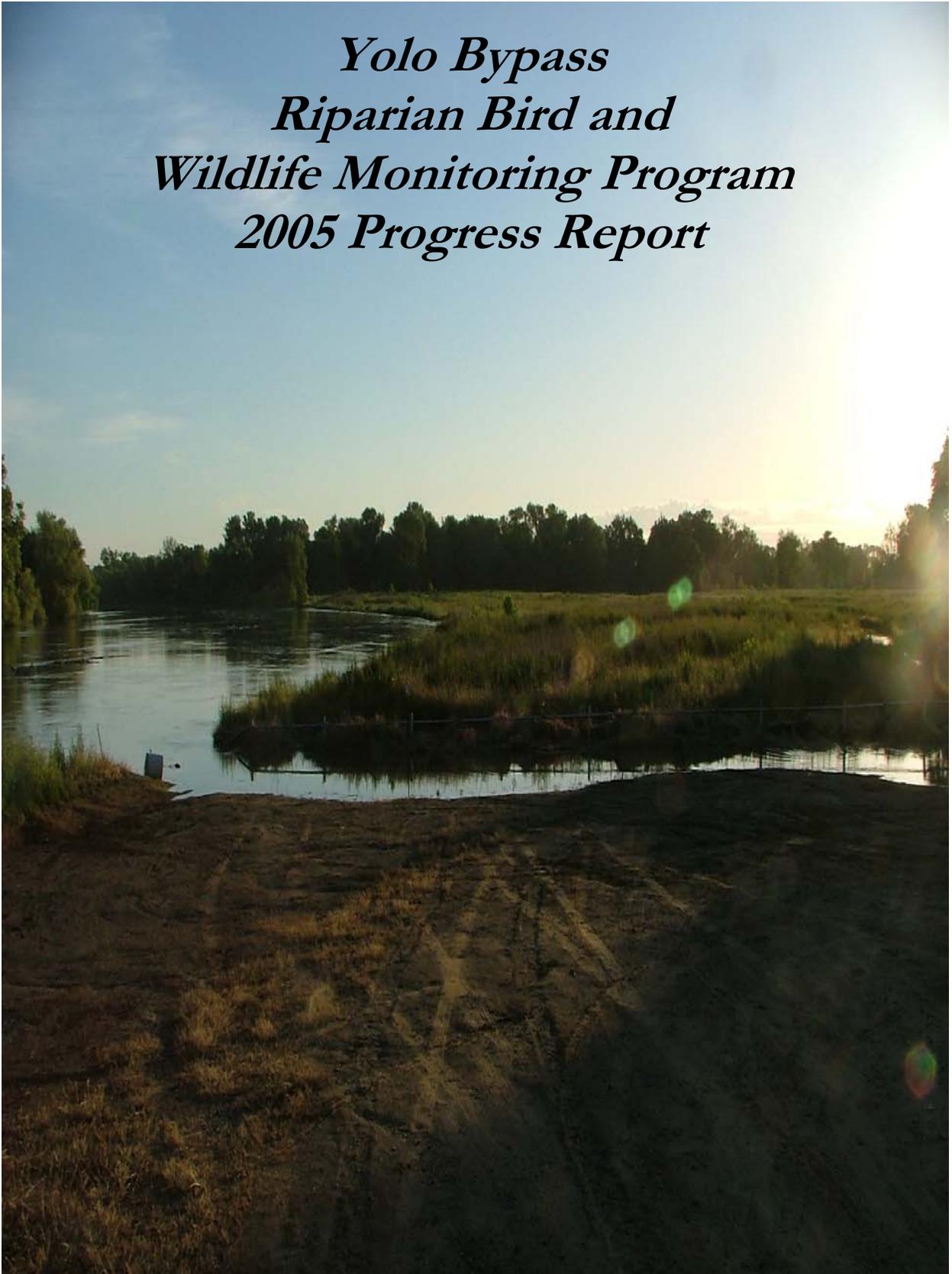


*Yolo Bypass
Riparian Bird and
Wildlife Monitoring Program
2005 Progress Report*



Yolo Bypass Riparian Bird and Wildlife Monitoring Program 2005 Progress Report

Ronald E. Melcer, Jr., Erica Lindgren, Melanie Allen Truan and Andrew Engilis, Jr.

Contributors and Acknowledgements

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Cover Photo: Sacramento River at Fremont Weir, by Ronald Melcer, Jr.

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Executive Summary

To address California Bay-Delta Authority's Ecosystem Restoration Program (CALFED-ERP) objectives for ecosystem restoration, the California Department of Water Resources (CDWR) has partnered with the Museum of Wildlife and Fish Biology (MWFB) at the University of California, Davis. Remnant riparian habitat sites were selected both to develop baseline data and to help identify desirable riparian habitat characteristics for butterflies, small mammals, and birds. Information from these surveys will be used to guide the development of a cooperative program to protect existing habitats, to rehabilitate degraded habitats, and to fill gaps in forest continuity

Specific goals of this research partnership, which will run through 2007, include:

- Develop species lists and assess habitat structure, community composition, and inter- and intra-site variability for selected riparian parcels.
- Establish baseline information on status, distribution, relative abundance, and trends for a suite of focal and special status bird species.
- Provide baseline data of bird species diversity, breeding species diversity and their seasonal use for monitoring future changes in bird populations.

The data presented in this report represent less than a complete year of data collection and should be viewed as preliminary.

The Yolo Bypass System is one of three major geographical regions within California's Central Valley currently under investigation by the MWFB, the other two being the lower Putah Creek watershed and the lower Cosumnes River watershed. Biomonitoring survey methods have been standardized across all sites within the three regions to allow for comparison across landscape units and subunits. Five sites were selected for the survey within the Yolo Bypass system: Sutter Bypass (SUB), Fremont Weir (FRW), Sacramento Weir (SAW), Putah Creek Sinks (PCS), and Los Rios Farms (LRF).

Six monitoring transects, each extending 500 meters in length, were established at the five Yolo Bypass System sites. Multitaxonomic surveys were conducted along the length of each transect. The taxa surveyed and methods employed were as follows:

- Avian census surveys including variable radius point counts and strip transects at all sites. Demographic data were also gathered from three constant-effort mist net stations (MAPS protocol) at FRW, SUB, and LRF. Breeding Bird Atlas protocols assessed the breeding status of all bird species at each of the five sites.
- Vegetation survey techniques included Braun-Blanquet relevé surveys in accordance with California Natural Diversity Database protocols across all sites, as well as a MAPS Habitat Structure Assessment (HSA) at each of the constant effort mist net stations.

- Pollard's transect walking technique was used to assess diversity, distribution, and relative abundance of butterflies.
- Small mammal populations were sampled at the FRW site in the summer and fall of 2005 by DWR biologist Patty Quickert. In addition, incidental sightings of mammals were recorded by the MWFB field crew along transects and throughout the 5 sites.

To date, 145 avian species were detected using all survey methods. This represents 44% of all species likely to occur in Yolo County. Seventy-one species recorded were classified as riparian associate or riparian obligate species, representing 58% of the riparian associate/obligate species occurring in Yolo County. Eighty-six bird species were observed breeding or suspected of breeding within the Yolo Bypass, as per Breeding Bird Atlas protocols. Forty-three of these species were riparian associate/obligate species, representing 71% of the riparian associate/obligate species recorded nesting within Yolo County.

Fifteen focal species identified by the CALFED Bay-Delta Program Multi-Species Conservation Strategy, and/or the California Partners in Flight Riparian Habitat Joint Venture were recorded. The species observed include: Bank Swallow, Black-headed Grosbeak, Blue Grosbeak, Common Yellowthroat, Greater Sandhill Crane, Modesto Song Sparrow, Swainson's Hawk, Swainson's Thrush, Tricolored Blackbird, Warbling Vireo, little Willow Flycatcher, Wilson's Warbler, Yellow-breasted Chat, Yellow-billed Cuckoo, and Yellow Warbler.

Six of thirteen California endemic species were recorded, including: Nuttall's Woodpecker, Anna's Hummingbird, California Towhee, Oak Titmouse, Yellow-billed Magpie and Tricolored Blackbird. Constant-effort mist net stations were run throughout the breeding season, capturing 42 species for a total of 557 individuals over 28 sampling days. The most abundant breeding species captured were House Wren and Spotted Towhee; the most abundant migrant species captured were Swainson's Thrush and Wilson's Warbler.

Sixteen tree species and 10 shrub species were recorded in the vegetation surveys. A more complete analysis of vegetative structure and composition will be presented in the 2006 report. Butterfly surveys recorded 17 species, 32% of all species likely to occur in Central Valley riparian habitats. Small mammal trapping efforts captured five species of small mammals, two of which were non-native species. An additional 11 species were observed incidentally by MWFB staff.

More complete monitoring efforts over the next two field seasons will provide a more comprehensive data set that will enable us to better address the objectives and goals outlined above, as well as provide management recommendations for future habitat protection and restoration projects.

INTRODUCTION

California Bay-Delta Authority's Ecosystem Restoration Program (CALFED-ERP) objectives seek to 1) to improve and increase aquatic and terrestrial habitats and 2) to improve ecological functions in the San Francisco-Sacramento Bay-Delta to support sustainable populations of diverse and valuable plants and animal species (CALFED-ERP 2000). Target 1 of the CALFED Ecosystem Restoration Program Plan, Yolo Bypass Management Strategy – Riparian and Riverine Aquatic Habitat Target 1 Programmatic Actions 1A – 1C, seeks to restore riparian vegetation along Cache Creek, Putah Creek, and Bypass and Solano Ecological Management Unit (EMU) channels and sloughs, wherever possible, to provide cover and other essential habitat requirements for native resident fish species and wildlife. Programmatic Action 1A calls for the development of a cooperative program to restore riparian vegetation and fill gaps in forest continuity. Programmatic Action 1B seeks to develop a cooperative program to protect existing riparian corridors along creeks, streams, sloughs and channels connecting to the Delta. Programmatic Action 1C calls for the development of a cooperative program to plant riparian vegetation and provide for early development until it becomes naturally self-sustaining (CALFED 2000, Appendix D).

To meet these objectives, the California Department of Water Resources (CDWR) has identified management goals and information needs critical to the assessment of ecosystem health and to the development and implementation of present and future habitat enhancement projects in the Yolo Bypass.

In 2005, CDWR partnered with the UC Davis Museum of Wildlife and Fish Biology (MWFB) to develop baseline data and to help identify desirable riparian habitat characteristics for wildlife. Remnant riparian habitat sites were selected in which to survey selected riparian indicators: plants, butterflies, birds, and small mammals. MWFB staff surveyed plants, butterflies and birds; CDWR staff surveyed small mammals. Information from these surveys will be used to guide the development of a cooperative program to protect existing habitats, to rehabilitate degraded habitats, and to fill gaps in forest continuity. Specific goals of this research partnership, which will run through 2007, include:

1. Develop species lists and assess habitat structure, community composition, and inter- and intra-site variability for selected riparian parcels.

2. Establish baseline information on the status, distribution and relative abundance of riparian focal and special status bird species.
3. Provide baseline data of bird species diversity, breeding species diversity and their seasonal presence for monitoring future changes in bird populations.

METHODS

Study Sites

Three major Central Valley geographical units are currently under investigation by the MWFB: lower Putah Creek, the lower Cosumnes River watershed, and the Sutter-Yolo Bypass system (Fig. 1). Biomonitoring survey methods have been standardized across all sites within the three units to allow for comparison across landscapes and habitat types. Putah Creek surveys began in 1997, but were significantly expanded in 2004. Surveys along the lower Cosumnes River and in the Sutter-Yolo Bypass system began in June of 2005.

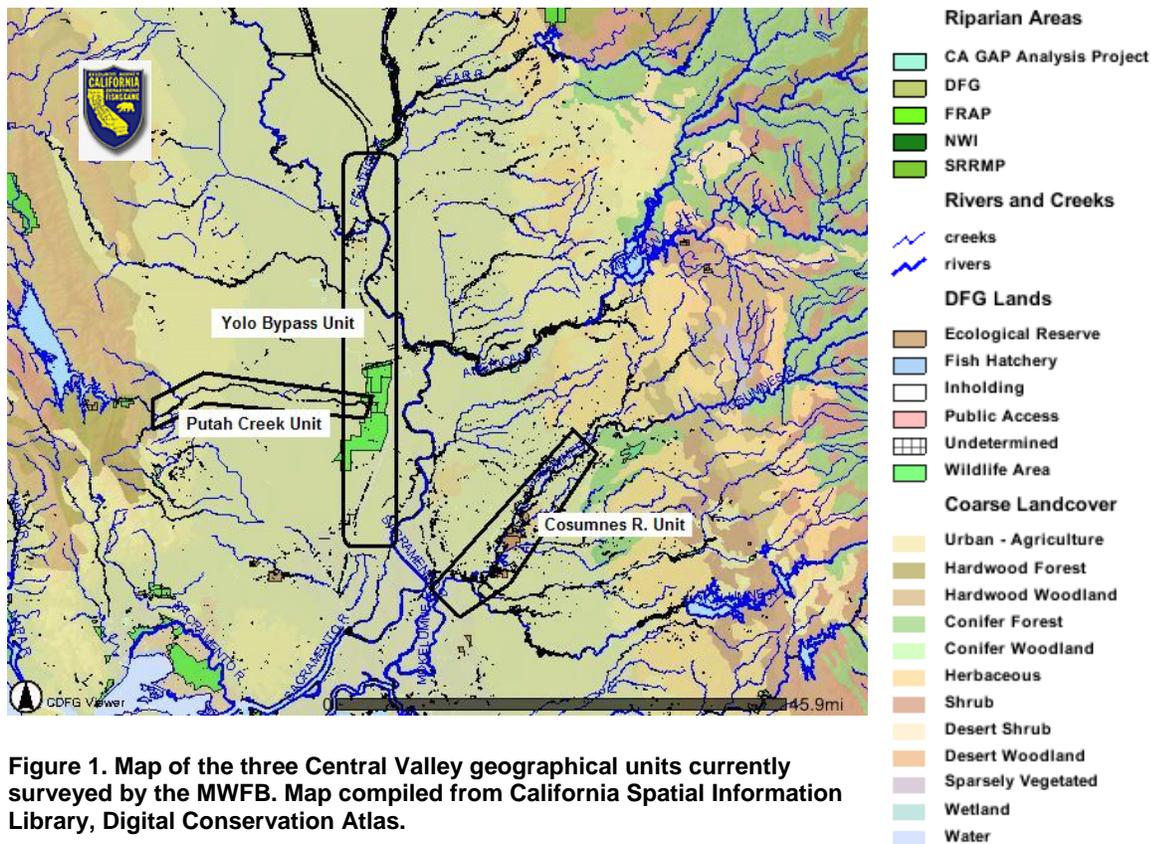


Figure 1. Map of the three Central Valley geographical units currently surveyed by the MWFB. Map compiled from California Spatial Information Library, Digital Conservation Atlas.

For the purposes of this focused investigation, we selected five survey sites in the Yolo Bypass system: Sutter Bypass (SUB), Fremont Weir (FRW), Sacramento Weir (SAW), Putah Creek Sinks (PCS), and Los Rios Farms (LRF) (Fig. 2).

Surveys at the Sutter Bypass site (SUB) were conducted in a narrow tract of mature riparian forest located at the confluence of the Sacramento and Feather Rivers, on the southeast edge of the Sutter Bypass. Fieldwork was conducted on the west side of the Feather River channel (Fig. 3). This property is operated by Teichert Associates.

The Fremont Weir site (FRW) is located along the Sacramento River at the northern end of the Yolo Bypass approximately 3.8 kilometers southwest of the Sutter Bypass site. The site is located on a peninsula at the northern edge of the Yolo Bypass and contains a 3.96 kilometer concrete weir, running east-west, which allows overflow from the Sacramento River to enter the Bypass. Fieldwork was conducted within the two major tracts of riparian woodland (averaging 250m in diameter) in the northern tip of the peninsula north of the weir, as well as along a linear fragment running along an old river oxbow south of the weir (Fig. 4). The land is managed by the California Department of Fish and Game and is classified as a wildlife area open to hunting, fishing and wildlife observation. The site is readily-accessible and often used by the public.

The Sacramento Weir site (SAW) lies within the Sacramento Bypass, an overflow corridor leading from the Sacramento River to the Yolo Bypass. This site consists of a narrow habitat fragment set adjacent to the floodway connecting the river with Yolo Bypass (Fig. 5). The land is also owned by the State of California.

The Putah Creek Sinks (PCS) and Los Rios Farms (LRF) sites, composed of narrow habitat shreds adjacent to agricultural fields, are located on Putah Creek at its confluence with the Yolo Bypass. These sites have been surveyed since 2003 within

the Putah Creek Biomonitoring Program, sponsored by the Lower Putah Creek Coordinating Committee. Putah Creek splits into two channels at the PCS site (Fig. 6). The LRF field site lies several hundred meters west of PCS (Fig. 7). Both sites are privately-owned.



High water event at LRF, spring 2005.

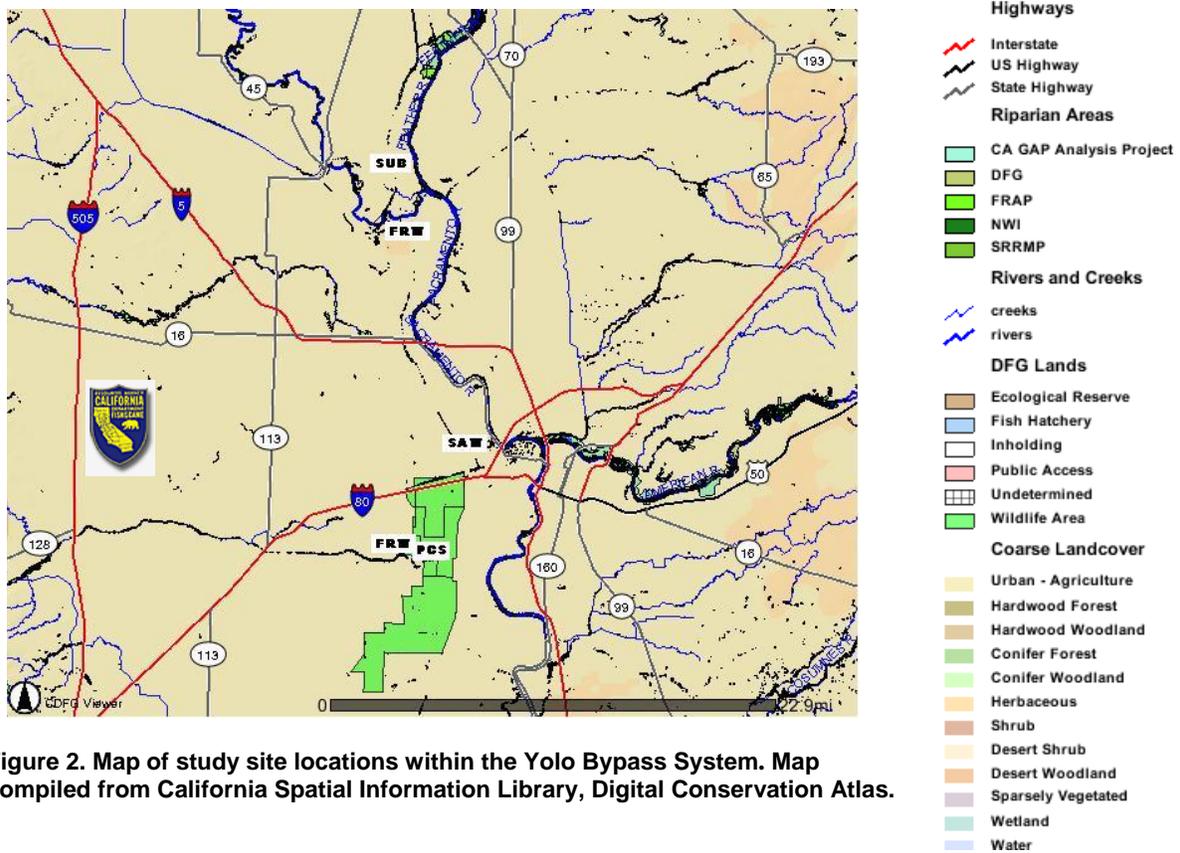


Figure 2. Map of study site locations within the Yolo Bypass System. Map compiled from California Spatial Information Library, Digital Conservation Atlas.

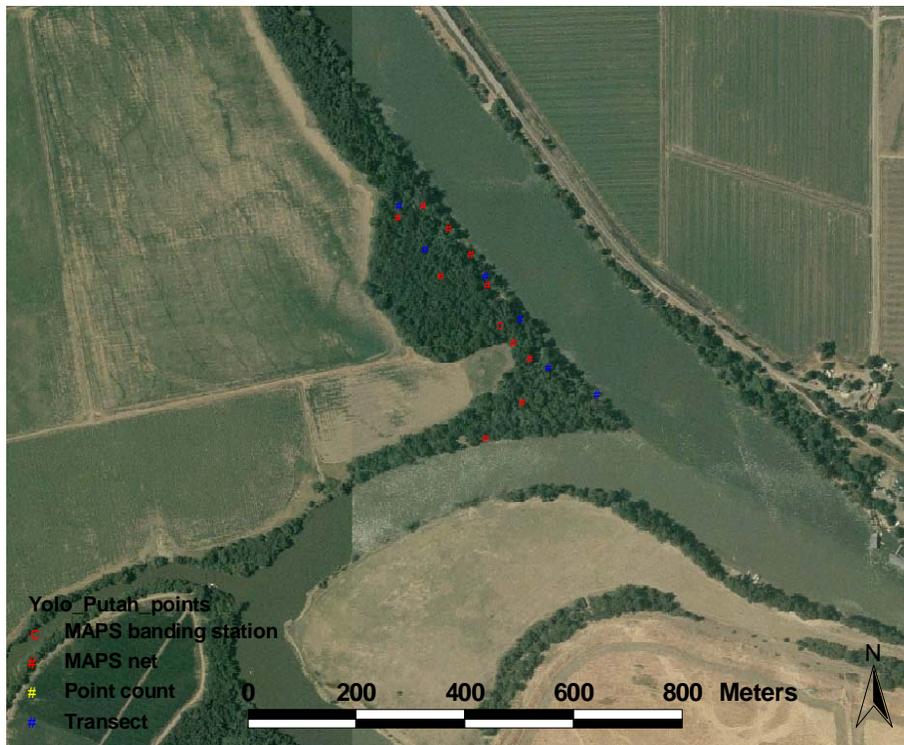


Figure 3. Sutter Bypass field site (SUB)

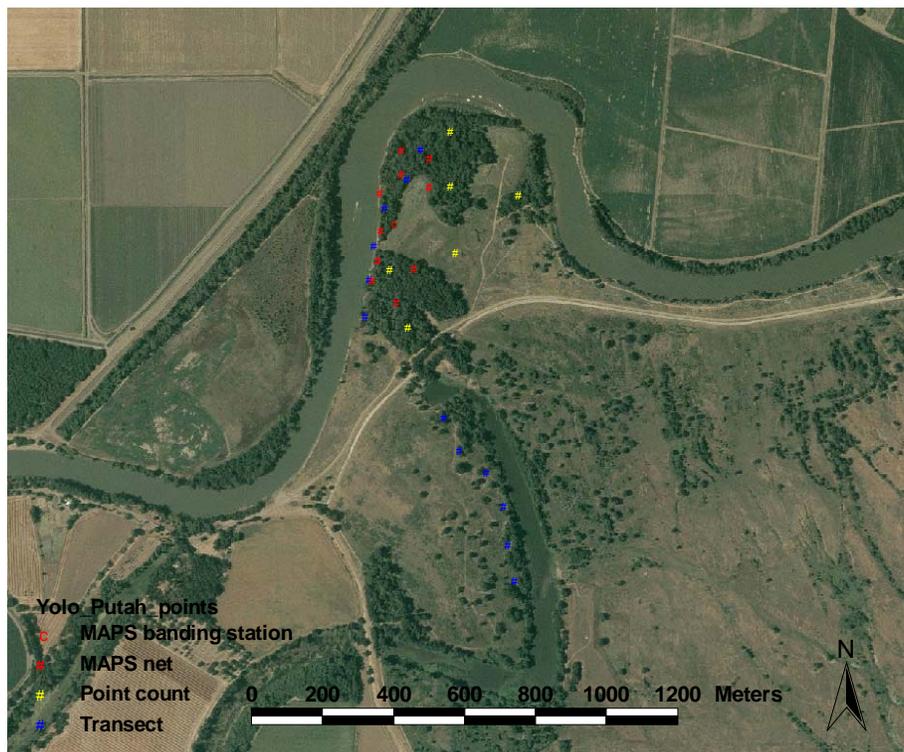


Figure 4. Fremont Weir field site (FRW)

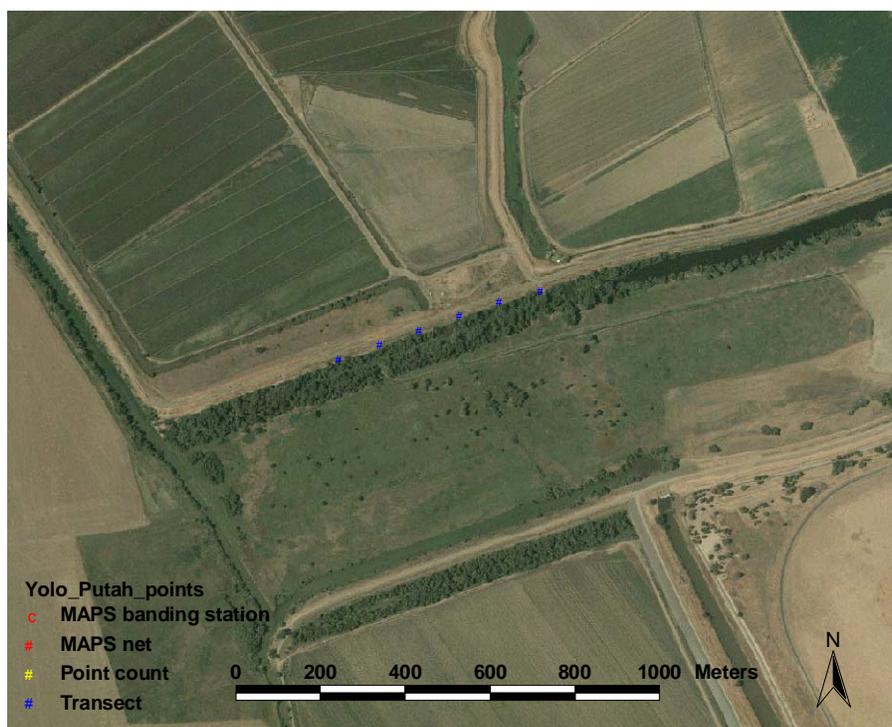


Figure 5. Sacramento Weir field site (SAW)



Figure 6. Putah Creek Sinks field site (PCS)

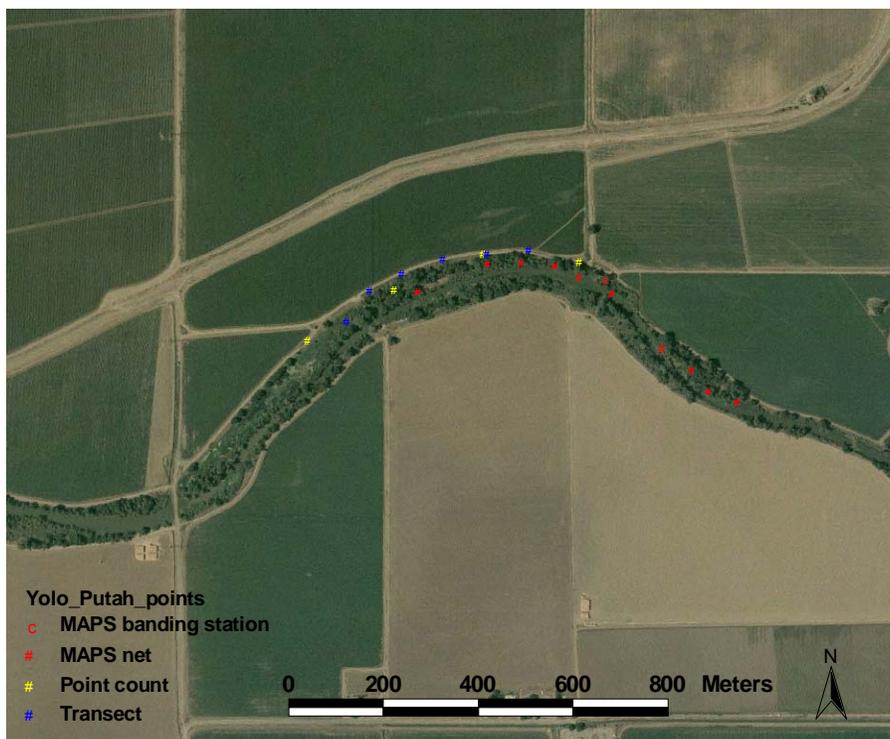


Figure 7. Los Rios Farms field site (LRF)

Avian Surveys

Objectives

- Provide baseline data on avian species richness, diversity, breeding status, productivity, and seasonal habitat use for monitoring future changes in bird populations.
- Document the distribution and abundance of special-status bird species.
- Estimate the proportion of resident species in the population.
- Characterize vegetation composition and structure at survey points and mist-netting (MAPS) stations using standardized protocols.
- Assess habitat needs of breeding birds.
- Compare findings to data from other long-term riparian study sites along Putah Creek and in the Cosumnes River Preserve.

Survey techniques for birds consisted of transect surveys (Ralph et al. 1993), timed variable radius point count surveys (Ralph et al. 1997), constant-effort mist-netting [Monitoring Avian Productivity and Survivorship (MAPS) protocol (DeSante et al. 2005)], and Breeding Bird Atlas (BBA) protocols (BBA Criteria, Cornell Lab of Ornithology). Samples were nested to accommodate different spatial and taxonomic levels of analysis. In addition to quantitative surveys, incidental observations of raptor nests, locations of bank nesting birds, and other information were recorded and georeferenced (Garmin eTrex Venture, UTM Zone 10).

Six monitoring transects, each extending 500 meters in length, were established at the five Yolo Bypass System sites (Figs. 3-7). FRW contained two transects. Transects were positioned either along the riparian corridor or parallel to the major axis of a landscape block to maximize the amount of riparian habitat sampled. Time- and area-constrained avian surveys were conducted monthly along each 500m transect. Birds were classified as being recorded either within a 30m band on either side of the transect line or as occurring outside the 30m band. Birds detected in flight were also recorded. All transect surveys were conducted during a 45-minute time interval.

Point count stations were established at 200m intervals along transects and in patches of riparian habitat too small to accommodate a 500m transect. Variable radius point count surveys were conducted in 5 and 10 minute intervals, following protocols outlined in Ralph et al. (1997). Six point count stations were placed at FRW, and four point count stations each were placed at LRF and PCS. Each point count station was visited four times throughout the breeding season from April to June. (Due to flooding, SUB and SAW were not accessible to our survey teams during the point count period.)

Constant effort mist-netting was conducted at SUB, FRW and LRF between May 3 and August 5, 2005, in keeping with Monitoring Avian Productivity and Survivorship (MAPS) protocols (DeSante et al. 2005).

Breeding Bird Atlas data were compiled according to protocols outlined in the *Cornell Lab of Ornithology's BBA Program* (BBA Criteria, Cornell Lab of Ornithology) (Table 1). A Breeding Bird Atlas classifies each species' breeding status based on specific behavioral observations or mist-netting information, designating species as a possible, probable, or confirmed breeder by date and season.



Banding Station Materials.

TABLE 1. CRITERIA FOR CLASSIFICATION OF BREEDING BIRD STATUS

Observed (OB):

X – Species was observed as present in this grid.

Possible (PO):

√ Individual (male or female) seen in suitable nesting habitat in breeding season.
X – Singing male in suitable habitat in breeding season.

Probable (PR):

P – Pair in suitable habitat in breeding season.
S – Territory presumed through song at same location on at least two occasions 7 or more days apart.
T – Territorial defense (chasing birds of the same species).
C – Courtship behavior or copulation observed.
N – Visiting probable nest site.
A – Agitated behavior, scolding of observer as if near a nest.
B – Nest building by wrens; Hole excavation by woodpeckers.

Confirmed (C):

CN – Carrying nest material (use this code with care).
NB – Nest building (except by wrens and woodpeckers).
PE – Physiological evidence obtained from bird in the hand (brood patch, egg in oviduct, etc.).
DD – Distraction displays.
UN – Used nest of eggshells found (careful documentation required).
FL – Recently fledged altricial young or downy precocial young incapable of sustained travel.
ON – Occupied nest.
CF – Adult carrying food for young.
FY – Adult feeding recently fledged young.
FS – Adult carrying fecal sac.
NE – Nest with eggs.
NY – Nest with young seen or heard



Orange-crowned Warbler, a common migrant and local breeding species in riparian areas.

Vegetation Surveys

Vegetation surveys were conducted at all five Yolo Bypass sites. Species composition and percent cover were estimated on ten-meter-radius plots (N=174), placed systematically along the avian transects, using a modified Braun-Blanquet relevé method (Mueller-Dombois & Ellenberg 1974) adapted to follow California Department of Fish and Game Natural Diversity Database protocols. Surveys were carried out July through October 2005. (Vegetation surveys are also being conducted at several sites on Putah Creek and the Cosumnes River, to be completed in 2006.) Data on species composition, relative cover, size class, tree diameter at breast height, crown diameter, and height, vertical structural diversity, and site character and habitat quality were also collected.

In addition to the relevé surveys, Habitat Structure Assessment (HSA) data were collected at all Monitoring Avian Productivity and Survivorship (MAPS) stations (Nott et al. 2003). A subset of the HSA variables were also collected at the two Yolo Bypass sites not containing MAPS stations (SAW and PCS). HSA vegetation data provide simple habitat characterizations, including the average tree height, percent cover and dominant species present within structural layers.

Butterfly Surveys

Butterflies are widely recognized as ecological indicators (Sparrow et al. 1994). They may be especially suitable for monitoring riparian habitats in arid or agricultural regions (Nelson and Andersen 1994), since they are sensitive to moisture, vegetative composition, and pesticide use. Butterfly species diversity is especially sensitive to development-related environmental change (Blair 1999). The numerous life stages of butterflies expose them to a wide range of



Red Admiral at Fremont Weir.

environmental influences. They are highly responsive to changes in temperature, humidity and light—parameters that are typically affected by habitat disturbance (Sparrow et al. 1994). Some butterflies (and other insects) respond positively to natural or anthropogenic clearing of vegetation (Pollard and Yates 1993), while others, such as many of the characteristic California riparian species (eg. Pipevine Swallowtail, Mourning Cloak, Willow Hairstreak), occur in mature, intact riparian forest (Arthur Shapiro, personal communication). These differential responses can inform habitat assessment and adaptive management strategies.

Different species vary in their sensitivity to environmental perturbations, vegetation changes, fragmentation of habitat, and pesticide use (Nelson and Andersen 1994). Therefore, monitoring and assessment protocols built upon them have the potential to provide fine-scale resolution of environmental condition, structure, function, and response to management actions. For example, species such as the Willow Hairstreak and Mourning Cloak are dependent on willow larval host plants for their survival. A longstanding Willow Hairstreak population was extirpated by vegetation clearing near the Old Davis Road bridge on Putah Creek in the mid-1990's (Arthur Shapiro, personal communication).

Many Central Valley butterfly species are experiencing widespread population declines, with populations of a number of species—including Lorquin's Admiral (*Limnitis lorquini*) and Mourning Cloak (*Nymphalis antiopa*)—at their lowest levels in 30 years (Arthur Shapiro, personal communication). None of these species are currently listed or included under the MSCS Conservation Strategy. These species should be monitored closely to track population

trends and determine causes for their decline. Moreover, these species may serve as indicators of larger environmental perturbations and stresses, including climate fluctuations.

Butterflies were surveyed monthly using Pollard's transect walking technique (Pollard and Yates 1993) to provide broad-scale information on species diversity, distribution, and relative abundance. Two observers surveyed each 500m transect at a standardized pace, recording all butterfly species encountered within a 5m x 5m x 5m box centered on the observer. Due to the late start, butterflies were only surveyed from August through October 2005. In 2006, butterfly surveys will be conducted from February through October.

Mammal Surveys

Small mammal populations were sampled at FRW in the summer and autumn of 2005 by DWR biologist Patty Quickert to gain cursory information on the species composition of the small mammal community. Two trapping grids containing 80 traps each (8x10 with 8 m between traps) were established in two different habitat types, a mature riparian forest and an adjacent ruderal grassland community located approximately 100m from the riparian forest edge (Fig. 8).

Open-wire, 4 x 10 inch Trippet traps were set over four nights in the summer and fall. Trapping in the summer was carried out in both habitat types. In the fall, however, trapping was only conducted in the riparian forest because the ruderal area had been mowed and conditions were not comparable to summer conditions. In summer, small mammals were trapped over four consecutive nights from 6/29/05 to 7/2/05 yielding a total of 320 trap nights in each habitat type. Fall trapping occurred on 10/24,10/25,10/27 and 10/28 for a total of 320 trap nights. Trapping was not carried out on 10/26 due to rain. Although rain continued on 10/27 and 10/28, all traps were covered and trapping was continued because capture rates of small mammals did not appear to be affected.



River Otter, common in Bypass waterways.
Photo courtesy of Jim Dunn.

Two to four voucher specimens of each species were euthanized and deposited in the MWFB. Most of the captured non-native species (House Mouse, *Mus musculus* and Black Rat, *Rattus rattus*) were euthanized. All other captured animals were identified, marked for

recapture identification purposes, and released. Thus, results from the mammal trapping efforts reported below are estimates of the minimum number of individuals known alive.

The vegetation in the two habitats was characterized by DWR biologists Jean Witzman and Patty Quickert. All plant species within the mammal trapping grids were recorded. Species not identifiable in the field were collected and identified with a dissecting scope, using the Jepson Manual (Hickman 1993) as a reference. Quantitative measurements of height, cover or abundance were not recorded.



Figure 8. Mammal trapping grids at FRW. Figure courtesy of DWR.

Incidental observations of mammal species were also documented by MFWB biologists while conducting various other surveys at the five Yolo and Sutter Bypass sites.

RESULTS

Birds

Species composition

We recorded 145 species across all five sites within the Yolo Bypass through a variety of survey techniques: transects, point counts, constant effort mist netting, and incidental encounters (Table 2). This represents 44% of all the total number of species detected in Yolo County as of December 31, 2003 (328 species) (Yolo Audubon Society 2004). Seventy-one species were classified by the Yolo Audubon Checklist as riparian associate or riparian obligate species, representing 58% of the riparian associate/obligate species known to occur in Yolo County. We detected 91 species at Sutter Bypass, 120 species at Fremont Weir, 68 species at Sacramento Weir, 96 species at Los Rios Farms, and 96 species at Putah Creek Sinks.

Survey efforts varied considerably between sites, likely contributing to differences in the total number of species detected at each site (Table 2). The number of species recorded at the five sites will likely increase as surveys continue through the winter months.



The House Wren, the most commonly captured bird in mist nets. Photo courtesy of Jim Dunn.

TABLE 2. SUMMARY OF AVIAN SPECIES DETECTED IN 2005 THROUGH TRANSECT SURVEYS (T), POINT COUNTS (P), CONSTANT EFFORT MIST NETTING (M) AND/OR INCIDENTAL ENCOUNTERS (I).

	Sutter Bypass	Fremont Weir	Sacramento Weir	Los Rios Farms	Putah Creek Sinks
Survey Effort	52 Hours (June-Oct.)	96 Hours (Mar.-Oct.)	3.75 Hours (Jul.-Oct.)	78 Hours (Jan.-Oct.)	19.5 Hours (Jan.-Oct.)
Survey Type	T, M, I	T, P, M, I	T, I	T, P, M, I	T, P, I
Total Species Detected	91	120	68	96	96
ANATIDAE					
Greater White-fronted Goose		X	X		X
Snow Goose		X			X
Canada Goose		X		X	X
Tundra Swan				X	
Wood Duck	X	X		X	X
Mallard	X	X		X	X
Northern Pintail		X			
Greater Scaup		X			
Common Merganser					X

TABLE 2. SUMMARY OF AVIAN SPECIES DETECTED IN 2005 THROUGH TRANSECT SURVEYS (T), POINT COUNTS (P), CONSTANT EFFORT MIST NETTING (M) AND/OR INCIDENTAL ENCOUNTERS (I).

	Sutter Bypass	Fremont Weir	Sacramento Weir	Los Rios Farms	Putah Creek Sinks
PHASIANIDAE					
Ring-necked Pheasant	X	X	X	X	X
Common Peafowl	X	X			
Wild Turkey	X	X			
ODONTOPHORIDAE					
California Quail	X	X	X	X	
PODICIPEDIDAE					
Pied-billed Grebe		X			
PELECANIIDAE					
American White Pelican	X				X
PHALACROCORACIIDAE					
Double-crested Cormorant		X	X	X	X
ARDEIDAE					
Great Blue Heron	X	X		X	X
Great Egret	X	X	X	X	X
Snowy Egret	X	X	X	X	X
Cattle Egret				X	
Green Heron	X	X		X	
Black-crowned Night-Heron	X	X		X	X
THRESKIORNITHIDAE					
White-faced Ibis		X		X	X
CATHARTIDAE					
Turkey Vulture	X	X	X	X	
ACCIPITRIDAE					
Osprey	X				
White-tailed Kite		X			
Northern Harrier		X			
Sharp-shinned Hawk		X			X
Cooper's Hawk	X	X			X
Red-shouldered Hawk	X	X	X	X	X
Swainson's Hawk	X	X	X	X	X
Red-tailed Hawk	X	X	X	X	X
FALCONIDAE					
American Kestrel	X	X	X	X	X
Peregrine Falcon		X		X	
CHARADRIIDAE					
Black-bellied Plover					X
Killdeer		X	X	X	X
RECURVIROSTRIDAE					
Black-necked Stilt	X	X			
SCOLOPACIDAE					
Greater Yellowlegs		X		X	
Lesser Yellowlegs	X				X
Spotted Sandpiper	X				
Long-billed Curlew	X	X	X	X	
Wilson's Snipe					X

TABLE 2. SUMMARY OF AVIAN SPECIES DETECTED IN 2005 THROUGH TRANSECT SURVEYS (T), POINT COUNTS (P), CONSTANT EFFORT MIST NETTING (M) AND/OR INCIDENTAL ENCOUNTERS (I).

	Sutter Bypass	Fremont Weir	Sacramento Weir	Los Rios Farms	Putah Creek Sinks
LARIDAE					
Ring-billed Gull				X	
California Gull				X	
Caspian Tern					X
Forster's Tern					X
COLUMBIDAE					
Rock Pigeon	X	X		X	X
Mourning Dove	X	X	X	X	X
CUCULIDAE					
Yellow-billed Cuckoo				X	
TYTONIDAE					
Barn Owl	X	X			
STRIGIDAE					
Great Horned Owl	X	X		X	X
APODIDAE					
Vaux's Swift		X			
White-throated Swift				X	X
TROCHILIDAE					
Black-chinned Hummingbird	X	X	X	X	
Anna's Hummingbird	X	X	X	X	X
Rufous Hummingbird				X	
ALCEDINIDAE					
Belted Kingfisher	X	X	X	X	X
PICIDAE					
Acorn Woodpecker		X			
Nuttall's Woodpecker	X	X	X	X	X
Downy Woodpecker	X	X	X	X	X
Northern Flicker (Red-shafted)	X	X	X	X	X
TYRANNIDAE					
Western Wood-Pewee	X	X	X	X	
Willow Flycatcher		X	X	X	X
Hammond's Flycatcher					X
Gray Flycatcher				X	
Dusky Flycatcher	X	X			
Pacific-slope Flycatcher	X	X		X	X
Black Phoebe	X	X	X	X	X
Ash-throated Flycatcher	X	X	X	X	X
Western Kingbird	X	X	X	X	X
LANIIDAE					
Loggerhead Shrike					X
VIREONIDAE					
Cassin's Vireo	X	X		X	X
Hutton's Vireo		X			
Warbling Vireo	X	X		X	X
CORVIDAE					
Western Scrub-Jay	X	X	X	X	X

TABLE 2. SUMMARY OF AVIAN SPECIES DETECTED IN 2005 THROUGH TRANSECT SURVEYS (T), POINT COUNTS (P), CONSTANT EFFORT MIST NETTING (M) AND/OR INCIDENTAL ENCOUNTERS (I).

	Sutter Bypass	Fremont Weir	Sacramento Weir	Los Rios Farms	Putah Creek Sinks
Yellow-billed Magpie		X		X	X
American Crow	X	X	X	X	X
Common Raven		X		X	
ALAUDIDAE					
Horned Lark	X	X		X	X
HIRUNDINIDAE					
Tree Swallow	X	X	X	X	X
Violet-green Swallow		X			
Northern Rough-winged Swallow	X	X		X	X
Bank Swallow	X	X		X	X
Cliff Swallow	X	X	X	X	X
Barn Swallow	X	X	X	X	X
PARIDAE					
Oak Titmouse	X	X	X	X	
AEGITHALIDAE					
Bushtit	X	X	X	X	X
SITTIDAE					
Red-breasted Nuthatch		X	X		X
White-breasted Nuthatch	X	X	X	X	X
TROGLODYTIDAE					
Bewick's Wren	X	X	X	X	X
House Wren	X	X	X	X	X
Winter Wren		X			
Marsh Wren				X	
REGULIDAE					
Golden-crowned Kinglet	X	X			X
Ruby-crowned Kinglet	X	X	X	X	X
SYLVIIDAE					
Blue-gray Gnatcatcher		X			
TURDIDAE					
Western Bluebird	X	X			
Swainson's Thrush	X	X		X	
Hermit Thrush	X	X		X	X
American Robin	X	X	X	X	X
Varied Thrush	X				
MIMIDAE					
Northern Mockingbird		X	X		X
STURNIDAE					
European Starling	X	X	X	X	X
MOTACILLIDAE					
American Pipit	X	X			X
BOMBYCILLIDAE					
Cedar Waxwing	X	X	X	X	X
PARULIDAE					
Orange-crowned Warbler	X	X	X	X	X
Nashville Warbler	X	X			X

TABLE 2. SUMMARY OF AVIAN SPECIES DETECTED IN 2005 THROUGH TRANSECT SURVEYS (T), POINT COUNTS (P), CONSTANT EFFORT MIST NETTING (M) AND/OR INCIDENTAL ENCOUNTERS (I).

	Sutter Bypass	Fremont Weir	Sacramento Weir	Los Rios Farms	Putah Creek Sinks
Yellow Warbler	X	X	X	X	X
Yellow-rumped Warbler (Audubon's)	X	X	X	X	X
Yellow-rumped Warbler (Myrtle)	X	X	X		X
Black-throated Gray Warbler	X	X	X	X	X
Townsend's Warbler		X	X	X	
Hermit Warbler		X	X		
Blackpoll Warbler				X	
MacGillivray's Warbler	X	X	X	X	
Common Yellowthroat	X	X	X	X	X
Wilson's Warbler	X	X	X	X	X
THRAUPIDAE					
Western Tanager	X	X	X	X	X
EMBERIZIDAE					
Spotted Towhee	X	X	X	X	X
California Towhee	X	X	X	X	X
Lark Sparrow	X				
Savannah Sparrow		X			
Fox Sparrow			X	X	X
Song Sparrow	X	X		X	X
Lincoln's Sparrow	X	X	X	X	X
White-crowned Sparrow		X	X	X	X
Golden-crowned Sparrow		X	X	X	X
Dark-eyed Junco (Oregon)		X	X		X
CARDINALIDAE					
Black-headed Grosbeak	X	X	X	X	X
Blue Grosbeak	X	X	X	X	X
Lazuli Bunting	X	X	X	X	X
ICTERIDAE					
Red-winged Blackbird	X	X	X	X	X
Tricolored Blackbird	X		X	X	X
Western Meadowlark	X	X		X	X
Yellow-headed Blackbird		X			
Brewer's Blackbird	X	X	X	X	X
Brown-headed Cowbird	X	X	X	X	X
Bullock's Oriole	X	X	X	X	X
FRINGILLIDAE					
Purple Finch		X			
House Finch	X	X	X	X	X
Pine Siskin		X			
Lesser Goldfinch	X	X		X	X
American Goldfinch	X	X	X	X	X
PASSERIDAE					
House Sparrow		X			
Other Taxonomic Groupings					
<i>Zonotrichia</i> sp.	X	X		X	X
Western Flycatcher		X		X	X

RHJV and CALFED MSCS Focal Species

California Partners in Flight (CalPIF) and the Riparian Habitat Joint Venture (RHJV) have developed a Riparian Bird Conservation Plan to, “stop the decline of, and maintain or increase, healthy populations of landbirds” that occupy California riparian habitat (RHJV 2004). This document identifies a suite of 17 focal species of conservation interest that are representative of California riparian habitats. Thirteen of these are known to occur within the Yolo Bypass. These species are discussed below in reference to our observations made at the five Yolo Bypass sites. Focal species, identified in the CALFED Bay-Delta Program Multi-Species Conservation Strategy (CALFED-MSCS 2000), are also identified and discussed below.

Swainson’s Hawk (*Buteo swainsoni*)

CALFED Multi Species Conservation Strategy Focal Species

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Threatened Species, California Department of Fish and Game*

The range of the Swainson’s Hawk spans open habitats across western North America. The species has ties to riparian habitat within the Central Valley through its breeding biology. Riparian habitat adjacent to open or agricultural areas provides tree structure for nests. Historical records show a decline in the nesting range of this species within California. Swainson’s Hawks are facing further declines due to loss of mature riparian habitat.



Swainson’s Hawks were recorded throughout the breeding season (03/17/05-10/18/05) at all field sites.

Detections range from 03/17/05-10/18/05. They are confirmed breeders at FRW (05/07/05), LRF (06/09/03), and PCS (05/28/03). They hold a

probable breeding status at SUB and SAW, with pairs observed throughout the season at all sites. Continued efforts will likely raise the status to confirmed breeder at SUB and SAW.

Greater Sandhill Crane (*Grus canadensis tabida*)

CALFED Multi Species Conservation Strategy Focal Species

Management Status: *Threatened Species, California Department of Fish and Game*

The Greater Sandhill Crane breeds in a vast range across North America, from central Canada southward. The species historically wintered in the wetland habitats across the Central Valley of California. Habitat loss due to development and agriculture has greatly reduced the amount of suitable winter habitat for the species in the Central Valley (Status Survey and Action Plan. Sandhill Crane). Wetland preservation and restoration are the recommended management activities for this species

Sandhill Cranes have been recorded as flyovers at 2 of the 5 field sites.

At the LRF site, on 01/22/04, a pair of cranes was observed circling and calling over the site. On 10/06/05 30+ birds were gliding and calling low over the FRW site. They do not use the riparian habitats in the bypass.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

CALFED Multi Species Conservation Strategy Focal Species

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Endangered Species, California Department of Fish and Game; Region 1 Sensitive Species, U.S. Fish and Wildlife Service*

The Yellow-billed Cuckoo was historically a common breeder in the lowland riparian habitats of California. The species suffered heavily from habitat loss in the early part of the 20th Century. Currently small breeding populations are limited to localities found in the northern Central Valley and along the Kern River. Cuckoos require healthy and extensive riparian habitat where natural hydrology leads to differential ages of tree structure.

Nests are often placed in willows, cottonwoods and box elders. Management suggestions indicate that all riparian habitat, regardless of quality, should be preserved and improved where possible. This, coupled with restoration of additional riparian habitat, will provide a chance for continued presence of the species in California (RHJV 2004).

On 06/22/05, a Yellow-billed Cuckoo was observed moving about in the canopy of a stand of Fremont Cottonwoods at the LRF field site. Subsequent efforts to relocate this bird were unsuccessful. Playback recordings were used throughout the summer at all field sites to aid in the detection of this species. However, no birds were encountered. On 6/23/05, a Yellow-billed Cuckoo was also observed by a local birder, Steve Hampton, in the Cache Creek Settling Basin which flows into Yolo Bypass from the west near Woodland, CA.

Little Willow Flycatcher (*Empidonax traillii brewsteri*)

CALFED Multi Species Conservation Strategy Focal Species

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Threatened Species, California Department of Fish and Game
Region 1 Sensitive Species, U.S. Fish and Wildlife Service*

The Willow Flycatcher historically was a widespread breeder in California. The species requires riparian deciduous shrubs, with strong ties to willow thickets. The subspecies *brewsteri* is the species that would have historically nested in the Sacramento Valley Region (RHJV 2004). This subspecies is occasionally separable from two other western Willow Flycatcher subspecies through measurements



Willow Flycatcher (*E. t. brewsteri*) at LRF.

(Pyle 1997). Decline across the species' current breeding range continues due to reasons unknown at this time.

Willow Flycatchers were detected at 4 of the 5 field sites. We recorded Willow Flycatchers at FRW on 05/24/05, as well as 08/31/05. One detection was made on 09/04/05 at SAW, 06/15/06 at PCS and 06/14/05 at LRF. These dates suggest that this species uses the Yolo Bypass habitat as both spring and fall migration stopover sites. Several of the captures along Putah Creek and in the Yolo Bypass were identified through measurements as the subspecies *brewsteri*.

Least Bell's Vireo (*Vireo bellii pusillus*)

CALFED Multi Species Conservation Strategy Focal Species

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Endangered Species, California Department of Fish and Game*
Endangered Species, U.S. Fish and Wildlife Service

The Least Bell's Vireo, prior to extirpation from the California Valley, was a common to locally common breeder in riparian lowland habitats throughout the Sacramento Valley of California (RHJV 2004). Management recommendations suggest pursuit of the objectives set forth by the recovery plan for the least Bell's Vireo by the U.S. Fish and Wildlife Service in 1998 (Table 3-1, CALFED Bay-Delta Program Multi-Species Conservation Strategy, July 2000).

No Least Bell's Vireos were recorded within the 5 field sites during the 2005 breeding season. However, two birds were reported along Putah Creek in 2005, one bird below the Solano Diversion Dam (25 June) and another near Stevenson's Bridge (29 September).

Warbling Vireo (*Vireo gilvus swainsonii*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *None*

The Warbling Vireo has strong associations with riparian habitat throughout its historic and current range. Historically, breeding populations spanned the Central Valley. Currently, breeding ranges are limited to the eastern and western edges of the Sacramento Valley (RHJV 2004).



Warbling Vireos were detected in 4 of the 5 field sites. The SAW site was the only site lacking a record for this species. Detections were limited to dates in the spring and fall, suggesting that this species uses the habitat within the field sites as both spring and fall migration stopover sites. Yolo Bypass detections were between 04/20/05-05/24/05 and then again between 08/04/05-09/22/05. Breeding behaviors or breeding characters have not been observed on mist-netted birds.

Bank Swallow (*Riparia riparia riparia*)

CALFED Multi Species Conservation Strategy Focal Species

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Threatened Species, California Department of Fish and Game*

The presence of breeding Bank Swallows in the Sacramento Valley of California is dependent on the availability of friable, exposed river and stream banks within riparian ecosystems. Local breeding populations benefit greatly from annual erosion and maintenance of the suitability of banks, cliffs, bluffs, and quarries where nesting colonies occur (RHJV 2004). Management recommendations suggest allowing currently uncontrolled waterways to meander, leading to the continued formation of cutbanks that serve as suitable

nesting habitat (Table 3-1, CALFED Bay-Delta Program Multi-Species Conservation Strategy, July 2000).

Bank Swallows were encountered at 4 of the 5 field sites. Early season detections within the Yolo Bypass were made on 04/21/05 at the PCS field site, where birds were observed foraging, and throughout the season (04/03/05, 04/20/05, 05/10/05, 06/07/05, 06/16/05, 09/22/05) at the FRW field site, where this species is considered a probable breeder. The birds were observed foraging and inspecting nesting cavities on the banks of the Sacramento River, and their presence continued throughout the season suggesting that a colony was located nearby. Further efforts to pinpoint the location of the nesting colony will be made in 2006. The LRF, SAW and SUB field sites, as well as FRW all held later records (07/19-09/22), with flocks composed of both hatching year and after-hatching year birds, suggesting the species is using these areas as pre-migratory staging grounds.

Swainson's Thrush (*Catharus ustulatus*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *None*

The Swainson's Thrush is an obligate riparian woodland breeder. Historic populations colonized riparian habitats west of the Cascade and Sierra Nevada mountains (Grinnell and Miller 1940). There are no current breeding records for the Sacramento Valley Region (RHJV 2004).

Swainson's Thrush was recorded in 3 of the 5 field sites. Due to flooding, the SAW site was not sampled early enough during the 2005 season to detect this species. FRW had records including 05/09/05, 05/19/05, 05/27/05, and 06/07/05. The species was detected on visits to the LRF site on 05/02, 05/03, 05/12, 05/23, 06/10. Breeding characters were not observed on birds captured in mist nets. SUB had an unseasonably-late record of 06/20/05. The date range of detections suggests that this species uses the field sites as spring migration stopover habitat. Fall records have not been recorded for 2005.

California Yellow Warbler (*Dendroica petechia brewsteri*)

CALFED Multi Species Conservation Strategy Focal Species

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Species of Special Concern, California Department of Fish & Game*

The Yellow Warbler was formerly a common breeding resident in lowland California habitats. Habitat loss, depredation by exotic mammals, and cowbird parasitism has led to the extirpation of breeding pairs in the Central Valley. Yellow Warblers require willow and cottonwood riparian habitat for breeding. Suggested management options include cowbird eradication programs, in addition to preservation and restoration of riparian habitats.

Yellow Warblers were commonly detected in all five of the field sites.

Spring dates ranged from 04/21/05-05/22/05, and fall dates ranged from 08/01/05-10/18. Yellow Warblers shared the bimodal distribution of detections also observed for Wilson's Warbler, Willow Flycatcher and Warbling Vireo, indicating that Yellow Warblers also use the Yolo Bypass as a migration stopover site. Evidence of breeding Yellow Warblers was not observed at any of the 5 field sites.

Wilson's Warbler (*Wilsonia pusilla*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *None*

Wilson's Warbler is a breeding species in coastal and montane California with strong associations with riparian or wet meadow habitats. This species does not currently nest in the lowlands of the Sacramento Valley, but uses the region for spring and fall migration stopover.

Wilson's Warblers were detected in all 5 of the field sites. They were a common migrant, using the habitat for migration stopover, and detections were made during visits between the dates of 04/03/05-05/20/05 in the spring and 08/05/05-10/22/05 in the fall.

Common Yellowthroat (*Geothlypis trichas*)

CALFED Multi Species Conservation Strategy Focal Species (Geothlypis trichas sinuosa)
California Partners in Flight/Riparian Habitat Joint Venture Focal Species (Geothlypis trichas)

Management Status: *Species of Special Concern, CDFG (Geothlypis trichas sinuosa).*

The Common Yellowthroat occurs in wetland habitats associated with riparian ecosystems throughout California's Central Valley. Populations of this species on the Sacramento and Feather Rivers are believed to be declining. The saltmarsh Common Yellowthroat, subspecies *G. t. sinuosa*, is supported by habitat in the Bay/Delta Bioregion (RHJV 2004).

Common Yellowthroats were detected at all five field sites. At FRW and SUB, the species was documented as a confirmed breeder on the following dates, 07/01/05 and 06/13/05, respectively. FRW also carried multiple detections throughout the year. There were detections throughout the year at the LRF field site (01/28/05, 06/24, 07/13, 07/20, 07/26, 08/01, 09/29, 10/28), and 2 records at SAW (07/01/05, 09/04/05). At the LRF banding station, 2 males were captured, and exhibited swollen cloacal protuberances (breeding characters), however these are unreliable for site-specific statements of breeding status. Due to the secretive nature of this species, breeding activity can be difficult to detect. Future breeding bird atlas efforts will likely elevate this species to a confirmed breeder at all sites. Based on ranges described in the *Identification Guide to North American Birds* (Pyle 1997) the listed subspecies *sinuosa* **should not occur** except during migration, when it and other western subspecies may be found. The subspecies *G. t. arizela* is the subspecies most likely to breed in this region of the Bypass (Grinnell and Miller 1940, Pyle 1997). Definitive subspecies identification of Yellowthroats in the hand is not always possible due to weak clinal variation and overlapping measurements. The Yolo Bypass' proximity to the saltmarsh habitats in the San Francisco Bay area, coupled with seasonal movements of the populations, create uncertainty as to the exact identities of the subspecies captured at our mist net stations.

Yellow-breasted Chat (*Icteria virens*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Species of Special Concern, California Department of Fish and Game*

The Yellow-breasted Chat was historically a widespread breeder in the Central Valley. Current breeding populations exclude Yolo County and the Yolo Bypass. This species requires dense riparian habitat for breeding. Loss of such habitat has led to population declines in California (RHJV 2004).

Yellow-breasted Chats were not detected during the 2005 field season within the Yolo Bypass. On 08/25/04, however, one bird was detected in Himalayan Blackberry (*Rubus discolor*) brambles at the PCS site. It was likely a migrant.

Black-headed Grosbeak (*Pheucticus melanocephalus maculatus*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *None*

The Black-headed Grosbeak has a broad suite of nesting habitat preferences. Western California populations nesting in riparian habitats require cottonwood and willow riparian lowlands (Hill 1995). The Black-headed Grosbeak often breeds in early successional vegetation. When nesting in riparian habitats, this species has close associations



Black-headed Grosbeak.

with the following CalPIF focal species: Warbling Vireo, Song Sparrow, and Common Yellowthroat (RHJV 2004).

Black-headed Grosbeaks were encountered at all 5 field sites during the summer and fall of 2005. This species carries a breeding status at all sites except SAW. At SUB, the species is considered a probable breeder, with a

pair present on 06/13/05. The bird is considered a possible breeder, with observations spanning the summer at both PCS and LRF. On 06/24/05 a female captured in a mist net at FRW showed breeding characters, confirming a breeding presence at this site. Early and late season detections indicate that this species is using all field sites as a migration stopover/staging ground.

Blue Grosbeak (*Guiraca caerulea*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *None*

The Blue Grosbeak is closely associated with riparian edge habitat. Riparian habitat structure provides places to stage territorial defense (singing perches) as well as cover for nests of this species. Nearby open habitats provide areas where the species forages.

Blue Grosbeaks were commonly encountered on all 5 field sites throughout the breeding season, and confirmed as breeders at SUB (06/13), FRW (07/01/05), LRF (06/10/05) and PCS (05/28/03). Their status at SAW as a possible breeder will likely be elevated to confirmed breeder as effort is accumulated at this site. The suspected low breeding productivity of the species in the Sacramento Valley is of concern and is likely due to Brown-headed Cowbird parasitism. Preliminary observations made by our field crew, in combination with off-season banding efforts at the LRF site, suggest that initial broods were negatively affected by cowbird parasitism, whereas later nesting attempts were more productive. More study is needed, however, and we hope to address this question with nest searching efforts in the 2006 breeding season.

Modesto Song Sparrow (*Melospiza melodia mailliardi*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Species of Special Concern, California Department of Fish and Game.*

The Song Sparrow is incredibly diverse in its morphology, with a purported 24-29 genetically-distinct populations recognized across North America (Pyle 1997). Eleven of these subspecies are present in California, with many of them considered endemic to the state (RHJV 2004). These subspecies are classified within 6 sub-groups. Extreme forms of these subspecies are separable in the hand, however, separation of subspecies within sub-groups of the species is extremely difficult due to weak and clinal variation among birds (Pyle 1997). The Modesto Song Sparrow, subspecies *mailliardi*, has strong association to riparian habitat, and its range is described as spanning central California from Glenn to Stanislaus Counties (Pyle 1997).

Summer-resident Song Sparrows of the subspecies *mailliardi* likely occur at the 5 field sites in Yolo Bypass. Winter detections of Song Sparrow include a suite of subspecies from several of the sub-groups mentioned above. Song Sparrows are commonly encountered at all sites, excluding SAW, but this will likely change as more effort is accumulated at that site. The species holds a confirmed breeding status at FRW (05/27/05), LRF (06/27/03), PCS (07/02/03) and SUB (06/13/05). Hatching-year Song Sparrows were captured at all banding stations within the Yolo Bypass.

Tricolored Blackbird (*Agelaius tricolor*)

California Partners in Flight/Riparian Habitat Joint Venture Focal Species

Management Status: *Species of Special Concern, California Department of Fish and Game*

The Tricolored Blackbird is a colonial nesting species that has been negatively affected by habitat loss, as well as depredation by exotic species. They are especially vulnerable due to the synchronous and colonial nature of their breeding biology. Populations in northern California appear to be stable at this time. They require wetlands associated with riparian habitat for breeding habitat (RHJV 2004).

Tricolored Blackbirds were detected in 4 of the 5 field sites. No colonies overtly existed in any of the field sites, however. On 07/01/05 a pair was detected at the SAW site. Flyovers at SUB were recorded on 07/08/05, as well as 10/25/05. A flock of 25-50 birds was detected at PCS on 06/29/05, and one bird was observed on 10/18/05 foraging with Red-winged Blackbirds. Consistent records of birds moving through the LRF site on 05/23/05, 06/22/05, 07/12/05, and 07/20/05 suggest that a nesting colony is located in the vicinity of this field site.

California Endemic Species



California endemic, Anna's Hummingbird.

The California Floristic Province encompasses most of the state of California, as well as small portions of southwestern Oregon and northwestern Baja California, Mexico. This region is characterized by Mediterranean climate and associated flora (Raven and Axelrod 1978). Thirteen native bird species have ranges that fall entirely within the California Floristic Province. These endemic species represent unique and important resources to the biodiversity of

the region.

The limited range of these endemic species increases their vulnerability to both intrinsic (i.e. small population size, genetic bottlenecks, predation, disease) and extrinsic (i.e. habitat loss, invasive species, climatic changes) disturbance factors. Three species hold Special Management Status, the Tricolored Blackbird, a California Species of Special Concern, the Federally Threatened California Gnatcatcher, and the State and Federally Endangered Least Bell's Vireo.

Endemics without current Special Management Status have been largely overlooked, but are not exempt from the vulnerabilities of their limited range. Recently, concern that both Oak Titmice and Yellow-billed Magpies have suffered significant population declines due to West Nile Virus has arisen through citizen science surveys and carcass returns to regional vector

control agencies (Andrew Engilis Jr., personal observation). These suspected declines within historically stable and abundant populations have been difficult to quantify due to a lack of understanding of pre-West Nile Virus population status. The vulnerability of all endemic bird species of the California Floristic Province should be better recognized and addressed by scientists and managers alike.

Six of the thirteen endemic species were found in Yolo and Sutter Bypass habitats by MWFB biologists during the 2005 field season: Oak Titmouse (*Baeolophus inornatus*), Tricolored Blackbird, Nuttall's Woodpecker (*Picoides nuttallii*), California Towhee (*Pipilo crissalis*), Yellow-billed Magpie (*Pica nutallii*) and Anna's Hummingbird (*Calypte anna*) – a historic endemic whose range has changed due to human alterations on the landscape. These six species have been confirmed either as breeders, or are breeding in close proximity to the study sites (Tables 3-7). Other endemic species that may inhabit these sites include Wrentit (*Chamaea fasciata*), California Thrasher (*Toxostoma redivivum*), Lawrence's Goldfinch (*Carduelis lawrencei*), and Allen's Hummingbird (*Selasphorus sasin*).

Breeding Status

We classified breeding status—using Breeding Bird Atlas criteria (Table 1)—for the 86 species recorded across the five Yolo Bypass study sites (Tables 3-7). Forty-three of these species were classified as riparian associate or riparian obligate species (Yolo Audubon Society 2004). This represents 71% of the riparian associate or riparian obligate species known to nest in Yolo County.

TABLE 3. SUTTER BYPASS (SUB) BREEDING BIRD ATLAS CLASSIFICATION.

Observed					
Great Blue Heron	X	6/13/2005	Swainson's Thrush	X	6/20/2005
Great Egret	X	6/13/2005	Western Tanager	X	6/29/2005
Snowy Egret	X	6/13/2005	Tricolored Blackbird	X	7/8/2005
American White Pelican	X	6/29/2005			
Cassin's Vireo	X	7/8/2005			
Pacific-slope Flycatcher	X	6/13/2005			
Possible					
Green Heron	√	6/13/2005	Northern Flicker	X	6/29/2005
Mallard	√	6/13/2005	Bank Swallow	√	7/19/2005
Turkey Vulture	√	6/13/2005	Red-winged Blackbird	√	6/13/2005
Osprey	√	6/29/2005	Western Meadowlark	√	7/8/2005
Red-tailed Hawk	√	7/8/2005	Brewer's Blackbird	√	6/13/2005
American Kestrel	√	6/29/2005	Lesser Goldfinch	√	6/29/2005
Probable					
Wood Duck	P	6/3/2005	Ash-throated Flycatcher	P	6/13/2005

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Red-shouldered Hawk	P	6/13/2005	Western Kingbird	P	6/13/2005
Swainson's Hawk	P	6/13/2005	Cliff Swallow	P	7/19/2005
Ring-necked Pheasant	S	6/29/2005	Barn Swallow	P	7/19/2005
Mourning Dove	P	6/13/2005	American Crow	P	6/13/2005
Great-horned Owl	P	7/8/2005	Bewick's Wren	S	6/29/2005
Black-chinned Hummingbird	A	6/3/2005	Western Bluebird	P	6/29/2005
Anna's Hummingbird	A	6/13/2005	Black-headed Grosbeak	P	6/13/2005
Belted Kingfisher	A	6/29/2005	California towhee	P	6/20/2005
Downy Woodpecker	P	6/13/2005	Brown-headed Cowbird	C	6/3/2005
Black Phoebe	P	6/13/2005	House Finch	P	6/13/2005

Confirmed

Cooper's Hawk	NY	6/29/2005	House Wren	PE	6/3/2005
Wild Turkey	FL	7/8/2005	American Robin	NY	6/13/2005
California Quail	FL	7/8/2005	Common Yellowthroat	FL	6/13/2005
Nuttall's Woodpecker	PE	6/13/2005	Blue Grosbeak	NY	7/19/2005
Western Wood-pewee	PE	6/20/2005	Lazuli Bunting	PE	7/28/2005
Tree Swallow	NY	6/13/2005	Spotted Towhee	PE	6/20/2005
Northern Rough-winged Swallow	NY	6/13/2005	Song Sparrow	NY	6/13/2005
Western Scrub-jay	NY	6/13/2005	Bullock's Oriole	NB	6/13/2005
Oak Titmouse	FL	6/13/2005	American Goldfinch	PE	6/20/2005
Bushtit	FL	6/29/2005			

TABLE 4. FREMONT WEIR (FRW) BREEDING BIRD ATLAS CLASSIFICATION

Observed					
Turkey Vulture	X	7/18/2005	Barn Owl	X	4/24/2005
Double-crested Cormorant	X	4/20/2005	Acorn Woodpecker	X	4/16/2005
Great Blue Heron	X	7/1/2005	Willow Flycatcher	X	6/24/2005
Snowy Egret	X	6/27/2005	Orange-crowned Warbler	X	5/20/2005
Great Egret	X	6/27/2005	Western Tanager	X	6/7/2005
Rock Pigeon	X	4/16/2005	Lesser Goldfinch	X	6/16/2005
Possible					
Green Heron	√	5/20/2005	Black Phoebe	√	7/6/2005
Canada Goose	√	5/20/2005	Ash-throated Flycatcher	√	6/7/2005
Killdeer	√	7/1/2005	Yellow-billed Magpie	√	6/7/2005
Anna's Hummingbird	√	5/19/2005	American Crow	√	5/28/2005
Northern Flicker	√	6/7/2005	Brewers Blackbird	X	7/1/2005
Pacific-slope Flycatcher	X	6/7/2005	American Goldfinch	√	5/28/2005
Probable					
Northern Harrier	P	6/1/2005	Belted Kingfisher	A	6/7/2005
Wood Duck	P	5/20/2005	Western Kingbird	T	6/7/2005
Mallard	P	6/7/2005	Bank Swallow	P	6/7/2005
Common Peafowl	P	5/28/2005	Western Scrub-Jay	P	5/20/2005
Red-shouldered Hawk	P	4/16/2005	White-breasted Nuthatch	P	5/20/2005
Red-tailed Hawk	P	5/20/2005	Western Bluebird	P	5/8/2005
Ring-necked Pheasant	P	5/20/2005	Lazuli Bunting	P	7/29/2005
California Quail	P	5/20/2005	California Towhee	P	5/20/2005
Mourning Dove	P	5/20/2005	Red-winged Blackbird	P	7/18/2005
Great-horned Owl	P	3/29/2005	Brown-headed Cowbird	C	5/9/2005
Black-chinned Hummingbird	A	6/21/2005			
Confirmed					

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White-tailed Kite	NB	3/17/2005	Bewick's Wren	PE	5/19/2005
Cooper's Hawk	ON	5/16/2005	House Wren	PE	5/19/2005
Swainson's Hawk	NB	5/7/2005	American Robin	ON	5/10/2005
Wild Turkey	FL	5/10/2005	European Starling	CF	5/20/2005
Nuttall's Woodpecker	FL	5/10/2005	Common Yellowthroat	CF	7/1/2005
Downy Woodpecker	PE	5/27/2005	Black-headed Grosbeak	PE	6/24/2005
Western Wood-pewee	PE	5/27/2005	Blue Grosbeak	NY	7/1/2005
Common Raven	ON	6/16/2005	Spotted Towhee	PE	5/19/2005
Tree Swallow	NY	5/20/2005	Song Sparrow	PE	5/27/2005
Northern Rough-winged Swallow	PE	7/17/2005	Western Meadowlark	CF	5/10/2005
Oak Titmouse	FY	7/29/2005	Bullock's Oriole	NB	4/24/2005
Bushtit	PE	5/9/2005	House Finch	PE	5/19/2005

TABLE 5. SACRAMENTO WEIR (SAW) BREEDING BIRD ATLAS CLASSIFICATION.

Observed					
Great Egret	X	7/28/2005			
Snowy Egret	X	7/28/2005			
Turkey Vulture	X	7/28/2005			
Possible					
Red-tailed Hawk	√	7/28/2005	White-breasted Nuthatch	√	7/28/2005
Ring-necked Pheasant	√	7/7/2005	Blue Grosbeak	X	7/19/2005
Killdeer	√	7/1/2005	Lazuli Bunting	X	7/28/2005
Northern Flicker	√	7/1/2005	California Towhee	√	7/1/2005
Barn Swallow	√	7/28/2005	Brown-headed Cowbird	X	7/1/2005
American Crow	√	7/1/2005			
Probable					
Red-shouldered Hawk	P	7/28/2005	Oak Titmouse	P	7/1/2005
Swainson's Hawk	P	7/28/2005	Bushtit	P	7/1/2005
Mourning Dove	P	7/1/2005	Bewick's Wren	P	7/1/2005
Black-chinned Hummingbird	A	7/1/2005	House Wren	P	7/1/2005
Belted Kingfisher	P	7/28/2005	Northern Mockingbird	P	7/1/2005
Nuttall's Woodpecker	P	7/1/2005	Common Yellowthroat	P	7/1/2005
Downy Woodpecker	P	7/1/2005	Spotted Towhee	S	7/28/2005
Western Wood-pewee	P	7/28/2005	California Towhee	S	7/28/2005
Black Phoebe	P	7/1/2005	Tricolored Blackbird	P	7/1/2005
Ash-throated Flycatcher	P	7/1/2005	Brewer's Blackbird	P	7/1/2005
Western Kingbird	P	7/1/2005	House Finch	P	7/1/2005
Cliff Swallow	P	7/1/2005	American Goldfinch	P	7/28/2005
Confirmed					
Tree Swallow	FY	7/1/2005			
American Robin	NY	7/1/2005			
Bullock's Oriole	NY	7/1/2005			

TABLE 6. PUTAH CREEK SINKS (PCS) BREEDING BIRD ATLAS CLASSIFICATION

Observed					
Pied-billed Grebe	X	2004	White-tailed Kite	X	5/28/2003
Double-crested Cormorant	X	4/21/2004	Northern Pygmy-Owl	X	5/2/2005

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Great Blue Heron	X	7/2/2003	Northern Rough-winged Swallow	X	7/2/2003
Great Egret	X	6/10/2003	Cliff Swallow	X	7/2/2003
Snowy Egret	X	5/30/2003	Tricolored Blackbird	X	6/29/2005
Green Heron	X	5/28/2003	Western Meadowlark	X	7/2/2003
Turkey Vulture	X	2004	Brewer's Blackbird	X	5/30/2003
Canada Goose	X	2004	Lesser Goldfinch	X	5/10/2004

Possible

Red-shouldered Hawk	√	6/10/2003	Orange-crowned Warbler	X	4/28/2005
American Kestrel	√	5/28/2003	Common Yellowthroat	X	7/2/2005
California Quail	√	5/28/2003	Black-headed Grosbeak	X	4/28/2005
Killdeer	√	4/21/2004	Red-winged Blackbird	√	6/10/2003
Pacific-slope Flycatcher	√	6/15/2005			
Barn Swallow	√	5/28/2003			
Marsh Wren	X	7/2/2003			
American Robin	√	5/31/2005			

Probable

Wood Duck	P	4/25/2005	American Crow	P	5/30/2003
Mallard	P	6/10/2003	Bushtit	P	6/10/2003
Ring-necked Pheasant	S	5/25/2005	Bewick's Wren	P	6/24/2005
Mourning Dove	P	6/10/2003	House Wren	P	6/10/2003
Belted Kingfisher	P	7/31/2005	Lazuli Bunting	P	7/2/2003
Nuttall's Woodpecker	P	6/29/2005	California Towhee	S	4/15/2004
Northern Flicker	S	5/10/2004	Brown-headed Cowbird	P	6/10/2003
Western-wood Pewee	P	5/30/2003	Bullock's Oriole	P	7/2/2003
Western Scrub-Jay	T	6/23/2004	House Finch	P	7/2/2003
Yellow-billed Magpie	P	4/5/2005			

Confirmed

Swainson's Hawk	ON	5/28/2003	Blue Grosbeak	CN	5/28/2003
Red-tailed Hawk	ON	4/8/2004	Spotted Towhee	CN	6/23/2004
Great Horned Owl	ON	4/8/2004	Song Sparrow	FL	7/2/2003
Black Phoebe	ON	4/2/2005	American Goldfinch	NB	4/8/2004
Ash-throated Flycatcher	CF	7/2/2003			
Western Kingbird	ON	5/28/2003			
Tree Swallow	ON	5/28/2003			
House Wren	CF	7/1/2004			
European Starling	ON	7/2/2003			

TABLE 7. LOS RIOS FARMS (LRF) BREEDING BIRD ATLAS CLASSIFICATION

Observed					
Pied-billed Grebe	X	2004	Osprey	X	2004
Double-crested Cormorant	X	6/27/2003	Northern Harrier	X	6/27/2003
Great Blue Heron	X	6/27/2003	Rock Pigeon	X	6/27/2003
Great Egret	X	6/27/2003	Barn Owl	X	6/27/2005
Snowy Egret	X	6/27/2003	Willow Flycatcher	X	6/24/2005
Cattle Egret	X	5/4/2005	Northern Rough-winged Swallow	X	6/9/2003
Green Heron	X	6/27/2003	Cliff Swallow	X	6/27/2003
Turkey Vulture	X	6/9/2003	Barn Swallow	X	6/27/2003
Canada Goose	X	5/2/2004	Tricolored Blackbird	X	5/23/2005
Cinnamon Teal	X	5/2/2004			

Possible

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Cooper's Hawk	√	5/2/2005	Red-winged Blackbird	√	6/9/2003
Pacific-slope Flycatcher	X	6/14/2005	Western Meadowlark	√	5/2/2004
Marsh Wren	√	5/24/2005	Brewer's Blackbird	√	5/30/2003
Orange Crowned Warbler	√	6/22/2005			
Black-headed Grosbeak	√	6/9/2004			
Probable					
Gadwall	P	5/28/2003	American Robin	S	7/12/2005
Red-shouldered Hawk	P	5/24/2005	Common Yellowthroat	P/T	6/24/2005
Ring-necked Pheasant	S	6/9/2003	Lazuli Bunting	P	6/27/2003
American Coot	P	5/28/2003	California Towhee	P	6/22/2005
Killdeer	P	5/28/2003	House Finch	P	5/31/2005
Black-chinned Hummingbird	S	5/31/2005	Lesser Goldfinch	P	6/27/2003
Anna's Hummingbird	P	6/24/2005			
Northern Flicker	P	6/24/2005			
Western Wood-pewee	P	5/31/2005			
Oak Titmouse	P	7/12/2005			
Confirmed					
Black-crowned Night Heron	ON	6/27/2003	Tree Swallow	ON	6/9/2003
Wood Duck	FL	5/28/2003	Western Scrub-Jay	PE	5/31/2005
Mallard	FL	5/30/2003	Yellow-billed Magpie	CN	5/28/2003
White-tailed Kite	NB	6/27/2005	American Crow	ON	5/30/2003
Swainson's Hawk	CF	6/9/2003	Bushtit	ON	5/2/2004
Red-tailed Hawk	ON	3/23/2004	White-breasted Nuthatch	CF	6/27/2003
Wild Turkey	FL	7/26/2005	Bewick's Wren	PE	5/12/2005
California Quail	FL	6/10/2005	House Wren	CF	6/27/2003
Common Moorhen	FL	6/10/2005	European Starling	CN	4/21/2004
Mourning Dove	ON	5/31/2005	Blue Grosbeak	PE	6/10/2005
Great Horned Owl	FL	6/27/2003	Spotted Towhee	FY	6/27/2003
Nuttall's Woodpecker	NY	6/27/2003	Song Sparrow	NY	6/27/2003
Downy Woodpecker	ON	5/23/2003	Brown-headed Cowbird	NY	7/20/2005
Black Phoebe	FY	5/2/2005	Bullock's Oriole	PE	5/31/2005
Ash-throated Flycatcher	CF	6/27/2003	American Goldfinch	PE	7/12/2005
Western Kingbird	NB	5/31/2005			

Constant Effort Mist Netting

Capture Summary

We captured 557 individuals of 42 species during 28 days of mist netting (1526 net hours of operation) (Table 8). The most abundant breeding species captured (in descending order) were: House Wren (*Troglodytes aedon*), Spotted Towhee (*Pipilo maculatus*), Nuttall's Woodpecker (*Picoides nuttallii*), Bushtit (*Psaltriparus minimus*),



Brent Campos after extracting 11 birds from mist nets.

Song Sparrow (*Melospiza melodia*), Black Phoebe (*Sayornis nigricans*), Brown-headed Cowbird (*Molothrus ater*), Bewick's Wren (*Thryomanes bewickii*) and Ash-throated Flycatcher

(*Myiarchus cinerescens*). The most frequently captured migratory species (in descending order) were: Swainson's Thrush (*Catharus ustulatus*), Wilson's Warbler (*Wilsonia pusilla*), Orange-crowned Warbler (*Vermivora celata*), and Pacific-slope Flycatcher (*Empidonax difficilis*). Captures of migrants dropped dramatically after mid-May (Figure 9).

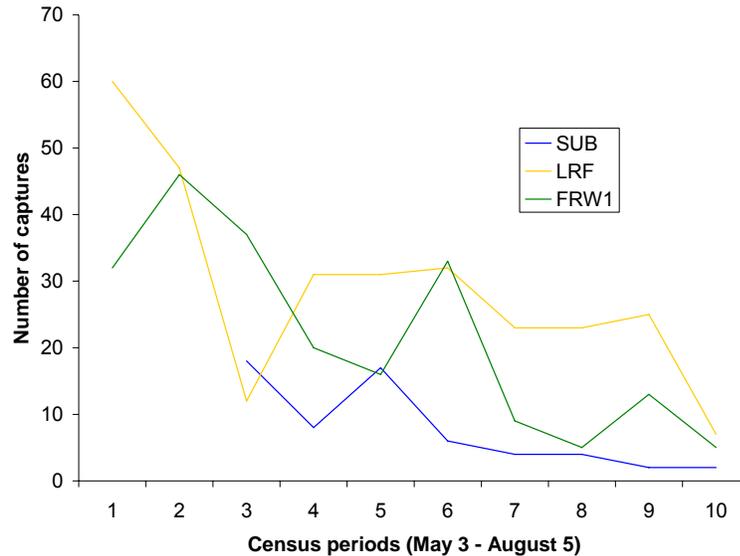


Figure 9. Number of captures by 10-day census period at Sutter Bypass (SUB), Los Rios Farms (LRF) and Fremont Weir (FRW) May 3 – August 5, 2005.

Species Richness and Species Diversity

Species richness and diversity indices were calculated for each site, using mist net data. These indices will also be calculated from transect and point count data after these datasets are more complete. Species diversity was calculated using the Shannon-Weiner Diversity Index (Krebs 1998) which incorporates species richness, and the evenness with which individuals are partitioned among species. Species richness and diversity was greatest at LRF, followed by FRW and SUB (Table 8). However, accuracy of these indices depends on sampling effort. Because of difficulties in accessing sites equally, total mist-netting hours were greatest at LRF (555 hours), FRW (539 hours) and SUB (433 hours). Therefore, some of the differences in species diversity and richness probably reflect differences in sampling effort. Additional sampling in 2006 and 2007 will allow more equitable comparisons between Bypass sites and other sites throughout the Central Valley. These data should also be interpreted with caution

because of differences in capture probabilities due to inherent variation in vegetative structure and habitat type at different net locations.

TABLE 8. SUMMARY OF CONSTANT EFFORT MIST NETTING DURING THE BREEDING SEASON AT YOLO BYPASS SITES (MAY 3-AUGUST 5, 2005).

Station	Total birds captured	Birds/100 net hours	Number new birds banded	Number birds captured unbanded	Number individuals recaptured	Species richness	Species diversity ^a
Los Rios Farms	286	51.53	230	16	40	34	4.026
Fremont Weir	208	38.61	177	10	21	26	3.583
Sutter Bypass	63	14.56	54	5	4	14	2.659
All Sites	557	36.50	461	31	65	42	4.346

^a Shannon-Weiner Diversity Index (Krebs 1998)

Estimates of Productivity

Productivity (the production of young) can be estimated using constant effort mist netting data (Nur et al. 1999) as the number of young produced, or as an index of young to adult birds. Productivity was calculated as the ratio of Hatching Year (HY) birds (birds in their first calendar year of life) to After Hatching Year (AHY) birds (birds in at least their second calendar year of life). This ratio was utilized rather than simply comparing the total production of Hatch Year (HY) birds because of potential variability in the size of the breeding population at each site. For example, differences in the number of HY birds caught between two sites may simply reflect differences in the size of the breeding population. To standardize productivity estimates, AHY's are therefore incorporated into the index.

Demographic parameters, such as productivity estimates, are important because they can identify potential causes of population declines. Habitat characteristics that may be linked or associated with these declines can then be identified (Nur et al. 1999). Determining whether a productivity estimate for a species is "high", "low" or "stable" depends largely on the annual survivorship of a breeding population (Rosenberg et al. 2000). A balance must exist between survivorship and productivity in order for a population to remain stable; if productivity or survivorship dips below this threshold, the population may be considered a "sink" rather than a "source" (Pulliam 1988, Rosenberg et al. 2000).

House Wrens and Spotted Towhees were the most frequently-captured breeding species at each site (Tables 9-11). While interpretation of avian productivity based on only one year of mist net data should be made with caution, preliminary results can help guide future monitoring efforts. House Wren productivity was 1.11 (20 HY/18 AHY), 0.49 (16 HY /33 AHY) and 0.50 (8

HY/16 AHY) at FRW, LRF and SUB, respectively yielding an overall index of 0.66 (44 HY/67 AHY). Annual survivorship for House Wrens in the western United States has been estimated from previous mist net studies at 0.388 (n = 941 individuals) (Michel et al. 2005). Productivity estimates for House Wrens were moderate to high for the 2005 nesting season.

Productivity indices for Spotted Towhees were 0.21 (7 HY/34 AHY), 0.33 (5 HY/ 15 AHY) and 0.00 (0 HY/7 AHY) for FRW, LRF, and SUB, respectively yielding an overall index of 0.21 (12 HY/56 AHY). Annual survivorship for Spotted Towhees has been estimated from previous mist net studies as 0.519 ± 0.047 SE and 0.486 ± 0.043 SE (Michel et al. 2005). Thus, it appears Spotted Towhee populations may be experiencing productivity problems. While interpretation of avian productivity based on only one year of mist net data should be made with caution, preliminary results suggest Spotted Towhee populations may be experiencing low productivity in Yolo Bypass habitats. We will continue to monitor Spotted Towhee populations closely in relation to biotic (e.g. nest predation) and/or abiotic (e.g. flooding) factors known to lead to low productivity.

TABLE 9. SUMMARY OF CONSTANT EFFORT MIST NETTING DURING THE BREEDING SEASON AT FREMONT WEIR IN 2005. AGE CLASSES INCLUDE AFTER HATCH YEAR (AHY) AND HATCH YEAR (HY) BIRDS.

	Total birds captured	Number birds captured unbanded	Number new birds banded	Number individuals recaptured	AHY	HY
Anna's Hummingbird	2	2				
Nuttall's Woodpecker	13		10	3	6	4
Downy Woodpecker	2		2		1	1
Western Wood-Pewee	1		1		1	
Pacific-slope Flycatcher	3		3		3	
Ash-throated Flycatcher	1		1			1
Western Kingbird	1		1		1	
Warbling Vireo	3	1	2		2	
Northern Rough-winged Swallow	3		3		2	1
Oak Titmouse	3		3		2	3
Bushtit	11		11		4	7
Bewick's Wren	10	1	8	1	7	1
House Wren	42	2	38	2	18	20
Swainson's Thrush	19		18	1	18	
American Robin	1		1		1	
Townsend's Warbler	2		2		2	
MacGillivray's Warbler	1		1		1	
Wilson's Warbler	7		7		7	
Spotted Towhee	53	1	41	11	34	7
Song Sparrow	9	1	7	1	5	
Black-headed Grosbeak	1		1		1	

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Brown-headed Cowbird	11		9	2	9
Bullock's Oriole	3	1	2		2
House Finch	4		4		4
Western Flycatcher	1		1		1
Unknown Hummingbird	1	1			
Total	208	10	177	21	132

TABLE 10. SUMMARY OF CONSTANT EFFORT MIST NETTING DURING THE BREEDING SEASON AT SUTTER BYPASS IN 2005. AGE CLASSES INCLUDE AFTER HATCH YEAR (AHY) AND HATCH YEAR (HY) BIRDS.

	Total birds captured	Number birds captured unbanded	Number new birds banded	Number individuals recaptured	AHY	HY
Black-chinned Hummingbird	3	3				
Nuttall's Woodpecker	4		4		2	2
Western Wood-Pewee	1		1		1	
Cassin's Vireo	1		1		1	
Oak Titmouse	2		2		1	1
Bewick's Wren	7		6	1	4	2
House Wren	26	1	24	1	16	8
Common Yellowthroat	1	1				
Spotted Towhee	9		7	2	7	
Song Sparrow	2		2		1	1
Lazuli Bunting	1		1		1	
Brown-headed Cowbird	4		4		4	
American Goldfinch	2		2			
Total	63	5	54	4	38	14



Mary Chambers checking breeding status of Tree Swallow. Photo Courtesy of Ryan Phillips.



Ronald Melcer, Jr. extracting a bird from a mist net.

TABLE 11. SUMMARY OF CONSTANT EFFORT MIST NETTING DURING THE BREEDING SEASON AT LOS RIOS FARMS IN 2005. AGE CLASSES INCLUDE AFTER HATCH YEAR (AHY) AND HATCH YEAR (HY) BIRDS.

	Total birds captured	Number birds captured unbanded	Number new birds banded	Number individuals recaptured	AHY	HY
Mourning Dove	1		1		1	
Black-chinned Hummingbird	2	2				
Anna's Hummingbird	2	2				
Rufous Hummingbird	1	1				
Nuttall's Woodpecker	15	1	12	2	5	7
Downy Woodpecker	3	1	2		2	
Pacific-slope Flycatcher	7		7		3	4
Black Phoebe	21	1	19	1	8	11
Ash-throated Flycatcher	12		7	5	7	
Western Kingbird	1		1		1	
Warbling Vireo	1		1		1	
Western Scrub-Jay	3	1	2		2	
Tree Swallow	1		1		1	
Bushtit	21	2	15	4	9	5
Bewick's Wren	2		2		1	1
House Wren	71	3	51	17	33	16
Swainson's Thrush	16		16		16	
American Robin	1		1		1	
European Starling	2		2		1	1
Orange-crowned Warbler	14		12	2	2	10
Yellow Warbler	1		1		1	
Common Yellowthroat	2		2		2	
Wilson's Warbler	23		21	2	21	
Western Tanager	3		3		2	1
Spotted Towhee	27	2	20	5	15	5
Song Sparrow	10		9	1	7	2
Blue Grosbeak	2		2		2	
Lazuli Bunting	1		1		1	
Red-winged Blackbird	1		1		1	
Brown-headed Cowbird	4		3	1	3	
Bullock's Oriole	3		3		2	1
House Finch	1		1		1	
American Goldfinch	5		5		4	
Western Flycatcher	6		6		6	
Total	286	16	230	40	162	64

Vegetation

Sixteen tree species and 10 shrub species were recorded in the vegetation surveys. A more complete analysis of vegetative structure and composition will be presented in the 2006 report. The habitat characterizations presented below are based on visual observations and data gathered using the Habitat Structure Assessment (HSA) module of the MAPS program (Nott et al. 2003).

Sutter Bypass (SUB)

This site was characterized by a narrow corridor of bottomland riparian habitat lying between the agricultural fields of the Sutter Bypass and the river channel (Fig. 3). The average width of the corridor was 180 meters. Average tree height was 25 meters. Percent cover of the overstory, midstory, and understory was 95%, 45%, and 75%, respectively. Tree species included: Box Elder (*Acer negundo* var. *californicum*), Northern California Black Walnut (*Juglans californica* var. *hindsii*)—a MSCS “r” and CNPS 1B/SC species, Oregon Ash (*Fraxinus latifolia*), Goodding’s Willow (*Salix gooddingii*), Fremont Cottonwood (*Populus fremontii* ssp. *fremontii*), Valley Oak (*Quercus lobata*), Osage Orange (*Maclura pomifera*) and Black Locust (*Robinia pseudoacacia*). Shrub species included: Himalayan Blackberry (*Rubus discolor*), California Blackberry (*Rubus ursinus*), Poison Oak (*Toxicodendron diversilobum*), California Rose (*Rosa californica*), Blue Elderberry (*Sambucus mexicana*), and Giant Reed (*Arundo donax*). 85% of the ground was covered with living plant matter, with leaves, twigs, branches, logs and recent tree fall comprising the remaining 15% of non-living vegetative cover. Non-vegetative ground cover was composed of dirt, sand, and water. More than fifteen snags stood within the site. The site was well drained with seasonally-standing water; slope was flat. The disturbance regime at the site was characterized by seasonal flooding due to precipitation and reservoir releases. Sunflowers composed the adjacent agricultural summer crop in 2005; fields were left fallow over the winter season. Dam releases and snowmelt led to flooding of the surrounding agricultural lands within the levees, as well as the riparian habitat. The agricultural fields were irrigated using a tractor-water truck throughout the summer of 2005.

Fremont Weir (FRW)

The tracts above the weir were characterized by bottomland riparian habitat with a closed canopy and an average tree height of 22m (Fig. 4). Percent cover of overstory, midstory,

and understory was 95%, 70%, and 40%, respectively. Tree species included: Box Elder, Northern California Black Walnut, Oregon Ash, Goodding's Willow, Fremont Cottonwood, Valley Oak, Osage Orange, California Sycamore (*Platanus racemosa*), Common Fig (*Ficus carica*), Sandbar Willow (*Salix exigua*) and Red Willow (*Salix laevigata*). Shrub species included: Himalayan Blackberry, California Blackberry, California Rose, Blue Elderberry, Poison Oak,



Buttonbush (*Cephalanthus occidentalis* var. *californicus*), and California Grape (*Vitis californica*). Ninety-five percent of the ground was covered with living plant matter, with leaves, twigs, branches, logs and recent tree fall comprising the remaining 5% of organic nonliving groundcover. Non-vegetative ground cover was composed of dirt, sand, and water. Fewer than five snags stood within the site. The site was poorly drained with seasonally-standing water; slope was flat. The disturbance regime at the site was characterized by seasonal flooding due to precipitation and reservoir releases. (Surveys for the linear habitat fragment south of the weir will be completed in 2006).

Sacramento Weir (SAW)

The site is characterized by a narrow corridor of bottomland riparian habitat running east-west along the north edge of the floodway (Fig. 5). The corridor is bordered on the north by a levee and agricultural fields, and to the south by the weedy herbaceous cover on the open land of the Sacramento Bypass. There is a toe drain which holds water year-round in the center of the riparian corridor. The average width of the corridor is 100 meters. Average tree height was 25 meters. Percent cover of the overstory, midstory, and understory was 80%, 90%, and 95%, respectively. Tree species included: Box Elder, Northern California Black Walnut, Oregon Ash, Goodding's Willow, Fremont Cottonwood, Valley Oak, and Black Locust. Shrub species included: Himalayan Blackberry, California Blackberry, Buttonbush, and Poison Oak. 40% of the ground was covered with living plant matter, with leaves, twigs,

branches, logs and recent tree fall comprising the remaining 60% of organic nonliving groundcover. Non-vegetative ground cover was composed of dirt, sand, and water. Between five and-fifteen snags stood within the site. The site was poorly-drained, with permanent standing water; slope was flat. The disturbance regime at the site was characterized by seasonal flooding due to precipitation and reservoir releases. Tomatoes comprised the summer crop in the agricultural fields to the north; they were actively irrigated throughout the summer of 2005. The fields were left fallow over the winter season, but were not flooded due to the presence of a levee.

Putah Creek Sinks (PCS)

The site is characterized by a narrow corridor of bottomland riparian habitat lying between agricultural fields (Fig. 6). The average width of the corridor was 70 meters. Average tree height at the site was 24 meters. Percent cover of the overstory, midstory, and understory was 30%, 40%, and 90%, respectively. Tree species included: Box Elder, Northern California Black Walnut, Oregon Ash, Sandbar Willow, Goodding's Willow, Fremont Cottonwood, Red Willow, Arroyo Willow (*Salix lasiolepis*) and Blue Gum (*Eucalyptus globulus*). Shrub species included: Himalayan Blackberry, California Rose, and Giant Reed. 60% of the ground was covered with living vegetative matter, with leaves, twigs, branches, logs and recent tree fall comprising the remaining 40% of organic nonliving groundcover. Non-vegetative ground cover consisted of dirt, sand, manmade structures and water. Between five and fifteen snags stood within the site. The site was well-drained, with seasonally-standing water; slope was flat. The disturbance regime at the site was characterized by seasonal flooding due to precipitation and reservoir releases. Sunflower, safflower and tomatoes comprised the summer crop rotation at the site. The agricultural fields are actively irrigated throughout the summer. One permanent pump station lies within the riparian corridor and is operated throughout the summer. Fields were left fallow over the winter season, and dam releases led to flooding of the surrounding agricultural lands and riparian habitat within the levees.

Los Rios Farms (LRF)

The site is characterized by a narrow corridor of bottomland riparian habitat lying between agricultural fields (Fig. 7). The average width of the corridor was 100 meters. Average tree height at the site was 22 meters. Percent cover of the overstory, midstory, and understory was 30%, 40%, and 90%, respectively. Tree species included: Box Elder, Northern

California Black Walnut, Oregon Ash, Sandbar Willow, Goodding's Willow, Fremont Cottonwood, Arroyo Willow, Red Willow, and Valley Oak. Shrub species included: Himalayan Blackberry, Giant Reed, and Tamarisk (*Tamarix parviflora x ramosissima*). 60% of the ground was covered with living vegetative matter, with leaves, twigs, branches, logs and recent tree fall comprising the remaining 40% of organic nonliving groundcover. Non-vegetative ground cover was comprised of dirt, sand, manmade structures and water. Between five and fifteen snags stood within the site. Drainage was poor, with seasonally-standing water; slope was flat. The disturbance regime at the site was characterized by seasonal flooding. Sunflower, safflower and tomatoes comprised the summer crop rotation at the site. The fields were actively irrigated throughout the summer. Two pump stations, one permanent, and one mobile, were within the riparian corridor and operated throughout the summer. Fields were left fallow over the winter season, and reservoir releases led to flooding of the surrounding agricultural fields and riparian habitat within the levees.

Mammal Grid Vegetation Assessment

Vegetation in the small mammal trapping grids was assessed by DWR biologists Patty Quickert and Jean Witzman. The riparian grid was dominated by mature riparian trees, primarily Valley Oak and Box Elder (Table 12). Other common plants included shrubs such as Poison Oak and California Grape, and herbaceous plants such as Valley Sedge (*Carex barbarae*) and Stickseed (*Torilis arvensis*). Most of the trees were mature and provided very close to 100% cover over the grid. Shrubs and vines were numerous, but not so dense as to make it impossible to traverse the grid. A narrow dirt road was present in the middle of the grid, and the herbaceous vegetation was markedly different on each side of the road. Ground cover to the west of the road was represented primarily by Stickseed, though this was dead-and-down at the time of the summer survey, and mostly decomposed during the fall survey. Much of the area east of the road had heavy cover of Valley Sedge, which was green and dense during both surveys. The ruderal grid had no overstory (due to frequent mowing) and was dominated by Perennial Pepperweed (*Lepidium latifolium*) and Bird's Foot Trefoil (*Lotus corniculatus*) (Table 13). The southeast corner of the grid was sparsely vegetated and included a small shallow ponded area.

Tables 12 and 13 include qualitative frequency information based on visual estimates. Plants listed as "common" occurred throughout the grid and represented at least 10% of the vegetative cover in the grid. Those species listed as "rare" were represented by just a few individual plants, and each made up much less than 1% of the plant cover in the grid. Those

species listed as “infrequent” had values intermediate between the “common” and “rare” plant species in their frequency and cover.

TABLE 12. PLANT SPECIES PRESENT IN RIPARIAN FOREST GRID.

Common name	Scientific name	Frequency
Trees		
Valley Oak	<i>Quercus lobata</i>	Common
Box Elder	<i>Acer negundo</i>	Common
Oregon Ash	<i>Fraxinus latifolia</i>	Common
Sycamore	<i>Platanus racemosa</i>	Common
Black Walnut	<i>Juglans californica</i>	Infrequent
Fig	<i>Ficus carica</i>	Rare (single small tree)
Buttonwillow	<i>Cephalanthus occidentalis</i>	Rare (single small tree)
Shrubs		
Poison Oak	<i>Toxicodendron diversilobum</i>	Common
California Wild Grape	<i>Vitis californica</i>	Common
Virgin's Bower	<i>Clematis ligusticifolia</i>	Infrequent
Honeysuckle	<i>Lonicera hispidula</i>	Rare
Himalayan Blackberry	<i>Rubus discolor</i>	Rare (at edge of grid)
California Blackberry	<i>Rubus ursinus</i>	Rare (at edge of grid)
California Rose	<i>Rosa californica</i>	Rare
Herbaceous		
Valley (Santa Barbara) Sedge	<i>Carex barbarae</i>	Common
Stickseed (Field Hedge Parsley)	<i>Torilis arvensis</i>	Common
Nut Sedge	<i>Cyperus sp.</i>	Infrequent
Italian Thistle	<i>Carduus pynoccephalus</i>	Inrequent
Nightshade	<i>Solanum sp.</i>	Rare
Dock	<i>Rumex sp.</i>	Rare
Perennial Pepperweed	<i>Lepidium latifolium</i>	Rare

TABLE 13. PLANT SPECIES PRESENT IN OPEN/RUDERAL GRASSLAND GRID.

Common name	Scientific name	Frequency
Trees		
Box Elder	<i>Acer negundo</i>	Rare (a few seedlings)
Valley Oak	<i>Quercus lobata</i>	Rare (a few seedlings)
Shrubs		
Poison Oak	<i>Toxicodendron diversilobum</i>	Rare (a few seedlings)
California Rose	<i>Rosa californica</i>	Rare (a few seedlings)
Herbaceous		
Perennial Pepperweed	<i>Lepidium latifolium</i>	Common
Birds Foot Trefoil	<i>Lotus corniculatus</i>	Common
Nut Sedge	<i>Cyperus sp</i>	Infrequent
Bindweed	<i>Convolvulus arvensis</i>	Infrequent
Bird's Nest	<i>Ammi visnaga</i>	Infrequent
Pennyroyal	<i>Mentha pulegium</i>	Infrequent
Chicory	<i>Chicorium intubus</i>	Infrequent
Mugwort	<i>Artemisia douglasiana</i>	Infrequent
Rabbit's Foot Grass	<i>Polypogon monspeliensis</i>	Infrequent
Goldenrod	<i>Euthamia occidentalis</i>	Infrequent
Corn Chamomile	<i>Anthemis arvensis</i>	Infrequent
Lippia	<i>Phyla nodiflora</i>	Infrequent
Fluellin	<i>Kickxia elantine (or spuria)</i>	Infrequent
Star Thistle	<i>Centaurea solstitialis</i>	Rare
Cocklebur	<i>Xanthium strumarium</i>	Infrequent
Creeping Spikerush	<i>Eliocharis macrostachya</i>	Rare
Centaury	<i>Centaureum muhlenbergii</i>	Rare
Valley (Santa Barbara) Sedge	<i>Carex barbarae</i>	Rare
Evening Primrose	<i>Oenothera sp.</i>	Rare
Tar Weed	<i>Hemizonia sp</i>	Rare
Gumplant	<i>Grindelia</i>	Rare
Lovegrass Sedge	<i>Cyperus eragrostis</i>	Rare

Butterflies

We recorded 783 individuals of 17 species between August 12 and October 16, 2005 (Table 14, Figure 10). This represents 32% of the total number of species (53) expected to occur in riparian habitats of the Central Valley (Arthur Shapiro, personal communication; Lynn Kimsey, personal communication). We will undoubtedly pick up additional species with greater sampling effort. For example, since our surveys did not begin until May, we missed a very large irruptive migration of Painted Lady butterflies that occurred in early spring.

TABLE 14. RESULTS OF YOLO BYPASS TRANSECT SURVEYS FOR BUTTERFLIES, AUG-OCT 2005. SPECIES ARRANGED IN ORDER OF ABUNDANCE. SITE CODES: SUB=SUTTER BYPASS, FW1=FREMONT WEIR NORTH OF WEIR, FW2=FREMONT WEIR SOUTH OF WEIR, SAW=SACRAMENTO WEIR, PCS=PUTAH CREEK SINKS, LRF=LOS RIOS FARMS.

Species	Scientific Name	Species Code	# of individuals per site						
			SUB	FW1	FW2	SAW	PCS	LRF	TOTAL
Cabbage Butterfly	<i>Pieris rapae</i>	CABU	4	234	69	21	90	249	667
Common Buckeye	<i>Junonia coenia</i>	COBU	4	12	34			2	52
Orange Sulfur	<i>Colias eurytheme</i>	ORSU	1	1	1	13		8	24
Fiery Skipper	<i>Hylephila phyleus</i>	FISK		2		4		1	7
West Coast Lady	<i>Vanessa annabella</i>	WCLA		2		4			6
Mournful Dusky-wing	<i>Erynnis tristis</i>	MODU		4					4
Common Checkered Skipper	<i>Pyrgus communis</i>	COCS					1	3	4
Purplish Copper	<i>Lycaena helloides</i>	PUCO		2	1				3
Monarch	<i>Danaus plexippus</i>	MONA				2		1	3
Roadside Skipper	<i>Amblyscirtes vialis</i>	ROSK				3			3
Rural Skipper	<i>Ochlodes agricola</i>	RUSK				3			3
Pygmy Blue	<i>Brephidium exile</i>	PYBL			2				2
Acmon Blue	<i>Plebeius acmon</i>	ACBL			1				1
Painted Lady	<i>Vanessa cardui</i>	PALA					1		1
Eastern Tailed Blue	<i>Everes comyntas</i>	ETBL				1			1
Northern Checkerspot	<i>Chlosyne palla</i>	NOCH				1			1
Gray Hairstreak	<i>Strymon melinus</i>	GRHA		1					1
TOTAL			9	258	108	52	92	264	783



Monarch caterpillar on milkweed at Los Rios Farms.

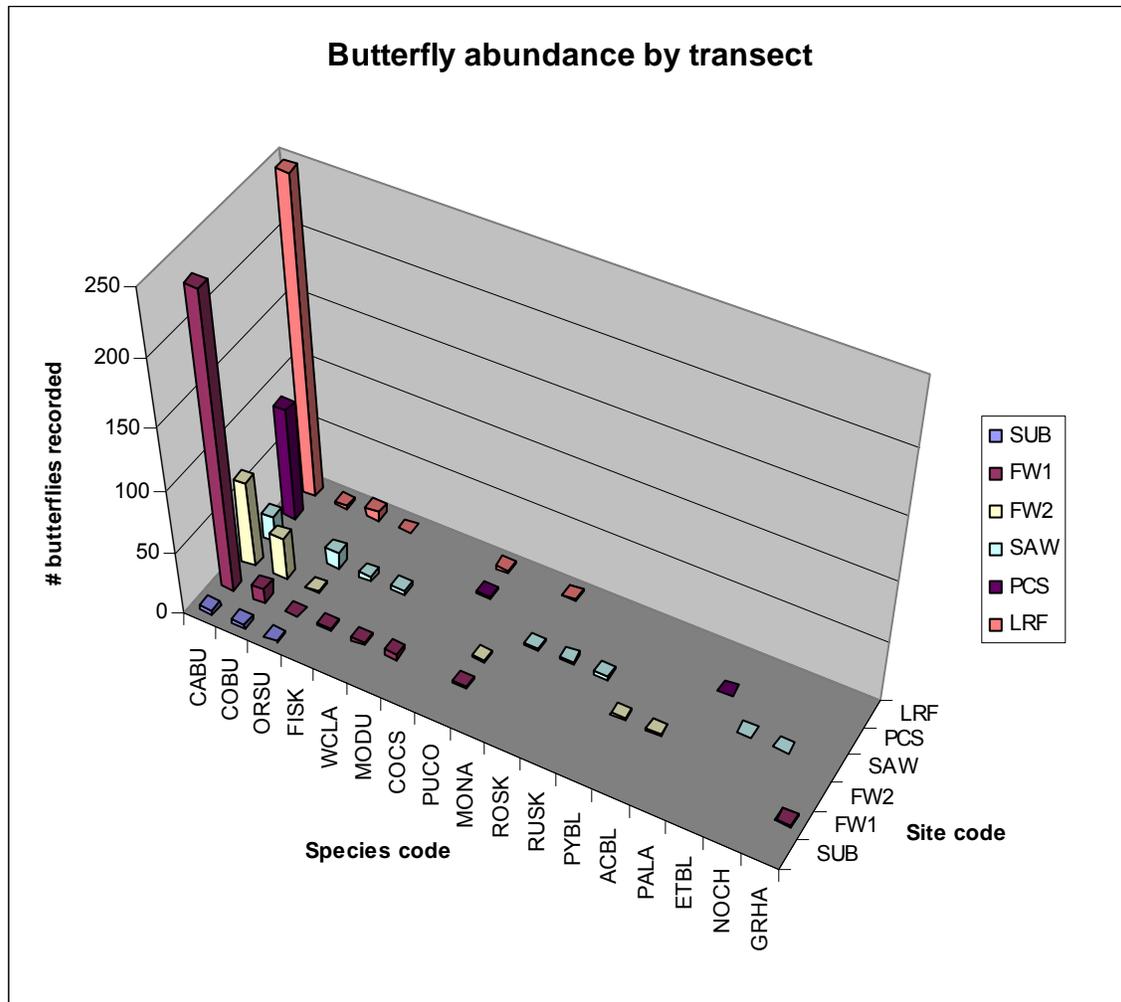


Figure 10. Graph of butterfly abundance from Yolo Bypass transect counts, Aug-Oct 2005 (See Table 14 for explanation of species and site codes).

The most abundant species was the Cabbage Butterfly (CABU), especially abundant at the north Fremont Weir transect (FW1) and at Los Rios Farms (LRF). This species was accidentally introduced into North America and has since spread to all parts of the country. It is one of the principal pests of cabbage and other cole crops. These plants contain mustard oils which make the larvae distasteful to birds (Scott 1986). Common Buckeye (COBU) and Orange Sulfur (ORSU) were also relatively abundant. Buckeyes are common across California and are often found in old neglected fields and weedy pastures. Orange Sulfurs are major pests of cultivated alfalfa, since they find it as suitable a larval food plant as the native plants on which they originally fed (Garth and Tilden 1986).

Of the species identified as rare, declining, or sensitive by UC Davis lepidopterist Arthur Shapiro—Lorquin’s Admiral (*Liminitis lorquini*), Mourning Cloak (*Nymphalis antiopa*), Willow

Hairstreak (*Satyrrium sylvinum*), Large Marble (*Euchloe ausonides*), Purplish Copper (*Lycaena helloides*), Silvery Blue (*Glaucopsyche lygdamus*), and Umber Skipper (*Paratrytone melane*)—only Purplish Coppers were recorded. This species is common in fields, yards, vacant lots, and marshy areas at low elevations. They consume many members of the buckwheat family.

The Sacramento Weir site had the highest butterfly species richness, with nine different species recorded. Four species (Roadside Skipper, Rural Skipper, Eastern Tailed Blue, and Northern Checkerspot) were recorded only along the SAW transect. Eight species were recorded at FRW, two of which (Mournful Duskywing, Gray Hairstreak) were recorded only at that site.

Small mammal trapping

Five mammal species were detected through small mammal trapping efforts at FRW (Table 15). Two of the five species captured were non-native species (House Mouse (*Mus musculus*) and Black Rat (*Rattus rattus*)). The number of individuals captured for both non-native species was greater than the number of individuals captured for each native species. House Mouse captures were higher in the ruderal grid, while Black Rat captures were higher in the riparian grid, consistent with the species' association with wooded habitats and its habit of roosting in trees during the day. Deer Mice (*Peromyscus maniculatus*) were detected exclusively in the ruderal grid, while Western Harvest Mice (*Reithrodontomys megalotis*) were detected solely in the riparian grid. Western Harvest Mice captures were greater in the fall, but small sample sizes precluded determination of differences due to random chance. Deer Mice and California Voles (*Microtus californicus*) were captured in open areas or in areas with 100% herbaceous cover, especially less tangled vegetation such as Perennial Pepperweed and Western Goldenrod. All of the Western Harvest Mice were captured in or near Valley Sedge. Black Rats were captured throughout the grid, though not in areas dominated by Stickseed or Valley Sedge. Nearly all House Mice were captured near the road at the edges of the Stickseed areas.



Western Gray Squirrel in Wood Duck box at Los Rios Farms.

Incidental mammal observations were recorded by MWFB field biologists. These observations are summarized in Table 16. The most notable observation was a Bobcat (*Lynx rufus*) walking between forest tracks at Fremont Weir in July 27, 2005. The Bobcat is a shy and secretive animal that is rarely encountered on the Valley floor (Andrew Engilis, Jr. personal observation).

TABLE 15. MINIMUM KNOWN NUMBERS OF SMALL MAMMAL TRAPPED AT FREMONT WEIR FROM 6/29/05-7/2/05 (SUMMER) AND 10/24/05-10/27/05 (FALL).

Species captured		Riparian		Ruderal	
Common name	Scientific name	Summer	Fall	Summer	Fall
House Mouse	<i>Mus musculus</i>	4	6	84	n/a
Black Rat	<i>Rattus rattus</i>	21	20	3	n/a
Deer Mouse	<i>Peromyscus maniculatus</i>	0	0	12	n/a
California Vole	<i>Microtus californicus</i>	4	1	4	n/a
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>	3	10	0	n/a

TABLE 16. SUMMARY OF INCIDENTAL MAMMAL OBSERVATIONS IN YOLO AND SUTTER BYPASS.

Species		Yolo Bypass Site Codes				
		SUB	FRW	SAW	PCS	LRF
Virginia Opossum	<i>Didelphis virginiana</i>				x	x
Brazilian Free-tailed Bat	<i>Tadarida brasiliensis</i>				x	x
Coyote	<i>Canis latrans</i>	X			x	x
River Otter	<i>Lutra canadensis</i>				x	x
Striped Skunk	<i>Mephitis mephitis</i>	X	x	x	x	x
Raccoon	<i>Procyon lotor</i>				x	x
Bobcat	<i>Lynx rufus</i>		x			
Domestic House Cat	<i>Felis silvestris</i>		x			
Black-tailed Deer	<i>Odocoileus hemionus</i>	X	x		x	x
California Ground Squirrel	<i>Spermophilus beecheyi</i>					
Western Grey Squirrel	<i>Sciurus griseus</i>	X	x	x	x	x
Beaver	<i>Castor canadensis</i>		x	x	x	x
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>		x			
Deer Mouse	<i>Peromyscus maniculatus</i>		x			
California Vole	<i>Microtus californicus</i>		x		x	x
Muskrat	<i>Ondatra zibethica</i>		x	x		
Black Rat	<i>Rattus rattus</i>		x			
House Mouse	<i>Mus musculus</i>		x			
Blacktailed Jackrabbit	<i>Lepus californicus</i>	X	x		x	x
Audubon's Cottontail	<i>Sylvilagus audubonii</i>	X	x			

FUTURE DIRECTIONS

The results presented in this report are based on less than one year of data collection and should, therefore, be viewed as preliminary and subject to change with continued sampling. Future monitoring efforts over the next two field seasons will provide a more comprehensive data set that will enable us to better address the objectives and goals outlined above.

The late initiation of surveys at a portion of our sites during the 2005 field season prevented the standardization of our survey efforts. To help ensure standardization across surveys, future monitoring efforts will seek to:

- Standardize survey initiation across all sites according to protocol dates. It should be noted that weather and related flooding events will add an element of uncertainty to our field schedule, since some sites are inaccessible in high water.
- Add point count surveys at all Yolo and Sutter Bypass sites
- Standardize Breeding Bird Atlas efforts across all sites

Through our monitoring efforts we have gained a better understanding of sites and survey methods, and are thus making adjustments to our monitoring efforts. These adjustments will include:

- **Reviewing the utility of the SUB mist net station.** Bird capture rates were significantly lower at the SUB station when compared to the other stations. We suspect that flooding due to a late high water event, or a lack of understory vegetation at the site, may be contributing to the lower capture rates. We are currently reviewing the results from this station to determine whether to continue its operation in 2006, or retire it and substitute with efforts at another site. If so, we would consider adding another 1-2 monitoring transects in SUB, as well as transects at another Yolo or Sutter Bypass location. This addition of transects would increase the sample size of the current riparian system modeling data set.
- **The addition of a nest searching program.** Low mist net capture rates for certain focal species preclude understanding of their demographics within the Bypass system. We will implement limited nest searching to assess primary productivity of certain focal species. Potential candidates for this monitoring included Blue Grosbeak, Lazuli Bunting and Common Yellowthroat. Little is known about the demographics of these species in

the Central Valley. Incidental observations made by MWFB biologists suggest that Blue Grosbeaks fledged offspring this year, but due to low mist net capture rates, this success was not quantified in our data set. Nest searching is necessary to quantify productivity for Blue Grosbeaks, a RHJV focal species.

- **Initiation of a winter banding program.** The Central Valley is an important habitat for wintering birds (Engilis 1995). Management and restoration schemes have largely overlooked the importance of riparian habitat to overwintering landbird species, instead focusing on breeding bird communities. Moreover, Audubon Christmas Bird Count data suggest that certain species of winter visitors (e.g. White-crowned Sparrow) are declining significantly in all or a portion of their ranges. Therefore, initiation of a winter banding program would help construct a more thorough and temporally complete assessment of population status, trends and habitat quality for riparian birds.

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