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**Elkhorn Slough Wetland/Riparian Restoration Project
2003-2004 Summary Report**

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INTRODUCTION _____ **4**

METHODS _____ **5**

 Point Count Censuses _____ 5

 Point Count Vegetation Assessment _____ 6

 Statistical Analysis _____ 6

RESULTS AND DISCUSSION _____ **7**

 Blohm Ranch _____ 7

 Carneros Creek _____ 7

 Elkhorn Slough Research Reserve _____ 8

 Triple M Oxbow _____ 9

 Restored Stations _____ 9

 Remnant Stations _____ 13

CONCLUSIONS _____ **15**

 Management _____ 16

 Research and Monitoring _____ 17

 Online Point Count Data _____ 17

PERSONNEL _____ **18**

ACKNOWLEDGEMENTS _____ **18**

LITERATURE CITED _____ **18**

APPENDIX A. Point count locations within the Elkhorn Slough Riparian/Wetland Restoration project _____ **20**

APPENDIX B. Management history by point count station through 2004. _____ **21**

APPENDIX C. Mean species abundance at remnant point count stations in 2003. Only detections within 50 meters are included _____ **22**

APPENDIX D. Mean species abundance at remnant point count stations in 2004. Only detections within 50 meters are included _____ **24**

APPENDIX E Mean species abundance at restored point count stations in 2003. Only detections within 50 meters are included. _____ **26**

APPENDIX F Mean species abundance at restored point count stations in 2004. Only detections within 50 meters are included. _____ **28**

APPENDIX G. Cumulative plant species list for Elkhorn Slough Research Reserve, Blohm Ranch, Carneros Creek, and Triple M Oxbow _____ **30**

TABLES AND FIGURES

Table 1. Point count transects, number of points per transect, and the dates that these transects were visited. _____ **6**

Figure 1. Mean species richness at restored point count sites, 2003 - 2004. _____ **10**

Figure 2. Mean abundance at restored point count sites, 2003 - 2004. _____ **11**

Figure 3. Mean species diversity at restored point count sites, 2003 - 2004. _____ **11**

Figure 4. Mean species diversity at restored point count sites, 2003 - 2004. _____ **12**

Figure 5. Mean species richness at remnant point count sites, 2003 - 2004. _____ 14
Figure 6. Mean abundance at remnant point count sites, 2003 - 2004. _____ 14
Figure 7. Mean species diversity at remnant point count sites, 2003 - 2004. _____ 15

INTRODUCTION

The Central Coast region has experienced a dramatic population increase in recent years. This expansive growth seriously threatens riparian habitats in the region because of land conversion, water diversion, resource extraction, intensive grazing, habitat clearing and the introduction of invasive plant species (RHJV 2004). Protection and enhancement efforts for riparian habitats within the Central Coast region merits immediate attention for several reasons. First, riparian vegetation is critical to the quality of in-stream habitat and aids significantly in maintaining aquatic life by providing shade, food and nutrients that form the basis of the food chain (Jensen et al. 1993). More than 225 species of birds, mammals, reptiles, and amphibians depend on California's riparian habitats. Additionally, the National Research Council (2002) concluded that riparian areas perform a disproportionate number of biological and physical functions on a unit area basis and that the restoration of riparian function along America's water bodies should be a national goal.

The Elkhorn Slough Wetland/Riparian Restoration project proposes to restore 2000 linear feet of riparian habitat and three acres of wetlands. In 2004, the Resource Conservation District of Monterey County (RCDMC) in collaboration with several willing landowners began restoration activities on private lands within the Elkhorn Slough watershed. Restoration activities included the removal of acacia trees (*Acacia* spp.), planting of native riparian vegetation, and erosion control efforts.

The RCDMC recognized the importance of evaluating the effectiveness of their land management actions and measuring the quality of the restored habitat. Birds can act as good indicators of habitat quality because they are more sensitive to environmental change than other forms of wildlife, and they respond quickly and consistently to environmental stresses or enhancements (Elliott et al. 2003). Additionally, birds are both cost effective and perhaps the easiest community of organisms to monitor (Temple and Wiens 1989, RHJV 2004). To this end, birds are the most appropriate taxa to provide feedback on the effectiveness of the restoration techniques employed by the RCDMC. Thus, they contracted PRBO Conservation Science to assist in the establishment and coordination of a breeding songbird monitoring program on the restored lands.

The principle objectives of this study are:

- 1) Record the utilization of local habitats by breeding birds;
- 2) Record the extent that native plant community restoration affects utilization;
- 3) Identify how to improve restoration design and implementation to support bird populations.

PRBO Conservation Science (PRBO) conducted training sessions in 2003 and 2004 to train volunteers on standardized bird monitoring techniques. In 2003, PRBO helped establish four transects totaling 26 point count stations at Blohm Ranch, Carneros Creek,

Elkhorn Slough Research Reserve, and Triple M Oxbow properties (Table 1; Appendix A). In 2003, restoration/management activities occurred at three of these transects, Blohm Ranch, Carneros Creek, and Triple M Oxbow. Both baseline and post-restoration data were collected and analyzed. In this report we provide detailed information on methodologies employed in collecting and analyzing data from 2003-2004, a summary of the preliminary results, and many specific research and monitoring recommendations.

METHODS

POINT COUNT CENSUSES

The point count method is one of the most widely used methods of monitoring landbird populations available (Ralph et al. 1995). The point count method is based on the assumption that breeding birds are territorial and do not move great distances in short periods of time. Thus, point counts are best used for surveying songbirds, which tend to have relatively small, fixed territories during the breeding season (approximately April – July in coastal California). Point count data are also used to calculate secondary population parameters, such as diversity, abundance, and species richness.

In 2003 twenty-six point count stations were established along four different transects: five along the Blohm Ranch transect, 13 along the Carneros Creek transect, five along the Elkhorn Slough Research Reserve transect, and three along the Triple M Oxbow transect. In 2004 an additional station was monitored at the Carneros Creek, but not in 2003 due to a ruptured levee. All point count census stations were geo-referenced. Each transect was surveyed three times during the breeding seasons of 2003 and 2004. Surveys began within 15 minutes of local sunrise, and ended not more than four hours thereafter to capitalize on high bird activity during the morning hours.

Volunteers were trained by PRBO Conservation Science in 2003 and 2004 on point count methodology. Due to safety concerns and varying levels of expertise, the volunteers deviated slightly from the standardized point count protocols by using 2-4 observers per site. This modification was considered acceptable only if volunteers kept separate data sheets, did not influence the observations of the other surveyors, and did not modify data sheets at the end of the count. During a survey, a trained observer(s) stood at a fixed point and recorded all detections of birds within a five-minute period. Each bird detected was recorded either as singing, as a visual sighting, or as calling, in that hierarchical manner. All birds detected within a radius of 50 meters surrounding the census station were recorded separately from those at greater than 50 meters. Birds that flew over the point without landing were recorded in a separate category.

Table 1. Point count transects, number of points per transect, and the dates that these transects were visited.

Transect	Full Name	Year	Total Pts	Visit 1	Visit 2	Visit 3
BLRA	Blohm Ranch	2003	5	5/16/03	5/30/03	6/11/03
BLRA	Blohm Ranch	2004	5	5/05/04	5/20/04	6/10/04
CACR_A	Carneros Creek (1-6)	2003	6	5/06/03	5/27/03	6/17/03
CACR_A	Carneros Creek (1-6; 1.5)	2004	7	5/04/04	5/18/04	6/01/04
CACR_B	Carneros Creek (7-12)	2003	6	5/16/03	5/30/03	6/11/03
CACR_B	Carneros Creek (7-12)	2004	6	5/04/04	5/20/04	6/10/04
ESRR	Elkhorn Slough Research Reserve	2003	5	5/12/03	5/27/03	6/16/03
ESRR	Elkhorn Slough Research Reserve	2004	5	5/04/04	5/20/04	6/07/04
TMOX	Triple M Oxbow	2003	3	5/06/03	5/27/03	6/17/03
TMOX	Triple M Oxbow	2004	3	5/04/04	5/18/04	6/01/04

POINT COUNT VEGETATION ASSESSMENT

The objective of point count vegetation assessment is to relate the changes in bird composition and abundance to differences in vegetation. These vegetation differences can be due to changes over time or differences between treatments or study sites.

Vegetation at each point count station was assessed using the relevé method (see Ralph et al. 1993 for a complete description of the relevé method. A 50-meter radius plot centered on each census station was used. General habitat characteristics of the site were recorded (canopy cover, slope, aspect, etc.) and the cover, abundance, and height of each vegetation stratum (tree, shrub, herb, and ground) was estimated. Within each vegetation stratum the species composition was determined and each species relative cover recorded, as a percentage of total cover for that stratum (see Appendix D for a comprehensive plant list).

STATISTICAL ANALYSIS

Point count census data yielded information on species richness, diversity and overall abundance by point for each year. A by-point analysis (as opposed to a cumulative analysis) allows for more appropriate comparisons between transects and treatment types when the number of points or the number of observers varies between transects or treatments, as was the case in this study. We categorized the point count stations according to their treatment history. Those stations that have had restoration activity within the last five years constituted the “restored” treatment and those that have not had restoration activity constituted the “remnant” treatment. Two stations (TMOX 1 and 3) were not included in the summary analyses because their management regime differed significantly from the other stations (Appendix B). One additional station (CACR 1.5) was not included because only one year of data was collected.

Because the detectability of birds in most habitats decreases dramatically past 50 meters from the observer, only birds detected within 50 meters of each point were included in analysis of point count data, except for the purpose of creating site bird lists. Abundance is defined as the mean number of individuals detected at a point count station, calculated by dividing the total number of individuals detected within 50m of each station by the number of visits. Species richness is the total number of species detected within 50

meters. Richness is presented as mean species richness (average number of species detected per point). Species diversity measures ecological diversity based on the number of species detected within 50 meters weighted by the number of individuals of each species. A high score indicates high ecological (species) diversity. We measured species diversity using a transformation of the usual Shannon-Wiener index (MacArthur 1965). The advantage of this transformation over the original Shannon-Wiener metric is that it is measured in terms of species instead of bits of information, and thus is more easily interpretable.

RESULTS AND DISCUSSION

A total of 56 species were detected for the Elkhorn Slough Riparian/Wetland Restoration project, 44 species in 2003 and 46 in 2004. Of those, 9 species are considered California Partners in Flight riparian focal species (Figure 4). Focal species are those that have one or more of the following attributes: are representative of specific habitat elements and ecological characteristics; are good indicators for monitoring; and/or may be of conservation concern in California (RHJV 2004, CalPIF 2002). The most abundant species for both years were Song Sparrow (*Melospiza melodia*), Bushtit (*Psaltirparus minimus*), Spotted Towhee (*Pipilo erythrophthalmus*), and Common Yellowthroat (*Geothlypis trichas*). A table showing species abundance values for each site and each year is presented in Appendix C.

BLOHM RANCH

This transect contains five point count stations and is surrounded by preserve land. Stations 1-3 received restoration treatments; stations 4 and 5 had no restoration activities. Data from the vegetation assessment showed only minor differences in cover and plant species diversity between the restored and remnant stations on this transect. In general, habitat along this transect is characterized as a mixture of the California annual grassland, arroyo willow, and coast live oak series (Sawyer and Keeler-Wolf 1995). Tree cover ranged from 2-15% with the dominant species being arroyo willow (*Salix lasiolepis*) and coast live oak (*Quercus agrifolia*). Both shrub and herb cover ranged from 40-75% and included arroyo willow, coyote brush (*Baccharis pilularis*), and annual grasses.

A total of 30 bird species were detected in 2003 and 29 in 2004. Five of these were California Partners in Flight riparian focal species: Black-headed Grosbeak (*Pheucticus melanocephalus*), Common Yellowthroat, Song Sparrow, Swainson's Thrush (*Catharus ustulatus*), and Wilson's Warbler (*Wilsonia pusilla*). Species of highest abundance were Bushtit, Spotted Towhee, and Bewick's Wren (*Thryomanes bewickii*) (Appendix C). This was the only site in which Blue-gray Gnatcatcher (*Polioptila caerulea*), Lawrence's Goldfinch (*Carduelis lawrencei*), Marsh Wren (*Cistothorus palustris*), and Northern Flicker (*Colaptes auratus*) were detected (including detections >50m and flyovers).

CARNEROS CREEK

This transect contains 13 point counts stations and is surrounded by agricultural and fallow lands. Stations 3-6 and 8 received restoration treatments; 1, 2, 7, and 9-12 had no restoration activities. Data from the vegetation assessment showed only minor

differences in cover and plant species diversity between the restored and remnant stations on this transect. In general, habitat along this transect is characterized as a mixture of the arroyo willow series (Sawyer and Keeler-Wolf 1995), agriculture, and fallow land. Tree cover ranged from 0-40% with dominant species being arroyo willow and Pacific willow (*Salix lucida*). Shrub cover ranged from 4-80% and included a diversity of plant species such as smartweed (*Polygonum punctatum*), California blackberry (*Rubus ursinus*), and poison hemlock (*Conium maculatum*). Herb cover ranged from 5-70% with dominant species being wildrye (*Leymus triticoides*) and annual grasses.

A total of 40 bird species were detected in 2003 and 36 in 2004. Eight of these were California Partners in Flight riparian focal species: Black-headed Grosbeak, Common Yellowthroat, Song Sparrow, Swainson's Thrush, Warbling Vireo (*Vireo gilvus*), Wilson's Warbler, Yellow-breasted Chat (*Icteria virens*), and Yellow Warbler (*Dendroica petechia*). Species of highest abundance at this site were Song Sparrow, Red-winged Blackbird (*Agelaius phoeniceus*), and Common Yellowthroat (Appendix C). Eleven species were detected only at this site: Bank Swallow, Black-crowned Night-Heron (*Nycticorax nycticorax*), Brown-headed Cowbird (*Molothrus ater*), Canada Goose (*Branta canadensis*), Great Blue Heron (*Ardea herodias*), Killdeer (*Charadrius vociferous*), Merlin (*Falco columbarius*), Northern Mockingbird (*Mimus polyglottos*), Ruby-crowned Kinglet (*Regulus calendula*), Warbling Vireo, and Yellow-breasted Chat (including detections >50m and flyovers). However, Black-crowned Night-Heron, Canada Goose, Great Blue Heron, Killdeer, Bank Swallow, and Merlin are not adequately sampled using point count methodology. Therefore, their absence at other locations is likely attributed to inadequate sampling methods rather than differences in habitat quality.

ELKHORN SLOUGH RESEARCH RESERVE

This transect contains five point count stations and is surrounded by preserve land with one point count station near a residential area. None of these stations have received restoration treatments within the past five years. Habitat along this transect is characterized as a mixture of the arroyo willow, coast live oak, and creeping ryegrass series (Sawyer and Keeler-Wolf 1995). Tree cover ranged from 15-65% with dominant species being arroyo willow and coast live oak. Shrub cover ranged from 25-75% and included species such as coyote brush, arroyo willow, and dogwood (*Cornus* sp.). Herb cover ranged from 25-60% with dominant species being wildrye, annual grasses, and California blackberry.

A total of 23 bird species were detected in 2003 and 28 in 2004. Seven of these were California Partners in Flight riparian focal species: Black-headed Grosbeak, Common Yellowthroat, Song Sparrow, Swainson's Thrush, Tree Swallow, Wilson's Warbler, and Yellow Warbler. Species of highest abundance at this site were Song Sparrow, Spotted Towhee, and Chestnut-backed Chickadee (*Poecile rufescens*). Four species were detected only at this site: Belted Kingfisher (*Ceryle alcyon*), Barn Owl (*Tyto alba*), Rufous Hummingbird (*Selasphorus rufus*), and Violet-green Swallow (*Tachycineta thalassina*) (including detections >50m and flyovers). However, Belted Kingfisher and

Barn Owl are not adequately sampled using point count methodology (see Carneros Creek section).

TRIPLE M OXBOW

This transect contains three point count stations and is surrounded by agricultural lands. Stations 1 and 3 received management treatments different from other sites (see Appendix B); station 2 received no restoration or management activities. Habitat along this transect is characterized as a mixture of the arroyo willow series (Sawyer and Keeler-Wolf 1995), agriculture, and fallow lands. Trees were present only at station 2. Tree cover for this station was 20% with the dominant species being arroyo willow. Shrub cover ranged from 25-50% and included species such as poison hemlock, curly dock (*Rumex crispus*), and Italian plumeless thistle (*Carduus pycnocephalus*). Herb cover ranged from 15-70% with dominant species being annual grasses, bristly ox-tongue (*Picris echioides*), and curly dock.

A total of 16 bird species were detected in 2003 and 20 in 2004. Six of these were California Partners in Flight riparian focal species: Black-headed Grosbeak, Common Yellowthroat, Song Sparrow, Swainson's Thrush, Tree Swallow, and Wilson's Warbler. Species of highest abundance at this site were Song Sparrow, American Goldfinch (*Carduelis tristis*), and Red-winged Blackbird. One species was detected only at this site: Nuttall's Woodpecker (*Picoides nuttallii*).

RESTORED STATIONS

Results from point count data showed consistent increases in species richness, diversity and abundance indices for the restored Carneros Creek stations (Figures 1 - 3). For this transect, station CACR 3 had the highest richness (17) and abundance (13.1), and CACR 4 had the highest index of diversity (12.22). Station CACR 8 regularly had the lowest population indices. Diversity and richness indices decreased for Blohm Ranch stations 1-3 during the second year of monitoring. For this transect, station BLRA 2 showed an increase in abundance in 2004 at 14.6, the highest abundance value of any restored station. Additionally, five of the seven California Partners in Flight riparian focal species detected at restored sites increased in abundance in 2004 (Figure 4).

The Riparian Bird Conservation Plan contains estimates for maximum breeding abundance for the 17 focal species by bioregion (RHJV 2004). These maximum breeding abundance estimates are taken from the highest recorded abundance in regions where populations are believed to be viable, and are calculated in the same manner as the abundance estimates within this report. Thus, comparing the abundance estimates for the Elkhorn Slough Riparian Project sites to other riparian sites within the Central Coast Bioregion can provide a reference for comparison. Estimates for the Bay-Delta Bioregion are also provided due to the similarity and close proximity to the Central Coast Bioregion.

In general, the abundance estimates from the Elkhorn Slough Riparian Project restored sites were lower than the maximum breeding abundance estimates for both bioregions (Table 2). Exceptions were a higher Song Sparrow abundance estimate for Elkhorn

Slough restored sites than the Central Coast Bioregion estimate and a higher 2004 abundance estimate for Common Yellowthroat than both the Central Coast and Bay Delta bioregions. Both of these species tend to depend on early successional riparian habitats with dense understory cover. The low abundance estimates for the restored sites is not surprising when compared to the bioregional sites. The restored sites represent habitats in early to middle seral stages, whereas the Central Coast and Bay Delta sites are primarily mature riparian.

Figure 1. Mean species richness at restored point count sites, 2003 - 2004.

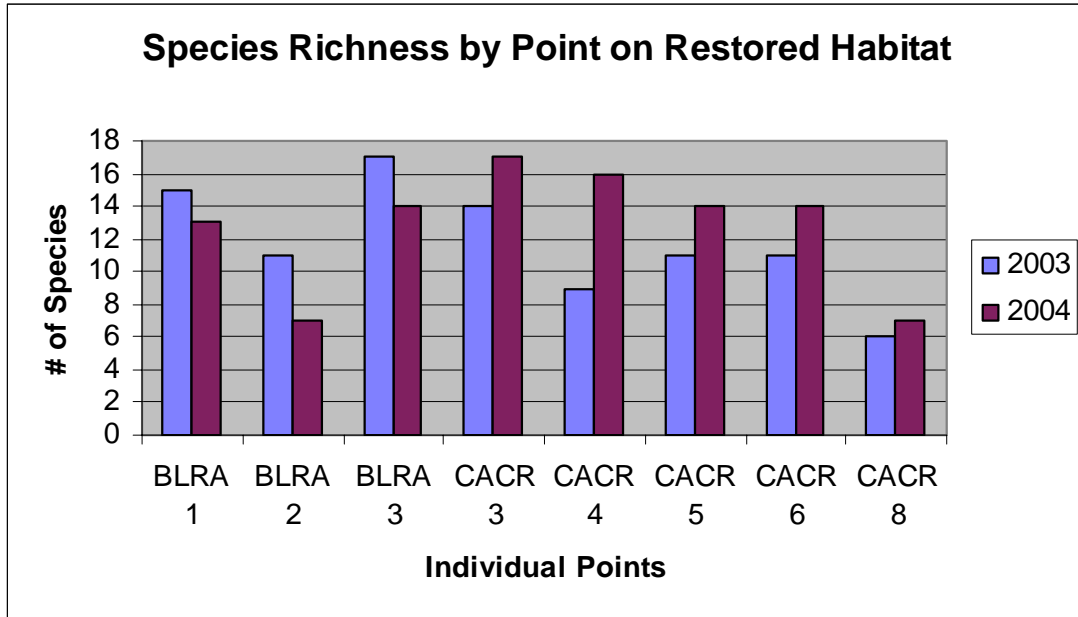


Figure 2. Mean abundance at restored point count sites, 2003 - 2004.

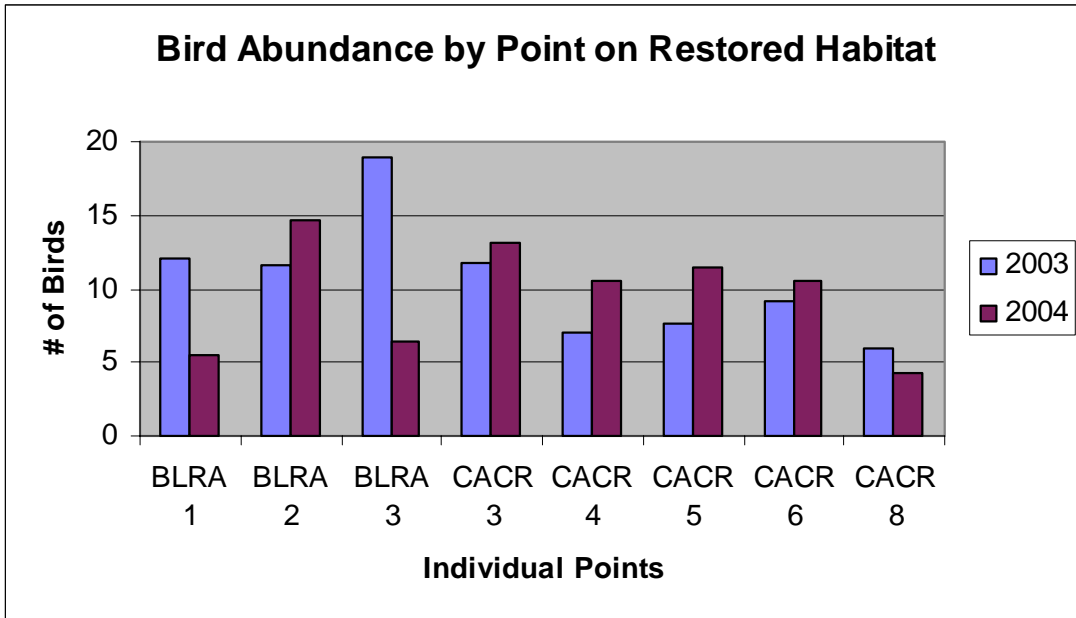


Figure 3. Mean species diversity at restored point count sites, 2003 - 2004.

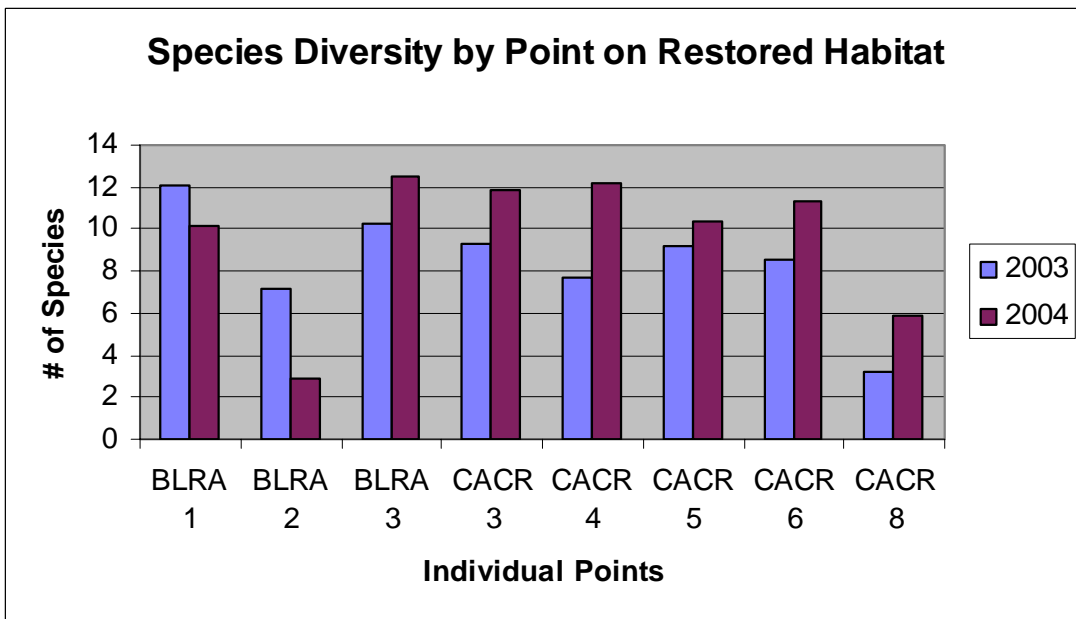


Figure 4. Mean species diversity at restored point count sites, 2003 - 2004.

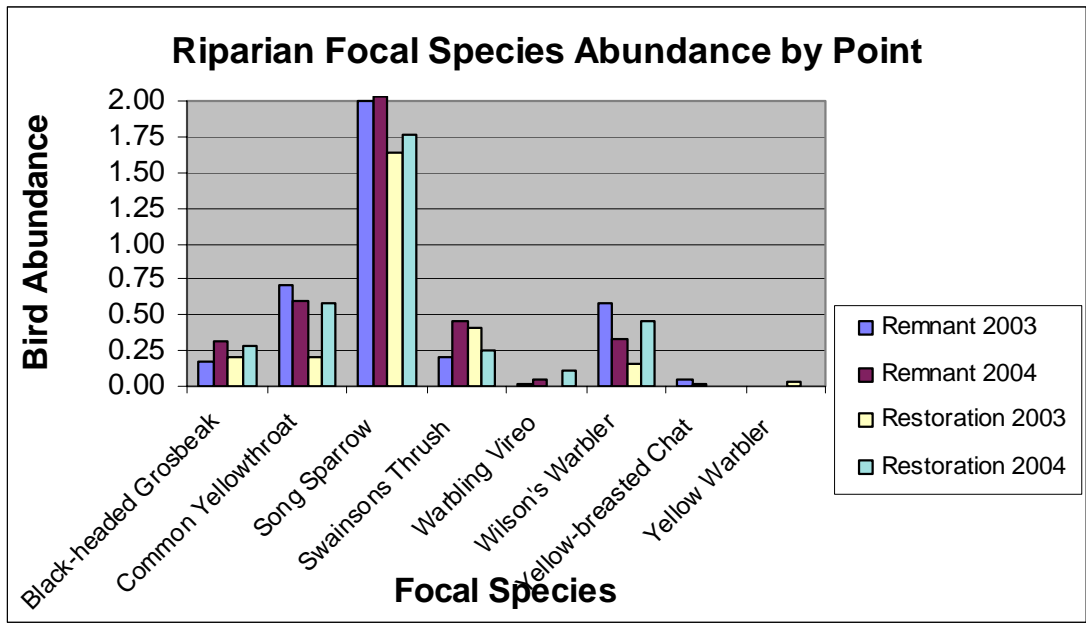


Table 2. Estimates of maximum breeding abundance by focal species and bioregion (RHJV 2004) compared to annual abundance at the Elkhorn Slough riparian project restored sites.

Species	Bay-Delta	Central Coast	Elkhorn Slough Restored 03	Elkhorn Slough Restored 04
Warbling Vireo	1.30	0.54	0	0.11
Swainson's Thrush	1.90	0.56	0.41	0.25
Yellow Warbler		0.30	0.04	0
Common Yellowthroat	0.42	0.10	0.20	0.59
Wilson's Warbler	1.69	1.20	0.16	0.45
Yellow-breasted Chat		0.15	0	0
Black-headed Grosbeak	0.91	0.72	0.21	0.29
Song Sparrow	3.10	0.07	1.64	1.76

REMNANT STATIONS

Population indices at untreated or "remnant" sites fluctuated annually. Richness and abundance indices decreased for eight of the 15 remnant stations in 2004 (Figures 5 - 6), and 10 of the 15 decreased in species diversity (Figure 7). All population indices increased in 2004 for three remnant stations, ESRR 2, 5 and TMOX 2. In 2004, station TMOX 2 had the highest mean abundance values at 20.4. Station ESRR 2 had the highest richness and diversity indices, 17 and 14.28 respectively. Additionally, four of the seven California Partners in Flight riparian focal species detected at remnant sites increased in abundance in 2004 (Figure 4).

Comparing the abundance estimates for the Elkhorn Slough Riparian Project remnant sites to other riparian sites within the Central Coast Bioregion reveals a similar pattern to the restored sites (Table 3). The abundance estimates for Common Yellowthroat were higher at the remnant sites compared to the Central Coast and Bay Delta bioregions for both years. Additionally, Song Sparrow abundance estimates for Elkhorn Slough remnant sites were higher both years than the Central Coast Bioregion estimate.

Figure 5. Mean species richness at remnant point count sites, 2003 - 2004.

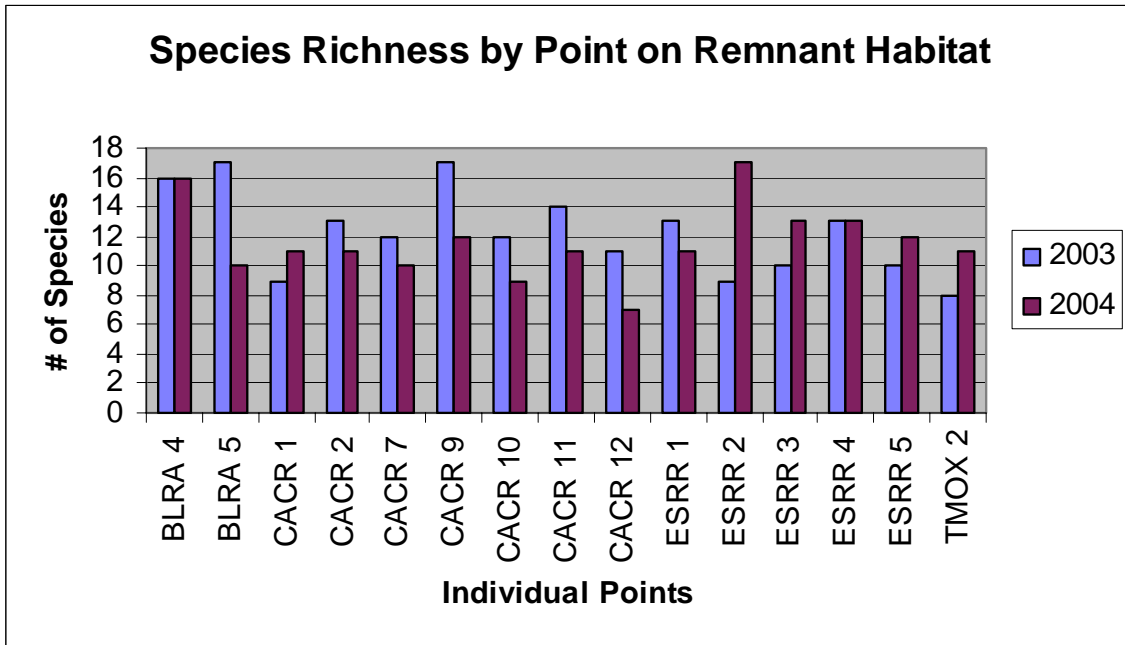


Figure 6. Mean abundance at remnant point count sites, 2003 - 2004.

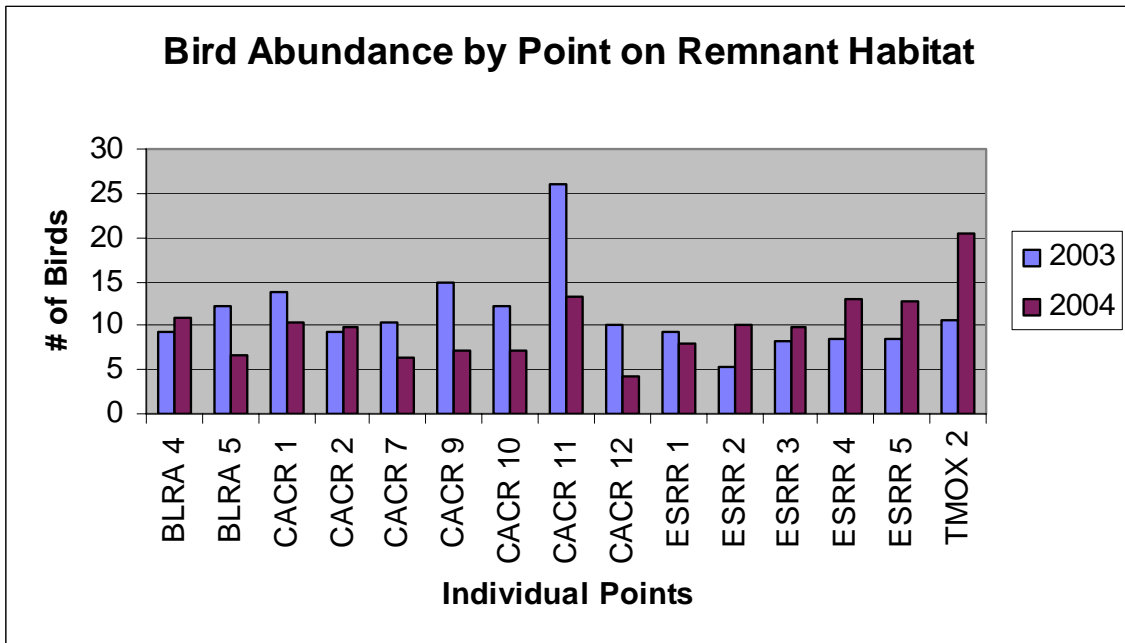


Figure 7. Mean species diversity at remnant point count sites, 2003 - 2004.

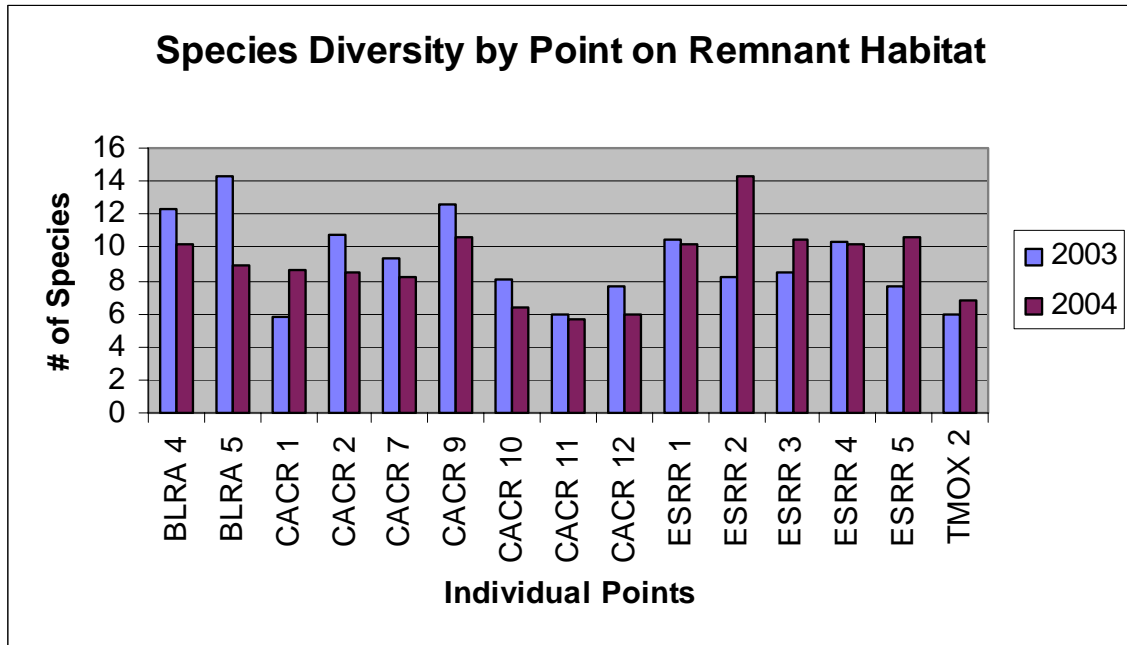


Table 3. Estimates of maximum breeding abundance by focal species and bioregion (RHJV 2004) compared to annual abundance at the Elkhorn Slough riparian project remnant sites.

Species	Bay-Delta	Central Coast	Elkhorn Slough Remnant 03	Elkhorn Slough Remnant 04
Warbling Vireo	1.30	0.54	0.02	0.04
Swainson's Thrush	1.90	0.56	0.20	0.46
Yellow Warbler		0.30	0	0
Common Yellowthroat	0.42	0.10	0.71	0.60
Wilson's Warbler	1.69	1.20	0.59	0.33
Yellow-breasted Chat		0.15	0.05	0.02
Black-headed Grosbeak	0.91	0.72	0.18	0.32
Song Sparrow	3.10	0.07	2.0	2.03

CONCLUSIONS

While it would be premature to draw too many conclusions from two years of data in a study designed to span many more years, data collected and analyzed in this report has provided valuable insight into the bird community of the Elkhorn Slough Wetland/Riparian Restoration Project. Many CalPIF Riparian Focal Species including Warbling Vireo, Swainson's Thrush, Yellow Warbler, Common Yellowthroat, Wilson's Warbler, Yellow-breasted Chat, Black-headed Grosbeak, and Song Sparrow are present in the project area. Two of these species, Common Yellowthroat and Song Sparrow,

showed higher abundance estimates than other riparian sites within the Central Coast Bioregion.

Increases in species richness, diversity, and abundance indices at the restored Carneros Creek sites suggest a positive response to the acacia removal and native plant restoration. Non-native plant species compete with native vegetation, thereby eliminating useful foraging and nesting habitat. The removal of invasive, non-native species can restore the flow of seasonal streams, allow native vegetation to establish, and subsequently provide more and better habitat for birds (RHJV 2004).

Long-term data are essential to providing information on restoration trajectory. A research study in the Sacramento Valley revealed that certain species such as Bewick's Wren and House Wren did not occur on revegetated plots until they were 5 to 10 years old, respectively. Appropriate habitat elements, such as nesting or foraging substrate, may not be present during the early stages of restoration plantings (Gardali et al. 2004). Thus, continued monitoring of the Elkhorn Slough Wetland/Riparian Restoration Project will help to provide a better understanding of the patterns of response towards restoration, thereby providing guidance for future management.

The following management recommendations have been selected from the Riparian Bird Conservation Plan. More detailed information on these and other conservation recommendations can be found in this plan (RHJV 2004). The research and monitoring recommendations are intended to guide the continuation and expansion of the Elkhorn Slough Riparian/Wetland Restoration Project.

MANAGEMENT

1. Limit maintenance activities that involve vegetation clearing or cutting to the non-breeding season. Planned disturbance events should be timed to minimize impact to nesting bird species. Nesting occurs from mid-March to mid-August.
2. Increase understory foliage volume. Increasing the amount and diversity of the shrubby and herbaceous plant communities will likely increase bird diversity. For example, increased understory foliage will provide nesting habitat for species that place their nests low to the ground.
3. Plant vegetation in a mosaic design with dense shrub patches interspersed with trees to achieve a semi-open canopy. Plantings that are concentrated into clumps will create more productive patches of habitat for nesting birds than plantings uniformly spaced over a large area. "Clumped" planting designs more closely mimic the natural establishment of vegetation after scouring or soil deposition from a flood.
4. Increase patch size. A habitat patch is a continuous area of similar vegetation. Larger areas may benefit songbirds by increasing the amount of available habitat allowing for greater breeding densities. Additionally, the interior habitat afforded by large areas has been shown to provide safer nesting habitat (i.e., less nest predation). When determining the minimum acceptable patch size for a site, managers should consider the mean territory size of their target species as a

- guideline. When considering a suite of species, managers should use the species with largest territory needs to set the minimum patch size requirement
5. Connect areas of like habitat. Connecting habitat patches will allow birds to disperse and establish breeding territories, and locate mates. The connection of habitat patches may be equally important as the size and protection of those patches. Relatively sedentary species, such as Song Sparrows, Spotted Towhees, and Wrentits, may be affected most by patch isolation.
 6. Do not remove snags unless absolutely necessary. The presence of snags is essential for cavity nesting species and when possible, snags should not be removed. In forest restoration sites, for example, consider leaving existing snags. Such dead trees are important to birds for a variety of reasons. Many birds require snags or dead trees for nesting; others require downed wood or dead trees for foraging. Olive-sided Flycatchers require the presence of very tall, dead trees in their territories for perching.
 7. Implement grazing standards that protect natural hydrology; reduce soil compaction, erosion, and water pollution due to grazing.

RESEARCH AND MONITORING

1. Continue point count surveys. Continue to use trained volunteers to conduct point count surveys. These data will help to assess restoration efforts over time. Ideally, all points should be surveyed three times each season.
2. Be consistent with point count protocol. Point counts are intended to be conducted by a single observer. If multiple observers are required, we recommend a maximum of two people at each point, one acting as the data recorder and the other acting as the observer. One should not influence the observations of the other. All points should be surveyed by the same number of observers. Consistency with methodology is very important when attempting to compare data across different sites and years.
3. Expand point coverage to include more reference sites. Increase the number of points within the ESRR transect so that multiple points are in each of the drainages. Alternately, establish more transects in nearby remnant riparian habitat.
4. Catalogue the restoration activities for each point count station. Maintain a “restoration history” by point count station that details any restoration or management activities that occur (Appendix B). This information will be helpful in future years for interpretation of the data.

ONLINE POINT COUNT DATA

The 2003-2004 point count data can be viewed and queried online by following these steps:

- Go to: <http://cain.nbio.gov/prbo/onpc/>
- Insert the UserID esrr (note that this is CAPS sensitive)
- Insert the password esrrb1rd (note that this is CAPS sensitive)

The following options exist for looking at the data:

1. Select *Browse/edit point count data* off the index in order to examine all the data for each visit at each point count station
2. Select *Download complete data sets* to have all the point count data
3. Select *Query point count data* to query the data set in numerous ways:
 - Select the stations you want to include in the query
 - Select the distance band and data type you want to query (e.g., all data; visual flyovers; all data <50m); you can choose multiple types simultaneously
 - Choose the month and/or year ranges you want to include
 - Select your level of query (by station or by site)
 - Select any species you'd like to be excluded in the query
 - Submit your query and view results
 - Download results if desired.

PERSONNEL

This project has been coordinated by PRBO biologists Sandy Scoggin, Missy Wipf, and Kim Kreitinger. Sandy Scoggin and Missy Wipf conducted volunteer point count training in 2003 and Kim Kreitinger in 2004. Point count data for the Elkhorn Slough Wetland/Riparian Restoration project were collected by volunteers trained by PRBO Conservation Science. Point count volunteers included: Bryan Largay, Jeana De la Torre, Shirley Murphy, Caroline Rodgers, Linda Jordan, Cheryl Gaebelin, and Susie Fork. Tonya Haff (PRBO) and the aforementioned volunteers conducted the point count vegetation assessments. All survey data were entered into PRBO's online database by the volunteers and proofed by PRBO biologists. Computer programs used to manage and summarize data, as well as the online point count data query tools, were created by PRBO staff Grant Ballard. Kirsten Lindquist of PRBO conducted the data analyses. These projects were carried out under the guidance of PRBO's Terrestrial Program Director Geoffrey Geupel.

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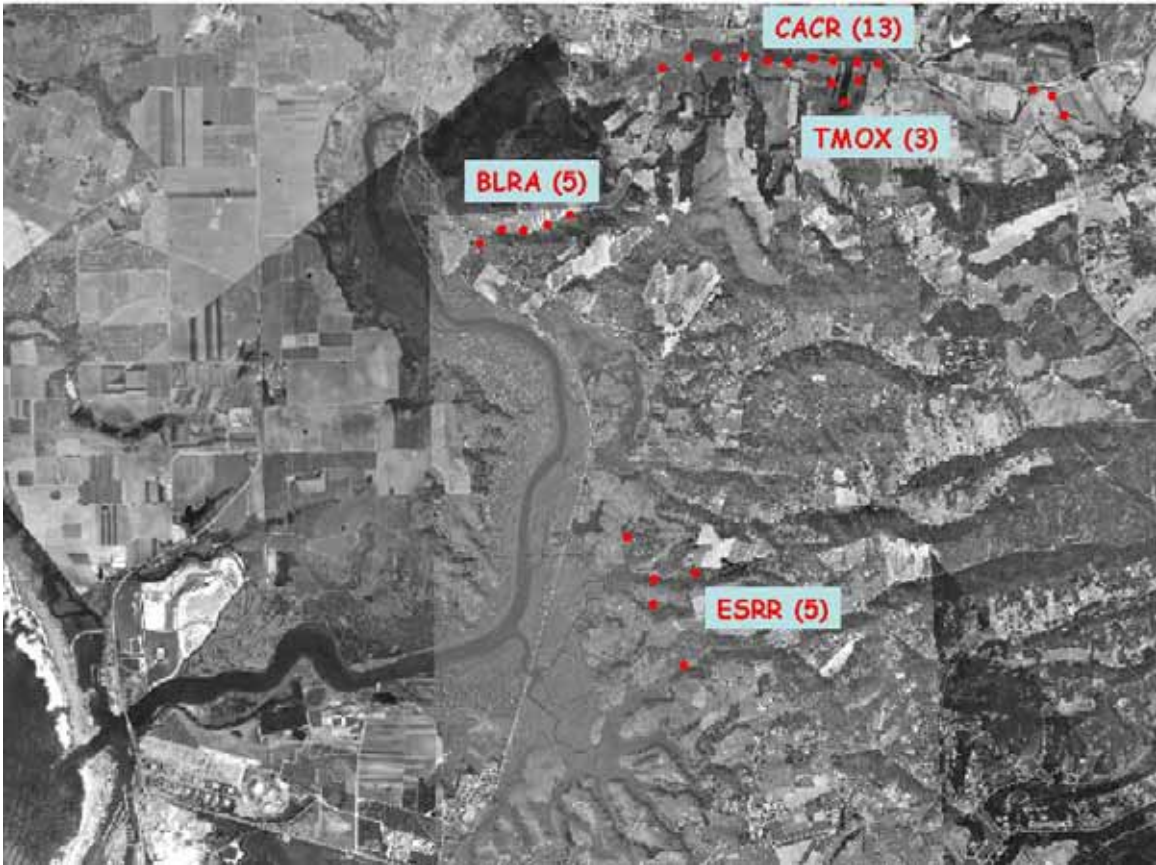
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APPENDIX A. Point count locations within the Elkhorn Slough Riparian/Wetland Restoration project: BLRA=Blohm Ranch; CACR=Carneros Creek, TMOX=Triple M Oxbow, ESRR=Elkhorn Slough Research Reserve.



APPENDIX B. Management history by point count station through 2004.

Blohm Ranch (BLRA) Surveyor(s): Bryan Largay
BLRA 1 Subject to extensive grading in 2001 and 2002. The site is still revegetating.
BLRA 2 Subject to extensive grading and revegetation during the early 1990s. Willow stakes and brush mats were placed along the whole length of the channel in 2002 and 2003.
BLRA 3 Subject to extensive grading and revegetation during the early 1990s. Willow stakes and brush mats were placed along the lowest 20 m of the channel in 2002 and 2003. The upper 80 m of the channel in the count circle received no treatment in the past 5 years.
BLRA 4–5 No restoration activity has occurred in the past five years.
Carneros Creek (CACR) Surveyor(s): Bryan Largay, Jeana De la Torre, Linda Jordan, Cheryl Gaebelin, Caroline Rodgers, Susie Fork, Todd Newberry
CACR 1–2 No restoration activity
CACR 3-6 Restoration activities conducted included the removal of 87 large acacia trees, mechanical suppression of acacia suckers and seedlings, and revegetation with native trees and shrubs
CACR 7 No restoration activity
CACR 8 Riparian restoration involved widening the channel to create an 8 foot floodplain, which was plug planted with creeping wild rye and juncus species, and seeded with meadow barley. Channel bank was sloped and seeded with California brome and container planted with black sage, sticky monkey flower, blue elderberry, coast live oak, and a currant species.
CACR 9–12 No restoration activity
CACR 15 No restoration activity
Elkhorn Slough Research Reserve (ESRR) Surveyor(s): Shirley Murphy, Todd Newberry
ESRR 1-5 No restoration activity
Triple M Oxbow (TMOX) Surveyor(s): Caroline Rodgers, Jeana De la Torre, Cheryl Gaebelin, Todd Newberry
TMOX 1 Grazed twice by goats during two consecutive fall seasons down to bare soil.
TMOX 2 No restoration activity
TMOX 3 Grazed twice by goats during two consecutive fall seasons down to bare soil.

APPENDIX C. Mean species abundance at remnant point count stations in 2003. Only detections within 50 meters are included.

Species	REMNANT		2003							ESRR					TMOX	
	BLRA	5	CACR	1	2	7	9	10	11	12	1	2	3	4	5	2
ACWO	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0
AMCR	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0	0
AMGO	0	0	0	0	0	0	1.3	0.3	0.7	1	0	0	0	0.3	0	0
AMRO	0	0	1	0	0	0	0.3	0	0	0	0.3	1	1	0.3	0.3	0
ANHU	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0
BARS	0	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0
BEWR	0.3	0.7	0	0.3	2	0.7	1	0	0	0	0	0	0	0	0	0.3
BHCO	0	0	0	0	0	0	0.3	0	0.3	1	0	0	0	0	0	0
BHGR	0.3	0.3	0	0	0.3	0.3	0	0	0.3	0	0	1	0	0	1	1
BLPH	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.0	0	0
BRBL	0	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0
BUSH	0.3	0.7	0	1.7	0	0.7	0	0	0	0	0.7	0	0	0.0	0	0
CALT	0	0.3	0.3	0.7	0	0.7	0	0	1.3	0.7	0.3	1.3	0.3	0	1	1
CAQU	0.3	1.7	1.7	0	0	2	0	0.7	0	0	0	0	1.7	0	0	0
CBCH	0.7	0	0.3	1	0.3	1	0	0	1	1.3	0.3	0.7	1.0	1.3	0	0
CEDW	0	0	0	0	0	0	0	0	0	0.7	0	0	0.0	0	0	0
COYE	1.3	0	1.7	1.3	0	0	1	1	0.7	0.3	0	0	0.3	2.3	0.7	0.7
HAWO	0	0	0	0	0	0	0	0	0	0.3	0	0	0.0	0	0	0
HOFI	0.3	0.3	0	0.7	0	0	0	0	2.7	0	0	0	0	0.3	0	0
HOWR	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.0	0	0
HUVI	0.3	0.3	0	0	0.3	0	0	0	0	0	0	0	0	0.0	0	0
KILL	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.0	0	0
LAGO	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0
LEGO	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0.0	0.3	0
MALL	0	0	0	0	0	0	0	1.7	0.7	0	0	0	0	0.0	0	0
MAWR	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0
MODO	0	0	0	0	0	0	0	0	0	0.3	0.3	0	0.7	0.0	0	0
NOMO	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

continued

Species	REMNAANT		2003							ESRR					TMOX
	BLRA		CACR												
	4	5	1	2	7	9	10	11	12	1	2	3	4	5	2
OATI	0	0	0	0	0	0	0	0.3	0	0	0.7	0	0.0	0.7	0
OCWA	0.3	0	0	0.3	0	0	0	0	0	0	0	0	0.0	0	0
ORJU	0	1	0	0	0	0	0	0	0	0	0	0	0.0	0	0
PSFL	0	0.3	0.3	0.3	0.7	0.3	0.3	0	0	0.3	0.7	0.3	0.3	0	0
PUFI	0	0	0	0	0.7	0.3	0	0	0	0	0	0	0.0	0	0
RSHA	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0
RTHA	0	1.3	0	0	0.7	0	0	0	0	0	0	0	0.0	0	0
RWBL	0	0	5.3	0.3	0	0	1	13.3	0.3	0	0	0	1.7	0.3	3.3
SOSP	1	1	3	1.3	2	2.7	4.3	3.7	3.7	2	1	0.3	1	1	3
SPTO	2	1.7	0	0.7	1.7	2.3	0.7	0.3	0.3	0.7	0	0.7	0.3	1.7	0
SWTH	0.3	0	0.3	0.3	0.3	1	0.3	0	0	0	0	0.3	0	0	0
WAVI	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0
WEFL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WESJ	0.3	0	0	0	0.3	0	0	0	0.3	0.3	0	0	0.7	0.3	0
WIWA	1.3	1	0	0	1	0.3	0	0	0	1.3	0.7	2	0.3	0.3	0.3
WREN	0.3	0.7	0	0	0	0	0	0.3	0	0	0	0	0	0	0
WTKI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
YBCH	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0
YWAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX D. Mean species abundance at remnant point count stations in 2004. Only detections within 50 meters are included.

Species	REMNANT 2004														
	BLRA		CACR							ESRR					TMOX
	4	5	1	2	7	9	10	11	12	1	2	3	4	5	2
ACWO	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0
ALHU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AMCR	0	0	0	0	0	0	0	0	0	0.3	0.3	0	0	0	4
AMGO	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	2
AMRO	0	0	0	0.3	0	0.3	0	0	0	0	0	0.3	0	0	0
ANHU	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0
BARS	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	1
BEWR	1	1	0	0.7	0.3	0	0.3	0	0	0.3	0	1.3	0.7	1.3	0
BHCO	0	0	1	0	0	0.3	0	0.3	0	0	0	0	0	0	0
BGGN	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BHGR	0	0	0.7	0	0	0.7	0	0.3	0.7	0	0	0.3	0.7	0	0
BLPH	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0
BNOW	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0
BRBL	0	0	0.7	0	0	0	0	0.7	0	0	0	0	0	0	0
BUSH	4	0.7	0	0	0.7	0	0	0	0	1	0.7	0.3	1.7	0.3	0
CALT	0.3	0.7	0.7	0.7	0.7	1.3	0	0	0.3	0	0.3	1	0.7	0.3	0
CATH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAQU	0.3	0.7	0	0	0	0.7	0	0.7	0	0	0	0	0	0	0
CBCH	1	0	1.7	0.3	0	0.3	0	0	0	1	1.7	2	0.7	0.7	0
CLSW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
COYE	1	0.3	2	2.3	0	0	0	0	0.3	0	0	0	0	1.7	0.7
DOWO	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0
EUST	0	0	0	0	0	0	0	0	0	0	0	0	2.3	0	0
HOWR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HUVI	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0
KILL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LEGO	0.3	0.3	0	0	0	1	0.7	0	1	0	0	0	0	0	0.3

continued

Species	REMNANT		2004												
	BLRA		CACR							ESRR					TMOX
	4	5	1	2	7	9	10	11	12	1	2	3	4	5	2
MODO	0	0	0.3	0	0	0	0.3	0.3	0	0	0.3	0.3	0	0	0
NOMO	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0
OATI	0	0	0	0	0	0	0	0	0	0.7	0.3	0	0	0.7	0
OCWA	0	0.3	0	0.3	0	0	0	0	0	0.7	0	0	0	0	0
ORJU	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PSFL	0.3	1	0	0	1	0.7	0.3	0	0	1	0.7	0	1.3	0	0.3
PUFI	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0
RUHU	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0
RWBL	0	0	0	0	0	0	2.7	8.3	0	0	0	0	0.3	0	1.7
SOSP	0.3	0	2.3	2.3	1.7	1.3	1.7	2	1.3	0.7	1	1	2.7	1.7	7.7
SPTO	1	1.3	0	1	0.3	0.7	0	0	0.3	1	1.3	0.3	0	1.7	0
SWTH	0	0.3	0	0.3	0	0	0	0	0	1	1	1	0.7	1	1
TRES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WAVI	0	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0
WESJ	0.3	0	0.3	0	1.3	0	0.3	0	0	0.3	0	0.3	0	0.7	0
WIWA	0.3	0	0	1	0.3	0	0.3	0	0	0	0	1.3	0	1	0.7
WREN	0	0	0.3	0	0	0	0	0	0	0	1	0.3	0.7	1.7	0
YBCH	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0

APPENDIX E Mean species abundance at restored point count stations in 2003.
Only detections within 50 meters are included.

Species	RESTORED			2003					Other	
	BLRA			CACR					TMOX	
	1	2	3	3	4	5	6	8	1	3
ACWO	0	0	0	0	0	0	0	0	0	0
AMCR	0	0	0	0	0	0	0.7	0.7	0	0
AMGO	0	0.3	0.3	0	0.7	0	0	0	1	0.7
AMRO	0	0	0	0	0	0	0	0	0	0
ANHU	0	0	0	0	0	0	0	0	0	0.3
BARS	0	0	0	0	0	0	0	0	0	0
BEWR	1.3	0	0.3	0.3	0	0.3	0.3	0	0	0
BHCO	0	0	0	0	0	0	0	0	0	0
BHGR	0	0	0	0.3	0	0.7	0.7	0	0	0.7
BLPH	0.3	0.3	0	0	1.3	0.3	0	0	0.3	0
BRBL	0	0	0	0	0	0	0	0	0	0
BUSH	0	4	5	2	1	0.3	0	0	0	0
CALT	0	0.3	0.3	0	0.7	0.7	0	0.3	0	1
CAQU	0.7	0.3	0.7	3.7	0.3	0	0	0.3	0	0
CBCH	0.7	0	3.7	0.7	0.7	0	2	0	0.3	0
CEDW	0	0	0	0	0	0	0	0	0	0
COYE	0.3	0	0.3	0.3	0	0.7	0	0	2	1.3
HAWO	0	0	0	0.3	0	0	0	0	0	0
HOFI	1.3	0	0.7	0	0	0	0	0.3	1	0.3
HOWR	0	0	0	0	0	0	0	0	0	0
HUVI	0.3	0	0.7	0	0.3	0	1.3	0	0	0
KILL	0	0	0	0	0	0	0	0	0	0
LAGO	0	0	0	0	0	0	0	0	0	0
LEGO	0	1.3	0	0	0	0	0	0	0.3	0
MALL	0	0	0	0	0	0	0	0	0	0
MAWR	0.7	0	0	0	0	0	0	0	0	0
MODO	0	0	0	0	0	0	0	0	0	0

continued

	RESTORED			2003					TMOX		
	BLRA			CACR					1	3	
	1	2	3	3	4	5	6	8			
NOMO	0	0	0	0	0	0	0	0	0	0	0
OATI	0	0	0	0	0	0	0	0	0	0	0
OCWA	0	0	0.3	0	0	0	0.3	0	0	0	0
ORJU	0	0	0	0	0	0	0	0	0	0	0
PSFL	0.3	0.7	1	0	0	0	0	0	0	0	0
PUFI	0.7	0.7	0.3	0	0	0	0	0	0	0	0
RSHA	0	0	0	0.3	0	0	0	0	0	0	0
RTHA	0	0	0	0	0	0	0	0	0	0	0
RWBL	2.7	0	0	0	0	0	0	0	1.7	1.3	
SOSP	1.3	1	0.7	0.7	1.7	1.7	2	4	4.3	5	
SPTO	0.7	2.7	3	0.3	0	1	1	0.3	0.3	0	
SWTH	0.7	0	0	1	0	1.3	0.3	0	0	0.3	
WAVI	0	0	0	0	0	0	0	0	0	0	
WEFL	0	0	0	0.3	0	0	0	0	0	0	
WESJ	0	0	0.7	1.3	0.3	0	0.3	0	0	0	
WIWA	0	0	1	0	0	0	0.3	0	0	0	
WREN	0	0	0	0	0	0.3	0	0	0	0	
WTKI	0	0	0	0	0	0.3	0	0	0	0	
YBCH	0	0	0	0	0	0	0	0	0	0	
YWAR	0	0	0	0.3	0	0	0	0	0	0	

APPENDIX F Mean species abundance at restored point count stations in 2004.
Only detections within 50 meters are included.

Species	RESTORED			2004					OTHER	
	BLRA			CACR					TMOX	
	1	2	3	3	4	5	6	8	1	3
ACWO	0	0	0	0	0	0	0	0	0	0
ALHU	0	0	0	1	0	0	0	0	0	0
AMCR	1	0	0	0	0	0.7	0	0	0.7	0.3
AMGO	0.3	0	0	0	0.7	0.3	0.3	1	4.7	2
AMRO	0	0	0	0.3	0	0	0	1.7	0	0
ANHU	0	0	0	0	0	0	0	0	0	0
BARS	0	0	0	0	0	0	0	0	2.7	1
BEWR	0.3	0.7	0.3	1	0.3	1	0.7	0	0	0
BHCO	0	0	0	0	0	0	0	0	0	0
BGGN	0	0	0.3	0	0	0	0	0	0	0
BHGR	0	0	0	0.3	0	0.7	1.3	0	0.3	1.3
BLPH	0	0	0	0	0	0	0	0	0	0
BNOW	0	0	0	0	0	0	0	0	0	0
BRBL	0	0	0	0	0	0.3	0	0	1.3	0
BUSH	0	10.3	0	2	0	0	0	0	0	2
CALT	0	0	0	0.3	0.3	0.3	1	0.3	0	0.3
CATH	0	0	0.3	0	0	0	0	0	0	0
CAQU	0	0.3	0	0	0.7	1.3	0	0	0.7	0
CBCH	0	0.3	0.7	2	0.7	0	1	0	0	0
CLSW	0	0	0	0	0	0	0	0	0	1
COYE	1.3	0	0	0.7	1.7	0.7	0.3	0	0	1.7
DOWO	0	0	0	0.3	0	0	0	0	0	0
EUST	0	0	0	0	0.3	0	0	0	0	0
HOWR	0.3	0	0	0	0	0	0	0	0	0
HUVI	0	0.7	0.3	0	0	0	0	0	0	0
KILL	0	0	0	0.3	0	0	0	0.3	0	0
LEGO	0	0.3	0.3	0	0	0	0	0	0	0

continued

Species	RESTORED			2004					TMOX		
	BLRA			CACR					1	3	
	1	2	3	3	4	5	6	8			
MODO	0	0	0	0	0	0	0	0	0	0	0
NOMO	0	0	0	0	0	0	0	0	0	0	0
OATI	0	0	0	0	0	0	0	0	0	0	0
OCWA	0	0	0.3	0	0	0	0.3	0	0	0	0.3
ORJU	0	0	0	0	0.7	0	0	0	0	0	0
PSFL	0	0	0.3	0.3	0.3	0	1	0	0	0	0
PUFI	0.3	0	0.3	0	0	0	0	0	0	0	0
RUHU	0	0	0	0	0	0	0	0	0	0	0
RWBL	0	0	0	0	0	0	0	0	0.7	0	0
SOSP	1.7	0	0.7	2.7	2.3	3.3	2.7	0.7	7	4	
SPTO	0	2	1	0.3	0.3	1	0.7	0	0	0	0
SWTH	0	0	0	0.3	0	1	0.7	0	0	0	0
TRES	0	0	0	0	0	0	0	0	0	1.3	
WAVI	0	0	0	0.3	0.3	0	0.3	0	0	0	0
WESJ	0.3	0	0.3	0	0.3	0.3	0	0.3	0	0	0
WIWA	0	0	1	0.7	1.3	0.3	0.3	0	0	0	0
WREN	0	0	0.3	0.3	0.3	0.3	0	0	0.3	0.3	0.3
YBCH	0	0	0	0	0	0	0	0	0	0	0

APPENDIX G. Cumulative plant species list for Elkhorn Slough Research Reserve, Blohm Ranch, Carneros Creek, and Triple M Oxbow. Plants are listed in alphabetically by common name.

Common Name	Scientific Name
Amaranth	<i>Amaranthus retroflexus</i>
Arroyo Willow	<i>Salix lasiolepis</i>
Bedstraw	<i>Galium sp.</i>
Broad-fruited Bur-reed	<i>Sparganium eurycarpum</i>
Birds-foot Trefoil	<i>Lotus corniculatus</i>
Blue-gum Eucalyptus	<i>Eucalyptus globulus</i>
Morning Glory	<i>Convolvulus arvensis</i>
Black Cottonwood	<i>Populus trichocarpa</i>
Black Mustard	<i>Brassica nigra</i>
Black Walnut	<i>Juglans californica var. hindsii</i>
Bottle Brush	<i>Callistemon sp.</i>
Box Elder	<i>Acer negundo</i>
Bracken Fern	<i>Pteridium aquilinum var. pubescens</i>
Bristley Ox-tongue	<i>Picris echioides</i>
Bromus species	<i>Bromus sp.</i>
Bur Chervil	<i>Anthriscus caucalis</i>
Buckwheat	<i>Eriogonum nudum</i>
Bulrush	<i>Scirpus sp.</i>
Burnet	<i>Sanguisorba sp.</i>
Bull Thistle	<i>Cirsium vulgare</i>
Blue Wild Rye	<i>Elymus glaucus</i>
California Aster	<i>Aster chilensis</i>
California Blackberry	<i>Rubus ursinus</i>
California Brome	<i>Bromus carinatus</i>
Cat's Ear	<i>Hypochaeris sp.</i>
Cape Ivy	<i>Delairea odorata</i>
California Poppy	<i>Eschscholzia californica</i>
Cattail species	<i>Typha sp.</i>
California Bee Plant	<i>Scrophularia californica</i>
Cinquoil	<i>Potentilla anserina ssp. pacifica</i>
Coast Live Oak	<i>Quercus agrifolia</i>
Cut-leaf Plantain	<i>Plantago coronopus</i>
Coffee Berry	<i>Rhamnus sp.</i>
Coyote Bush	<i>Baccharis pilularis</i>
Cocklebur	<i>Xanthium strumarium</i>
Composite species	

Common Name	Scientific Name
Common rush	<i>Juncus patens</i>
Creek Dogwood	<i>Cornus sp.</i>
Creeping Snowberry	<i>Symphoricarpos mollis</i>
Curly Dock	<i>Rumex crispus</i>
Curly Willow	<i>Salix sp.</i>
Creeping Wild Rye	<i>Leymus triticoides</i>
Deodar Cedar	<i>Cedrus deodara</i>
Deerweed	<i>Lotus scoparius</i>
Rumex Species	<i>Rumex sp.</i>
Douglas Iris	<i>Iris douglasiana</i>
Duckweed	<i>Lemna sp.</i>
English Ivy	<i>Hedera helix</i>
English Plantain	<i>Plantago lanceolata</i>
Fennel	<i>Foeniculum vulgare</i>
Fescue sp.	<i>Festuca sp.</i>
Fiddleneck	<i>Amsinckia sp.</i>
Filaree	<i>Erodium sp.</i>
Field Mustard	<i>Brassica rapa</i>
Flowering Currant	<i>Ribes sanguineum</i>
Hairy Fleabane	<i>Conyza bonariensis</i>
Harding Grass	<i>Phalaris aquatica</i>
Hairy Vetch	<i>Vicia villosa</i>
Hedge Nettle	<i>Stachys bullata</i>
Himalayan Blackberry	<i>Rubus discolor</i>
Horse Weed	<i>Conyza canadensis</i>
Ice Plant	<i>Carpobrotus edulis</i>
Iris-leaved Rush	<i>Juncus xiphioides</i>
Italian Rye	<i>Lolium multiflorum</i>
Italian Thistle	<i>Carduus pycnocephalus</i>
Juncus species	<i>Juncus sp.</i>
Knotweed	<i>Polygonum sp.</i>
Large Monkeyflower	<i>Mimulus guttatus</i>
Lamb's Quarters	<i>Chenopodium album</i>
Lady's Thumb	<i>Polygonum persicaria</i>
Lippia	<i>Phyla nodiflora</i>
Mayweed Chamomile	<i>Anthemis cotula</i>
Mallow	<i>Malva sp.</i>
Mexican Elderberry	<i>Sambucus mexicana</i>
Miner's Lettuce	<i>Claytonia perfoliata</i>
Mixed Plantings	

Common Name	Scientific Name
Milk Thistle	<i>Silybum marianum</i>
Monterey Cypress	<i>Cupressus macrocarpa</i>
Monterey Pine	<i>Pinus radiata</i>
Mugwort	<i>Artemisia douglasiana</i>
Narrow-leaved Clover	<i>Trifolium angustifolium</i>
Orchard Grass	<i>Dactylis glomerata</i>
Ornamental	
Pacific Bog Rush	<i>Juncus effusus var. pacificus</i>
Pennywort	<i>Hydrocotyle sp.</i>
Pennyroyal	<i>Mentha pulegium</i>
Periwinkle	<i>Vinca major</i>
Petty Spurge	<i>Euphorbia peplus</i>
Pickleweed	<i>Salicornia virginica</i>
Poison Hemlock	<i>Conium maculatum</i>
Poison Oak	<i>Toxicodendron diversilobum</i>
Ponderosa Pine	<i>Pinus ponderosa</i>
Redwood	<i>Sequoia sempervirens</i>
Rabbits-foot Polypogon	<i>Polypogon monspeliensis</i>
Ripgut Brome	<i>Bromus diandrus</i>
Rush-rose	<i>Helianthemum scoparium</i>
Sandbar Willow	<i>Salix hindsiana</i>
Sheep Sorrel	<i>Rumex acetosella</i>
Smartweed	<i>Polygonum punctatum</i>
Sow Thistle	<i>Sonchus asper</i>
Spike Rush	<i>Eleocharis sp.</i>
Stork's Bill	<i>Erodium botrys</i>
Sticky Monkeyflower	<i>Mimulus aurantiacus</i>
Stinging Nettle	<i>Urtica dioica ssp. holosericea</i>
Suncup	<i>Camissonia ovata</i>
Tall Fescue	<i>Festuca arundinacea</i>
Tarweed	<i>Madia sp.</i>
Telegraph Weed	<i>Heterotheca grandiflora</i>
Trumpet Vine	<i>Campsis radicans</i>
California Tule	<i>Scirpus californicus</i>
Umbrella Sedge	<i>Cyperus eragrostis</i>
Unknown Forb	
Unknown Grass	
Vetch	<i>Vicia sp.</i>
Vulpia species	<i>Vulpia sp.</i>
Water Parsley	<i>Oenanthe sarmentosa</i>

Common Name	Scientific Name
Wattle	<i>Acacia sp.</i>
Western Rush	<i>Juncus occidentalis</i>
White Alder	<i>Alnus rhombifolia</i>
Wild Cucumber	<i>Marah fabaceus</i>
Wild Oats	<i>Avena sp.</i>
Wild Radish	<i>Raphanus sativus</i>
Wild Rose	<i>Rosa californica</i>
Wood Fern	<i>Dryopteris arguta</i>
Western Sword Fern	<i>Polystichum munitum</i>
Yarrow	<i>Achillea millefolium</i>
Yellow Bush Lupine	<i>Lupinus arboreus</i>
Yerba Buena	<i>Satureja douglasii</i>
Yellow Willow	<i>Salix lucida ssp. lasiandra</i>