Program Decision Document 10-002
Work Task E1: Beal Lake Riparian Restoration, Arizona

Partner: **Havasu National Wildlife Refuge (NWR)**
U.S. Fish and Wildlife Service

CONSERVATION AREA DEVELOPMENT

Background

In 1997, the Bureau of Reclamation (Reclamation) received a Biological and Conference Opinion from the Fish and Wildlife Service (Service) on routine operations and maintenance of the lower Colorado River. Reasonable and Prudent Alternative Number 3 called for the creation, restoration, or enhancement of 300 acres of backwater habitat for the razorback sucker and bonytail. In order to fulfill this requirement, Reclamation entered into a partnership with Havasu NWR to enhance Beal Lake. To create a functioning backwater, deeper channels were created throughout Beal Lake by excavating bottom sediment. The excavated material was deposited on lands adjacent to the lake where the material was mixed with existing soils and divided into a series of fields that could be independently irrigated and managed (Figure 1). The Beal Lake Riparian restoration demonstration site was planted with native riparian vegetation between 2001 and 2005 utilizing a variety of restoration techniques to obtain data on the efficacy of these techniques. Management and monitoring activities have continued under the auspices of the LCR MSCP as this site has developed into habitat for a number of LCR MSCP covered species.

Development History

The Beal Lake Riparian Restoration Project was developed in three phases (Figure 2). Phase 1 implementation began in 2001 and continued through 2004. Phase 1 activities included site preparation, installation of the irrigation system, soil testing, and planting riparian vegetation using several different techniques. Phase 1 resulted in 59 acres of Fremont cottonwood, Goodding's willow, coyote willow, screwbean mesquite, and honey mesquite land cover types.

Phase 2 implementation occurred between December 2003 and January 2005. Several restoration demonstration techniques were used on Phase 2, including various seeding methods, as well as planting one gallon container plants and poles. An additional 48 acres of cottonwood, willow and mesquite land cover types were established and managed in Phase 2.

The original restoration plan called for Phase 3 to be developed into multiple, independently managed cells where primarily honey mesquite would be established. Changing priorities associated with the initiation of LCR MSCP, specifically the decrease in priority of honey mesquite land cover types in Arizona, altered Phase 3 implementation. Phase 3 activities were limited to clearing non-native vegetation and arrowweed; and placing honey mesquite seed pods throughout the site.

Figure 1. Aerial photo taken in 2003 as area is being divided into individual cells using berms.

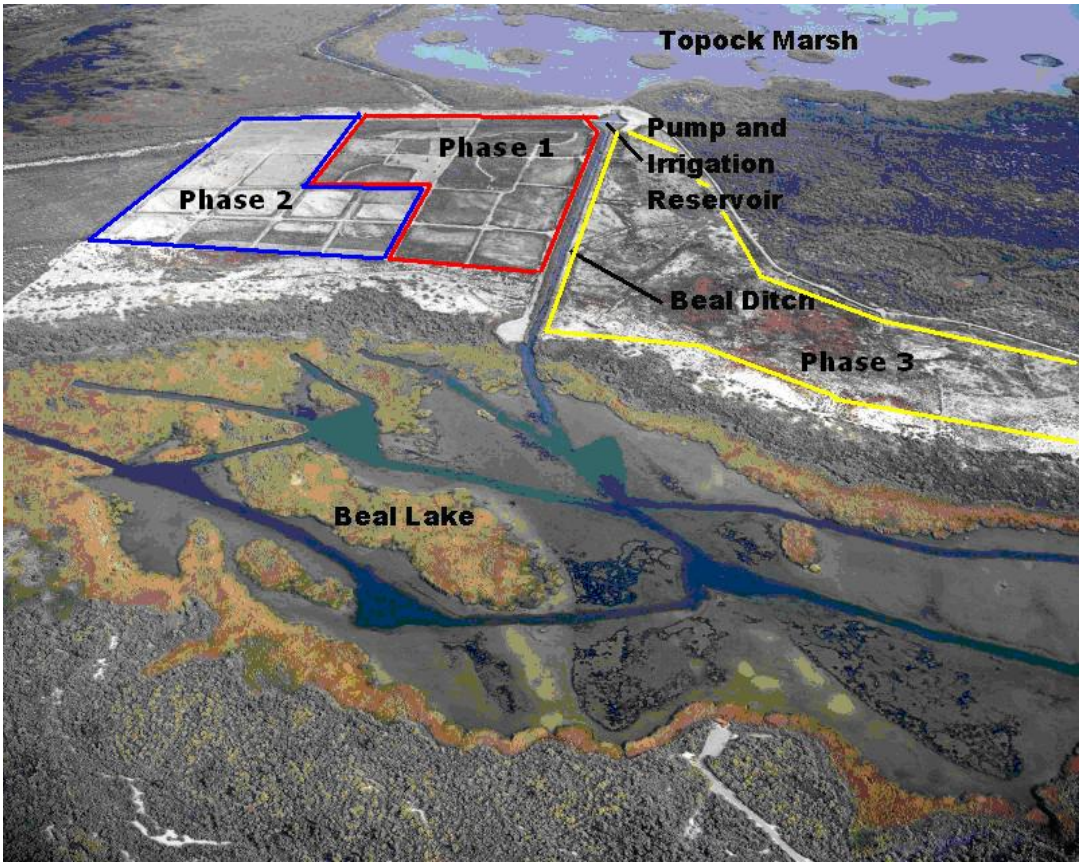

Figure 2. Outline of project phases over aerial photo taken August 2006

Current Status

The Beal Lake Riparian Restoration Demonstration Project has resulted in 107 acres of riparian vegetation managed as an integrated mosaic of land cover types that will result in LCR MSCP covered species habitat. Beal consists of 30 small fields, ranging from less than one acre to five acres, which are separated by berms so each field can be independently irrigated. Each field was used to evaluate different riparian restoration techniques over a four year establishment period which has resulted in a heterogeneous stand of riparian vegetation.

Overall, Beal Lake results in a cottonwood-willow structural type I stand, with various sized patches of Fremont cottonwood, Gooding's willow, coyote willow, screwbean mesquite, and honey mesquite. Multiple height classes are present within the stand. In 2008, overall stand density averaged approximately 900 trees per acre, with average canopy closure measured at approximately 50% closure.

Monitoring Results

Monitoring activities have been conducted at the Beal Lake Riparian Restoration Project since its inception. Plant species composition and survival were monitored for each restoration plot. Wildlife surveys were conducted as vegetation matured into potential habitat.

Surveys have been conducted for a variety of wildlife species since 2006. Several LCR MSCP covered species have been detected during these surveys (Table 1). Summer tanagers, yellow warblers, and Arizona Bell's vireos have all been confirmed breeding, while yellow-billed cuckoos have detected during breeding season although nesting has not been confirmed. Willow flycatchers have been detected; however, most of these birds were considered migrants. One banded southwestern willow flycatcher was detected utilizing the site briefly until it moved to the breeding habitat at Topock Marsh. Numerous bat species have been detected at Beal Lake Riparian including two covered species, western red bat and western yellow bat, and two evaluation species, pale Townsend's big-eared bat and California leaf-nosed bat.

Figure 3. Willow flycatcher and Bell's vireo captured at Beal Lake Restoration site in 2009.

Table 1. LCR MSCP Covered Species found utilizing Beal Riparian Restoration

Species	Year				Breeding Status	Notes
	06	07	08	09		
MACNEILL'S SOOTYWING SKIPPER			0	ns		No appropriate habitat present
WILLOW FLYCATCHER	1	2	3		2006-M 2007-M 2008-M	Detected during standardized SWFL surveys
YELLOW-BILLED CUCKOO	ns	X	X	X	2007-Unkn 2008-NB 2009-NB	2007-Detected during general avian surveys 2008 & 09-Detected during standardized cuckoo surveys
ARIZONA BELL'S VIREO		X	X	X	2007-B 2008-B 2009-B	2007, 08, 09 - Nesting confirmed 2009 – 10 breeding territories, 14 individuals color-banded
YELLOW WARBLER	X					2006-Subspecies unknown
SONORAN YELLOW WARBLER		X	X	X	2007-B 2008-B 2009-B	2007, 08, 09- nesting confirmed 2009- 7 breeding territories, 14 individuals color-banded
SUMMER TANAGER				X	2009-B	2009- 1 breeding territory, 5 individuals color-banded
WESTERN RED BAT	0	X	X	X		
WESTERN YELLOW BAT	X	X	X	X		
COTTON RAT Sp.	1	0	0			Likely *S.a. plenus* based on range
DESERT POCKET MOUSE sp.	15	17	6			Present, but not likely the covered *sobrinus* subspecies

Key:
X- Present (number present provided, if known)
ns– Not surveyed
M-Migrant
NB-Breeding Not Confirmed
B-Breeding Confirmed by nest or other evidence
Unkind- Unknown

Adaptive Management for Targeted Covered Species

Numerous LCR MSCP covered species have been detected at Beal Lake during monitoring activities conducted since 2006, including summer tanager, Arizona Bell's vireo, Sonoran yellow warbler, western red bat, and western yellow bat. Existing land cover types will continue to be managed for these species. In addition, adaptive management activities will be conducted to provide habitat requirements for yellow-billed cuckoo and southwestern willow flycatcher, dependent on monitoring results, research activities, and water availability. Management activities may include inter-planting cells where stand density is less than desired for targeted covered species and the addition of soil amendments to more effectively and efficiently manage

soil moisture, if feasible. Additional species are expected to benefit from these management activities, including elf owl, gilded flicker, Gila woodpecker, and vermilion flycatcher.

LCR MSCP Expenditures

The Beal Lake Riparian Restoration Project (Work Task E1) has been an approved LCR MSCP riparian restoration research project since 2004. Past expenditures, FY10 approved estimate, and anticipated future costs are shown in Table 2 below.

Table 2. Expenditures at Beal Lake Riparian Restoration

FY09 Estimates	FY09 Actual	Cumulative Accomplishment Through FY09	FY10 Approved Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate	FY13 Proposed Estimate
$180,000	$195,931.36	$2,412,492.71	$130,000	$200,000	$200,000	$200,000

Anticipated costs associated with Beal Lake Riparian are primarily for annual operations and maintenance and adaptive management activities projected over the next several years. Operations and maintenance costs are not expected to increase significantly over the 50 year program. Any adaptive management activities identified through monitoring and research will require additional funding once they have been identified and scheduled. Monitoring and research activities are funded under separate work tasks. No compensation for land and water will be provided to the Service.

Anticipated annual operations and maintenance costs include site maintenance and development activities, such as irrigation services, pump and irrigation system maintenance, pump fuel, road maintenance, fertilizer, general site maintenance, and administrative costs. In FY11, operations and maintenance costs are estimated at $200,000 or approximately $1,870 per acre. This estimate is based on actual costs accumulated in FY09. Adaptive management changes or additional habitat creation would be addressed through the normal Work Plan process.

Water Use

Water utilized to irrigate habitat restored during the project comes from Havasu NWR's combined second and third priority entitlements of 37,339 acre feet per year consumptive use and 41,839 acre feet diversionary right. Havasu NWR possesses a second/third 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). Annual forecasted water use on the site is approximately 1,200 acre-feet for the 107 acres.

Other Factors

Operations and maintenance costs are dependent on several factors, including conservation area size and proximity to other sites or resources. Beal lake is the smallest conservation area designed primarily for riparian land cover types. In addition, it is the only current conservation

area in Reach 3 that requires substantial operations and maintenance funding. Consequently, the Beal Lake Riparian Conservation Area has higher costs per acre than other riparian sites at this time. Costs may decrease as additional conservation areas are established in Reach 3 or if the conservation area is expanded in the future.

The Beal Lake Riparian Conservation Area also has some unique benefits. This site is located adjacent to Beal Lake which has been enhanced and managed for native fish by Reclamation and the Service. In addition, this site is located approximately 1 mile from currently occupied southwestern willow flycatcher habitat near Topock Marsh. No other current conservation area is located in such close proximity to occupied flycatcher breeding habitat.

There are no land and water costs associated with Beal Lake Riparian Conservation Area. The LCR MSCP will have expended approximately $2.5 million through FY10 on riparian restoration and development, research, and monitoring at this conservation area.

RECOMMENDATION

Reclamation is recommending the inclusion of the Beal Lake Riparian Restoration site as a new Conservation Area to be managed for LCR MSCP covered species, pending completion of a Land Use Agreement with the Service. It is anticipated that Beal Lake Riparian will provide at least 107 acres of cottonwood-willow habitat for covered species currently found utilizing the site. Additional acreage may be incorporated into the Beal Lake Riparian project in the future and additional covered species habitat may be developed through adaptive management at the Beal Lake site.