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: Middle Hippy Fire

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

October 2018

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Lower Colorado River Multi-Species Conservation Program Steering Committee Members

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

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Arizona Game and Fish Department
Arizona Power Authority
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Cibola Valley Irrigation and Drainage District
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Other Interested Parties Participant Group

QuadState Local Governments Authority
Desert Wildlife Unlimited

California Participant Group

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City of Needles
Coachella Valley Water District
Colorado River Board of California
Bard Water District
Imperial Irrigation District
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Palo Verde Irrigation District
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Lower Colorado River
Multi-Species Conservation Program

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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
FY	fiscal year
HCP	Habitat Conservation Plan
LCR	lower Colorado River
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
lidar	light detection and ranging
Nature Trail	Cibola National Wildlife Refuge Unit #1 Conservation Area Nature Trail
Reclamation	Bureau of Reclamation
USFWS	U.S. Fish and Wildlife Service

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1.0 INTRODUCTION

The Lower Colorado River Multi-Species Conservation Program (LCR MSCP) is a multi-stakeholder Federal and non-Federal partnership responding to the need to balance the use of lower Colorado River (LCR) water resources and the conservation of native species and their habitats in compliance with the Endangered Species Act.

The LCR MSCP is a long-term (50-year) plan consisting of conservation measures that provide protection along the LCR from Lake Mead to the Southerly International Boundary with Mexico for 27 species currently threatened or endangered and 5 species on the verge of becoming threatened or endangered. The LCR MSCP anticipates development and/or protection of a minimum of 8,132 acres of habitat consisting of a mosaic of Fremont cottonwood-Goodding's willow (*Populus fremontii-Salix gooddingii*) (hereafter cottonwood-willow), honey mesquite *(Prosopis glandulosa*), marsh, and backwater components. The program uses adaptive management principles to research and monitor species and habitats as well as to enhance management actions and science applications over the life of the program.

This report outlines the preliminary concept, project parameters, and monitoring activities for development of Middle Hippy Fire (in Area #2) in the Cibola National Wildlife Refuge Unit #1 Conservation Area (Cibola NWR Unit #1), which will result in an additional 122 acres of the cottonwood-willow land cover type. Development of this area is in partial fulfillment of requirements described in the LCR MSCP Habitat Conservation Plan (HCP) (LCR MSCP 2004).

1.1 Purpose

Cibola NWR Unit #1 is being developed in phases The purpose of developing Middle Hippy Fire is to convert approximately 122 acres of active agricultural fields to the cottonwood-willow land cover type and to develop 122 acres of riparian habitat for the benefit of LCR MSCP covered species such as southwestern willow flycatchers (*Empidonax traillii extimus*), yellow-billed cuckoos (*Coccyzus americanus occidentalis*), and other covered species listed in the LCR MSCP Habitat Conservation Plan (LCR MSCP 2004).

This area, in conjunction with pre-established cottonwood-willow parcels adjacent to the LCR, is designed to replace the existing land cover with historical landscape patterns of plant communities along the river and to create an integrated mosaic of habitats. Additionally, this habitat will provide an abundance and diversity of insects used as food by covered bird species, migrants, and covered bat species.

Cibola NWR Unit #1 will partially meet and/or support the following LCR MSCP Habitat Conservation Plan conservation measures:

- WIFL1 – Create 4,050 acres of southwestern willow flycatcher (*Empidonax traillii extimus*) habitat
- WRBA2 – Create 765 acres of western red bat (*Lasiurus blossevillii*) roosting habitat
- WYBA3 – Create 765 acres of western yellow bat (*Lasiurus xanthinus*) roosting habitat
- YBCU1 – Create 4,050 acres of yellow-billed cuckoo (*Coccyzus americanus occidentalis*) habitat
- ELOW1– Create 1,784 acres of elf owl (*Micrathene whitneyi*) habitat
- GIFL1 – Create 4,050 acres of gilded flicker (*Colaptes chrysoides*) habitat
- GIWO1 – Create 1,702 acres of Gila woodpecker (*Melanerpes uropygialis*) habitat
- VEFL1 – Create 5,208 acres of vermillion flycatcher (*Pyrocephalus rubinus*) habitat
- YWAR1 – Create 4,050 acres of Sonoran yellow warbler (*Dendroica petechia sonorana = Setophaga petechia sonorana*) habitat
- SUTA1 – Create 602 acres of summer tanager (*Piranga rubra*) habitat
- CRCR2 – Create 125 acres of Colorado River cotton rat (*Sigmodon arizonae plenus*) habitat
- BEVI1 –Create 2,983 acres of Arizona Bell's vireo (*Vireo bellii arizonae*) habitat

1.2 Location and Description

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

The Cibola NWR consists of about 16,600 acres of land located along approximately 12 miles of the LCR in Arizona and California. It was established

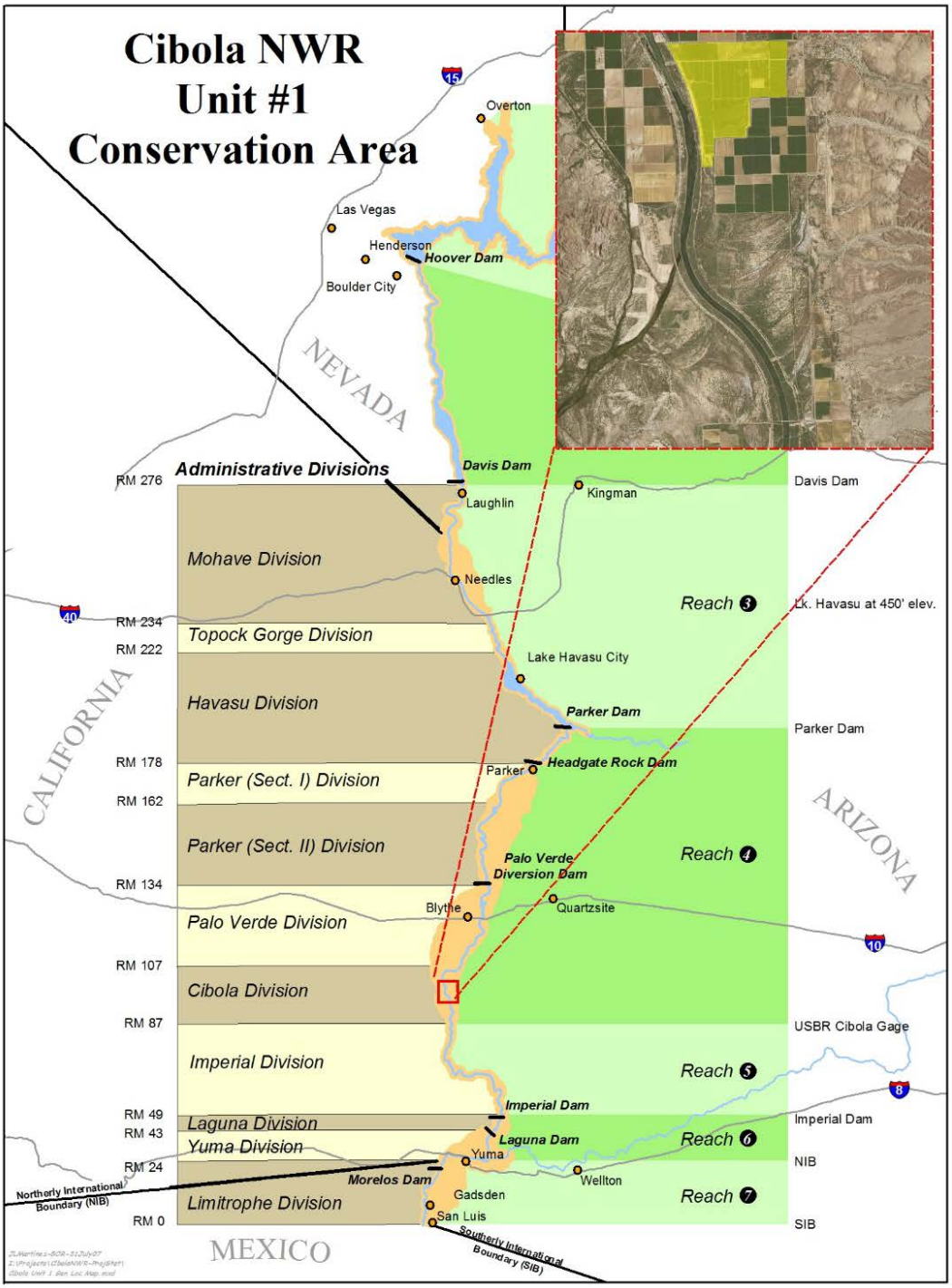


Figure 1.—LCR MSCP planning area map showing the location of Cibola NWR Unit #1.

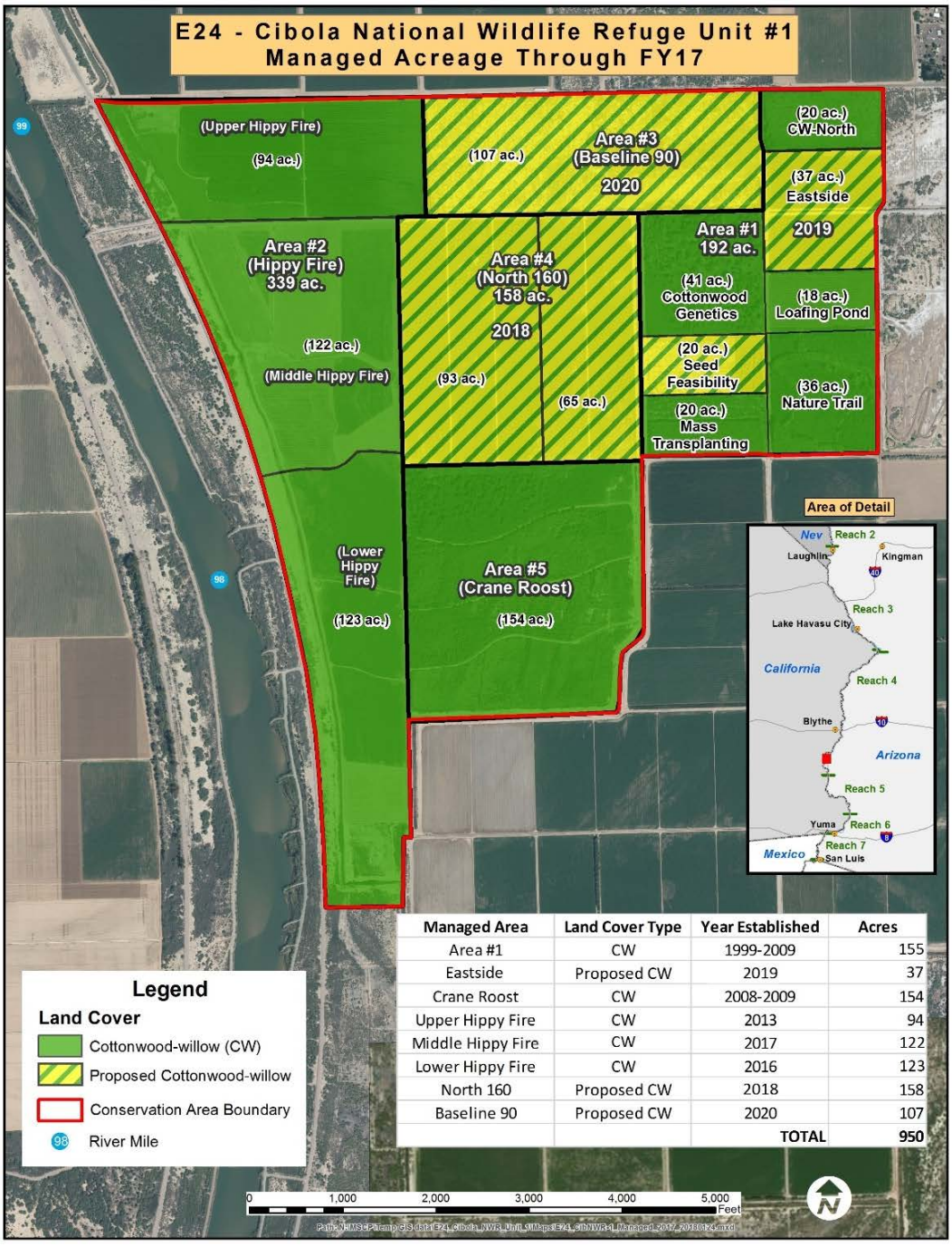
in 1964 as a refuge and breeding ground for migratory birds and other wildlife. The Cibola NWR is divided into six management units known as Unit 1, Unit 2, Unit 3, Unit 4, Unit 5, and Unit 6.

Cibola NWR Unit #1 is located on the northern end of the Cibola NWR 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 Cibola NWR 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 the cottonwood-willow and honey mesquite land cover type within Cibola NWR Unit #1. In 2002, the USFWS and Reclamation planted approximately 18 acres of cottonwood-willow in Area #1 north of the Nature Trail.

Six fields of approximately 20 acres each in Area #1 were set aside for the LCR MSCP to conduct research and development projects. The LCR MSCP funded and has since closed the work tasks for three research and development projects: 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 Area #1 through fiscal year (FY) 2009. Prior to its expiration, a new Land Use Agreement was signed in 2007, which allowed for additional land and water to be secured for the remainder of the 50-year term of the LCR MSCP.

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 339 acres that have been cleared as a result of a fire.

Area #3 (Baseline 90) and Area #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. 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 (approximately 4,100 acres).



Managed Area	Land Cover Type	Year Established	Acres
Area #1	CW	1999-2009	155
Eastside	Proposed CW	2019	37
Crane Roost	CW	2008-2009	154
Upper Hippy Fire	CW	2013	94
Middle Hippy Fire	CW	2017	122
Lower Hippy Fire	CW	2016	123
North 160	Proposed CW	2018	158
Baseline 90	Proposed CW	2020	107
		TOTAL	950

Figure 2.—Cibola NWR Unit #1, Areas 1–5, managed acreage through FY17.

1.3 Landownership

Cibola NWR Unit #1 is owned by the USFWS and is located within the Cibola NWR.

1.4 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.

2.0 RESTORATION AND DEVELOPMENT PLAN

Implementation of Middle Hippy Fire will serve as partial fulfillment of the LCR MSCP's habitat creation goals. Development of Middle Hippy Fire (122 acres) will create the cottonwood-willow land cover type.

2.1 Conceptual Planting Design

Middle Hippy Fire will be planted in spring 2017. 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 Middle Hippy Fire 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 typically observed in natural riparian communities. Future structure management may address mechanical seral-stage setbacks and the introduction of other species into patches to achieve greater structural and biological diversity (figure 3).

The planting design of Middle Hippy Fire incorporates native riparian species found along the LCR into a mosaic of created habitats. Areas of cottonwood-willow and honey mesquite are based on habitat creation concepts presented in the LCR MSCP Habitat Conservation Plan. Patch sizes of created habitats are designed and managed to provide habitat for more than one species. Based on

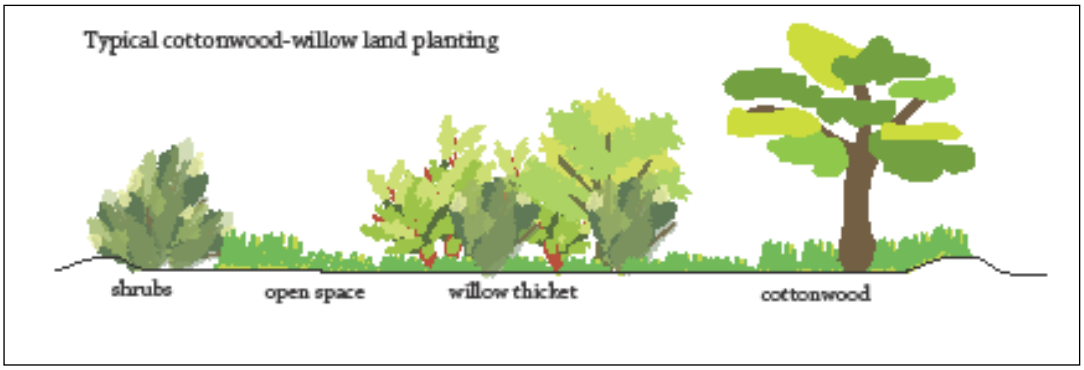


Figure 3.—Typical cottonwood-willow planting.

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.

Middle Hippy Fire will consist of three distinct planting zones: low-density riparian, high-density riparian, and low-density mesquite (figure 4). This will allow for the desired mosaic of land cover types with diversity in vegetation structure.

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

2.1.1 Planting

Prior to planting the riparian vegetation in spring 2017, alfalfa (*Medicago* spp.) and rye seed (*Secale cereale*) may be planted as a ground cover to suppress weeds; this approach has been used in the past as an effort to reduce non-native species, including weeds at other restoration sites (Palo Verde Ecological Reserve and Cibola Valley Conservation Area). However, in recent plantings, weeds have continued to be a concern. The agricultural fields are already planted in alfalfa, and this year, the field will be left as is. Furrows for the honey mesquite trees will be cut through the existing alfalfa. High- and low-density riparian areas will be disced prior to planting as a trial effort to determine if reducing the number of times the field is disced will reduce the introduction of weeds.

Grading and contouring will consist of laser leveling the fields prior to planting. Irrigation distribution basins and other water control structures will be constructed to allow for different irrigation regimes to be applied to the three distinct planting zones. In the riparian (high- and low-density) areas, borders will be added and maintained between field checks for efficient water delivery. Furrows will be installed in honey mesquite areas to allow for less water use by directing water only to the areas where trees will be planted (figure 5).

Figure 4.—Middle Hippy Fire as built, FY17.

Figure 5.—Example of the furrow planting technique.

Most of the Middle Hippy Fire will be planted using an automated mass planter, a technique successfully used in other LCR MSCP conservation areas, such as the Palo Verde Ecological Reserve and Cibola Valley Conservation Area. Spacing for areas planted using the mass planter will have rows spaced 40 inches apart with 6-foot inline spacing (table 1). This method will achieve dense native plantings of rapid growth that will inhibit the establishment and growth of non-native plant species.

Honey mesquite trees will be planted by hand in shallow furrows. The spacing for mesquite plantings will be 25 feet on center. Low-density riparian areas will consist of widely spaced cottonwood trees with alkali sacaton (*Sporobolus airoides*) ground cover. The cottonwood trees will be planted by hand; the spacing will be 20 feet on center. The alkali sacaton will be planted using the mass planter in rows spaced 40 inches apart with 4-foot inline spacing.

Plant material for the project will be collected from LCR MSCP nurseries along the LCR and from areas that are ecologically similar.

Table 1.—Native plant species, numbers planted, and planting type at Middle Hippy Fire

Scientific Name	Common name	Number of plants	Planting type
Populus fremontii	Fremont cottonwood	39,168	Mass
Salix gooddingii	Goodding's willow	39,168	Mass
Salix exigua	Coyote willow	39,168	Mass
Prosopis glandulosa var. *torreyanna*	Honey mesquite	1,400	Hand
Baccharis sarothroides	Broom baccharis	7,200	Mass
Baccharis salicifolia	Seepwillow	11,412	Mass
Populus fremontii (1 gallon)	Fremont cottonwood (1 gallon)	1,853	Hand
Sporobolus airoides	Alkali sacaton	79,926	Mass
	Total	219,295	

2.1.2 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 southwestern willow flycatchers to ensure moist soil conditions. Differing watering regimes will be employed to hold irrigation water during southwestern willow flycatcher 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 southwestern willow flycatchers.

3.0 MANAGEMENT OVERVIEW

3.1 Site Management

Cibola NWR Unit #1 is within the Cibola NWR on land owned by the USFWS. In 2007, Reclamation secured the lands within the conservation area for the 50-year term of the LCR MSCP. Reclamation is responsible for site management in accordance with the program.

3.2 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.

3.3 Law Enforcement

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

3.4 Wildfire Management

The LCR MSCP is responsible for wildfire management at the Cibola NWR. As guided by commitments in the LCR MSCP Habitat Conservation Plan, wildfire management practices on the conservation area will "Reduce the risk of loss of related habitat to wildfire by providing resources to suppress wildfires, e.g., contributing to and integrating with local, State, and Federal agency fire management plans, and implement land management and habitat creation measures to support the reestablishment of native vegetation that is lost to wildfire" (LCR MSCP 2010).

Federal, State, and local fire agencies, either by existing management agreements or mutual aid agreements, provide wildland fire suppression, incident dispatch, fire investigation, fuels reduction, and potential fire restrictions. The full range of suppression strategies are available to managers provided that selected options do not compromise firefighter or public safety, are cost effective, consider the benefits of suppression and the values to be protected, and are consistent with resource objectives.

3.5 Site Maintenance

Reclamation is responsible for maintaining infrastructure, access roads, and habitat created throughout development of Cibola NWR Unit #1. Reclamation

executes contracts or agreements with private companies or within the U.S. Department of the Interior to complete services or construction activities needed at the conservation area.

3.5.1 Herbicide/Fertilizer/Pesticide Application

To maintain healthy stands of native riparian species, the application of herbicides, fertilizers, 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 will be done in compliance with the rules, regulations, and laws set by the State of Arizona, La Paz County, and the 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
- Safety data sheets for all pesticides, herbicides, and fertilizers
- A location map of the herbicide and pesticide storage site
- A record of Arizona, La Paz County, and refuge-approved and used herbicides, pesticides, and fertilizers

4.0 MONITORING

As stated above, Middle Hippy Fire will be managed for southwestern willow flycatchers, yellow-billed cuckoos, and other covered species listed in the LCR MSCP Habitat Conservation Plan. The site will be added to conservation area monitoring for neotropical birds and small mammals once habitat develops. Monitoring will be conducted to document presence and may not be required annually.

4.1 Pre-Development Monitoring

Pre-development surveys and monitoring at former agricultural sites, including Middle Hippy Fire, 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.

4.2 Post-Development Monitoring

Post-development monitoring will be implemented to assess the effectiveness of the conservation area and management activities in achieving the goals of the HCP. Post-development monitoring includes conducting presence surveys for targeted species such as yellow-billed cuckoos.

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 Middle Hippy Fire.

Habitat monitoring was designed to determine whether conservation areas are providing the habitat requirements needed by targeted covered species. Habitat characteristics will be determined primarily through vegetation structure derived from light detection and ranging (lidar) data. Species monitoring will document targeted covered species' use of the created habitat. Monitoring protocols have been developed for documenting species' responses to created land cover types. The following monitoring may occur:

- Cottonwood-willow and honey mesquite may be surveyed annually for neotropical birds during the breeding season (April – June). If covered species are observed, species-specific surveys, nest searches, and mist netting/banding may be conducted.

- Southwestern willow flycatcher surveys may be conducted in areas of suitable habitat (cottonwood-willow) during the breeding season (May – August). Surveys will be conducted according to the standardized protocol (Sogge et al. 2010). If breeding or resident birds are detected, they may be captured and banded. If breeding occurs at the site, nests will be monitored for success.

- Yellow-billed cuckoo surveys may be conducted in areas of suitable habitat (cottonwood-willow) during the breeding season (June – September). Surveys will be conducted according to a standardized protocol that is being developed for Reclamation (Halterman et al. 2016). If breeding or resident birds are detected, they may be captured and banded. If breeding occurs at the site, nests will be monitored for success.

- Colorado River cotton rat monitoring may be conducted for presence if appropriate habitat is found. Trapping will occur at night and will be concentrated in areas where native grasses are present. The number of traps will be determined by how much of the native grass successfully develops in dense enough patches that a Colorado River cotton rat population can be sustained.

- When cavities become present in the riparian habitat, species-specific presence surveys for elf owls and gilded flickers may be conducted.

5.0 ADAPTIVE MANAGEMENT

Adaptive management relies on obtaining new information, the analysis of that information, and the incorporation of the new information into the design and/or direction of future project work (LCR MSCP 2007). Adaptive management ensures conservation areas are biologically effective and fulfill the conservation measures outlined in the HCP. Post-development monitoring and species research results will be used to adaptively manage conservation areas after initial implementation. If it is determined through monitoring 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 Final Science Strategy (LCR MSCP 2007). Alterations or changes to conservation areas can be accomplished through management activities; these activities will be initiated through the adaptive management process. Conservation areas will be manipulated and/or maintained for covered species using the best available science throughout the 50-year term of the LCR MSCP.

5.1 Monitoring Analysis and Evaluation

Monitoring data (primarily vegetation structure derived from lidar data) will be assessed to determine whether a site meets species-specific habitat requirements, which are the limiting factors for habitat to be considered covered species habitat in accordance with the current knowledge. In order to more effectively and efficiently manage conservation areas, sites will be designed to ensure that they more than adequately fulfill these habitat requirements and will then be monitored over time to see whether habitat quality decreases as the sites change.

5.2 Recommendations

If it is determined that a site does not meet the species-specific habitat requirements, recommendations for site modifications may be made by the following means:

- Comparison of monitoring results with species-specific habitat requirements to identify the habitat characteristics 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 results with previous successful and unsuccessful conservation areas 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 fulfilled the species-specific habitat requirements

- Review of other studies that may provide insight into additional covered species habitat requirements or different restoration techniques to achieve the desired conditions

These recommendations of how to move toward fulfilling species-specific habitat requirements will be included in the annual report (as further described in the next section). They will also be used to improve future project designs where appropriate.

6.0 REPORTS

6.1 Annual Report

An annual report summarizing the following will be prepared by Reclamation and made available each calendar year:

- A general description of the status of the project and the effects on covered species

- A description of all restoration activities and monitoring actions conducted over the past year

- A summary of monitoring and research activities conducted over the past year

- Results and analyses of monitoring and research data

- An assessment of the effectiveness of each mitigation measure in minimizing and compensating for project impacts
- The total number of acres planted
- The total number of acres that meet or exceed the performance standards
- Any other applicable information

6.2 Final Report

A final report will be prepared by Reclamation and submitted no later than 180 days after the completion of all mitigation measures. The final report is anticipated in 2055 and will include the following:

- All available information regarding project-related incidental take of covered species
- Information regarding other project impacts on covered species in California Endangered Species Act Incidental Take Permit No. 2081-2005-008-06
- An assessment of the effectiveness of the permit's conditions of approval for minimizing and compensating for project impacts
- Recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the covered species
- Any other pertinent information

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