Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Cibola Valley Conservation Area 2009 Annual Report

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

February 2013

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Lower Colorado River Multi-Species Conservation Program

Cibola Valley Conservation Area 2009 Annual Report

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Multi-Species Conservation Program
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Acronyms and Abbreviations

AGFD	Arizona Game and Fish Department
CVIDD	Cibola Valley Irrigation and Drainage District
CVCA	Cibola Valley Conservation Area
CVCWA	Cibola Valley Conservation and Wildlife Area
CW	Cottonwood-willow land cover type, as defined in the LCR MSCP HCP
HCP	Habitat Conservation Plan
LCR	Lower Colorado River
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
MCWA	Mohave County Water Authority
Reclamation	U.S. Bureau of Reclamation
SWFL	Southwestern Willow Flycatcher
YBCU	Yellow-billed Cuckoo

Background

In 2002, the Bureau of Reclamation (Reclamation) secured 1,309 acres of land within the Cibola Valley Irrigation and Drainage District (CVIDD) in southwestern Arizona and established the Cibola Valley Conservation Area (CVCA). In September 2007, the property was conveyed to the Arizona Game and Fish Department (AGFD) through an agreement among AGFD, Reclamation, the Mohave County Water Authority (MCWA), and The Conservation Fund. Under the agreement, AGFD retains title to the property and leases the land and water rights to Reclamation until April 5, 2055 as part of the Lower Colorado River Multi-Species Conservation Program.

In September, 2008 a Memorandum of Understanding (MOU) was signed between Reclamation and AGFD that assures availability of land and water resources for the 50-year term of the LCR MSCP. This MOU changed the name to the Cibola Valley Conservation and Wildlife Area (CVCWA). However, to maintain consistency with prior reports and documents, CVCA will continue to be used.

Large habitat restoration sites such as CVCA are developed over a number of years with restoration activities divided into phases as shown in Figure 1. The report, *Cibola Valley Conservation Area Restoration Development Plan: Overview*, provides a summary of site and projected phase implementation.

In Fiscal Year (FY) 2006, Reclamation planted Phase 1, consisting of a 22-acre native plant nursery and approximately 69 managed acres of cottonwood-willow habitat. Phase 2 was originally scheduled for implementation in early spring of FY 2007 as reported in *CVCA Restoration Development Plan: Phase 2*, but was delayed for one year to in an attempt to eradicate the invasive plant ivyleaf morning-glory's seed bank. Phase 3 consisting of 103 managed acres, was planted in FY07 as reported in *CVCA Restoration Development Plan: Phase 3*. Phase 2, a 71-acre parcel, was planted in March 2008 with approximately 160,000 coyote willow (*Salix exigua*), Goodding's willow (*Salix gooddingii*), and Fremont cottonwood (*Populus fremontii*), in accordance with the *CVCA Restoration Development Plan: Phase 2*. Phase 4, consisting of two separate locations: 58 managed acres, north of Phase 3, and 187 managed acres west of Phase 1. These two sites were planted in FY09 with approximately 25,000 honey mesquite trees and 18,000 *Atriplex* plants, in accordance with the *CVCA Restoration Development and Monitoring Plan: Phase 4*. These development plans, as well as additional information on design, planting, and monitoring of the CVCA site, is located on the LCR MSCP website at http://www.lcrmscp.gov .

This report documents the development and management of land cover types through October 2009, presents the results of monitoring, determines habitat credit, and makes recommendations for future adaptive management of lands within CVCA.

1.0 Site Information

Cottonwood-willow land cover created within CVCA will be managed for the southwestern willow flycatcher (*Empidonax traillii extimus)* (SWFL), yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (YBCU), and other species covered under the LCR MSCP. As part of habitat creation, native plant communities are established and managed to meet performance standards for integrating seral stages of vegetation, moist soil, standing water, and open areas into mosaics of riparian habitat.

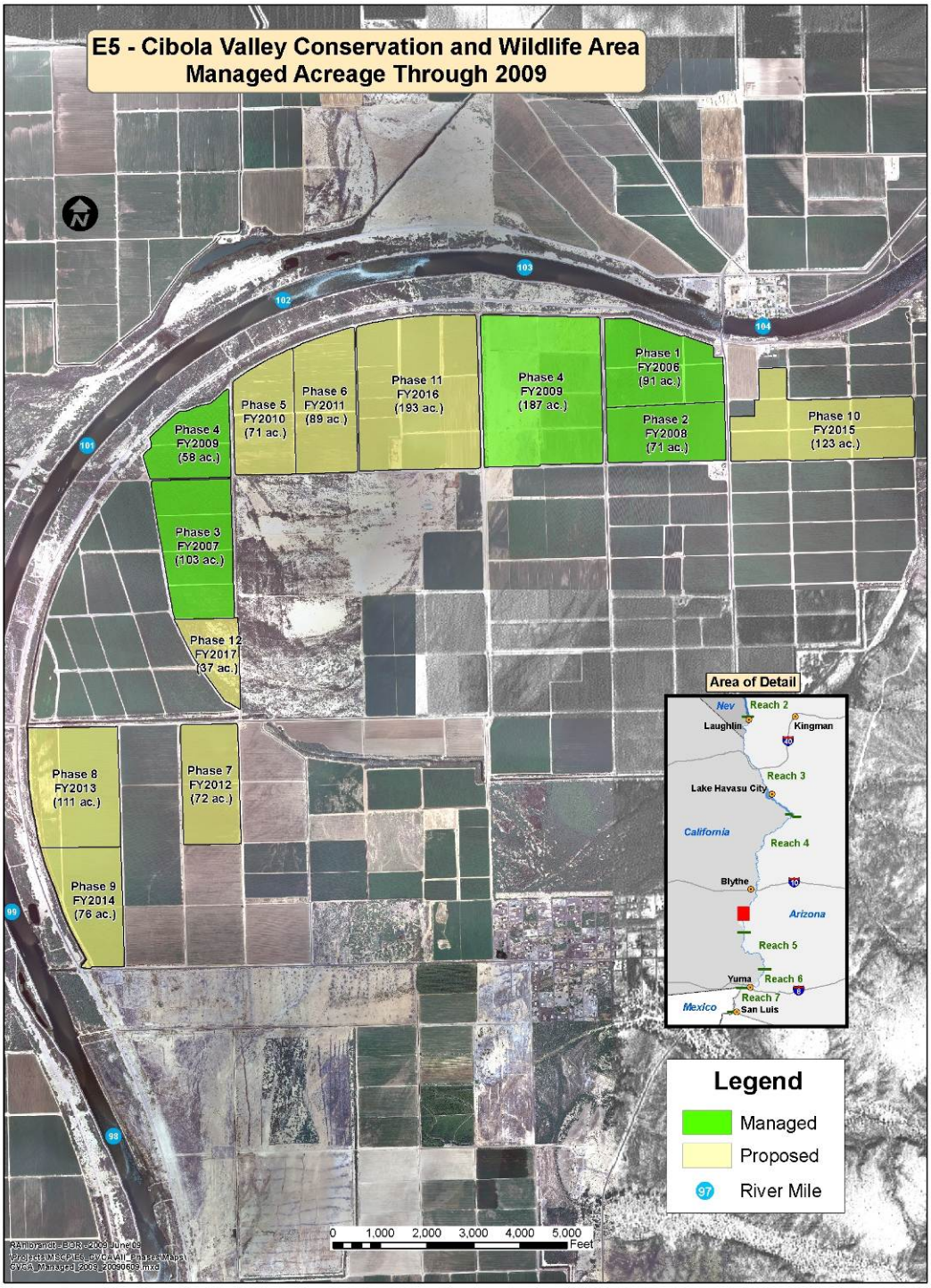

Figure 1: Current Phase Map of Cibola Valley Conservation Area.

1.1 Location

The 1,309-acre CVCA is located in southwestern La Paz County, Arizona, which is approximately 15 miles south of Blythe, California. Cibola Valley encompasses the land inside an engineered bend of the lower Colorado River and a remnant oxbow on the west side of the river (Palo Verde Oxbow). Farmed primarily for cotton and alfalfa, CVCA is bordered to the south by Cibola National Wildlife Refuge and on the east by unimproved land under the jurisdiction of the Bureau of Land Management. The river forms the north and west boundaries, except for the Palo Verde Oxbow, from river miles 98.8 to 104.9.

1.2 Land Ownership

AGFD acquired CVCA land and water rights in 2007 and 2008 through multiple agreements involving AGFD, Reclamation, MCWA, The Conservation Fund, and the Hopi Tribe. Through these agreements, AGFD acquired CVCA fee title and water entitlements, and agreed to manage the site. The entitlements are subject to an existing long-term lease of the land and water rights to Reclamation through April 5, 2055 as part of the LCR MSCP. Short-term leases of the land to farmers for crop production also exist on portions of the acquired land.

1.3 Agreements

A Land Use Agreement was signed in 2007 between Reclamation and AGFD that assures availability of land and water resources for the 50-year term of the program.

1.4 Water Availability

For the long term, 2,838 acre-feet per year diversionary right of 4th Priority Colorado River water is available. Reclamation has an option to purchase 1,300 acre-feet per year from the AGFD's entitlement and 1,419 acre-feet per year from the Hopi Tribe's entitlement. In addition, Reclamation has a 4th Priority entitlement for 118.94 acre-feet per year (Table 1).

Additionally, a 7,747 acre-feet diversionary right of combined 4th, 5th, and 6th Priority Colorado River water is currently available for lease each year from MCWA to the LCR MSCP to accommodate the higher water diversions required to establish habitat.

Table 1: Water Entitlement and Priority

Term	Entitlement	Priority
Long-Term		
Purchase option from AGFD entitlement	1,300 acre-feet/year	4th
Purchase option from Hopi Tribe entitlement	1,419 acre-feet/year	4th
Reclamation entitlement	119 acre-feet/year	4th
Long-Term Total	2,838 acre-feet/year	
Short-Term		
Multi-year lease from MCWA entitlement	5,997 acre-feet/year	4th
Multi-year lease from MCWA entitlement	750 acre-feet/year	5th
Multi-year lease from MCWA entitlement	1,000 acre-feet/year	6th
Short-Term Total	7,747 acre-feet/year	

2.0 Habitat Development

2.1 Planting

Phase 4 development of CVCA will create 245 managed acres of additional coverage of native habitat designed to mimic the historical landscape patterns of plant communities along the LCR and create an integrated mosaic of habitats. Phase 4 actually consists of two locations; one site (58 acres) is located due north of Phase 3 (Figure 2). These two sites were planted in FY09 with approximately 25,000 honey mesquite trees (*Procopis glandulosa torreyanna*) and 18,000 atriplex (*Atriplex lentiformis*). The other site consisting of 187 acres is located west of Phases 1 and 2. Approximately 80 acres (Fields E, F, and G) of this site was planted with a mix of native seeds and irrigated in an effort to eliminate blowing dust and stabilize the ground. This seed mix consisted of quail bush, needle grama, curley mesquite, desert bluebells, and desert Indian wheat. A sprinkler system was rented for 4 months to provide irrigation water for initial plant germination. This mixture requires less than 4 inches of annual rainfall to survive (Figure 3). In September, the tumbleweeds in Fields E, F, and G were mowed and shredded in an attempt to keep them from blowing. Additionally, barley seed was applied to germinate along with the native seeds, to act as a ground cover. This should prevent the tumbleweed problem in the spring of 2010.

The remaining portion of Phase 4 was planted in furrows approximately 2-feet deep with a 20-foot separation between the rows. This wide furrow spacing saves irrigation water

and provides adequate room for a tractor to disk invasive salt cedar and volunteer cotton which grows between the planted furrows.

A contracted agronomist continued taking soil samples, recommending fertilizer applications, and provided soil moisture monitoring information. The consultant conducted inspections focusing on general plant health, evidence of disease, over-irrigation, under-irrigation, water drainage, general nutrition, and insect problems. All reports were forwarded to Reclamation with recommendations for treatment.

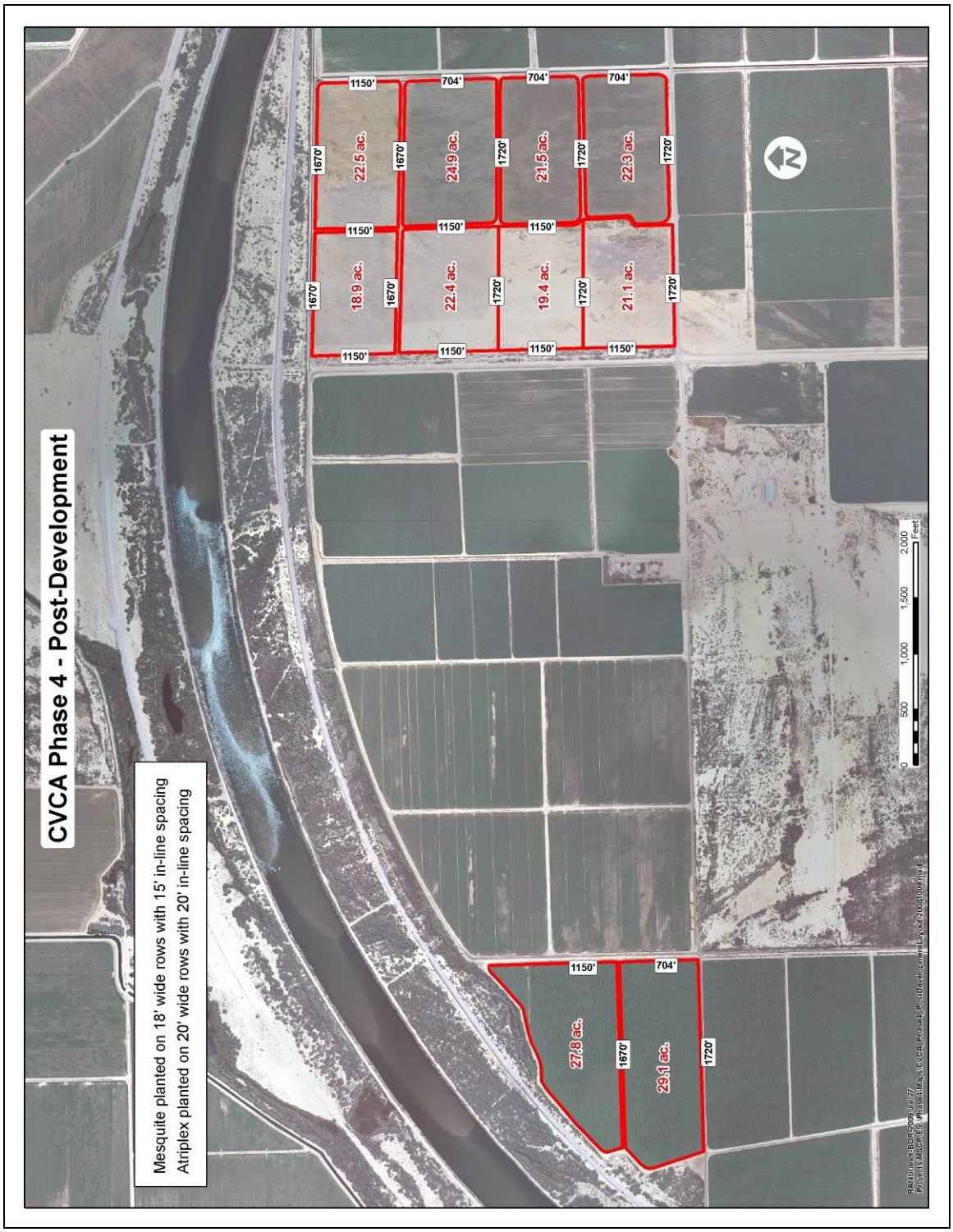

Figure 2: As-Built of Phase 4.

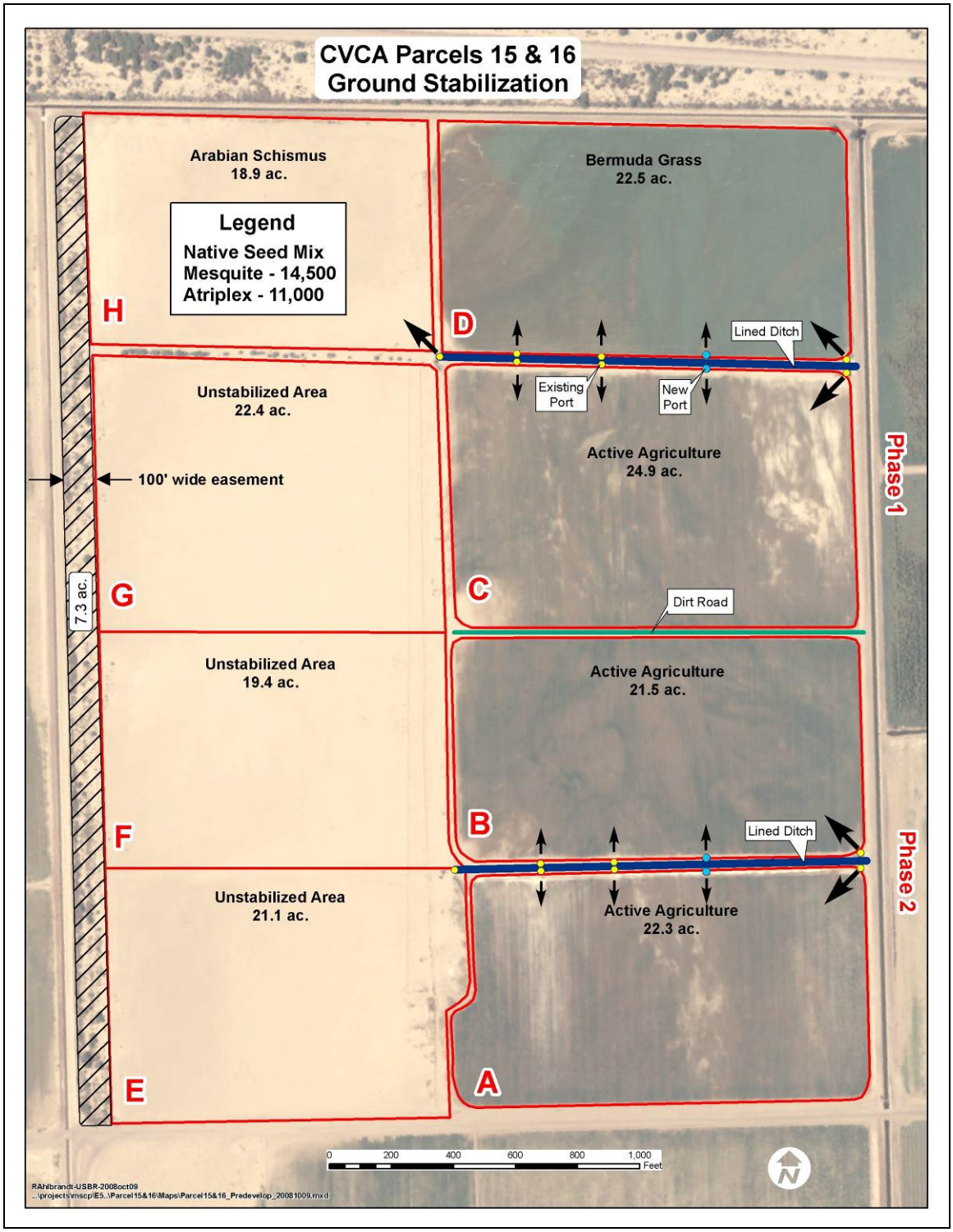

Figure 3: Phase 4 Ground Stabilization.

2.2 Irrigation

2.2.1 Method

Flood irrigation was used to provide water to each field. Irrigation amounts applied in each phase were based on monthly invoices received by CVIDD. Irrigation scheduling was determined by the contract farmer and with input from Reclamation.

2.2.2 Water Applied

Table 2 depicts the number of acre feet of water applied to each phase, by calendar year. These values are based on monthly invoices received by CVIDD.

Table 2: Irrigation Water Applied from 2006 to 2009.

	2006	2007			2008			
	Phase 1	Phase 1	Phase 2	Phase 3	Phase 1	Phase 2	Phase 3	Phase 4
	91 acres	91 acres	71 acres	103acres	91 acres	71 acres	103acres	58 acres
	af applied *	af applied *	af applied *	af applied *	af applied *	af applied *	af applied *	af applied *
March	0.00	96.40	0.00	145.16	94.76	53.84	102.07	0.00
April	111.11	82.11	15.99	91.59	53.02	71.18	12.38	0.00
May	80.93	75.42	28.91	76.33	157.45	17.80	160.97	36.49
June	146.07	87.62	25.01	110.47	157.54	66.93	86.17	0.00
July	151.84	152.75	31.71	125.92	232.15	38.48	91.41	33.60
August	141.46	120.23	57.90	113.27	172.53	51.85	136.85	0.00
September	147.78	195.02	0.00	152.39	106.23	37.49	80.03	0.00
October	84.10	26.38	0.00	9.39	3.70	0.00	39.29	0.00
November	31.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
af / year	**894.72**	**835.93**	**159.52**	**824.52**	**977.37**	**337.56**	**709.18**	**70.10**
Af / acre of phase	**9.83**	**9.19**	**2.25**	**8.01**	**10.74**	**4.75**	**6.89**	**1.21**

*af applied – represents the quantity of acre feet of irrigation water in acre feet applied to each phase.

Table 2 cont.

	2009				
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 4 (Ground Stabilization)
	91 acres	71 acres	103acres	58 acres	187 acres
	af applied *	af applied *	af applied *	af applied *	af applied *
March	99.00	24.84	85.81	24.84	106.95
April	73.98	15.99	5.96	27.46	34.42
May	152.30	33.24	156.63	17.61	150.40
June	162.77	61.70	80.30	24.84	38.84
July	101.71	42.18	128.90	34.78	182.50
August	131.79	42.18	73.08	23.58	98.55
September	102.98	0.00	99.90	34.05	146.88
October	0.00	30.17	0.00	0.00	0.00
November	0.00	0.00	0.00	0.00	0.00
af / year	**824.53**	**250.30**	**630.32**	**187.16**	**758.54**
Af / acre of phase	**9.06**	**3.53**	**6.12**	**3.23**	**4.06**

The amount of water applied to the individual fields of Phase 1 and 2 during 2008 and 2009 is an approximation. During 2008 the irrigation system was modified, and it was difficult of to measure the exact volume of water delivered to each of the adjacent fields. When calculating the volume of water applied to each Phase during 2008 and 2009, it is most accurate to combine the volumes delivered to Phases 1 and 2, as exactly how much water reached the individual phases is unknown.

In summary, all phases are requiring less irrigation than in 2008. Both plantings in Phase 4 used up to 4 acre-feet of water, as estimated.

2.3 Site Maintenance

There were no major improvements to this site with the exception of scheduled field maintenance. However, over the life of the program, additional site improvements are likely.

2.4 Management of Existing Land Cover

Ivyleaf morning-glory was present again in the fields of Phases 1, 2, and, to a smaller degree, Phase 3. The incursion was not as widespread as in the previous year. In an attempt to control the morning-glory, a trial application of Harrell's granular herbicide 75 was aerially applied in field B-2 (5 acres) in Phase 1 and Fields 2-5 (6.5 acres) in Phase 2 (Figure 3). The manufacturer recommended two separate applications on each field. The two treatments did not noticeably affect the morning-glory's growth.

Figure 4. Aerial View of Phase 1 & 2 Harrell's Application.

Field crews continued to control morning-glory, volunteer cotton, and saltcedar with hand tools. This method of using crews proves to be an effective method of controlling invasives as they germinate. The crews remove these weeds and other invasives from the fields twice a year, in the spring and in the fall.

3.0 Monitoring

3.1 Vegetation

Vegetation monitoring data were collected within several parameters to capture vegetation composition and structure from the ground layer to the canopy layer. The following data were summarized across each site. Table 3 lists the percent of total vegetation per meter layer. The high percentage of vegetation at meter 1 and 2 is reflective of the ground cover at the foliage height diversity sampling points. Table 4 shows ranges and means of height and DBH for plants within the overstory tree and intermediate tree and shrub categories. Table 5 lists percent of ground cover by species. Ground cover data were gathered on herbaceous plants and small shrubs only. Table 6 shows average total abundance of target tree species per plot and per acre at each site/phase. Abundance was calculated from plots containing trees within each respective category (overstory, intermediate and shrub, DBH classes 1-4) and then added together to get the values shown in table 6. Table 7 shows mean percent crown closure at each phase. The number of observations for each site refers to the number of readings at al plots across each phase.

Table 3. Foliage height diversity at Cibola Valley Conservation Area. Percent total vegetation and standard deviation per meter layer are presented.

Foliage Ht Diversity											
Site/Phase	Meter	% (SD)	Site/Phase	Meter	% (SD)	Site/Phase	Meter	% (SD)	Site/Phase	Meter	% (SD)
CVCA 1	1	16.2 (0.13)	CVCA 2	1	18.0 (0.09)	CVCA 3	1	23.8 (0.06)	CVCA 4	1	99.2 (0.01)
CVCA 1	2	5.6 (0.01)	CVCA 2	2	15.2 (0.01)	CVCA 3	2	13.3 (0.01)	CVCA 4	2	2.3 (n/a)
CVCA 1	3	8.5 (0.03)	CVCA 2	3	18.9 (0.02)	CVCA 3	3	17.9 (0.01)			
CVCA 1	4	11.5 (0.05)	CVCA 2	4	18.1 (0.01)	CVCA 3	4	18.6 (0.04)			
CVCA 1	5	11.9 (0.06)	CVCA 2	5	11.1 (0.03)	CVCA 3	5	12.5 (0.02)			
CVCA 1	6	14.1 (0.01)	CVCA 2	6	8.9 (0.02)	CVCA 3	6	9.3 (0.04)			
CVCA 1	7	13.6 (0.01)	CVCA 2	7	6.4 (0.01)	CVCA 3	7	5.2 (0.04)			
CVCA 1	8	8.0 (0.04)	CVCA 2	8	2.7 (0.01)	CVCA 3	8	1.7 (0)			
CVCA 1	9	5.9 (0.01)	CVCA 2	9	1.0 (0.01)						
CVCA 1	10	1.6 (0.01)	CVCA 2	10	0.4 (0)						
CVCA 1	11	4.1 (0.04)									
CVCA 1	12	4.5 (0.06)									
CVCA 1	13	2.8 (0.03)									

Table 4. Cibola Valley Conservation Area overstory tree heights (m), intermediate tree and shrub heights (m), and diameter breast heights (cm); means plus standard deviations are presented.

	Overstory [a]				Intermediate [b]			
Site/Phase	Ht (Range-m)	Mean (SD)	DBH (Range-cm)	Mean (SD)	Ht (Range-m)	Mean (SD)	DBH (Range-cm)	Mean (SD)
CVCA 1	0.00 -13.49	5.45 (6.10)	0.00 - 16.43	7.49 (8.06)	8.70-13.00	10.43 (1.52)	8.10-12.50	9.59 (1.40)
CVCA 2	a	a	a	a	1.60-10.50	6.69 (3.00)	8.00-12.25	9.16 (1.04)
CVCA 3	0.00 - 10.67	1.47 (3.95)	0.00 - 15.63	2.13 (5.43)	1.70-10.10	6.64 (3.63)	8.10-10.00	9.09 (0.67)
CVCA 4	a	a	a	a	1.40-1.80	1.60 (0.16)	b	b

[a] Denotes phases with no trees meeting the overstory size requirement (≥ 12.7cm DBH)
[b] Shrub layer vegetation limited to big saltbush; no DBH data were collected because of growth habitat

Table 5. Average percent ground cover by species at Cibola Valley Conservation Area.

Site/Phase	Species	% (SD)
CVCA 1	*Conyza canadensis*	11.00 (n/a)
CVCA 1	*Cynodon dactylon*	42.77 (3.96)
CVCA 1	*Cyperus rotundus*	7.00 (n/a)
CVCA 1	*Ipomea hederocea*	2.00 (n/a)
CVCA 1	*Ipomea purpurea*	11.70 (1.67)
CVCA 1	*Medicago sativa*	11.67 (1.28)
CVCA 2	*Amaranthus palmeri*	2.00 (n/a)
CVCA 2	*Conyza canadensis*	16.13 (2.33)
CVCA 2	*Cynodon dactylon*	29.57 (2.89)
CVCA 2	*Cyperus esculentus*	8.50 (1.10)
CVCA 2	*Cyperus rotundus*	11.00 (0.99)
CVCA 2	*Echinochloa colona*	12.82 (1.39)
CVCA 2	*Ipomea hederocea*	1.00 (n/a)
CVCA 2	*Ipomea purpurea*	16.12 (2.44)
CVCA 2	*Leptochloa uninervia*	4.00 (n/a)
CVCA 2	*Medicago sativa*	6.57(0.50)
CVCA 3	*Conyza canadensis*	24.88 (3.11)
CVCA 3	*Cynodon dactylon*	29.40 (3.55)
CVCA 3	*Cyperus rotundus*	66.61 (3.71)
CVCA 3	*Echinochloa colona*	2.67 (0.21)
CVCA 3	*Ipomea purpurea*	12.57 (1.68)
CVCA 3	*Leptochloa uninervia*	4.50 (0.21)
CVCA 4E	*Amaranthus palmeri*	8.40 (0.78)
CVCA 4E	*Bouteloua barbata*	9.50 (0.97)
CVCA 4E	*Conyza canadensis*	1.60 (0.09)
CVCA 4E	*Gossypium sp.*	3.00 (0.38)
CVCA 4E	*Cynodon dactylon*	49.94 (4.40)
CVCA 4E	*Cyperus rotundus*	5.81 (0.28)
CVCA 4E	*Echinochloa colona*	7.33 (0.34)
CVCA 4E	*Heliotropium curassavicum*	13.17 (1.05)
CVCA 4E	*Helianthus annuus*	10.00 (n/a)
CVCA 4E	*Ipomea purpurea*	17.50 (1.06)
CVCA 4E	*Kochia sp.*	4.00 (0.27)
CVCA 4E	*Leptochloa uninervia*	12.22 (1.17)
CVCA 4E	*Medicago sativa*	2.00 (n/a)
CVCA 4E	Unk. succulent	1.0 (n/a)
CVCA 4W	*Cyperus rotundus*	28.96 (3.10)
CVCA 4W	*Echinochloa colona*	14.18 (1.78)
CVCA 4W	*Ipomea purpurea*	16.93 (1.28)
CVCA 4W	*Leptochloa uninervia*	8.17 (0.66)

Table 6. Average total abundance of target tree species per plot and per acre at each site/phase.

Abundance- number of trees										
	Populus fremontii		*Salix gooddingii*		*Salix exigua*		*Prosopis glandulosa*		*Prosopis pubescens*	
Site	Plot	Acre	Plot	Acre	Plot	Acre	Plot	Acre	Plot	Acre
CVCA1	25.17	1169.01	29.00	1405.00	106.30	5633.90	-	-	-	-
CVCA2	13.93	738.29	17.65	935.45	37.79	2002.87	-	-	-	-
CVCA3	38.75	1938.25	36.83	662.50	133.75	7088.75	4.00	212.00	-	-
CVCA4	-	-	-	-	-	-	6.52	345.56	-	-

Table 7. Mean percent crown closure by site.

Site	Number of observations*	Mean % crown closure (SD)
CVCA1	72	88.87 (27.12)
CVCA2	180	80.67 (31.60)
CVCA3	126	70.81 (38.83)
CVCA4	252	0.00

* Number of observations for each site refers to the number of readings at each plot across the site.

3.2 MacNeill's Sootywing

Four plots at CVCA totaling 162 acres were sampled for sootywings. Sootywings were most abundant in the 58-acre plot at CVCA Phase 4 planted in March 2009, with greater than 200 adults counted during September along a dirt road bisecting the plot. Sootywings also were abundant at the detached 90-acre Phase 4 plot. An 8-acre plot at CVCA Phase 2 supported low abundances of sootwings along the west edge where rainfall collected from an adjacent dirt road. A 6-acre CVCA Phase 3 plot was devoid of sootywings. The deep-furrow irrigation used at CVCA Phase 4 appears very effective in growing suitable *Atriplex lentiformis* host plants and other plants that provide adults with nectar. We suggest deep furrows should be used at all future plots constructed for MacNeill's sootywings.

3.3 Small Mammals

Phases 2 and 3 of CVCA were trapped in 2009. No *Sigmodon* were captured within CVCA; however, the species continues to maintain populations nearby.

3.4 Bats

Acoustic and capture survey methods were used to monitor bats.

3.4.1 Acoustic Surveys

Anabat bat detectors were deployed across the site quarterly to determine bat activity across habitat types. A total of 35 detector nights were completed in five monitoring sites in 2009. Bat activity is expressed in call minutes which indicates that a given species is present if it is recorded at least once within a 1-minute period. Table 8 lists the total number of call minutes of MSCP species for each year compared to all other species for each sample combined across three years of sampling. A dramatic increase in western red bat (*Lasiurus blossevillii*) activity occurred in 2009. Acoustic surveys will continue in 2010. For more details of how this data is collected and analyzed see the report, *Post-Development Bat Monitoring of Habitat Creation Areas along the Lower Colorado River – 2009 Acoustic Surveys*.

Table 8. Total number of call minutes recorded for FY07 through FY09.

Species	FY07	FY08	FY09	All Years
Western Red Bat	4	0	91	95
Western Yellow Bat	0	0	3	3
California Leaf-Nosed Bat	36	17	14	67
Townsend's Big-Eared Bat	1	0	1	2
All other species	758	629	1672	3059
Total call minutes	799	646	1781	3226

3.4.2 Capture Surveys

This was the first year of bat capture surveys at CVCA. A combination of mist-nets and harp traps were deployed one night each month from May to September. Table 9 shows the captures of MSCP species compared to all other species across all surveys. The western red bats were captured during the August and September surveys, indicating they were possible migrants. The western yellow bats (*Lasiurus xanthinus*) were all captured during the August survey, indicating a probable migration pulse. Bat capture surveys will continue in 2010. See *Post-Development Bat Monitoring of Habitat Creation Areas along the Lower Colorado River – 2009 Capture Surveys* for a more detailed account of the bat capture surveys and methods.

Table 9. Total captures for 2009. N = number of survey nights.

Species	FY09 N = 5
Western Red Bat	3
Western Yellow Bat	5
California Leaf-Nosed Bat	1
Townsend's Big-Eared Bat	0
All other species	112
Total	121

3.5 Avian Species

Sonoran yellow warblers were confirmed breeding. One willow flycatcher was detected on 27 May 2009 at CVCA Phase 1. One willow flycatcher was detected on 16 May 2009, one on 27 May 2009 and two on 10 June 2009 at CVCA Phase 3 (Table 10).

Table 10. LCR MSCP Avian Species Detected at CVCA, 2009.

LCR MSCP-covered Species Detected	Number of Confirmed Breeding Pairs
willow flycatcher	0
yellow-billed cuckoo	2
Sonoran yellow warbler	3.5

4.0 Established Land Cover & Habitat Credit

The process for Habitat Credit has not been finalized. Once the process is finalized, information in this section will be used to establish credit.

The land cover for Phase 1 is cottonwood-willow III, as defined by Anderson and Ohmart (1976, 1984). The cottonwood-willow III structure type is described as having one layer of vegetation with the bulk of the volume between 2 m and 6 m (6.5-20 ft) tall. Phase 2 and Phase 3 land cover classification is cottonwood-willow VI, as defined by Anderson and Ohmart (1976, 1984). The cottonwood-willow VI structure type is described as having one layer of vegetation with the bulk of the volume between 0 and 2 m (0-6.5 ft) tall.

5.0 Adaptive Management Recommendations

5.1 General

Specific management methods, techniques, and/or agreements will be addressed in each phase-specific management plan. These management plans will include elements such as habitat objectives, monitoring requirements, land cover type management, targeted covered species habitat management, infrastructure maintenance, and water management, wildfire management, noxious weed control, and pesticide use. Specific land cover type management activities will be further developed for each phase as the vegetation approaches a stage that indicates it is successfully established.

It is assumed that successful creation of the cottonwood-willow land cover type requires that the physical processes which determine habitat structure and dynamics in riparian systems be mimicked as much as possible. As a part of the implementation program for Phases 1, 2, 3, and 4, specific habitat objectives, design, and management criteria are in the process of being refined. The elements considered for 2010 planting of Phase 5 include, but are not limited to the following:

- The ground will be prepared for planting by disking, laser leveling, and creating furrows in preparation for hand planting of 1-gallon potted mesquites.
- Smaller *Atriplex* plants will also be hand-planted between the mesquite.
- *Atriplex* will be planted in furrows with a plant in-line spacing of 15 feet and a furrow row spacing of 18 feet wide.
- This wide furrow spacing saves irrigation water and allows for a tractor to disk invasive saltcedar, weeds, and volunteer cotton that grow between the planted furrows. A cover crop will not be applied.
- A consultant will be used to take soil samples, recommend irrigation schedules and fertilizer applications. During the growing season, the consultant will track plant vigor by sampling and analyzing plant tissue for nitrogen levels and other nutrients as necessary.

5.2 Operations and Maintenance

There was no scheduled irrigation canal repair work or road work completed. Future work is anticipated to maintain irrigation canals and to repair service roads.

5.3 Management of Existing Habitat/Vegetation

The first year is primarily dedicated to allowing the young transplants to grow and mature as fast as possible. Through the adaptive management process, certain parameters will be

systematically adjusted to produce ideal cottonwood-willow habitat. Some of these parameters include:

- Monitoring the irrigation regime in order to determine the required amount of irrigation water.
- Controlling unexpected invasive infestations, whether it is insects, bacteria, or morning-glory, by use of mechanical or chemical applications.

5.4 Soil Management

Soil characteristics and textures will continue to be sampled and analyzed at least annually or as required.

5.5 Water Management

Irrigation water will continue to be applied as determined by Reclamation or contracted crop consultants. Monitoring soil moisture and other site conditions will provide the data necessary to determine an appropriate irrigation schedule

5.6 Wildfire Management

As guided by commitments in the HCP, wildfire management practices on CVCA would:

- Reduce the risk of the loss of created habitat to wildfire by providing resources to suppress wildfires (e.g., contributing to and integrating with local, state, and Federal agency fire management plans).
- Incorporate designs to contain wildfire and facilitate rapid response to suppress fires (e.g., fire management plans would be an element of each conservation area management plan).
- Implement land management and habitat creation measures to support the reestablishment of native vegetation that is lost to wildfire.

Specific agreements and/or methods will be addressed in each phase-specific design and management plan.

5.7 Law Enforcement

After the property is secured for the life of the program, appropriate agencies will patrol CVCA regularly by land and river to enforce all applicable laws. Specific agreements and/or methods have not been finalized at this time. However, wildfire management practices on CVCA would:

- Reduce the risk of the loss of created habitat to wildfire by providing resources to suppress wildfires (e.g., contributing to and integrating with local, State, and Federal agency fire management plans).
- Incorporate designs to contain wildfire and facilitate rapid response to suppress fires (e.g., fire management plans would be an element of each conservation area management plan).
- Implement land management and habitat creation measures to support the reestablishment of native vegetation that is lost to wildfire.

5.8 Public Use

No recommendations needed.

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