

# Vino Farms Riparian Enhancement Plan

*Mokelumne River Mile 54  
San Joaquin County, California*

June 2007



*Prepared for*

**Vino Farms, Inc.**



---

806 14<sup>th</sup> Street  
Modesto, CA 95354  
[info@riverpartners.org](mailto:info@riverpartners.org)

Phone: (209) 521-1700  
Fax: (209) 521-7327  
[www.riverpartners.org](http://www.riverpartners.org)

## Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>iv</b>
<b>I. INTRODUCTION .....</b>	<b>1</b>
A. Project Overview .....	1
B. Project Area and Location .....	1
C. Cooperative Relationships and Funding Sources .....	2
D. Project Goals and Objectives .....	4
E. Purpose of Riparian Enhancement Plan .....	5
<b>II. SITE DESCRIPTION .....</b>	<b>5</b>
A. Land Use History .....	5
B. Soils .....	7
C. Topography .....	9
D. Hydrology .....	10
E. Vegetation .....	11
F. Wildlife .....	14
<b>III. WILDLIFE AND ENVIRONMENTAL BENEFITS .....</b>	<b>19</b>
A. Importance of Riparian Habitat .....	19
B. Valley Elderberry Longhorn Beetle .....	19
C. Riparian Bird Focal Species .....	20
<b>IV. CONCEPTUAL SITE MODEL .....</b>	<b>22</b>
A. Past Environmental Conditions .....	22
B. Likely Successional Patterns without Enhancement .....	22
C. Comparison of Site to Nearby Vegetation (Reference Sites) .....	22
<b>V. TARGET NON-NATIVE SPECIES .....</b>	<b>23</b>
A. Tree of heaven .....	23
B. Yellow starthistle .....	23
C. Himalayan Blackberry .....	24
D. Black Walnut .....	24
<b>VI. RIPARIAN ENHANCEMENT ALTERNATIVES .....</b>	<b>24</b>
A. Alternative 1—No herbicide treatment of walnuts .....	25
B. Alternative 2—Apply herbicides to young walnut stand .....	25
C. Alternative 3—Treat both young and mature walnut stands with herbicides .....	26
<b>VII. RIPARIAN ENHANCEMENT DESIGN .....</b>	<b>26</b>
A. Design Considerations .....	26
B. Rationale for Plant Association Selection .....	28
C. Plant Design .....	28
<b>VIII. PROJECT IMPLEMENTATION .....</b>	<b>31</b>
A. Regulatory Compliance .....	31
B. Site Preparation .....	32
C. Field Layout .....	32
D. Irrigation .....	32
E. Plant Material Collection and Propagation .....	33
F. Plant Installation .....	33
G. Plant Maintenance .....	34
<b>IX. POTENTIAL FUNDING SOURCES .....</b>	<b>36</b>
A. Lower Mokelumne River Partnership .....	36
B. Partners for Fish and Wildlife Program .....	36
C. Wildlife Conservation Board .....	36
D. Natural Resources Conservation Service .....	37
E. Private Foundations .....	37

<b>X.</b>	<b>ESTIMATED PROJECT TIMELINE .....</b>	<b>38</b>
<b>XI.</b>	<b>ESTIMATED PROJECT COSTS.....</b>	<b>39</b>
<b>XII.</b>	<b>REFERENCES.....</b>	<b>42</b>

**List of Tables**

Table 1.	Summary of soil types within Vino Farms, Inc. project area (McElhiney 1992). .....	7
Table 2.	Summary of existing native species at Vino Farms, Inc. ....	12
Table 3.	Summary of existing non-native species at Vino Farms, Inc. ....	12
Table 4.	Acreages of the enhancement areas delineated by dominant vegetation. ....	13
Table 5.	Design considerations for riparian enhancement on Vino Farms, Inc. ....	27
Table 6.	Species composition for walnut areas left untreated (planting density: 200 plants/acre). .....	29
Table 7.	Species composition for treated walnut areas (planting density: 200 plants/acre).....	29
Table 8.	Species composition for treated tree of heaven and the center/nonforested areas (planting density: 200 plants/acre). ....	30
Table 9.	Species composition for the northern bluff area.....	30
Table 10.	Herbaceous species planting design. ....	31
Table 11.	Herbaceous species planting recommendations and methods. ....	31
Table 12.	Planting methods and timing for woody species. ....	33
Table 13.	Planting methods and timing for herbaceous understory species. ....	34
Table 14.	Estimated project timeline for the Vino Farms, Inc. riparian enhancement project. ...	38
Table 15.	Alternative 1, estimated three-year budget for riparian enhancement project on 22.5 acres of Vino Farms, Inc.....	39
Table 16.	Alternative 2, estimated three-year budget for riparian enhancement project on 22.5 acres of Vino Farms Inc.....	40
Table 17.	Alternative 3, estimated three-year budget for riparian enhancement project on 22.5 acres of Vino Farms Inc.....	41

**List of Figures**

Figure 1.	Regional map and location of Vino Farms, Inc. ....	2
Figure 2.	Riparian enhancement project area on Vino Farms, Inc., San Joaquin County. ....	3
Figure 3.	Areas of the enhancement site delineated by dominant vegetation. ....	4
Figure 4.	Vino Farms, Inc. 1927 historical aerial photo (Edwards 2005). ....	6
Figure 5.	San Joaquin County Soil Survey map for Vino Farms, Inc. (McElhiney 1992). ....	8
Figure 6.	Topography map for Vino farms, Inc. ....	9
Figure 7.	Representative photos of enhancement areas. ....	16
Figure 8.	Structurally diverse riparian vegetation is needed to support a variety of riparian birds (RHJV 2004, Illustration by Zac Denning).....	21

**Suggested citation:**

River Partners. 2007. Vino Farms Riparian Enhancement Plan. San Joaquin County, California. Modesto, California.

## ACKNOWLEDGEMENTS

The following individuals contributed to this unit plan:

Name	Affiliation
John Ledbetter	Vino Farms, Inc.
Marissa Ledbetter	Vino Farms, Inc.
Kent Reeves	East Bay Municipal Utility District
Brook Edwards	Robertson-Bryan, Inc.
Tom Griggs	River Partners
Stacy Small	River Partners
Tamara Sperber	River Partners
Lauren Singleton	River Partners
Sara Taylor	River Partners

# Vino Farms Riparian Enhancement Plan

## **EXECUTIVE SUMMARY**

River Partners proposes three habitat restoration alternatives for 22.5 acres of the Vino Farms, Inc. property along the Mokelumne River in Acampo, California. These alternatives seek to benefit wildlife by removing invasive non-native plant species and replacing with native trees, shrubs and herbaceous species. In this plan, River Partners presents details of these three alternate plans with budgets and potential funding sources.

Alternative 1 provides the least habitat structure as it does not call for the removal of black walnut stands. Alternative 2 calls for herbicide treatment of a stand of young black walnuts, but leaves the mature stand untouched. The first two approaches will reduce short-term costs, but will increase long term maintenance costs as the remaining walnut trees will continue to produce seed, and saplings will need to be removed annually. Alternative 3 will result in herbicide treatment of all walnut trees and has the most potential to provide habitat for a diverse group of wildlife species.

Vino Farm, Inc. as well as several other conservation-minded farmers and corporations in the lower Mokelumne River watershed are setting the pace for private lands conservation in the San Joaquin Valley through their commitment to watershed protection and habitat preservation. As a member of the Lodi-Woodbridge Winegrape Commission, Vino Farms, Inc. has made a pledge to use sustainable vineyard management practices.

Members of the Winegrape Commission are also part of the Lower Mokelumne River Watershed Stewardship Plan. The mission of the plan is to connect biological resource management programs to maintain and improve the quality and quantity of biological resources in the watershed, increasing educational opportunities through the study of biological resources, supporting existing biological resources and education programs, and encouraging conservation of biological resources and habitats.

The Vino Farms, Inc. restoration plan meets the goals set forth by the Lower Mokelumne River Watershed Stewardship Plan and creates a general template for use on other farms in the watershed. This is a unique opportunity to create and enhance wildlife habitat in a large area by working on small parcels of individual farms.

## **I. INTRODUCTION**

### **A. Project Overview**

On May 17, 2006 Vino Farms, Inc. contracted with River Partners to prepare a Riparian Enhancement Plan for approximately 22.5 acres of existing riparian vegetation along the lower Mokelumne River. On the Vino Farms, Inc. site, part of the riparian area contains almost exclusively native riparian species, while non-native species dominate most of the remaining area, providing very poor habitat for riparian dependent wildlife species. The goal of this project is to improve wildlife habitat by decreasing the extent of non-native plant species and increasing the species and structural diversity of native vegetation.

This Riparian Enhancement Plan will describe current site conditions, enhancement alternatives for the project area, enhancement designs, and estimated project timeline and costs. Potential funding sources for enhancement activities on private lands will also be included.

### **B. Project Area and Location**

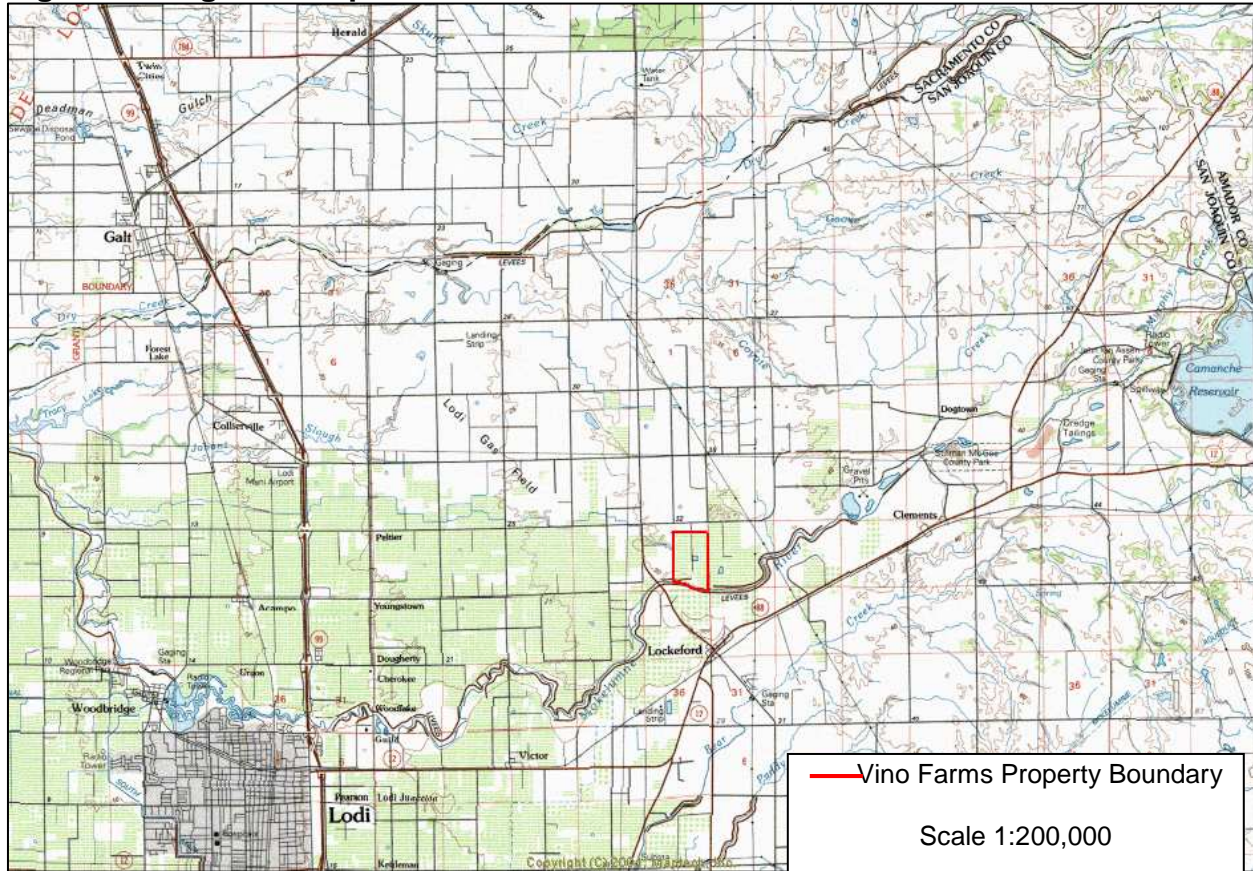
Vino Farms, Inc., located on the north side of the lower Mokelumne River off of East Peltier Road, is one of five vineyards in San Joaquin County owned by John Ledbetter and his family. The farm is situated in the predominantly agricultural community of Acampo, approximately 9 river miles downstream from the Camanche Dam (Figure 1). Wine grapes, one of the dominant crops in this area, border the northern perimeter of the enhancement site.

Of the 254-acre Vino Farms, Inc., approximately 221 acres are vineyard and 22.5 acres support remnant riparian forest that is proposed for enhancement (Figure 2). Approximately 3.5 acres of the enhancement area lies along a northern bluff between vineyards, the remaining 19 acres are located adjacent to the river (Figure 3).

This proposed riparian enhancement site is also directly adjacent to the 24 acre-El Rio Farms property. Like Vino Farms, El Rio Farms is primarily vineyard, and its southern boundary also borders the Mokelumne River. As of now, the farm maintains a small strip of remnant riparian habitat that buffers the vineyard from the river. With support from a conservation easement funded by the San Joaquin County Council of Governments, 7 acres of El Rio Farms' vineyard will be replaced with native riparian habitat along a 1.2 mile stretch of river (Kent Reeves, personal communication).



**Figure 1. Regional map and location of Vino Farms, Inc.**



### **C. Cooperative Relationships and Funding Sources**

As part of a unique partnership of local wine growers in the San Joaquin Valley, Vino Farms, Inc. is a member of the Lodi-Woodbridge Winegrape Commission and one of six farms certified as sustainable under the Lodi Rules Program (LWWC 2005). Within this commission growers are encouraged to follow ecological standards to preserve and enhance native habitat and use sustainable viticulture practices, including reducing pre-emergent herbicide use and installing owl boxes and raptor perches, among other practices (Ohmart and Matthiasson 1999, Dlott et al., 2002, LWWC 2005).

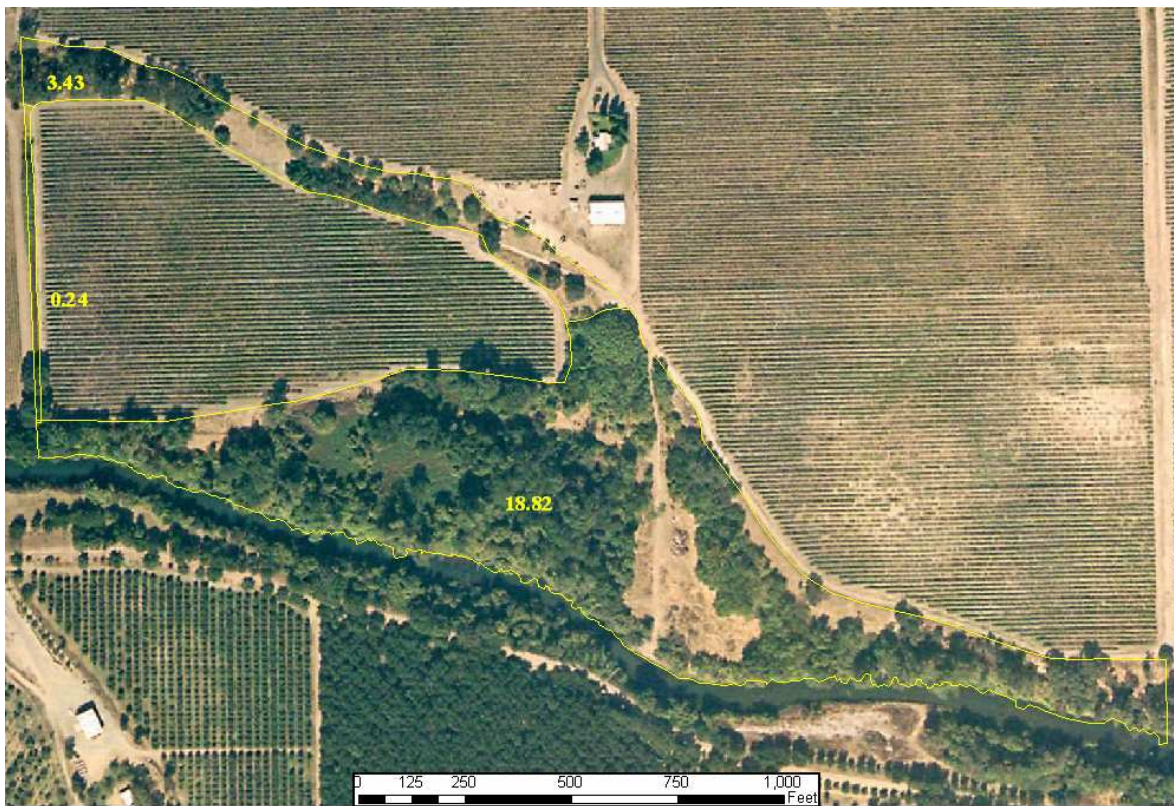
The commission is also part of the Lower Mokelumne River Watershed Stewardship Plan, funded through the San Joaquin County Resource Conservation District by CalFed. This plan brings together multiple biological, educational, agricultural, and recreational groups to preserve the integrity of the lower Mokelumne River watershed. The mission of the plan is to connect biological resource management programs to maintain and improve the quality and quantity of biological resources in the watershed, increasing educational opportunities through the study of biological resources, supporting existing biological resources and education programs, and encouraging conservation of biological resources and habitats. The Vino Farms, Inc., Riparian

Enhancement Plan is in alignment with the goals set forth in the Lower Mokelumne River Watershed Stewardship Plan.

River Partners is working closely with the East Bay Municipal Utilities District (EBMUD) Division of Fisheries and Wildlife, Mokelumne Unit. Staff at EBMUD have experience developing restoration and enhancement projects that benefit wildlife and enhance agricultural areas and operations. EBMUD has provided River Partners with technical advice as well as biological monitoring data gathered in and along the lower Mokelumne River (LMR)

Funding for the Riparian Enhancement Plan is being provided by Vino Farms, Inc. Funding for riparian enhancement activities will need to be secured from other sources. Potential funding programs will be described in Section IX of this document.

**Figure 2. Riparian enhancement project area on Vino Farms, Inc., San Joaquin County.**



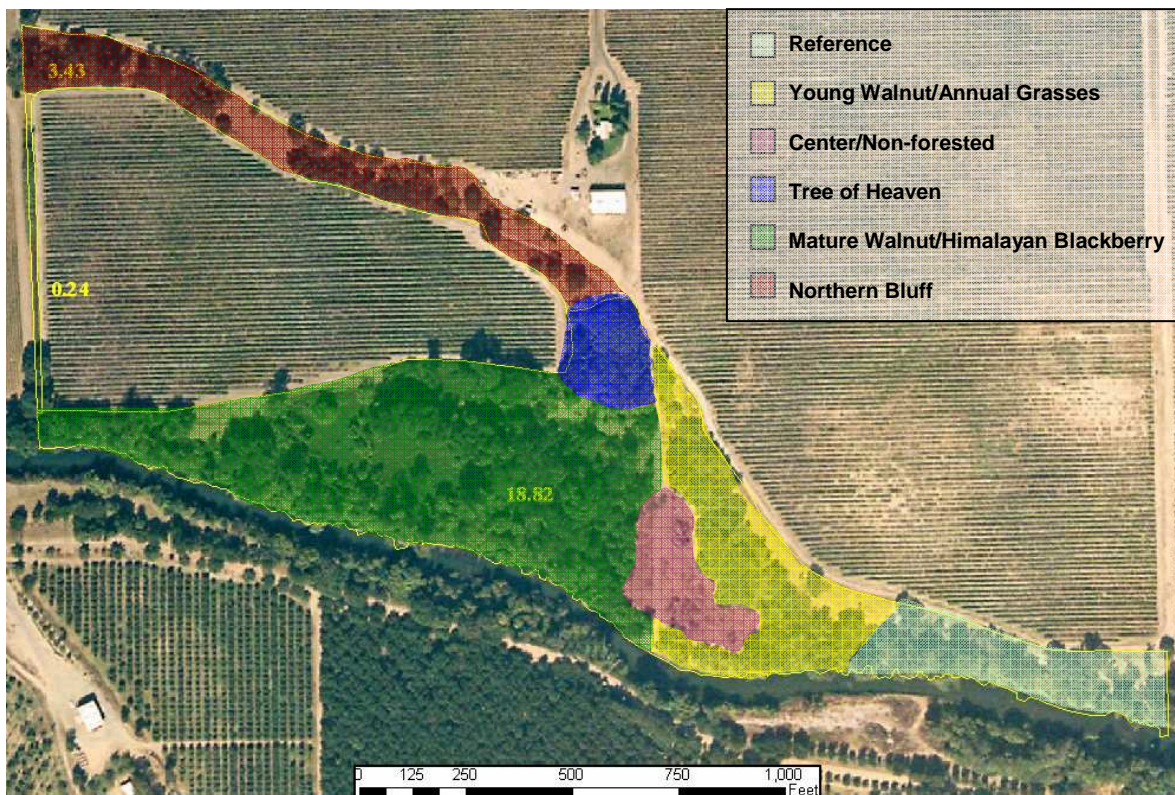


### D. Project Goals and Objectives

The overall goal of this project is to improve wildlife habitat along the lower Mokelumne River by decreasing the extent of non-native species and enhancing existing riparian vegetation by planting native species. Goals and objectives to this enhancement include:

- Decrease the extent and cover of non-native plant species such as Himalayan blackberry, tree of heaven, black walnut, and yellow starthistle
- Diversify the understory with native shrub and herbaceous species
- Design plantings that will improve habitat for riparian nesting and migrating songbirds and other wildlife
- Plant elderberry shrubs to improve Valley elderberry longhorn beetle habitat.

Figure 3. Areas of the enhancement site delineated by dominant vegetation.



## **E. Purpose of Riparian Enhancement Plan**

The purpose of this Riparian Enhancement Plan is to:

- Identify project goals and objectives
- Summarize the site history, soils, topography, hydrology, vegetation, and wildlife
- Outline our current understanding of the physical and biological factors that influence site ecology (a conceptual site model)
- Describe enhancement alternatives for the project area including site designs and rationale
- Describe recommended enhancement implementation and monitoring activities
- List potential funding sources for riparian enhancement on private lands
- Provide an estimated timeline for the project and cost estimates

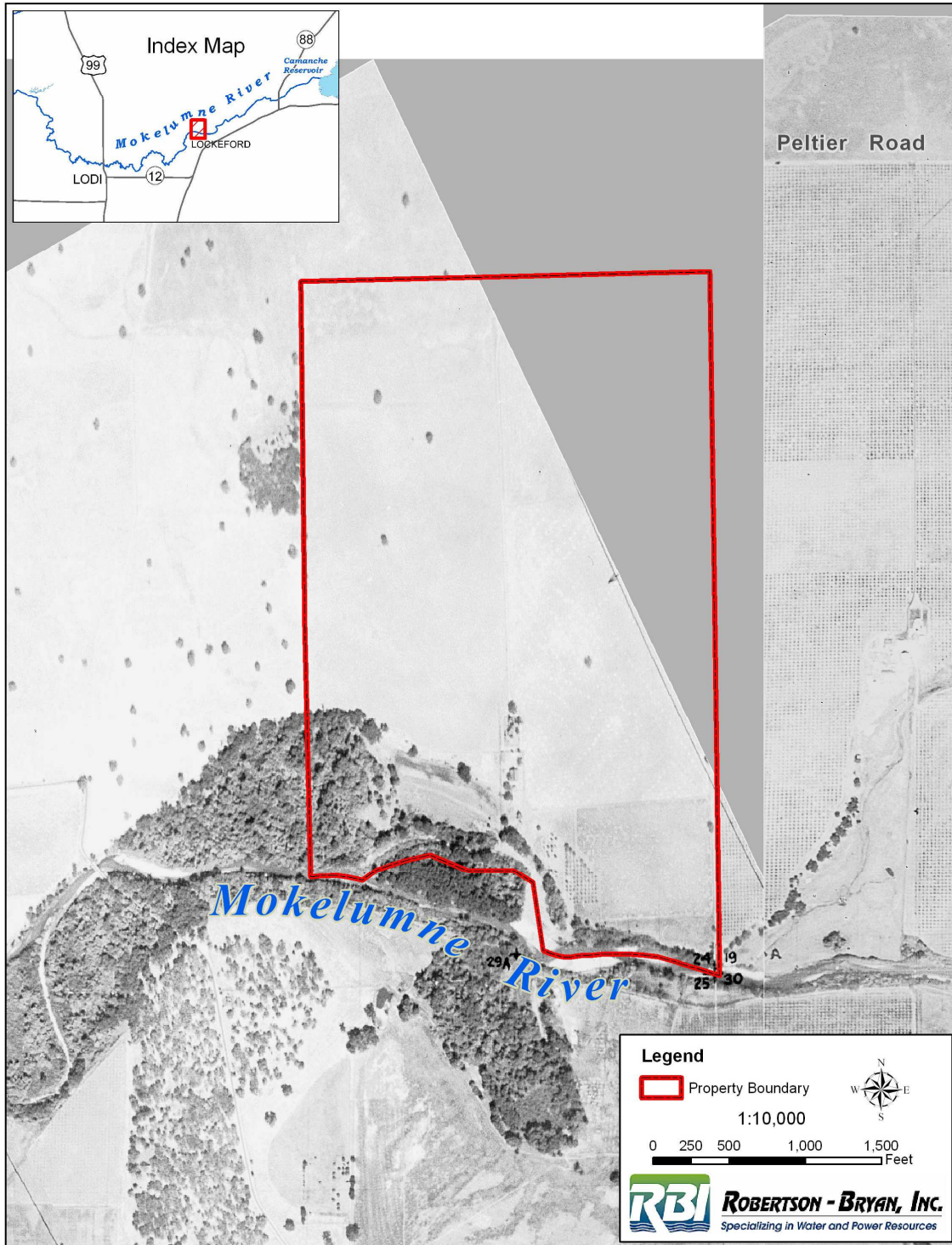
## **II. SITE DESCRIPTION**

### **A. Land Use History**

During the last 150 years, the lower Mokelumne River watershed has changed dramatically. Historically, the riparian areas supported a diverse and dynamic ecosystem of oxbow lakes, seasonal wetlands, secondary channels and extensive, forested floodplain. Human disturbance began impacting the river with the inception of California's gold rush in the late 1840s. A recent spatial analysis study of the lower Mokelumne River from 1910 to 2001 by Brook Edwards shows startling human impacts to the Mokelumne River. Over 80% of seasonal lakes have been converted to agriculture and 73% of the floodplains have been cleared of riparian forest and shrub communities, leaving a narrow ribbon of vegetation adjacent to the river (Edwards 2005).

Most of the 254-acre ranch has been in agricultural production since at least the 1920s (Figure 4). The property was used primarily for cattle grazing prior to acquisition by John Ledbetter in 1971. Since then, 221 acres have been converted to vineyard.

Figure 4. Vino Farms, Inc. 1927 historical aerial photo (Edwards 2005).



Vino Farms Property: 1927 Aerial Photo

Source: EBMUD 1927 Aerial Photo



## B. Soils

Soil characteristics partially determine riparian vegetation composition, structure, and patterns. There are three different soil types in the project area (Table 1, Figure 5). Channeled Columbia fine sandy loam (SMU 132), covers a majority of the project area, which is a landscape channeled by intermittent drainage ways. This very deep, somewhat poorly drained and nearly level soil is on floodplains with a 0 to 2 percent slope. It formed in alluvium derived from mixed rock sources. Permeability is moderately rapid in this Columbia soil and available water capacity is moderate. The soil is subject to frequent, brief or long periods of flooding from December through April (McElhiney 1992). The northern 10% of the site has the similar Columbia fine sandy loam soil (SMU 131) but the landscape is not channeled.

Tujunganga loamy sand (SMU 259) covers the remaining 10% of the project area, along the river on the eastern part of the site. This very deep, well-drained, and nearly level soil occurs on floodplains and elongated channel remnants. It formed in alluvium derived from granitic rock sources. Permeability is rapid in the Tujunganga soil and the high percentage of sand in the soil reduces the amount of moisture available for plant growth. The soil is subject to rare flooding during years of very high precipitation (McElhiney 1992).

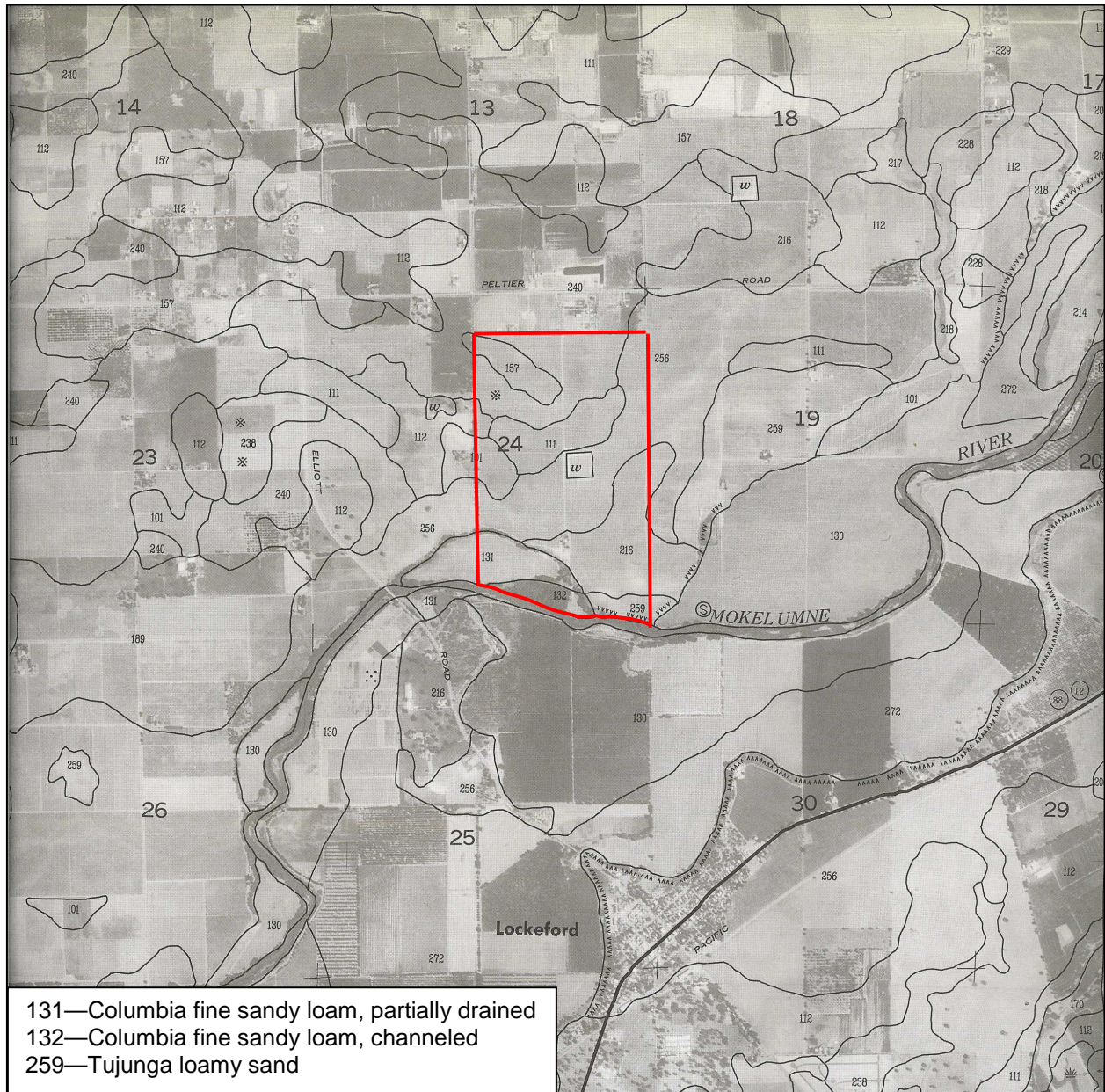
Soil surveys (excavated soil pits or augured soil cores) will be done to further assess soil conditions. These surveys will indicate whether there are any soil characteristics that may preclude root growth of native vegetation such as pure sand layers or hardpan, and will also indicate height of the water table.

**Table 1. Summary of soil types within Vino Farms, Inc. project area (McElhiney 1992).**

Soil Series	Columbia loam	Columbia loam, channeled	Tujunganga sand
<b>Mapping Unit</b>	131	132	259
<b>Percent Slope</b>	0-1%	0-8%	0-3%
<b>Textures</b>	Fine sandy loam	Fine sandy loam	Loamy sand
<b>Drainage</b>	Partially	Partially	Excessive
<b>Permeability</b>	Moderately rapid	Moderately rapid	Rapid
<b>Available water capacity</b>	Moderate	Moderate	Low
<b>Fertility</b>	Moderate	Moderate	Very low
<b>Plant growth limitations</b>	High water table; occasional flooding	High water table; frequent flooding; channeled landscape	Low available water capacity; soil blowing



**Figure 5. San Joaquin County Soil Survey map for Vino Farms, Inc. (McElhiney 1992).**





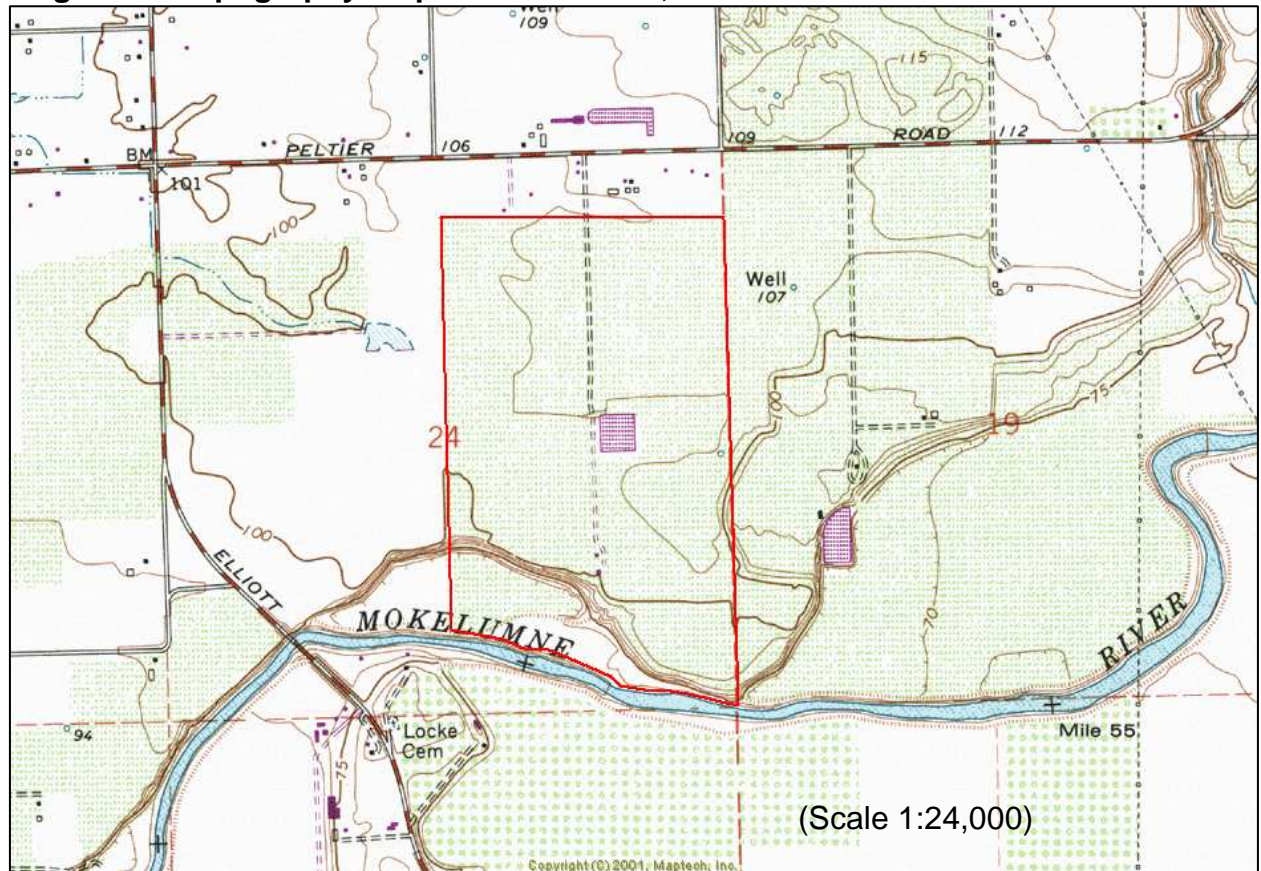
### C. Topography

The topography of the Vino Farms, Inc. project area ranges from low elevation on the west boundary to a higher elevation on the east boundary. The northwest to central portion of the property ranges in elevation from 10 to 55 ft and its eastern portion 40 to 70 ft (Figure 6).

Land use alteration in the lower Mokelumne River system during the past 150 years has included reduction in the number of channel segments, leveling of topography and minimization of floodplain sedimentation and inundation (Edwards et al. 2004). However, some historical features are still evident in the project area including a secondary channel near the non-forested center area and the elevated northern bluff. The northern bluff is likely the result of large historical floods and changes in soil type.

Original topography still exists throughout the western portion of the project area. Some of the eastern portion of the project area may have been disturbed in the past and possibly scraped or leveled, and little natural topography is evident in this area.

**Figure 6. Topography map for Vino farms, Inc.**



## **D. Hydrology**

### **1. Historical Conditions**

Historically, the Mokelumne River channel migrated within a floodplain ranging from ¼ to 1 mile wide, scouring and depositing sediment (Piper et al. 1939). Within the project area the river traversed the Victor Plain and its floodplain was delineated by steep cut banks and ground water levels fluctuated in response to changes in river stage. Rising river stages created ground water waves that stored relatively large volumes of water in alluvium close to the river (Piper et al. 1939). During falling stages, much of the water stored in the adjacent alluvium percolated back into the river.

John C. Fremont, one of the first Western explorers in the mid 1840s, described the lower Mokelumne River as having broad alluvial bottoms of very fertile soil, sometimes 1,500 feet wide, bounded by uplands 30 to 40 feet above the floodplain wooded with evergreen oaks (Spence 1984). He also noted natural flood cycles of the river, important to travelers in those days as there were no bridges, and rivers had to be forded or boated across. He described easily crossing the 177-foot wide river in December 1847 before the commencement of winter rains. Prior to that however, in June of 1847, the Mokelumne River had to be crossed by boat, along with other tributaries of the San Joaquin River, because the rivers had swollen to 300 to 600 ft wide with great volumes of melted snow from the Sierras (Spence 1984).

### **2. Current Conditions**

Since the late 1800s, the Mokelumne River has been modified by mining, agriculture, forestry, levee and dam construction, as well as municipal water diversion (Edwards 2005). Two major dams were constructed along the river; Pardee Dam, completed in 1928 in the Sierra foothills, and Camanche Dam constructed further downstream and completed in 1965. The natural pulse of the instream flow from spring snowmelt in the upper reaches has been reduced by over 80% in May, and bankfull discharge has been similarly reduced (Edwards et al. 2004, Edwards 2005). Channel width declined in the upstream reaches, while remaining static or increasing slightly downstream. Secondary channels were filled or leveled to increase acreage for agriculture. However, the historic secondary channel that cuts through the center/non-forested area of the Vino Farms project area was never completely filled and is still visible from aerial photos. This secondary channel likely filled with flood waters prior to the construction of Comanche Dam.

High rainfall in spring 2006 coupled with record snow pack in the Sierras resulted in flows that flooded the low elevation areas of the riparian project site. Overall, the low-lying project area has been flooded approximately 6 to 7 times since 1971, while the rest of the farm is above the 100 year flood plain.

## E. Vegetation

### 1. Pre-development conditions

Pre-settlement riparian areas of the lower Mokelumne River supported dense vegetation from the waters edge to the outer margin of the riparian zone (Katibah 1984). These plant communities were high in structural and species diversity, created and sustained by river processes (i.e., flooding, scouring, and sediment deposition).

The historic Mokelumne River floodplain covered approximately 6,807 acres (Edwards et al. 2004, Edwards 2005). Riparian cover (within 131 ft of the channel) was originally dominated by native woody vegetation. Aerial photographs indicate that in some areas along the lower Mokelumne River, up to 1 mile of riparian forest was completely removed leaving no vegetation adjacent to the river. From 1927 to 2001, floodplain forests were reduced by 73%, with a majority of land being converted to agriculture (Edwards et al. 2004, Edwards 2005). The actual change may be greater than this estimate, since large areas of riparian forest had likely been cleared before 1927 at the Vino Farms, Inc. location and upstream.

### 2. Current on-site conditions

The general habitat type for the area is classified as Valley Foothill Riparian and the vegetation for this area was mapped by EBMUD (Reeves and Jones 2004). The Vino Farms project area currently supports a multi-layer canopy with an overstory consisting of native tree species Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), interior live oak (*Quercus wislizenii*), a stand of invasive, non-native tree of heaven (*Ailanthus altissima*), and agricultural escapees almond (*Prunus dulcis*), walnut (*Juglans regia*) and fig (*Ficus carica*) (Tables 2 and 3). The sub-canopy is composed of sandbar willow (*Salix exigua*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), Oregon ash (*Fraxinus latifolia*), mulberry (*Morus alba*) and box elder (*Acer negundo* var. *californicum*). The shrub understory is dominated by invasive Himalayan blackberry (*Rubus discolor*) and interspersed with native California blackberry (*Rubus ursinus*), blue elderberry (*Sambucus mexicana*), California rose (*Rosa californica*), poison oak (*Toxicodendron diversilobum*) and snowberry (*Symphoricarpos albus* var. *laevigatus*). The herbaceous layer is a mix of native and invasive, non-native forbs and grasses. Basket sedge (*Carex barbarae*) grows in some low, moist areas and there are also patches of native California grape (*Vitis californica*) and hybridized grapes. The site can best be described by dividing the project area into sections delineated by dominant vegetation (Figure 3; Table 4). Photos in Figure 7, taken during the site assessment, are representative of each corresponding section.



**Table 2. Summary of existing native species at Vino Farms, Inc.**

Common Name	Species Name	Common Name	Species Name
<b><u>Woody</u></b>		<b><u>Herbaceous</u></b>	
Arroyo willow	<i>Salix lasiolepis</i>	Basket sedge	<i>Carex barbarae</i>
Box elder	<i>Acer negundo</i>	Cucumber	<i>Marah fabaceus</i>
California blackberry	<i>Rubus ursinus</i>	Creeping wildrye	<i>Leymus triticoides</i>
California rose	<i>Rosa californica</i>	Fiddleneck	<i>Amsinckia menziesii</i>
Elderberry	<i>Sambucus mexicana</i>	Gumplant	<i>Grindelia camporum</i>
Fremont cottonwood	<i>Populus fremontii</i>	Hedge-nettle	<i>Stachys albens</i>
Interior live oak	<i>Quercus wislizenii</i>	Lippia	<i>Phyla nodiflora</i>
Oregon ash	<i>Fraxinus latifolia</i>	Monkeyflower	<i>Mimulus guttatus</i>
Poison oak	<i>Toxicodendron diversilobum</i>	Mugwort	<i>Artemisia douglasiana</i>
Red willow	<i>Salix laevigata</i>	Stinging nettle	<i>Urtica dioica</i>
Sandbar willow	<i>Salix exigua</i>		
Snowberry	<i>Symphoricarpos albus</i>		
Valley oak	<i>Quercus lobata</i>		
Wild grape	<i>Vitis californica</i>		

**Table 3. Summary of existing non-native species at Vino Farms, Inc.**

Common Name	Species Name	Common Name	Species Name
<b><u>Woody</u></b>		<b><u>Herbaceous</u></b>	
Almond	<i>Prunus dulcis</i>	Bermuda grass	<i>Cynodon dactylon</i>
Fig	<i>Ficus carica</i>	Foxtail	<i>Hordeum murinum</i>
Himalayan blackberry	<i>Rubus discolor</i>	Grape	<i>Vitis sativa</i>
Mulberry	<i>Morus alba</i>	Johnson grass	<i>Sorghum halepense</i>
Tree of heaven	<i>Ailanthus altissima</i>	Horehound	<i>Marrubium vulgare</i>
Black walnut	<i>Juglans hindsii</i> X	Mare's tail	<i>Conyza canadensis</i>
		Milk thistle	<i>Silybum marianum</i>
		Mustard	<i>Brassica rapa</i>
		Morning glory	<i>Convolvulus arvensis</i>
		Poison hemlock	<i>Conium maculatum</i>
		Prickly lettuce	<i>Lactuca serriola</i>
		Ripgut brome	<i>Bromus diandrus</i>
		Starthistle	<i>Centaurea solstitialis</i>
		Verbena	<i>Verbena bonariensis</i>
		Vetch	<i>Vicia sativa</i>
		Wild oat	<i>Avena fatua</i>

**Table 4. Acreages of the enhancement areas delineated by dominant vegetation.**

<b>Area</b>	<b>Acreage</b>
Reference	2
Young Walnut/Annual Grasses	2.5
Center/Nonforested	1.5
Tree of Heaven	1
Mature Walnut/Himalayan Blackberry	12
Northern Bluff	3.5
<b>Total</b>	<b>22.5</b>

**a) Reference**

In the upstream (eastern) portion of the site, there is high native species diversity with a predominantly native understory of California blackberry, rose, poison oak, snowberry, basket sedge, creeping wild rye, and mugwort. The overstory consists of cottonwoods, valley and interior live oaks, box elder, and scattered walnut trees. The high density of native species suggests that this area was likely never disturbed by agriculture. Therefore, this area will be used as a reference area for the enhancement design.

**b) Young Walnut/Annual Grasses**

Directly west of the reference area there is a closed canopy of young walnuts, box elder, and scattered oaks with the understory dominated by non-native annual grasses (including ripgut brome). Creeping wild rye can be found in small, scattered patches. The growth form of the smaller, young walnuts in this area differs from the larger, more mature walnuts to the west.

**c) Center/Nonforested**

A large open space near the center of the project area is most likely part of the historical secondary channel. This area is dominated by non-native, herbaceous vegetation such as: vetch, Bermuda grass, yellow starthistle, Johnson grass, and ripgut brome. This area appeared devoid of woody vegetation even in the 1927 aerial photo (Figure 4). The only natives in this area, red willow, arroyo willow, and sandbar willow, are mainly along the river's edge.

**d) Tree of Heaven**

A large patch of tree of heaven dominates the far north corner. This closed canopy area has little vegetation in the understory, likely due to severe shading. This highly invasive species is an ecological threat to the project site and will be discussed further in Section V.A, along with the impacts of other non-native vegetation found on the project site.

### **e) Mature Walnut/Himalayan blackberry**

Large, mature walnuts, box elder, and few scattered oaks create a mostly closed canopy on the western portion of the project area. Very dense and tall Himalayan blackberry dominates the understory. Other natives such as California blackberry, stinging nettle, and hedge-nettle are rare. The dominance of non-native vegetation is most likely due to historical disturbance, possibly a walnut orchard. Fire scarring is visible on oaks and walnuts throughout the project area, indicating another historic disturbance factor.

### **f) Northern Bluff**

Oaks and mature elderberry are scattered along the northern bluff. Due to the bluffs high elevation and lack of flooding, elderberry seem to be thriving here. This location will be a priority for Valley Elderberry Longhorn Beetle habitat expansion.

## **3. Current off-site conditions**

Land use along the Mokelumne River is primarily agriculture. Vineyards dominate the surrounding area north of Vino Farms, Inc., while orchards dominate the acreage south of the river. Riparian vegetation along the river is very narrow, even absent in some places. However, the Vino Farm's project area is notable as one of the largest tracts of riparian habitat along the north end of the lower Mokelumne River, and it is connected to a riparian corridor on its east and west sides, making this particular site ideal for riparian enhancement.

## **F. Wildlife**

EBMUD conducted a survey of falcons, kites, hawks, and owls in the lower Mokelumne River watershed from April 1998 to April 2001 which yielded 2,172 observations of 16 species. Red-tailed hawk, American kestrel, Swainson's hawk, White-tailed kite, Red-shouldered hawk, Northern harrier, and Osprey were the most commonly observed species (Reeves and Smith 2004).

Amphibian and reptile populations were inventoried along the lower Mokelumne River (LMR) from Camanche Dam to tidewater from spring 2000 to spring 2004. Potentially 12 amphibian and 27 reptile species occur in San Joaquin and Sacramento counties. The inventory identified 3,858 individuals of 16 species (3 amphibians and 13 reptiles) during the four-year survey period (Workman and Smith 2004).

Small mammal populations were inventoried along the lower Mokelumne River from Camanche Dam to tidewater from April 2002 to July 2004. Potentially 43 native and 12 non-native mammal species occur along the LMR in San Joaquin and Sacramento counties (Reeves and Jones 2004b). The inventory identified 1,136 individuals of 14 species during the survey period (Reeves and Jones 2004b, Reeves and Jones 2005).

Researchers from California State University, Sacramento conducted neotropical bird monitoring from April 1999 to February 2000 along the lower Mokelumne River from Camanche Reservoir to Woodbridge, California. A total of 119 species were identified as occurring along the lower Mokelumne River, including a number of species of special concern: Long-billed Curlew, Loggerhead Shrike, Common Yellowthroat, Yellow Warbler, and Yellow-breasted Chat. Breeding activity was recorded for the following neotropical migrants: Swainson's Hawk, Tree Swallow, Cliff Swallow, Northern Rough-winged Swallow, Western Wood-peewee, Ash-throated Flycatcher, Western Kingbird, Black-headed Grosbeak, and Bullock's Oriole (Reeves et al. 2001, Reeves et al. 2003, Smith 2004).

PRBO Conservation Science has conducted bird monitoring along the Mokelumne River since 2003 (Pfeffer et al. 2006). A total of 156 species of birds were recorded using point counts, mist netting, and nest searches. A total of 56 species were identified on the Vino Farms property from area searches during fall migration (Pfeffer et al. 2006). This site had an average species richness of 49 over three years and was the lowest of the seven sites monitored during fall migration (Pfeffer et al. 2006). This is most likely due to an overstory primarily composed of black walnut and a sparse understory (Pfeffer et al. 2006).

Observations of wildlife on the Vino Farms, Inc. project site, from the Ledbetter family and River Partners field staff, include deer, raccoon, coyote, wild turkey, and bobcat. During the site assessment Cooper's hawk, Spotted towhee, California quail, Western kingbirds, Nuttall's woodpecker, California towhee, House wren, and a White-breasted nuthatch were observed. Several mature elderberry bushes exist on site, and there is evidence of the Valley Elderberry Longhorn Beetle (VELB).



**Figure 7. Representative photos of enhancement areas.**







**Center/Nonforested Area**



**Tree of Heaven (*Ailanthus altissima*)**





**Mature Walnut/Himalayan Blackberry Area**

River Partners



**Northern Bluff Area**

Page 18

### III. WILDLIFE AND ENVIRONMENTAL BENEFITS

#### A. Importance of Riparian Habitat

In agricultural areas, riparian forest vegetation and buffers have many positive impacts on adjacent waterways. Buffers slow water runoff, trap sediment, and enhance water infiltration. They also trap fertilizers, pesticides, bacteria, pathogens, and heavy metals, lessening the chance these pollutants will reach surface or ground water sources (USDA Program Aid 1615 2000). Riparian-vegetated floodplains are 80 to 150% less erodable than agriculture-dominated floodplains and tend to reduce river migration rates (Micheli et al. 2004). This ultimately protects the surrounding areas, especially the people and wildlife that live there.

Riparian systems are also some of our most important and most neglected renewable natural resources. River hydrology that has been altered by dams, levees, and water diversions, as well land clearing and leveling for agriculture and development, poorly planned grazing, and invasion by exotic species have critically degraded riparian habitat in California's Central Valley (Edwards et al. 2004, Edwards 2005).

While small in total area when compared to California's size, riparian areas are of special value as wildlife habitat. Over 135 species of California birds either completely depend upon riparian habitats or use them preferentially at some stage of their life history, and another 90 species of mammals, reptiles, invertebrates and amphibians depend on California's riparian habitats (RHJV 2004). Riparian habitat also provides riverbank stabilization, reduces flooding and sedimentation rates, cools water temperatures, and enhances scenery (Vilkitis et al. 2003).

A primary goal of this riparian restoration project is to improve wildlife habitat along the Mokelumne River corridor. Target wildlife species for this project include the valley elderberry longhorn beetle and Neotropical migratory birds. In order to develop a restoration and enhancement strategy for the Vino Farms project area, habitat needs of the target wildlife species must be considered.

#### B. Valley Elderberry Longhorn Beetle

The threatened valley elderberry longhorn beetle (VELB; *Desmocerus californicus dimorphus*) is endemic to riparian oak woodlands in California's Central Valley (Barr 1991). The beetle is found only in association with its host plant, blue elderberry (*Sambucus mexicana*) where it spends its entire life cycle.

The life cycle takes one to two years to complete. Adults feed on the foliage and possibly flowers. Females lay eggs in bark crevices and after hatching larvae bore into the pith stems. The insect spends most of its life cycle in the larval stage, living within the stems of the elderberry plant and, at maturity emerges through a hole created in the stem. Barr (1991) conducted extensive surveys, which determined the extent of the beetle's distribution and established that it requires elderberry with stems of a minimum diameter of approximately 1 inch. Research has also indicated that VELB has limited



dispersal abilities, which suggests isolated riparian habitat will be less likely to be colonized (Collinge et al. 2001). Additionally, VELB or its host plant may be negatively impacted by insecticide or herbicide drift.

River Partners staff observed exit holes on elderberry stems on the Vino Farms, Inc. property, indicating the presence of VELB. However, an intensive survey was not conducted on the property. VELB activity has been reported elsewhere along the lower Mokelumne River. Possible current occupancy by VELB of the project area and close proximity to existing elderberry shrubs increases the potential of the proposed project to provide habitat for this at-risk species.

### **1. US Fish and Wildlife Service Conservation Guidelines**

The US Fish and Wildlife Service Conservation Guidelines for VELB limit activities that can occur near elderberry. Its purpose is to create guidelines for project development, restoration plans, and survey and monitoring procedures in VELB habitat. On any project site, complete avoidance may be assumed when a 100 ft (or wider) buffer is established and maintained around elderberry plants containing stems 1.0 inch or greater in diameter at ground level. In areas where encroachment on the 100 ft buffer has been approved by the US Fish and Wildlife Service, a minimum setback of at least 20 ft from the dripline of each elderberry plant must be provided. No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer area of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level (USFWS 1999).

### **2. Safe Harbor Agreement**

In 2006, a programmatic Safe Harbor Agreement for VELB along the lower Mokelumne River was entered into by the California Association of Resource Conservation Districts and the US Fish and Wildlife Service. This agreement promotes ecosystem restoration and provides regulatory assurances to landowners participating in restoration activities, while not negatively affecting farming operations. Landowners who enroll in the program must maintain at least as many elderberry bushes as were present when the landowner entered into the program. The objective of restoration activities on enrolled lands is to restore riparian plant communities that include elderberry bushes, therefore enhancing and expanding VELB habitat. This partnership benefits this threatened species while giving landowners assurances from additional restrictions (USFWS 2006).

### **C. Riparian Bird Focal Species**

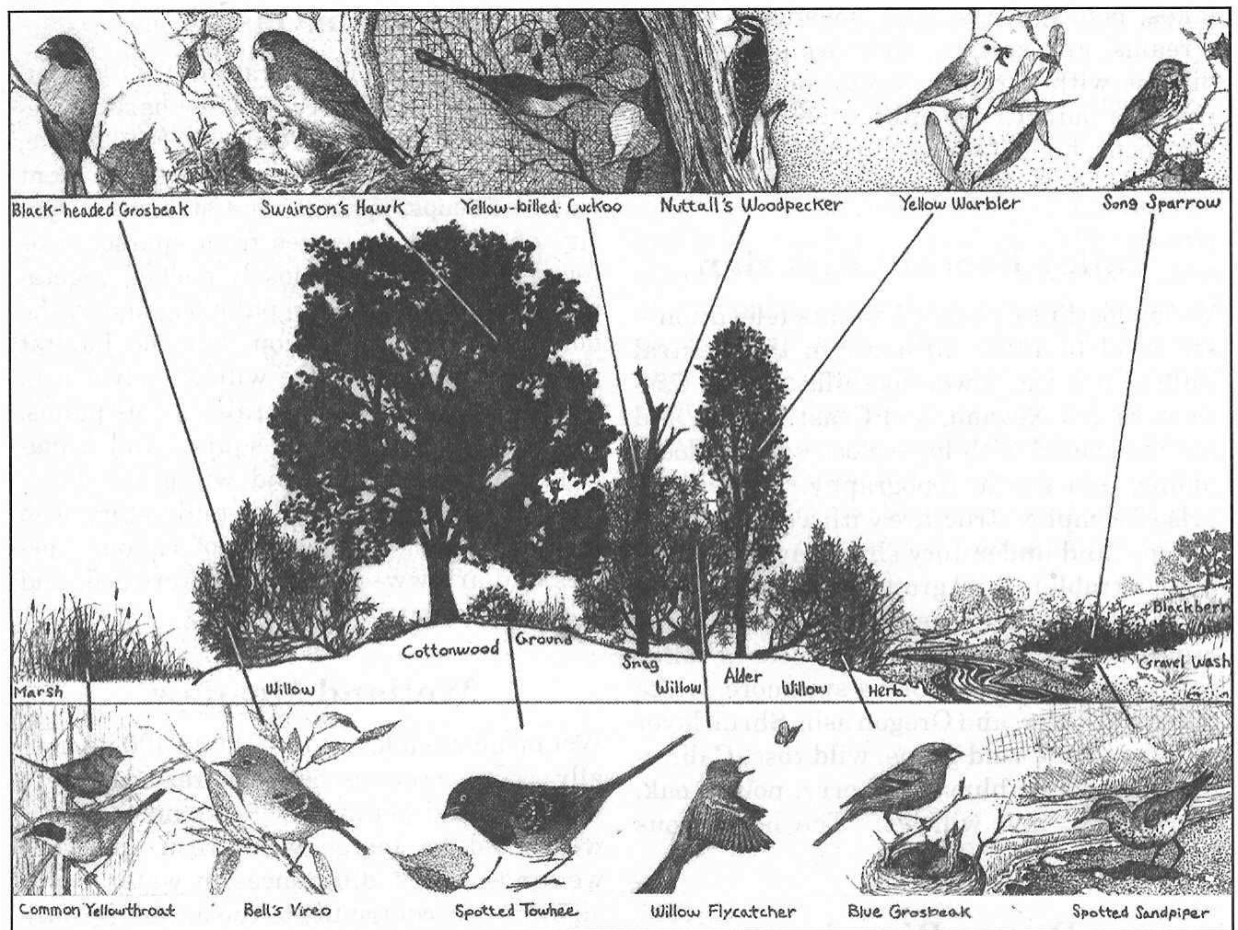
Songbirds are excellent indicators of ecosystem health and restoration success because of their specific habitat requirements, detectability, high metabolic rates, and distribution within and across habitats (Gardali et al. 2006).

The Riparian Habitat Joint Venture selected 17 riparian bird focal species that indicate ecologically healthy riparian systems (RHJV 2004). Six riparian focal species and 15 Neotropical migrants were recorded on the Vino Farms site by Point Reyes Bird

Observatory (PRBO) (Pfeffer et al. 2006). As one would expect, there is a wide range of spatial and structural habitat requirements among the species (Figure 8). For example, the Common Yellowthroat may occupy a breeding and foraging territory as small as one acre, while the Yellow-billed Cuckoo requires a minimum of 40 acres during breeding season. While some species avoid agricultural areas, the Blue Grosbeak will nest along farm roads and forage in certain types of cultivated crops.

The Least Bell's Vireo (LBV; *Vireo bellii pusillus*) is currently Federally listed as Endangered, but was once common in the lowland riparian plant communities from southern California to the Sacramento Valley (Grinnell and Miller 1944). The species was extirpated from the San Joaquin and Sacramento Valleys in the 1980s due to the loss of suitable habitat (USFWS 1998). In the spring of 2005 a nesting pair was discovered by PRBO in one of River Partners' fields recently restored to riparian habitat on the San Joaquin River National Wildlife Refuge. A sighting in the Mokelumne watershed in August 2006 has further energized the effort to restore LBV habitat in the area (Kent Reeves, personal communication). This plan incorporates the habitat needs of the LBV in hopes of promoting movement of mating pairs further north in the species' historical range.

**Figure 8. Structurally diverse riparian vegetation is needed to support a variety of riparian birds (RHJV 2004, Illustration by Zac Denning).**





## **IV. CONCEPTUAL SITE MODEL**

### **A. Past Environmental Conditions**

The riparian areas of the lower Mokelumne River historically supported a diverse and dynamic ecosystem of oxbow lakes, seasonal wetlands, secondary channels and extensive, forested floodplains (Edwards et al. 2004, Edwards 2005). The natural processes of flooding, scouring, and deposition along the lower Mokelumne River created and sustained healthy riparian systems. These systems provided high quality habitat for riparian dependent wildlife species and for a greater variety of wildlife than any other habitat found in California.

### **B. Likely Successional Patterns without Enhancement**

Since the construction of both the Pardee and Comanche Dams, the natural pulse of the instream flow from spring snowmelt in the upper reaches has been reduced by over 80% for the month of May and bankfull discharge has been similarly reduced (Edwards 2005). Many riparian plant species depend upon seasonal flooding for mineral substrate deposition, seed dispersal, and seed germination. In the absence of flooding, natural regeneration of the riparian forest will likely not occur.

Most of the riparian zone on Vino Farms, Inc. is currently dominated by non-native, invasive vegetation. Without removal and revegetation with native plants, these noxious species will continue to dominate and degrade wildlife habitat. Noxious weeds and shrubs also create a seed bank that will germinate and disperse locally and long distance by water, wind, and animals. Restoration activities are also potentially beneficial to agriculture. The removal of the adjacent invasive weed patch will decrease the likelihood of infestation in the vineyard, and may also result in a reduction of pest insects and diseases that are associated with non-native species.

### **C. Comparison of Site to Nearby Vegetation (Reference Sites)**

One of the fundamental components of a restoration or enhancement plan is the identification of reference sites to guide restoration design and plant species composition. Even though the Vino Farms, Inc. project area overall has a history of disturbance, the far eastern part of the site offers a good reference site for the enhancement of the downstream riparian area. This reference area is dominated by natives that provide species and structural diversity, providing optimum habitat for a variety of wildlife. During the site assessment River Partners observed the greatest diversity of bird species in this area. Other sites such as the Nakagawa property and Lodi Lake nature area also provide helpful reference information (Kent Reeves, personal communication).

## V. TARGET NON-NATIVE SPECIES

The density and cover of non-native, invasive species within the Vino Farms project area likely has the greatest negative impact on local habitat quality and presents the biggest restoration challenge. We propose to eradicate non-native species and replace them with native riparian vegetation. If native vegetation is not planted after weed eradication, the area will eventually become dominated by non-natives again. All alternatives seek to reduce non-native invasives in the riparian zone and plant with native riparian species.

Continued invasion by non-natives will decrease native plant and animal species diversity. Below is a summary of non-native species targeted for eradication at the Vino Farms, Inc. project site. Tree of heaven, yellow starthistle and Himalayan blackberry are the most invasive and aggressive. Information on methods of removal for each invasive species can be found in Section VIII.G.

### A. Tree of heaven

Bossard et al. (2000) state that Tree of heaven (*Ailanthus altissima*) was likely introduced to California from China during the gold rush and now commonly displaces native vegetation in riparian areas of the state. It is a prolific seed producer, grows rapidly, and can quickly overrun native species. Once established, it can produce numerous root sprouts and take over a large area, forming an impenetrable thicket. This tree species also releases allelopathic chemicals into the soil that prevent the establishment of other plant species.

### B. Yellow starthistle

Yellow starthistle (*Centaurea solstitialis*) as described by Bossard et al. (2000) is native to Eurasia and was introduced to California around 1850 via South America. It is now common in open areas on roadsides, rangeland, wildlands, hay fields, pastures, and waste areas. Recent reports indicate that yellow starthistle infests between 10 and 12 million acres in California. Disturbances created by cultivation, poorly timed mowing, road building and maintenance, or overgrazing favor this rapid colonizer. It forms dense infestations and rapidly depletes soil moisture, thus preventing the establishment of other species. Yellow starthistle is only found in the center/nonforested area of the project site. Because this species does not tolerate shade, it will likely not invade any closed canopy, forested areas.

### **C. Himalayan Blackberry**

Bossard et al. (2000) state that Himalayan blackberry (*Rubus discolor*) reproduces sexually and through several asexual methods. The species' sprawling nature and ability to root from the tips of stems, or canes, can shade out and smother native vegetation. Old stocks of Himalayan blackberry build up over time creating large thickets with living vines covering mounds of old, leafless canes, providing poor habitat for many riparian animal species. Thickets can produce 7,000 to 13,000 seeds per square meter allowing the species to quickly dominate a large area. However the species is not tolerant of dense shade and seeds often cannot germinate under the low light conditions found under a dense thicket.

### **D. Black Walnut**

Northern California Black Walnut (*Juglans hindsii* X) hybrids, which are growing on Vino Farms, Inc. property, are no longer considered native species in the Central Valley. Due to hybridization with the English walnut (*Juglans regia*) from Persia, the true Northern California Black Walnut, *Juglans californica* var. *hindsii*, has become a rare species (Hickman 1993). In general, *Juglans* species are known to produce chemicals which inhibit growth of other plants in two ways. One way is that the chemicals dissolve out of the leaves when it rains, reducing the growth of plants under the tree (Philbrick et al 1979). And second, the roots leach chemicals that inhibit plant growth along the root crown (Huxley 1992). Therefore, black walnuts are not good companion plants and are considered a target for treatment on the project site.

## **VI. RIPARIAN ENHANCEMENT ALTERNATIVES**

This section describes three riparian enhancement alternatives for the 22.5-acre remnant riparian forest based on current scientific knowledge of wildlife habitat needs and the site evaluation. Multiple alternatives, with different levels of intensity and cost, were developed as funding is still being pursued for the project.

Alternative 1 includes the minimum enhancement activities recommended for the project area. The following two alternatives offer additional habitat enhancement opportunities, at some additional cost.

### **A. Alternative 1—No herbicide treatment of walnuts**

Alternative one includes the following enhancement activities:

- **Eradicate Himalayan blackberry under mature walnuts (12 acres)**
- **Treat and leave standing tree of heaven (1 acre)**
- **Plant native woody and herbaceous vegetation in the following areas:**
  - Center/non-forested (1.5 acres),
  - Tree of heaven (1 acre),
  - Mature walnut/Himalayan blackberry (12 acres), and
  - Young walnut (2.5 acres)
- **Plant reference area with herbaceous understory (2 acres)**
- **Plant northern bluff with drought tolerant woody and herbaceous native species (3.5 acres)**

Alternative 1 incorporates the minimum recommended enhancement activities and does not include herbicide application or removal of walnuts. This alternative will be beneficial only because the understory vegetation will be enhanced with native vegetation, but structural diversity will be lacking in a majority of the project site due to shading by the walnuts. The shade will limit the variety of native species that can grow below and will thereby decrease the potential for wildlife species diversity at this site. Furthermore, leaving the black walnut trees untreated will allow the species to set seed and establish more individuals in the future.

### **B. Alternative 2—Apply herbicides to young walnut stand**

Alternative two includes the following enhancement activities:

- **All activities listed in Alternative 1**
- **Herbicide applications on young walnuts without physical removal (2.5 acres)**

The second alternative is to treat with herbicides and leave standing the young walnut trees (2.5 acres). This alternative increases the quality of the wildlife habitat more than Alternative 1 by opening up the canopy and allowing more light into the understory. This will increase the number of native species that can establish and therefore increase the structural diversity.

This alternative does not include treating the mature walnut stand on the western portion of the project area. This area would remain a relatively closed canopy, dominated by mature walnuts with shade tolerant native species being planted in the understory after Himalayan blackberry removal. Leaving the mature walnuts untreated may be cheaper in the short-term but will increase the need for long-term maintenance on the site, as the mature walnuts will continue to produce seed and young saplings will need to be removed annually.



### **C. Alternative 3—Treat both young and mature walnut stands with herbicides**

Alternative three includes the following enhancement activities:

- **All Activities listed in Alternative 2**
- **Herbicide application on mature walnuts without physical removal (12 acres)**

To maximize wildlife benefit, we recommend treating with herbicides both the young and mature stands of walnuts on site (14.5 acres). This alternative provides benefits to wildlife by reducing competition by non-natives, opening up the canopy throughout the area and, increasing native plant species and structural diversity. Leaving walnut trees standing after herbicide treatment may also provide raptor perches and snags for cavity nesters until planted native riparian tree species mature.

Complete removal of walnut stands may maximize restoration success by removing the canopy shade and allowing for the growth of a greater diversity of native plants, not just shade tolerant species. The mature walnuts may be harvested for timber and/or firewood to offset project costs.

## **VII. RIPARIAN ENHANCEMENT DESIGN**

### **A. Design Considerations**

Physical and biological factors weigh greatly on the selection of vegetation associations and essentially dictate what will grow on an area (site potential). Based on these factors, the Vino Farms, Inc. project area can support a variety of riparian forest, riparian shrub, and herbaceous species. However, wildlife objectives and management issues also alter the arrangement, composition, and vegetation associations that are selected. We refer to these factors as design considerations (Table 5).

**Table 5. Design considerations for riparian enhancement on Vino Farms, Inc.**

Objective	Example of Project Design Considerations
Provide immediate (< 3 years) habitat benefits and high probability of long-term survivorship	The project area on Vino Farms, Inc. is likely to sustain oak woodland in the long-term (>25-80 years), but will support cottonwood, willow, and other species in the short-term, providing several generations of targeted bird species with nesting and foraging habitat. Planting both slow and fast growing species maximizes quality habitat as the slow growing, but shade tolerant, oaks mature.
Maintain high plant species and vegetative structural diversity	PRBO data suggests that bird diversity is highest in areas with 5-7 shrub species over a 50-m <sup>2</sup> area. Design considerations include creating structural differences (grouping trees together will create pockets of shade and light gaps), creating vegetation patches (grouping small shrubs together will mimic larger plants and may attract desirable wildlife species faster than if they were grown apart), and planting herbaceous species (Geupel et al. 1997).
Maintain general flood flow conveyance patterns	Orient bands of vegetation parallel to general flow direction and do not direct flows toward levees or other sensitive structures. Plant willows, native grasses and herbaceous species along streambank to decrease erosion potential.
Provide rapid cover for neotropical migratory birds	Incorporate designs that have a high proportion of low stature plants to increase native cover (include some trees to provide a trellis system).
Provide VELB habitat	Plant elderberry in appropriate areas of the site.
Minimize sources of weeds	Plant native herbaceous understory to displace weeds.
Retain access road to the river and do not plant trees under the power lines parallel to the access road	Plant only native shrubs and herbaceous species along road and under power lines.

## **B. Rationale for Plant Association Selection**

River Partners has developed a site-specific planting design that represents a synthesis of the available information on the site conditions and project objectives. The planting design is based on several factors:

- Soil properties (texture, moisture, seasonal water table),
- Topography/hydrology (flood regime),
- Proximity to existing vegetation,
- Habitat characteristics for targeted species, and
- Management considerations.

Using knowledge of the site factors and design considerations, River Partners developed a plant design for riparian enhancement on Vino Farms, Inc. The plant design will follow the recommendations from PRBO that are based upon field data collected from areas that were known to support individual species of birds (Hammond et al. 2002; see Riparian Bird Conservation Plan (RHJV 2004) for examples of bird diversity related to plant species diversity).

## **C. Plant Design**

### **1. Walnut areas left untreated (Alternative 1)**

The existing black walnuts within the project area provide a closed canopy on the west side of the project area and an almost closed canopy on the east side of the project area. Leaving these walnuts in place limits the native species that can be planted to shade tolerant species, including California blackberry, interior live oak, valley oak, creeping wildrye, and basket sedge (Table 6). California rose and mugwort could be planted in light gaps and around canopy edges. Snowberry could be planted in areas with partial shade and a high canopy. Elderberry should be planted in light gaps as it thrives in full sun, and in higher elevations of the project area that are not prone to flooding.

Native California blackberry will be used to replace Himalayan blackberry, which dominates most areas within the site. The shade tolerant oaks will take decades to mature, but will eventually become dominant.

**Table 6. Species composition for walnut areas left untreated (planting density: 200 plants/acre).**

Plant Species	% Species Composition	Total Walnut Area (14.5 acres)
		Number
Blackberry ( <i>Rubus ursinus</i> )	35%	1,015
California rose ( <i>Rosa californica</i> )	25%	725
Elderberry ( <i>Sambucus mexicana</i> )	10%	290
Interior live oak ( <i>Quercus wislizenii</i> )	5%	145
Snowberry ( <i>Symphoricarpos albus</i> )	10%	290
Valley oak ( <i>Quercus lobata</i> )	15%	435
<b>Total</b>	<b>100%</b>	<b>2,900</b>

## 2. Walnut areas treated (Alternatives 2 and 3)

Treating the existing walnuts throughout the project area will significantly decrease shading and allow a greater diversity of native species to be planted (Table 7). The high proportion of California blackberry will be used to replace Himalayan blackberry. Greater light availability throughout the area will support willows and cottonwoods and boxelder. Elderberry shrubs will likely also fair better under less shaded conditions and a recent study by River Partners (2007) indicates that the VELB show a preference for unshaded elderberry shrubs.

**Table 7. Species composition for treated walnut areas (planting density: 200 plants/acre).**

Plant Species	% Species Composition	Young Walnut Area (2.5 ac)	Mature Walnut Area (12 ac)
		Total Number	Total Number
Arroyo willow ( <i>Salix lasiolepis</i> )	5%	25	120
Blackberry ( <i>Rubus ursinus</i> )	30%	150	720
California rose ( <i>Rosa californica</i> )	25%	125	600
Elderberry ( <i>Sambucus mexicana</i> )	10%	50	240
Fremont cottonwood ( <i>Populus fremontii</i> )	3%	15	72
Interior live oak ( <i>Quercus wislizenii</i> )	5%	25	120
Snowberry ( <i>Symphoricarpos albus</i> )	10%	50	240
Valley oak ( <i>Quercus lobata</i> )	12%	60	288
<b>Total</b>	<b>100%</b>	<b>500</b>	<b>2,400</b>

### 3. Tree of heaven and center/nonforested areas (Alternatives 1,2 and 3)

Plant species selection for the tree of heaven and center/nonforested areas is not limited by shade and could support a more diverse plant association including Fremont cottonwood, willows, oaks, and a variety of shrub species (Table 8).

**Table 8. Species composition for treated tree of heaven and the center/nonforested areas (planting density: 200 plants/acre).**

Plant Species	% Species Composition	Total Number
Arroyo willow ( <i>Salix lasiolepis</i> )	10%	50
Blackberry ( <i>Rubus ursinus</i> )	25%	125
California rose ( <i>Rosa californica</i> )	20%	100
Coyote brush ( <i>Baccharis pilularis</i> )	5%	25
Elderberry ( <i>Sambucus mexicana</i> )	5%	25
Fremont cottonwood ( <i>Populus fremontii</i> )	3%	15
Interior live oak ( <i>Quercus wislizenii</i> )	5%	25
Red willow ( <i>Salix laevigata</i> )	5%	25
Snowberry ( <i>Symphoricarpos albus</i> )	10%	50
Valley oak ( <i>Quercus lobata</i> )	12%	60
<b>Total</b>	<b>100%</b>	<b>500</b>

### 4. Northern bluff (planting density: 100 plants/acre)

The northern bluff is on a slope, higher in elevation, and not prone to flooding. Drought tolerant native species should be planted in this area to increase native species and structural diversity (Table 9). This area could be enhanced to increase its function as a hedgerow and wildlife corridor. Site conditions in this area make it ideal for planting a high proportion of elderberry for VELB habitat.

**Table 9. Species composition for the northern bluff area.**

Plant Species	% Species Composition	Total Number
Blackberry ( <i>Rubus ursinus</i> )	35%	123
California rose ( <i>Rosa californica</i> )	25%	88
Coyote brush ( <i>Baccharis pilularis</i> )	10%	35
Elderberry ( <i>Sambucus mexicana</i> )	20%	70
Interior live oak ( <i>Quercus wislizenii</i> )	5%	18
Valley oak ( <i>Quercus lobata</i> )	5%	18
<b>Total</b>	<b>100%</b>	<b>350</b>



## 5. Herbaceous understory

Native herbaceous understory species should be planted throughout the project area to increase diversity and as a measure of weed control (Table 10). The planting of herbaceous species should be designed around the existing topography and light availability (Table 11).

**Table 10. Herbaceous species planting design.**

Herbaceous Species	Walnut Areas	Tree of Heaven	Center/ Nonforested	Northern Bluff	Reference Area
Basket sedge ( <i>Carex barbarae</i> )	X				X
Creeping wildrye ( <i>Leymus triticoides</i> )	X	X	X	X	X
Mugwort ( <i>Artemisia douglasiana</i> )	X	X	X	X	X

**Table 11. Herbaceous species planting recommendations and methods.**

Herbaceous Species	Planting Design Recommendation	Planting Method	
		Seed	Plug
Basket sedge ( <i>Carex barbarae</i> )	Lowest and moist areas, shaded		4 ft spacing
Creeping wildrye ( <i>Leymus triticoides</i> )	Higher areas, shaded or sunny	4 lbs PLS/ac	4 ft spacing
Mugwort ( <i>Artemisia douglasiana</i> )	Sunny areas	0.5 PLS/ac	

## VIII. PROJECT IMPLEMENTATION

This section outlines the steps to complete riparian enhancement on the Vino Farms, Inc. property. The steps are laid out for the three years needed to decrease non-native vegetation and establish riparian species on the project area.

### A. Regulatory Compliance

Depending on the funding source (see Section IX), the project will need to comply with all Federal laws and regulations, such as, the National Environmental Policy Act, the Endangered Species Act, the National Historic Preservation Act and the Clean Water Act. The project also needs to comply with applicable state and local laws and regulations, such as California Environmental Quality Act (CEQA), a Reclamation Board Encroachment permit (California Code of Regulations, Title 23) and Department of Fish and Game regulations. Permitting can add significant amounts of time to a project. Regulatory compliance and permitting should be completed as early as possible during the project.

## **B. Site Preparation**

The main goal of the riparian enhancement project is to remove non-native vegetation without impacting local native vegetation. Manual eradication, goats, herbicide, or combinations of these techniques can be used for non-native vegetation removal at this site. Manual eradication would involve using tractors to scrape, pull, or disc non-natives, or hand cutting and removal of plant material. Goats can be used for browsing understory vegetation, mainly Himalayan blackberry, which would decrease costs relative to manual removal. Herbicides will be required to treat unwanted plant species initially and throughout the riparian enhancement process. US Fish and Wildlife conservation guidelines for VELB need be followed when conducting activities around existing elderberry.

## **C. Field Layout**

Once the non-native vegetation has been treated, native plants will be planted in rows parallel to the river and spaced around existing native vegetation. Planting rows will be curved to follow topographic contours. Planting rows will be spaced 20 ft apart. For all planting areas, except the northern bluff, spacing of plants within rows will be 11 ft. Plants in the northern bluff will be spaced 22 ft apart within rows.

Plant mortality, recruitment and flood events will alter planting density and orientation in time. Planting densities have been selected to provide good cover in a short period of time and to maintain economies of scale associated with standard plant spacing.

## **D. Irrigation**

Drip irrigation will be used on all enhancement areas to establish the young riparian plants during the project. Potential irrigation water sources include connecting to the existing vineyard system or using a portable river pump to pull water from the river.

The water volume needed to irrigate restoration and enhancement plantings will vary through the season. Early season cool temperatures and small leaf surface of young plants will require much less water than later in the season when hot and dry conditions are common and plants are beginning to develop lateral shoots and greater leaf surfaces. Even though early season water volume needs will be relatively low, cuttings will require constant moisture during this time of root formation and development. This will require regular and frequent irrigation to maintain adequate soil moisture. Varying soil textures and meandering rows of varying lengths will require constant attention by irrigators. Average irrigation frequency is estimated to be at three-week intervals, but this will ultimately be determined by environmental conditions.

## E. Plant Material Collection and Propagation

To preserve any ecotype differences, plant material should be collected locally. Table 12 summarizes common plant material sources and optimal planting times. Oak acorns can be collected from approximately September to November and placed in cold storage until planted. Field cuttings of cottonwood and willows should be collected in January-February when trees are dormant. A lead-time of at least 12 to 18 months is required from time of seed collection to transplant maturity for plants grown in containers at a nursery. Seeds for the herbaceous understory can be bought at local nurseries or seed can be collected from sources near the site and processed by River Partners staff.

## F. Plant Installation

### 1. Woody species

Oak acorns should be planted directly into the field during the fall. Cottonwood and willow cuttings should be planted in February and March. Optimally, nursery material (i.e., blackberry, rose, and elderberry) should be planted in the spring or fall when weather conditions are cool and moist.

**Table 12. Planting methods and timing for woody species.**

Species	Nursery Grown		Direct Planting		Field Planting Time (primary method)
	Seeds	Cuttings	Seeds	Cuttings	
Arroyo willow	(x)	(x)		X	Feb-Mar
Blackberry	X	(x)		(x)	Oct-Apr
California rose	X	(x)		(x)	Oct-Apr
Coyote brush	X	X		(x)	Oct-Apr
Elderberry	X				Oct-Apr
Fremont cottonwood	(x)	(x)		X	Feb-Mar
Interior live oak	(x)		X		Nov-Dec
Red willow				X	Feb-Mar
Snowberry	X				Oct-Apr
Valley oak	(x)		X		Nov-Dec

X – primary method, (x) – secondary method

### 2. Herbaceous species

Disking is ideal for field preparation prior to planting herbaceous understory species. Most of the site will likely not be accessible by equipment and prescribed burning is not an option given the amount of existing vegetation on site and air quality restrictions. Basket sedge plugs should be planted in clusters with 4 ft spacing within clusters. Creeping wildrye can be planted as plugs in areas that are not accessible by equipment and planted using a no-till drill or broadcast seeder in areas accessible by equipment. Mugwort seed can be broadcast seeded on bare mineral soil.

Planting should begin in the fall, once the rains have “flushed” the winter weeds (Table 13). Herbicide application should take place just prior to planting to kill existing weeds and reduce light and water competition for native species. The herbaceous understory species should be planted after at least one year of weed control.

**Table 13. Planting methods and timing for herbaceous understory species.**

<b>Planting Methods</b>	<b>Species</b>	<b>Timing</b>
Drilling	Native Grasses	Nov-Jan
Broadcasting	Mugwort	Nov-Jan
Plugging	Basket Sedge	Feb-Mar

## **G. Plant Maintenance**

### **1. Plant protectors**

Plant protectors should be installed with about 4 inches of wood shavings applied as mulch to hold soil moisture and minimize weed growth. These help protect the plant from desiccation, herbivory, and drift from herbicide applications. Additional protectors should be placed around any native trees that colonize the site. Types of protectors that can be utilized include:

- Milk cartons,
- Blue-X, and
- Tubex.

### **2. Weed control**

Once the enhancement is implemented, weeds should be controlled on the planting rows by spraying Roundup® or a generic herbicide brand with glyphosate as the active ingredient. The aisles between the planted rows should be sprayed to remove newly introduced weeds and sprouts of non-native invasive species. Once the herbaceous species are planted, weed control methods will be limited to mowing in areas accessible by equipment and possibly wicking with glyphosate herbicide.

Weed control will need to continue for at least 2-3 years after planting. Himalayan blackberry, tree of heaven, and walnuts are prone to re-sprouting after treatment. In order to have a successful establishment of riparian plant species, weed control of the target non-native plant species is essential during the enhancement project. Below is a summary of various controls for the target non-natives.

### **a) Himalayan blackberry**

In order to effectively treat blackberry the canes must first be significantly cut back either through mechanical means or by grazing goats or sheep. Re-sprouting shoots tend to die more quickly when subjected to heavy grazing and goats readily consume blackberry throughout the year even when more lush vegetation is available (Bossard, 2000, DiTomaso, 2003).

Cane removal should be followed with chemical application of either a glyphosate or triclophr (Garlon®) product. In wetter soils such as those under the mature walnut stands on the Vino Farms Inc. property, blackberry should be sprayed during times of active growth to ensure that chemicals are translocated to rhizomes and growing points.. In drier soils a fall application of chemicals is ideal (Bossard et al. 2000, Stephen Sheppard, personal communication).

### **b) Yellow starthistle**

Control of yellow starthistle cannot be accomplished with a single treatment or in a single year. Effective management requires control of the current population and suppression of seed production, combined with establishment of competitive, desirable vegetation (DiTomaso, 2001).

Starthistle can be initially treated with Transline (active ingredient clopyralid) preferably when starthistle is in the rosette stage and before flowering. This herbicide has post and pre-emergent qualities and is very effective in controlling starthistle. Glyphosate and 2, 4-D do not have pre-emergent qualities, but may be used to control starthistle in some areas. Grazing by goat, which will eat starthistle before the spiny stage, is also effective in reducing yellow starthistle seed production (Bossard et al. 2000).

### **c) Tree of heaven**

An effective way to eradicate Tree of Heaven is by girdling the bark, usually with a hatchet or machete, and applying 15 to 20 percent triclopyr or 15 to 40 percent glyphosate. This should be done in the spring so the tree is physiologically active, distributing the herbicide throughout its canopy and root system (Bossard et al. 2000). This treatment requires minimal equipment and is advantageous in situations where managers might want to leave dead trees standing. Young sprouts can either be hand-pulled or foliar sprayed with 4 percent glyphosate. Sites should be monitored several times throughout the growing season (Bossard et al. 2000)



## **IX. POTENTIAL FUNDING SOURCES**

Funding for restoration and enhancement activities on private lands is available from several sources.

### **A. Lower Mokelumne River Partnership**

The Lower Mokelumne River Partnership was established by East Bay Municipal Utility District, US Fish and Wildlife Service, and California Department of Fish and Game. The purpose of this funding program is “to protect and enhance the anadromous fishery and lower Mokelumne River ecosystem.” Funding from this program can range from \$600 to \$50,000. Funding matches are not required, but would likely make the proposal more competitive. More information is available from East Bay Municipal Utility District’s Lodi Office.

### **B. Partners for Fish and Wildlife Program**

The Partners for Fish and Wildlife Program provides financial assistance on a competitive basis to private landowners who want to restore or improve habitat on their property. The mission of this program is to “efficiently achieve voluntary habitat restoration on private lands, through financial and technical assistance, for the benefit of Federal trust species,” which include migratory birds, anadromous fish, Federally threatened and endangered species, and other at-risk species.

Restoration projects may include activities recommended in this riparian enhancement plan, such as planting native species and removing exotic vegetation that has altered natural habitats. There is no formal application process. The initial step is to contact the State Partners coordinator. The goal of the Partners program is to secure at least 50% in cost-sharing or matching, but projects are approached on a case by case basis. This program does not fund planning and research. More information about this funding program is available at <http://www.fws.gov/partners/>.

### **C. Wildlife Conservation Board**

The Wildlife Conservation Board’s California Riparian Habitat Conservation Program’s (CRHCP) goals are to protect, preserve, restore and enhance California’s riparian ecosystems. This program is a cooperative effort involving state and federal agencies, local government, nonprofit conservation groups, and private landowners. Eligible projects include restoring riparian vegetation on flood-prone land, removal of invasive plant species, and restoration of native riparian vegetation. State departments, federal agencies, local government agencies, and nonprofit organizations are eligible to receive funding through this program. For more information, contact the Riparian Program Manager (916) 445-1072.

## **D. Natural Resources Conservation Service**

### **1. Wildlife Habitat Incentives Program**

The Wildlife Habitat Incentives Program (WHIP) provides assistance to conservation-minded landowners who want to develop and improve wildlife habitat. The Natural Resources Conservation Service (NRCS) provides technical assistance and up to 75% cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the landowner generally last from 5 to 10 years.

National priorities for this program in fiscal year 2006 included promoting the restoration of declining or important native wildlife habitats, restoring or enhancing wildlife habitat of at-risk species, and reducing the impacts of invasive species on wildlife habitats. For more information, contact the local NRCS.

### **2. Environmental Quality Incentives Program**

The Environmental Quality Incentives Program (EQIP) promotes agricultural production and environmental quality as compatible national goals. EQIP provides incentive payments and cost-shares to implement conservation practices on eligible agricultural land. EQIP activities are carried out according to an environmental quality incentives program plan of operations developed in conjunction with the producer that identifies the appropriate conservation practices to address resource concerns. EQIP offers contracts from one to ten years and may cost-share up to 75% of the costs of certain conservation practices. National priorities for this program in fiscal year 2006 include promoting at-risk species habitat conservation.

## **E. Private Foundations**

### **1. National Fish and Wildlife Foundation**

The National Fish and Wildlife Foundation has a mission to sustain, restore and enhance the Nation's fish, wildlife, plants and habitats with measurable outcomes. The foundation invests in a range of projects that focus on developing the best methods and science-based answers for restoration and enhancement projects. The Foundations' Charter initiatives have the purpose of engaging the community and focusing on regional conservation issues and are a potential source of funding for this project.

## X. ESTIMATED PROJECT TIMELINE

An estimated project timeline for the Vino Farms, Inc. riparian enhancement project is shown in Table 14.

**Table 14. Estimated project timeline for the Vino Farms, Inc. riparian enhancement project.**

Task	Year 1				Year 2				Year 3			
	Spring	Summer	Fall	Winter	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring
Regulatory Compliance												
Plant Propagation												
Removal of Himalayan Blackberry												
Treatment of Tree of Heaven/Walnuts												
Site Preparation												
Irrigation Installation												
Field Planting												
Weed Control & Maintenance												
Monitoring & Reporting												
Project Management												

## XI. ESTIMATED PROJECT COSTS

Cost estimates for each of the three enhancement alternatives are listed below. Alternative 1 includes cost estimates for all of the minimum recommended riparian enhancement activities which do not include any treatment of walnuts (Table 15). Table 16 lists the additional cost for treating 2.5 acres of young walnuts for Alternative 2. Additional costs for implementing Alternative 3 are listed in Table 17 (in addition to Alternative 1 costs).

**Table 15. Alternative 1, estimated three-year budget for riparian enhancement project on 22.5 acres of Vino Farms, Inc.**

ACTIVITY	ACRES	ESTIMATED COST	TOTALS
Himalayan blackberry removal	12.0	\$57,499	
Treatment of tree of heaven	1.0	958	
Site preparation	22.5	3,055	
Irrigation installation	22.5	15,453	
Planting native vegetation in lower riparian areas	19.0	25,795	
Planting native vegetation along northern bluff	3.5	2,516	
Planting herbaceous native species	22.5	8,984	
Weed control and maintenance	22.5	23,718	
Monitoring and reporting		1,118	
Project management		13,441	
		<b>Year 1 Sub-total</b>	<b>\$152,537</b>
Weed control and maintenance	22.5	59,296	
Monitoring and reporting		5,031	
Project management		13,441	
		<b>Year 2 Sub-total</b>	<b>77,768</b>
Weed control and maintenance	22.5	35,578	
Monitoring and reporting		5,031	
Project management		13,441	
		<b>Year 3 Sub-total</b>	<b>54,050</b>
		<b>Total</b>	<b>\$284,355</b>

**Table 16. Alternative 2, estimated three-year budget for riparian enhancement project on 22.5 acres of Vino Farms Inc.**

ACTIVITY	ACRES	ESTIMATED COST	TOTALS
Himalayan blackberry removal	12.0	\$57,499	
Treatment of tree of heaven	1.0	958	
Treat and leave standing young black walnuts	2.5	2,795	
Site preparation	22.5	3,055	
Irrigation installation	22.5	15,453	
Planting native in lower riparian areas	19.0	25,795	
Planting natives along northern bluff	3.5	2,516	
Planting herbaceous native species	22.5	8,984	
Weed control and maintenance	22.5	23,718	
Monitoring and reporting		1,118	
Project management		13,441	
		<b>Year 1 Sub- total</b>	<b>\$155,532</b>
Weed control and maintenance	22.5	59,296	
Monitoring and reporting		5,031	
Project management		13,441	
		<b>Year 2 Sub-total</b>	<b>77,768</b>
Weed control and maintenance	22.5	35,578	
Monitoring and reporting		5,031	
Project management		13,441	
		<b>Year 3 Sub-total</b>	<b>54,050</b>
		<b>Total</b>	<b>\$287,150</b>



**Table 17. Alternative 3, estimated three-year budget for riparian enhancement project on 22.5 acres of Vino Farms Inc.**

ACTIVITY	ACRES	ESTIMATED COST	TOTALS
Himalayan blackberry removal	12.0	\$57,499	
Treatment of tree of heaven	1.0	958	
Treat and leave standing all black walnuts	14.5	16,212	
Site preparation	22.5	3,055	
Irrigation installation	22.5	15,453	
Planting native in lower riparian areas	19.0	25,795	
Planting natives along northern bluff	3.5	2,516	
Planting herbaceous native species	22.5	8,984	
Weed control and maintenance	22.5	23,718	
Monitoring and reporting		1,118	
Project management		13,441	
		<b>Year 1 Sub-total</b>	<b>\$168,749</b>
Weed control and maintenance	22.5	59,296	
Monitoring and reporting		5,031	
Project management		13,441	
		<b>Year 2 Sub-total</b>	<b>77,768</b>
Weed control and maintenance	22.5	35,578	
Monitoring and reporting		5,031	
Project management		13,441	
		<b>Year 3 Sub-total</b>	<b>54,050</b>
		<b>Total</b>	<b>\$300,567</b>

## XII. REFERENCES

- Barr, C. B. 1991. The distribution, habitat and status of the valley elderberry longhorn beetle *Desmocerus californicus dimorphus* Fisher (Insecta: Coleoptera: Cerambycidae). Report to U.S. Fish and Wildlife Service.
- Bossard, C.C., J.M. Randall, and M.C. Hoshovsky. 2000. Invasive plants of California wildlands. University of California Press, Berkeley, CA.
- Collinge S.K., M. Holyoak, C.B. Barr, and J.T. Marty. 2001. Riparian habitat fragmentation and population persistence of the threatened valley elderberry longhorn beetle. *Biological Conservation* 100:103-113.
- Dlott, J., C.P. Ohmart, J. Garn, K. Birdseye, and K. Ross. 2002. The Code of Sustainable Winegrowing Practices Workbook. Wine Institute and California Association of Winegrape Growers. 477 pp. [www.cawg.org](http://www.cawg.org)
- DiTomaso, J. 2001. Yellow Starthistle Information. UC Davis, UC Weed Research and Information website. <http://wric.ucdavis.edu/yst>
- DiTomaso, J.M. and Kyser, E.A. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources. Oakland, CA.
- Edwards, B.R., C.H. Perry, S.J. Steinberg, and K.A. Reeves. 2004. A Century of Riparian Change in the Lower Mokelumne River. Proceedings of the Geographic Information Systems and Water Resources III American Water Resources Association (AWRA) Spring Specialty Conference, Nashville, TN May 17-19, 2004.
- Edwards, B.R. 2005. Historical assessment of the ecological condition and channel dynamics of the lower Mokelumne River: 1910-2001. A Thesis Presented to the Faculty of Humboldt State University.
- Gardali, T., A.L. Holmes, S.L. Small, N. Nur, G.R. Geupel, and G.H. Golet. 2006. Abundance patterns of landbirds in restored and remnant riparian forests on the Sacramento River, California, USA. *Restoration Ecology* 14:391-403.
- Geupel, G.R., N. Nur, A. King, and G. Ballard. 1997. Songbird monitoring on the San Luis National Refuge: Results from the 1996 field season. PRBO unpublished report to the US Fish and Wildlife Service. Stinson Beach, CA.
- Grinnel, J., and A. H. Miller. 1944. The Distribution of the Birds of California. Cooper Ornithological Club. *Pacific Coast Avifauna* 27: 617pp

Hammond, J., R. Chruchwell, and G.R. Geupel. 2002. Songbird monitoring on the San Joaquin River National Wildlife Refuge: Progress report for the 2001 field season. Point Reyes Bird Observatory. Publication Number 966.

Hickman, J.C., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley, California.

Huxley, A. 1992. The New RHS Dictionary of Gardening. McMillan Press.

Katibah, E.F. 1984. A Brief History of Riparian Forests in the Central Valley of California. In California Riparian Systems: Ecology, Conservation, and Productive Management. R.E. Warner and K.M. Hendrix (Editors). University of California Press, Berkeley, California. pp.23-29.

Lodi-Woodbridge Winegrape Commission (LWWC). 2005. The Lodi Rules for Sustainable Winegrowing. Lodi-Woodbridge Winegrape Commission, 2545 West Turner Road, Lodi, CA 95242. 124 pp. [www.lodirules.com](http://www.lodirules.com) and [www.protectedharvest.org](http://www.protectedharvest.org)

McElhiney, M.A. 1992. Soil Survey of San Joaquin County, California. United States Department of Agriculture, Soil Conservation Service.

Micheli, E.R., J.W. Kirchner, and E.W. Larsen. 2004. Quantifying the effect of riparian forest versus agricultural vegetation on river meander migration rates, central Sacramento River, California, USA. River Research and Applications 20:537-548.

Ohmart, C.P., and S.K. Matthiasson. 1999. Lodi Winegrower's Workbook: A Self-Assessment of Integrated Farming Practices. Lodi-Woodbridge Winegrape Commission, 2545 West Turner Road, Lodi, CA 95242. 135 pp. [www.lodiwine.com](http://www.lodiwine.com)

Pfeffer, A., J.K. Wood, and G.R. Geupel. 2006. Songbird breeding and migration along the lower Mokelumne River, 2004-2006. A final report submitted to the San Joaquin Resource Conservation District, Stockton, CA. 88 pp.

Philbrick, H. and Gregg, R.B. 1979. Companion Plants. Watkins Press.

Piper, A.M., Gale, H.S., Thomas, H.E., and Robinson, T.W., 1939, Geology and ground-water hydrology of the Mokelumne area, California. U.S. Geological Survey Water-Supply Paper 780. U.S. Government Printing Office, Washington, D.C., 230pp.

Reeves, K.A., L.S. Hall, J. Hammond, G. Ballard, and J.S. Jones. 2001. Species Richness and Relative Abundance of Riparian Birds along the Lower Mokelumne River. Poster. State of the Rivers Symposium – University of California, Davis, Davis, CA

Reeves, K.A., J.S. Jones, L.S. Hall, and J. Hammond. 2003. Riparian Bird Monitoring along the Lower Mokelumne River, San Joaquin County, California. Poster. 2<sup>nd</sup>

Biennial CALFED Science Conference, Advances in Science and Restoration in the Bay, Delta and Watershed, Sacramento, CA

Reeves, K.A., and J.S. Jones. 2004a. Lower Mokelumne River Small Mammal Inventory. Baseline inventory report for the Joint Settlement Agreement. East Bay Municipal Utility District, 1 Winemaster Way, Suite K2, Lodi, CA 95240. 30 pp.

Reeves, K.A., and J.R. Smith. 2004. Survey of falcons, kites, hawks, and owls in the lower Mokelumne River Watershed, Sacramento and San Joaquin counties, California. Baseline inventory report for the Joint Settlement Agreement. East Bay Municipal Utility District, 1 Winemaster Way, Suite K2, Lodi, CA 95240. 45 pp.

Reeves, K.A., and J.S. Jones. 2005. Field Checklist of the Mammals for the Lower Mokelumne River, San Joaquin County, California. East Bay Municipal Utility District, 1 Winemaster Way, Suite K2, Lodi, CA 95240.

RHJV (Riparian Habitat Joint Venture). 2004. Version 2.0. The Riparian Bird Conservation Plan: A strategy for reversing the decline of riparian associated birds in California. California Partners in Flight. <http://www.prbo.org/calpif/pdfs/riparian.v-2.pdf>.

River Partners. 2007. VELB Habitat and Colonization of Remnant and Planted Elderberry along the Stanislaus and San Joaquin Rivers. San Joaquin, Stanislaus and Tuolumne Counties, California. Sara Taylor, Tom Griggs, and Lauren Singleton. Modesto, California.

Smith, J.R. 2004. Lower Mokelumne River Riparian Bird Surveys. Baseline inventory report for the Joint Settlement Agreement. East Bay Municipal Utility District, 1 Winemaster Way, Suite K2, Lodi, CA 95240. 59 pp.

Spence, M.L., ed. 1984. The Expeditions of John Charles Fremont: Travels from 1848-1854. University of Illinois Press, Urbana, Illinois.

United States Department of Agriculture. Natural Resources Conservation Service. Conservation Resources Program. 2000. Conservation Buffers Work-Economically and Environmentally. Program Aid 1615.

U.S. Fish and Wildlife Service (USFWS). 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. Sacramento, California

U.S. Fish and Wildlife Service (USFWS). 1998. Draft Recovery Plan for the Least Bell's Vireo. Fish and Wildlife Service, Portland, OR. 139 pp.

U.S. Fish and Wildlife Service (USFWS). 2006. Programmatic Safe Harbor Agreement: Lower Mokelumne River Watershed. 22 pp.  
<http://www.fws.gov/sacramento/ea/Documents/Mokelumne%20River%20PSHA%206-8-06.pdf>



Vilkitis, J.R, K.J. Busby, M.I. Pinno. 2003. Partnering for managing riparian systems for water quality in the agriculture-urban interface. In: Faber, P.M., ed. 2003. California Riparian Systems: Processes and Floodplain Management, Ecology, and Restoration. 2001 Riparian Habitat and Floodplain Conference Proceedings, Riparian Habitat Joint Venture, Sacramento, CA.

Workman, M.L., and J.R. Smith. 2004. Lower Mokelumne River Amphibian and Reptile Inventory. Baseline inventory report for the Joint Settlement Agreement. East Bay Municipal Utility District, 1 Winemaster Way, Suite K2, Lodi, CA 95240. 32 pp.



## Vino Farms Riparian Habitat Restoration (1600-2007-0302-R2)

**SCH Number:** 2007098178

**Document Type:** NOE - Notice of Exemption

**Project Lead Agency:** Fish & Game #2

### Project Description

Chemical treatment and subsequent mechanical removal of a non-native black walnut/English walnut hybrid trees, both mature and sapling stages, chemical treatment and physical removal of invasive non-native herbaceous vegetation such as Himalayan blackberry and star thistle. Chemical treatment of the plant, Tree of Heaven. Soil preparation by mechanical equipment and use of hand tools, to allow for transplanting and establishment of native woody vegetation including: willow species, cottonwood trees, oak trees, and various native herbaceous species. Ongoing treatment of areas within the restoration project with herbicides to maintain control of various invasive vegetation species until native planting can become established.

### Contact Information

**Primary Contact:**

Robert Hosea  
California Department of Fish and Game  
(916) 704-9156  
North Central Region  
1701 Nimbus Road, Suite A  
Rancho Cordova, CA 95670

### Project Location

County: San Joaquin  
City:  
Region:  
Cross Streets:  
Latitude/Longitude:  
Parcel No:  
Township:  
Range:  
Section:  
Base:  
Other Location Info: Acampo

### Exempt Status

- Ministerial
- Declared Emergency
- Emergency Project
- Categorical Exemption
- Statutory Exemption

**Type, Section or Code Number** 15304

**Reasons for Exemption**

This project is a small project aimed at restoration of native riparian habitat on the Mokelumne River.

---

**Date Received:** 9/17/2007

---

[CEQAnet HOME](#) | [NEW SEARCH](#)

**PROGRAMMATIC**

**SAFE HARBOR AGREEMENT**

**LOWER MOKELUMNE RIVER WATERSHED**

## **1. INTRODUCTION**

This programmatic Safe Harbor Agreement (Agreement) is entered into as of \_\_\_\_\_, 2006 between the California Association of Resource Conservation Districts (Program Administrator) and the U.S. Department of Interior, Fish and Wildlife Service (Service); hereinafter collectively called the "Parties." The purposes of this Agreement are (1) to promote ecosystem restoration, including the conservation of endangered species, through the voluntary restoration, enhancement, and management of native riparian habitat in the lower Mokelumne River watershed in California, (2) to provide certain regulatory assurances to landowners participating in such restoration, enhancement, and management activities, and (3) to accomplish the foregoing without negatively affecting farming activities. This Agreement follows the Service's Safe Harbor Agreement policy (64 FR 32717) and regulations (64 FR 32706), both of which implement section 10(a)(1)(A) of the Endangered Species Act (ESA).

## **2. LIST OF COVERED SPECIES**

This Agreement covers the following Federally listed species, which is hereafter referred to as the "covered species": Valley elderberry longhorn beetle, *Desmocerus californicus dimorphus*.

## **3. DESCRIPTION OF ENROLLED LANDS**

The properties subject to this Agreement consist of those non-Federal lands in the lower Mokelumne River Watershed in San Joaquin County, California, that are hereafter made subject to Cooperative Agreements between the owners or managers thereof (Program Participants) and the Program Administrator in the form attached hereto as Exhibit 1. Such properties are referred to herein as the "enrolled properties." The area within which properties may be enrolled is depicted on the attached map and consists generally of those lands lying within the lower Mokelumne River watershed from the confluence with the Cosumnes River, upstream to the Camanche Dam, exclusive of lands within the watershed of Dry Creek upstream of its crossing with Highway 99. The total amount of acreage for potential lands with riparian areas eligible to enroll in the SHA is not expected to exceed 15,000 acres. The total amount of acreage within this area that may be restored to riparian habitat is not expected to exceed 3,500 acres. The enrolled properties are to be more precisely indicated on maps attached to such Cooperative Agreements. Current and recent land use practices on the enrolled properties are likely to be varied and to include grazing, viticultural, and other agricultural uses, as well as recreational uses. Such Cooperative Agreements shall be effective upon the signing thereof by the Program Participant and the Program Administrator.

## **4. BASELINE DETERMINATION**

For each enrolled property, the baseline conditions shall be based upon a survey of the enrolled property, undertaken by a qualified person satisfactory to the Service not more



than 18 months prior to the signing of the Cooperative Agreement, to delineate the locations of all elderberry bushes having 1 or more stems that are 1 inch or greater in diameter at the base. Where possible to estimate baseline conditions based on monitoring and modeling of elderberry bushes in the watershed, such an estimate may be used in lieu of the survey of the enrolled property, provided that the Service, the Program Administrator, and the Program Participant concur. In order to receive the assurances regarding take of covered species specified in Section 10 of this Agreement, a Program Participant must maintain on the enrolled property at least as many such elderberry bushes as were present when the program participant entered into the program and in the same general locations.

## **5. MANAGEMENT ACTIVITIES**

Each Cooperative Agreement shall specify the riparian restoration, enhancement, and management activities to be carried out on the enrolled property to which it applies and a timetable for implementing those activities. These activities shall include those listed as "standard activities" in Exhibit 3 and such "additional activities" listed in Exhibit 3 as the Program Participant agrees to implement. The object of such activities will be to create healthy native riparian plant communities that include elderberry bushes, on the enrolled properties. The Service has determined that implementation of these activities is expected to produce a net conservation benefit for the covered species.

## **6. NET CONSERVATION BENEFIT**

Implementation of this Agreement is reasonably expected to provide a "net conservation benefit" to the covered species, because the collective management activities performed by the Program Participants pursuant to this Agreement are expected to provide an increase in the covered species' population and/or enhance, restore, or maintain the covered species' habitat.

Specifically, the Agreement supports recovery objective #5 listed in the Recovery Plan for the valley elderberry longhorn beetle (USFWS 1984) by restoring habitat sites within the presumed historical range of the animal, managing this habitat by removing exotic species as necessary, and protecting these restored sites for a minimum of 10 years. In addition, it is anticipated that many Program Participants will restore native plant species typical of Valley Foothill Riparian habitats, which may encourage colonization of the planted elderberries by the valley elderberry longhorn beetle (River Partners, 2004), as well as provide habitat for other species.

Because valley elderberry longhorn beetle populations appear to have limited dispersal capability (Collinge et al., 2001), colonization of restored habitat will be more likely if valley elderberry longhorn beetles are known to exist within a 10 to 20-km radius of the restored site. The area included in this Agreement is within the requisite radius of several valley elderberry longhorn beetle sightings recorded in the California Natural Diversity Database (e.g., #79 at Clements Glen View Cemetery, #90 on the Mokelumne River,

#160 and 161 on nearby Bear Creek). This Agreement will provide additional habitat for dispersing adults in this metapopulation, potentially increasing their occupied habitat, and therefore is expected to provide a “net benefit” to the species.

## **7. OTHER RESPONSIBILITIES OF THE PARTIES**

A. In addition to entering into Cooperative Agreements with willing non-Federal landowners and managers, as described above, the Program Administrator agrees to:

1. Inform the Service within 30 days of any notification it receives from a Program Participant (or from a neighboring landowner who has entered into an agreement pursuant to Section 8 of this Agreement) of the latter’s intent to make a change in land use likely to reduce the number of living elderberry bushes with 1 or more stems of 1 inch or greater in diameter at the base, and reasonably cooperate with the Service in the event that it chooses to relocate such bushes or capture and/or relocate potentially affected individuals of the covered species in response to such notification;
2. At least triennially, carry out surveys on not less than 20 percent of the total restored habitat on enrolled properties to assess the general condition of elderberry bushes, use of planted bushes by the covered species, and general condition of other native plant species in the restored habitat. Such surveying activities may be carried out on the Program Administrator’s behalf by the East Bay Municipal Utilities District or other qualified entity pursuant to an agreement with the Program Administrator and Program Participant;
3. Provide the Service with an annual report, due by March 31 of each year, in the form attached hereto as Exhibit 2;
4. Notify the Service of any living or dead specimens of the covered species of which it becomes aware on the enrolled properties; and
5. Furnish the Service with copies of all Cooperative Agreements hereunder within 2 weeks after they are signed.

B. In consideration of the foregoing, the Service agrees to:

1. Upon execution of the Agreement, issue to the Program Administrator a permit in accordance with ESA section 10(a)(1)(A), and valid for a period of 50 years, authorizing incidental take of the covered species as a result of implementing management activities specified in a Cooperative Agreement, or as a result of other lawful activities on enrolled properties after the management activities specified in such Cooperative Agreement have been initiated, provided that such taking shall be consistent with maintaining baseline conditions on the enrolled property. The duration of the Agreement will be 50 years. The section 10 permit

may extend for an additional 2 years beyond the 50 year duration of the Agreement, so long as prior to or upon expiration of the Agreement, the Service determines that the conservation actions identified in the Agreement have been implemented and the Program Participants need not perform additional conservation activities on the properties. If extended under the conditions above, the duration of the permit will be 52 years.

2. Provide to the Program Administrator and Program Participants technical assistance, to the maximum extent practicable, when requested; and provide information on Federal funding programs.

## **8. OTHER LANDOWNERS WHO MAY SECURE INCIDENTAL TAKE AUTHORIZATION**

Landowners who own land that abuts the Mokelumne River or its tributaries and is immediately adjacent to enrolled land may, without committing to undertake any management activities described in Section 5 of this Agreement on such adjoining land, secure the incidental take authority conferred by the permit issued by the Service to the Program Administrator pursuant to Section 7.B.1 of this Agreement, provided: (1) such adjoining landowner enters into a written agreement with the Program Administrator in the form attached hereto as Exhibit 5; (2) such written agreement specifies the baseline conditions on such adjoining property; and (3) activities resulting in such incidental take are consistent with maintaining the baseline conditions on such adjoining property. Where possible to estimate baseline conditions based on recent aerial photos, surveys undertaken from public roadways, adjacent lands, or other similar locations, the Program Administrator may, with the concurrence of the Service, propose a baseline on such basis. The adjoining landowner may either accept the Program Administrator's proposed baseline conditions or have undertaken at his own expense a survey to establish the baseline conditions more precisely. Under either event, the determination of baseline conditions shall be made by a qualified person satisfactory to the Service.

## **9. AGREEMENT AND PERMIT DURATION**

The Agreement becomes effective upon issuance by the Service of the ESA section 10(a)(1)(A) permit described in Section 7 of this Agreement, and will be in effect for 50 years. Cooperative Agreements developed pursuant to this Agreement will be for a term of at least 10 years. When the Service determines that the conservation actions identified in the Cooperative Agreements have been implemented, then the Program Participants need not perform additional conservation activities on the property and the section 10 permit may continue in effect following termination of the Agreement for an additional 2 years. In such case, the section 10 permit authorizing incidental take of the VELB will be for a duration of 52 years from the effective date of the permit. The additional duration of the permit following termination of the Agreement will continue section 10(a)(1)(A) permit coverage of the Program Participants for two years to allow a return of the enrolled property to its baseline condition. This Agreement and the permit described in

Section 7 of this Agreement may each be extended by mutual written consent of the parties.

## **10. ASSURANCES REGARDING TAKE OF COVERED SPECIES**

Provided that such take is consistent with maintaining the baseline conditions identified in Section 4 of this Agreement, the ESA section 10(a)(1)(A) permit referenced in Section 7 of this Agreement shall authorize the taking of covered species incidental to otherwise lawful activities by Program Participants (and by neighboring landowners who have entered into agreements pursuant to Section 8 hereof), their employees or agents, and those authorized by law to control flooding in the Mokelumne River watershed in the following circumstances:

1. Implementing the management activities identified in Section 5 of this Agreement; or
2. Making any lawful use of the enrolled property of the Program Participant after the management activities identified in Section 5 of this Agreement have been initiated, including but not limited to farming, ranching, or other agricultural use, use of registered pesticides and herbicides (provided that such use is in accordance with label restrictions, "standard activities" specified in Exhibit 3 and such "additional activities" from Exhibit 3 that are included in Exhibit B of the Cooperative Agreement), recreation, use and maintenance of access paths and of roadways, levee repair and maintenance, maintenance of floodways, and emergency flood fighting.
3. Returning to baseline.

## **11. MODIFICATIONS**

A. Modification of the Agreement. Either party may propose amendments to this Agreement by providing written notice to, and obtaining the written concurrence of, the other Party. Such notice shall include a statement of the proposed modification, the reason for it, and its expected results. The Parties will respond to proposed modifications within 60 days of receipt of such notice. Proposed modifications will become effective upon the other Parties' written concurrence.

B. Termination of the Agreement. As provided for in Part 12 of the Service's Safe Harbor Policy (64 FR 32717), a Program Participant may terminate his Cooperative Agreement with the Program Administrator for circumstances beyond his or her control by giving written notice to the Program Administrator. In such circumstances, the Program Participant may, pursuant to the permit referenced in Section 7.B.1 of this Agreement, return the enrolled property to baseline conditions even if the management activities identified in Section 5 of this Agreement have not been fully implemented.

C. Permit Suspension or Revocation. The Service may suspend or revoke the permit referenced in Section 7.B.1 above for cause in accordance with the laws and regulations in force at the time of such suspension or revocation. The Program Administrator or any Program Participant has the right to appeal any suspension or revocation to a mutually agreed upon arbitrator.

D. Baseline Adjustment. The baseline conditions for any enrolled property may, by mutual agreement of the Parties and the Program Participant, be adjusted if, during the term of the Cooperative Agreement and for reasons beyond the control of the Program Participant or as an unintended result of properly-implemented management activities, the number of living elderberry bushes with 1 or more stems of 1 inch or greater in diameter at the base is reduced from what it was at the time the Cooperative Agreement was negotiated.

E. Inability of the Program Administrator to Continue. If the Program Administrator shall, for any reason, cease to be able to perform its obligations under this Agreement, it shall give written notice of that fact to the Service at least 60 days prior to ceasing to perform its obligations under the Agreement. Upon receiving such notice, the Service may, at its discretion after consultation with Program Participants, either amend this Agreement and the associated permit to substitute a new Program Administrator, or, if a Program Participant prefers, convert any previously approved Cooperative Agreement into an individual agreement between the Program Participant and the Service under the same substantive terms.

## 12. OTHER MEASURES

A. Remedies. No party shall be liable in monetary damages for any breach of this Agreement, any performance or failure to perform an obligation under this Agreement or any other cause of action arising from this Agreement.

B. Dispute Resolution. The Parties agree to work together in good faith to resolve any disputes, using dispute resolution procedures agreed upon by all Parties.

C. Succession and Transfer. As provided in Part 11 of the Service's Safe Harbor Agreement Policy, if a Program Participant transfers his or her interest in the enrolled property to another non-Federal entity, the Service will regard the new owner or manager as having the same rights and responsibilities with respect to the enrolled property as the original Program Participant, if the new owner or manager agrees to become a party to the Cooperative Agreement in place of the original Program Participant.

D. Availability of Funds. Implementation of this Agreement is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. The Parties acknowledge that the Service will not be required under this Agreement to expend any



Federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

E. No Third-Party Beneficiaries. This Agreement does not create any new right or interest in any member of the public as a third-party beneficiary, nor shall it authorize anyone not a party to this Agreement to maintain a suit for personal injuries or damages pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third parties shall remain as imposed under existing law. In the event that any third party successfully challenges the permit referenced in Section 7.B.1 of this Agreement, the Service shall, at the request of a Program Participant, remove and relocate away from the enrolled property any elderberry bushes on the enrolled property in excess of baseline conditions.

F. Other Listed Species, Candidate Species, and Species of Concern. In the event that other riparian-associated species in the lower Mokelumne River Watershed in San Joaquin County not initially covered by this Agreement are subsequently listed as threatened or endangered under the Endangered Species Act, the parties agree to amend this Agreement, and subject to the concurrence of the Program Participant, any Cooperative Agreements previously approved hereunder, to include such other species as Covered Species. The amendment of any Cooperative Agreement pursuant to this provision shall specify as the baseline for such subsequently listed species the lesser of the following:

- (1) the amount of habitat for that species on the enrolled property that existed at the time the Cooperative Agreement was signed (as determined by a qualifying vegetational survey, if the survey was carried out within 18 months prior to such signing), or
- (2) the amount of habitat for that species on the enrolled property at the time of the amendment of such Cooperative Agreement as determined by a qualifying vegetational survey.

The term "qualifying vegetational survey" refers to a survey conducted substantially in accordance with either the California Native Plant Society's (CNPS) Releve Protocol (California Native Plant Society Vegetation Committee October 20, 2000; revised 4/2/04), or by using the existing vegetation classification and mapping protocol referenced in *Terrestrial Vegetation Communities of the Lower Mokelumne River, California* (Kent A. Reeves and James S. Jones, 2004, published by and available from East Bay Municipal Utilities District, 1 Winemaster Way, Suite K2, Lodi, CA 95240).

G. Notices and Reports. Any notices and reports, including monitoring and annual reports, required by this Agreement shall be delivered to the persons listed below, as appropriate:

California Association of Resource Conservation Districts  
3823 V Street, Suite 3

Sacramento, CA 95817

Project Leader  
Sacramento Fish and Wildlife Office  
U.S. Fish and Wildlife Service  
2800 Cottage Way, W-2605  
Sacramento, California 95825


### **13. RELATIONSHIP TO THE SAN JOAQUIN COUNTY MULTI-SPECIES HABITAT CONSERVATION AND OPEN SPACE PLAN**

Lands established as Preserves under the San Joaquin county Multi-Species Habitat Conservation and Open Space Plan ("SJCMSHCP") may be enrolled under this Agreement, and vice versa, provided that nothing in either this Agreement or the SJCMSHCP diminishes or enlarges any obligations imposed by the other with respect to such lands.

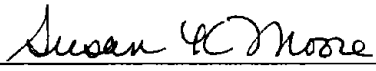
#### **Literature Cited**

- Collinge, S.K., M. Holyoak, C.B. Barr, and J.T. Marty. 2001. Riparian habitat fragmentation and population persistence of the threatened valley elderberry longhorn beetle in central California. *Biological Conservation* 100 (2001) 103-113.
- River Partners, 2004. Survey of planted elderberry on Sacramento River National Wildlife Refuge riparian restoration sites for use by Valley elderberry longhorn beetles. Prepared for US Fish and Wildlife Service, Sacramento. February 23, 2004.
- US Fish and Wildlife Service, 1984. Valley elderberry longhorn beetle recovery plan. US Fish and Wildlife Service, Portland, Oregon. June, 1984.

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Safe Harbor Agreement to be in effect as of the date that the Service issues the permit referred to in Section 7.B.1 above.

  
\_\_\_\_\_  
Executive Director  
California Association of Resource  
Conservation Districts

5/25/06  
Date

  
\_\_\_\_\_  
Acting Field Supervisor  
Sacramento Fish and Wildlife Office  
U.S. Fish and Wildlife Service

6/1/06  
Date

**EXHIBIT 1**  
**Cooperative Agreement**

This is a voluntary agreement that recognizes the unique and important role that private landowners in California can play in helping wildlife valued by the people of the state and of the nation. The purpose of the agreement is to enable land management activities beneficial to rare species to be carried out on privately owned land while minimizing the impact of such activities on the right and ability of the owner or manager thereof to use it as he or she wishes. The terms of this agreement are as follows:

1. The California Association of Resource Conservation Districts ("Program Administrator") and \_\_\_\_\_ (Program Participant) have entered into this Agreement to improve and manage native riparian habitat for the betterment of wildlife, including endangered species, on certain land owned or managed by the Program Participant that are delineated on the attached map (Exhibit A), and referred to herein as the "enrolled property."
2. The United States Fish and Wildlife Service (Service) has issued to the Program Administrator an endangered species permit that authorizes, until the year [20..], the incidental taking of valley elderberry longhorn beetles by Program Participant and other persons who enter into cooperative agreements with the Program Administrator pursuant to the permit.
3. Program Participant agrees to conduct, or allow to be conducted, activities to restore, enhance, or manage native riparian habitat in accordance with the plan set forth in the attached Exhibit B, and maintain such habitat for a period of 10 years from the date of this Agreement.
4. The Program Participant further agrees to provide the Program Administrator with a brief report, due December 31 of the year following the signing of this Cooperative Agreement, and annually thereafter. Such report, in the format shown in Exhibit 4 or in any other simple format to be developed by the Program Administrator, shall identify any management activities undertaken to restore, enhance, or manage native riparian habitat on the property subject to this Cooperative Agreement, as well as any changes in the extent of native riparian habitat in the preceding year. The Program Participant understands and agrees that the Program Administrator will include these annual reports with the reports that it is required to submit to the Service from time to time. The Program Participant further agrees to promptly report to the Program Administrator the observation of any living or dead specimens of the Valley elderberry longhorn beetle.
5. In consideration of the foregoing, the Program Administrator has issued to the Program Participant the attached Certificate of Inclusion under the Program Administrator's permit. This Certificate authorizes the Program Participant and the Program Participant's successors or assigns:

- a) to take the species identified above incidental to implementing the management activities set forth in this Agreement;
- b) after initiation of, and consistent with such management activities, to carry out any other lawful activity that may cause the incidental taking of such species on Program Participant's property, provided that such taking does not reduce the number of living elderberry bushes below the amount specified in Part 7 below.

As used in this Cooperative Agreement, "incidental" take refers to the unintentional or unavoidable killing or injuring of the species identified above in the course of carrying out otherwise lawful activities. Nothing in this Cooperative Agreement authorizes Program Participant to capture, collect, or deliberately kill or injure any such species.

6. After the agreed-upon management activities have been initiated, Program Participant agrees to give the Program Administrator at least 90 days notice (except when precluded by emergency situations) prior to commencing any change in land use likely to reduce the number of living elderberry bushes with 1 or more stems 1 inch or greater in diameter at the base on the enrolled property, and to allow the Program Administrator or the Service the opportunity to rescue and relocate any individuals of the above species and translocate elderberry bushes from Program Participant's land to avoid their loss.

7. The Program Participant and the Program Administrator agree that at the time that this Cooperative Agreement was signed, there were [X] living elderberry bushes with 1 or more stems of 1 inch or greater in diameter at the base on the enrolled property located at the general locations indicated on Exhibit A. That number of living elderberry bushes in those general locations shall be considered the "baseline conditions" applicable to the property. So long as at least that number of living elderberry bushes of that size remain in the same general locations on Program Participant's enrolled property, Program Participant may incidentally take the species as provided in Part 5 above. If requested by the Service within 90 days of its receiving a copy of the Cooperative Agreement, the Program Participant agrees to allow the Service access to the enrolled portion of Program Participant's property for the sole purpose of verifying the baseline determination set forth in this paragraph.

8. Successors and assigns may incur the responsibilities and benefits of this Agreement by becoming a party thereto, unless terminated in writing as specified below. If Program Participant decides to sell or otherwise transfer ownership or management of the property, Program Participant agrees to give the Program Administrator notice of such decision prior to the intended sale or transfer and to give the purchaser or transferee notice of this Cooperative Agreement so that the purchaser or transferee can become a party to it if he or she so wishes. Program Participant will inform the Program Administrator in the event all, or part of, the Program Participant's property delineated on the map labeled Exhibit A is transferred to another owner.

9. The Program Participant shall grant the Program Administrator access to Program Participant's property to confirm that the restoration, enhancement, or management activities set forth in Exhibit B have been conducted, and to assess the condition of the habitats being managed under the Cooperative Agreement. The Program Administrator shall give the Program Participant reasonable notice of these visits and shall be accompanied by the Program Participant or an agent of the Program Participant if the Program Participant so desires.

10. The Program Participant, or the Program Participant's successors or assigns, may terminate the Cooperative Agreement for reasons beyond their control at any time by giving 60 days written notification to the Program Administrator, in which case the Program Participant or the Program Participant's successors or assigns' right to incidentally take the species under the permit and Certificate of Exclusion shall expire two years after giving such notice. This Cooperative Agreement can be renewed, extended, or modified at any time subject to both the Program Participant's and the Program Administrator's approval. The baseline conditions in any renewal or extension of this Cooperative Agreement shall be the same as set forth in Part 7 above.

11 Program Participant and the Program Administrator agree with respect to liability and indemnification for injuries to persons or property arising out of this Agreement as follows: [details may vary from agreement to agreement] Program Participant assumes no liability for injury to any employee or representative of Program Administrator in the course of any visit to the property under this agreement. Program Administrator shall not be liable for any damage to the property of the Landowner arising from any visit to the property pursuant to this agreement.

12. So long as the permit and Certificate remain in effect, and provided the management activities required by this Agreement have been carried out, the Program Participant may exercise the right conferred by the Program Administrator's permit and the Certificate to incidentally take the species identified above on the enrolled property.

13. Nothing herein affects the right of the Program Participant to seek to establish the enrolled property as a Preserve under the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan ("SJCMShCP"), but neither this Agreement nor the SJCMShCP diminishes or enlarges any obligations imposed by the other.

California Association of Resource \_\_\_\_\_, Program  
Participant  
Conservation Districts

By \_\_\_\_\_

By \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_



Exhibit A

[map of the property subject to the cooperative agreement]

Exhibit B

[specifications for management actions to be carried out]

CERTIFICATE OF INCLUSION

This certifies that the property described as follows [DESCRIPTION], owned by [NAME OF PROGRAM PARTICIPANT], is included within the scope of Permit No. \_\_\_\_\_ issued by the U.S. Fish and Wildlife Service on [DATE] for a period of 50 years to the California Association of Resource Conservation Districts under the authority of section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, 16 U.S.C. 1539(a)(1)(A). Such permit authorizes certain activities by participating landowners as part of a safe harbor program to restore and enhance habitat for the valley elderberry longhorn beetle. Pursuant to that permit and this certificate, the holder of this certificate is authorized to engage in activities on the above described property that may result in the incidental taking of such species, subject only to the terms and conditions of such permit and the cooperative agreement entered into pursuant thereto by the California Association of Resource Conservation Districts and [NAME OF PROGRAM PARTICIPANT] on [DATE].

\_\_\_\_\_  
Name and Title of Representative of the California  
Association of Resource Conservation Districts

Date: \_\_\_\_\_

**EXHIBIT 2**  
**Annual Report for**  
**Safe Harbor Agreement between the U.S. Fish and Wildlife Service**  
**and California Association of Resource Conservation Districts**

**Permittee's Name:** California Association of Resource Conservation Districts

**Permit Tracking Number:** TE-XXXXXX-0

**Location:** Mokelumne River Watershed, San Joaquin County, California

**Agreement Approved by:** California/Nevada Operations Office, U.S. Fish and Wildlife Service

**Covered Species:** Valley elderberry longhorn beetle

**Report on the Monitoring Program (1-2 paragraphs):** Describe in general terms the results of any surveys carried out pursuant to Section 7.A.2 of the Safe Harbor Agreement in the year covered by the report; append a copy of the report. Describe any major changes in the collective condition of elderberry bushes included in the baseline or planted as part of the Program Participants' restoration plans. Describe any evidence of utilization of such habitat by the covered species. Append to this report copies of all reports submitted to the Program Administrator by Program Participants since the last annual report.

**Date Annual Report is Due:** On or before March 31, for the prior calendar year

**Date Annual Report was Received:** \_\_\_\_\_

**Date Annual Report was Reviewed:** \_\_\_\_\_

**Signature of Reviewer:** \_\_\_\_\_

**Printed Name and Phone # of Reviewer** \_\_\_\_\_

**Report on Area wide Management and Conservation Actions (1-2 paragraphs):** As necessary to supplement the monitoring reports above, summarize the extent and condition of restored native riparian vegetation on the collective enrolled properties. Describe any apparent year-to-year trends in restoration success in the region, as well as significant differences in restoration success between reached and-or sites. Describe any relevant regional conditions (e.g., drought, flood) that may be required to interpret the management activities described in the appended annual reports from the Program Participants. Finally, please convey any suggestions for adaptive management of restored areas that may have emerged from the program so far.

**EXHIBIT 3**  
**Management Activities**

**Standard Activities**

At least one of the following two management activities shall be included in all cooperative agreements:

- Plant native species typical of the canopy, subcanopy, shrub, and herbaceous layers found in Valley Foothill Riparian habitats<sup>1</sup>, preferably with stock obtained from local sources; if elderberries already exist on the site, recruitment and growth of additional elderberries will be encouraged via natural processes, **and/or**
- Plant elderberry bushes, using local stock when practical, at a density of at least 24 bushes per acre, or at a density appropriate for conditions at the site.

In addition, both of the following management activities shall be included in all cooperative agreements:

- Limit pesticide and herbicide use within the restored area to those contact herbicides necessary to control invasive weeds.
- Do not use aerial application of pesticides or herbicides within 100 feet of the restored area, except in extreme weather that precludes other pesticide application equipment from moving through the fields.

**Additional Activities**

A Program Participant may elect to include one or more of the following management activities in a cooperative agreement:

- Undertake reasonable efforts to remove non-native invasive species as appropriate to facilitate restoration.
- Monitor new plantings until they are established and adjust management practices (such as irrigation, if required) accordingly.
- Create riparian pastures that promote sustainable grazing management.
- Implement prescribed burns to foster restoration of native riparian habitat, following U.S. Fish and Wildlife Service guidelines for the protection of elderberry shrubs during prescribed burns.

---

<sup>1</sup> As defined in the "California Wildlife Habitat Relationships System" adopted by the California Department of Fish and Game. It is an adaptation of the description found in *A Guide to Wildlife Habitats of California* by K.E. Mayer and W. F. Laudenslayer, published by the California Department of Forestry and Fire Protection in 1988.

- Within 25 feet of the nearest elderberry bush planted as part of the initial restoration plan: monitor insect activity and nuisance plant growth; use pesticides and herbicides only when economic thresholds for insect pests and weeds have been exceeded and wind conditions minimize drift potential; and use the lowest-risk pesticides and herbicides appropriate to the task, as detailed below. The following may be revised to reflect advances in pest management science if such changes are approved by the Program Administrator and the Service.
  - Monitor at recommended intervals<sup>2</sup> for the important insect, disease, vertebrate and weed pests as identified in the University of California pest management guidelines (<http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>).
  - Do not treat for any pest unless the economic threshold for that pest has been exceeded (<http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>).
  - When making a decision whether to treat or not, take into consideration the presence of pests' natural enemies, if these species are important to the natural control of the pest (e.g., mite predators in the case of Willamette or Pacific mites, or *Anagrus* wasps in the case of leafhoppers).
  - If treatment is necessary use only low risk pesticides. For vineyards, the Pesticide Environmental Assessment System (PEAS)<sup>3</sup> model can be used to determine which pesticides are low risk.
  - Spot treat, if possible, (i.e. only treat pest affected areas, not the entire vineyard or cropped area).
  - Assure that sprayers/dusters have been calibrated for the material being used.
  - Do not spray/dust when winds will carry the spray/dust off of the property or into the restored area.
  - If application of herbicides is necessary, use a shielded sprayer to apply the herbicide.
  - To the extent feasible, minimize dust in and around the property by watering or sealing roads and growing cover crops.
  - Keep records of monitoring, economic threshold and toxicity determinations, and pesticide or herbicide use within the 25-foot buffer zone; provide these records to the Program Administrator and/or the Service on request.

---

<sup>2</sup> Every 10 days for vineyards.

<sup>3</sup> The PEAS model was developed by Dr. Chuck Benbrook, Benbrook Consulting Services. The primary goal of PEAS is to quantitatively identify risk for each pesticide used in the vineyard. Risk is calculated as pesticide impact units and is based on 5 indices: 1) Toxicity to *Daphnia*; 2) Toxicity to birds; 3) Toxicity to bees; 4) Worker exposure; and 5) Dietary exposure. The PEAS model calculates the number of pesticide impact units based on the amount of material applied per acre for each application, the method of application, and the time of day and time of year the material is applied. Pesticides having 10 or fewer impact units per application are considered low risk for purposes of this Agreement. Instructions for using the PEAS model can be obtained from the Lodi-Woodbridge Winegrape Commission.

**Exhibit 4**  
**Annual Report from Program Participant to Program Administrator**

Directions: Walk through the restoration area observing overall conditions and paying particular attention to elderberry bushes. You may wish to have your baseline maps and restoration plan handy for reference. Explanations can be brief (one or two sentences). Please refer to the sample photos provided by the Program Administrator to assess the condition of elderberry bushes and other native vegetation.

At the discretion of the Program Administrator, you may substitute for this form a monitoring report provided to you by a biologist or restoration professional familiar with the Valley elderberry longhorn beetle.

**Condition of Elderberry Bushes**

1. Of the elderberry bushes or clumps of elderberry bushes documented in Exhibit A (your pre-restoration baseline), how many are in
- Excellent condition (growing larger and denser, possibly reproducing) \_\_\_\_\_
  - Fair condition (no signs of stress, but little or no growth) \_\_\_\_\_
  - Poor condition (showing signs of stress) \_\_\_\_\_
  - No longer alive \_\_\_\_\_

Alternative to Question 1: Provide a photograph of each elderberry bush or clump of bushes listed in Exhibit A.

2. Of the elderberry bushes planted as part of the restoration plan described in Exhibit B, approximately what percentage (or how many) are in
- Excellent condition \_\_\_\_\_
  - Fair condition \_\_\_\_\_
  - Poor condition \_\_\_\_\_
  - No longer alive \_\_\_\_\_

Alternative to Question 2: Provide photographs that show the condition of a representative sample of the elderberry bushes planted as part of the restoration project.

3. If you have noticed any “exit holes” that appear typical of Valley elderberry longhorn beetles, please note here the number of bushes on which you have noticed them.

**Condition of Other Native Plants and the Restored Riparian Area**

4. What is the general condition of the native vegetation that was planted as part of the restoration plan? (If relevant, please note the condition of the canopy, subcanopy, shrub, and herbaceous layers separately.)
- Excellent condition \_\_\_\_\_
  - Fair condition \_\_\_\_\_
  - Poor condition \_\_\_\_\_



- No longer alive \_\_\_\_\_

Alternative to Question 4: Provide photographs taken from several locations within the restored site to show annual changes. These locations should be marked for reference on Exhibit B and should remain the same from year to year.

5. Has the extent of the area that supports native riparian vegetation changed within the past year? For example, has the area expanded naturally or has it markedly decreased due to fire, flood, drought, or other natural disturbance?

- Expanded \_\_\_\_\_
- Decreased \_\_\_\_\_
- Stayed the same \_\_\_\_\_

Please explain briefly the extent and causes of any noticeable increase or decrease.

6. Did non-native grasses or other invasive species

- Spread \_\_\_\_\_
- Degrade or dominate portions of the native plantings \_\_\_\_\_
- Remain about the same \_\_\_\_\_

Please describe any action you took to control the spread of non-natives.

7. Have you noticed a change in the types or numbers of birds, beneficial insects, or other wildlife in the restored area? If so, please describe these briefly.

### **Management Activities**

8. In what month and year were the restoration activities substantially complete? \_\_\_\_\_

9. Please list the types of activities (e.g., irrigation, grazing) you undertook this year to maintain or manage the restoration area this year and note whether they differed significantly from the activities described in Exhibit B of your Cooperative Agreement.

**EXHIBIT 5**  
**Neighboring Landowner Agreement**

1. [Owner] owns land (hereafter "the Property") in San Joaquin County, California, that is designated on the attached map and that is adjacent to land enrolled in the Programmatic Safe Harbor Agreement between the California Association of Resource Conservation Districts and the United States Fish and Wildlife Service (hereafter "the Service"), dated [date]. The Programmatic Safe Harbor Agreement, and the permit issued by the Service to the California Association of Resource Conservation Districts in connection therewith, authorizes participating landowners who enter into cooperative agreements to restore riparian habitat on land enrolled in the program to take endangered Valley Elderberry Longhorn Beetles incidental to farming, ranching, and other lawful activities on the enrolled land, provided that baseline habitat conditions as specified in such cooperative agreements are maintained.

2. The California Association of Resource Conservation Districts serves as the Program Administrator of the foregoing Programmatic Safe Harbor Agreement, and as such is authorized by that Agreement to enter into both cooperative agreements with landowners who enroll land in the Programmatic Agreement, and similar Neighboring Landowner Agreements with landowners who own land adjacent to land enrolled in the Agreement. Such Neighboring Landowner Agreements confer upon such neighboring landowners the same rights to take endangered species incidental to lawful activities on such neighboring land, subject to requirements as are set forth in this Agreement, as cooperative agreements confer upon landowners who enroll land in the Programmatic Agreement.

3. The California Association of Resource Conservation Districts has determined that the "baseline conditions" applicable to the Property are as follows: [number] living elderberry bushes with 1 or more stems of 1 inch or greater in diameter at the base occur on the Property at the general locations indicated on the attached map. So long as at least that number of living elderberry bushes of that size remain in the same general locations on the Property, [owner] may incidentally take Valley elderberry longhorn beetles in the course of any lawful use of the property, subject to Section 4 below. As used herein, "incidental" take refers to the unintentional or unavoidable killing or injuring of Valley elderberry longhorn beetles in the course of carrying out otherwise lawful activities. The restoration of riparian habitat on land enrolled in the Program shall not affect in any way the use by the Owner of pesticides or herbicides on the Property. Nothing herein authorizes [Owner] to capture, collect, or deliberately kill or injure any such beetles.

4. [Owner] agrees to give the the California Association of Resource Conservation Districts at least 90 days notice (except when precluded by emergency situations) prior to commencing any change in land use likely to reduce the number of

living elderberry bushes with 1 or more stems 1 inch or greater in diameter at the base on the Property, and to allow the Program Administrator or the Service the opportunity to rescue and relocate any individual Valley elderberry longhorn beetles and translocate elderberry bushes from the Property to avoid their loss.

5. This Neighboring Landowner Agreement remains in effect until the expiration of the Programmatic Safe Harbor Agreement between the California Association of Resource Conservation Districts and the Service on [date].

6. Nothing herein affects the right of [Owner] to seek to establish the Property as a Preserve under the San Joaquin County Multispecies Habitat Conservation and Open Space Plan ("SJCMSHCP"), but neither this Neighboring Landowner Agreement nor the SJCMSHCP diminishes or enlarges any obligations imposed by the other.

---

[Owner]

Date

---

California Association of Resource Conservation Districts

Date