# RIPARIAN BIRD MONITORING AND HABITAT ASSESSMENT IN RIVERINE / RIPARIAN HABITATS OF THE LOWER OWENS RIVER PROJECT

**BASELINE RESULTS FROM THE 2002 FIELD SEASON** 



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## **SUMMARY**

In 2002, the Point Reyes Bird Observatory (PRBO) implemented a standardized bird monitoring program in riverine/riparian habitats of the Lower Owens River Project area (LORP). We established 150 new point count stations to supplement the 23 that we had established in 1999, for a total of 173 independent point count stations. 165 of these sites were located between the Los Angeles Aqueduct Intake and the Owens River delta, while 8 points were located above the intake, north of Tinemaha Reservoir. Data derived from LORP sites are comparable with those of other eastern Sierra riparian bird monitoring sites. This year's effort constitutes the baseline year of a proposed ten-year riverine/riparian bird monitoring component of LORP.

We detected one hundred and twenty four species within the study area and determined breeding status for each. Breeding status of focal species for the California Partners in Flight and Riparian Habitat Joint Venture Riparian Bird Conservation Plan were submitted for inclusion in the most current breeding distribution maps for those species.

We determined frequency of occurrence for 36 breeding species for the entire study area and relative abundance for each river reach. LORP Habitat Suitability Index model species (HSI) Marsh Wren, Red-shafted Flicker and Yellow Warbler were detected at 14%, 8% and 2% of sites respectively. LORP Wildlife Habitat Indicator Species (WHIS) Nuttall's Woodpeckers and Blue Grosbeaks were detected at 14% and 7% of sites respectively. Species detected at over 30% of all stations included Red-winged Blackbirds, Ash-throated Flycatchers, Western Kingbirds, Bewick's Wrens, Common Yellowthroats, Song Sparrows, Western Meadowlarks, and Brownheaded Cowbirds.

We calculated an index of total individuals, species richness and species diversity for breeding species at each of the 173 point count stations and mean indices by river reach. Mean breeding total individuals, species richness and species diversity were significantly lowest at "Dry" Reach #2 sites and similar among all other reaches.

We determined Sawyer and Keeler-Wolf habitat types for all 173 points and calculated mean breeding bird indices for the five most common types. Mixed Saltbush and Bulrush-Cattail habitat types had significantly lower bird species richness and species diversity than Mature Willow, Mature Willow/Bulrush-Cattail and Shrub Willow/Bulrush-Cattail habitat types. Bird species diversity was not significantly different between Mature Willow, Mature Willow/Bulrush-Cattail, or Shrub Willow/Bulrush-Cattail habitat types.

We summarized frequency of occurrence at the five most prevalent habitat types for 24 breeding bird species. WHIS Yellow Warbler and Blue Grosbeak were present at only Mature Willow/Bulrush-Cattail or Mature Willow sites. Nuttall's Woodpeckers were present at all but Shrub Willow/Bulrush-Cattail sites. HSI species Marsh Wrens were detected at all but Mixed Saltbush and Mature Willow sites and Red-shafted Flickers were detected at Mature Willow/Bulrush-Cattail, Mature Willow and Bulrush-Cattail sites.

Using our 2002 habitat assessment data, we summarized HSI-equivalent habitat variables to those used in models for Marsh Wrens, Red-shafted Flickers and Yellow Warblers. We tested the relationships between these variables and the occurrence of each species. Two of the 11 habitat variables were significantly correlated with the occurrence of these species.

## INTRODUCTION AND BACKGROUND

Western populations of Neotropical migrant and resident landbirds are declining (Askins 2000, Gardali et al. 2000, Ballard et al. *in review*). Western riparian has been identified as critical habitat for the majority of these declining bird species (Miller 1951, Gaines 1974, Manley and Davidson 1993, RHJV 2000) and the loss of this habitat has been implicated as the most important cause of landbird population declines in western North America (DeSante and George 1994). California alone has lost an estimated 85%-95% of its functioning riparian habitat in the past 150 years (RHJV 2000).

Birds are excellent indicators of environmental health and data on landbird populations can provide an ideal means to monitor the effectiveness of riparian management practices and restoration efforts (Ralph et al.1993, RHJV 2000). Different bird species have a wide variety of nesting and foraging needs, filling many niches of a riparian system. Riparian areas are variable and dynamic and accordingly, the native avifauna is diverse. By designing management efforts on avian habitat requirements, planners can also manage for many other elements of the ecosystem.

The Lower Owens River at one time provided breeding habitat for a host of riparian and wetland associated bird species, including many of the 14 California Partners in Flight (CPIF) Riparian Habitat Joint Venture (RHJV) focal species (Fisher 1893, Grinnell and Miller 1944, RHJV 2000). Today, some of these species remain relatively abundant (e.g. Song Sparrows, Common Yellowthroats), while some only occur in localized pockets (e.g. Yellow Warblers, Willow Flycatchers, Yellow-breasted Chats) or have been extirpated (Bell's Vireo).

Through flow and land management, a stated goal of the LORP is to establish a "healthy, functioning Lower Owens River riverine/riparian ecosystem," and to maintain a diverse natural habitat consistent with the needs of specified "habitat indicator" species (Ahlborn 1999a). As such, many of the historically breeding landbird species should benefit from the increased quality and quantity of habitat.

This bird and habitat monitoring project constitutes the only direct evaluation of the effects of LORP on bird life within the riverine/riparian system. The objectives of this monitoring program along representative sections of the Lower Owens River are summarized as follows:

- To determine baseline bird species presence/absence and breeding status.
- To determine baseline indices of bird species richness, relative abundance and diversity.
- To monitor expected changes (trends) in bird species composition, relative abundance, richness and diversity over time.
- To determine bird habitat associations or preference, and habitat and landscape features.
- To monitor changes in habitat association or preference over time.

## METHODS

### Study area description

The study area is comprised of an approximately 70-mile (112 km) stretch of the riverine/riparian habitat of the Owens River, Inyo County, California (37° 05' N, 118° 14' W to 36° 33' N, 117° 59' W). A majority (95%) of the study area is located within the Lower Owens River Project (LORP 1999) and below the Los Angeles Aqueduct intake, and 5% is located above this diversion point (Figure 1, Table 1).

Figure 1. Study area, Lower Owens River Project riverine/riparian bird point count locations, 2002.



Table 1. Study sites, 4-letter transect codes, number of points per transect, year of study site initiation, and corresponding LORP reach (Ahlborn 1998), Lower Owens River Project riverine/riparian bird and habitat monitoring, 2002. Study sites listed from north to south.

Study site grouping	4-letter transect code	Number of points	Year of initiation	Corresponding LORP reach
Owens River North of Tinemaha Resevoir <sup>1</sup>	ORTI	8	1999	Upstream of Intake <sup>1</sup>
Goodale	GOOD	15	2002	"Dry" reach #2
Black Rock Springs	BLRS	15	2002	"Dry" reach #2
Crystal Ridge	CRRI	15	2002	"Dry" reach #2
Mc Iver	MCIV	15	2002	"Dry" reach #2
Owens River North of Mazourka Canyon	ORMC	15	1999	"Intermediate" reach #3
South of Mazourka Canyon	SOMA	15	2002	"Intermediate" reach #3
Manzanar	MANZ	15	2002	"Intermediate" reach #3
Alabama Gates	ALGA	15	2002	"Island" reach #4
Pangborn Lane	PANG	15	2002	"Island" reach #4
Narrow Gauge	NAGA	15	2002	"Beaver" reach #5
Delta	DELT	15	2002	"Beaver" reach #5
TOTAL		173	independe	nt census stations

<sup>1</sup>ORTI is located above the Los Angeles Aqueduct intake and is not located within the LORP, all other sites located below this diversion point and within the LORP.

### Study Design

We conducted a power analysis using the program MONITOR (Gibbs 1995) to determine the number of point count stations necessary to detect trends in abundance of songbird species over a ten-year period. We used bird abundance indices and standard deviations derived from Eastern Sierra point count stations censused 1999 through 2001 (Heath et al. 2001) as input data for the power analysis. We determined that 11 transects of 15 points each would be sufficient to detect a 2% - 5% change in songbird numbers with 90% - 100% confidence.

We randomly selected starting points for 10 transects using ArcView 3.2 GIS (ESRI 2000) with aerial photographs and a riverine/riparian vegetation polygon provided by Ecosystem Sciences. Point locations were constrained only in that they allowed enough space for a 15-point transect with 250m between points (and transects).

We located starting points in the field using GPS and established 10 new 15-point transects with 250m spacing between points along the river channel (using GPS to determine distances). Additionally included were two transects of 8 and 15 points each that were established in 1999 as a part of the Eastern Sierra Riparian Songbird Conservation project (Heath et al. 2001), for a total of 173 independent point count stations grouped into 12 transects. We named all transects and assigned each point a unique code using the 4-letter transect code and the point number (Table 1, Appendix 1, Figure 1). We marked all points (nearest shrub or tree) with orange flagging and metal tree tags labeled with 4-letter code, point number and "PRBO LORP." At each point a GPS waypoint was collected. Descriptions were written for access to all points (Appendix 1).

## **Observer** Training

PRBO biologists, all trained in distance estimation and familiar with songs and calls of birds in the area, conducted all point count censuses. Additionally, all biologists practiced and calibrated distance estimation and local bird identification for two weeks prior to censuses. Throughout the season, observers calibrated distance estimations on a weekly basis, and a Leica Range Finder <sup>™</sup> was rotated through observers for use during the censuses.

### Point Count Censuses

We censused all 173 points using the five-minute variable circular plot (VCP) point count method (Rosenstock et al. 2002) and followed general guidelines outlined in Ralph et al. (1993). We estimated the distance to each bird in 10m increments out to 50m, in 25m increments out to 100m, and lumped all detections beyond 100m. We recorded all birds detected and type of initial detection (visual, song or call).

We visited all stations three times during the peak of the songbird breeding season (between May 25 and June 27, 2002) and spaced each of three visits at least 10 days apart (Appendix 1 – Table A). To minimize observer bias, a different observer conducted each of the three censuses. Additionally, we conducted points in order from point 1 to 15 for two censuses and in the opposite direction (from point 15 to 1) for one census in order to minimize the effects of time of day on detection rates. We conducted censuses from within 30 minutes after local sunrise until approximately 4 hours later, and did not conduct counts in excessively windy or rainy conditions. We also recorded all observations of breeding behavior and recorded all mammalian and reptilian predator species detected during the 5-minute counts. Dates of censuses, GPS coordinates and transect descriptions are presented in Appendix 1, data forms are in Appendix 2.

### Habitat Assessment

We conducted vegetation assessments at each of the 173 point count stations in 2002. Using the relevé method described by Ralph et al. (1993), we estimated percent cover by height category for every species of plant located within 50m of point count stations. Height categories were "herb" (0 - 0.5m), "shrub" (0.5 - 5m) and "tree" (> 5m). We also estimated the width of the riparian zone at the point and perpendicular to the river (riparian width), the percent of riparian vegetation along this riparian width (riparian patchiness), and the percent of the 50m radius occupied by riparian vegetation (percent riparian). We used our vegetation measurements and guidance provided by Sawyer and Keeler-Wolf (1995) to assign dominant habitat series (habitat types) to each point. Data forms are provided in Appendix 2, detailed description of habitat assessment variables are provided in Appendix 3.

## Geographic Data

Location information was collected at all point count stations using a Garmin Global Positioning System (GPS II+) receiver. Positions were recorded in Decimal Degrees, NAD83 datum. All coordinates and estimated accuracy (figure of merit; FOM) were recorded. FOM of these points ranged from 0 to 6m. Point count locations and associated vegetation and bird data have been converted to Geographic Information System (GIS) coverages in ArcView 3.2 (ESRI 2000) for use in some of the analyses presented below. All maps are represented in UTM (Universal Transverse Mercator) coordinates, Zone 11, NAD27 datum.

## Statistical Analysis and Definitions

*Breeding Total Individuals, Species Abundance, Species Richness and Species Diversity* We summarized indices of total detections, species richness and species diversity for all breeding species detected during point counts. We excluded all non-breeding migrant or transient species (14 species). We further limited the species included in the summaries to those that we determined to be most reliably recorded with the point count protocol. Thus we also removed species whose territories are typically so large that we could not assure independence of individual observations among points (swallows [*Hirundinidae*], swifts [*Apodidae*], waterfowl [*Anatidae*], wading birs [*Ardeidae*], shorebirds [*Scolopacidae* and *Charadriidae*], hawks [*Accipitridae*], falcons [*Falconidae*], and ravens [*Corvus corax*]). Nocturnal species were also excluded (owls [*Strigidae* and *Tytonidae*] and nightjars [*Caprimulgidae*]).

We summarized data by point, river reach, and habitat type and by point per river reach and by point per habitat type. We summarized total detections, individual breeding species abundance, species richness and species diversity for each of 173 individual point count stations for by point summaries, and took the mean of individual point summaries for by point per habitat and by point per river reach summaries. By point per habitat or river reach summaries allow for comparisons between groupings of greater or fewer numbers of points.

*Total detections and species abundance*: We calculated the total number of breeding species individuals detected (all breeding species combined) for each point count station using all detections within 50m summed over three visits. We also calculated the mean number of breeding species individuals (for each species) by point per river reach, averaged over three visits, using all detections within 50m. Because few species are 100% detectable, such calculations probably underestimate absolute density. Therefore results should be considered a minimum estimate of abundance (*relative abundance*).

*Species richness*: We calculated the number of all breeding species for each point count station using all detections within 50m summed over three visits, using Point Count 2.75 (Ballard 2002).

Species diversity: We used Point Count 2.75 (Ballard 2002) to calculate breeding species diversity for each point count station using all detections within 50m summed over three visits. We used a transformation of Shannon's diversity index (or H', Krebs 1989) denoted  $N_1$  (MacArthur 1965). The transformation expresses the data in terms of number of species and thus is more easily interpreted. Expressed mathematically:

$$N_1 = e^{H'}$$
 and  $H' = \sum_{i=1}^{i=S} (p_i)(\ln p_i)(-1)$ 

Where  $S = \text{total species richness and } p_i$  is the proportion of the total numbers of individuals that were each species (Nur et al. 1999). High index scores indicate both high species richness and more equal distribution of individuals among species.

## Breeding bird indices comparisons between reaches habitat types

We log-transformed breeding total individuals, species diversity and species richness to normalize the data for statistical comparisons. We compared transformed mean total individuals, species richness and species diversity among LORP reaches and Sawyer and Keeler-Wolf habitat types using one-way ANOVA. When results from ANOVA indicated significant differences among reaches or habitat types, we used Kruskall-Wallace equality of populations rank test to evaluate the differences between specific reaches or habitat types.

## Bird and habitat relationships

We used simple logistic regression to assess which of the LORP HSI model variables were related to the occurrence of HSI model species Yellow Warblers, Marsh Wrens and Red-shafted Flickers.

Statistical calculations were performed using STATA 7.0 (Stata Corp. 1999). Significance was assumed at P = 0.05. Residuals from ANOVA's passed Skewness/Kurtosis tests for normality (P > 0.05). Logistic regression models passed goodness of fit  $\chi^2$  tests (P > 0.05).

## **Breeding Status**

Breeding status was determined for all species encountered at all newly established study sites between May 13 and July 14, 2002. Breeding status for transects established in 1999 (ORTI and ORMC) was determined cumulatively for all observations starting May 28, 1999. We used observations recorded before, during, and after point count censuses and during project set up and vegetation assessments. Species were ranked by site, using the following four criteria of the Riparian Habitat Joint Venture breeding scale, modified from breeding bird atlas criteria (http://www.prbo.org/calpif/criteria.html):

**0** <u>No evidence of breeding</u>: Species not detected during breeding season, or species known not to breed within the general study area.

**2** <u>Possible breeding</u>: Species encountered singing or acting territorial only once during the breeding season (in suitable habitat).

**3** <u>Probable breeding:</u> Singing individual encountered on 2 or more different days of standardized censuses (at least one week apart); territorial behavior noted more than once at the same location; pair observed in courtship behavior.

1 <u>Confirmed breeding</u>: distraction display; nest building (except woodpeckers and wrens); nesting material or fecal sack being carried by adult; independent juveniles with adults; active territory observed on at least three days (at least one week apart); active nest observed.

## Personnel

PRBO Terrestrial Biologist Sacha Heath conducted all aspects of fieldwork, study design and set-up, and data analysis and Field Biologist River Gates conducted all aspects of fieldwork and project set-up, with guidance from Senior Terrestrial Biologist Grant Ballard, Terrestrial Program Science Coordinator Mary Chase and Terrestrial Program Director Geoffrey Geupel. Fieldwork was conducted by Field Biologists Noah Hamm, Gernot Huber, Yen Luc, Kristie Nelson and Chris Tonra. Chris McCreedy assisted with random starting point selection.

## **RESULTS AND DISCUSSION**

### Bird species composition, distribution and breeding status

We detected one hundred and twenty four bird species within the study area in 2002 (Appendix 4). We determined breeding status for all species encountered at all locations and ranked their breeding status using the RHJV breeding scale. Breeding status of the 14 riparian focal species was submitted for inclusion in the CPIF statewide database and Version 1.0 of the Riparian Bird Conservation Plan (RHJV 2000) to assist in documenting the most current California breeding distribution for these species. Distribution maps for the focal species are periodically updated to incorporate the most current data. See http://www.prbo.org/calpif/maps.html for the most current California distribution maps for all CPIF riparian focal species.

Habitat Indicator Species, Species of Special Concern, sensitive and focal species We detected a total of 34 indicator, sensitive or focal species within LORP (Table 2).

Table 2. Habitat Indicator Species, Species of Special Concern, sensitive and focal species detected during, before and after point count censuses on the Lower Owens River, 2002. See Appendix 4 for breeding status by site.

Common name	Latin name	LORP HSI	LORP WHIS	LORP SSWS	CDFG BSSC	USFWS MNBMC	State	Federal	RHJV RFS
American White Pelican	Pelecanus ervthrorhvnchos				1st	Х			
American Bittern	Botaurus lentiginosus					Х			
Great Blue Heron	Ardea herodias		X	X					
Great Egret	Ardea alba			Х					
Black-crowned Night Heron	Nycticorax nycticorax			Х					
White-faced Ibis	Plegadis chihi			Х					
Wood Duck	Aix sponsa		X						
Canada Goose	Branta canadensis	X							
Golden Eagle	Aquila chrysaetos			Х			SFP		
Virginia Rail	Rallus limicola		Х						
Sora	Porzana carolina		Х						
Northern Harrier	Circus cyaneus		Х	Х	2nd				
Swainson's Hawk	Buteo swainsoni		Х	Х			ST		Х
Prairie Falcon	Falco mexicanus			Х	3rd	Х			
Belted Kingfisher	Ceryle alcyon	Х	Х						
Nuttall's Woodpecker	Picoides nuttallii		Х						
Downy Woodpecker	Picoides pubescens	Х							
Red-shafted Flicker	Colaptes auratus	Х							
Willow Flycatcher	Empidonax traillii	Х	Х	х			SE	FE	Х
Olive-sided Flycatcher	Contopus cooperi				2nd				
Loggerhead Shrike	Lanius Iudovicianus			Х	2nd	Х			
Warbling Vireo	Vireo gilvus		Х						Х
Bank Swallow	Riparia riparia			Х			ST		Х
Marsh Wren	Cistothorus palustris	Х							
Le Conte's Thrasher	Taxostoma lecontei			Х					
Yellow Warbler	Dendroica petechia	Х	Х	Х	2nd				Х
Wilson's Warbler	Wilsonia pusilla								Х
Yellow-breasted Chat	Icteria virens		Х	Х	3rd				Х
Common Yellowthroat	Geothlypis trichas								Х
Brewer's Sparrow	Spizella breweri					Х			
Song Sparrow	Melospiza melodia								Х
Black-headed Grosbeak	Pheucticus melanocephalus						-		Х
Blue Grosbeak	Guiraca caerulea		Х				-		Х
Yellow-headed Blackbird	Xanthocephalus xanthocephalus				2nd				

<sup>1</sup>LORP HSI and Federal Endangered designation for Willow Flycatchers refer to the breeding Southwestern subspecies (*Empidonax traillii extimus*). LORP HSI= LORP Habitat Suitability Index model species; LORP WHIS= LORP Wildlife Habitat Indicator Species; LORP SSWS= LORP Special Status Wildlife Species; CDFG CSSC = California Department of Fish and Game Species of Special Concern draft list 2001 and priority #; ST= state threatened, SE= state endangered, SFP= state fully protected, FE=federal endangered; USFWS MNBMC= Fish and Wildlife Service, Migratory Nongame Birds of Management Concern; RHJV RFS= Riparian Habitat Joint Venture riparian focal species. (Ahlborn 1999a, Ahlborn 1999b, CDFG and PRBO 2001, USFWS 1995, CDFG 2002, RHJV 2000). Seven species are LORP Habitat Suitability Index model species (HSI), thirteen are LORP Wildlife Habitat Indicator Species (WHIS) and fourteen are LORP Special Status Wildlife Species (SSWS, Ahlborn 1998, 1999a and 1999b). Fourteen species are considered sensitive, Threatened, Endangered or of concern, and eleven species are RHJV riparian focal species. Focal species (such as those for the Riparian Bird Conservation Plan) are not necessarily sensitive or of concern, but are listed under the assumption that if a habitat is managed to meet the focal species' needs, other species will benefit (Lambeck 1997, RHJV 2000).

Great Blue Herons, Wood Ducks, Virginia Rails, Swainson's Hawks, Nuttall's Woodpeckers, Red-shafted Flickers, Loggerhead Shrikes, Marsh Wrens, Le Conte's Thrashers, Common Yellowthroats, Song Sparrows and Blue Grosbeaks were observed as probable or confirmed breeders within the study area. Although observed in late May as migrants throughout the study area, Yellow Warblers were only present as probable breeders above the intake in this and previous years as were Yellow-breasted Chats (Heath et al. 2001). Willow Flycatchers, which have historically bred on the Lower Owens River and which currently breed on other Owens River locations northwest of Bishop, were only present as migrants at any study site in 2002 (Appendix 4, Fisher 1893, M. Whitfield pers. comm.).

## Breeding species abundance and frequency of occurrence

Thirty-six species fit our criteria for inclusion in breeding species summaries (see Methods p. 6). Red-winged Blackbirds were detected within 50m of 60% of all point count stations, and were the most frequently detected species (Table 5). Species detected at over 30% of the stations included Ash-throated Flycatchers, Western Kingbirds, Bewick's Wrens, Common Yellowthroats, Song Sparrows, Western Meadowlarks, and Brown-headed Cowbirds. The most frequently detected species among LORP reaches were Red-winged Blackbirds at the "Beaver" and "Island" reaches and Song Sparrows and Brown-headed Cowbirds above the intake.

LORP HSI model species Marsh Wren, Red-shafted Flicker and Yellow Warbler were detected at 14%, 8% and 2% of sites respectively (Table 5). Marsh Wrens were detected at all but the "Dry" Reach #2 and were most abundant above the intake (though not significantly higher than at the "Island" Reach#4, P = 0.11). Yellow Warblers were detected as breeders only above the intake and in low abundance, and Red-shafted Flickers were detected at all reaches in similar abundance.

LORP WHIS Nuttall's Woodpeckers and Blue Grosbeaks were detected at 14% and 7% of sites respectively (Table 5). Nuttall's Woodpeckers were detected at all reaches in similar abundance and Blue Grosbeaks were similarly abundant at all but "Beaver" Reach#4, where they were not detected within 50m.

Table 5. Frequency of occurrence and mean relative abundance<sup>1</sup> for all breeding species detected during 5-minute 50m fixed-radius point counts. Number of individuals detected by point per entire study area and per river reach, mean of three visits, May 25 – June 27, 2002.

Species					LORP R	each	
	% points present (n = 173)	entire study area (n = 173)	Above Aqueduct Intake (n = 8)	"Dry" Reach # 2 (n = 60)	"Intermediate" Reach # 3 (n = 45)	"Islands" Reach # 4 (n = 30)	"Beaver" Reach # 5 (n = 30)
California Quail	1%	0.004			0.01	0.01	
Mourning Dove	14%	0.06	0.08	0.06	0.07	0.09	0.03
Ladder-backed Woodpecker	2%	0.01		0.01	0.01		
Nuttall's Woodpecker	14%	0.05	0.04	0.04	0.04	0.06	0.09
Red-shafted Flicker	8%	0.03	0.04	0.01	0.04	0.04	0.04
Black Phoebe	5%	0.03	0.04		0.04		0.07
Say's Phoebe	6%	0.02		0.02	0.01		0.07
Ash-throated Flycatcher	44%	0.2	0.04	0.13	0.33	0.19	0.23
Western Kingbird	39%	0.32	0.04	0.11	0.37	0.41	0.64
Loggerhead Shrike	13%	0.06		0.02	0.07	0.12	0.06
American Magpie	10%	0.04		0.01	0.08	0.06	0.01
Bushtit	1%	0.01	0.04	0.01			
Bewick's Wren	41%	0.27	0.63	0.21	0.44	0.19	0.12
House Wren	6%	0.02	0.13	0.01	0.01	0.03	0.04
Marsh Wren	14%	0.08	0.58		0.07	0.13	0.07
Blue-gray Gnatcatcher	29%	0.15	0.71	0.13	0.15	0.11	0.06
Northern Mockingbird	23%	0.12		0.04	0.13	0.14	0.26
LeConte's Thrasher	4%	0.02		0.05	0.01		
European Starling	7%	0.05				0.21	0.08
Yellow Warbler	2%	0.01	0.25				
Common Yellowthroat	45%	0.28	0.83	0.11	0.41	0.4	0.13
Spotted Towhee	21%	0.13	0.08	0.23	0.14	0.04	0.01
Black-throated Sparrow	17%	0.08	0.08	0.21	0.01		
Sage Sparrow	2%	0.01		0.02			
Savannah Sparrow	1%	0.004	0.04			0.01	
Song Sparrow	39%	0.28	1.13	0.01	0.34	0.31	0.47
Blue Grosbeak	7%	0.03	0.17	0.01	0.04	0.02	
Lazuli Bunting	5%	0.02	0.13		0.01		0.04
Red-winged Blackbird	60%	1.02	0.50	0.36	1.05	1.64	1.82
Western Meadowlark	36%	0.2		0.15	0.24	0.23	0.23
Yellow-headed Blackbird	6%	0.04	0.04			0.11	0.12
Brewer's Blackbird	8%	0.07	0.04	0.01		0.14	0.22
Great-tailed Grackle	3%	0.02			0.01	0.08	0.01
Brown-headed Cowbird	45%	0.32	0.92	0.12	0.39	0.42	0.38
Bullock's Oriole	6%	0.03	0.04		0.01	0.09	0.02
House Finch	1%	0.02			0.06		

<sup>1</sup>To calculate number of individuals per hectare, multiply abundance by 1.27. To calculate number of individuals detected across the entire reach (averaged over three visits), multiply abundance by number of points. Because so few species are 100% detectable, such calculations probably underestimate absolute density. Therefore results should be considered a minimum index of abundance, or relative abundance.

### Breeding total individuals, species richness and species diversity

We summarized breeding bird indices of total individuals, species richness and species diversity by point, by reach and by habitat type. By point summaries of species diversity ranged widely from 0.00 (BLRS15, CRRI04 and CRRI09) to 11.78 (PANG10, Table 3). Sites just below the Los Angeles Aqueduct intake had fewer birds and less diversity than at either the sites above the intake or at sites further south along the river (Figure 2). Overall, breeding bird indices at LORP

sites fall within range of bird indices among other Eastern Sierra riparian sites, where species diversity ranged from 0.00 to 13.34 (Heath et al. 2001).

Table 3. Indices of total individuals (TI), species richness (SR) and Shannon-Weiner index of species diversity (SW) by point for breeding species detected on 5-minute 50m fixed-radius point counts, summed over 3 annual visits, 2002. Sites presented from north to south.

Station	Site	TI	SR	SW	Station	Site	TI	SR	SW	Station	Site	TI	SR	SW
ORTI	1	28	13	11 17	MCIV	6	7	5	4 37	AL GA	4	15	6	3 23
ORTI	2	27	10	7 4 9	MCIV	7	6	š	2 75		5	25	11	8 47
	2	21	10	11 02	MCIV	0	7	5	4 27		6	20	6	5.67
	3	21	13	7.54		0		5	4.37	ALGA	0	9	0	5.07
ORTI	4	11	8	1.54	MCIV	9	3	2	1.89	ALGA	1	1	5	4.71
ORTI	5	15	8	7.32	MCIV	10	11	5	4.70	ALGA	8	11	5	4.11
ORTI	6	12	5	4.15	MCIV	11	6	5	4.76	ALGA	9	22	10	8.79
ORTI	7	15	7	6.30	MCIV	12	15	8	6.92	ALGA	10	8	7	6.73
ORTI	8	30	5	3.88	MCIV	13	16	8	6 27	AL GA	11	16	10	8 91
GOOD	1	33	11	5 12	MCIV	14	10	õ	5.17	ALGA	12	20	10	7.67
0000	0	40	4	0.12	MOIN	45	10	-	0.17		12	20	0	1.07
GOOD	2	13	4	2.98	MCIV	15	14	<u>/</u>	0.50	ALGA	13	23	8	4.67
GOOD	3	6	4	3.78	ORMC	1	10	5	4.35	ALGA	14	16	6	5.11
GOOD	4	6	4	3.78	ORMC	2	21	10	8.68	ALGA	15	20	8	5.74
GOOD	5	3	2	1.89	ORMC	3	21	11	8.79	PANG	1	12	8	7.24
GOOD	6	2	1	1.00	ORMC	4	13	5	4.59	PANG	2	18	9	6.74
GOOD	7	1	1	1 00	ORMC	5	9	5	4 17	PANG	3	12	8	6.73
COOD	ò	1	2	2 93	OPMC	6	17	7	5 37	PANG	4	7	4	3 50
GOOD	0	4	5	2.05	ORNIC	-	5		0.37	PANO	7	~	4	0.08
GOOD	9	1	5	4.37	URMC	1	5	4	3.79	PANG	5	23	8	0.70
GOOD	10	13	5	4.11	ORMC	8	5	4	3.79	PANG	6	18	6	3.84
GOOD	11	5	4	3.79	ORMC	9	4	3	2.83	PANG	7	15	8	7.07
GOOD	12	13	4	2.81	ORMC	10	8	4	3.75	PANG	8	19	5	3.44
GOOD	13	6	2	1 57	ORMC	11	4	3	2 83	PANG	9	18	7	4 17
GOOD	14	11	4	3.22	ORMC	12	5	5	5.00	PANG	10	21	13	11 78
COOD	15	7	-	2 50	OPMC	12	10	1	2 20	DANC	11	20	0	7.01
GOOD	10	10	4	0.09		13	10	4	0.08	PANG	10	20	9	0.01
BLRS	1	10	4	2.50	URMC	14	9	<u>/</u>	0.01	PANG	12	15	8	0.05
BLRS	2	4	3	2.83	ORMC	15	8	5	4.46	PANG	13	12	6	5.26
BLRS	3	9	5	4.59	SOMA	1	20	10	7.71	PANG	14	18	8	6.22
BLRS	4	3	2	1.89	SOMA	2	19	11	9.32	PANG	15	12	5	3.44
BLRS	5	4	3	2.83	SOMA	3	18	8	6.55	NAGA	1	4	3	2.83
BLRS	6	2	1	1.00	SOMA	4	7	5	4.71	NAGA	2	17	6	3.32
BLRS	7	2	2	2 00	SOMA	5	22	12	10 25	NAGA	3	7	4	3 86
BLRS	8	4	2	1 75	SOMA	6	21	9	6 56	NAGA	4	7	5	4 71
BLRS	à	2	2	2 00	SOMA	7	15	7	5 55	NAGA	5	à	7	6.61
	10	1	1	1 00	SOMA	0	25	11	0.00	NACA	6	11	5	2 02
DLNG	10		2	1.00	SOMA	0	25	-	0.00	NAGA	7	14	5	3.85
BLRS	11	2	2	2.00	SOMA	9	15	1	4.51	NAGA	1	11	0	4.07
BLRS	12	4	2	1.75	SOMA	10	23	6	4.69	NAGA	8	12	10	9.52
BLRS	13	2	1	1.00	SOMA	11	12	9	7.56	NAGA	9	18	5	2.61
BLRS	14	2	2	2.00	SOMA	12	10	7	6.60	NAGA	10	10	5	3.89
BLRS	15	0	0	0.00	SOMA	13	19	9	7.46	NAGA	11	23	8	4.51
CRRI	1	1	1	1.00	SOMA	14	18	6	3.86	NAGA	12	19	11	9.49
CRRI	2	1	1	1 00	SOMA	15	19	8	6 47	NAGA	13	16	9	7 22
CRRI	3	1	1	1 00	MANZ	1	18	6	5 78	NAGA	14	14	7	5 64
CDDI	1	ò	0	0.00		2	14	õ	Q 22	NAGA	15	11	10	0.04
	-	2	1	1.00		2	16	0	0.22		10	10	7	5.70
	5	3	1	1.00		3	10	9	0.17	DELT	1	12	<i>'</i>	0.47
CRRI	6	3	2	1.89	MANZ	4	17	11	9.31	DELT	2	16	9	6.87
CRRI	7	3	3	3.00	MANZ	5	17	7	6.01	DELT	3	9	4	3.57
CRRI	8	1	1	1.00	MANZ	6	13	7	6.16	DELT	4	31	12	8.79
CRRI	9	0	0	0.00	MANZ	7	12	6	5.50	DELT	5	42	12	7.84
CRRI	10	4	3	2.83	MANZ	8	17	6	4.47	DELT	6	11	7	6.34
CRRI	11	2	1	1 00	MAN7	9	11	5	3 19	DELT	7	16	8	6 62
CRPI	12	7	4	3 50	MAN7	10	11	ĥ	4 92		8	17	Ř	5 26
CPPI	13	7	1	3 50		11	21	o o	6.52		ă	16	6	5 17
	13	<i>'</i>	+	3.09		10	40	0	0.00		3	10	7	5.47
CKKI	14	ğ	5	4.46	MANZ	12	16	[	4.26		10	23	1	5.90
CRRI	15	5	5	5.00	MANZ	13	12	5	4.36	DELT	11	32	7	3.89
MCIV	1	8	6	5.30	MANZ	14	8	5	4.46	DELT	12	18	8	5.86
MCIV	2	5	4	3.79	MANZ	15	9	5	3.68	DELT	13	22	7	5.50
MCIV	3	11	7	6.34	ALGA	1	26	8	4.66	DELT	14	14	3	2.22
MCIV	4	14	6	5.33	ALGA	2	12	4	2.67	DELT	15	9	5	4.59
MCIV	5	15	7	6.30	ALGA	3	8	4	2.93					



Figure 2. Breeding species diversity by point. All detections during 5-minute, 50m radius point counts, summed over 3 visits, 2002.

Overall, 2116 breeding individuals and 36 breeding species were detected across three visits and within 50m using point counts (Table 4). Because reaches had varying numbers of survey points, comparisons between reaches should be made using mean by point summaries. "Dry" reach sites had significantly lower mean total individuals detected, species richness and species diversity than at any other reach (TI:  $\chi^2 = 15.71-37.77$ , P < 0.001; SR:  $\chi^2 = 14.62-33.53$ , P < 0.001; SW:  $\chi^2 = 14.4-33.53$ , P < 0.001). Mean total individuals, species richness and species diversity among all other reaches were not significantly different.

Table 4. Total individuals, species richness and species diversity by reach, mean by point per reach and standard error of the mean, for breeding species detected within 50m during 5-minute point counts, 2002.

		Tota	al Individua	als	Spec	ies Richn	ess	Species Diversity			
Reach	# of	Total	Mean by		Total	Mean by	,	Total	Mean by		
	points	reach	Point	SE	reach	point	SE	reach	point	SE	
Entire study area	173	2116	12.23	±0.58	36	5.87	±0.22	16.65	4.84	±0.18	
Upstream of Intake	8	159	19.88	±2.70	24	8.60	±1.12	12.90	7.36	±0.96	
"Dry" Reach #2	60	375	6.25	±0.72	25	3.43	±0.29	14.72	3.00	±0.23	
"Intermediate" Reach #3	45	624	13.87	±0.85	29	6.87	±0.35	14.35	5.73	±0.29	
"Island" Reach #4	30	478	15.93	±0.99	26	7.33	±0.40	13.71	5.80	±0.39	
"Beaver" Reach #5	30	480	16.00	±1.48	26	7.03	±0.44	11.50	5.50	±0.38	

### Sawyer and Keeler-Wolf habitat types

We assigned eleven Sawyer and Keeler-Wolf habitat types to all 173 bird monitoring sites (Table 6). Mature Willow/Bulrush-Cattail characterized 40% of the point count stations.

Table 6. Sawyer and Keeler-Wolf habitat types characterizing 173 50m radius point count stations and each river reach, number and percent of points characterized by each habitat type.

	Entire st	udy area	Percent points per Reach								
Sawyer and Keeler-Wolf habitat types	Number of points	Percent points	Above Aqueduct Intake (n = 8)	"Dry" Reach # 2 (n = 60)	"Intermediate" Reach # 3 (n = 45)	"Islands" Reach # 4 (n = 30)	"Beaver" Reach # 5 (n = 30)				
Mature Willow / Bulrush-Cattail	70	40.46%	62.50%	5.00%	55.56%	60.00%	63.33%				
Bulrush-Cattail	27	15.61%		21.67%	8.89%	10.00%	23.33%				
Mature Willow	27	15.61%	12.50%	15.00%	24.44%	20.00%					
Mixed Saltbush	26	15.03%		41.67%	2.22%						
Shrub Willow / Bulrush-Cattail	11	6.36%	25.00%		8.89%	10.00%	6.67%				
Salt Cedar	7	4.05%		11.67%							
Fremont Cottonwood	1	< 1 %		1.67%							
Common Reed	1	< 1 %		1.67%							
Greasewood	1	< 1 %					3.33%				
Rabbitbrush	1	< 1 %					3.33%				
Shrub Willow	1	< 1 %		1.67%							

Multiple habitat types may have been determined for each point if the 50m radius encompassed multiple riparian and/or upland habitats, but only the riparian types are discussed here. The exceptions are sites characterized as Mixed Saltbush, Salt Cedar, Common Reed, Greasewood and Rabbitbrush, which had less than 5% of a riparian habitat type present within 50m.

We did not consistently identify willow to species (as is done by the Sawyer and Keeler-Wolf habitat classification system). We therefore designated the habitat type Mature Willow to indicate one or more willow species (e.g. *Salix goodingii*, *S. laevigata* or *S. lucida*) dominant in "tree" (> 5m high, > 8cm DBH) form. Shrub Willow indicates one or more of these willow species (in addition to *S. exigua*) dominant in "shrub" (> 50 cm < 5m high) form. Combined Mature Willow/Bulrush-Cattail or Shrub Willow/Bulrush-Cattail sites were those in which the combined habitat types were co-dominant.

## Breeding bird indices and frequency of occurrence, summarized by riparian habitat type

Mixed Saltbush and Bulrush-Cattail sites had significantly lower mean bird species richness and species diversity than any other habitat types ( $P \le 0.01$ , Table 7). Species diversity was not significantly different between Mature Willow, Mature Willow/Bulrush-Cattail, or Shrub Willow/Bulrush-Cattail sites (P > 0.33).

Table 7. Total individuals, species richness and species diversity by habitat type, mean by point per habitat type and standard error of the mean, for breeding bird species detected within 50m during 5-minute point counts, 2002.

		Tota	l Abundan	ice	Spec	ies Richn	ess	Species Diversity			
Habitat type	# of	Total reach	Mean by Point	9E	Total	Mean by	SE	Total	Mean by	y se	
Mature Willow	27	309	11.44	±1.16	29	6.37	±1.16	18.09	5.55	±0.34	
Mature Willow/Bulrush-Cattail	70	1158	16.54	±0.80	34	7.63	±0.28	15.22	6.13	±0.25	
Shrub Willow/Bulrush-Cattail	11	175	15.91	±2.21	21	6.82	±0.57	10.88	5.52	±0.49	
Bulrush-Cattail	27	305	11.30	±1.23	22	4.81	±0.48	8.92	3.93	±0.39	
Mixed Saltbush	26	89	3.46	±0.67	15	2.12	±0.32	8.21	1.89	±0.24	

We summarized species frequency of occurrence at the five most prevalent habitat types for 24 species detected on LORP (Figures 3a – 3x). Species such as Ash-throated Flycatchers (Figure 3d), Loggerhead Shrikes (Figure 3f), Bewick's Wrens (Figure 3g), Common Yellowthroats (Figure 31), Black-throated Sparrows (Figure 3n), Song Sparrows (Figure 3p), Red-winged Blackbirds (Figure 3s) and Western Meadowlarks (Figure 3t) were detected among all habitat types. Species such as Yellow Warblers (Figure 3k), Ladder-backed Woodpeckers (Figure 3a), and Blue Grosbeak (Figure 3q) were present at only Mature Willow/Bulrush-Cattail or Mature Willow sites. LORP HIS species Marsh Wrens (Figure 3h) were not detected at Mature Willow and Mixed Saltbrush sites and Red-shafted Flickers (Figure 3c) were detected at Mature Willow/Bulrush-Cattail, Mature Willow and Bulrush-Cattail sites. LORP WHIS Nuttall's Woodpeckers (Figure 3b) were present at all but Shrub Willow/Bulrush-Cattail sites.

Figures 3a - 3h. Percent of 5-minute, 50m radius point counts where at least one individual of each subject bird was detected, by top five most prevalent Sawyer and Keeler-Wolf habitat types, and in proportion to the total number of points characterized by each habitat type, 2002. (e.g. Figure 3a: Ladder-backed Woodpeckers were detected at 11% of available Mature Willow sites.)



Bulrush-Cattail

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Percent of point swith detections

Bulrush-Cattail

0% 10%

20% 30% 40% 50% 60% 70% 80% 90% 100%

Percent of points with detections

Figures 3i – 3p. Percent of 5-minute, 50m radius point counts where at least one individual of each subject bird was detected, by top five most prevalent Sawyer and Keeler-Wolf habitat types, and in proportion to the total number of points characterized by each habitat type, 2002. (e.g. Figure 3i: Blue-gray Gnatcatchers were detected at 18% of available Shrub Willow/Bulrush-Cattail, 31% Mature Willow/Bulrush-Cattail sites, 8% of Mixed Saltbush sites, and 70% of Mature Willow sites.)



Figures 3q - 3x. Percent of 5-minute, 50m radius point counts where at least one individual of each subject bird was detected, by top five most prevalent Sawyer and Keeler-Wolf habitat types, and in proportion to the total number of points characterized by each habitat type, 2002. (e.g. Figure 3q: Blue Grosbeaks were detected at 9% Mature Willow/Bulrush-Cattail sites and 22% of Mature Willow sites.)



### Habitat Suitability Index Models

Using our 2002 habitat assessment and bird data, we summarized the variables used to build Habitat Suitability Index models for Marsh Wrens, Yellow Warblers and Red-shafted Flickers (Ahlborn 1998), and tested the relationship between these variables and the occurrence of each species within the study area sites (Table 9).

Table 9. Summary statistics for Habitat Suitability Index (HSI) model habitat variables<sup>1</sup> at sites where HSI breeding bird species occur, and results of logistic regression models testing the occurrence of HSI species in relation to the HSI variables. Based on bird detections during 5 minutes and within 50m of point count stations and associated habitat assessments, 2002. (n = number of 173 potential sites where each breeding species was detected at least once.)

			Sumn Statis	nary tics	Lo	Logistic Regress Model Results				
Habitat Suitability Index model species <sup>1</sup>	HSI habita variable <sup>1</sup>	t Equivalent PRBO habitat variable	Mean	SE	P	Coefficient	Pseudo R <sup>2</sup>			
Yellow Warbler	VCVSH02	willow shrub cover (%)	11.88%	2.76	0.02	0.1385	14%			
(n=3)	VHTSH02	mean willow shrub ht (m)	3.85m	0.65	0.10					
	VRCSH01	marsh shrub cover (%)	15.00%	6.11	0.75					
Marsh Wren	VCVEM01	marsh shrub cover (%)	23.44%	1.96	< 0.01	0.0958	17%			
(n=25)	VCVTR07	tree cover (%)	15.80%	1.90	0.37					
	VCVTR07	shrub cover (%)	59.80%	2.60	0.28					
Red-shafted Flicker	aNF01ov	tree cover (%)	17.92%	2.48	0.17					
(n=13)	aNF02ov	snags (#)	13.98	3.78	0.78					
	aNF03ov	logs (#)	12.92	2.31	0.46					
	aNF04ov	Maximum mean DBH (cm)	47.77 cm	6.73	0.88					
	aNF05ov	Max mean tree ht (m)	15.76 m	7.03	0.10					

<sup>1</sup> From Ahlborn (1998): Lower Owens River Project TM #16: Revised projections of Wildlife Habitat Units for the Lower Owens River using Habitat Suitability Index (HSI) models.

Mean willow shrub cover and height for the three sites occupied by Yellow Warblers was 11.88% and 3.85m respectively. Marsh vegetation (bulrushes and cattails in the shrub layer) at these sites provided an average of 15% cover. Percent willow shrub cover was significantly correlated with the occurrence of Yellow Warblers (P = 0.02). The coefficient implies that one unit of willow shrub cover increase should result in a +0.14 unit increase in Yellow Warbler presence at that point count station (Table 9).

Marsh Wren occurrence was significantly related to the percent cover of marsh shrub cover (P < 0.01). None of the HSI variables were significantly related to the occurrence of Red-shafted Flickers ( $P \ge 0.10$ ).

## **CONCLUSIONS AND FUTURE WORK**

Because scant standardized bird monitoring has been conducted within riverine/riparian habitats of the Lower Owens River, results presented here represent a significant increase in the understanding of songbird occurrence, breeding status, diversity, abundance and associated habitat features within the LORP area.

With the submission of this report, the baseline year of a proposed 10-year riverine/riparian bird monitoring project on within LORP is complete. Bird point counts and habitat assessments will be conducted annually 2003-2012 (funding pending), in a manner comparable to baseline work conducted in 2002.

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## LITERATURE CITED

AHLBORN, G. 1998. Lower Owens River Project. Technical Memorandum # 16. Revised projections of wildlife habitat units for the Lower Owens River using Habitat Suitability Index models. <u>http://www.inyowater.org/LORP</u>

AHLBORN, G. 1999a. Lower Owens River Project. Technical Memorandum # 19. Riparian Wildlife Management Summary of Management Concepts and Priorities. <u>http://www.inyowater.org/LORP</u>

AHLBORN, G. 1999b. Lower Owens River Project. Technical Memorandum # 20. Special status wildlife and plants species accounts. Ecosystem Sciences. <u>http://www.inyowater.org/LORP</u>

ASKINS, R.A. 2000. Restoring North America's Birds: Lessons from landscape ecology. Yale University Press. 288pp.

BALLARD, G., G.R. GEUPEL, N. NUR AND T. GARDALI. *In review*. Long-term declines and decadal patterns in population trends of songbirds in Western North America 1979-1999. Point Reyes Bird Observatory, 4990 Shoreline Highway, Stinson Beach, CA 94970 USA

BALLARD, G. 2002. Pointcnt 2.75. Point Reyes Bird Observatory, Stinson Beach, CA. <u>http://www.prbo.org/tools/</u>

CDFG (CALIFORNIA DEPARTMENT OF FISH AND GAME) AND PRBO. 2001. California Bird Species of Special Concern: Draft List and Solicitation of input. http://www.prbo.org/BSSC/draftBSSClist.pdf

CDFG (CALIFORNIA DEPARTMENT OF FISH AND GAME). 2002. State and Federally Listed Endangered and Threatened Animals of California. <u>http://www.dfg.ca.gov</u> accessed Sept. 23, 2002

CDFG (CALIFORNIA DEPARTMENT OF FISH AND GAME). 2002. Habitat Conservation Planning Branch. <u>http://www.dfg.ca.gov/hcpb/species/t\_e\_spp/fullypro/fully\_pro.shtml</u> accessed Sept. 22, 2002

CPIF (CALIFORNIA PARTERS IN FLIGHT). 2000. Version 1.0. The draft grassland bird conservation plan: a strategy for protecting and managing grassland habitats and associated birds in California (B. Allen, lead author). Point Reyes Bird Observatory, Stinson Beach, CA. http://www.prbo.org/CPIF/Grasslnd/Grassland.html.

DESANTE, D.F. AND T.L. GEORGE. 1994. Population trends in landbirds of western North America. In A Century of Avifaunal Change in Western North America. Studies in Avian Biology No. 15. Cooper Ornithological Society.

ESRI. 2000. ArcView Geographic Information System version 3.2a. Redlands, CA: Environmental Systems Research Institute, Inc.

FISHER. A.K. 1893. Report on the ornithology of the Death Valley Expedition of 1891, comprising of notes on the birds observed in southern California, southern Nevada, and parts of Arizona and Utah. North American Avifauna, No. 7.

GIBBS, J.P. 1995. MONITOR version 7.0 (web version, based on version 6.2).

GAINES, D. 1974. A new look at the nesting riparian avifauna of the Sacramento River Valley, California. Western Birds. 5:61-84.

GARDALI, T. G. BALLARD, N. NUR, AND G.R. GEUPEL. 2000. Demography of a declining population of Warbling Vireos in coastal California. Condor 102:601-609.

GRINNELL, J. AND A.H. MILLER. 1944. The distribution of the birds of California. Pacific Coast Avifauna 27. Cooper Ornithological Club, Berkeley, CA.

HEATH, S.K., G. BALLARD, AND C. MCCREEDY. 2001. Eastern Sierra Riparian Songbird Conservation: 1998-2000 final report and Mono Basin 2000 Progress report. PRBO contribution # 1002. Stinson Beach, CA.

KREBS, C.J. 1989. Ecological methodology. Harper and Row Publishers, New York, New York: 654 pp.

LAMBECK, R.J. 1997. Focal species: a multi-species umbrella for nature conservation. Conservation Biology Vol. 11, No.4:849-856.

LORP (LOWER OWENS RIVER PROJECT). 1999. Inyo County / Los Angeles Water Agreement, Technical Memoranda, Action Plan and Memorandum of Understanding concerning the Lower Owens River Project. http://www.inyowater.org/LORP.

MACARTHUR, R.H. 1965. Patterns of species diversity. Biological Reviews 40: 510 - 533.

MANLEY, P. AND DAVIDSON.1993. A risk analysis of neotropical migrant birds in California, USFS report, Region 5, San Francisco, CA.

MILLER, A. H. 1951. An analysis of the distribution of the birds of California. Univ. Calif. Publication Zool. 50: 531-643.

NUR, N., S.L. JONES AND G. R. GEUPEL. 1999. A statistical guide to data analysis of avian population monitoring Programs. U.S. Department of Interior, Fish and Wildlife Service, BTP-R6001-1999, Washington, D.C.

RHJV (RIPARIAN HABITAT JOINT VENTURE). 2000. Version 1.0. The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California. California Partners in Flight: <u>http://www.prbo.org/CPIF/Riparian/Riparian.html</u>.

RALPH, C. J., G. R. GEUPEL, P. PYLE, T. E. MARTIN, AND D. F. DESANTE. 1993 . Field Methods for Monitoring Landbirds. USDA Forest Service Publication: PSW-GTR 144, Albany, CA.

ROSENSTOCK, S.S, D.R. ANDERSON, K.M. GIESEN, T. LEUKERING, M.F. CARTER, M.F. 2002. Landbird counting techniques: current practices and an alternative. Auk: 119(1): 46-53.

ROTHSTEIN, S.R., J. VERNER, AND E. STEVENS. 1984. Radio-tracking confirms a unique diurnal pattern of spatial occurrence in the parasitic Brown-headed Cowbird. Ecology 65(1).

SAWYER, J. O. AND T. KEELER-WOLF. 1995. A manual of California vegetation. California Native Plant Society. Sacramento, CA.

STATA CORP. 1999. Stata Statistical Software, Release 6.0. Stata Corp., College Station, TX.

THOMAS, L., J.L. LAAKE, S. STRINDBERG, F.F.C. MARQUES, S.T. BUCKLAND, D.L. BORCHERS, D.R. ANDERSON, K.P. BURNHAM, K.P., S.L. HEDLEY, AND J.H. POLLARD. 2002. Distance 4.0. Release "X" 1. Research Unit for Wildlife Population Assessment, University of St. Andrews, UK. <u>http://www.ruwpa.st-and.ac.uk/distance/</u>

USFWS (UNITED STATES FISH AND WILDLIFE SERVICE). 1995. Non game Birds of Management Concern. <u>http://www.sacramento.fws.gov/es/spp\_concern.htm</u> accessed Sept. 22, 2002

Site	Code	# points	Visit 1	Visit 2	Visit 3
Owens River N. of Tinemaha Res.	ORTI	8	28 May	13 June	26 June
Goodale	GOOD	15	26 May	16 June	26 June
Black Rock Springs	BLRS	15	28 May	13 June	25 June
Crystal Ridge	CRRI	15	27 May	13 June	25 June
Mc Iver	MCIV	15	27 May	12 June	25 June
Owens River North of Mazourka	ORMC	15	27 May	12 June	25 June
South of Mazourka	SOMA	15	26 May	12 June	26 June
Manzanar	MANZ	15	27May	12 June	26 June
Alabama Gates	ALGA	15	26 May	11 June	27 June
Pangborn Lane	PANG	15	27 May	10 June	26 June
Narrow Gauge	NAGA	15	25 May	10 June	26 June
Delta	DELT	15	25 May	10 June	27 June
Total		173 points			

Appendix 1 – Table A. Point count transects, 4-letter codes, number of points, and census dates, 2002. Listed from north to south.

Appendix 2 - Table B. GPS locations of all point count stations established in 2002 (ORMC and ORTI established i	n
1999), in decimal degrees, NAD83.	

ALGA   1   36.68756   -118.09063   DELT   14   38.580457   -117.996455   NAGA   12   35.594311   -118.02706     ALGA   3   36.68544   -118.009137   DE   -118.02706   -118.02706   -118.02706     ALGA   3   56.81349   -118.009013   GODD   2   35.77680   -118.02120   ORMC   1   35.552289   -118.02706     ALGA   3   56.77774   -118.09475   GODD   3   36.977481   -118.09476   GODD   6   36.96709   -118.14540     ALGA   9   36.67759   -118.094745   GODD   7   36.96521   -118.104617   ORMC   3   38.96460   -118.134540     ALGA   13   36.67769   -118.09519   GODD   10   36.95729   -118.13500   ORMC   38.81730   -118.13380     ALGA   13   36.67621   -118.06219   GODD   12   36.9579   -118.13520   ORMC   38.81730   -118.13380     ALGA	station	site	lat	lon	station	site	lat	lon	station	site	lat	lon
ALGA   2   36.86344   -118.00982   COD   1   36.55830   -117.904130   NAGA   13   35.5289   -118.02470     ALGA   36.81344   -118.00985   COD   2   38.97460   -118.02470   NAGA   15   35.52283   -118.04470     ALGA   36.87743   -118.09475   COD   3   35.97043   -118.02470   ORMC   2   38.80460   -118.13940     ALGA   3   68.7753   -118.09458   COD   7   36.989709   -118.00470   COMC   3   38.80460   -118.13440     ALGA   13   36.689741   -118.09428   CPMC   5   38.81720   -118.13440     ALGA   13   36.689491   -118.062181   COD   9   36.95161   -118.19500   CPMC   6   38.81720   -118.13340     ALGA   13   36.80261   -118.062181   COD   13   36.94293   -118.13340     ALGA   13   36.802610   -118.062181   COD	ALGA	1	36.687765	-118.090083	DELT	14	36.560547	-117.995455	NAGA	12	36.596323	-118.031015
ALGA   3   36.86344   -118.009013   COND   1   36.972609   -118.024712   NAGA   14   36.552289   -118.024706     ALGA   5   36.69149   -118.049001   -118.02490   ORNC   1   36.552283   -118.02490     ALGA   6   36.677765   -118.049755   CODD   3   36.977660   -118.040142   ORNC   2   38.80460   -118.133400     ALGA   3   66.77743   -118.002449   OCNC   3   36.80460   -118.134400     ALGA   9   36.877660   -118.00149   GOND   7   36.86221   -118.134400     ALGA   13   36.869794   -118.00149   GOND   118.13440   ORMC   3   38.81730   -118.13340     ALGA   13   36.86720   -118.00218   GOND   12   35.85759   -118.13440   ORMC   3   38.81730   -118.13340     ALGA   13   36.86220   -118.02711   0.855759   -118.132124   ORMC   13 </td <td>ALGA</td> <td>2</td> <td>36.685844</td> <td>-118.091397</td> <td>DELT</td> <td>15</td> <td>36.558530</td> <td>-117.994130</td> <td>NAGA</td> <td>13</td> <td>36.594311</td> <td>-118.029664</td>	ALGA	2	36.685844	-118.091397	DELT	15	36.558530	-117.994130	NAGA	13	36.594311	-118.029664
ALGA   4   36.851949   -118.024910   CNACA   15   55.852233   -118.024970     ALGA   5   36.877060   -118.004106   COOD   3   36.97043   -118.201420   CNACC   1   36.804600   -118.132704     ALGA   7   36.87745   -118.004575   GOOD   5   36.987043   -118.201492   ORNCC   3   36.806600   -118.13440     ALGA   9   36.67763   -118.0081194   GOOD   7   36.98347   -118.13440     ALGA   10   36.669764   -118.081194   GOOD   7   36.98347   -118.13420   -118.133800     ALGA   13   36.667562   -118.082181   GOOD   113.956934   -118.134943   -118.133800     ALGA   13   36.667562   -118.082181   GOOD   13   36.95161   -118.19420   ORNC   13   36.822090   -118.13420     ALGA   15   36.96304   -118.08219   ORNC   13   36.822090   -118.134204   ORNC <td>ALGA</td> <td>3</td> <td>36.683645</td> <td>-118.090882</td> <td>GOOD</td> <td>1</td> <td>36.972899</td> <td>-118.208712</td> <td>NAGA</td> <td>14</td> <td>36.592889</td> <td>-118.027609</td>	ALGA	3	36.683645	-118.090882	GOOD	1	36.972899	-118.208712	NAGA	14	36.592889	-118.027609
ALGA   5   36.870000   -118.090455   GOOD   3   36.877043   -118.090455   GOOD   4   36.80000   -118.20142   ORNC   2   38.802700   -118.13440     ALGA   8   36.87713   -118.092449   OCOD   6   36.980709   -118.200491   ORNC   4   38.802400   -118.13440     ALGA   8   36.867745   -118.092449   OCOD   6   36.980741   -118.1092049   ORNC   6   38.81730   -118.133340     ALGA   13   36.66752   -118.081919   OCOD   13   36.95771   -118.19540   ORNC   7   36.85779   -118.133340     ALGA   14   36.66752   -118.081919   OCOD   13   36.95779   -118.19540   ORNC   10   38.82500   -118.13844     ALGA   14   36.83020   -118.19740   ORNC   13   36.94253   -118.119170     BLRS   36.34265   -118.19749   ORNC   14   36.822500   -118.19171	ALGA	4	36.681349	-118.090813	GOOD	2	36.971660	-118.206470	NAGA	15	36.592283	-118.024970
ALGA   6   36.877765   -118.09353   GOOD   5   36.89700   -112.201470   ORKC   2   38.804660   -111.134440     ALGA   7   36.87715   -118.093538   GOOD   5   36.897070   -112.204870   ORKC   4   38.804660   -111.134440     ALGA   9   36.87715   -118.09119   GOOD   7   36.89231   -111.8149220   ORKC   5   36.81730   -118.133800     ALGA   11   36.66974   -118.082710   GOOD   13   36.95934   -118.119474   ORKC   7   36.817304   -118.133800     ALGA   13   36.667590   -118.082181   GOOD   113.85430   ORKC   13   36.81740   -118.133800     ALGA   13   36.66749   -118.082181   GOOD   13   36.957591   -118.14372184   ORKC   13   36.822600   -118.14320     BLRS   2   36.836441   -118.082700   -118.143270   ORKC   13   38.826560   -118.142270	ALGA	5	36.679080	-118.091086	GOOD	3	36.970443	-118.204120	ORMC	1	36.802700	-118.130940
ALGA   7   36.87743   -118.032449   OCNC   3   88.00469   -118.134440     ALGA   8   36.87715   -118.032449   OCNC   4   38.004690   -118.134440     ALGA   9   36.877165   -118.031494   OCNC   6   38.81720   -118.133400     ALGA   10   36.669724   -118.03519   OCNC   6   38.815370   -118.133340     ALGA   12   36.66752   -118.06519   OCNC   7   36.857371   -118.139320   ORNC   7   36.815771   -118.133340     ALGA   14   36.66752   -118.06519   OCNC   118.133420   ORNC   10   36.81550   -118.13846     ALGA   14   36.66521   -118.06519   OCNC   118.05219   OCNC   13   36.81757   NAL2   36.81743   -118.142240   ORNC   14   36.825200   -118.14022     BLRS   36.303080   -118.16331   MAL2   36.37242   -118.113270   ORNC   14   36.	ALGA	6	36.677765	-118.094755	GOOD	4	36.969005	-118.201942	ORMC	2	36.804660	-118.132770
ALGA   8   86.73715   -118.09149   GOOD   6   36.69250   -118.198420   ORMC   5   36.801270   -118.133400     ALGA   10   36.669744   -118.09710   GOOD   8   36.695261   -118.198747   ORMC   5   36.811270   -118.133400     ALGA   11   36.669730   -118.08710   GOOD   9   36.851761   -118.195430   ORMC   9   36.81730   -118.133480     ALGA   13   36.667560   -118.02710   GOOD   12   36.657561   -118.19543   ORMC   9   36.81730   -118.132420     ALGA   15   36.664490   118.07790   GOOD   12   36.654711   -118.19270   ORMC   13   36.624290   -118.14220     BLRS   2   36.932043   +118.18274   GOOD   14   36.424200   ORMC   13   36.624290   -118.14220     BLRS   36.932049   +118.18794   MANZ   1   36.742207   -118.13270   ORMC   13<	ALGA	7	36.675743	-118.093538	GOOD	5	36.967009	-118.200617	ORMC	3	36.806490	-118.134540
ALGA   9   86.671650   -118.09194   GOOD   7   36.692241   -118.19876   ORMC   6   36.811270   -118.133804     ALGA   10   36.669341   -118.09570   GOOD   9   36.951511   -118.195741   ORMC   6   36.815370   -118.133846     ALGA   12   36.667520   -118.05216   GOOD   13   36.955751   -118.195280   ORMC   10   36.821760   -118.139846     ALGA   14   36.665521   -118.07992   GOOD   13   36.955756   -118.192240   ORMC   12   36.821760   -118.136843     ALGA   14   36.932663   -118.184239   ORMC   12   36.822500   -118.140220     BLRS   36.932663   -118.184239   MANZ   136.74267   -118.112421   ORMC   14   36.825500   -118.142231     BLRS   36.932653   -118.18439   MANZ   136.733346   -118.112470   ORM1   3   37.017800   -118.238400   -118.238490	ALGA	8	36.673715	-118.092449	GOOD	6	36.964751	-118.200499	ORMC	4	36.808650	-118.134540
ALGA   10   386.69744   -118.03700   8   366.95111   -118.19776   ORMC   7   36.813430   -118.13380     ALGA   12   36.66730   -118.08710   000D   9   36.91734   -118.195800   ORMC   9   36.81730   -118.13380     ALGA   13   36.66752   -118.00216   GOOD   12   36.95516   -118.19528   ORMC   9   36.81730   -118.13380     ALGA   13   36.66542   -118.00216   GOOD   12   36.955161   -118.19228   ORMC   13   36.824290   -118.134220     BLRS   13   36.932014   118.18727   ORMC   13   36.824290   -118.14220     BLRS   36.932039   -118.18729   NANZ   13   36.72207   -118.13270   ORMC   13   36.822900   -118.144250     BLRS   36.932039   -118.18764   MANZ   3   36.73262   -118.10270   ORTH   37.061080   -118.23880     BLRS   36.9320361	ALGA	9	36.671650	-118.091194	GOOD	7	36.963281	-118.198428	ORMC	5	36.811270	-118.133600
ALGA   11   36.66841   -118.037100   GOOD   9   36.69334   -118.19541   ORMC   8   36.19370   -118.13384     ALGA   13   36.66752   -118.092161   GOOD   10   36.65571   -118.193248   ORMC   10   36.82060   -118.139848     ALGA   14   36.66572   -118.09216   GOOD   12   36.655731   -118.19240   ORMC   10   36.821760   -118.136848     ALGA   14   36.382630   -118.182491   ORMC   12   36.82250   -118.140220     BLRS   2   36.393426   -118.184239   ORMC   12   36.82251   -118.14223     BLRS   36.393426   -118.18429   MANZ   1   36.74207   -118.112270   ORMC   12   36.82251   -118.142231     BLRS   5   35.93086   -118.18331   MANZ   13.673426   -118.23480   -118.23480     BLRS   7   36.92513   -118.18331   MANZ   13.673426   -118.23480	ALGA	10	36.669794	-118.089552	GOOD	8	36.961511	-118.196776	ORMC	6	36.813430	-118.133940
ALGA   12   36.867/300   -118.080/19   GODD   10   36.95710   -118.198000   ORMC   9   36.819550   -118.138484     ALGA   13   36.665621   -118.00196   GOOD   12   36.95759   -118.19128   ORMC   9   36.821760   -118.139493     ALGA   15   36.695614   -118.192409   ORMC   10   36.822760   -118.139128     BLRS   2   36.936104   -118.184939   AALX   11   36.644245   -118.1192409   ORMC   13   36.8225600   -118.140220     BLRS   3   36.932614   -118.146439   MANZ   3   36.742627   -118.118240   ORMC   15   36.8225600   -118.142231     BLRS   5   36.930986   -118.118270   MANZ   3   36.73252   -118.108450   ORTI   3   37.072800   -118.238640     BLRS   3   86.92753   -118.17715   MANZ   7   36.73315   -118.106751   ORTI   37.073400   -118.2358640	ALGA	11	36.668941	-118.087100	GOOD	9	36.959344	-118.195741	ORMC	7	36.815370	-118.133380
ALGA   13   38.68/262   -118.02/181   GODD   11   38.695/16   -118.19483   ORMC   10   38.82000   -118.13420     ALGA   14   38.68/260   -118.007992   GOOD   13   36.95181   -118.192184   ORMC   10   38.821200   -118.13420     BLRS   13   38.93208   -118.118273   ORMC   12   38.824200   -118.14211     BLRS   38.934265   -118.18479   MANZ   13   36.42670   -118.142420     BLRS   38.932039   -118.18577   MANZ   2   36.742267   -118.113270   ORMC   15   38.828521   -118.142450     BLRS   6   36.929090   -118.181599   MANZ   4   36.733262   -118.108652   ORTI   2   37.078890   -118.1234840     BLRS   6   36.929090   -118.17746   MANZ   4   36.73324   -118.102050   ORTI   3   37.081400   -118.234840     BLRS   38.928540   -118.17746   MANZ	ALGA	12	36.667390	-118.085019	GOOD	10	36.957171	-118.195000	ORMC	8	36.817304	-118.133648
ALLA   14   36.862/2   -118.109196   GUOD   12   36.85799   -118.19128   OHMC   110   36.821760   -118.139130     BLRS   1   38.98206   -118.07544   GOOD   14   36.945164   -118.192409   OHMC   11   36.825560   -118.14220     BLRS   3   38.93206   -118.16439   MANZ   1   36.744445   -118.114041   OFMC   13   36.825960   -118.14221     BLRS   3   38.930266   -118.118311   MANZ   3   36.742027   -118.118270   OFMC   15   36.822960   -118.234840     BLRS   3   36.922697   -118.1179454   MANZ   3   36.73124   -118.108470   OFTT   3   37.081060   -118.235860     BLRS   13   36.922697   -118.17715   MANZ   7   36.73124   -118.10478   OFTT   3   37.074400   -118.23530     BLRS   13   36.916677   -118.17715   MANZ   10   36.73166   -1	ALGA	13	36.667562	-118.082181	GOOD	11	36.955116	-118.195483	ORMC	9	36.819550	-118.134820
ALLAR   15   36.684489   -118.07/992   GODD   13   36.951681   -118.192/14   ORMC   11   36.827/00   -118.14220     BLRS   2   36.93014   -118.18129   GODD   15   36.947129   -118.193273   ORMC   13   36.822590   -118.141220     BLRS   3   36.334269   -118.186757   MANZ   2   36.742267   -118.113279   ORMC   15   36.829900   -118.14420     BLRS   5   36.330269   -118.18159   MANZ   4   36.73036   -118.10962   ORTI   2   37.078890   -118.23680     BLRS   6   36.922552   -118.17469   MANZ   6   36.735315   -118.10771   ORTI   5   37.08160   -118.23560     BLRS   9   36.92456   -118.17715   MANZ   6   36.735315   -118.10205   ORTI   7   37.07320   -118.23550     BLRS   13   36.91556   -118.17773   MANZ   16.7353121   -118.102051 <t< td=""><td>ALGA</td><td>14</td><td>36.665921</td><td>-118.080196</td><td>GOOD</td><td>12</td><td>36.953759</td><td>-118.193128</td><td>ORMC</td><td>10</td><td>36.820600</td><td>-118.136930</td></t<>	ALGA	14	36.665921	-118.080196	GOOD	12	36.953759	-118.193128	ORMC	10	36.820600	-118.136930
BLRS   1   36.932/16   -116.19/24   GODD   14   36.942/23   -116.19/24/9   ORMC   12   36.22/230   -116.14/220     BLRS   3   36.93205   -118.180439   MANZ   1   36.74445   -118.11270   ORMC   14   36.822521   -118.114251     BLRS   3   36.932056   -118.118271   MANZ   36.744267   -118.112270   ORMC   15   36.822900   -118.144450     BLRS   5   36.930866   -118.182311   MANZ   36.732682   -118.108653   ORTI   3   7.078800   -118.236800     BLRS   3   36.925532   -118.17285   MANZ   5   36.735315   -118.107571   ORTI   4   37.086340   -118.235840     BLRS   13   36.916707   -118.17261   MANZ   7   36.735151   -118.10478   ORTI   6   37.07440   -118.235840     BLRS   13   36.91677   -118.17237   MANZ   10   36.731624   -118.1002860   2	ALGA	15	36.664499	-118.077992	GOOD	13	36.951581	-118.192184	ORMC	11	36.821760	-118.139170
BLRS   2   30.800/H   116 106 / 2   000/H   13   30.947 / 29   116 1192/13   ORNC   14   30.622390   116 114 142231     BLRS   4   36.93029   -118.186757   MANZ   2   36.742267   -118.113279   ORNC   15   36.829000   -118.144450     BLRS   5   36.93029   -118.1185757   MANZ   4   36.730366   -118.109652   ORTI   2   37.078890   -118.233680     BLRS   6   36.92552   -118.178253   MANZ   6   36.735315   -118.107701   ORTI   5   37.068640   -118.235680     BLRS   9   36.92552   -118.177469   MANZ   7   36.735315   -118.102035   ORTI   5   37.068640   -118.235500     BLRS   13   36.918554   -118.17773   MANZ   9   36.731680   -118.102035   ORTI   7   37.07320   -118.23530     BLRS   13   36.914572   -118.170773   MANZ   12   36.731680	DLRO	1	30.930200	-110.10/044	COOD	14	30.949253	-110.192409	ORIVIC	12	30.024290	-110.140220
BLRS   3   30.934200   -118.1180933   MANZ   1   30.444430   18.18747   ORNIC   18   30.82021   -118.14230     BLRS   5   36.930969   -118.183311   MANZ   3   36.740207   -118.112270   ORNIC   1   37.077260   -118.233680     BLRS   6   36.920980   -118.117445   MANZ   36.737262   -118.108653   ORTI   3   37.081080   -118.23860     BLRS   8   36.9223450   -118.1174459   MANZ   7   36.731261   -118.107201   ORTI   4   37.08404   -118.238340     BLRS   10   36.923450   -118.177115   MANZ   7   36.731860   -118.102035   ORTI   6   37.07340   -118.238340     BLRS   10   36.915557   118.17087   MANZ   1   36.731860   -118.102035   ORTI   6   37.07340   -118.238500     BLRS   13   36.914557   -118.1707373   MANZ   12   36.731860   -118.1060763	DLRO	2	30.930014	-110.100129	GOOD	15	30.947129	-110.193273	ORIVIC	13	30.023390	-110.141910
BLRS   5   36.32039   118.1130731   MANZ   2   36.742207   118.112270   ORTI   1   37.077260   118.1233680     BLRS   6   36.92099   118.1181589   MANZ   4   36.73226   118.108853   ORTI   2   37.07880   118.1233680     BLRS   7   36.927532   118.1178474   MANZ   6   36.73315   118.10701   ORTI   4   37.07880   118.236540     BLRS   9   36.92450   118.177115   MANZ   8   36.73124   118.107011   ORTI   6   37.07440   -118.235360     BLRS   10   36.917554   -118.177115   MANZ   8   36.731860   -118.008081   ORTI   7   37.07320   -118.235360     BLRS   13   36.91554   -118.17377   MANZ   11   36.73166   118.008754   PANG   1   36.630077   -118.079360     CRRI   1   36.83757   -118.17377   MANZ   14   36.72168   118.008754	DLRO	3	36.934203	118 185757		י ר	36 742267	-118 113270		14	36,820000	118 144251
BLRS   5   30.30030   118.10301   118.10301   118.234840     BLRS   7   36.927533   -118.17945   MANZ   5   36.737262   ORTI   2   37.078890   -118.233666     BLRS   8   36.92553   -118.17745   MANZ   6   36.73316   -118.109652   ORTI   4   37.083640   -118.233566     BLRS   9   36.921181   -118.17715   MANZ   7   36.733121   -118.102035   ORTI   5   37.085610   -118.233580     BLRS   11   36.916707   -118.177315   MANZ   9   36.731660   -118.102035   ORTI   7   37.072440   -118.233780     BLRS   13   36.916572   -118.17737   MANZ   12   36.720662   118.009260   PANG   2   36.641335   -118.079242     BLRS   15   36.91255   -118.170801   MANZ   12   36.72066   PANG   2   36.643361   -118.079340     CRRI   36.854565   -118.170	DLRO	4 5	30.932039	-110.100707		2	36 740207	-118 112279		10	30.029900	-110.144400
BLRS   7   36.92533   -118.179454   MARL   4   36.737262   -118.108853   ORTI   3   37.081080   -118.233680     BLRS   8   36.925532   -118.178253   MANZ   6   36.733215   -118.107201   ORTI   4   37.083640   -118.233630     BLRS   9   36.924181   -118.17715   MANZ   8   36.73124   -118.100205   ORTI   6   37.074400   -118.233530     BLRS   11   36.916554   -118.17373   MANZ   9   36.73166   -118.100038   ORTI   8   37.072440   -118.229490     BLRS   14   36.915554   -118.17373   MANZ   12   36.726168   -118.1009744   PANG   2   36.63307   -118.079360     CRRI   13   36.912255   -118.170201   MANZ   13   36.724012   -118.097148   PANG   3   36.63707   -118.073960     CRRI   3   36.83398   -118.16751   MCIV   2   36.55760   -11	BLRS	6	36 920090	-118 181580	MANZ	1	36 730386	-118 109652	ORTI	2	37.078890	-118 234840
BLRS   B   38.92532   -118.172253   MANZ   6   36.733515   -118.107571   ORTI   4   37.083840   -118.233360     BLRS   9   36.923450   -118.17749   MANZ   7   36.73312   -118.107571   ORTI   5   37.083840   -118.2335360     BLRS   10   36.918658   -118.177115   MANZ   8   36.731860   -118.102035   ORTI   6   37.07320   -118.2335360     BLRS   12   36.918554   -118.17737   MANZ   10   36.728166   -118.098961   PANG   1   36.633077   -118.029242     BLRS   13   36.914572   -118.171267   MANZ   11   36.722012   -118.097464   PANG   2   36.643261   -118.029242     BLRS   13   36.814573   -118.167051   MANZ   15   36.721706   PANG   4   36.637437   -118.07773     CRRI   3   36.83240   -118.161670   MANZ   15   36.72176   PANG   9 </td <td>BLRS</td> <td>7</td> <td>36 927533</td> <td>-118 179454</td> <td>MANZ MANZ</td> <td>5</td> <td>36 737262</td> <td>-118 108853</td> <td>ORTI</td> <td>2</td> <td>37 081080</td> <td>-118 235660</td>	BLRS	7	36 927533	-118 179454	MANZ MANZ	5	36 737262	-118 108853	ORTI	2	37 081080	-118 235660
BLRS   9   36.822450   -118.177469   MANZ   7   36.73121   -118.107201   ORTI   5   37.085810   -118.23350     BLRS   10   36.921181   -118.177469   MANZ   7   36.73124   -118.107201   ORTI   6   37.04940   -118.23350     BLRS   11   36.916564   -118.17715   MANZ   9   36.731860   -118.102035   ORTI   8   37.072440   -118.23950     BLRS   14   36.916554   -118.177173   MANZ   12   36.720162   -118.099454   PANG   1   36.443261   -118.060652     BLRS   14   36.912255   -118.170801   MANZ   13   36.724012   -118.097448   PANG   3   36.633777   -118.07753     CRRI   3   36.883898   -118.169513   MCIV   1   36.635766   -118.147322   PANG   5   36.633743   -118.07753     CRRI   3   36.880540   -118.165147   MCIV   2   36.635766   -	BLRS	8	36 925532	-118 178253	MANZ MANZ	6	36 735315	-118 107571	ORTI	4	37 083640	-118 236340
BLRS   10   36.921181   -118.177115   MANZ   8   36.731924   -118.104878   ORTI   6   37.074940   -118.23350     BLRS   11   36.91858   -118.177115   MANZ   9   36.731860   -118.100085   ORTI   7   37.07320   -118.231780     BLRS   12   36.91554   -118.171773   MANZ   10   36.73166   -118.100085   ORTI   8   37.072440   -118.231780     BLRS   13   36.91554   -118.17127   MANZ   11   36.726168   -118.097454   PANG   1   36.641335   -118.079242     BLRS   15   36.912255   -118.170801   MANZ   13   36.72402   -118.097454   PANG   4   36.63307   -118.079360     CRRI   3   36.88753   -118.167561   MCIV   1   36.86108   -118.16978   PANG   4   36.633107   -118.07753     CRRI   3   36.887604   -118.167551   MCIV   36.856760   -118.145755	BLRS	9	36 923450	-118 177469	MANZ	7	36 733121	-118 107201	ORTI	5	37 085810	-118 235360
BLRS   11   36.918858   -118.177115   MARZ   9   36.731860   -118.102035   ORTI   7   37.07320   -118.231780     BLRS   12   36.916707   -118.177115   MARZ   10   36.731860   -118.102035   ORTI   8   37.07320   -118.221780     BLRS   13   36.91554   -118.17715   MARZ   11   36.726062   -118.099454   PANG   1   36.641335   -118.079242     BLRS   13   36.91255   -118.107801   MARZ   13   36.726168   -118.097148   PANG   3   36.639077   -118.079342     CRRI   13   36.857573   -118.169616   MARZ   14   36.81790   -118.07100   PANG   5   36.637436   -118.077157     CRRI   36.883898   -118.16551   MCIV   1   36.85760   -118.147755   PANG   6   36.631910   -118.071120     CRRI   5   36.87648   -118.16510   MCIV   5   36.851208   -118.145337	BLRS	10	36 921181	-118 177115	MANZ	, 8	36 731924	-118 104878	ORTI	6	37 074940	-118 233530
BLRS   12   36.916707   -118.176311   MANZ   10   36.730186   -118.10008   ORTI   8   37.07240   -118.229490     BLRS   13   36.91554   -118.177373   MANZ   11   36.720180   -118.099161   PANG   1   36.643261   -118.0078242     BLRS   15   36.912255   -118.170801   MANZ   13   36.724012   -118.097100   PANG   3   36.63077   -118.0778242     BLRS   14   36.724012   -118.097100   PANG   3   36.637307   -118.0778242     CRRI   2   36.863766   -118.165053   MANZ   15   36.719683   -118.07148   PANG   4   36.63767   -118.07773     CRRI   3   36.887860   -118.165147   MCIV   2   36.85766   -118.147322   PANG   7   36.634179   -118.0711023     CRRI   6   36.878640   -118.165147   MCIV   3   36.85766   -118.143732   PANG   9   36.630891	BLRS	11	36 918858	-118 177115	MANZ	9	36 731860	-118 102035	ORTI	7	37 073320	-118 231780
BLRS   13   36.915554   -118.173773   MANZ   11   36.728062   -118.098961   PANG   1   36.643261   -118.080652     BLRS   14   36.914572   -118.171257   MANZ   12   36.724168   -118.097454   PANG   2   36.641335   -118.079242     BLRS   15   36.91255   -118.170801   MANZ   13   36.724716   -118.097148   PANG   4   36.637307   -118.077573     CRRI   2   36.885455   -118.169503   MANZ   15   36.71968   -118.14575   PANG   5   66.63737   -118.07773     CRRI   36.882740   -118.165751   MCIV   2   36.858766   -118.147332   PANG   7   36.631910   -118.071023     CRRI   6   38.87604   -118.165141   MCIV   3   36.85203   -118.14537   PANG   9   36.630691   -118.06836     CRRI   7   36.87489   -118.16513   MCIV   5   36.85203   -118.145337	BLRS	12	36.916707	-118.176311	MANZ	10	36,730186	-118,100088	ORTI	8	37.072440	-118.229490
BLRS   14   36.914572   -118.171257   MANZ   12   36.726168   -118.097454   PANG   2   36.641335   -118.079242     BLRS   15   36.912255   -118.170801   MANZ   13   36.724012   -118.097140   PANG   3   66.63077   -118.0773300     CRRI   2   36.885465   -118.169616   MANZ   15   36.719683   -118.097446   PANG   5   36.637436   -118.07794     CRRI   3   36.83898   -118.167551   MCIV   1   38.681008   -118.146755   PANG   6   6   66.65875   -118.071023     CRRI   4   36.887604   -118.165147   MCIV   3   36.855188   -118.145395   PANG   9   36.630891   -118.068350     CRRI   6   36.87604   -118.16151   MCIV   6   36.851133   -118.145395   PANG   9   36.630691   -118.068350     CRRI   9   36.87563   -118.161510   MCIV   7   36.8648	BLRS	13	36.915554	-118.173773	MANZ	11	36.728062	-118.098961	PANG	1	36.643261	-118.080652
BLRS   15   36.912255   -118.170801   MANZ   13   36.724012   -118.097100   PANG   3   36.639077   -118.079360     CRRI   1   36.887573   -118.169616   MANZ   14   36.721796   -118.097148   PANG   4   36.637307   -118.077573     CRRI   2   36.885465   -118.16551   MCIV   1   36.861008   -118.146978   PANG   6   36.637436   -118.072912     CRRI   4   36.88240   -118.16514   MCIV   2   36.856760   -118.143732   PANG   7   36.631910   -118.071023     CRRI   6   36.87640   -118.165145   MCIV   4   36.855188   -118.143357   PANG   9   36.629153   -118.066834     CRRI   7   36.87469   -118.16510   MCIV   7   36.845148   -118.144580   PANG   12   36.629153   -118.064037     CRRI   9   36.873593   -118.157841   MCIV   7   36.848161	BLRS	14	36.914572	-118.171257	MANZ	12	36.726168	-118.097454	PANG	2	36.641335	-118.079242
CRRI   1   36.887573   -118.169616   MANZ   14   36.72796   -118.097148   PANG   4   36.637307   -118.077573     CRRI   2   36.885465   -118.169503   MANZ   15   36.719683   -118.096456   PANG   5   36.635875   -118.077573     CRRI   3   36.88398   -118.167551   MCIV   2   36.856760   -118.146755   PANG   7   36.631910   -118.0712912     CRRI   6   36.8604   -118.163045   MCIV   3   36.85760   -118.145755   PANG   8   36.631910   -118.071023     CRRI   6   36.876748   -118.163045   MCIV   4   36.85183   -118.14537   PANG   10   36.629153   -118.066834     CRRI   8   36.876748   -118.160153   MCIV   7   36.848404   -118.143529   PANG   11   36.620566   -118.061276     CRRI   10   36.871639   -118.164027   MCIV   8   36.48104	BLRS	15	36.912255	-118.170801	MANZ	13	36.724012	-118.097100	PANG	3	36.639077	-118.079360
CRRI   2   36.885465   -118.169503   MANZ   15   36.719683   -118.096456   PANG   5   36.637436   -118.074794     CRRI   3   36.83898   -118.16551   MCIV   1   38.861008   -118.146778   PANG   6   36.633875   -118.071291     CRRI   4   36.882740   -118.16514   MCIV   2   38.85766   -118.14372   PANG   7   36.631910   -118.071023     CRRI   6   36.87490   -118.16510   MCIV   4   38.85188   -118.14395   PANG   9   36.630891   -118.068050     CRRI   7   36.874992   -118.16513   MCIV   5   36.851133   -118.14320   PANG   10   36.629756   -118.064087     CRRI   10   36.874992   -118.16513   MCIV   8   36.84144   -118.14320   PANG   13   36.630569   -118.064087     CRRI   13   36.86767   -118.151323   MCIV   10   36.84144   -118.145	CRRI	1	36.887573	-118.169616	MANZ	14	36.721796	-118.097148	PANG	4	36.637307	-118.077573
CRRI   3   36.883898   -118.167551   MCIV   1   36.861008   -118.146978   PANG   6   36.63575   -118.071190     CRRI   4   36.880740   -118.165147   MCIV   2   36.856760   -118.147332   PANG   7   36.63170   -118.071190     CRRI   6   36.87604   -118.16514   MCIV   4   36.855188   -118.14395   PANG   9   36.63081   -118.06850     CRRI   7   36.876748   -118.161510   MCIV   5   36.855188   -118.145337   PANG   10   36.629153   -118.064087     CRRI   8   36.87489   -118.156103   MCIV   6   36.845113   -118.145307   PANG   11   36.630569   -118.064087     CRRI   10   36.87164   -118.156103   MCIV   8   36.845114   -118.14520   PANG   13   36.630569   -118.061276     CRRI   12   36.867567   -118.157323   MCIV   10   36.845114   -1	CRRI	2	36.885465	-118.169503	MANZ	15	36.719683	-118.096456	PANG	5	36.637436	-118.074794
CRRI   4   36.882740   -118.165147   MCIV   2   36.858766   -118.147332   PANG   7   36.634179   -118.071190     CRRI   5   36.880540   -118.164514   MCIV   3   36.855766   -118.145755   PANG   8   36.631910   -118.071023     CRRI   6   36.876604   -118.163151   MCIV   4   36.855188   -118.143935   PANG   9   36.630891   -118.066834     CRRI   8   36.874892   -118.161510   MCIV   7   36.84804   -118.144226   PANG   11   36.629153   -118.064087     CRRI   9   36.873593   -118.157841   MCIV   7   36.848761   -118.144520   PANG   12   36.630569   -118.061276     CRRI   10   36.871764   -118.157323   MCIV   9   36.845761   -118.144529   PANG   14   36.632452   -118.056851     CRRI   12   36.86767   -118.14914   MCIV   11   36.840799	CRRI	3	36.883898	-118.167551	MCIV	1	36.861008	-118.146978	PANG	6	36.635875	-118.072912
CRRI   5   36.880540   -118.164514   MCIV   3   36.856760   -118.145755   PANG   8   36.631910   -118.071023     CRRI   6   36.878604   -118.163045   MCIV   4   36.85788   -118.143395   PANG   9   36.631910   -118.066834     CRRI   8   36.8776748   -118.16510   MCIV   6   36.851133   -118.14337   PANG   10   36.629153   -118.066084     CRRI   9   36.873593   -118.157841   MCIV   7   36.848804   -118.144322   PANG   12   36.630569   -118.064087     CRRI   10   36.871764   -118.157841   MCIV   9   36.847611   -118.144520   PANG   13   36.630569   -118.064087     CRRI   13   36.867659   -118.14027   MCIV   9   36.843118   -118.145292   SOMA   1   36.795997   -118.129791     CRRI   13   36.867567   -118.14822   MCIV   13   36.836399	CRRI	4	36.882740	-118.165147	MCIV	2	36.858766	-118.147332	PANG	7	36.634179	-118.071190
CRRI   6   36.87604   -118.163045   MCIV   4   36.855188   -118.143995   PANG   9   36.630891   -118.068550     CRRI   7   36.876748   -118.161510   MCIV   5   36.85203   -118.145337   PANG   10   36.629550   -118.06834     CRRI   9   36.87678492   -118.157041   MCIV   7   36.84804   -118.145337   PANG   12   36.629756   -118.066834     CRRI   9   36.871764   -118.156103   MCIV   7   36.848604   -118.14529   PANG   13   36.630569   -118.056851     CRRI   12   36.867659   -118.151323   MCIV   10   36.845114   -118.145412   PANG   14   36.632355   -118.056851     CRRI   12   36.867659   -118.149414   MCIV   11   36.843789   -118.145123   SOMA   2   36.79597   -118.12907     CRRI   13   36.864415   -118.146147   MCIV   13   36.83638789	CRRI	5	36.880540	-118.164514	MCIV	3	36.856760	-118.145755	PANG	8	36.631910	-118.071023
CRRI   7   36.876748   -118.161510   MCIV   5   36.85203   -118.145337   PANG   10   36.629153   -118.066834     CRRI   8   36.874892   -118.160153   MCIV   6   36.81333   -118.14226   PANG   11   36.629550   -118.064087     CRRI   9   36.871692   -118.156103   MCIV   8   36.846761   -118.143529   PANG   13   36.630569   -118.058707     CRRI   11   36.870235   -118.151323   MCIV   9   36.843118   -118.145129   PANG   14   36.632355   -118.056851     CRRI   13   36.867659   -118.149414   MCIV   11   36.843118   -118.145921   SOMA   1   36.979597   -118.18.055697     CRRI   13   36.86767   -118.146147   MCIV   13   36.836595   -118.145922   SOMA   3   36.791582   -118.129773     DELT   1   36.570332   -118.02642   MCIV   15   36.834379	CRRI	6	36.878604	-118.163045	MCIV	4	36.855188	-118.143995	PANG	9	36.630891	-118.068550
CRRI   8   36.874892   -118.160153   MCIV   6   36.851133   -118.144226   PANG   11   36.629550   -118.064087     CRRI   9   36.873593   -118.157841   MCIV   7   36.84804   -118.144580   PANG   12   36.629786   -118.061276     CRRI   10   36.871764   -118.156103   MCIV   8   36.846761   -118.14529   PANG   13   36.630569   -118.058707     CRRI   11   36.869640   -118.151323   MCIV   10   36.843114   -118.146710   PANG   15   36.634421   -118.05697     CRRI   13   36.867859   -118.149414   MCIV   11   36.840999   -118.146710   PANG   15   36.634421   -118.129791     CRRI   14   38.865767   -118.14822   MCIV   13   36.836595   -118.145182   SOMA   2   36.793749   -118.12907     DELT   1   36.570123   -118.013887   MCIV   14   36.834379	CRRI	7	36.876748	-118.161510	MCIV	5	36.853203	-118.145337	PANG	10	36.629153	-118.066834
CRRI   9   36.873593   -118.157841   MCIV   7   36.848804   -118.144580   PANG   12   36.629786   -118.061276     CRRI   10   36.871764   -118.156103   MCIV   8   36.846761   -118.143529   PANG   13   36.630569   -118.058707     CRRI   11   36.870235   -118.154027   MCIV   9   36.845114   -118.145492   PANG   14   36.632355   -118.056851     CRRI   12   36.869640   -118.149414   MCIV   11   36.840999   -118.145921   SOMA   1   36.795997   -118.129791     CRRI   14   36.865767   -118.148282   MCIV   12   36.836595   -118.145921   SOMA   1   36.791582   -118.129791     CRRI   15   36.671861   -118.012847   MCIV   13   36.836595   -118.145921   SOMA   3   36.790413   -118.129753     DELT   2   36.571616   -118.012847   MCIV   15   36.832357 <td>CRRI</td> <td>8</td> <td>36.874892</td> <td>-118.160153</td> <td>MCIV</td> <td>6</td> <td>36.851133</td> <td>-118.144226</td> <td>PANG</td> <td>11</td> <td>36.629550</td> <td>-118.064087</td>	CRRI	8	36.874892	-118.160153	MCIV	6	36.851133	-118.144226	PANG	11	36.629550	-118.064087
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CKRKI 14 36.865767 -118.148282 MCIV 12 36.838789 -118.146168 SOMA 2 36.793749 -118.129007   CRRI 15 36.864415 -118.146147 MCIV 13 36.836595 -118.145932 SOMA 3 36.791582 -118.129753   DELT 1 36.573932 -118.013887 MCIV 14 36.834379 -118.145990 SOMA 4 36.790413 -118.129763   DELT 2 36.571861 -118.012642 MCIV 15 36.832931 -118.143244 SOMA 5 36.788616 -118.122168   DELT 3 36.570123 -118.01920 NAGA 1 36.617378 -118.036788 SOMA 6 36.786529 -118.122168   DELT 4 36.570568 -118.003677 NAGA 2 36.615237 -118.036719 SOMA 7 36.786619 -118.1220703   DELT 5 36.570568 -118.000873 NAGA 3 36.611697 -118.037619 SOMA 8 36.780671 -118.122897   DELT </td <td>CRRI</td> <td>13</td> <td>36.867859</td> <td>-118.149414</td> <td>MCIV</td> <td>11</td> <td>36.840999</td> <td>-118.145921</td> <td>SOMA</td> <td>1</td> <td>36.795997</td> <td>-118.129791</td>	CRRI	13	36.867859	-118.149414	MCIV	11	36.840999	-118.145921	SOMA	1	36.795997	-118.129791
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DELT   9   36.571110   -117.996592   NAGA   7   36.605206   -118.038113   SOMA   12   36.775591   -118.122083     DELT   9   36.5671110   -117.996592   NAGA   7   36.603206   -118.038113   SOMA   12   36.775591   -118.122083     DELT   10   36.568969   -117.995696   NAGA   8   36.603613   -118.036122   SOMA   13   36.773322   -118.120633     DELT   11   36.566931   -117.995465   NAGA   9   36.602460   -118.033741   SOMA   14   36.771069   -118.119990     DELT   12   36.564973   -117.995825   NAGA   10   36.602298   -118.032786   SOMA   15   36.768848   -118.119834     DELT   13   36.562774   -117.995165   NAGA   11   36.597953   -118.032872		, 8	36 570028	-117 900317	NAGA	6	36 607234	-118 030126	SOMA	10	36 77733/	-118 102683
DELT   10   36.568969   -117.995696   NAGA   8   36.603613   -118.036122   SOMA   12   36.773322   -118.120902     DELT   10   36.568969   -117.995696   NAGA   8   36.603613   -118.036122   SOMA   13   36.773322   -118.120902     DELT   11   36.566931   -117.994436   NAGA   9   36.602460   -118.033741   SOMA   14   36.771069   -118.119990     DELT   12   36.564973   -117.995825   NAGA   10   36.600298   -118.032786   SOMA   15   36.768848   -118.119834     DELT   13   36.562774   -117.995165   NAGA   11   36.597953   -118.032872		q	36 571110	-117 996592	NAGA	7	36 605206	-118 038120	SOMA	12	36 775501	-118 12000
DELT   11   36.566931   -117.994436   NAGA   9   36.602460   -118.033741   SOMA   14   36.771069   -118.119990     DELT   12   36.564973   -117.995425   NAGA   10   36.60228   -118.032786   SOMA   15   36.768848   -118.119834     DELT   13   36.562774   -117.995165   NAGA   11   36.597953   -118.032872	DELT	10	36 568969	-117 995696	NAGA	, 8	36 603613	-118 036122	SOMA	13	36 773322	-118 120633
DELT 12 36.564973 -117.995825 NAGA 10 36.600298 -118.032786 SOMA 15 36.768848 -118.119834 DELT 13 36.562774 -117.995165 NAGA 11 36.597953 -118.032872	DFLT	11	36 566931	-117 994436	NAGA	9	36 602460	-118 033741	SOMA	14	36 771069	-118 119990
DELT 13 36.562774 -117.995165 NAGA 11 36.597953 -118.032872	DELT	12	36.564973	-117,995825	NAGA	10	36.600298	-118.032786	SOMA	15	36,768848	-118,119834
	DELT	13	36.562774	-117.995165	NAGA	11	36.597953	-118.032872				

STATION: Alabama Gates = ALGA FLAG MARKING POINT: orange flagging and metal tags INTERVALS BETWEEN POINTS: 250 m TOTAL # POINTS: 15

**NOTES:** All points are located on the west side of the river. The 1<sup>st</sup> 5 points are located north of a spring/marshy area that runs perpendicular to the main river channel. Travel through this area and head east to marsh area. Follow the marsh's western edge. After these 5 points, traverse through the spring area, the next point is <250 m from Point 5, on the southern edge of the spring. The rest of the points follow the west side of indistinct channel. **ACCESS:** Located roughly .1 miles north of Alabama Gates spillway. Road is on the east side of Hwy 395. **From the south**, travel approx. 5 miles north of Lone Pine, keep your eyes out for the Alabama Spillway, after crossing it turn east on the first small dirt road (One tenth of a mile past the spillway, <u>before</u> yellow sign for a turn to the west). **From the north,** drive south of Independence after approx. 10 miles, you will cross the Alabama Spillway, take the next small dirt road to cross the highway (on the east of the freeway to U-turn). Turn unto northbound hwy 395. You will cross the spillway again, take the 1<sup>st</sup> small dirt road to the east. Turn north on small dirt road to parallel Hwy. Park after about ½ mile at a convient location. **To do transect in reverse:** Look at directions above, turn east onto small dirt road with a green gate SOUTH of the spillway, follow road down and north to the end of small road, Park here. Walk 1.30 km, due east (80degrees magnetic), to point 15. Or .62 km. NE (36 degrees magnetic) to point 11.

**Point # 1**: You need to hike about 1 km to get to first point, head down to marsh via a large open pasture field. Keep heading east and towards marshy strip of green vegetation (Cattails and such). Point located on west side of marsh/channel, north of Alabama Gates drainage. Point on tamarisk, immediately adjacent to marsh.

Point # 2: Follow distinct marsh edge SSW, point tagged in willow. Look up, tag is high up in willow.

Point # 3: Follow marsh SSW. Point near marsh edge on a willow.

**Point # 4:** Continue to follow marsh SSW, point tagged in willow on edge of marsh, before barbed wire fence. **Point # 5**: Continue to follow marsh, SSW, riparian comes in from the west. Point located just South of convergence. Point tagged high in willow.

**Point # 6 (>250m)**: On southwest side of drainage which flows perpendicular to river to the west. Head directly west from pt.5 to avoid marsh. Point tagged on large 3 trunked willow, on edge of riparian corridor. On a dead branch.

**Point #7**: Return to the river/ marsh heading SSE. It's definitely wet out there, so be prepared to get marshy, point located in willow on edge of river/marsh.

**Point #8:** Return to road to cross small spring drainage flowing from the west. Return to the riparian marsh (after crossing), staying on the west side. Point tagged in willow meadow.

**Point # 9:** Head out at 165 degrees (magnetic, south), cross dry sandy wash. You can see the Alabama Gates (cement aqueduct structures) directly to the west and upstream. Follow sandy wash south, Point in willow 25 m west of wash.

Point # 10: continue on S side along sandy wash, follow cowtrail. Point located in Tamarisk.

**Point # 11:** Head SE out towards the open marsh. Follow sandy wash on west bank. Point just to the west of wash on dead branch of 7 m willow.

**Point # 12**: Continue south along wash, cross wash to the east. Point tagged in Atriplex in open flats with willow surrounding point.

**Point # 13:** Head east across saltbush flat to stand of willows. Point in Atriplex.

Point # 14: Continue SSE, staying close to cattail band. Point located on Atriplex.

**Point # 15:** Head SSE along wash, cross the tule marsh in open area, point in rabbitbrush adjacent to next marsh to the east.

**STATION:** Black Rock Springs=BLRS **FLAG MARKING POINT:** orange flagging and metal tags **INTERVALS BETWEEN POINTS:** 250 m. **TOTAL # OF POINTS:** 15

**NOTES:** All points located on east bank of river and are most easily accessed by walking in the channel. This one will be a wet one once the water is released.

**ACCESS:** From Hwy 395,11 miles south of Big Pine, turn east on Aberdeen Rd. Continue straight for .9 miles, you will cross aqueduct, immediately crossing the aqueduct you will come to a very confusing intersection. Take the 2<sup>nd</sup> left (far east fork), stay on this main road, a few spur roads take off to the south, don't be tempted to wander off the beaten path, at .4 miles, road will turn sharply (90 degrees) south. Proceed on this road for 4.7 miles. Park at trough on the east side of the road (stay on the most defined road for the duration) Load BLRSTR on GPS. This marks the trough on the east side of the road. To return from point 15, head east to road that parallels river, at 4-way intersection go north (straight) on main road. **To do transect in reverse:** ACCESS: From hwy 395, take Black Rock Springs Road east (this road is a few miles south of Big Pine). At .7 miles turn right (east) if you have ended up at a fish hatchery you have gone too far. At 1.0 miles you will cross the aqueduct, turn left (north). At 1.2 miles turn right (east).

Take the immediate next left (after crossing narrow ditch). At 4.2 miles turn right. At 5.6 cross cattle guard and turn left (east). This road goes a short way and ends. Park here and head to point 15.

**Point # 1:** Point on Atriplex shrub 8 m east of channel on middle of bend. Point 36 m NNE of lone willow (8 m tall). Point on eastside of channel. Point is 270 m at 244 degrees from Black Rock Trough.

**Point # 2:** Follow channel south on east side. Point is located in Saltbush on bank.

Point # 3: Continue on east bank. Point tagged in saltbush on bend in channel.

Point # 4: Same as above. Lone willow located 60 m upstream on opposite bank. Point tagged in Saltbush.

**Point # 5:** Truck on down the east bank, avoid tamarisk piles. Point tagged on Saltbush on the middle of the bank, downslope of terrace. Point more than 50 m upstream from lone willow.

Point # 6: Cross road heading South from point #5, continue south, point on saltbush adjacent to channel.

**Point # 7:** Same as above, point located on bend that swings SE on saltbush adjacent to channel.

**Point # 8:** Channel becomes very entrenched at the next bend (bank approx. 15 m high), at about 180 m south of point # 7, two side channels emerge from the west and then one from the east. Point located on east bank on saltbush, on top of entrenched bank.

Point # 9: Point located on terrace just before channel takes a sharp turn east. Point on saltbush, near rebar.

Point # 10: Follow channel south, point tagged on saltbush adjacent to bank. 11 m south of snag.

**Point # 11:** Same as above point on saltbush down on river bank, upstream and across channel from three 15 m tall willows.

**Point # 12:** Pace 250 m downstream, point tagged on tamarisk stump ½ vertical foot from channel. Decend off terrace to find point.

Point # 13: Pace 250 m downstream point tagged on saltbush on terrace.

**Point # 14:** Pace 250 m downstream point tagged on tamarisk stump in open sand terrace. 26 m SE of lone willow with broken top.

Point # 15: Pace 250 m downstream, point tagged in rabbit brush on sandy edge of channel.

**STATION:** CRRI= Crystal Ridge **FLAG MARKING POINT:** orange flagging and metal tags **INTERVALS BETWEEN POINTS:** 250 meters **TOTAL # OF POINTS:** 15

**NOTES:** Points located on west side of channel. Return from point 15 is easy. Head north from point 15 overland, you will junction with dirt road. Head west, this road junctions with main road, turn north to travel back to rig. **ACCESS:** From hwy 395, take Black Rock Springs Road east (this road is a few miles south of Big Pine). **RESET ODOMETER AT JUNCTION OF HWY 395 AND BLACK ROCK SPRINGS ROAD.** At .7 miles turn right (east) if you have ended up at a fish hatchery you have gone too far. At 1.0 miles you will cross the aqueduct, turn left (north). At 1.2 miles turn right (east). Take the immediate next left (after crossing narrow ditch). At 4.2 miles turn right. At 5.6 cross cattle guard and continue forward. At 6.5 take left or forward at "Y". At 7.2 another 4 way intersection, go forward. At 7.6 miles park on side of road and proceed to 1<sup>st</sup> point. **To do transect in reverse:** simply continue down the road (without stopping at point 1). You'll come to a second cattle guard. Continue about 1.2 miles past the cattle guard and park. Head east to channel (+-500m).

**Point #1**: Look for lone willow 25 m NNE of point. Point located on west side of main channel approx. 10 m SSW of bank. Point located at base of dead tamarisk stump. Little willow (approx 3 m tall due east from point. Little willow in channel.

**Point # 2:** Head downstream, south along river channel, cross gully. Point located on rim of bank in big rabbitbrush. Upstream from tall grass, about 45m south of a 90% dead willow, and a lone willow on the west bank. **Point # 3:** Point tagged on rabbitbrush about 5m south of a small willow on west bank where channel bends in a sharp C-shape. There are about 10 willow trees dispersed around here, point is by the only tree on the west side of the channel.

**Point # 4:** Cut across open field and tamarisk slaughter area. Return to bank to find point, tagged on large tamarisk stump. East of open flat barren area, about 50m south of lone willow tree. Around point covered with tamarisk slash.

**Point # 5:** Continue on west edge, avoiding tamarisk piles if ya can. Point tagged on willow about 40m south of tall phragmities clump (tall exotic grass).

**Point # 6:** Tagged in Saltbush next to bank 18m north of point is a metal steak with PIT 7W on it. Also about 40m across bank from and angled a bit to the SE is a lone, multiple trunked willow.

**Point # 7:** About 90m north of fence, on north end of a peninsula formed by the bending side channel. **Point # 8:** Stay up on bank, travel through mess of tamarisk. Scoot through fence, road crosses channel perpendicularly. Channel heading east, turns within view. Go straight up road and to the east. Point located on tamarisk stump on bank across and a bit south of completely dead willow snarl. There is an open sandy area with a saltbrush in the center of it west of point.

**Point # 9:** Cross side channel coming from the west. Point immediately on other side. Point tagged in dead Saltbush (the only thing with alive around). Point located where a small side channel meets with a larger channel. There are some trees about 100m to the south. There is a lot of dead saltbush by point.

**Point # 10:** Follow west side of main channel, point in saltbush, directly on bank. Point on south end of a distinct portion of the levee/bank that has no vegetation and is whitish. 50m north is a dying willow.

**Point # 11**: Point on rabbitbrush about 75m north of big shredded clearing, and another open area is visible to the west 25m. Look for additional blue flagging.

**Point # 12**: Follow terrace out to broken levee, point on main channel, directly across from large (1m DBH) willow snag. Point tagged in dead Saltbush in a messy confluence/joining of channels.

**Point # 13:** Cross small channel, coming in from the NW, swing wide to avoid tamarisk slaughter zone. You will come to a road heading east-west. Continue south across tamarisk. Point adjacent to channel on saltbush. Cross channel by large willow to the south with cavity.

**Point # 14:** As you progress down stream, tamarisk removal project ends. Head SSE along messy channel system. Point located on large (60 cm DBH) willow on scrub edge. 12m northeast is one snag that's leaning on a second. **Point # 15:** Weave through tamarisk on east side of channel by heading ESE (114 degrees). Last point on tamarisk, adjacent to channel on southeast corner of open sandy scrub area surrounded by tamarisk. Point on cow trail that drops down a steep little lip to channel.

**STATION:** Delta= DELT **FLAG MARKING POINT:** orange flagging and metal tags **INTERVALS BETWEEN POINTS:** 250 m **TOTAL # POINTS:** 15

**NOTES:** All points on west side of main channel. Points run north (point 1), to south (15) **ACCESS:** From Lone Pine, head south on Hwy 395, turn EAST approx 4 miles out of town onto Hwy 136. Proceed 2.6 miles on 136, turn into pull out on south side of road.

**Point # 1:** Located @ 115 m south of Hwy 136, adjacent to sunken pond, an old oxbow of the river channel. Point is located on stump, immediately adjacent to riverbank.

**Point # 2:** Located on main channel/bank beside a major bend of the river. Point just off trail that follows contour of channel. Point located 8 m SW of distinct "Y" shaped willow snag.

**Point # 3:** From DELT02, walk east following road/trail. Point just past curve of river. Tagged in a Rabbitbrush (*Chrysothamnus* spp.) approx. 14 m south of two snags (e. snag with large south facing cavity). Point east of two track road near a small side channel.

**Point # 4:** Near pond with dead "y" shaped snag in the middle. Point SSE from "Y" shaped snag approx. 20 m. Point tagged on Saltbush (*Atriplex* spp.), at the end of an open sandy spot and a broken beaver dam.

**Point # 5:** Point located on rise between pond and channel. Point tagged in CHNA on right side of trail (heading SSE)

**Point # 6:** Point located on large diameter willow with broken top, adjacent to marsh. Marsh has a high density of snags. Point located on SE side of marsh.

**Point # 7:** Point on Saltbush (*Atriplex* spp.) bush adjacent to marsh/channel, directly south and 10 m of snag (leaning to the south) in the middle of the marsh. To cross with dry feet, head directly south and a little west of DELT07 to get to DELT08, follow gray eroding bank trail along the southern contour.

**Point # 8:** Point on south side of marshy channel. Point located indeed tree pile immediately adjacent to channel. **Point # 9:** Point below debris dam 2 m from large willow, adjacent to reed bed.

Point # 10: Near still water marsh. Point in dead willow clump.

Point # 11: Point on dead willow, west side of bank.

**Point # 12:** Point located on Rabbitbrush (*Chrysothamnus* spp.) bush approx 10 m from the bank. Point is across from a willow clump and knoll to the east. Also under 10m north of a line of small coyote willows on the western bank. 50m south of a grassy flat.

**Point # 13:** Point located adjacent to two live willows with bushy green tops. Willows at two heights, the tall one in 10 m, short is 4 m. tall, and next to a V shaped snag (with twigs) and west 45m of a 3-pronged willow, but only 1 prong is alive.

**Point # 14:** Follow west side of channel, point adjacent to rushes where channel is approx 4 m across, near a section of dead reeds.

**Point # 15:** 150 m northeast of clump of dead trees (trees spaced out approx. 20 trees). Point is in mostly dead saltbush (very north most of a clump), where the cowtrail splits. The reeds on the west side of the channel are dead, ones on the east are living.

**STATION:** Goodale =GOOD **FLAG MARKING POINT:** orange flagging and metal tags **INTERVALS BETWEEN POINTS:** 250 m **TOTAL # OF POINTS:** 15

**NOTES:** All points are located on the west side of the river channel. There has been some major tamarisk eradication on this stretch of the river. Please discourage any resprouting that you might encounter and have a great time out there.

**ACCESS:** From Big Pine, travel south on Hwy 395, turn east on Goodale Rd. Take left at "Y", stay on main road. Drive 1.5 miles and park by trees with concrete slabs nearby. Park under the glorious shade. This is the aqueduct intake and the release point for the re "water". **To do transect in reverse:** Walk through fence (see directions to point # 1), walk on road that parallels the fence, pass under powerlines (after second crossing), after about 300m a small road cuts off to the SE. Walk on this road to end of transect (marked with orange flagging).

**Point # 1:** Crawl through barbed wire fence, cross bridge and head towards lush clump of trees, about 300m south. Point is 7 m from main river channel. West side of channel on Saltbush next to large stump and large black willow on riverbank next to point. Upstream (north), 25 m from bridge crossing river.

**Point # 2:** Pass through barbed wire fence into open area. Point by tall grasses. 10 m from main river channel west side of channel. Point on rebar, 5 m west of T-post, there is a  $2^{nd}$  rebar west of T post. Point 37 degrees from powerline tower on east side (70 m) of river channel. Point at 132 degrees and 180 meters from tower on east side of river, point near mound with saltbush

**Point #3:** Continue on southwest bank of "river", cross road and powerlines. Turn right and follow tall grassy channel. Point located on channel terrace. No woody shrubs anywhere. Point tagged on grass 1 m NE of trail. 75m from point tall grasses end, and it becomes flattened reeds. Point located just before a sharp elbow bend in river (small puddle there).

**Point # 4:** Long windy haul from point 3. Pass powerlines, take cowtrail to mid-terrace/main channel. Point on last of 5 willows, with log under outer crown.

**Point # 5:** Head directly south to short cut bend of river and towards tall tallow grass patch in channel. point in small saltbush, about 50m "downstream" of the north end of thick tall grass patch, in front of a 20m stretch of just reeds without the tall grass.

**Point # 6:** Continue to follow small trail on west edge of channel and pass a few willows. Point on small willow on the west side of the trail (the  $5^{th}$  willow of the row), between a live and dead willow.

**Point #7:** Follow terrace trail. When trail junctions, stay east, cut across Saltbush field to channel. Drop down a few meters on bank for point tagged in saltbush. Point about 50m downstream of brush pile next to a small rise in the terrace. Also by small sandy depression.

**Point # 8:** Follow channel edge, down point on mid bank (drop off terrace), on Saltbush. Point by a sharp bend (hairpin about 100m ahead) where another channel merges. A 'peninsula' merges out less than 100m ahead. **Point # 9:** Head directly south to curve in channel. Point in dead saltbush on bank's edge, just west of a mound that would be an island if there was more water. It's between a small log pile and a murky puddle.

**Point # 10:** Point located at the beginning of an open grassy flat 50m south of sandy side channel with tamarisk debris pile. Point tagged in tamarisk stump.

**Point # 11:** Head south and farther towards band of several willows, point located just south of this confluence with willows (side channel) on small coyote willow growing in tall grasses, located on terrace.

**Point # 12:** Stick to main channel, when side channel swings parallel to main channel, cross side channel. Point located in rabbitbrush on mid bank less than 10m from big branch pile and +- across from a large, lone spectacular rock formation to the east.

**Point # 13:** Follow west side of channel south. Point on saltbush, mid bank, adjacent to tall exotic grass. Saltbush hangs over small trail. Across from lone willow and distinct piling of pale gray rocks on "levee" to east.

**Point # 14:** Point tagged on small tamarisk stump in open grassy area. Conduct point count 12 m east near channel. **Point # 15:** Last point located 50 m south of tall terraced bank. Point in dying saltbush.

#### **STATION:** MANZ = Manzanar **FLAG MARKING POINT:** orange flags and metal tags **INTERVALS BETWEEN POINTS:** 250 meters **TOTAL # OF POINTS:** 15

**NOTES:** The first 2 points are located on the west side of the channel, after point 2 it is necessary to cross the river by returning to the road and crossing over the river by way of the road to access point 3. From here on the points are located on the <u>east</u> side of the river.

**ACCESS:** From Independence, travel south on Hwy 395, take Manzanar Reward Rd east (not well marked but has green sign). MANZ is located north of the Manzanar War Relocation Center Historical Monument located off of Hwy 395. Follow road for 2.2 miles going through old airstrip and crossing aqueduct early on. At 2.2 miles there will be a small road to the north, be adventurous and take it!!, you will immediately cross a cattlegaurd. Travel .4 miles to a smaller dirt road to the east. Drive towards the river (east) and park in a sandy pull out west of the river. **To do transect in reverse:** 4WD needed... From Independence, travel south on Hwy 395, take Manzanar Reward Rd east (not well marked but has green sign). MANZ is located north of the Manzanar War Relocation Center Historical Monument located off of Hwy 395. Follow road for 2.2 miles going through old airstrip and crossing aqueduct early on. Turn right, south on dirt road approx .3 miles east of river crossing. Go through cattle guard gates. Travel on road for 1.5 miles (pull of road). Park. Walk west .18 km at 72 degrees magnetic to point 15.

**Point # 1:** From parking spot, head east towards the river to point located below westernmost bank. Point is near the North end of a field of small coyote willows, which is across the river from many burned snags. There is a small *Yerba* patch to the west.

**Point # 2:** From point 1, return to terrace and travel overland for about 150 meters, drop back down into river corridor. Point is located on Tamarisk, 4.5 m from the river bank.

**Point # 3**: Go overland, following cowtrail, return to Manzanar Rd. and cross the river and travel to the EAST side of the river, go through the barbed wire fence (there is a nice entrance gate, a few meters east of the river, south side of the road). Point approx. 50 m from gate, on willow adjacent to cattail marsh.

**Point # 4:** Go overland for approx. 50 m. then head back down to the riparian, point on multi-stem burnt willow. **Point # 5:** Follow channel overland, you will see a green belt coming in from the west. Point located 50 m south of confluence with main channel. All willows burnt and resprouting.

**Point # 6:** Follow channel south, point is tagged on a Tamarisk. South of confluence with above mentioned side channel. Conduct point count 6 m west, towards bank.

**Point # 7**: Follow channel south, point located on dead willow branch that comes out at eyelevel on the cowtrail. Point located before bend on the river.

**Point # 8:** Point on burnt willow, after shallow pond to the east.

**Point #9:** Continue south on east bank, ignore yellow flagging. Point tagged on Atriplex upslope from trail. Count from view NW and 5 m of tagged Atriplex

**Point # 10**: Head south, cross oxbow pond on east side. Avoid crossing drainage to oxbow. Head 100 m east for mudless crossing, stay on terrace. Drop down to riparian after traveling approx. 80 m. Point on dead willow, to the west of pond at base of drainage.

**Point # 11**: Head overland, 175 m., drop down close to channel. Point tagged in Ash? Tree, below 12 m tall willow.

Point # 12: Travel down river (south), pass a decent sized cottonwood. Point 40 m south of tall willows.

**Point # 13:** Head east and overland, immediately you will see an open water marsh. Check out all the herons and egrets!, continue past at 40 meters past pond, drop down into riparian through tamarisk. Point in Tamarisk, 4 m from bank.

**Point # 14:** Head SSE, ignore blue flagging. Follow cowtrail, point in tamarisk near channel.

**Point #15:** Follow channel, south, point tagged on rabbit brush adjacent to channel, overlooking marsh/wetland.

To return head back north towards big pond. A road paralleling the river is located 800 m to the east. This road leads to Manzanar/Reward Rd.

**STATION:** Mc Iver (MCIV) **FLAG MARKING POINT:** orange flagging and metal tags **INTERVALS BETWEEN POINTS:** 250 m **TOTAL # POINTS:** 15

**NOTES:** In general, this transect is difficult to travel from point to point. The uplands are covered by dead Saltbush and the channel is covered in Russian Olive and tamarisk! Be prepared to bushwhack and definitely make sure your GPS works cause there is some thick vegetation out there. The first 9 points are located on the east side of the powerline road, on the WEST side of the channel. After 9, you will need to cross the powerline road, the rest of the points are located on the west side of the road on the EAST side of the channel.

**ACCESS:** A tenth of a mile south of Independence, turn east on Mazourka Canyon Rd. (Look for nice stone work house that is an auto repair shop). At 3.3 miles, turn north on substantial dirt road, before the 1<sup>st</sup> green strip, (with a big white LA DWP DAY USE ONLY sign), continue forward, passing large pond on east side of road and cow feeding area. At 6.5 miles take main road curves east curving, stay on this main road, travel .4 miles towards powerlines and continue forward. Drive north for .9 miles look for small spur road that drops off steeply to the SE. Park at junction and walk at 45 degrees (magnetic, NE) for 340 meters to channel. **To do transect in reserve:** From Mazourka Canyon road, turn left (north) on the powerline road (under the huge noisy powertowers, past 2<sup>nd</sup> green strip). Drive about 2.1 miles until you get to powertower # 58/2 (on the east side of the road). This is angled just north of the very cool striated rock formation on the eastern hillside. The transect is about .7km away to the west.

**Point #1:** Walk at 45 degrees (magnetic, NE) for 340 meters to channel. Point located on west side of channel. Flagged high in 13 m tall Tamarisk, 27 m NNE of large willow

**Point # 2:** Proceed south on west side of most prominent channel. Point located in flat tagged on atriplex. Large snag 35 m NW of point.

**Point # 3:** Travel 60 m SSE to distinct channel edge, follow down stream (south), cut across channel to bend with large dead willow and 1 live. Point is tagged on Atriplex. Three willows to the SE. Point under large 3 trunked willow.

**Point # 4:** Cut across channel SE of point 3, there are many deeply incised channels. Stay on outermost west bank. Point tagged on Tamarisk, 20 m downstream from 2 large cottonwood trees.

**Point # 5:** Head SW out of point 4, across saltbush/succulent scrub. Point located on succulent bush directly on the channel. Channel drops 6 m.

**Point # 6:** Hike on the rim, road parallels channel. Travel on road for 40 m, drop down across small channel coming in from the SW, to stay in main channel, stay down in flats. Point tagged next to main channel on a Tamarisk.

**Point # 7:** Follow trail up bank, through dying shrub flat. Point tagged in Tamarisk. Point is south (downstream) of 2 Russian Olives.

**Point #8:** Follow cowtrail, cross fence, descend down into Tamarisk channel mush. It is easier to travel down in channel. Point in Tamarisk 7 m, west of depression in channel. 6 m SW of 25 m tall ½ dead willow.

**Point # 9:** Follow channel, sometimes it is easier to pop up to bank, channel turns to the west. Point located in channel on small uprising, tagged in Tamarisk. Two power towers at 250 degrees magnetic (W) and 125 m away. **Point # 10:** Channel ends in a coldesac, under powerlines. Hop out of this channel and head SW to other active channel, crossing powerline road. Point located in new channel system, west of powerline road. Follow east side of channel out to a curve. Point is located on a willow. 10m east of rebar, look for blue flagging.

**Point # 11:** From point 10, head SE across channel, drop down into channel, heading south. Point located in middle of channel in Russian Olive.

Point # 12: Follow eastern side as it turns and bends to the SE. Point on 3m tamarisk.

**Point # 13:** Travel overland on **west** side of channel, following cowtrail. Drop back down into riparian at 30 m from point. Point tagged (overhead) in Russian Olive on openflat.

**Point # 14:** Head overland on west bank, drop sharply down into corridor at 250 m from point 13. Point tagged overhead on Russian Olive.

**Point # 15:** Cross channel, Travel 230 m downstream on EAST side of channel. Swing out east and follow cowtrail overland. Follow cowtrail down when 20 m from point. Bushwhack down into channel. Point on Russian Olive, on west bank

STATION: NAGA= Narrow Gauge FLAG MARKING POINT: orange flagging and metal tags INTERVALS BETWEEN POINTS: 250 m TOTAL # POINTS: 15

**NOTES:** All points located on west side of river channel, be prepared to get wet up to the knees on the later half of the transect.

**ACCESS:** Head north out of Lone Pine on Hwy 395, in approx. .5 miles out of town turn east on Lone Pine Narrow Gauge Road. Travel 1.8 miles from junction of 395, before crossing "river", park and walk "downstream" south to point 1, approx. 130 m.

**Point # 1:** Point located on floodplain terrace, west of channel, SW of corral near Narrow Gauge Rd. approx. 150 m. Point directly south of telephone pole (the middle on of three within the view), point west of corral telephone pole. Point in Rabbitbrush.

**Point # 2:** From terrace, walk SSE towards riparian corridor, follow cow trail around oxbow lake to far side (west). Point is on Saltbush, east of cow trail. Look for 4 m Tamarisk and 2 snags with both tops facing SE.

**Point # 3:** Return to terrace with sage scrub. Travel south along side river slump/channel. Follow cow trails. Point is near oxbow on "river". Point tagged on a Saltbush.

**Point # 4:** Stay on upper trial as you travel south from NAGA03, NAGA04 is just off terrace trail approximately 5 m downslope. Point is tagged on Rabbit brush south of sharp bend with large willow. After completing point count, head on upper terrace trail. Follow trail, approx. .14 km, you will see a T-post and Lone Pine Creek coming in from the west. Head down into the creek and cross at confluence with river.

**Point # 5:** Located adjacent to confluence with Lone Pine Creek. Point is located just off the path leading south that ascends to the terrace on Rabbitbrush to the east of willow clump.

**Point # 6:** Point is located upslope from trail and is tagged in a Rabbit bush.

**Point # 7:** Point located down in riparian corridor, in large 2 trunked willow near oxbow. Cross oxbow heading SSE. You will junction with a 4WD road. Follow rd. Road splits, take lower road. Follow road to curve, drop off road 10 m to point.

Point # 8: Point on Saltbush about 8 m from channel.

**Point # 9:** Drop off dusty road after approx 120 m towards distant bend in river. Another alkaline road comes in, follow this new road out to point. Point on Rabbit brush. Head south out of NAGA09 for next point.

**Point # 10:** Follow riparian corridor south, direct yourself in between two large cottonwood. NAGA10 is located SE of easternmost cottonwood.

**Point # 11:** Point is located in 4 m tall willow tree. Go upslope to the SW for better view, near Atriplex. Point overlooks marsh/channel.

**Point # 12:** Follow trail down past rose bush, between 2 patches of marsh, staying along main channel. Point on 3 trunked willow.

**Point # 13:** Follow double track SSE. Point is located 6 m off of double track road near gallery cottonwood (west) and marsh to the east. Point at two dead willows crossing single track.

**Point # 14:** Follow double track SE to a single track trail, head east of the double track trail to marsh. Point is located on Saltbush, immediately east of large cottonwood (on oxbow) and Lone Pine peak. The point, large cottonwood and Lone Pine Peak are all on one bearing (west).

**Point # 15:** From NAGA14, head west towards Lone Pine Peak and large cottonwood for 50 meters, then head SSE. Follow eastward bend of marsh/channel on single/double track. Cross south end of marsh into the interior of marsh/channel.

STATION: Owens River north from Mazourka Canyon Road (ORMC) FLAG MARKING POINT: Orange flag and 2" metal tag. Intervals between points 250m unless stated otherwise. INTERVALS BETWEEN POINTS: 250m TOTAL # POINTS: 15

**NOTES**: Points run from Mazourka Canyon Road / Owens River junction upstream (north). Points are along the western edge of the river unless otherwise stated.

**ACCESS**: Drive east on Mazourka Canyon Road from 395 just South of the town of Independence. Pass 1<sup>st</sup> row of vegetation that resembles a river bed. When you come to the next river channel, which has a pond on the south side of the road with cattails (Billy's Pond), park.

**Point # 1:** On west side of riparian vegetation, 50m upstream from Mazourka Canyon Road. On Black Willow before 25m gap in large willows. There are 2 more large willows upstream from the point.

**Point # 2:** Go to road and continue upstream. When you reach a "Y", take right arm and stay right, straight to the edge of the riparian zone. The road forms a donut here. Follow the donut counterclockwise (N) and go into riparian zone as road begins to curve west. Point is on a Black Willow next to a patch of cattails.

**Point # 3:** Walk upstream through sage and Common Reed. At 200m you will come to a 50m gap in the Black Willows with bare ground and lots of cow shit. Go into riparian zone at end of this opening. Point is on a black willow at the cattail edge.

**Point # 4:** Walk along western edge of riparian for a while, crossing over side channel (impossible not to get wet) as you notice that it is taking you away from the main channel. Walk across the sand and sage flat to meet up again with the main channel. Point is on the west side of the main channel about 30m before the main channel takes a significant bend to the east, and about 70m before the next side channel crossing. It is on a Russian Olive next to Black Willow has three trunks breaking at the level of the bank.

**Point # 5:** Cross the next side channel, walking along another dry open flat area to meet up with main channel, walking in a straight northerly direction for about 220 m. Go 70m past largest willow overhanging the bare ground. Point is down toward the water from a lone Willow tree which is about 9m out in the sandy flat. Point is on a 3m salt cedar. Across from point are 2 willow trees, one with main trunk broken and on ground pointing toward water. **Point # 6:** Continue along this main channel. Pass 3 large trunks that have been cut and are laying on the ground. Point is at a group of willows (5 on west bank, 2 on east),  $\approx$ 40m past trunks. About 15 m upstream is a snag about 1.5 meters high.

**Point # 7:** Walk through sage. At bank is open dry clay/mud. Point is on a 3-forked willow tree with a small broken side trunk which points east toward the bank. Slightly down into the channel, you will see a lone 1.5m willow in the middle of an open channel. There is another open area of dry mud just past the point.

**Point # 8:** Walk through sage for 250m until riverbed bends north. About 20m before bend, point on willow on edge, towards river from another 6 m willow that is out in Atriplex.

**Point # 9:** Continue along western edge of sage and riparian. At 200m, look for a lone willow out in the sage followed by a Russian Olive also out in the sage, followed by an open flat muddy area at which point the river bends west. Go into middle of channel about 30m before bend in river. Point on Russian Olive at the tip of the muddy area.

**Point # 10:** Walk along western edge of riparian. At 250m, you will come again to a easterly bend in the River and a sandy wash. Point on Russian Olive towards end of wash. Past point, River takes a large turn west.

**Point # 11:** Walk along sage. At  $\approx$ 220m you will come to a dry muddy bank with a 1m drop-off and cutbank. Go into drainage. Point is on a willow, 15 m north of dropoff/cutbank

**Point # 12:** Follow edge for 250m where you will reach a soft and sandy area with a group of 5 decadent willows. There is a bend  $\approx$ 200m ahead and to the west. Point is at 1<sup>st</sup> willow on S end of sandy area. On Bank

Point # 13: Point on large 2 trunked willow 25 m north of 4-trunked willow at SW edge of bend.

**Point #14 (320m from Point #13):** Continue along the western sage/riparian edge through the sage until you come to a point where the river turns north for  $\approx$ 200m. In the middle of this 200m northerly stretch is a large willow with 8 trunks adjacent to a large muddy patch. Point is on russian olive on edge of sandy wash. Point is approx. 22m downstream of 8 trunked willow to the SW.

**Point # 15:** Continue along western edge of riparian/sage for 250 meters. 50m before the apex of a large westerly curving oxbow in the river, the point is on a willow tree with 9 trunks on the edge of the riparian. Down in the drainage, next to the point, is a patch of Tule.

**STATION:** Owens River – North of Tinemaha Reservoir (ORTI) **FLAG MARKING POINT:** Orange flag and 2" metal tag. Intervals between points 250m unless stated otherwise. **INTERVALS BETWEEN POINTS:** 250 m **TOTAL # POINTS:** 8

**NOTES:** Points run from Reservoir upstream in the following order: 8, 7, 6, 1, 2, 3, 4, 5. Points along western side of the Owens River and side channels. Wear shorts & TEVAs or don't mind getting wet... lots of thigh-deep wading!

ACCESS: From Independence: Drive north of Independence on 395, ≈1 mile north of Tinemeha Reservoir, and north of the Birch Creek/Owens River confluence, look for the Mountain View Motel/Baskin Robbins litter removal sign on east side of 395. Just past this is a gravel road which runs east and a gate at a barbed wire fence. (also look for a few Lombardy Poplars ≈200m off east side of road.) Park here. 30-40 minute walk ≈SE to Point 8. From Bishop: Drive south on 395 through Big Pine. Site entrance road is 5.5 miles south of the southern end of Big Pine. On the way you will pass (on the west side of the highway) a "Patrolled by Aircraft" sign, Fish Springs Road, an "Elk Next 14 Miles" sign, and the "Mountain View Motel/Baskin & Robbins Adopt-a-Highway sign. Site entrance is a small gravel road on left (east) side of highway 1.8 miles south of Adopt-a-Highway sign. Park here. Walk 30-40min ≈SE towards reservoir to Point 8.

**Point # 8:** Walk  $\approx$ SE toward reservoir. Look for snag with branches pointing toward reservoir on edge of riparian vegetation  $\approx$ 100m upstream from reservoir. Point is on the next 10m Willow tree from this snag. It has 2 trunks. **Point # 7:** Walk upstream along western edge of Cattail/Reed vegetation and Willows. Point is on far end of next clump of tall Willows. It is adjacent to a patch of bare mud (west of point).

**Point # 6:** Continue upstream on riparian/marsh vegetation edge. Pass a large expanse of Cattails and Reeds with prominent snags in the middle to the east. Point is on a Willow just after the Cattails curve in from the east and the Willow line begins to run N-S. There are some smallish logs in the Sage just above Point.

**Point # 1:** Keep the vegetation close on your right as you continue upstream. You will approach tallest Willow tree yet. There will be a side arm of low growing Willow that meets up with this tree. Cross the Willow arm and then cross a field of Rabbitbrush ( $\approx 150m \approx E$  from large Willow), curving back in a downstream direction. Point is slightly within the Willow, on a Willow next to a fallen snag with branches pointing west. (magnetic bearing from point to Lombardi Poplars is 293 degrees). Point and flag are back in an open pocket of vegetation.

**Point # 2:** Walk upstream north across the field of Rabbitbrush. After crossing the field, go into riparian vegetation  $\approx 100$ m, staying  $\approx 50$ m in from the riparian edge on the west. Point is in an area of tall Willow interspersed with Rush and Cattails. It is a swamp during some portions of the summer. Point is on a 3-forked Willow top that is broken and stuck upside down into the ground. It is at the end of a semi-open draw and also near 2 forked and downed Willow snags.

**Point # 3:** Continue north through the draw of Rush/marsh vegetation. Cross a small channel, continue through a field of cut Tamarisk which at 150m, crosses you through another field of Rabbitbrush and sand. Stick to the edge of riparian to your east and then along the western edge of the Rush/marsh vegetation for  $\approx$ 20m. Look for 4 snags with fuzzy growths on their trunks (WR says they look like they're wearing leg warmers!). Point is on a Willow  $\approx$ 10m west of the marsh/Reeds edge and north of these burly snags. There are 8m snags laying on the ground between Point and these burly (ha!) willows.

**Point # 4:** Keep walking around western edge of marsh. Veg opens up into Rabbitbrush. Keep along edge and at 250m, you will be on the edge of shrubby Willow bordering the marsh veg. A large round Willow tree is across the marsh from you. Point on Willow shrub  $\approx$ 75m around curve of the tule. 20m upstream from Point will bring you to the edge of a river channel.

**Point # 5:** Continue along marsh vegetation. At 200m you will reach a section where tire tracks cross a side channel of marsh veg.  $\approx$ 50m ahead are 2 mounds of soil. Point is between river channel and eastern-most mound, on grassy bank. (Flag on Rabbitbrush  $\approx$ 10m upstream from where I actually stand for the point).

STATION: Pangborn= PANG FLAG MARKING POINT: orange flagging and metal tags INTERVALS BETWEEN POINTS: 250 m TOTAL # POINTS: 15

#### NOTES: All points are on west side of channel, heading down stream (south).

**ACCESS: From the south**, PANG can be found 1.3 miles north of Pangborn Rd. on Hwy 395. (a few miles north of Lone Pine). Look for "+" and divided highway sign that allows the southbound traffic to cross. Turn east onto this dirt road, pass through green gate, and take an immediate left Follow dirt road north for .3 miles to the third power pole. **From the north**, drive south about 12 miles from Independence, cross Alabama Spillway, travel approx. 3 miles to a highway crossing that allows southbound traffic to traverse over to the northbound Hwy 395, this road is marked with a "+"sign. Turn left to cross highway and continue forward across highway onto dirt road with green gate. **To transect in reverse:** Follow directions to green gate, turn south (right) on substantial dirt road. Follow powerlines more or less. Travel approx. 1.5 miles to where small road intersects main road bending off to the SE and follows riparian corridor. Park here. Main road continues south with powerlines. Park here, walk along terrace to point 15, approximately a mile.

**Point #1:** Point located approximately 57 m east of west bank, south of cattail pond.

Point # 2: Point located 13 m NE of willow, on sharp bend in the channel. Tagged on a Saltbush

**Point # 3:** Follow channel and single track trail south. Point is located 7 m south of two medium willows on channel bank. Point is tagged on a Rabbitbrush.

**Point # 4:** Follow cow trail along channel. Point in Saltbush 6 m NW of medium willows (approx 9 m tall). **Point # 5:** Follow cow trail past pond on the right with snag. After pond, stick close to west side of channel. Point is located on Saltbush 5 m west of channel. Look for three small willow snags to the NE.

**Point # 6:** Follow cow trail to small flat with Tamarisk away from channel. Point near med sized willow and broken top small willow. Point tagged on saltbush.

**Point #7:** Head ESE out of PANG06 stay below cliff on well established trail, when trail breaks up, stay on lower trail to riparian. Point tagged on small willows (2 m tall) on east side of trail.

**Point #8:** Return to dusty junction, head overland (SSW), travel on cliff rim for approx 150 m, drop down into flat that bends to the west. Look for a distinct clump of ashes before you descend into the riparian corridor. Point located in the middle of flat tagged on medium willow.

**Point # 9:** Head south out of flat, trail splits head up and overland, past beaver dam below, drop back into the riparian flat. Pt is tagged on a willow, 7 m past (SE) of two willows downed by beaver.

**Point # 10:** Go overland to 20 m past point, descend into riparian and backtrack up stream to get to point, tagged on a small willow below powerline.

**Point # 11:** Return to cliff terrace overland, through to green gates. Stay high on terrace, drop down after bend, look for cow trail. Beware of seep. Point just south of seep and large overhanging willow. Point tagged on Saltbush.

**Point # 12:** Proceed out of seep/channel mess to overland trail for 20 m, drop down onto flat, cross open area to the east of a pond with two big willows. Head west towards the channel. Follow channel trail to point located on edge of channel. Tag in Saltbush north (6 m) from 3 medium willows.

**Point # 13:** Head up and out to middle terrace trail. Drop down into riparian/marsh after approx. 220 m. Point tagged in willow, Look for "y" shaped snag, surrounded by a willow clump, near beaver pond.

**Point # 14:** Head up and out at the base of cliff terrace to the SW of the point. GBHE rookery between PANG 13 and PANG14. Look NNW when on mid terrace trail. Remain on mid terrace around cliffs. Descend into riparian (look for trail) at approx. 200 meters from PANG13. Point tagged on willow.

**Point # 15:** Head south across Rabbit brush flat. Head up mid terrace trail. Point tagged on tamarisk near cattail channel. Mt Whitney's true north bearing is 240 degrees from point.

**STATION:** South of Mazourka (SOMA) **FLAG MARKING POINT:** orange flagging and metal tags **INTERVALS BETWEEN POINTS:** 250 m **TOTAL # POINTS:** 15

**NOTES:** A tamarisk laden ditch intersects the channel before you get into the native channel. Be sure to go through ditch (heading west) to find the real stuff. The first three points are located 300 m South of gate that you park next to. There are two diverging channels at the beginning of the transect, the first three points are located on the east bank of the channel farther to the west. After completing these three points, you have to cross the eastern channel to be able to complete rest of the transect. Points 4 - 15 are located on the east bank of the eastern most channel. To make it even more confusing these channels come back together around point 8, and create a series of ponds and marshes. This one is a wet one, be prepared to get a little wet in order to travel efficiently between points. There are a lot of shallow ponds out there. **To do transect in reverse**: From Mazourka Canyon road, turn right (south) on the powerline road. There is a yellow cattle guard here (the road under the huge noisy powertowers). Drive about 0.7 miles and turn right on a side road. Take this about 1.75 miles and park in a small opening. Point 15 is about 0.35 km away.

**ACCESS:** From 395, on the southern edge of Independence, turn east on Mazourka Canyon Rd. Turn right at 4.1 miles from junction (after crossing the aqueduct). Proceed .6 miles on small dirt road, that turn into a dark gravel road. Follow gravel road till it ends, park where fence crosses the road. 1<sup>st</sup> Point is located approx 350 m southwest of here.

**Point #1:** From the parking spot, hop fence and head west passing through Tamarisk ditch and into native riparian approx 300 meters SSW from parking spot. Point located on edge of main channel in large willow. Stand up on rise, 5 m NW of metal tag, to collect data.

**Point # 2:** Walk south on east side of the bank, cross small channel, continue SSW along edge of riparian. Point on willow adjacent to the channel.

**Point # 3:** Continue along edge of wet channel, point tagged in tamarisk down on lower bank, south of wide curve. **Point # 4:** From Point # 3, you need to switch to the eastern most channel, head south east approximately 450 meters across the salt brush flat, you will see an obvious riparian community with a distinct and unfortunately deep channel that you need to cross, be prepared to get wet. Once on the east side, follow along native channel, point tagged in tamarisk, just before a stretch of willows.

**Point # 5:** Continues to follow native channel. Point is under a huge willow, with another big willow to the south. Point tagged in Saltbush. Tamarisk surround the willow.

**Point #6:** Continue on east side of "river". Point 4 m east of channel on Saltbush. Near tamarisk, and by a fat log with flakey chunks of bark. On the north end of saltbush surrounded by willow. A lone thin snag stands 40m to the north.

**Point # 7:** Proceed about 70 m. River turns west, head through trough Tamarisk band to active channel. Contour around active channel to large willow. Point tagged in Saltbush. 4 m from bank, west of trail. Tamarisk are on the east, and cattails on the west.

**Point #8:** Channel turns sharply west. 60 m south of SOMA07, head SSE to avoid marsh. Point is located north of large willow in active channel. It is also 10m north of the largest willow around.

**Point # 9**: Swing wide SSE to avoid marsh and ponds. Head for gray levee. Once on gray levee head NW to channel. Follow cowtrail alongside east side of "river". Point in Saltbush on edge. Cross broken down barbed wire fence, just north of the side channel.

**Point # 10:** Follow contour, be careful to avoid marshland. Point in greasewood. Point is on the northwest corner of a big arcing bend in the river, along a small side drainage. Cattails are 30m away to the north and west.

**Point # 11:** Head south from SOMA10, channel begins to spread out. Point near dry channel in Rabbit brush, 10m north of dry channel that heads east and makes a deep dip.

**Point # 12:** Descend into drainage to the SSW. Continue south along active channel. Point in med willow immediately adjacent to active channel. About 40m north of big marshy channel split, on the scrub/riparian edge. **Point # 13**: Head SSW, point adjacent to active marsh in Tamarisk.

Point # 14: Follow channel south to Saltbush

**Point # 15:** Follow main cow trail along side active channel. Point tagged in Tamarisk. To return to car, head directly east to levee, climb to the east side of the levee to find dirt road back to SOMA01.

Appendix 2. Point count and point count habitat assessment data collection forms, 2002.

P	RBO	) Va	aria	ıble	Ci	rcul	ar I	Plot	(V(	CP) Poi	nt Coui	nt Data	Form				Pg	of_	
St	ate		R	legi	on					] S	tation			Month	Day		Year		/isit
Firs	t Na	ame		Las	t Na	me		Add	lres	S					Т	elephor	ne	Er	nail
Poi	nt #		Tiı	me			Spe	cies		≤ 10	10-20	20-30	30-40	40-50	50-75	75-100	> 100	Fly- overs	Breeding Obs

Breeding Obs Codes: CO=copulation, MC=material carry, FC=food carry, NF=nest found, FL=fledglings, FS=fecal sac carry, DD=distraction display, PA=pair, DI=display

Appendix 2. Point count and point count habitat assessment data collection forms, 2002.

## PRBO POINT COUNT HABTIAT ASSESSMENT FORM

Initials	D	ate:	State: <u>CA</u>	County: ]	<u>INYO</u> Pro	oject <u>LOR</u>	<u>P</u> Station:	Poi	Point#:						
Radius: <u>50m</u> Hab1			Hab1%	Hab2	H	Iab2%	Hab3	Hab3%							
Snags>10 Logs>10		Ripariar	width	m Rip	. Patchine	ess des	% % Rip%								
0			<b>1</b>		¥			•	<u> </u>						
	Tot		Heigh	t (m)			DBI	DBH (cm)							
	Cov		6												
Layer	%	Low	Spec	High	Spec	Min	Spec	Max	Spec						
<u>&gt;</u> 5m (Treel)			•		•		•								
<u>&gt;</u> 5m (Tree2)															
.5 to <5m (Shrub1)															
.5 to <5m (Shrub2)															
0 to .5m (Herb1)															
"Total Woody" (TWI)															
Standing H <sub>2</sub> O															
Running H <sub>2</sub> O															
Litter															
Road/trail															
Rock															
Bare Ground															
Sublayor (	over	Spacios	Sub	avor Covor	Snor	vice	Sublayor	Cover	Spacios						
Sublayer	lover	Species		ayer Cover	Spec	.105	Sublayer	Cover	species						
			┣					<b> </b>							
								I							

Appendix 3. Variables investigated in point count habitat assessments, 2002.

### **DEFINITIONS**

<u>Tree:</u> Vegetation  $\geq$  5m tall, regardless of species

<u>Shrub</u>: Vegetation > 50cm < 5m, regardless of species

<u>Herb</u>: Vegetation  $\leq$  50cm, regardless of species

Snag: A dead standing tree with DBH >10 cm

Log: A dead fallen tree with DBH > 10cm

<u>Total woody</u>: All woody vegetation combined regardless of height categories – as viewed from above.

Litter: Ground materials such as leaves, fallen branches, dead grass, etc. Anything that is not a log (as defined above) is litter.

<u>Cover</u>: The percent of ground (within the 50m radius circle) obscured from above. For layer descriptions, this is the absolute cover. For species lists cover is relative to the other species in the layer (with the exception of Total Woody – see below).

<u>Width of riparian</u>: The estimated width of the riparian vegetation from one edge of the riparian vegetation to another, perpendicular to the stream (if > 100m, use GIS). Riparian vegetation is defined as willow, cottonwood, wetland species and not saltbush, grass/meadow, etc. River not included in estimate unless it falls between two riparian edges.

<u>Riparian Patchiness</u>: The percent of the riparian width "line" that is taken up by riparian vegetation, as viewed from above. If the riparian is wide, but very patchy (ie willows interspersed with pasture) the riparian patchiness may be low. If the riparian strip is narrow, but solid riparian veg, riparian patchiness = 100%.

Percent Riparian: Estimated percent cover of total riparian vegetation within 50m radius circle.

### VARIABLES

**Habitat types**: Defines the habitat types according to Sawyer/Keeler-Wolf series (Sawyer and Keeler Wolf 1995) present within the 50m radius circle. Two to three habitat are typically defined.

Habitat percent: Percent of the 50m radius plot that corresponds to the defined habitat(s).

Number of snags and Number of logs

Width of riparian zone at the point, perpendicular to the river

Riparian Patchiness of riparian zone at the point, perpendicular to the river

Percent Riparian within 50m radius circle of the point

Absolute cover (%) of tree layer(s)

Absolute cover (%) of **shrub** layer(s)

Absolute cover (%) of herb

Absolute cover (%) of **total woody** 

Absolute cover (%) of **standing water** (includes ponds, shallow floodwater etc.)

Absolute cover (%) of **running water** (creeks, aqueducts, rivers)

Absolute cover (%) of litter

Absolute cover (%) of **road** (including paved, dirt, gravel, human trails or campground, parking lots etc.)

Absolute cover (%) of **rocks** (i.e. large boulders, cliffs, river rocks, lava flows)

Absolute cover (%) of **bare ground** that is not road or rock (sandbar, gravel bar, decomposed granite, soil)

Average high height of tree layer(s) and corresponding species

Average height of the lower bounds of the tree layer(s) and corresponding species

Average high height of shrub layer(s) and corresponding species

Average height of the **low**er bounds of the **shrub** layer(s) and corresponding species

Average high height of herb layer(s) and corresponding species

Average height of the lower bounds of the herb layer(s) and corresponding species

Minimum of tree DBH and corresponding species

Maximum of tree DBH and corresponding species

### LAYER COMPOSITION VARIABLES

% relative cover of each species within the tree layer, recorded by species (should equal 100%)

% relative cover of each species within the shrub layer, recorded by species (should equal 100%)

% relative cover of each species within the herb layer, recorded by species (should equal 100%)

% absolute cover of the five most abundant woody species, regardless of height or layer, recorded by species. Plus (or including if they are of the top five) any exotic species such as Russian Olive or Salt Cedar. Combine all salix species into "SALIX" for this category for total willow cover. (may not equal 100%).

Appendix 2. Breeding status of all bird species observed at all sites, May 26 – June 27, 2002 (ORMC and ORTI breeding status cumulative 1999 – 2002)

Common name	Latin name	ORTI	GOOD	BLRS	CRRI	MCIV	ORMC	SOMA	MANZ	ALGA	PANG	NAGA	DELT
Pied-billed Grebe	Podilymbus podiceps	0	~	~	~	~	~	0	0	~	~	~	~
Clark's Grebe	Aechmophorus clarkii	0	~	~	~	~	~	~	~	~	~	~	~
American White Pelican	Pelecanus erythrorhynchos	0	~	~	~	~	~	~	~	~	~	~	~
Double-crested Cormorant	Phalacrocorax auritus	0	~	~	~	~	~	~	~	~	~	~	~
American Bittern	Botaurus lentiginosus	~	~	~	~	~	~	2	~	~	~	~	~
Great Blue Heron	Ardea herodias	0	0	~	~	~	0	0	0	0	1	0	0
Great Egret	Ardea alba	0	~	~	~	~	~	~	~	0	0	0	0
Snowy Egret	Egretta thula	~	~	~	~	~	~	~	~	0	~	0	0
Green Heron	Butorides virescens	~	~	0	~	~	~	~	~	0	0	0	~
Black-crowned Night Heron	Nycticorax nycticorax	~	~	~	~	~	~	~	2	~	2	2	2
White-faced Ibis	Plegadis chihi	0	~	~	~	~	~	~	~	~	0	~	0
Turkey Vulture	Cathartes aura	0	0	0	~	~	0	0	0	0	0	0	0
Canada Goose	Branta canadensis	0	~	~	~	~	~	~	~	0	~	~	~
Wood Duck	Aix sponsa	1	~	~	~	~	~	~	~	~	~	0	0
Gadwall	Anas strepera	1	~	~	~	~	~	0	0	0	0	0	0
Mallard	Anas platyrhynchos	1	~	~	~	~	~	~	0	0	1	0	2
Cinnamon Teal	Anas cyanoptera	0	~	~	~	~	~	~	0	~	0	0	~
Green-winged Teal	Anas crecca	~	~	~	~	~	~	~	0	0	~	~	~
Canvasback	Aythya valisineria	0	~	~	~	~	~	~	~	~	~	~	~
Lesser Scaup	Aythya affinis	0	~	~	~	~	~	~	~	~	~	~	~
Northern Harrier	Circus cyaneus	0	2	~	~	~	0	0	~	0	~	~	~
Swainson's Hawk	Buteo swainsoni	1	~	~	~	~	0	0	0	~	~	~	~
Red-tailed Hawk	Buteo jamaicensis	2	~	~	~	~	0	0	0	0	~	0	0
Golden Eagle	Aquila chrysaetos	~	~	~	~	~	0	~	~	~	~	~	~
American Kestrel	Falco sparverius	1	~	~	~	3	1	3	2	1	1	1	2
Prairie Falcon	Falco mexicanus	~	~	~	~	~	~	~	~	~	~	~	0
Chukar	Alectoris chukar	~	~	~	~	~	~	~	2	~	~	~	~
California Quail	Callipepla californica	1	~	~	2	~	2	~	~	2	~	2	2
Virginia Rail	Rallus limicola	~	1	~	~	~	2	~	2	~	~	2	~
Sora	Porzana carolina	~	~	~	~	~	0	~	~	2	2	~	~
American Coot	Fulica americana	2	~	~	~	~	2	~	~	~	~	~	2
Killdeer	Charadrius vociferus	3	~	3	~	~	~	3	3	2	1	1	3
American Avocet	Recurvirostra americana	~	~	~	~	~	~	~	~	0	~	~	~

Appendix 2. Breeding status of all bird species observed at all sites, May 26 – June 27, 2002 (ORMC and ORTI breeding status cumulative 1999 – 2002)

Common name	Latin name	ORTI	GOOD	BLRS	CRRI	MCIV	ORMC	SOMA	MANZ	ALGA	PANG	NAGA	DELT
Greater Yellowlegs	Tringa melanoleuca	0	~	~	~	~	~	~	~	~	~	~	~
Spotted Sandpiper	Actitis macularia	0	~	~	~	~	~	~	~	~	~	2	2
Common Snipe	Gallinago gallinago	0	~	~	~	~	~	~	~	3	2	2	~
Wilson's Phalarope	Phalaropus tricolor	0	~	~	~	~	~	~	~	~	~	~	~
California Gull	Larus californicus	~	~	~	~	~	~	~	~	0	~	~	~
Caspian Tern	Sterna caspia	0	~	~	~	~	~	~	~	~	~	~	~
Mourning Dove	Zenaida macroura	2	3	2	3	3	1	3	3	3	2	2	2
Greater Roadrunner	Geococcyx californianus	0	0	~	~	~	0	~	~	0	~	~	~
Barn Owl	Tyto alba	3	~	~	~	~	~	~	~	~	~	~	~
Western Screech-Owl	Otus kennicottii	1	~	~	~	~	~	~	~	~	~	~	~
Great Horned Owl	Bubo virginianus	1	~	~	~	0	0	0	0	0	0	~	0
Northern Pygmy-Owl	Glaucidium gnoma	~	~	~	~	~	~	0	~	~	~	~	~
Lesser Nighthawk	Chordeiles acutipennis	~	0	~	~	0	0	0	0	0	0	0	0
Common Nighthawk	Chordeiles minor	0	0	~	~	~	0	0	~	0	0	0	0
White-throated Swift	Aeronautes saxatalis	~	~	~	0	0	0	0	0	0	0	0	0
Black-chinned Hummingbird	Archilochus alexandri	0	~	~	~	~	~	~	~	~	~	0	~
Belted Kingfisher	Ceryle alcyon	2	~	~	~	~	~	~	2	~	2	~	~
Red-breasted Sapsucker	Sphyrapicus ruber	~	~	~	~	~	2	~	~	~	~	~	~
Ladder-backed Woodpecker	Picoides scalaris	~	~	~	~	2	2	2	~	~	~	~	~
Nuttall's Woodpecker	Picoides nuttallii	2	~	~	2	3	3	2	2	2	2	3	3
Downy Woodpecker	Picoides pubescens	0	~	~	~	~	0	~	~	~	~	~	~
Red-shafted Flicker	Colaptes auratus	3	2	~	~	~	1	3	3	1	2	1	2
Olive-sided Flycatcher	Contopus cooperi	~	~	~	~	~	~	0	0	0	0	0	0
Western Wood-pewee	Contopus sordidulus	0	0	0	~	0	0	0	0	0	0	0	0
Willow Flycatcher	Empidonax traillii	~	~	~	~	~	~	~	~	0	0	0	0
Gray Flycatcher	Empidonax wrightii	~	~	~	~	0	~	0	~	0	~	~	0
Dusky Flycatcher	Empidonax oberholseri	~	~	~	~	~	0	~	~	~	~	~	~
Western Flycatcher	E. occidentalis or difficilis	~	~	~	~	0	~	0	~	0	~	0	~
Black Phoebe	Sayornis nigricans	1	~	~	~	~	1	2	1	2	~	3	3
Say's Phoebe	Sayornis saya	0	2	2	2	2	2	2	~	2	2	2	2
Ash-throated Flycatcher	Myiarchus cinerascens	0	2	2	3	3	1	1	3	2	3	3	1
Western Kingbird	Tyrannus verticalis	1	2	2	2	2	0	1	3	1	1	1	1

Appendix 2. Breeding status of all bird species observed at all sites, May 26 – June 27, 2002 (ORMC and ORTI breeding status cumulative 1999 – 2002)

Common name	Latin name	ORTI	GOOD	BLRS	CRRI	MCIV	ORMC	SOMA	MANZ	ALGA	PANG	NAGA	DELT
Loggerhead Shrike	Lanius Iudovicianus	~	1	1	2	2	1	1	1	1	1	2	2
Cassin's Vireo	Vireo cassinii	0	~	~	~	~	~	0	~	0	~	~	~
Warbling Vireo	Vireo gilvus	2	~	~	~	0	0	0	0	0	0	~	0
Steller's Jay	Cyanocitta stelleri	~	~	~	~	~	~	~	~	0	~	~	~
Western Scrub-Jay	Aphelocoma californica	~	~	~	~	~	0	~	~	~	~	~	~
Pinyon Jay	Gymnorhinus cyanocephalus	~	0	~	~	~	~	~	~	0	~	~	~
American Magpie	Pica hudsonia	1	2	2	~	2	1	3	2	1	3	1	1
Common Raven	Corvus corax	1	2	2	2	2	2	2	2	2	1	2	2
Horned Lark	Eremophila alpestris	~	0	~	~	~	~	~	~	~	~	~	~
Violet-green Swallow	Tachycineta thalassina	0	0	0	0	~	0	0	0	0	0	0	0
Northern Rough-winged Swallow	Stelgidopteryx serripennis	1	1	~	~	~	~	0	0	0	0	2	0
Bank Swallow	Riparia riparia	~	~	~	~	~	~	0	~	0	0	~	~
Cliff Swallow	Petrochelidon pyrrhonota	0	1	0	~	~	0	0	0	~	~	2	0
Barn Swallow	Hirundo rustica	0	1	~	~	~	~	~	0	0	0	0	~
Bushtit	Psaltriparus minimus	1	~	~	~	2	2	~	~	~	~	~	~
Bewick's Wren	Thryomanes bewickii	1	3	~	3	1	1	3	3	1	3	3	2
House Wren	Troglodytes aedon	3	2	~	~	~	0	2	~	3	2	1	2
Marsh Wren	Cistothorus palustris	1	2	~	~	~	2	1	2	3	3	1	2
American Dipper	Cinclus mexicanus	2	~	~	~	~	~	~	~	~	~	~	~
Blue-gray Gnatcatcher	Polioptila caerulea	1	2	~	3	3	1	3	2	1	3	3	2
American Robin	Tudus migratorius	0	~	~	2	~	0	~	~	2	~	2	~
Northern Mockingbird	Mimus polyglottos	0	3	3	2	2	3	1	3	1	1	1	1
Le Conte's Thrasher	Taxostoma lecontei	~	2	1	2	~	2	2	~	~	~	~	~
European Starling	Sturnus vulgaris	~	~	~	~	~	1	~	2	1	1	1	2
Cedar Waxwing	Bombycilla cedrorum	~	~	~	~	~	~	~	~	0	0	~	~
Phainopepla	Phainopepla nitens	~	~	~	~	~	~	~	~	~	~	0	~
Yellow Warbler	Dendroica petechia	3	0	~	~	0	0	0	0	0	0	0	0
Audubon's Warbler	Dendroica coronata auduboni	~	~	~	~	~	~	~	~	~	0	0	0
Myrtle Warbler	Dendroica coronata coronata	~	~	~	~	~	~	~	~	~	~	~	0
Yellow-rumped Warbler	Dendroica coronata	~	~	~	~	~	~	~	~	~	~	0	~
Townsend's Warbler	Dendroica townsendi	~	~	~	~	~	~	0	~	~	~	~	0
Mac Gillivray's Warbler	Oporornis tolmei	~	~	~	~	0	0	0	~	~	~	~	0

Appendix 2. Breeding status of all bird species observed at all sites, May 26 – June 27, 2002 (ORMC and ORTI breeding status cumulative 1999 – 2002)

Common name	Latin name	ORTI	GOOD	BLRS	CRRI	MCIV	ORMC	SOMA	MANZ	ALGA	PANG	NAGA	DELT
Common Yellowthroat	Geothlypis trichas	3	3	~	~	~	3	3	1	3	3	3	3
Wilson's Warbler	Wilsonia pusilla	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-breasted Chat	Icteria virens	3	~	~	~	~	~	~	~	0	~	~	~
Western Tanager	Piranga ludoviciana	~	~	~	~	0	0	0	~	0	0	0	0
Green-tailed Towhee	Pipilo chlorurus	0	~	~	~	0	~	~	~	0	~	~	~
Spotted Towhee	Pipilo maculatus	3	~	2	3	3	1	3	~	2	3	~	2
Brewer's Sparrow	Spizella breweri	2	2	2	~	2	~	2	~	~	~	~	2
Vesper Sparrow	Pooecetes gramineus	~	~	~	~	~	~	~	~	~	~	~	0
Black-throated Sparrow	Amphispiza bilineata	2	2	1	3	2	2	~	2	~	2	~	2
Sage Sparrow	Amphispiza belli	~	2	2	2	2	2	~	~	~	~	~	2
Savannah Sparrow	Passerculus sandwichensis	3	~	~	~	~	~	~	~	~	2	~	2
Song Sparrow	Melospiza melodia	1	2	~	2	2	1	1	1	1	3	3	3
Gambel's White-crowned Sparrow	Zonotrichia leucophrys gambelii	~	~	~	~	~	~	~	~	~	~	~	0
White-crowned Sparrow	Zonotrichia leucophrys	~	~	~	~	~	~	~	~	~	~	~	0
Black-headed Grosbeak	Pheucticus melanocephalus	2	0	~	~	~	0	~	~	~	~	~	0
Blue Grosbeak	Guiraca caerulea	2	2	~	~	2	1	2	2	2	2	3	~
Lazuli Bunting	Passerina amoena	3	~	~	~	~	3	2	~	2	2	2	2
Red-winged Blackbird	Agelaius phoeniceus	1	1	3	~	~	1	3	1	1	1	1	1
Western Meadowlark	Sturnella neglecta	3	1	3	2	~	2	3	3	1	1	1	1
Yellow-headed Blackbird	Xanthocephalus xanthocephalus	2	2	~	~	~	0	~	2	2	3	3	1
Brewer's Blackbird	Euphagus cyanocephalus	2	2	~	2	~	2	2	2	1	~	2	1
Great-tailed Grackle	Quiscalus mexicanus	0	~	~	~	~	0	~	0	0	0	2	0
Brown-headed Cowbird	Molothrus ater	3	3	2	2	2	1	1	3	3	3	3	3
Bullock's Oriole	lcterus bullockii	2	~	~	~	~	2	2	2	3	2	3	2
Cassin's Finch	Carpodacus cassinii	~	~	~	~	~	0	~	~	~	~	~	~
House Finch	Carpodacus mexicanus	~	2	~	~	~	3	~	2	~	2	~	~
Lesser Goldfinch	Carduelis psaltria	~	2	~	~	~	2	~	~	2	2	2	~