



Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Beal Lake Conservation Area

2011 Annual Report



April 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 Local Governments Authority
Desert Wildlife Unlimited

California Participant Group

California Department of Fish and Wildlife
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

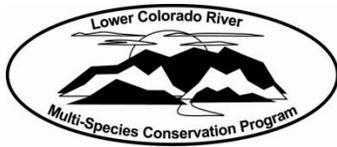
Colorado River Commission of Nevada
Nevada Department of Wildlife
Southern Nevada Water Authority
Colorado River Commission Power Users
Basic Water Company

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 Conservation Area 2011 Annual Report

Prepared by:

Ashlee Rudolph, Restoration Group

Barbara Raulston, Wildlife Group

Sonja Kokos, Adaptive Management Program

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

April 2013

Rudolph, Ashlee and B. Raulston. 2011. Beal Lake Conservation Area, 2011 Annual Report. Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation, Lower Colorado Region, Boulder City, Nevada.

ACRONYMS AND ABBREVIATIONS

AGFD	Arizona Game and Fish Department
BLCA	Beal Lake Conservation Area
HNWR	Havasu National Wildlife Refuge
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
LUA	Land Use Agreement
Reclamation	Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service

Symbols

%	percent
---	---------

CONTENTS

	Page
Background	iii
1.0 General Site Information.....	1
1.1 Purpose.....	1
1.2 Location/Description.....	1
1.3 Land Ownership.....	1
1.4 Water Right Information.....	1
1.5 Land Use Agreement	3
1.6 Public Use	3
1.7 Law Enforcement.....	4
1.8 Wildfire Management	4
2.0 Habitat Development and Management.....	4
2.1 Planting and Fertilizing.....	4
2.2 Irrigation	4
2.3 Site Maintenance.....	5
3.0 Monitoring	6
3.1 Avian Monitoring.....	6
3.1.1 Southwestern Willow Flycatcher Surveys	6
3.1.2 Yellow-billed Cuckoo Surveys.....	6
3.1.3 Marsh Bird Surveys	6
3.1.4 General Avian Surveys	6
3.2 Small Mammal Monitoring.....	7
3.2.1 Bat Monitoring.....	7
3.2.2 Rodent Monitoring.....	8
3.3 Insect Monitoring.....	8
4.0 Habitat Creation Conservation Measure Accomplishment.....	9
4.1 Vegetation Monitoring.....	9
4.2 Evaluation of the Beal Lake Conservation Area.....	9
5.0 Adaptive Management Recommendations	10
Literature Cited	11

Tables

Table		Page
1	Acre-feet of water applied per month at the project in 2011	5
2	LCR MSCP avian species detected at Beal Lake in 2011	7
3	Total number of bat call minutes recorded on the driving surveys for the four focal species at Beal Lake Conservation Area in 2011	8
4	Species-specific habitat creation conservation measure creditable total acres for 2011.....	10

Figures

Figure		Page
1	Location of the Beal Lake Conservation Area.....	2
2	Aerial photo of the project, October 2008.	3
3	2010 irrigation schedule.....	5

Attachments

Attachment

- 1 Presence of All Avian Breeders, Migrants, and Other Non-breeders
Detected during Rapid Area Searches at the Beal Lake Conservation
Area in 2011

BACKGROUND

In 2001, the Bureau of Reclamation's (Reclamation) Lower Colorado Regional Office in Boulder City, Nevada, in partnership with the U.S. Fish and Wildlife Service and Havasu National Wildlife Refuge initiated the backwater improvement project at Beal Lake and subsequently riparian restoration. Because the lake and adjacent lands were immediately available to Reclamation when the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) began, the area was initially used to test and demonstrate restoration and management techniques.

In 2001, Beal Lake was dredged to create a refuge for native fishes. The dredge material was distributed over the adjacent area to be planted with native riparian vegetation the following year. The riparian restoration area was broken into two phases: the first started in 2002 and the second in 2004. Details on the plantings in each field can be found in the 2005 Annual Report. The project area, which is divided into fields that can be independently irrigated and managed, was designed to provide an area to test various riparian restoration methods and techniques for site preparation, planting, irrigation, monitoring, management, and maintenance.

While in the process of testing restoration techniques, many of the fields attracted LCR MSCP targeted species, and in April 2010, the site was confirmed as a LCR MSCP conservation area by the program's Steering Committee. At the end of the 2011 monitoring season, the Beal Lake Conservation Area had nesting pairs of Sonoran yellow warbler, Arizona Bell's vireo, summer tanager, and yellow-billed cuckoo. Under this project, 107 acres (43.3 hectares) of cottonwood, willow, and mesquite land cover types have been contributed toward the acreage goals of the LCR MSCP, and valuable information about restoration techniques and management practices has been attained.

1.0 GENERAL SITE INFORMATION

1.1 Purpose

In addition to providing habitat for Lower Colorado River Multi-Species Conservation Program (LCR MSCP) covered species, the Beal Lake Conservation Area (BLCA) has been used to demonstrate restoration, management, and monitoring techniques. The results of these techniques are documented annually and analyzed to determine if conditions are appropriate for the species targeted by the LCR MSCP, specifically the southwestern willow flycatcher (*Empidonax trailii extimus*) and the yellow-billed cuckoo (*Coccyzus americanus occidentalis*).

1.2 Location/Description

The BLCA is located in Reach 3, between Beal Lake and lower Topock Marsh, on the Havasu National Wildlife Refuge (HNWR), near Needles, California. It is within the historic flood plain of the lower Colorado River and adjacent to River Mile 237 on the Arizona side (figures 1 and 2).

1.3 Land Ownership

The property is owned by the U.S. Fish and Wildlife Service (USFWS), which has dedicated land and water resources to establish and maintain the conservation area. The BLCA is located in Arizona on the HNWR.

1.4 Water Right Information

At the time the HNWR was created, Topock Marsh was the primary attraction and the focus of most refuge activities. The 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). The HNWR's 37,339 acre-foot per year entitlement of consumptive use and 41,839 acre-foot diversionary right of Colorado River water is used to fill Topock Marsh through two instrumented inlet canals. The water used for irrigation at the BLCA is supplied from Topock Marsh.

**Beal Lake Conservation Area
2011 Annual Report**

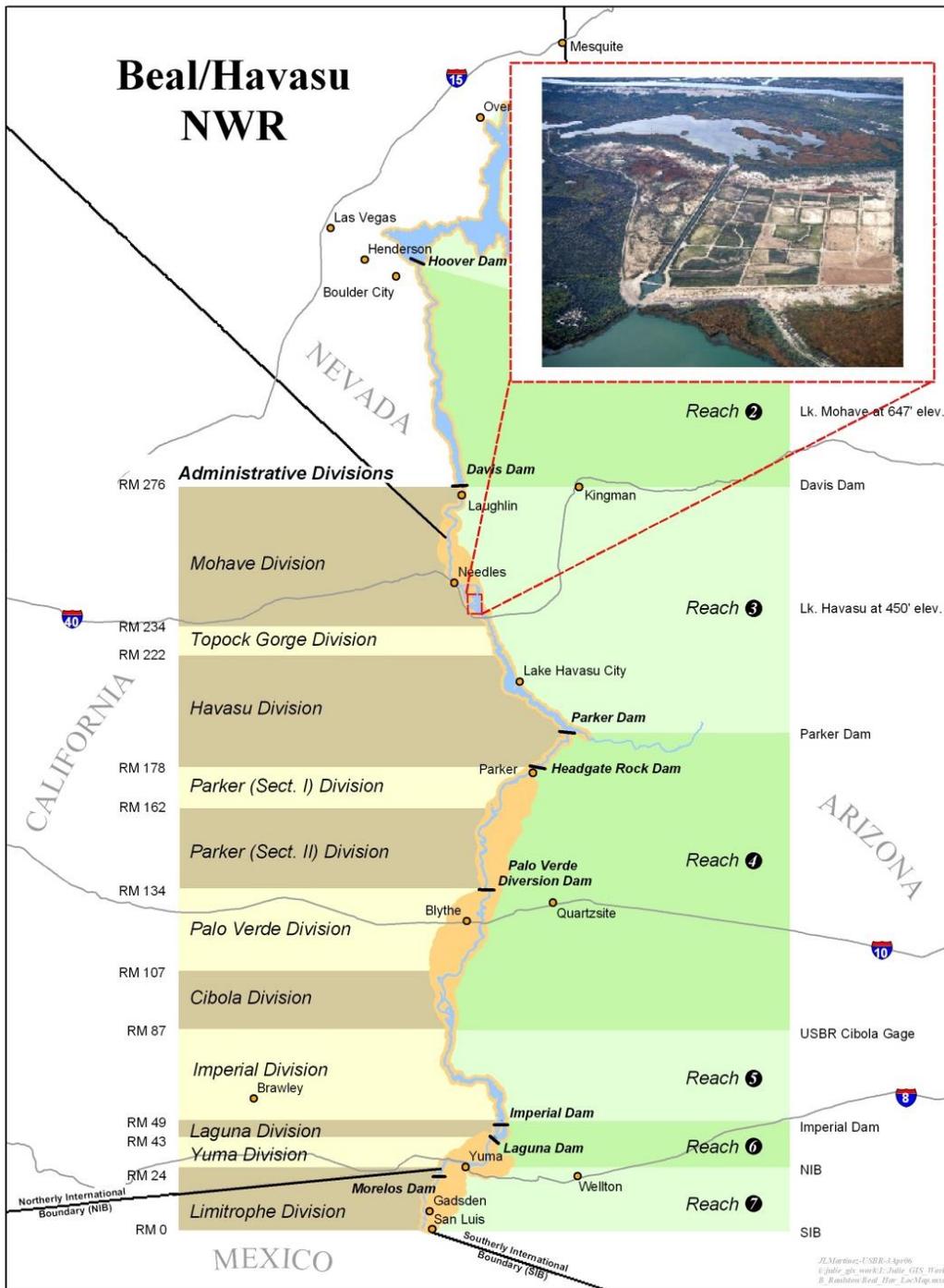


Figure 1.—Location of the BLCA.



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

1.5 Land Use Agreement

A Land Use Agreement (LUA) was executed in 2010 between the Bureau of Reclamation (Reclamation) and the USFWS to secure land and water for the conservation area for the remainder of the 50-year LCR MSCP. The LUA outlines the rights and responsibilities of each partner in the project's development and maintenance.

1.6 Public Use

Public access to the conservation area is restricted. The USFWS controls access is responsible for overall management of the refuge. The Arizona Game and Fish Department (AGFD) has the authority, and is the lead, to regulate hunting and recreation uses pursuant to AGFD statutes, regulations, and policies at the BLCA. In cooperation with Reclamation, the USFWS coordinates its public use and related activities so they are consistent with and do not adversely affect restoration activities at BLCA.

1.7 Law Enforcement

Reclamation continues to work proactively with the USFWS and AGFD to ensure all State and Federal wildlife statutes are enforced. The USFWS and Mohave Valley County Sheriff's Department are the agencies responsible for enforcement of State statutes on the BLCA.

1.8 Wildfire Management

A LCR MSCP Conservation Area Specific Fire Management and Law Enforcement Strategy has been finalized for the BLCA and is posted on our Web site. The LCR MSCP will continue to work with local State and Federal fire agencies to reduce the risk of wildland fires and maintain clear lines of communication among the agencies.

2.0 HABITAT DEVELOPMENT AND MANAGEMENT

2.1 Planting and Fertilizing

No new planting occurred at the BLCA Area during 2011.

A mixture of UN-32, 10-34-0, Zinc Chelate, and Manganese Chelate was applied in two lower-concentration applications via the fertigation system throughout August and September.

2.2 Irrigation

The BLCA is flood irrigated with one alfalfa valve per field. The fields are irrigated on different schedules to minimize water use while keeping the central area wet (figure 3). In an effort to attract southwestern willow flycatchers to the site, the three center fields (K, L, and 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 919 acre-feet was applied to the project area in 2011 (table 1) compared to the 1,313 acre-feet in 2010. The 30-percent (%) reduction in irrigation water was due to lower than normal marsh levels that reduced the time and rate at which the pump could run.

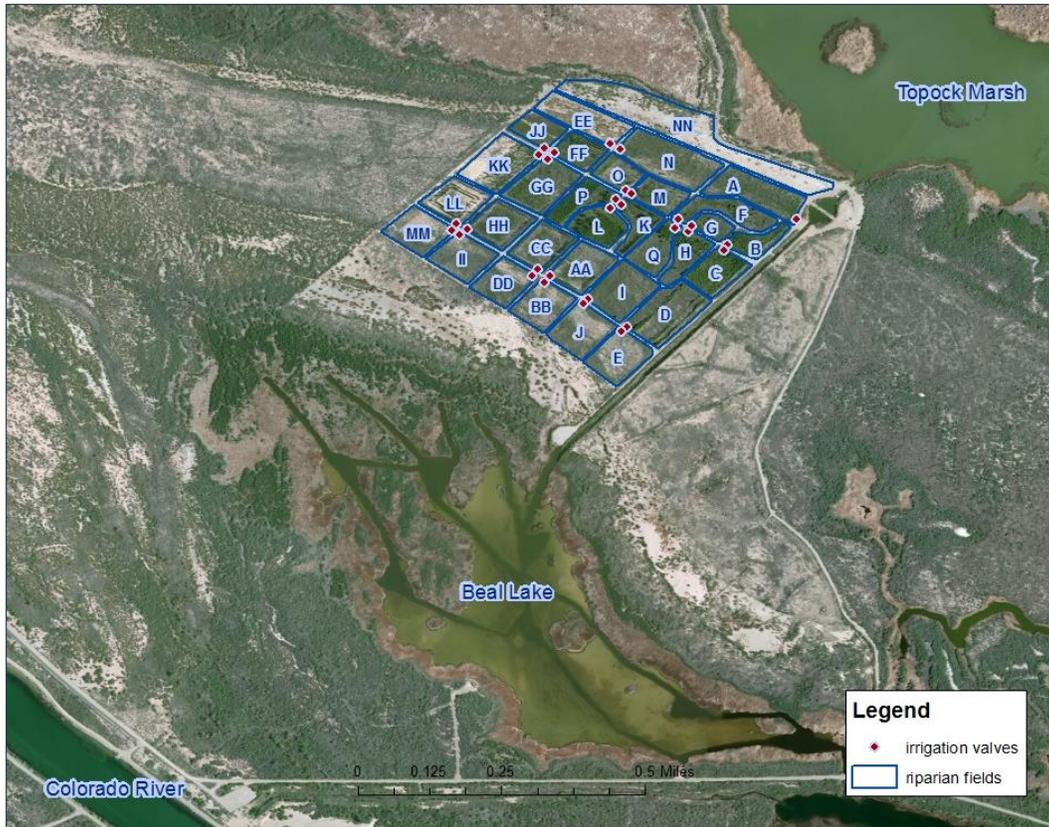


Figure 3.—2010 irrigation schedule.

Table 1.—Acre-feet of water applied per month at the project in 2011

Acre-feet applied	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
			31*	174	117	134	140	181	143			
* Irrigation did not occur through the entire month.										Calculated total water use for 2011 (acre-feet)	919	
										Average water use/week (acre-feet)	35	

2.3 Site Maintenance

The irrigation pump was operated for 774 hours during fiscal year 2011 compared to 876 hours in 2010. Routine maintenance was performed on the pump throughout the year. Saltcedar (*tamarisk* spp.) eradication and weed control around the irrigation valves continued.

3.0 MONITORING

3.1 Avian Monitoring

Single species surveys were conducted for the southwestern willow flycatcher and yellow-billed cuckoo as well as marsh birds. General avian surveys were conducted for six LCR MSCP avian covered species and all non-covered avian species, and a Monitoring Avian Productivity and Survivorship Station was operated.

3.1.1 Southwestern Willow Flycatcher Surveys

The BLCA was surveyed five times for southwestern willow flycatchers during 2011. No breeding southwestern willow flycatchers were detected (see table 2). One willow flycatcher (*Empidonax traillii*) was detected before June 16 and was therefore determined not to be the covered *extimus* subspecies (McLeod and Pellegrini 2012).

3.1.2 Yellow-billed Cuckoo Surveys

Five surveys for western yellow-billed cuckoos were conducted at the BLCA between mid-June and the end of August. Data were also collected on nesting, microhabitat, vegetation, and arthropods (McNeil et al. 2012). Cuckoos were detected on four of the five surveys conducted between June 16, 2011, and August 2, 2011. One nest was found, and a pair successfully fledged two young from it. Neither parents nor nestlings were banded (McNeil et al. 2012).

3.1.3 Marsh Bird Surveys

Three marsh bird surveys for LCR MSCP covered species were conducted at 12 locations. One Yuma clapper rail was recorded. No black rails or least bitterns were observed.

3.1.4 General Avian Surveys

Surveys of habitat conservation areas with more than 2 years' growth were conducted using a double sampling area search method (rapid and intensive area searches) to determine their use for breeding by other LCR MSCP avian species. Arizona Bell's vireo (*Vireo bellii arizonae*), Sonoran yellow warbler (*Dendroica petechia sonorana*), summer tanager (*Pirangra rubra*), and yellow-billed cuckoo were confirmed breeding (table 2). For additional species detected at the BLCA, see attachment 1.

Table 2.—LCR MSCP avian species detected at Beal Lake in 2011

LCR MSCP covered species detected	Number of confirmed breeding pairs
Arizona Bell's vireo	13
Sonoran yellow warbler	9
Summer tanager	2
Western yellow-billed cuckoo	1
Southwestern willow flycatcher	0

A bird banding station was operated from May 1 through July 30, 2012. Four birds captured and banded in previous years were recaptured in 2011: one Sonoran yellow warbler from 2010 and three Arizona Bell's vireos from previous years. The following new LCR MSCP covered species individuals were captured: 11 yellow warblers, 9 Bell's vireos, and 2 summer tanagers. Gila woodpeckers were observed in non-breeding status. Bell's vireos were reported staying at the site until September 30, 2011.

3.2 Small Mammal Monitoring

3.2.1 Bat Monitoring

In fiscal year 2011, intensive quarterly bat surveys were replaced with a trial monitoring protocol. The principle monitoring method consisted of acoustic driving surveys rather than fixed monitoring stations (Broderick 2012).

3.2.1.1 Acoustic Surveys

Acoustic driving surveys were conducted at the BLCA in May, July, and September. A pre-defined driving route was established for each area. The routes were designed to avoid overlapping bat detections. A transect consists of driving the route slow and steady one time with 5-minute point counts at selected areas of the route. There were two transects surveyed in May, five transects surveyed in July, and two transects surveyed in September.

Bat activity is expressed in call minutes, which indicate that a given species is present if it is recorded at least once within a 1-minute period. Table 3 lists the number of call minutes for the four focal bat species recorded during the driving surveys.

**Beal Lake Conservation Area
2011 Annual Report**

Table 3.—Total number of bat call minutes recorded on the driving surveys for the four focal species at the BLCA in 2011

Species	May	July	September	Total
Western red bat	0	1	0	1
Western yellow bat	0	0	0	0
California leaf-nosed bat	1	0	0	1
Townsend's big-eared bat	0	0	0	0
All other species	44	129	4	177
Total call minutes	45	130	4	179

3.2.2 Rodent Monitoring

Thirty traps were set in field K for one night in November 2011 at the BLCA. Three Colorado River cotton rats (*Sigmodon plenus arizonae*) were captured (Hill 2012).

3.3 Insect Monitoring

No monitoring for MacNeill's sootywing skipper was conducted.

A research project was initiated to determine the relationship between body mass and sulfur content of spiders and insects and to compare sulfur content among taxa of spiders and insects. Arthropods, such as insects and spiders, were collected with a sweep net and malaise trap eight times at the BLCA during July – August 2011. Samples of spiders (n = 34) and insects (n = 100) were identified to genus and analyzed for sulfur content. Sulfur concentrations in 4 families of spiders and 22 families of insects were measured. The most abundant spiders collected were jumping spiders (*Habronattus tranquillus*). The most abundant insects collected were *Melanoplus herbaceous*, a grasshopper found only on arrowweed, and *Tabanus* deer flies caught in a malaise trap. Spiders contained greater sulfur concentrations (1.4% of body dry mass) than insects (0.65%). Coleoptera contained the least sulfur (0.35%) among insects.

4.0 HABITAT CREATION CONSERVATION MEASURE ACCOMPLISHMENT

4.1 Vegetation Monitoring

Vegetation data were collected within several parameters to evaluate the vegetation structure from the ground layer to the upper canopy layer. Parameters included tree and shrub density, tree heights, and canopy closure.

On average, the tree density in cottonwood-willow (cottonwood, Goodding's willow, and coyote willow) was 1,372 trees per acre. The average shrub (baccharis and saltcedar) density was estimated at 35.7 shrubs per acre. Cottonwood, Goodding's willow, and mesquite tree height average ranges were from approximately 13 to 29 feet. The average canopy closure was 82%, with ranges from 33.5–100% closure.

4.2 Evaluation of the Beal Lake Conservation Area

The process for Habitat Creation Conservation Measure Accomplishment was finalized in October 2011 (Reclamation 2011). All areas within the BLCA were designed to benefit covered species at the landscape level.

In 2011, the BLCA was classified using the Anderson and Ohmart vegetation classification system (Anderson and Ohmart 1976, 1984a, 1984b). The BLCA supports 107 acres of cottonwood-willow structure type I. Eight species with habitat creation goals have creditable acres at the BLCA. These species (including their corresponding conservation measure acronym) are: western red bat (WRBA2), yellow-billed cuckoo (YBCU1), elf owl (ELOW1), gilded flicker (GIFL1), Gila woodpecker (GIWO1), vermilion flycatcher (VEFL1), Arizona Bell's vireo (BEV11), Sonoran yellow warbler (YWAR1), and summer tanager (SUTA1). The species-specific conservation measure creditable total acres are provided in table 4.

**Beal Lake Conservation Area
2011 Annual Report**

Table 4.—Species-specific habitat creation conservation measure creditable total acres for 2011

Species-specific habitat creation conservation measure	WIFL1¹	WRBA2	WYBA3²	CRCR2³	YBCU1	ELOW1	GIFL1	GIWO1	VEFL1	BEV1⁴	YWAR1	SUTA1
Creditable acres in 2011	0 ¹	107	0 ²	0 ³	107	107	107	107	107	0 ⁴	107	107

¹ Although the BLCA provides the appropriate structure type (cottonwood-willow I–IV) as defined in WIFL1 of the Habitat Conservation Plan, Reclamation is in the process of gathering the appropriate hydrologic data to determine saturated soils, moist soils, or slow-moving water. Once this has been determined, the BLCA will be evaluated.

² Reclamation is in the process of determining foraging and roosting habitat for the western yellow bat. Once this has been determined, the BLCA will be evaluated.

³ The preliminary data suggest the Colorado River cotton rat uses both cottonwood-willow and fringe marsh habitats. Reclamation is in the process of evaluating data collected to determine marsh and cottonwood-willow habitat uses by this species.

⁴ The BLCA cottonwood-willow structure type was classified as I, thus not meeting the BEV11 habitat creation conservation measure goal of cottonwood-willow III–IV.

5.0 ADAPTIVE MANAGEMENT RECOMMENDATIONS

Adaptive management relies on the initial receipt of new information, the analysis of that information, and the incorporation of the new information into the design and/or direction of future project work (Reclamation 2007). Under the Adaptive Management Program, habitat creation sites will be assessed for biological effectiveness and whether they fulfill the conservation measures outlined in the Habitat Conservation Plan for 26 covered species and potentially benefit 5 evaluation species. Post-development monitoring and species research results will be used to adaptively manage habitat creation sites after initial implementation. Once monitoring data are collected over a few years, and then analyzed for the BLCA, recommendations may be made through the adaptive management process for site improvements in the future. At this time, there are no adaptive management recommendations for the BLCA.

LITERATURE CITED

- Anderson, B.W. and R.D. Ohmart. 1976. Vegetation Type Maps of the Lower Colorado River from Davis Dam to the Southerly International Boundary, Final Report. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- _____. 1984a. Vegetation Management Study for the Enhancement of Wildlife along the Lower Colorado River, Final Report. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- _____. 1984b. Lower Colorado River Riparian Methods of Quantifying Vegetation Communities to Prepare Type Maps, Final Report. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- Broderick, S. 2012. Post-Development Bat Monitoring of Habitat Creation Areas along the Lower Colorado River – 2011 Acoustic Surveys. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- Bureau of Reclamation (Reclamation). 2007. Draft Final Science Strategy. Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- _____. 2011. Final Habitat Creation Conservation Measure Accomplishment Tracking Process. Lower Colorado River Multi-Species Conservation Program, Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- Great Basin Bird Observatory. 2012. Annual Report on the Lower Colorado River Riparian Bird Surveys, 2011. Submitted to the Bureau of Reclamation, Lower Colorado Region, Boulder City, NV, by Great Basin Bird Observatory, 1755 E. Plumb Lane #256, Reno, NV.
- Hill, J. 2012. Small Mammal Colonization at Habitat Creation Areas along the Lower Colorado River: 2011. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- McLeod, M.A. and A.R. Pellegrini. 2012. Southwestern Willow Flycatcher Surveys, Demography, and Ecology along the Lower Colorado River and Tributaries, 2011 Annual Report. Submitted to the Bureau of Reclamation, Boulder City, NV, by SWCA Environmental Consultants, Flagstaff, AZ. 166 p.

**Beal Lake Conservation Area
2011 Annual Report**

McNeil, Shannon E.D. Tracy, J.R. Stanek, M.D. Halterman, and J.E. Stanek.
2012. Yellow-billed Cuckoo Distribution, Abundance and Habitat Use on
the Lower Colorado River and Tributaries, 2011 Annual Report. Submitted
to the Bureau of Reclamation, Boulder City, NV, by Southern Sierra
Research Station, Weldon, CA.

ATTACHMENT 1

Presence of All Avian Breeders, Migrants, and Other Non-breeders Detected during Rapid Area Searches at the Beal Lake Conservation Area in 2011

Fly-overs are included in this list, but incidental birds that were not in or above the plot during the survey are not included (Great Basin Bird Observatory 2012). Breeders are denoted by an *.

Avian Species

Abert's towhee*
Anna's hummingbird*
Arizona Bell's vireo*
Ash-throated flycatcher*
Audubon's warbler
Belted kingfisher*
Bewick's wren*
Black-tailed gnatcatcher*
Blue grosbeak*
Bullock's oriole*
Common yellowthroat*
Costa's hummingbird*
Crissal thrasher*
Dusky flycatcher
Gray vireo
Hammond's flycatcher
Killdeer*
Ladder-backed woodpecker*
Lazuli bunting
Lesser goldfinch*
Lucy's warbler*
Northern harrier*
Orange-crowned warbler
Pacific-slope flycatcher
Song sparrow*
Sonoran yellow warbler*
Summer tanager*
Townsend's warbler
Verdin*
Violet-green swallow
Western tanager
Western wood-pewee
Western yellow-billed cuckoo*
willow flycatcher
Wilson's warbler
Yellow-breasted chat*
Yellow-rumped warbler