

Lower Colorado River Multi-Species Conservation Program



Balancing Resource Use and Conservation

Beal Lake Riparian Restoration 2009 Annual Report



February 2013

Lower Colorado River Multi-Species Conservation Program Steering Committee Members

Federal Participant Group

Bureau of Reclamation
U.S. Fish and Wildlife Service
National Park Service
Bureau of Land Management
Bureau of Indian Affairs
Western Area Power Administration

Arizona Participant Group

Arizona Department of Water Resources
Arizona Electric Power Cooperative, Inc.
Arizona Game and Fish Department
Arizona Power Authority
Central Arizona Water Conservation District
Cibola Valley Irrigation and Drainage District
City of Bullhead City
City of Lake Havasu City
City of Mesa
City of Somerton
City of Yuma
Electrical District No. 3, Pinal County, Arizona
Golden Shores Water Conservation District
Mohave County Water Authority
Mohave Valley Irrigation and Drainage District
Mohave Water Conservation District
North Gila Valley Irrigation and Drainage District
Town of Fredonia
Town of Thatcher
Town of Wickenburg
Salt River Project Agricultural Improvement and Power District
Unit "B" Irrigation and Drainage District
Wellton-Mohawk Irrigation and Drainage District
Yuma County Water Users' Association
Yuma Irrigation District
Yuma Mesa Irrigation and Drainage District

Other Interested Parties Participant Group

QuadState County Government Coalition
Desert Wildlife Unlimited

California Participant Group

California Department of Fish and Game
City of Needles
Coachella Valley Water District
Colorado River Board of California
Bard Water District
Imperial Irrigation District
Los Angeles Department of Water and Power
Palo Verde Irrigation District
San Diego County Water Authority
Southern California Edison Company
Southern California Public Power Authority
The Metropolitan Water District of Southern California

Nevada Participant Group

Colorado River Commission of Nevada
Nevada Department of Wildlife
Southern Nevada Water Authority
Colorado River Commission Power Users
Basic Water Company

Native American Participant Group

Hualapai Tribe
Colorado River Indian Tribes
Chemehuevi Indian Tribe

Conservation Participant Group

Ducks Unlimited
Lower Colorado River RC&D Area, Inc.
The Nature Conservancy



Lower Colorado River Multi-Species Conservation Program

Beal Lake Riparian Restoration 2009 Annual Report

Prepared by: Restoration and Wildlife Groups

Lower Colorado River
Multi-Species Conservation Program
Bureau of Reclamation
Lower Colorado Region
Boulder City, Nevada
<http://www.lcrmscp.gov>

February 2013

Contents

Acronyms and Abbreviations	vi
Background	1
General Site Information.....	1
Purpose.....	1
Location/Description.....	1
Land Ownership.....	3
Water.....	3
Agreements	4
2007 Habitat Development	4
Planting and Fertilizing.....	4
Irrigation	5
Site Maintenance.....	6
Monitoring	6
Vegetation.....	6
Insects	9
Small Mammals	9
Bats	9
Acoustic Surveys	9
Avian Species.....	10
Established Land Cover and Habitat Credit.....	11
Adaptive Management	11
Operation and Maintenance	11
Soil Management	11
Water Management.....	11
Vegetation Management	11
Wildfire Management	12
Law Enforcement.....	12
Future Habitat Development.....	12
Literature Cited	13

Figures and Tables

Figure 1. Location of Beal Lake Riparian	2
Figure 2. Aerial photo of the project, October 2008.....	3
Figure 3. Goodding’s willow Pre- and Post-Fertilizer Treatment	5
Figure 4. 2009 Irrigation Schedule	6
Table 1. Soil Analysis Report-May 2009	4
Table 2. Acre feet of water applied per month at Beal Riparian Project in 2009	5
Table 3. Foliage height diversity at Beal Lake	7

Table 4. Beal Lake overstory tree and intermediate tree and shrub height and diameter breast height means plus standard deviations are shown.....	8
Table 5. Average percent ground cover by species at Beal Lake	8
Table 6. Average total abundance of target tree species per plot and per acre at each site/phase.....	8
Table 7. Mean percent crown closure by site	9
Table 8. Total number of call minutes for FY07 through FY09.....	10
Table 9. LCR MSCP Avian Species Detected at Beal Lake, 2009.....	11

Acronyms and Abbreviations

AW	Arrowweed land cover type, as defined in the LCR MSCP HCP
CW	Cottonwood-Willow land cover type, as defined in the LCR MSCP HCP
DBH	Diameter at Breast Height
EC	Electro-conductivity
HCP	Habitat Conservation Plan
HM	Honey Mesquite land cover type, as defined in the LCR MSCP HCP
HNWR	Havasu National Wildlife Refuge
LAU	Land Use Agreement
LCR	Lower Colorado River
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
n	Sample size
NWR	National Wildlife Refuge
Pa	Pascal
Reclamation	U.S. Bureau of Reclamation
SM	Saltcedar and Screwbean Mesquite land cover type, as defined in the LCR MSCP HCP
sp(p)	Species (plural)
TVV	Total Vegetation Volume
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USDA	U.S. Department of Agriculture

Background

Beal Lake Riparian was initiated in 2001 by the Bureau of Reclamation's (Reclamation) Lower Colorado Regional Office in Boulder City, Nevada, in partnership with the land owner, the U.S. Fish and Wildlife Service (USFWS), Havasu National Wildlife Refuge (HNWR). Since it was immediately available to Reclamation when the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) began, it was utilized to test and demonstrate restoration and management techniques (Reclamation 2005). In 2001, Beal Lake was dredged to create a refugia for native fish. The dredge material was distributed over adjacent areas to be planted at a later date with native riparian vegetation. Work on the riparian habitat area began in 2002. Beal Lake Riparian is being used to test various riparian restoration methods and techniques for site preparation, planting, irrigation, monitoring, managing, and maintenance (Reclamation 2005). In addition, this project will result in approximately 107 acres (43.3 ha) of cottonwood, willow, and mesquite landcover types, not including Phase 3, a 100-ac (40.5-ha) area which was cleared and seeded with intact honey mesquite seed pods (*Prosopis glandulosa* var. *torreyana*).

Beal Lake Riparian was planted using container plants grown in nurseries, cuttings and/or poles, and seeds. Phase 1, started in 2003 and completed in 2005, resulted in 59.5 ac (24.1 ha) of Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), coyote willow (*Salix exigua*), and screwbean (*Prosopis pubescens*) and honey mesquite land cover types (Reclamation 2005). Phase 2 was started in 2004 and completed in 2005, adding an additional 47.7 ac (19.4 ha) of cottonwood and willow land cover types. Areas with saline soils were planted with salt-tolerant shrubs (*Atriplex* spp., *Baccharis* spp.) and various groundcovers. Details on the planting in each field can be found in the 2005 Annual Report (Reclamation 2005).

General Site Information

Purpose

Beal Lake Riparian demonstrates restoration, management, and monitoring techniques. Results are documented annually to determine if conditions are appropriate for LCR MSCP covered species, specifically the southwestern willow flycatcher (*Empidonax trailii extimus*) and the yellow-billed cuckoo (*Coccyzus americanus occidentalis*). The site provides approximately 107 ac (43.3 ha) of potential habitat for LCR MSCP covered species.

Location/Description

Beal Lake Riparian is located in Reach 3, between Beal Lake and lower Topock Marsh, on HNWR, near Needles, California. It is within the historic floodplain of the lower Colorado River (LCR) and adjacent to River Mile 237 on the Arizona side (Figures 1 and 2).



Figure 2. Aerial photo of the project, October 2008.

Land Ownership

Beal Lake Riparian is located on HNWR, which is owned and managed by the USFWS. The HNWR headquarters is located in Needles, California.

Water

At the time HNWR was created Topock Marsh was the primary attraction and focus of most refuge activities (Shoreline, 2006). HNWR possesses a 2nd and 3rd priority water entitlement provided by Supreme Court Decree No. (7) to fulfill the purposes of the Refuge (Executive order No. 8647 and Public land Order No. 559). HNWR's entitlement of 37,339 acre-feet (af) per year consumptive use and 41,839 af diversionary right of Colorado River water is used to fill Topock Marsh through two instrumented inlet canals. The water used for irrigation at Beal Lake Riparian is supplied from Topock Marsh.

Agreements

Restoration efforts at Beal Lake Riparian represent an ongoing partnership between the HNWR and Reclamation. If the decision is made to request habitat creation credit under the LCR MSCP for the project site, a Land Use Agreement (LUA) will be drafted to secure the land and water to maintain the riparian habitat for 50 years. The LUA will also outline the rights and responsibilities of each partner in the project's development and maintenance.

During the interim period, Reclamation funded a position for a USFWS employee at HNWR to manage the site through 2009. The employee began work in May 2007 and left the position in June 2008. At this time the position remains open, but is in the process of being filled.

2007 Habitat Development

Planting and Fertilizing

Riparian vegetation plantings within Phase 1 and 2 were completed by December 2005 (Reclamation 2006).

During May 2009 soil samples were taken in cells P and I and analyzed by a contracted crop consultant. The samples indicated Nitrate, Phosphate, and Zinc levels had risen due to last year's aerial application of fertilizer, but had not yet reached optimal levels (Table 1). A mixture of UN-32, 10-34-0, and Zinc Chelate was prescribed and applied using the recently installed fertigation system (Figure 3) during June and July 2009.

Table 1. Soil Analysis Report-May 2009.

Area	NO3-N	PO4-P	K	Zn
		Olsen/ppm		DTPA/ppm
Cell P	0.2	7.7	127.0	2.46
Cell I	0.2	3.1	73.0	0.75
Optimum Range	10.0-20.0	10.0-15.0	100.0-200.0	1.00-3.00



Figure 3. (Left) 1,500 gallons of fertilizer were delivered and connected to irrigation delivery pipe. (Right) Pump and tubing that deliver fertilizer into irrigation water.

Irrigation

Beal Lake Riparian is flood irrigated with one alfalfa valve per field (Reclamation 2006). Fields are irrigated on different schedules to minimize irrigation while keeping the central area wet (Figure 4). In an effort to attract southwestern willow flycatchers to the site, the three fields center fields (K, L, P) are irrigated once a week throughout the breeding season to keep ambient conditions under the tree canopy moist. Irrigation regimes for the surrounding fields are based on vegetation species requirements or planting dates. Cottonwood and willow were irrigated more frequently than mesquites and fields planted more recently are irrigated more frequently than older, established vegetation. A total of 1,244 AF were applied to the project in 2009 (Table 2) compared to 1,098 AF in 2008.

Table 2. Acre feet of water applied per month at Beal Riparian Project in 2009.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
AF applied			160*	180*	146	224	154	121	190	49^		
* Value estimated based on average weekly water use during May - October. Irrigators noticed the flowmeter recording inaccurate measurements and replaced the meter on May 4, 2009.										Estimated Total Water Use for 2009 (acre-feet)		1224
^ Site was irrigated only during the first week of October.										Average Water Use/Wk (acre-feet)		40

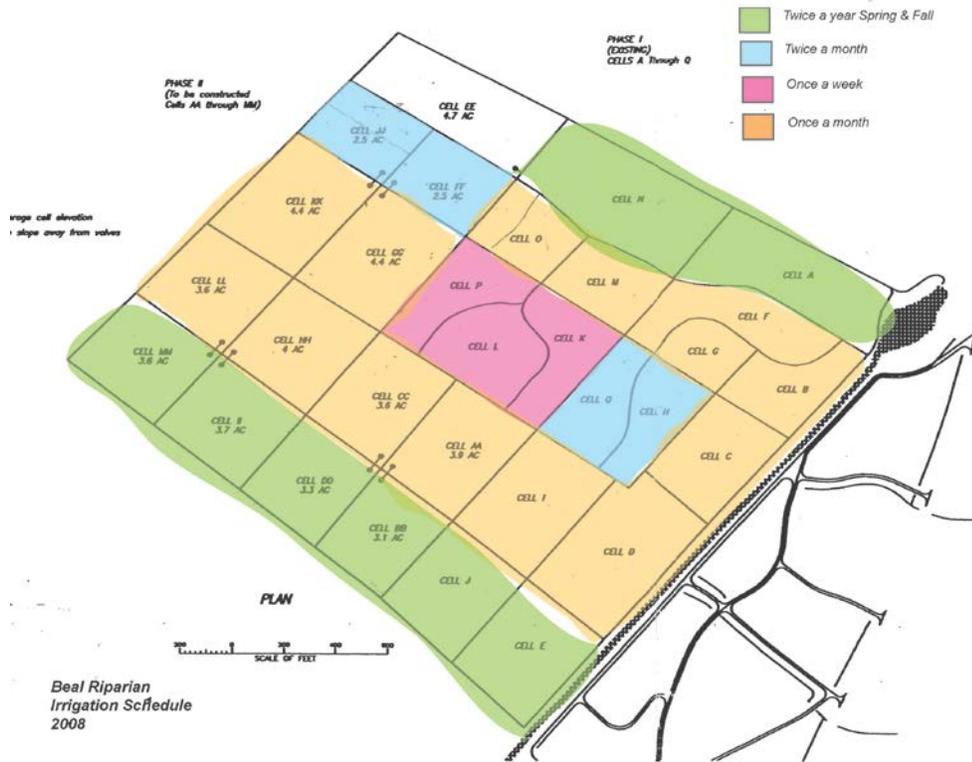


Figure 4. 2009 Irrigation Schedule.

Site Maintenance

Both the flow meter and the engine hour meter were replaced. A new fertigation system was installed and fertilizer was applied to the fields through the irrigation water. The irrigation pump was operated for an estimate 848 hours during FY09 compared to 680 hours in 2008. Routine maintenance was performed on the pump throughout the year. Berms between fields were repaired as needed. Saltcedar (*Tamarisk* spp.) eradication continued on site when time permitted.

Monitoring

Vegetation

In 2008 permanent plots were established at five habitat creation sites as part of the Lower Colorado Multi-Species Conservation Program (LCR-MSCP). The LCR-MSCP was designed to create habitat to support the conservation of target fish and wildlife species important to the Lower Colorado River ecosystem. According to the Lower Colorado River Habitat Conservation

Plan (HCP), approximately 8,100 acres (3,278 hectares) of habitat will be created in order to reach this goal. Included in the HCP is a long-term monitoring strategy designed to follow the progression of each LCR MSCP habitat creation goal over time and ensure that the long-term goals are reached.

Using several components of common forestry and vegetation monitoring protocols, data were collected to capture vegetation composition and structure within each habitat creation site (BioWest). Data gathered across multiple years will be used to guide the adaptive management process for each habitat creation site.

Vegetation monitoring data were collected within several parameters to capture vegetation composition and structure from the ground layer to the canopy layer. Detailed methods used to gather vegetation data can be found in BioWest’s Vegetation Monitoring Report (BioWest 2010). The following data were summarized across each site. Table 3 lists the percent of total vegetation per meter layer. The high percentage of vegetation at meter 1 and 2 is reflective of the ground cover at the foliage height diversity sampling points. Table 4 shows ranges and means of height and DBH for plants within the overstory tree and intermediate tree and shrub categories. Table 5 lists percent of ground cover by species. Ground cover data were gathered on herbaceous plants and small shrubs only. Table 6 shows average total abundance of target tree species per plot and per acre at each site/phase. Abundance was calculated from plots containing trees within each respective category (overstory, intermediate and shrub, DBH classes 1-4) and then added together to get the values shown. Table 7 shows mean percent crown closure at each site/phase. The number of observations for each site refers to the number of readings at all plots across each site/phase.

Table 3. Foliage height diversity at Beal Lake. Percent total vegetation and standard deviation per meter layer are shown.

Foliage Ht Diversity		
Site/Phase	Meter	% (SD)
		27.57
Beal Lake	1	(0.04)
		27.03
Beal Lake	2	(0.02)
		18.13
Beal Lake	3	(0.02)
		13.15
Beal Lake	4	(0.01)
Beal Lake	5	7.33 (0.02)
Beal Lake	6	4.79 (0.01)
Beal Lake	7	1.81 (0.02)
Beal Lake	8	0.58 (n/a)

Table 4. Beal Lake overstory tree and intermediate tree and shrub height and diameter breast height means plus standard deviations are shown.

Site/Phase	Overstory				Intermediate			
	Ht (Range-m)	Mean (SD)	DBH (Range-cm)	Mean (SD)	Ht (Range-m)	Mean (SD)	DBH (Range-cm)	Mean (SD)
Beal Lake	0.00-8.45	1.97 (3.01)	0.00-17.25	5.14 (7.56)	4.30-8.50	6.50 (1.31)	7.90-12.00	9.48 (1.40)

Table 5. Average percent ground cover by species at Beal Lake.

Site/Phase	Species	% (SD)
Beal Lake	<i>Bouteloua gracilis</i>	22.20 (1.77)
Beal Lake	<i>Cynodon dactylon</i>	18.09 (2.18)
Beal Lake	<i>Tiquilia plicata</i>	0.38 (0.04)

Table 6. Average total abundance of target tree species per plot and per acre at each site/phase.

Site	Abundance-number of trees									
	<i>Populus fremontii</i>		<i>Salix gooddingii</i>		<i>Salix exigua</i>		<i>Prosopis glandulosa</i>		<i>Prosopis pubescens</i>	
	Plot	Acre	Plot	Acre	Plot	Acre	Plot	Acre	Plot	Acre
Beal	46.5						13.0		20.4	
	0	2200.50	8.00	424.00	69.50	3683.50	0	623.00	8	961.69
CRIT	39.8						20.0			
	0	1984.00	4.50	73.00	-	-	0	994.00	8.50	236.00
CVCA 1	25.1		29.0							
	7	1169.01	0	1405.00	106.30	5633.90	-	-	-	-
CVCA 2	13.9		17.6							
	3	738.29	5	935.45	37.79	2002.87	-	-	-	-
CVCA 3	38.7		36.8							
	5	1938.25	3	662.50	133.75	7088.75	4.00	212.00	-	-
CVCA 4	-	-	-	-	-	-	6.52	345.56	-	-
	36.0		13.5							
CNWR	3	1750.20	0	715.50	12.00	636.00	4.00	179.00	1.00	53.00
	34.4		19.9							
PVER2	7	1793.91	2	1055.76	75.00	3975.00	5.00	265.00	-	-
	23.7		16.0							
PVER3	4	1258.22	7	851.71	23.79	1260.87	-	-	1.00	53.00
	10.2									
PVER4	3	542.19	7.27	385.31	9.25	490.25	5.67	300.51	-	-

Table 7. Mean percent crown closure by site.

Site	Number of observations*	Mean % crown closure (SD)
Beal Lake	135	51.75 (40.30)
CRIT	108	77.28 (26.67)
CVCA1	72	88.87 (27.12)
CVCA2	180	80.67 (31.60)
CVCA3	126	70.81 (38.83)
CVCA4	252	0.00
CNWR	126	78.74 (34.69)
PVER2	126	68.71 (40.61)
PVER3	180	33.62 (37.89)
PVER4	198	8.57 (17.74)

* Number of observations for each site refers to the number of readings at each plot across the site.

Insects

Arthropods, insects and spiders, were collected during April-August 2009 to measure their nitrogen contents. Nitrogen concentration of arthropod prey may influence establishment and nesting success of insectivorous birds. Arthropods were collected from different plant species, identified, and measured for nitrogen content.

Small Mammals

Beal Lake was trapped in spring 2009. Line transects were run for a total of 90 trap nights. No *Sigmodon* spp. have been captured since 2006. For more detailed methods and results refer to Neiswenter (2009).

Bats

Acoustic survey methods were used to monitor bats.

Acoustic Surveys

Anabat bat detectors were deployed across Beal Lake quarterly to determine bat activity across habitat types. Seventy-six detector nights were completed on nine monitoring sites and one exploratory site in 2009. Bat activity is expressed in call minutes which indicates that a given species is present if it is recorded at least once within a 1-minute period. Table 8 lists the total number of call minutes of LCR MSCP species for each year sampled combined across three years of sampling. A long term acoustic station has also been collecting data on a nightly basis since April 2007. Due to the large amount of data, results from 2009 have not yet been prepared,

but will be in the acoustic survey annual report. Acoustic surveys will continue in 2010. For more details of how this data is collected and analyzed, see the report, *Post-Development Bat Monitoring of Habitat Creation Areas along the Lower Colorado River – 2009 Acoustic Surveys*.

Table 8. Total number of call minutes for FY07 through FY09.

Species	FY07	FY08	FY09	All Years
Western Red Bat	3	0	2	5
Western Yellow Bat	9	1	0	10
California Leaf-Nosed Bat	7	3	13	23
Townsend’s Big-Eared Bat	1	0	2	3
All other species	1607	2292	3594	7493
Total call minutes	1627	2296	3611	7534

Avian Species

Cuckoo surveys were conducted following Halterman et al. (2008). Beal Lake was visited 10 times between 15 June and 18 August 2009. Surveys were spaced 12 to 20 days apart and took place between sunrise and 12:00 PM, or until temperature reached 40°C (104°F). Call-playback, described by Johnson et al. (1981) and Gaines and Laymon (1984), was used to increase the probability of detection. Along with playback surveys, data was collected on nesting, microhabitat, vegetation, and arthropods (McNeil et al. 2009).

On 4 July, capture of cuckoos for banding and radio telemetry work was attempted, but no cuckoos were caught. One cuckoo was detected and it is possible (cuckoos detected in an area at least 16 days apart) cuckoos nested here, but breeding was not confirmed.

All flycatcher surveys were conducted according to methods described in Sogge et al. (1997), following a five-survey protocol, as recommended by the U.S. Fish and Wildlife Service (USFWS 2000). At least one survey was conducted between 15 and 31 May, at least one survey between 1 and 15 June, and three additional surveys between 16 June and 25 July. To elicit responses from nearby willow flycatchers, conspecific vocalizations previously recorded throughout the Southwest from 1996 to 1998 were broadcast within appropriate habitat. Detailed methods are described in McLeod and T.J. Koronkiewicz (2010).

One willow flycatcher (*Empidonax traillii*) was detected on 15-23 May, and another on 3 June. A third flycatcher was caught in a mist net at the banding station run by Reclamation on 15 May; this flycatcher was later confirmed to be the breeding male in The Wallows site nearby in Topock Marsh.

Surveys of restoration sites with more than two years of growth to determine their use for breeding birds by other LCR MSCP avian species were conducted using an intensive area search method. In 2009, Beal Lake was split into four area search plots. The Arizona Bell’s vireo (*Vireo*

bellii arizonae), Sonoran yellow warbler (*Dendroica petechia sonorana*) and summer tanager (*Piranga rubra*) were confirmed breeding (Table 9). Bell’s vireos (*Vireo bellii*) and summer tanagers that were classified as non-breeders were also detected at the site. Details of the intensive area search method and further results are found in GBBO (2009).

Table 9. LCR MSCP Avian Species Detected at Beal Lake, 2009.

LCR MSCP-covered Species Detected	Number of Confirmed Breeding Pairs
Arizona Bell’s vireo	10
summer tanager	1
willow flycatcher	0
yellow-billed cuckoo	0
Sonoran yellow warbler	7

Established Land Cover and Habitat Credit

The process for Habitat Credit has not been finalized. Once the process is finalized, information in this section will be utilized to establish credit.

The land cover for the Beal Restoration is classified as cottonwood-willow III, as defined by Anderson and Ohmart (1976, 1984). The cottonwood-willow III structure type is described as having one layer of vegetation with the bulk of the volume between 2-6 m tall.

Adaptive Management

Operation and Maintenance

The check valve and fertilizer adapter were installed in the irrigation line.

Soil Management

Soil sample were taken to determine fertilizer needs.

Water Management

Irrigation continued under the 2008 water regime.

Vegetation Management

Invasive weeds will continue to be removed around irrigation valves and on rock structure.

Wildfire Management

As guided by commitments in the HCP, wildfire management practices at Beal Riparian are intended to 1) reduce the risk of the loss of created habitats to wildfires by contributing to and integrating with local, State and Federal agency fire management plans, 2) develop a fire management plan for this project to contain wildfire and facilitate rapid response to suppress fire, and 3) implement land management and habitat creation measures to support the reestablishment of native vegetation that is lost to wildfire. The Fire Management Plan was drafted during this reporting period to be finalized in 2010.

Law Enforcement

HNWR is responsible for law enforcement at Beal Riparian. Reclamation will work with HNWR to ensure these activities do not conflict with the LCR MSCP HCP.

Future Habitat Development

At this time there are no further plans for development of cottonwood-willow land cover type in 2009.

Literature Cited

- BioWest, Inc. 2010. Lower Colorado Multi-species Conservation Program Vegetation Plot Monitoring Report. Final report submitted to U.S. Bureau of Reclamation, Boulder City, NV.
- Broderick, S. 2010. Post-development Bat Monitoring of Habitat Creation Areas along the Lower Colorado River—2009 acoustic surveys. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- Gaines, D. and S.A. Laymon. 1984. Decline, Status and Preservation of the Yellow-billed Cuckoo in California. *Western Birds* 15:49-80.
- Great Basin Bird Observatory 2009. Annual Report on the Lower Colorado River Riparian Bird Surveys, 2009. Submitted to Bureau of Reclamation, Lower Colorado River Region, Boulder City, NV by Great Basin Bird Observatory, 1755 E. Plumb Lane #256, Reno, NV.
- Halterman, M.D., E.T. Rose, S.E. McNeil, and D. Tracy. 2008. Yellow-billed Cuckoo Distribution, Abundance and Habitat Use on the Lower Colorado River and Tributaries, 2009 Annual Report, submitted to Bureau of Reclamation, Boulder City, NV by Southern Sierra Research Station, PO Box 1316, Weldon, CA.
- Halterman, M., E. Rose, S. McNeil, and D. Tracy. 2009. Yellow-billed Cuckoo Distribution, Abundance and Habitat Use on the Lower Colorado River and Tributaries, 2008 Draft Annual Report. Submitted to Bureau of Reclamation, Lower Colorado Region, LCR MSCP Office, Boulder City, NV.
- Johnson, R.R., B.T. Brown, L.T. Haight, and J.M. Simpson. 1981. Playback Recordings as a Special Avian Censusing Technique, pp. 69-75 *in* Estimating Numbers of Terrestrial Birds. (C.J. Ralph, and J.M. Scott, eds.). *Studies in Avian Biology*, Allen Press, Inc, Lawrence, KS.
- McLeod, M.A., and T.J. Koronkiewicz. 2010. Southwestern Willow Flycatcher Surveys, Demography, and Ecology along the Lower Colorado River and Tributaries, 2009. Annual report submitted to U.S. Bureau of Reclamation, Boulder City, NV, by SWCA Environmental Consultants, Flagstaff, AZ.
- Neiswenter, S. 2009. Small Mammal Colonization at Habitat Creation Areas along the Lower Colorado River: 2009. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- McNeil, S.E., M.D. Halterman, E.T. Rose, and D. Tracy. 2009. Yellow-billed Cuckoo Distribution, Abundance and Habitat Use on the Lower Colorado River and Tributaries, 2009. Annual report submitted to Bureau of Reclamation, LCR MSCP, Boulder City, NV by Southern Sierra Research Station, PO Box 1316, Weldon, CA.

- Shoreline Engineering and Restoration. 2006. Havasu National Wildlife Refuge Water Management Plan.
- Sogge, M.K., R.M. Marshall, S.J. Sferra, and T.J. Tibbitts. 1997. A Southwestern Willow Flycatcher Natural History Summary and Survey Protocol. Technical Report NPS/NAUCPRS/NRTR-97/12. USGS Colorado Plateau Research Station, Northern Arizona University, Flagstaff, AZ.
- U.S Department of Agriculture. 1996. Soil Survey Laboratory Methods Manual. U.S. Department of Agriculture, Soil Survey Investigations Report No. 42, Version 3.0. Natural Resource Conservation Service, Lincoln, NE.
- U.S. Bureau of Reclamation 2005. Beal Lake Habitat Restoration. 2005. Lower Colorado River Multi-Species Conservation Program, Boulder City, NV.
- U.S. Fish and Wildlife Service (USFWS). 2000. Southwestern Willow Flycatcher Protocol Revision 2000. U.S. Fish and Wildlife Service, Sacramento, CA.