



# Lower Colorado River Multi-Species Conservation Program

*Balancing Resource Use and Conservation*

## Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration Development and Monitoring Plan: Upper Hippy Burn



December 2012

# 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**

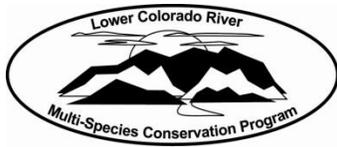
Colorado River Commission of Nevada  
Nevada Department of Wildlife  
Southern Nevada Water Authority  
Colorado River Commission Power Users  
Basic Water Company

## **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**

## **Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration Development and Monitoring Plan: Upper Hippy Burn**

*Prepared by:*

Gail Iglitz, Restoration Group

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

**December 2012**

## **ACRONYMS AND ABBREVIATIONS**

HCP	Habitat Conservation Plan
LCR	lower Colorado River
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
NWR	National Wildlife Refuge
Reclamation	Bureau of Reclamation
SWFL	southwestern willow flycatcher
USFWS	U.S. Fish and Wildlife Service
YBCU	western yellow-billed cuckoo

# CONTENTS

	Page
Background .....	1
Purpose.....	1
Design and Planting Plan .....	4
Planting Plan .....	5
Planting Material and Planting Techniques .....	5
Grading .....	6
Irrigation .....	6
Herbicide/Fertilizer/Pesticide Application.....	6
Monitoring .....	7
Pre-development Monitoring .....	7
Post-development Monitoring.....	7
Implementation Monitoring .....	7
Habitat Monitoring.....	8
Vegetation Sampling.....	8
Microclimate Sampling.....	8
Vegetation Classification .....	8
Response Monitoring .....	9
Adaptive Management .....	10
Literature Cited .....	13

## Tables

Table	Page
1 Proposed planting schedule.....	4
2 Native plant species list for Upper Hippy Burn.....	5

## Figures

Figure	Page
1 Unit 1, Areas #1 – #5. ....	2
2 Cibola NWR managed acres, 2012. ....	3
3 Typical cottonwood–willow planting. ....	4
4 Upper Hippy Burn planting plan, 2013.....	12

## BACKGROUND

Cibola National Wildlife Refuge (NWR) consists of about 16,600 acres of land located along approximately 12 miles of the lower Colorado River in Arizona and California. It was established in 1964 as a refuge and breeding ground for migratory birds and other wildlife. The refuge is divided into six management units known as Unit 1, Unit 2, Unit 3, Unit 4, Unit 5, and Unit 6.

Unit 1 is located on the northern end of the refuge in Arizona and encompasses approximately 4,100 acres, with approximately 1,000 acres dedicated to agriculture and 3,100 acres currently undeveloped. The Bureau of Reclamation (Reclamation) has previously partnered with the U.S. Fish and Wildlife Service (USFWS) at Cibola NWR in a number of established projects at Unit 1. These include habitat creation projects as well as research and demonstration projects. In 1999, USFWS and Reclamation planted the Cibola Corn Field/Nature Trail and established 34 acres of cottonwood-willow and mesquite land cover type within Unit 1. In 2002, USFWS and Reclamation planted approximately 18 acres of cottonwood-willow in Unit 1 north of the Cibola Corn Field/Nature Trail.

Approximately six 20-acre fields in Unit 1 have been set aside for the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) to conduct research and development projects. To date, four fields are occupied by three projects that have been fully or partially funded by the LCR MSCP. These include Work Task E6: Cottonwood Genetics Study, Work Task E7: Mass Transplanting Demonstration, and Work Task E8: Seed Feasibility Study. To the east of these projects are two additional agricultural fields, which are still in agricultural production. The six fields combined are currently included in a 5-year land use agreement under which USFWS conducts activities on Unit 1; the agreement expires this fiscal year (fiscal year 2009).

Cibola NWR Unit 1 Conservation Area incorporates these existing projects and agricultural land as well as additional adjacent acreage into a single conservation area (figure 1). Note that the Cibola NWR Unit 1 Conservation Area (~ 950 acres) only includes a portion of the total area designated as Unit 1 by the Cibola NWR (~ 4,100 acres); currently, 270 acres are being managed (figure 2).

## PURPOSE

Cibola NWR Unit 1 Conservation Area is being developed in phases. The purpose of developing Upper Hippy Burn (Area 2) is to create approximately 75 acres of riparian habitat that shall be managed for the southwestern willow flycatcher (*Empidonax traillii extimus*) (SWFL), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (YBCU), and other covered species listed in

Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration  
Development and Monitoring Plan: Upper Hippy Burn

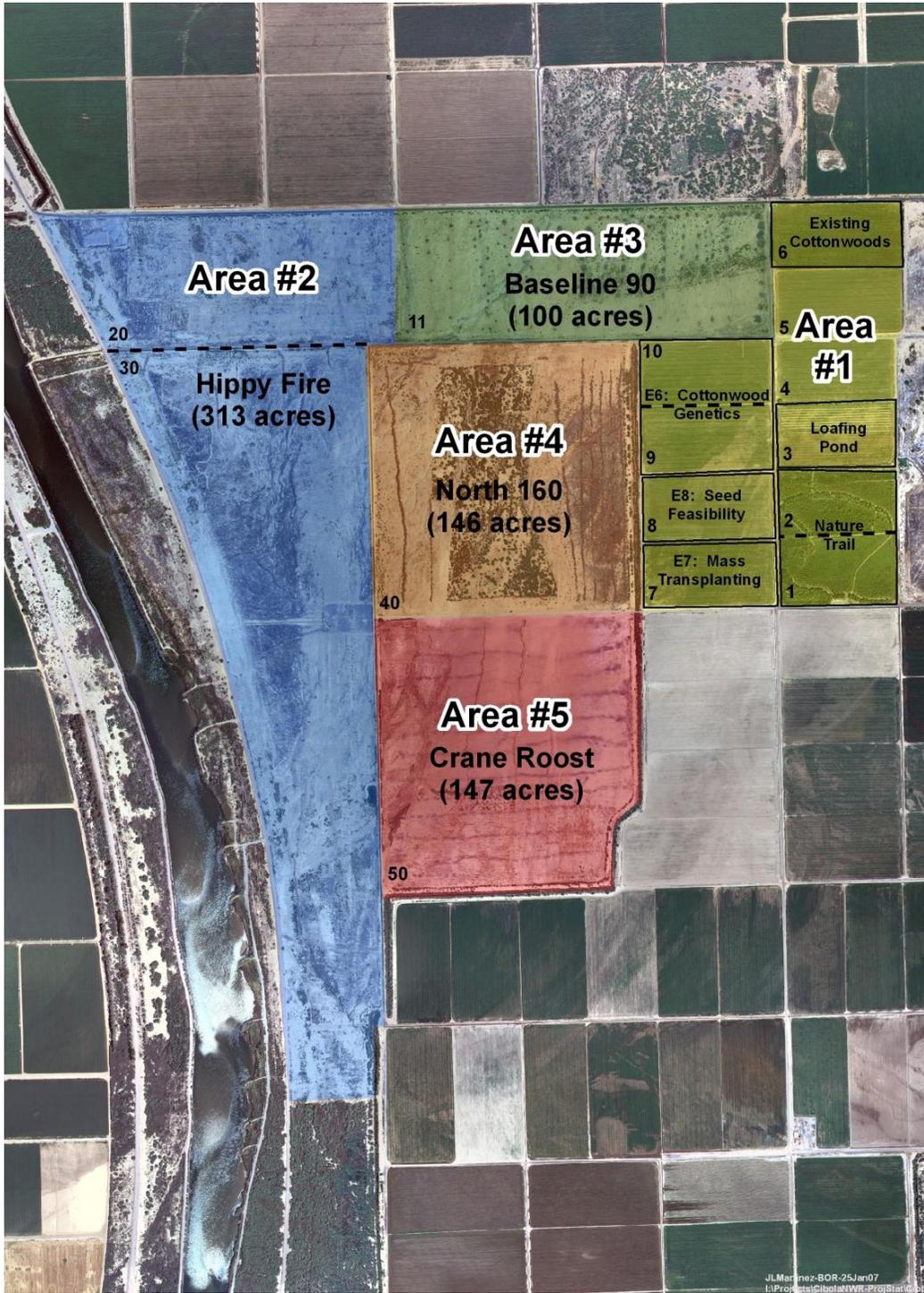
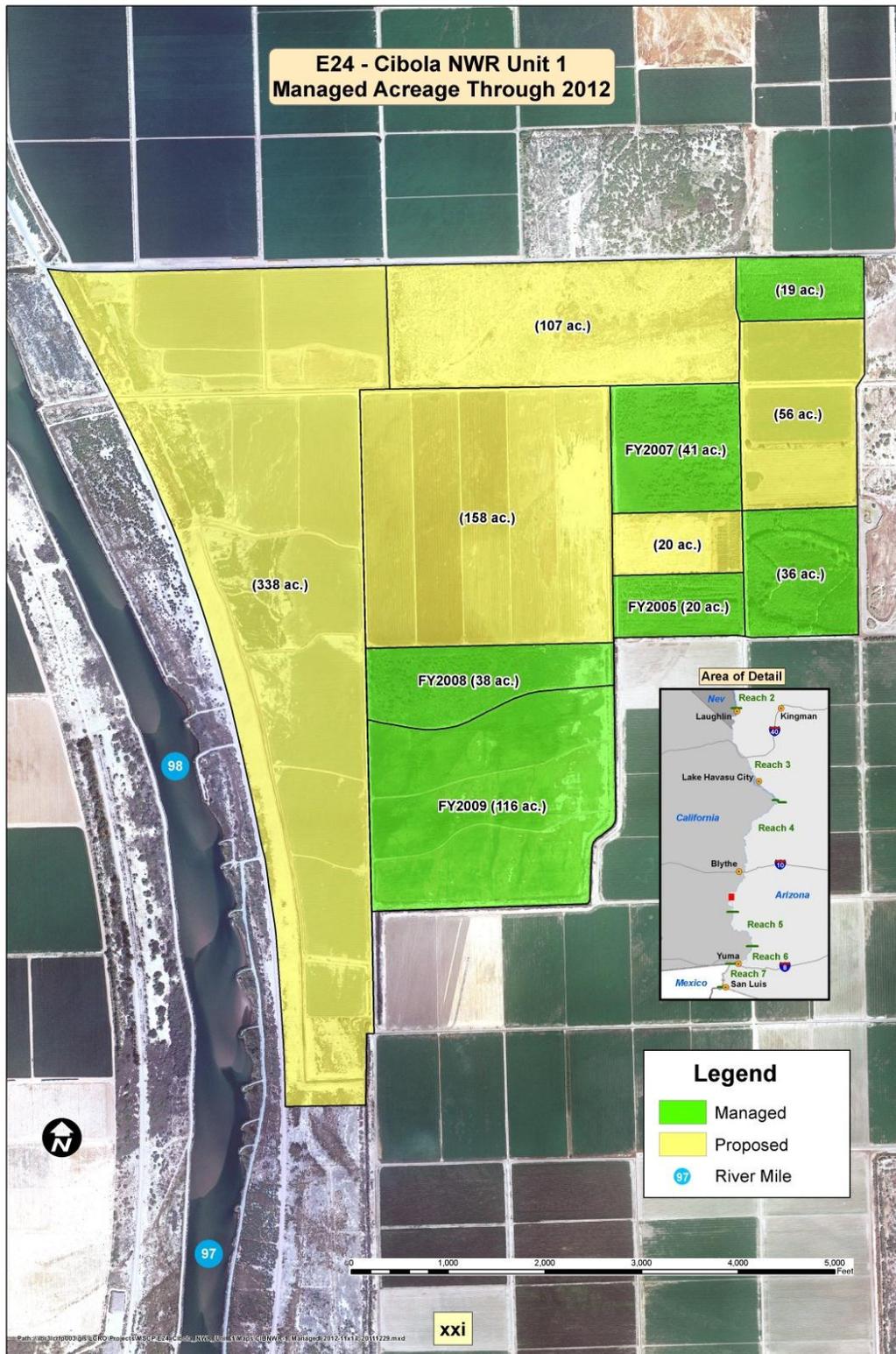


Figure 1.—Unit 1, Areas #1 – #5.

**Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration  
Development and Monitoring Plan: Upper Hippy Burn**



**Figure 2.—Cibola NWR managed acres, 2012.**

**Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration  
Development and Monitoring Plan: Upper Hippy Burn**

the LCR MSCP Habitat Conservation Plan (HCP). Upper Hippy Burn is designed to convert approximately 75 acres of active agricultural fields to cottonwood-willow habitat (table 1).

Table 1.—Proposed planting schedule

Area	Name	Acres	Year planted	Scheduled to plant
1	Ag Fields	200	1999–2007	2019–2023
2	Upper Hippy Burn	75	2013	
2	Middle Hippy Burn	100		2016
2	Lower Hippy Burn	138		2017
3	Baseline 90	100		2019
4	North 160	146		2018
5	Crane Roost	116	2010	

## DESIGN AND PLANTING PLAN

Upper Hippy Burn (Area 2) will be planted in the spring of 2013. The configuration of this riparian cover type establishment is designed to approximate a mosaic of native vegetation composition necessary to support species covered under the LCR MSCP. The fields in Upper Hippy Burn will be planted with blocks of native plant species based on water requirements and field/soil conditions. This stratification of riparian tree and shrub species is what is typically observed in natural riparian communities. Future structure management may address mechanical seral-stage setbacks and the introduction of other species into the patches to achieve greater structural and biological diversity (figure 3).



Figure 3.—Typical cottonwood–willow planting.

## Planting Plan

The planting design incorporates native riparian species found along the lower Colorado River (LCR) into a mosaic of created habitats. Areas of cottonwood-willow and honey mesquite cover types are based on information habitat creation concepts presented in the LCR MSCP HCP. Patch sizes of created habitats are designed and managed to provide habitat for more than one species. Based on site conditions, cottonwood-willow and honey mesquite will be planted in proximity to each other to re-create an integrated mosaic of habitats that approximate terrestrial communities historically present in the LCR flood plain.

Areas that target SWFL will have the ability to be irrigated more frequently from March through September so that multiple areas will have moist soils or standing water.

## Planting Material and Planting Techniques

Upper Hippy Burn will be planted using an automated mass planter, a technique successfully used in other LCR MSCP conservation areas, such as Palo Verde Ecological Reserve and Cibola Valley Conservation Area. The plants will be planted in rows spaced 40 inches apart with 6-foot inline spacing (table 2) . This method will achieve dense, rapid growth plantings of native species and inhibit the establishment and growth of non-native plant species. Plant material for the project will be collected from LCR MSCP nurseries along the LCR and from areas that are ecologically similar. Alfalfa and rye grass seed will be planted as a ground cover to suppress weeds; this has been effective at reducing weeds at other restoration sites (Palo Verde Ecological Reserve and Cibola Valley Conservation Area).

Table 2.—Native plant species list for Upper Hippy Burn

Scientific Name	Common name	Number of plants
<i>Populus fremontii</i>	Fremont cottonwood	33,500
<i>Salix gooddingii</i>	Goodding's willow	59,000
<i>Salix exigua</i>	Coyote willow	39,500
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	Honey mesquite	425
<i>Baccharis sarothroides</i>	Baccharis	7,700
<i>Baccharis salicifolia</i>	Baccharis	7,700
<i>Distichlis spicata</i>	Saltgrass	214,500
<i>Sporobolus airoides</i>	Alkali sacaton	24,000

## **Grading**

Grading and contouring will consist of laser leveling the fields prior to planting. Borders will be added and maintained between field checks for efficient water delivery.

## **Irrigation**

It is anticipated that all fields will be flood irrigated on a regular basis. Soil moisture and other microclimate monitoring and observation will provide the data necessary to determine an appropriate irrigation schedule.

Once the cottonwood-willow matures, irrigation will be increased during the breeding and nesting season of the SWFL to ensure moist soil conditions. Differing watering regimes will be employed to hold irrigation water during SWFL season (March through September), creating conditions of moist soils, and standing or ponded water necessary for the species' habitat. Moist soils and areas of standing water encourage insect diversity and can also increase the relative humidity within the vegetation, which has been observed as a preferred component of habitat for SWFL.

## **Herbicide/Fertilizer/Pesticide Application**

To maintain healthy stands of native riparian species, the application of herbicides, fertilizer, and pesticides may be required. All herbicide, fertilizer, or pesticide application will be applied by persons possessing valid applicators' licenses for the chemicals being applied and in compliance with the rules, regulations, and laws set by the State of Arizona, La Paz County, and Cibola NWR.

All records and associated chemical application documents will be stored by the land manager and will include:

- Training records of all employees handling pesticides and herbicides
- Material Safety Data Sheets for all pesticides, herbicides, and fertilizers
- A location map of the herbicide and pesticide storage site

- Use of Arizona, La Paz County, and refuge-approved herbicide, pesticide, and fertilizers
- A record of herbicide, pesticide, or fertilizer use

## **MONITORING**

Conservation area monitoring plans are based on elements described in the LCR MSCP HCP (LCR MSCP 2004) and Final Science Strategy (LCR MSCP 2007). Monitoring results will be used as part of the adaptive management process as discussed in the “Adaptive Management” section of this report. Monitoring at Upper Hippy Burn is structured into two main categories:

- Pre-development monitoring
- Post-development monitoring
  - Implementation monitoring
  - Response monitoring

### **Pre-development Monitoring**

Pre-development surveys and monitoring at former agricultural sites, including Upper Hippy Burn, will be limited to initiation of photo point monitoring. Photos will be taken after the area has undergone site preparation for planting, immediately after planting, and 6 months after planting has been completed.

### **Post-development Monitoring**

Post-development monitoring will be implemented to assess the effectiveness of each habitat creation site and management activities in achieving the goals of the HCP. Post-development monitoring includes implementation monitoring and response monitoring components that allow each habitat creation site to achieve the target goals of the HCP through an adaptive management process (LCR MSCP 2007).

### **Implementation Monitoring**

Implementation monitoring includes evaluating habitat characteristics and documenting the success of habitat creation techniques. Implementation monitoring includes biotic and abiotic components. Habitat characteristics, including soil moisture, plant community composition, plant community structure, and microclimate, will be evaluated at Upper Hippy Burn.

## **Habitat Monitoring**

Habitat monitoring was designed to determine whether habitat creation sites are providing the habitat requirements (as defined by management guidelines) needed for the targeted covered species. Monitoring protocols have been developed and will document vegetation and microclimate characteristics. A three-tiered approach to habitat monitoring will be implemented at all developed phases. The three tiers are:

- *Status Monitoring* – Assess the current conditions of the area
- *Trend Monitoring and Causal Analysis* – Determine change over time and potential causes of change by evaluating specific habitat parameters
- *Effectiveness Monitoring* – Determine whether management actions are having the intended impact to LCR MSCP covered species and test the effectiveness of various experiments designed to assist the LCR MSCP in achieving conservation goals

## **Vegetation Sampling**

Vegetation data collection will begin in September and continue through November. Upper Hippy Burn will be monitored intensively for 2 years and then rotated between reduced intensity and full intensity in subsequent years. Detailed methods can be found in the LCR MSCP Habitat Monitoring Protocols.

Intensive plots will be conducted to address trends in density, species composition, and vegetation structure. Intensive plots will be evaluated for overstory trees, intermediate story trees and shrubs, crown closure, foliage height diversity, and ground cover/herbaceous layer. Reduced intensity plots will be used for density assessments of target tree species.

## **Microclimate Sampling**

HOBO data loggers will be placed at a subset of vegetation plots to record temperature, relative humidity, and photosynthetically active radiation. Data will be offloaded approximately every 6 months.

## **Vegetation Classification**

The LCR MSCP HCP (LCR MSCP 2004) outlines the specific habitat acreage to be created. The Anderson and Ohmart vegetation classification system (Anderson and Ohmart 1976, 1984) will be used to track the total land cover type managed by the program annually. To map the vegetation at Palo Verde Ecological Reserve, Reclamation will annually obtain aerial imagery of the site.

## **Response Monitoring**

Response monitoring is conducted to evaluate the response of targeted covered species to the establishment and management of created habitats. Species monitoring protocols will be implemented to evaluate whether Upper Hippy Burn is providing the necessary habitat requirements needed for the targeted covered species. Species monitoring will also help document whether any other species are using the created habitat. Monitoring protocols have been developed for documenting species' response to created land cover types:

- MacNeill's sootywing skipper
  - No quailbush will be planted at Upper Hippy Burn. If volunteer quailbush becomes established, surveys for MacNeill's sootywing would begin when the plants are in their first year of growth. Quailbush will be surveyed for adult sootywings twice during April – August, and randomly selected plants will be sampled for sootywing eggs and larvae.
- Neotropical birds
  - A standardized, double-sampling, rapid-intensive area search survey will be employed (Bart et al. 2010). Surveys will be conducted annually during the breeding season (April – June), beginning the second week of April, approximately 2 years after the initial planting.
  - If covered species are observed, nest searches and mist netting/banding may be conducted.
- Cavity nesting birds
  - Elf owl presence/absence surveys will be conducted once appropriate habitat is present. Because elf owls are secondary cavity nesters, the habitat will need to mature, and cavities or nest boxes will need to be present prior to elf owl occupation. The habitat will be observed during neotropical bird surveys for the presence of cavities and primary cavity nesters (woodpeckers). If nest boxes are installed, they will be monitored during the breeding season. If elf owls are detected during the breeding season, nest searches and mist netting/banding may be conducted.
  - Gilded flickers and Gila woodpeckers will be surveyed as part of the system-wide neotropical bird monitoring effort. Once suitable nesting habitat (snags and cavities) develops on the site, more directed presence/absence surveys may be necessary for gilded flicker. If flickers are detected during the breeding season, nest searches and mist netting/banding may be conducted.

**Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration  
Development and Monitoring Plan: Upper Hippy Burn**

- Southwestern willow flycatcher
  - Standardized presence/absence surveys (Sogge et al. 1997; USFWS 2000) will be conducted in the riparian habitat after three growing seasons. A minimum of five surveys each year will be conducted beginning in May and ending in July. If a SWFL is detected after June 15, or positive breeding evidence is identified, nest searches will be conducted to determine breeding status and use of habitat. Targeted banding and mist netting may be conducted to document long-term use of the site and to define habitat requirements.
- Yellow-billed cuckoo
  - Standardized presence/absence surveys (Halterman and Johnson 2005) will be conducted beginning after two or three growing seasons depending on habitat suitability. A minimum of five surveys will be conducted beginning in June and ending in September. If a YBCU is detected during the breeding season, nest searches will be conducted, and targeted banding and mist netting may be conducted to document long-term use of the site and to define nesting habitat requirements.
- Rodents
  - Post-development monitoring will be conducted for the presence of cotton rats. Trapping will occur at night and will be concentrated in areas where grasses are present. Once presence is established, a standardized protocol will be developed and implemented.
- Bats
  - A long-term acoustic station has been operating in the Crane Roost phase since 2012. This area was planted in a similar manner as Upper Hippy Burn and will serve as a surrogate for other phases. Additional acoustic surveys may be added in the future if necessary.

## **ADAPTIVE MANAGEMENT**

Adaptive management relies on the initial receipt of new information, the analysis of that information, and the incorporation of new information into the design and/or direction of future project work (LCR MSCP 2007). The Adaptive Management Program ensures habitat creation sites are biologically effective,

**Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration  
Development and Monitoring Plan: Upper Hippy Burn**

fulfills the conservation measures outlined in the HCP for 26 covered species, and potentially benefits 5 evaluation species. Post-development monitoring and species research results will be used to adaptively manage habitat creation sites after initial implementation. If it is determined through the monitoring results that additional information is needed to better define covered species habitat requirements, these data will be collected using the procedures outlined in the LCR MSCP Science Strategy (LCR MSCP 2007).

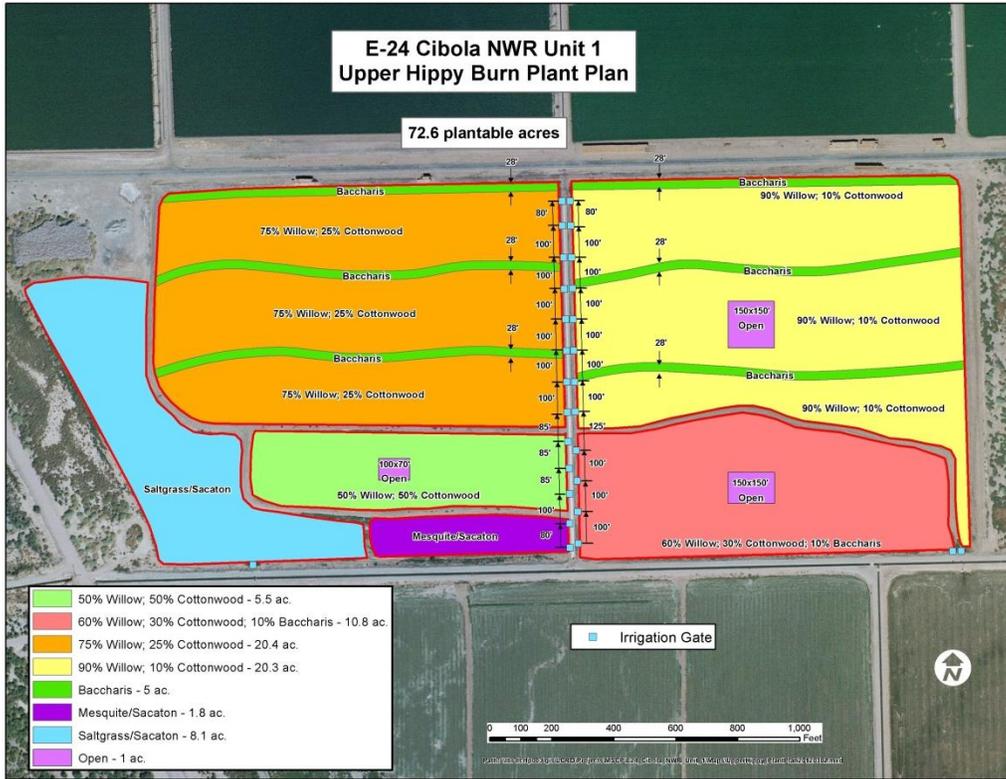
The Science Strategy provides for an adaptive management process for improving the effectiveness of HCP implementation and identification of monitoring and research priorities. Alterations or changes to habitat creation sites can be accomplished through management activities; these activities will be initiated through the Adaptive Management Program. Habitat creation sites will be managed for covered species using the best available science throughout the term of the HCP.

Creditable habitat acreage will be determined through the process approved by the LCR MSCP Steering Committee and reported in the annual reports. Monitoring activities will document the conservation area's adherence to management guidelines established through an approved management plan. If it is determined that the site does not meet the management guidelines, recommendations for site modifications may be made by the following means:

- Comparison of monitoring results with management guidelines to identify those guidelines not being met that can be remedied by site manipulations (plant removal, additional plantings, site contouring, etc.) or changes to the watering regime
- Comparison of monitoring results with previous successful and unsuccessful habitat restoration projects to look for differences in site characteristics (elevation, distance to river, climate, etc.), baseline conditions, planting design, plant and animal species composition, watering regimes, and abiotic conditions that may help explain why the site has not met the management guidelines
- Review of other studies that may provide insight into additional covered species habitat requirements or different restoration techniques to achieve the desired conditions

Adaptive management recommendations will be included in the annual report. These recommendations will also be used to improve future project designs where appropriate.

**Cibola National Wildlife Refuge Unit 1 Conservation Area Restoration  
Development and Monitoring Plan: Upper Hippy Burn**



**Figure 4.—Upper Hippy Burn planting plan, 2013.**

## 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 submitted to the Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- \_\_\_\_\_. 1984. Lower Colorado River riparian methods of quantifying vegetation communities to prepare type maps. Final report submitted to the Bureau of Reclamation, Lower Colorado Region, Boulder City, NV.
- Bart, J., L. Dunn, and A. Leist. 2010. A sampling plan for riparian birds of the Lower Colorado River—Final Report. U.S. Geological Survey Open File Report 2010–1158.
- Halterman, M. and M.J. Johnson. 2005. Draft western yellow-billed cuckoo natural history summary and survey methodology. Southern Sierra Research Station, Weldon, CA.
- Lower Colorado River Multi-Species Conservation Program (LCR MSCP). 2004. Lower Colorado River Multi-Species Conservation Program, Volume II: Habitat Conservation Plan. Bureau of Reclamation, Lower Colorado River Multi-Species Conservation Program, Boulder City, NV.
- \_\_\_\_\_. 2007. Final Science Strategy. Bureau of Reclamation, Lower Colorado River Multi-Species Conservation Program, Boulder City, NV.
- Sogge, M.K., R.M. Marshall, S.J. Sferra, and T.J. Tibbets. 1997. A southwestern willow flycatcher natural history summary and survey protocol. National Park Service Technical Report USGS/NAUCPRS/NRTR-97/12.
- U.S. Fish and Wildlife Service (USFWS). 2000. Southwestern willow flycatcher protocol revision 2000. U.S. Fish and Wildlife Service, Sacramento, CA.