

Sonoma Valley Historical Ecology Project

Phase 1

Final Report

Arthur Dawson
Sonoma Ecology Center

and

Robin Grossinger
San Francisco Estuary Institute

November 13, 2002

SUMMARY

During the period November 2001 to October 2002, the Sonoma Ecology Center (SEC) and the San Francisco Estuary Institute (SFEI) carried out the first phase of a Historical Ecology Project for Sonoma Valley. The establishment of this broad-based effort to recover historical information about the watershed was supported by a grant from the Sonoma Water Agency, under the auspices of the San Francisco Estuary Project and the San Francisco Bay Regional Water Quality Control Board.

This first phase of the Sonoma Valley Historical Ecology Project (SVHEP) has compiled an extensive archive of historic maps, photographs, newspaper articles, and other materials describing early conditions in the watershed. The archive, housed at the SVHEP headquarters at the SEC Watershed Station, provides the information base from which a range of analyses of historical landscape change can be developed to answer pressing environmental management questions.

During Phase 1, SEC and SFEI met with a range of individuals and groups involved in local natural resource management issues. From these discussions we have determined five key priorities for historical research and analysis to be developed from the historical dataset. These high-priority research directions, which support stream and fishery restoration, oak conservation, flood control, and other community goals, are described in detail later in this report.

An Open House was held at the SVHEP Archive on October 9, 2002. On exhibit were sample historical materials, a series of posterboard panels illustrating the research process, and a “wraparound time machine” surrounding visitors with a panoramic photograph of Sonoma Valley taken in 1887. (Some of these materials are presented in Appendix 1.) The event revealed substantial local interest in historical ecology, as about 75 people attended and an illustrated article covering the event appeared in the Sonoma Index-Tribune (copy attached).

Numerous groups have provided assistance to the development of the Sonoma Valley Historical Ecology Project and its archive. In particular we would like to thank the Sonoma Valley Historical Society’s Depot Museum; Sonoma County Library; Sonoma County Records Office; UC Berkeley Map Room and Bancroft Library; U.S. Bureau of Land Management; California Department of Fish and Game and numerous individuals whose contributions of local knowledge and information are integral to the project. Funding for the next phases of the project is currently being recruited, and we look forward to creating maps, technical reports, and educational materials to bring this wealth of local information into widely-accessible forms over the next several years.

SUMMARY OF HISTORICAL DATA COLLECTION

Historical Documents Acquired

Information pertaining to the ecological history of Sonoma Valley was carefully selected by examining more than two dozen public and private archives in Sonoma County, UC Berkeley, Sacramento and the Santa Barbara Mission. We estimate that our researchers examined over 100,000 pages of information, from which a select set of useful information was collected. Some of the institutions and individuals we visited, as well as their stated interests in historical ecology research, are listed in Table 1.

Through this intensive effort to recover historical environmental data, the Sonoma Valley Historical Ecology Project has developed a substantial archive, including:

- More than 2,150 pages of text, both paper copies and microfiche/film
- Paper copies of 147 maps
- Paper copies of 54 photographs
- 2,031 computer files (mostly digital photographs), including:
 - 152 historic photographs
 - 18 maps
- 36 books

Highlights of the collection include a large number of maps from the mid-19th century (earliest is 1837); survey notes from the same era; court transcripts from cases heard by the Land Commission; historic photographs going back to the 1860s, with over 75 dating to 1890 or earlier; newspaper articles dating back to 1852; and Padre Altimira's account in the original Spanish of his visit to Sonoma Valley in 1823 to found the mission.

We are also in the process of becoming the home for the Glen Ellen Historical Society's collection. While we don't have figures for other archives, it appears that in less than a year we have become one of the largest archives in Sonoma Valley, bringing together diverse materials from a wide variety of sources, organized for environmental research.

Table 1. Summary of historical research contacts and interests.

<i>Institutions and People Visited and/or Contacted</i>	<i>Expressed Research/Product Needs</i>
Bancroft Library , Berkeley; William Brown, Susan Snyder	oral histories
Bouverie Audubon Preserve , Glen Ellen; Rebecca Anderson-Jones, Daniel Gluesenkamp, John Peterson	vernal pool distribution, local fire history, eco-atlas, presentations
Bureau of Land Management , Sacramento David Conklin	
California State Archive , Sacramento	
City of Sonoma , David Goodison, Planner	
Robert Cannard, Sr., Sonoma Botanist, farmer, political candidate	historical photos & trees
Watershed Sciences , Laurel Collins	erosion, flooding, fisheries, water supply, mapping of distributary channels, channel changes
Curtis & Associates, Surveyors , Healdsburg; R. Curtis	historic maps
Robert Dawson & Ellen Manchester, San Francisco Professional landscape photographers	historic photos/rephotography
Lisa Micheli, Geomorphologist	erosion, flooding, fisheries, water supply, mapping of distributaries, channel changes
Calif. State Parks , Sonoma; B. Parkman, Archeologist	Eco-atlas
California Department of Fish and Game , Yountville John Emigg, Gail Seymour	historic spawning areas, presence/abs. of coho & other salmonids, fisheries history
Friends of Napa River , Napa; Shari Gardner	early mission grazing history
Glen Ellen Historical Society , Glen Ellen; George Ellman	historic maps & photos
Glen Oaks Ranch , Glen Ellen; Nathan Boone	
Kiwanis Club , Sonoma; Kathy Witkowicki, Neils Chew	website
Northwest Information Center , Rohnert Park Orriger, Tom. Archeologist	
Robert Parmelee, Sonoma; author and historian	historic maps
San Francisco Regional Water Quality Control Board Sandy Potter, Michael Napolitano	
Sonoma County Museum , Santa Rosa Alexandra Quinn, Eric Stanley	website, Eco-history exhibit(s), oral histories, school curriculum
Santa Barbara Mission Archive , Sta Barbara; Fr. Virgilio	
Sonoma County Land Trust , Santa Rosa; David Katz	
Sonoma County Library History Annex , Santa Rosa	oral histories
Sonoma Valley Historical Society , Sonoma; Diane Smith	website, Publicly accessible archive, Eco-atlas, Local native history book, Altimira's journal, Eco-history exhibit
Sonoma Valley Library , Sonoma; Stephan Buffy	oral histories
Sonoma County Records Office , Santa Rosa	
Sonoma County Water Agency , Santa Rosa Jim Zambenini, Michael Yu	historic maps & photos
Sonoma Mtn. Preservation Group , George Ellman	logging & woodcutting history
Sonoma Valley Unified School District	school curriculum
Southern Sonoma Resource Conservation District , Petaluma; Leandra Swent	oral histories for Schellville, flooding histories
UC Berkeley Map Room , Berkeley; John Creaser	historic maps
Valley of the Moon Water District , El Verano Robert Freeland	historic photographs
Watershed Education Program , Sonoma; Suzie Joyce	local fisheries history, Steelhead curriculum, land-use history; historic maps & photos

Potentially useful remaining resources to visit or acquire

Some additional historical resources have been earmarked for collection in the future. These have been identified and are listed below:

Top Priorities:

- **Bancroft Library, UC Berkeley:**
 - Jose Sanchez journal of founding of Sonoma Mission (contains material not found in Altimira's account)
 - gleanings from court transcripts for the following Land Commission cases:
 - *Petaluma Rancho
 - *Agua Caliente Rancho
 - *Huichica Rancho
 - *Pueblo of Sonoma
 - Weber, Francis, *Last of the Missions*
- **Sonoma County Library:** copies of the *Sonoma Index-Tribune* for the late 19th and early 20th centuries copied from microfilm to CD.

Lower Priorities:

- **Santa Barbara Mission:** complete copying of 1824 Informe
- Copy account of the founding of the mission and the rancho era from *Bancroft's History of California*
- **Sonoma League for Historic Preservation Archive**
- **Sonoma Mission Archive**
- **Sonoma Historic State Parks Archive**
- **Sonoma City Records**
- **Sonoma Developmental Center Archive**

In addition to the needs and preferences discussed in Table 1, the general public has expressed great interest in the idea of a website with layers of local history (maps, oral histories, photos and written accounts) keyed to the community or neighborhood level. In concept, the website would present a map of Sonoma Valley divided into 30 or 40 sections. Users would click on a specific area to access materials about that site.

NEXT STEPS

The five most important historical research topics, based upon extensive discussions with local stakeholders, are described below. Estimated costs for these projects range from about \$20-50,000 each, depending on the exact extent of each project.

1. Channel Network Change Analysis

One of the most significant information gaps for current watershed planning efforts is the lack of specific data about changes in the structure of the channel network, including the tributaries, mainstem, and floodplain of Sonoma Creek. This information would help explain the relative roles of natural process and anthropogenic impact in shaping present-day concerns, providing a foundation for successful long-term management.

Identifying historical distributaries, discontinuous stream channels, and floodplains.

We have obtained a number of historical maps and early aerial photographs showing dramatic differences from the present-day channel network. Combined with historical landscape photographs and written accounts, this information can be synthesized into a single map showing how water and sediment were routed through the system prior to extensive European-style modification. A well-documented composite map of these features would be used by principals in the investigations to reduce flooding in the lower watershed (Sonoma Creek and Tributaries Flood Protection Project: Army Corps of Engineers, Southern Sonoma Resource Conservation District, Watershed Sciences, PWA) and to assess impairment of the watershed by sediment through the TMDL process (San Francisco Bay Region Water Quality Control Board, SEC, Watershed Sciences).

The location of these former components of the channel network will help explain why flooding is occurring in certain places and how changes in the channel network have affected sediment delivery to the main stem. Comparing past and present channel patterns will suggest how changes in channel quantity, sinuosity, and conductivity have altered the routing and timing of floodwaters. This information is also useful for a range of other topics, such as explaining locally high water tables affecting urban infrastructure and variations in agricultural productivity.

Identifying historical anadromous fish habitat.

The information assembled above can also be evaluated to identify secondary channels, backwater sloughs, low gradient meander systems and other features which historically provided habitat for anadromous fisheries. Understanding the distribution of these features, and the processes which maintained them, provides a solid foundation for designing specific restoration strategies for steelhead and salmon.

Documenting stream channel erosion/aggradation.

Evidence for changes in the depth of local streams can be developed from a variety of sources. This information, which is fundamental to understanding changes in stream function, sediment delivery, and groundwater level, relies on correctly locating and interpreting historical accounts (of trying to cross, falling into, or dumping materials into a creek), historical photographs (particularly of bridges), as-built diagrams, and other sources. Significant resources have been found in this regard, which can be combined into an analysis of tributary-specific channel erosion/aggradation.

2. Riparian Habitat Change Analysis

Substantial questions exist regarding the historical extent of riparian habitat in the Sonoma Creek watershed, particularly with respect to its width, composition, and variability throughout the watershed and in association with different types of stream channels.

Mapping historical riparian habitat.

The SVHEP has acquired 1940s aerial photography as a key source for assessing changes in riparian habitat. Preliminary work has been accomplished towards scanning and georectifying these images. The 1940s data provides an extremely useful, high-resolution view of riparian conditions prior to World War II. Its value increases even more when compared with earlier sources of data such as early landscape photography, written accounts, and maps. While these sources are less resolute, they allow the 1940s picture to be interpreted as a product of natural process and the effects of land use. Understanding the dynamics of riparian habitat change is essential to setting appropriate prescriptive policies for habitat protection, including setbacks, and to designing restoration efforts supported by natural processes.

3. History of the Local Salmonid Fishery

Understanding the prior extent of salmonid distribution and the timing of significant decreases in their population in relation to changes in land use, is essential to understanding the causes for decline and to prioritize restoration strategies. Many parties involved in efforts to recover the local fishery, as well as members of the general public, have asked the SVHEP for historic information about the salmonid fishery on Sonoma Creek.

Characterizing the historical fishery.

Significant questions include: How big was the historic steelhead run? What is the evidence for the presence of salmon, the timing of run(s), and species present? Which streams supported steelhead runs, which were most productive, and where were the best fishing holes and spawning beds? A wide range of independent historical data sources have been identified and/or collected to help answer these questions, including indigenous cultural information, early explorers' and settlers' accounts, town histories, articles in local newspapers and fishing magazines, trophy shot photographs, and CDFG surveys. These documentary sources can be combined with data from oral histories and analysis from available reports of the contents of middens and other archeological sites.

Characterizing the timing and potential historical causes of fishery decline.

Key questions involve identifying periods of major decline and what local, regional, or climatic events may have been associated with them. A variety of human disturbances can be documented from the historical record including: permanent and summer dams; dredging and channelization; fishing pressure; fish planting; introduction of exotic species such as carp; grazing; and removal of riparian vegetation. Understanding the history of the local hatchery on Graham Creek and steelhead planting in the watershed may be particularly important.

4. Valley Oak Change Analysis

Our research and discussions with local residents have emphasized that the scattered ancient valley oak trees constitute one of the strongest tangible links to the pre-European Sonoma Valley, and are a significant element of the cultural heritage of the region. The most popular images of the Valley usually include these relatively rare, and generally declining, trees. Understanding the historic and current distribution of valley oak savanna will be essential for maintaining this important ecological and cultural resource.

Map of existing heritage oaks.

Through work in the Napa Watershed with Friends of Napa River, SFEI has developed an approach to mapping trees of expected pre-European vintage. This includes developing a dataset relating tree diameter to age using tree cores; GPS-based mapping; and field data sheets to collect associated information (such as canopy size, health, etc.) to create a GIS map and associated database of heritage trees. This information will be useful both for conserving existing resources and identifying locations for potential oak savanna restoration.

Map of Valley Oak savanna circa 1940.

The 1940s aerial photography can be used in concert with the above-described GPS data to map additional trees which have died or been removed since 1940. These combined datasets give the basis for identifying natural patterns of valley oak savanna distribution, which can be correlated to local topography, climate, and water table to identify the environmental setting which supports this habitat. This information will also help shed light on the ecological patterns existing in Sonoma Valley at European contact. The full picture of stream-related features, seasonal wetlands, grasslands, and woodlands will be valuable for understanding differences in agricultural land characteristics, open space planning and reserve design, sites of groundwater recharge and changes in depth to groundwater, as well as local education.

Map of Valley Oak regeneration.

Key questions for the restoration of specific habitats are (1) what was the historical distribution of the habitat, and what were the processes which created and maintained that distribution? and (2), what is the current distribution of the habitat, and how have the controlling processes changed, or stayed the same? Mapping the location of younger trees will illustrate whether optimal conditions have changed significantly during historical times. In combination with the earlier data, this will guide long-term conservation efforts aimed at protecting the resource.

5. Oral Histories of Flooding in the Lower Sonoma Creek Watershed

Residents of the lower watershed, particularly in the Schellville area, are very concerned with the area's long history of flooding. The experiences and memories of longtime residents in this area are an important source for understanding the spatial extent of flooding, the timing and duration of flood events, and potential correlation of flooding to land use changes upstream or downstream. The Army Corps/Southern Sonoma RCD effort to resolve these problems has expressed strong interest to the SVHEP for the development of a set of interviews to collect and synthesize this local knowledge. The SVHEP has developed substantial expertise in the area of oral histories about land use

and the environmental workings of other parts of the watershed. Building upon these efforts and contacts, the SVHEP could design and carry out a well-designed oral history project to produce a reliable report for technical use.

Additional Topics

One of the important tools to develop prior to, or through several of these tasks is a photomosaic of aerial photography illustrating Sonoma Valley circa 1940. This should be produced in standard GIS format so it can be broadly used by local planning departments, vineyard managers, and the public to answer questions about land-use 60 years ago.

A related topic, which may be addressed in part through the above efforts, is the extent and impact of grazing, agriculture, logging and mining on the production of sediment and runoff to Sonoma Creek. These questions have been raised by many scientists and resource managers involved in fishery and flooding management, and could be pursued in concert with these efforts.

POTENTIAL SOURCES OF FUNDING

While we have identified several potential sources of funding for these next steps, no further funding for the project has been secured at this time. However, both substantial public interest and specific management requests suggest that these next steps will have broad community value. Several potential project sponsors are listed below; some have expressed interest in the project to date.

- Bob Cannard Foundation
- CALFED
- California Department of Fish and Game
- Columbia Foundation
- Fred Gellert Foundation
- James Irvine Foundation
- Packard Foundation (as part of a regional project through SFEI)
- San Francisco Bay Regional Water Quality Control Board
- San Francisco Foundation
- Sonoma County Community Foundation
- Sonoma County Water Agency
- Sonoma Valley Education Foundation
- Vintners & Growers Association