasses and shrubs. 6% keep vineyards free of all vegetation and 2% replied N/A, not applicable or information not available.



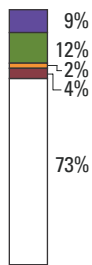
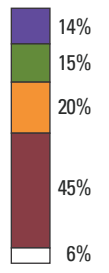
8-10. ENHANCING HABITAT THROUGH NEST BOXES Some members of the biological community, such as raptors, owls and bats, provide direct pest control services to the vineyard. Growers can build nesting boxes and perches to ensure these creatures hunt in their vineyard. 58% of growers have nesting boxes for owls and raptors and maintain natural sites and perches for owls, with 9% also monitoring and maintaining the nest sites and perches and including additional structures for bats. 19% have boxes specifically for owls. Another 21% have no man-made nest boxes for birds of prey. This could be due to the fact that there is natural nesting, such as trees, in close proximity so no additional boxes are needed. 2% replied N/A, not applicable or information not available.

Grower Response

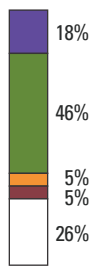


8-11. ENHANCING HABITAT THROUGH NEST BOXES FOR NON-PREDATORY BIRDS -Small percentages of growers and vintners expand the concept of diversity in the vineyards and around wineries by including nest boxes and other habitat enhancement. 12% of growers and 29% of vintners have more than one box for multiple species and of these, 5% of growers and 14% of vintners have also planted native plants for food and shelter for wildlife. Another 15% of growers and 20% of vintners have nesting boxes for non-prey bird species. 69% of growers and 45% of vintners have no habitat enhancement for other wildlife. 4% of growers and 6% of vintners replied N/A, not applicable or information not available.

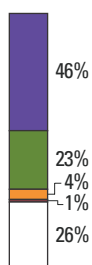
Vintner Response



8-12. VERNAL POOLS Maintaining and preserving diversity is more than just protecting animals and birds. It requires protecting diverse habitat and plant communities as well. 21% of growers preserve vernal pools with adequate setbacks and buffer strips, with 9% also observing the plant and animal diversity as part of their overall understanding of the property. An additional 2% preserve the vernal pools with setbacks but no buffer strips. 4% do not go beyond compliance with the current legal requirements. 73% replied N/A, not applicable or information not available because they farmed in areas without any vernal pools on the property.

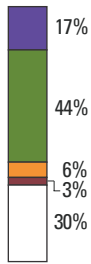


8-13. OAK WOODLANDS Oak woodlands inhabit all of California’s bioregions and cover a third of the state’s total acreage. The Mediterranean climate, strongly associated with oak woodlands, is also conducive to winegrowing. 64% of growers developed their vineyards without removing any oaks, or oaks that were removed were mitigated with new oak plantings or other forms of permanent protection of nearby oak woodlands. 18% of the growers do not farm under the oak canopy and are working with local conservation groups to plan for preservation of oak woodland ecosystems in the region. 5% replaced oaks removed during vineyard construction with local seeds/saplings planted around the edge of the property. 5% maximized the use of their land by removing all of the oaks. 26% replied N/A, not applicable or information not available because they farm within an area that did not have oak trees.



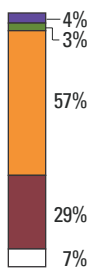
8-14. RIPARIAN HABITAT Another important ecosystem for growers is the riparian habitat along streams and rivers. Riparian vegetation prevents sediments and nutrients in surface runoff from entering waterways by acting as a filter. The dense matrix of roots and organic surface litter can, therefore, improve water quality. Vegetation on the banks of waterways helps prevent bank erosion and can act as a sponge by absorbing floodwater and then slowly releasing it over time, maintaining the stream flows later in the summer. 69% have vegetation buffer strips on banks of watercourses, with 46% also maintaining a row of trees and shrubs that shade part of the entire watercourse. 4% have no vegetation buffer and 1% plant up to the edge of the watercourse to make maximum use of the land. 26% replied N/A, not applicable or information not available because they do not have this habitat on their property.

Grower Response

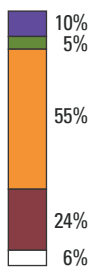
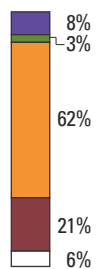


8-15. AQUATIC HABITATS The aquatic habitats, streams, rivers and wetlands are particularly important to a broad host of animals, reptiles, amphibians and birds. Considering these habitats in vineyard management is a critical step in preserving these diverse ecosystems. 67% of growers do consider these habitats in vineyard site selection and management, with 61% also providing buffer strips between the vineyards and the aquatic habitat. 17% take additional measures by keeping roads to a minimum around vineyards adjacent to aquatic habitat. Only 3% do not consider aquatic habitat in their vineyard management decisions. 30% replied N/A, not applicable or information not available due to the fact that they do not have any aquatic habitat on their vineyards.

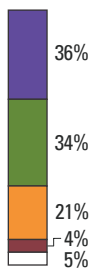
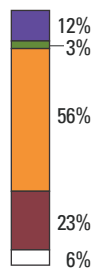
Vintner Response



8-16. NATURAL RESOURCES CONSERVATION EASEMENTS Federal and state agencies provide resources, such as the Natural Resource Conservation Easements program, to growers and vintners to offset the financial investment needed for habitat preservation, enhancement or restoration. 4% of the growers and 8% of the vintners have protected the natural areas on their property with conservation easements, while another 3% of growers and vintners have conducted an assessment of their property to determine if easements are appropriate. 57% of growers and 62% of vintners are aware of conservation easements. 29% of growers and 21% of vintners do not know about natural resource conservation easements. 7% of growers and 6% of the vintners replied N/A, not applicable or information not available.

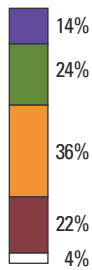


8-17. AGRICULTURAL CONSERVATION EASEMENTS The Agricultural Conservation Easements program is another habitat protection resource, established for the express purpose of keeping farmland in production and reducing the pressure on farmers to sell for development. 10% of the growers and 12% of the vintners have some or all of their property protected with Agricultural Conservation Easements. 5% of growers and 3% of vintners have identified where easements are appropriate and are considering them for their property. 55% of growers and 56% of vintners are aware of them, and another 24% of growers and 23% of vintners don't know about agriculture conservation easements. 6% of growers and vintners replied N/A, not applicable or information not available.



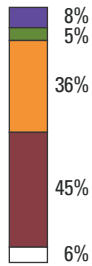
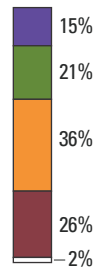
8-18. USE OF PESTICIDES Some pesticides may be toxic to terrestrial and aquatic organisms, threatening biological diversity. Before applying pesticides, growers must inspect labels and be fully aware of potential impacts to wildlife and other non-target organisms. 70% do not use pesticides that are toxic to wildlife near wildlife habitat, nesting sites or aquatic habitats and 36% rarely, if ever, use pesticides that are toxic to any wildlife. 21% consider pesticide toxicity to wildlife when selecting pesticides to use in the vineyard. 4% do not consider pesticide toxicity to wildlife when selecting pesticides to use. 5% replied N/A, not applicable or information not available.

Grower Response

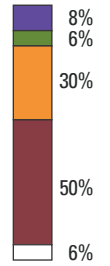


8-19. SENSITIVE SPECIES Habitat for nearly half of the 360 plants and animals listed under the Federal and State Endangered Species Act in California is on private property. Because of the importance of private lands to listed species, it is important for growers and vintners to understand how their practices can contribute to the recovery and added diversity of the state's vast biological mix. 74% of the growers and 72% of vintners are aware of and know most of the threatened, endangered or sensitive species in their region. 38% of the growers and 36% of the vintners know if they live on their property, with 14% of the growers and 15% of the vintners managing their property to protect and enhance habitat for these species. 22% of the growers and 26% of the vintners are not informed about sensitive species. 4% of the growers and 2% of the vintners replied N/A, not applicable or information not available.

Vintner Response



8-20. COLLABORATION WITH AGENCIES Although government agencies provide assistance to growers and vintners for species protection, collaboration between the groups can be improved. 13% of the growers and 14% of the vintners consult with agency biologists familiar with sensitive species to help make decisions regarding vineyard management, with 8% of the growers and vintners participating in incentive programs. 36% of the growers and 30% of the vintners are aware of available agency resources, but research sensitive species issues independently. 45% of the growers and 50% of the vintners meet the regulatory requirements without seeking outside assistance. 6% of growers and vintners replied N/A, not applicable or information not available.



Best Practices

Statewide Strengths: The majority of growers and vintners report that they have adopted practices that support ecosystem management including defining resources, implementing sustainability strategies, understanding and enhancing ecosystem functions and processes, and implementing practices that enhance or conserve important habitat types.

In 1998, Bronco Winery partners were seeking to expand their Lodi vineyards at Clay Station near the Delta. The surrounding land was a vast expanse of vernal pools, native grasses and wetlands, so the partners wanted to find a way to develop their property that would meet their goals as well as serve the interests of the public with environmental concerns and government agencies.

Working with the Army Corps of Engineers and environmental groups, the Bronco partners developed a plan that was both a good financial decision and involved good environmental practices. Adjacent to the vineyards and the expansion, the partners preserved a 300-acre refuge with native habitat and six reservoirs. Wood ducks, red wing blackbirds, owls, hawks, bullfrogs, fairy shrimp, coyote and many other species find their home in the refuge. The

native grasses and flowering vegetation provide habitat for this wildlife and add to the simple beauty of the open landscape.

“We worked out a plan that was compatible for everyone involved,” says Bill Rossini of Rossini Farming Company in Ceres. “It was a win-win situation with give and take on both sides. In the process, we developed better relationships.” Rossini explained that they pursued the project because the climate, marginal rocky soils and low rolling hills were ideal for growing great quality winegrapes. The wetland areas also recharged the ground water, providing a consistent source of water in addition to year-round habitat for waterfowl.

Targets for Continual Improvement

Statewide Opportunities for Improvements: There is an opportunity for the majority of growers and vintners to increase habitat enhancement for birds other than raptors (criteria 8-11) and increase collaboration with government agencies with respect to sensitive species (criteria 8-20).

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 green. 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 ecosystem management practices in the wine community, please email info@sustainablewinegrowing.org.

