Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Cibola National Wildlife Refuge Unit #1 Conservation Area

Fiscal Year 2013 Annual Report

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

May 2017

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Lower Colorado River Multi-Species Conservation Program

Cibola National Wildlife Refuge Unit #1 Conservation Area

Fiscal Year 2013 Annual Report

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ACRONYMS AND ABBREVIATIONS

Cibola NWR	Cibola National Wildlife Refuge
Cibola NWR Unit #1	Cibola National Wildlife Refuge Unit # 1 Conservation Area
dS/m	decisiemens per meter
EC	electrical conductivity
FY	fiscal year
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
PET	potential evapotranspiration
Reclamation	Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service

Symbols

%	percent

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1.0 INTRODUCTION

The purpose of this annual report is to summarize all activities, including planning, design, construction and management that have occurred at the Cibola National Wildlife Refuge Unit #1 Conservation Area (Cibola NWR Unit #1) from October 1, 2012, through September 30, 2013, which is Federal fiscal year (FY) 2013. Water usage is presented for the calendar year, January 1 through December 31, 2013, consistent with water accounting reporting.

1.1 Background

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

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 Cibola NWR and currently has a number of established projects at Unit 1, which include previous habitat creation projects as well as research and demonstration projects. In 1999, the U.S. Fish and Wildlife Service (USFWS) and Reclamation planted the Cibola Corn Field Nature Trail (now called Nature Trail) and established 34 acres of Fremont cottonwood-Goodding's willow (*Populus fremontii-Salix gooddingii*) (hereafter cottonwood-willow) and honey mesquite (*Prosopis glandulosa*) land cover type within the unit. In 2002, the USFWS and Reclamation planted approximately 18 acres of cottonwood-willow in Unit 1 north of the Nature Trail.

Six fields of approximately 20 acres each in Unit 1 were set aside for the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) to conduct research and development projects. To date, four of the 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 an additional two agricultural fields that are still in agricultural production. The six fields combined were included in a 5-year Land Use Agreement with the USFWS to continue research activities on Unit 1 through FY09. Prior to its expiration, a new Land Use Agreement was signed in 2007 that allowed for additional land and water to be secured for the remainder of the 50-year term of the LCR MSCP.

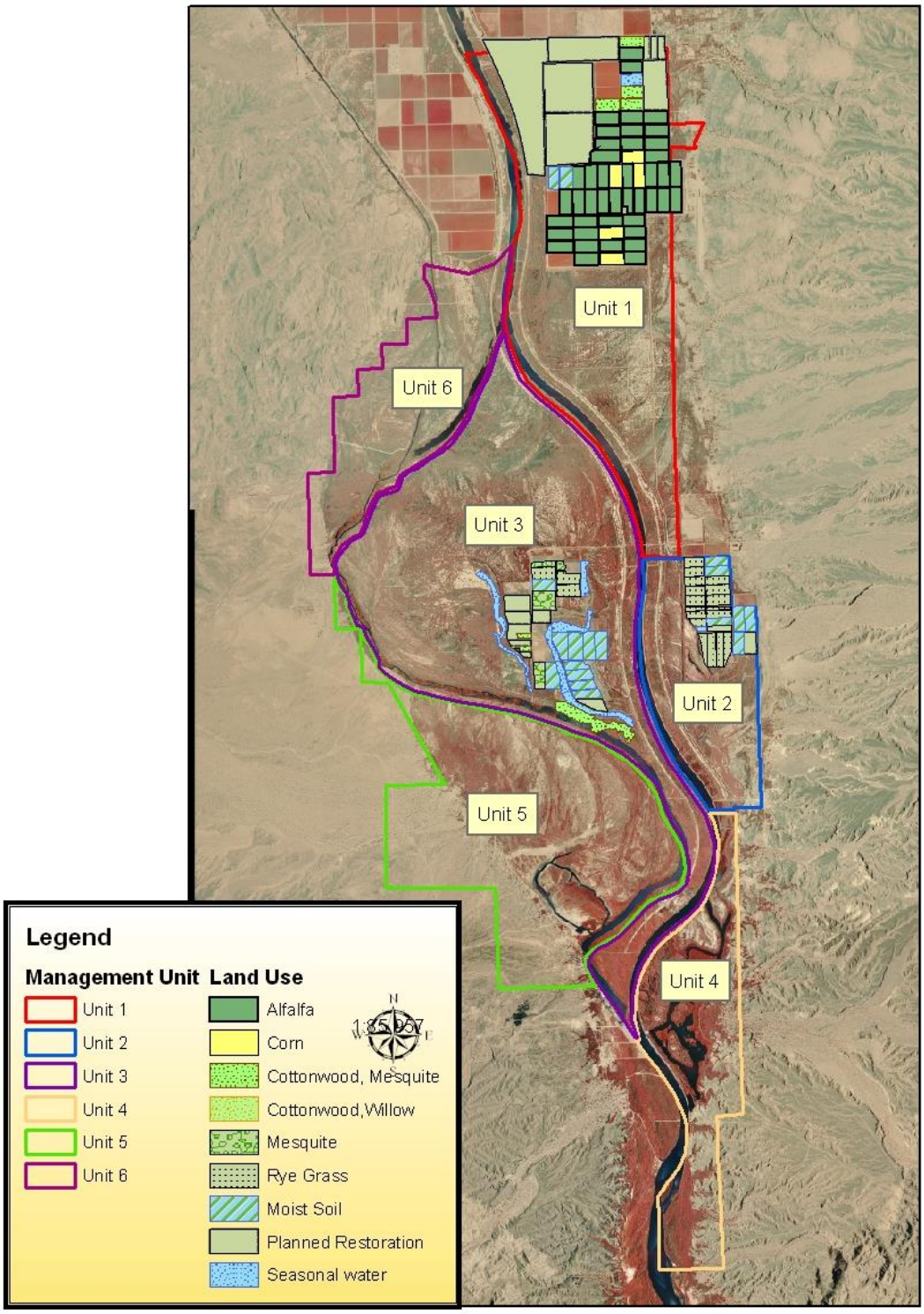

Figure 1.—The Cibola NWR's six management units.

Cibola NWR Unit #1 incorporates the aforementioned existing projects and agricultural land as well as additional adjacent acreage into a single conservation area. The acreage in Cibola NWR Unit #1 has been categorized into five areas (figure 2). Area #1 includes active agricultural fields, an existing (converted agriculture) cottonwood-willow land cover type, and ongoing LCR MSCP research and demonstration projects as described above. Area #2 (Hippy Fire) includes 338 acres that have been cleared as a result of the Hippy Fire. Areas #3 (Baseline 90) and #4 (North 160) were undeveloped land and fallowed agricultural land, respectively, and Area #5 is Crane Roost. Figure 2 illustrates the current state of these lands as managed by the LCR MSCP. A Land Use Agreement, that supersedes the aforementioned agreement, was signed in 2007, securing the lands within this conservation area for the 50-year term of the program. Note that Cibola NWR Unit #1 (approximately 949 acres) only includes a portion of the total area designated as "Unit 1" by the Cibola NWR (about 4,100 acres).

2.0 CONSERVATION AREA INFORMATION

2.1 Purpose

The cottonwood-willow land cover created within Cibola NWR Unit #1 will be managed for the southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and other terrestrial wildlife species covered by the LCR MSCP. The riparian restoration area of Cibola NWR Unit #1 provides habitat for a variety of avian and small mammal species and also provides creditable land cover type acreage to the program. Irrigation cycles for the riparian restoration area are evaluated annually to determine if conditions are appropriate for the species targeted by the LCR MSCP, specifically the southwestern willow flycatcher.

2.2 Location

Cibola NWR Unit #1 is located in Reach 4, within the Cibola NWR, in Cibola, Arizona. It is within the historic flood plain of the lower Colorado River and between River Miles 97 and 99 (figure 3).

2.3 Land Ownership

The conservation area is located on the Cibola NWR, which is owned and managed by the USFWS.

Figure 2.—Cibola NWR Unit #1 managed acreage, FY13.

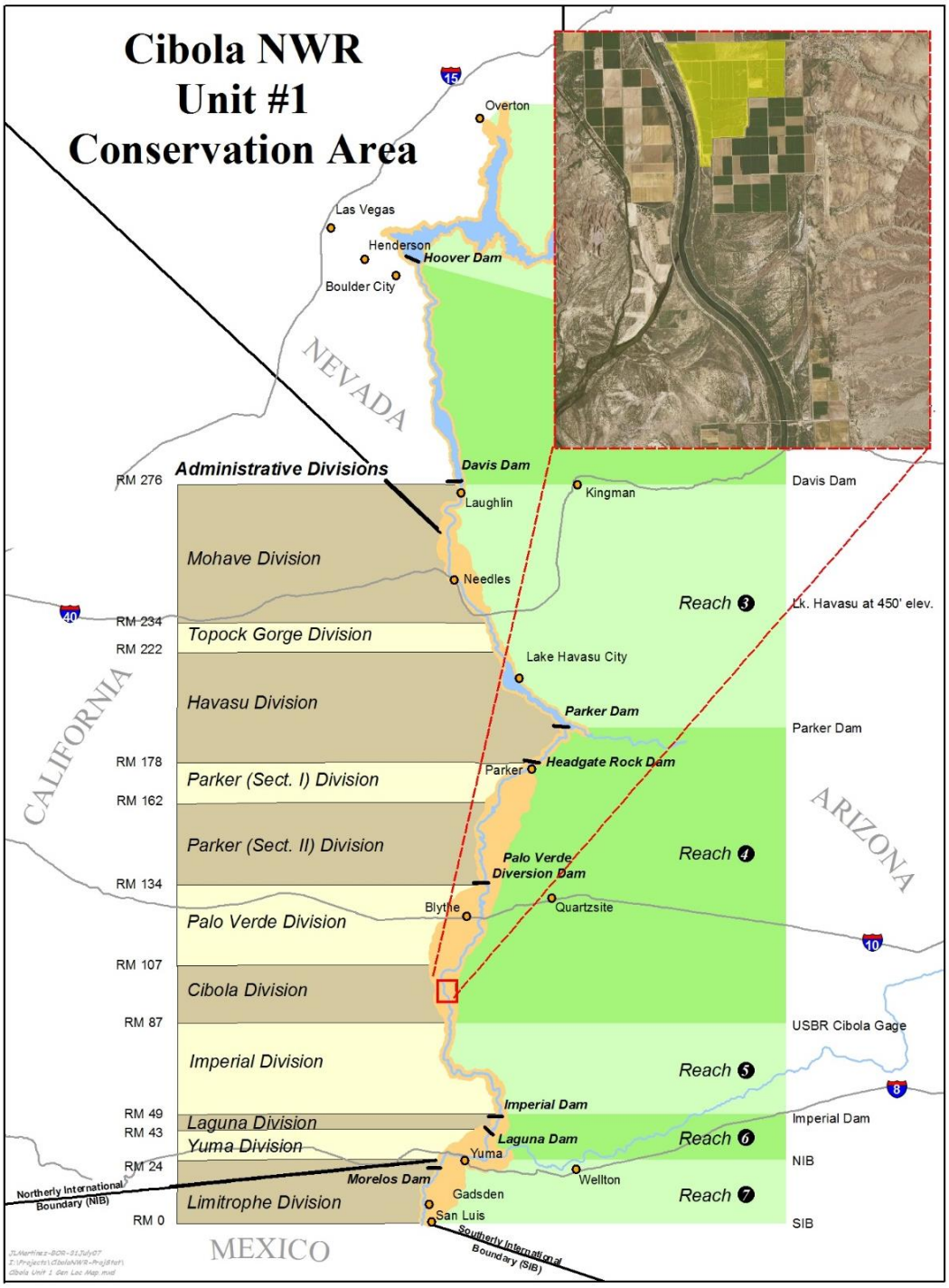

Figure 3.—The location of Cibola NWR Unit #1.

2.4 Water

Cibola NWR Unit #1 receives water from the Cibola NWR's 2nd priority water entitlement provided by the 1964 Supreme Court Decree in *Arizona* v. *California* and by U.S. Department of the Interior Secretarial reservation. The Cibola NWR has a diversionary entitlement of 27,000 acre-feet per year, a consumptive use entitlement (diversion minus return flow) of 16,793 acre-feet per year, and a circulatory (circulation water with minimum consumptive use) water right of 7,500 acre-feet per year. A maximum of 5,400 acre-feet per year (6 acre-feet per acre, per year) of that water is available for irrigating the conservation area when it has been fully developed.

2.5 Agreements

A Land Use Agreement was signed in 2007 by Reclamation and the USFWS to secure land and water for Cibola NWR Unit #1 for the remainder of the 50-year term of the LCR MSCP. The agreement outlines the rights and responsibilities of each partner in the project's development and maintenance.

2.6 Public Use

Cibola NWR Unit #1 is in an area that had public access limited by the USFWS prior to becoming a conservation area, and public access will remain limited. Vehicular access is restricted to a driving trail referred to as "Goose Loop." Low-impact public uses, such as wildlife watching, sport fishing, and education/ outreach, are expected at Cibola NWR Unit #1. However, these uses may be regulated depending on future occupation of the habitat by listed species.

2.7 Law Enforcement

Law enforcement activities at the Cibola NWR Unit #1 are performed primarily by the USFWS's law enforcement officer under the LCR MSCP's site-specific Fire Management & Law Enforcement Strategy (Reclamation 2010). Additional local law enforcement assistance is available through the Arizona Game and Fish Department's Yuma Office, the Yuma County Sherrif's Office, and Bureau of Land Management's Yuma Office.

2.8 Wildfire Management

The USFWS will provide an appropriate management response to all wildfires that occur within Cibola NWR Unit #1. The full range of suppression strategies is available to managers provided that selected options do not compromise firefighter and public safety, are cost effective, consider the benefits of suppression and the values to be protected, and are consistent with resource objectives (Reclamation 2010).

3.0 HABITAT DEVELOPMENT AND MANAGEMENT

3.1 Planting

Approximately 73 acres were planted in the northern section of Area #2 (Hippy Fire) in the spring of FY13 (table 1). The planting design consisted of an arrangement of cottonwood-willow species and honey mesquite to ensure a diverse habitat mosaic and to promote ease of irrigation water movement across the fields (figures 4 and 5).

Table 1.—Total plants planted for upper Hippy Fire, Cibola NWR Unit #1, FY13

Common name	Scientific name	Number
Fremont cottonwood	*Populus fremontii*	33,500
Gooding's willow	*Salix gooddingii*	59,000
Coyote willow	*Salix exigua*	39,500
Honey mesquite	*Prosopis glandulosa*	425
Mule fat	*Baccharis salicifolia*	7,700
Desert broom	*Baccharis sarothroides*	7,700
Saltgrass	*Distichlis spicata*	214,500
Alkali sacaton	*Sporobolus airoides*	24,000
Total plants		**386,325**

3.2 Irrigation

The cottonwood-willow land cover type at Cibola NWR Unit #1 is flood irrigated in accordance with the schedule prepared by Reclamation.

Figure 4.—Ground photo of Upper Hippy Fire fields planted in March 2013 (6 months of growth).

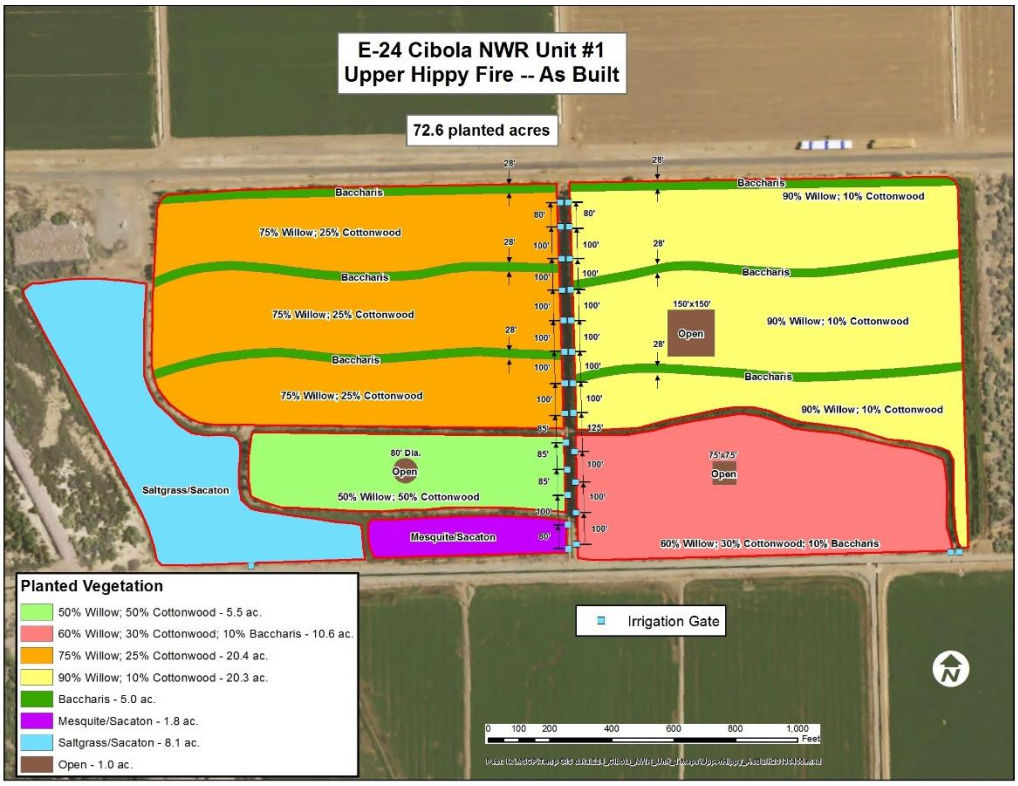

Figure 5.—As-built plan of Upper Hippy Fire fields planted in FY13.

3.3 Site Management

Routine site maintenance, such as road grading, was conducted at Cibola NWR Unit #1. Infrastructure improvements across the conservation area are expected as development of the site moves to subsequent phases.

To maintain healthy stands of trees and to promote growth, flood irrigation was also used on other previously established fields within the conservation area for regular watering. Additional measures were taken, as necessary, to maintain field borders, and herbicide and/or fertilizer were appropriately used.

3.4 Restoration Research and Demonstration

A number of previously established long-term research and demonstration projects are ongoing on Cibola NWR Unit #1 in Area #1. The projects are described in greater detail in their respective work plans and in associated technical reports. If available, research updates will be periodically presented in these annual reports for projects in Cibola NWR Unit #1; however, for more detailed information on those projects, please refer to their specific technical research reports.

3.4.1 Groundwater Monitoring Study/LCR MSCP Salinity Management Scenario Modeling

To further investigate the importance of groundwater and groundwater salinity on the long-term health and survival of the LCR MSCP's restored areas, research was conducted at Cibola NWR Unit #1 and at additional conservation areas. A series of monitoring wells were installed and sampled to record the effects of irrigation on groundwater chemistry. In addition, mitigating measures were identified to better manage groundwater at the restoration sites for the long-term success of trees planted at LCR MSCP conservation areas. The research results indicate that salinity is a problem at Cibola NWR Unit #1, specifically within Crane Roost 2, where both soil and groundwater exceed or approach the published electrical conductivity (EC) threshold of riparian species (8 decisiemens/meter [dS/m]). The current irrigation regime requires application of water at a rate between 23–43% of potential evapotranspiration (PET). Salinity model results indicate that regardless of the time of year, irrigation rates greater than 150% of PET will be required to reduce soil EC levels below riparian tree tolerances (GeoSystems Analysis, Inc. 2011, 2013)

Nineteen different scenarios, plus the management baseline, were run through the salinity model for each of the four model areas: Mass Transplanting, Nature Trail, Crane Roost 1, and Crane Roost 2. The 19 scenarios were further divided into 5 categories:

1. Spring-summer irrigation
2. Baseline summer irrigation + winter flooding
3. PET summer irrigation + winter flooding
4. Baseline summer irrigation + winter flooding + groundwater pumping
5. PET summer irrigation + groundwater pumping

Predicted root zone EC levels at the Mass Transplanting and Crane Roost 1 sites for all scenarios, including current management conditions, fell under the 8 dS/m threshold. The Nature Trail's root zone EC levels hovered around 10 dS/m until irrigation rates exceeded PET. The most effective irrigation practice at reducing salinity levels in the root zone within the Nature Trail was to irrigate at the current baseline levels during the summer months and then irrigate above 220% PET (approximately 300 acre-feet) during the winter months.

Due to the extremely high salinity levels within Crane Roost 2, any additional irrigation decreased salinity within the root zone; however, the EC levels did not begin to approach the tolerance limit until irrigation applied met or exceeded PET. Again, the most effective method for reducing EC levels within the root zone at Crane Roost 2 was to irrigate at baseline levels during the summer and then irrigate above 220% PET during the winter months. However, if the water is available, it is more efficient from a management standpoint to increase irrigation during the summer months rather than trying to run two separate irrigation seasons. Groundwater pumping was evaluated, but the practice was only recommended if increasing irrigation proves ineffective or infeasible due to limited water.

3.4.2 Groundwater Monitoring Study

Research from previous studies has suggested that riparian obligate trees will utilize groundwater when they have reached sufficient maturity. Studies have also suggested that this water source may be more important than the available soil water (applied surface water) for long-term health and survival of these trees. The focus in large-scale restoration to date has been on agricultural conversion of production crops (primarily alfalfa [*Medicago sativa*] and upland cotton [*Gossypium hirsutum*]). These crops are shallow rooted (relatively speaking) and rely on soil water to grow. In time, when the trees at the LCR MSCP's restoration sites begin to mature (i.e., conversion of shallow-rooted crops to riparian tree species), they may be impacted by the groundwater that exists below the crop root zone. Variability in growth rates and long-term tree survival has been observed in some areas that cannot be explained by differences in soils or available surface water. Additional recent data suggest that irrigation regimes can affect groundwater salinity levels.

3.4.3 Cottonwood Genetics

This research project is designed to determine the relative levels of genetic diversity in remaining stands of Fremont cottonwoods across the Southwest and to investigate the influence of this genetic diversity and local genetic adaptations on community diversity in the context of habitat restoration. The expression of these genetic adaptations may manifest in trees possessing superior traits with respect to growth, reproduction, survival, and the habitat quality they influence. Northern Arizona University contributed matching funds from a National Science Foundation grant to undertake these investigations. The project includes genetically screening remaining stocks of Fremont cottonwoods in stands throughout the Southwest and selecting genetically distinct trees, representative of these locations, to be planted in an experimental garden with a replicated design. The experimental garden will be monitored to observe how these genetic differences may be expressed in terms of growth, reproduction, and survival in a typical restoration site and to determine which genetic traits influence superior habitat quality (including those that may support LCR MSCP covered species). These genetic traits will likely be important for long-term survival of the trees and for maintaining habitat quality and health throughout the life of the program. Results to date suggest that populations of Fremont cottonwoods are highly structured across the Southwest, suggesting that genetic variation may be an important consideration when choosing trees for maximum fitness and adaptability and, therefore, restoration success (figure 6).

Northern Arizona University will continue monitoring this experimental garden at no cost to the LCR MSCP. This long-term research will continue to benefit the LCR MSCP by providing information regarding genetic diversity and how it can be used to inform future restoration efforts.

3.4.4 Seed Feasibility

Through a series of laboratory and field experiments, this study has documented the necessary steps involved in using seeds to create dense mosaics of native riparian land covers. The steps in the process included seed collection, storage, treatment, planting, germination, and monitoring of seedling growth and survival. Using seeds may be feasible if it involves less labor, is more cost effective, or preserves the genetic diversity of the riparian habitat created by the LCR MSCP. The amount of non-native to native vegetation resulting from using seeds for restoration will also be an important factor in determining the feasibility of this method.

Over the past four seasons, the techniques to achieve riparian seeding have been refined using information and best practices from laboratory experiments and through the establishment, monitoring, and management of a series of small plot

Figure 6.—Northern Arizona University Cottonwood Genetics garden representing 16 genotypes of Fremont cottonwoods.

studies. The details of these experimental trials are available on the LCR MSCP Web site in the "Technical reports" section. A summary of the trial results is provided below.

3.4.4.1 Seed Feasibility Results

Four years of study on the feasibility of using native seeds for riparian restoration have pointed toward the following conclusions:

- Fremont cottonwood, Goodding's willow, and coyote willow (*Salix exigua*) seed can be stored cleaned or uncleaned in freezers for over 2 years while retaining viability of greater than 80%.

- The optimal seeding method for Fremont cottonwood and Goodding's willow is hydroseeding onto furrows.

- Fremont cottonwood and Goodding's willow should be seeded separately to avoid cottonwood dominance of seeded areas.

- When co-established, Fremont cottonwoods dominate volunteer saltcedar (*Tamarix* spp.).

- Establishment of undesirable species (primarily saltcedar and grasses) can be controlled by reducing the seed bank on and adjacent to revegetation areas and by spraying revegetation areas with grass-specific herbicide during the first growing season.

- Infrequent, deep irrigation appears to enhance survival of Fremont cottonwood and Goodding's willow compared to frequent, shallow irrigation.

- Large-scale direct seeding of Fremont cottonwood would likely result in cost reductions of over 60% compared to mass transplanting.

- Large-scale direct seeding of Goodding's willow would likely result in cost reductions of over 40% compared to mass transplanting.

The applicability of seeding for large-scale restoration is still unclear. The results of this study show promise; however, a large-scale demonstration of these established techniques and protocols would be prudent to determine the true effort, logistics, and costs involved in establishing riparian cover type in a restoration setting (figure 7). In addition, long-term monitoring of the experimental plots should be continued to determine if the competitive treads in these experiments will continue and if seeding can produce the desired species composition and habitat characteristics necessary for LCR MSCP covered species.

Figure 7.—The 2009 plots showing successful establishment of Goodding's willow from seed.

4.0 MONITORING

4.1 Avian Monitoring

Avian monitoring in FY13 included surveys for the southwestern willow flycatcher, yellow-billed cuckoo, and riparian breeding birds as well as bird migration monitoring at a Monitoring Avian Productivity and Survivorship Station.

4.1.1 Southwestern Willow Flycatcher Surveys

The Nature Trail was surveyed five times during FY13. No breeding or resident southwestern willow flycatchers were detected (McLeod and Pellegrini 2014).

4.1.2 Yellow-billed Cuckoo Surveys

Five surveys for yellow-billed cuckoos were conducted in the Crane Roost, Mass Transplanting, Nature Trail, and the Cibola North sites from June through August 2013. Yellow-billed cuckoos were detected at the Crane Roost, Mass Transplanting, and the Nature Trail sites using call broadcast surveys (table 2), and they were detected during all five surveys conducted between June 21 and August 12.

Table 2.—Yellow-billed cuckoo detections at Cibola NWR Unit #1, FY13

Site name	Estimated territories		
	POS[1]	PRB[2]	COB[3]
Crane Roost	2	1	0
Mass Transplanting	1	0	0
Nature Trail	1	0	0
Cibola North	0	0	0
Total	**4**	**1**	**0**

[1] Possible breeding territory (POS) = two or more total detections in an area during two survey periods and at least 10 days apart.
[2] Probable breeding territory (PRB) = POS territory plus yellow-billed cuckoos observed carrying food, traveling as a pair, or exchanging vocalizations.
[3] Confirmed breeding territory (COB) = observation of copulation, stick carry, nest, or fledgling.

Eight individuals were detected in June, nine individuals were detected between July 3–8, three individuals were detected between July 16–21, six individuals were detected between July 28–30, and two individuals were detected between

August 7–10. There were no confirmed pairs and four possible and one probable pair at Cibola NWR Unit #1 in FY13. There was possible breeding at all three areas and probable breeding at Crane Roost (see table 2) (McNeil and Tracy 2013).

4.1.3 General Avian Surveys

Avian surveys were conducted on the phases at Cibola NWR Unit #1 with more than 2 years' growth using a double sampling area search method to determine their use by breeding LCR MSCP riparian covered species. A total of 19 species (151 pairs) of birds were detected breeding within the habitat at Cibola NWR Unit #1. One pair of Arizona Bell's vireos (*Vireo bellii arizonae*) was confirmed at the Nature Trail. Yellow warblers (*Dendroica petechia = Setophaga petechia*) were detected at the Cottonwood Genetics fields and Crane Roost sites, but breeding and whether they were Sonoran yellow warblers (*Setophaga petechia sonorana = Dendroica petechia sonorana*) could not be confirmed. Summer tanagers (*Piranga rubra*) were detected at the Nature Trail and Crane Roost sites, but breeding could not be confirmed (Great Basin Bird Observatory 2016).

A bird banding station was operated 10 times from May 1 through July 30, 2013. One Bell's vireo (*Vireo bellii*) and one yellow warbler were captured and banded (Dodge and Kahl 2015).

4.2 Small Mammal Monitoring

4.2.1 Bat Monitoring

Acoustic and capture survey methods were used to monitor bats to document the presence of species using Cibola NWR Unit #1 and to determine the age, sex, and reproductive status of bats that were captured.

4.2.1.1 Acoustic Surveys

One long-term monitoring station was operated to continuously monitor bat activity at Cibola NWR Unit #1. The station was used to monitored activity at the Mass Transplanting site from October to July2013 and was relocated to a more representative site in the Crane Roost area on July 10. Table 3 summarizes the total number of bat minutes by month for the four LCR MSCP covered and evaluation bat species recorded in FY13. A bat minute is the number of minutes that at least one bat call is recorded for a species regardless of how many calls are recorded within any 1-minute interval. The method of using bat minutes reduces the bias of a single bat being recorded multiple times within a single minute. All four LCR MSCP covered and evaluation species were detected (Broderick 2016).

Table 3.—Total bat minutes by month at Cibola NWR Unit #1, FY13[1]

Month	Common name			
	Western red bat[2]	Western yellow bat[3]	California leaf-nosed bat[4]	Pale Townsend's big-eared bat[5]
October	–	–	–	–
November	–	–	–	–
December	7	1	0	0
January	41	0	1	0
February	123	0	1	0
March	134	0	5	2
April	45	3	4	0
May	37	6	5	0
June	21	0	5	0
July	8	2	2	0
August	13	4	4	0
September	11	0	4	0

[1] Data were not collected in October and November due to equipment malfunction.
[2] *Lasiurus blossevillii.*
[3] *Lasiurus xanthinus*.
[4] *Macrotus californicus*.
[5] *Corynorhinus townsendii pallescens* = *Plecotus townsendii pallescens* = *Corynorhinus townsendii townsendii)*.

4.2.1.2 Capture Surveys

Bat were captured with mist nets within the Nature Trail and Mass Transplanting sites one night each month in May, June, July, and September (high winds caused a cancellation of the August survey). Western red bats (*Lasiurus blossevillii*), western yellow bats (*Lasiurus xanthinus*), and California leaf-nosed bats (*Macrotus californicus*) were captured. Table 4 shows the captures of LCR MSCP bat species compared to all other species across years at Cibola NWR Unit #1 (Calvert 2016).

Table 4.—Total LCR MSCP bat species captured across years at Cibola NWR Unit #1 (n = number of survey nights)

Species	2007 n = 2	2008 n = 3	2009 n = 5	2010 n = 5	2011 n = 5	2012 n = 5	2013 n = 4	Totals
Western red bat	0	0	0	0	0	1	3	4
Western yellow bat	0	2	0	0	0	1	0	3
California leaf-nosed bat	14	4	4	5	8	6	0	41
Pale Townsend's big-eared bat	0	0	0	0	0	0	0	0
All other species	5	31	162	58	62	117	52	487
Totals	**19**	**37**	**166**	**63**	**70**	**125**	**55**	**535**

4.2.2 Rodent Monitoring

Live trapping was conducted in fall and spring of FY13 to determine the presence of the Colorado River cotton rat (*Sigmodon arizonae plenus*). The Nature Trail and Cottonwood Genetics fields were each trapped for 1 night in spring and fall, and the Upper Hippy Fire fields were trapped for 1 night in fall. In addition, the Nature Trail was trapped for four consecutive nights in fall as part of a mark-recapture study. Table 5 lists all Colorado River cotton rat captures at Cibola NWR Unit #1 (Hill and Calvert 2016).

Table 5.—Number of Colorado River cotton rats captured at Cibola NWR Unit #1, FY13

Location	Fall 2012	Spring 2013	Number of traps set
Nature Trail	NA	3	560
Cottonwood Genetics	0	17	140
Upper Hippy Fire	NA	NA	60
Totals	**0**	**20**	**760**

5.0 HABITAT CREATION CONSERVATION MEASURE ACCOMPLISHMENT

5.1 Vegetation Monitoring

Vegetation measurements were collected at Cibola NWR Unit #1 to evaluate the vegetation structure from the ground to the upper canopy. Parameters included tree and shrub density, tree heights, and canopy closure.

The tree density in cottonwood-willow plots (Fremont cottonwood, Goodding's willow, and coyote willow [stem density]) ranged from 10–2,309 trees/stems per acre. The shrub density (willow baccharis [(*Baccharis salicina*], mule fat [(*Baccharis salicifolia*], quailbush [(*Atriplex lentiformis*], and saltcedar) in plots ranged from 1–958 shrubs per acre. Fremont cottonwood, Goodding's willow, and honey mesquite tree heights ranged in plots from 0.6–23.1 meters. The average canopy closure measured at each plot ranged from 0–100%.

5.2 Evaluation of the Cibola NWR Unit #1 Conservation Area

The process for habitat creation conservation measure accomplishment was finalized in October 2011 (Reclamation 2011). All restored areas within Cibola NWR Unit #1 were designed to benefit covered species at the landscape level.

To meet species habitat creation requirements, the Habitat Conservation Plan provides goals for habitat creation based on land cover types. These land cover types are described using the Anderson and Ohmart vegetation classification system (Anderson and Ohmart 1976, 1984a, 1984b). In FY13, Cibola NWR Unit #1 supported 190 acres of cottonwood-willow structure type I, 80 acres of cottonwood-willow structure type II, and 74 acres of cottonwood-willow structure type IV. Table 6 shows how much habitat is creditable for each of the targeted covered species at Cibola NWR Unit #1 in FY13. At total of nine species with habitat creation goals have creditable acres at Cibola NWR Unit #1. These species (including their corresponding conservation measure acronym) are the western red bat (WRBA2), yellow-billed cuckoo (YBCU1), elf owl (*Micrathene whitneyi*) (ELOW1), gilded flicker (*Colaptes chrysoides*) (GIFL1), Gila woodpecker (*Melanerpes uropygialis*) (GIWO1), vermilion flycatcher (*Pyrocephalus rubinus*) (VEFL1), Arizona Bell's vireo (BEVI1), Sonoran yellow warbler (*Dendroica petechia sonorana = Setophaga petechia sonorana*) (YWAR1), and the summer tanager (SUTA1).

Table 6.—Species-specific habitat creation conservation measure creditable total acres, FY13

Species-specific habitat creation conservation measure	WIFL1	WRBA2	WYBA3	CRCR2	YBCU1	ELOW1	GIFL1	GIWO1	VEFL1	BEVI1	YWAR1	SUTA1
Creditable acres in FY13	0[1]	0	0[2]	0[3]	0	0	0	74	74	74	74	0
Total (including previous years)	**0**	**270**	**0**	**0**	**270**	**270**	**270**	**344**	**344**	**190**	**344**	**270**

[1] Although Cibola NWR Unit #1 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 these data have been obtained, Cibola NWR Unit #1 will be evaluated.

[2] Reclamation is in the process of determining the foraging and roosting habitat for the western yellow bat. Once this habitat has been determined, Cibola NWR Unit #1 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 the marsh and cottonwood-willow habitat uses by this species.

6.0 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 measure outlined in the Habitat Conservation Plan for 26 covered species and if they 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 Cibola NWR Unit #1, 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 Cibola NWR Unit #1.

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