

# Lower Colorado River Multi-Species Conservation Program



*Balancing Resource Use and Conservation*

## LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PROGRAM



Final Implementation Report, FY20 Work Plan and Budget, FY18 Accomplishment Report





# Lower Colorado River Multi-Species Conservation Program

*Balancing Resource Use and Conservation*

## LCR MSCP FY18 Overview Funding Summary

FY18 Total Required Funding	FY18 Approved Estimate	FY18 Actual Obligations	Cumulative Program Accomplishment
\$31,251,240.00	\$33,496,740.00	\$24,858,154.65	\$298,057,688.71





# Lower Colorado River Multi-Species Conservation Program

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## FY18 Program Element Accomplishment

Program Administration	\$ 1,288,045.42	( 5%)
Fish Augmentation	\$ 2,215,957.29	( 9%)
Species Research	\$ 1,952,659.00	( 8%)
System Monitoring	\$ 2,384,354.44	(10%)
Conservation Area D&M	\$ 11,373,971.55	(46%)
Post Development Monitoring	\$ 2,622,192.79	(10%)
AMP	\$ 1,756,856.33	( 7%)
Remedial Measure Fund	\$ 1,122,360.00	( 4%)
Public Outreach	\$ 141,757.83	( 1%)
<b>TOTAL</b>	<b>\$ 24,858,154.65</b>	





# Lower Colorado River Multi-Species Conservation Program

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## FY18 Financial Accomplishments

- Obligations under approved Work Tasks by \$8,638,586
  - Planet Ranch delayed to complete compliance
  - IPCA canal work delayed
  - Delay in securing the Dennis Underwood Conservation Area until FY19
- Status of Special Funds
  - HMF: Cumulative Total through FY18 = \$34,285,574.82
  - RMF: \$1,122,360.00 FY18 payment
    - Cumulative Total through FY18 = \$7,542,121.16
  - LWF: \$0 contributed in FY18
    - Cumulative Total through FY18 = \$15,400,000

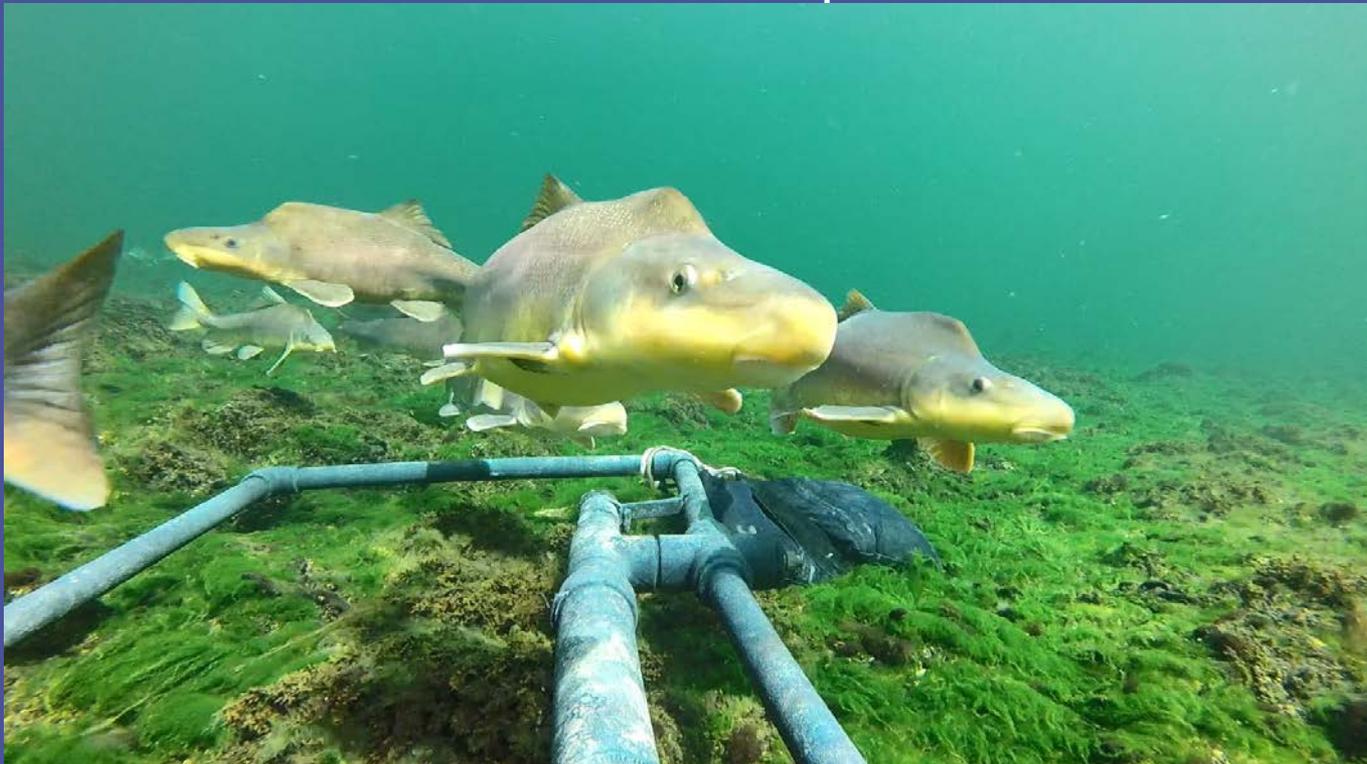




# Lower Colorado River Multi-Species Conservation Program

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## FY18 Fisheries Accomplishments



Razorback sucker contacted via remote PIT scanning (Reach 2)





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## FY18 Larvae Collection and Fish Augmentation

Larvae collected from Lake Mohave: **30,604**

Reach 2 (RASU 5): 3,107 RASU > 300 mm

Reach 3 (RASU 3): 6,471 RASU > 300 mm

Reaches 4/5 (RASU 3): 6,266 RASU > 305 mm

Total FY18 RASU (credited): **12,737**

Reach 2 (BONY 3): 513 BONY > 300 mm

Reach 3 (BONY 3): 4,061 BONY > 300 mm

Reaches 4/5 (BONY 3): 8,039 BONY > 305 mm

Total FY18 BONY (credited): **12,613**



Razorback sucker larvae attracted to submerged light





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## Fish Augmentation Summary FY05-18

SPECIES	LAKE MOHAVE	DAVIS-PARKER	BELOW PARKER	GRAND TOTAL	AUGMENTATION TOTAL
RAZORBACK SUCKER	126,016*	94,086	99,177	319,279	193,263
BONYTAIL	2,110	59,039	39,112	100,261	100,261
TOTAL	126,016*	153,125	138,289	417,430	291,414





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## FY18 Fisheries Research

### C31: Razorback Sucker Genetic Diversity Assessment

- Reach 1 – 54 adults and 310 larvae were analyzed. The Lake Mead adult population exhibited lower levels of genetic diversity than other river reaches
- Reach 2 – 209 adults and 664 larvae were analyzed. Levels of genetic diversity are still similar to the historic population (wild adults from the 1980s)
- Reach 3 – 51 adults and 327 larvae were analyzed. Larvae exhibited similar or higher levels of allelic and gene diversity than Lake Mohave

### C40: Genetic and Demographic Studies to Inform Conservation Management in Off-Channel Habitats

- BONY successfully spawned in the Imperial ponds. Genetic analyses of larvae and juvenile fish indicated that adult genetic diversity was preserved in progeny
- 300 candidate single nucleotide polymorphic (SNP) markers were identified for razorback sucker population genomics and parentage analysis
- Male-specific markers (n=3) for razorback suckers were evaluated and found in 81% of males sampled





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### C53: Sonic Telemetry of Juvenile Flannelmouth Suckers in Reach 3

- Open water and vegetative cover appear to be important habitat components for flannelmouth
- Juvenile flannelmouth suckers were most often observed utilizing open water areas in backwater and river channel habitats at night, and occupying stands of emergent vegetation during daylight hours
- These observations will be used to inform habitat creation in Reach 3





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### C59: Selenium Monitoring in Created Backwater and Marsh Habitats

- Fish, invertebrate, sediment, and water samples were collected from the BBCA, Hart Mine Marsh, IPCA, and McAllister Lake for selenium analysis
- Analyses of FY18 samples are pending

### C63: Evaluation of Habitat Features that May Influence Success of Razorback Suckers and Bonytail

- Research focused on evaluating survival in the presence of predators and different habitat structures
- Bonytail had higher survival when artificial vegetation and habitat structures were available
- Razorback sucker survival was similar for each habitat type tested





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C64: Post-Stocking Movement, Distribution, and Habitat Use of Razorback Suckers and Bonytail

Reach 2 -

- Active and passive contacts suggested that post-stocking survival of sonic-tagged bonytail was lower than sonic-tagged razorback suckers in Lake Mohave

Reach 3 -

- Passive integrated transponder (PIT) scanning in Topock Marsh contacted 233 razorback suckers and 2 bonytail
- Long-term presence of razorback suckers in Topock Marsh (151 razorback suckers present for 8 years) prompted a stocking of 20 sonic-tagged bonytail to evaluate their survival and habitat use in the marsh

Reach 4/5 -

- Eighteen subadult bonytail, 18 subadult razorback suckers, and 10 adult razorback suckers were sonic tagged and released downstream of Palo Verde Dam.





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C65: Evaluation of Immediate Post-Stocking Survival of Razorback Suckers and Bonytail

- Predation of native fish by avian predators was monitored for 10 days following selected stocking events
- ~3% of bonytail stocked in Laughlin Lagoon in December were consumed by avian predators
- Predation by striped and largemouth bass was also observed





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## FY18 Fisheries Monitoring

D8: Razorback Sucker and Bonytail Stock Assessment

Reach 1 -

- 64 razorback suckers were captured by trammel net during the spawning season
- 100 razorback suckers were contacted by remote PIT scanning (89 of these fish were not captured in trammel nets)
- The current Lake Mead razorback sucker population estimate is 360 individuals

Reach 2 -

- 37,903 hours of remote PIT scanning resulted in contacting 3,835 unique razorback suckers
- The current Lake Mohave RASU population estimate is 3,471 individuals

Reach 3 -

- 3,371 razorback suckers, 225 bonytail, and 9 flannelmouth suckers were contacted by multiple methods
- The current Reach 3 razorback sucker population estimate is 3,803 individuals

Reach 4 and 5 -

- 1,234 razorback suckers and 535 bonytail were contacted using multiple methods





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## FY18 Fisheries Monitoring

### F5: Post-Development Monitoring of Fishes at Conservation Areas

#### Big Bend Conservation Area

- One bonytail and 13 razorback suckers were captured during routine netting
- 10 bonytail and 80 razorback suckers were contacted via remote PIT scanning
- Flannelmouth and razorback sucker larvae were captured within the conservation area
- Water quality was monitored throughout the year and all parameters remained within suitable ranges for native fish

#### Imperial Ponds

- 64% of razorback sucker adults stocked in December 2016 were contacted in September 2018
- 22% of bonytail adults stocked in December 2016 were contacted in September 2018
- Juvenile bonytail (recruits) were captured in each of the bonytail ponds, and
- A single razorback sucker juvenile was also captured





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FY18 Wildlife Accomplishments





# Lower Colorado River Multi-Species Conservation Program

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## Species Research

3 research projects focused on 5 species

- C24 - develop effective survey methods for **elf owls** and identify some of their riparian habitat characteristics
- C66 – Identify the range of water depth fluctuations in **California black rail** and **Yuma clapper rail** breeding sites to refine marsh management methods.
- C2 – Contribute \$10,000 a year to a conservation program for **threecorner milkvetch** and **sticky buckwheat**.

The following research projects were closed in FY18:

- C24: Avian Species Habitat Requirements
- C66: Marsh Bird Water Depth Analysis





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## System Monitoring

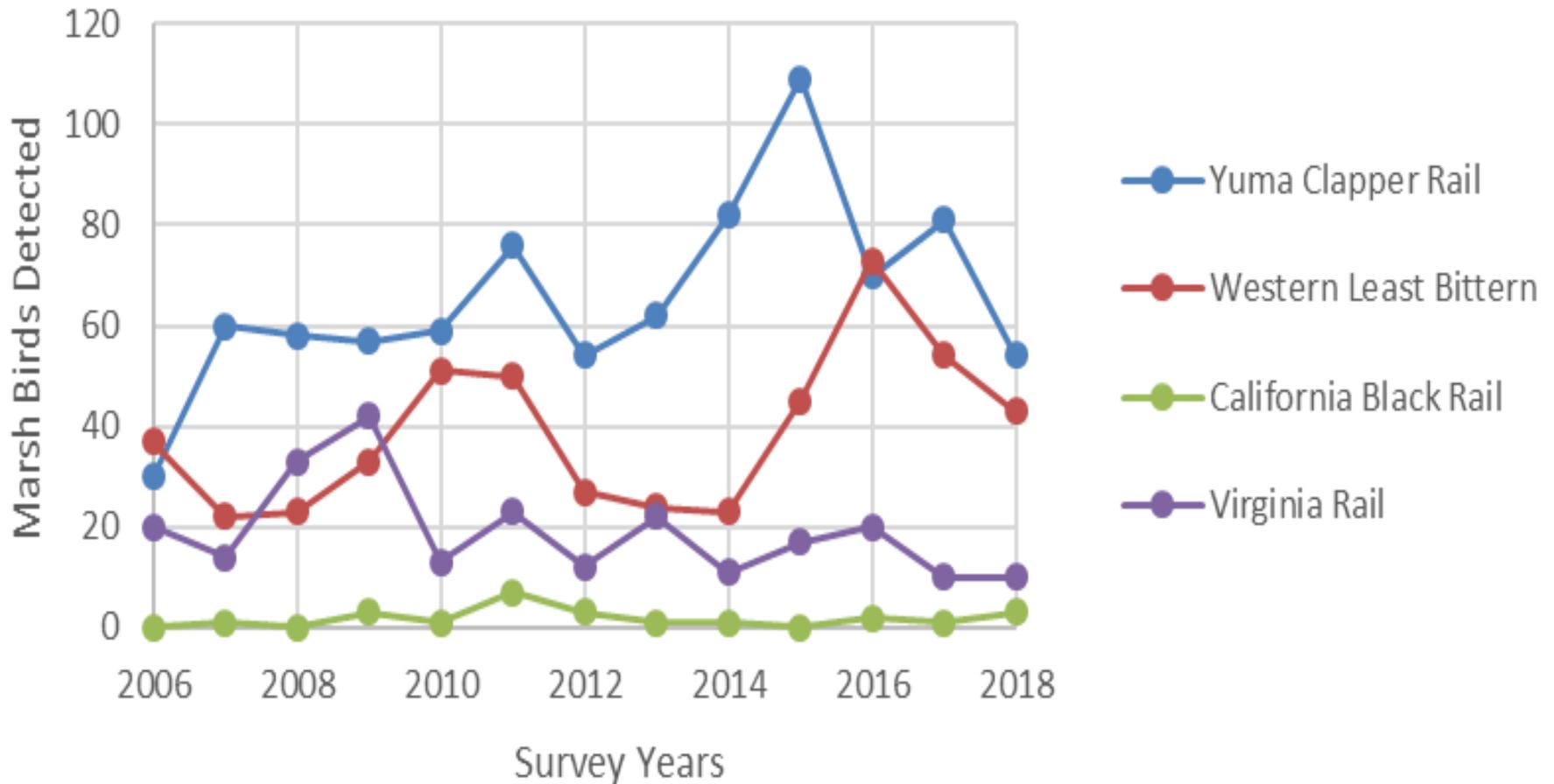
System-wide monitoring continued along the LCR and adjacent river systems for:

- marsh birds
- southwestern willow flycatcher
- gilded flicker
- bats
- rodents



# System Monitoring Highlights

## Marsh Bird Survey Results in Topock Gorge, 2006-18





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- **Southwestern willow flycatcher** - 124 flycatchers from 72 territories were recorded at Topock Marsh, Bill Williams River, and Alamo Lake, Arizona.
- Bats - Acoustic monitoring continued at Havasu NWR, Bill Williams River NWR, Cibola NWR Island Unit, Mittry Lake, and Picacho State Recreation Area
  - **western red bats** were detected at all sites
  - **western yellow bats** were detected at all but Picacho
  - **California leaf-nosed bats** were recorded at all but Havasu



14 **yellow-billed cuckoos** at PVER fitted with lightweight GPS tags in 2014 and 2015. The recovered GPS tags recorded 33 locations.

- Yellow-billed cuckoos that breed on the LCR follow a loop migration pattern
  - Fly south along the Pacific coast through Mexico and Central America
  - Winter in the Gran Chaco forest of central South America which spans eastern Bolivia, western Paraguay, northern Argentina, and a portion of the Brazilian states of Mato Grosso and Mato Grosso do Sul
  - Return in the spring along a more easterly route through Yucatan, Coahuila and Chihuahua, Mexico.



- The GPS points also give us insights about risks they may face each year. The birds stopped to forage and rest during migration.
  - 33% of recorded locations fell within conservation areas such as biosphere reserves, national parks, and wildlife refuges
  - 67% recorded locations were on private land outside formal protection.





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## Post-Development Monitoring

Conservation Area	Count of LCR MSCP Terrestrial Species Detected (FY05-FY18)
Beal Lake Conservation Area	19
Big Bend Conservation Area	7
Cibola NWR Unit #1 Conservation Area	12
Cibola Valley Conservation Area	11
Hart Mine Marsh	6
Hunters Hole	7
Imperial Ponds Conservation Area	5
Laguna Division Conservation Area	8
Palo Verde Ecological Reserve	13
Planet Ranch	11
Pretty Water Conservation Area	4
Yuma East Wetlands	13



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## Listed Species Highlights:

- **Yuma clapper rails** were detected at Hart Mine Marsh (25 detections Apr 26), and Yuma East Wetlands (5 detections Apr 10 and Apr 25), as well as marsh areas of Beal Lake Conservation Area and Laguna Division Conservation Area.





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## Listed Species Highlights:

- **Yellow-billed cuckoo** - 35 confirmed territories, 11 probable territories and 26 possible territories and 24 confirmed nests at LCR MSCP conservation areas
  - First nest confirmed at Yuma East Wetlands
  - First detection at Hunters Hole
  - 62% of detections were at PVER - 26 confirmed territories, 8 probable territories and 17 possible territories and 18 nests
  - Nests: CVCA (2), Cibola NWR Unit #1 (3), Yuma East Wetlands (1)
  - Confirmed territories: Beal Lake Conservation Area (1), CVCA (2), Cibola NWR Unit #1 (5) and Yuma East Wetlands (1)





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## Other Species Highlights:

	Beal Lake Conservation Area	Cibola NWR Unit #1	Cibola Valley Conservation Area	Laguna Division Conservation Area	Middle Bill Williams River NWR	Palo Verde Ecological Reserve	Parker Dam Camp	Pretty Water Conservation Area	Yuma East Wetlands
Arizona Bell's vireo	Breeding		Breeding	Breeding	Breeding	*		*	*
Gila woodpecker			*	Breeding	Breeding		Breeding	*	Breeding
Sonoran yellow warbler	Breeding	*	*	Breeding	Breeding	Breeding		*	Breeding
summer tanager			*		Breeding	Breeding			

\* Detected but breeding behavior was not observed during the survey visits





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## Other Species Highlights:

- **Yuma hispid cotton rats** continue to be detected at YEW and Hunters Hole.
- **Colorado River cotton rats** were captured at Hart Mine Marsh for the first time and at PVER
- **MacNeill's sootywing skippers** continue to be detected at conservation areas containing quailbush
- **Western red bats** and **western yellow bats** were detected at BLCA, the PVER, the CVCA, Cibola NWR Unit #1, YEW, and Hunters Hole





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FY18 Restoration Accomplishments (\$11,373,972 or 46%)

- Conservation Area Development
- Conservation Area Expansion
- Proposed new Conservation Areas





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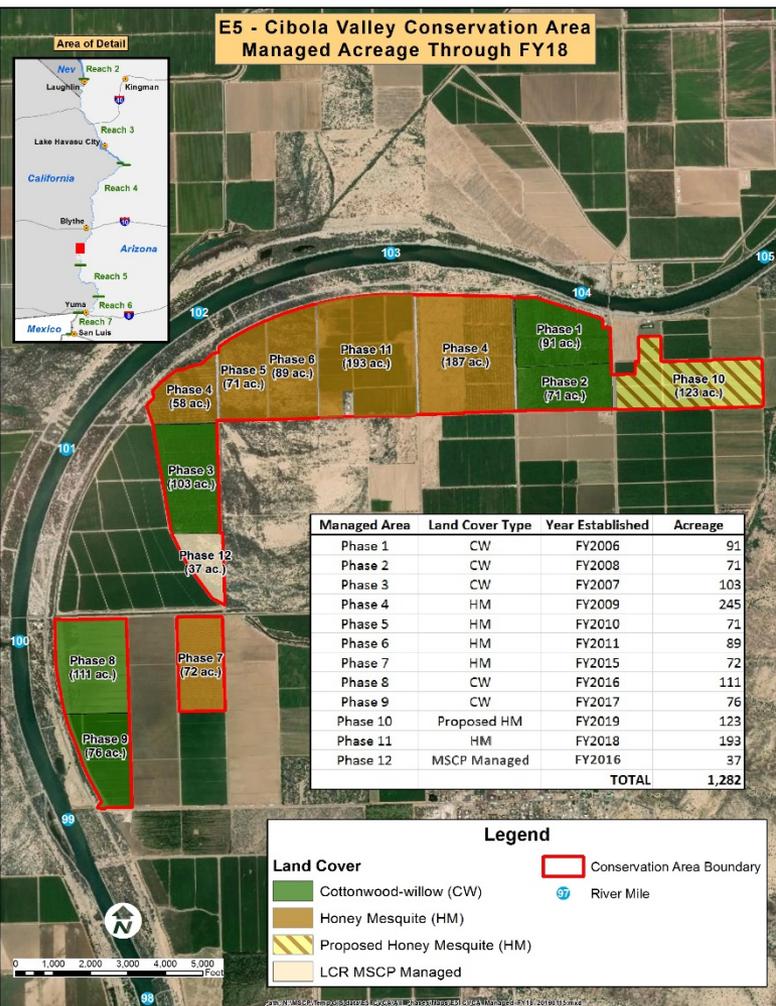
- Conservation Area Development (16 existing)
  - Planting at CVCA,
  - Planting at Cibola NWR Unit #1
  - Construction at Mohave Valley
  - Design & modeling for Planet Ranch





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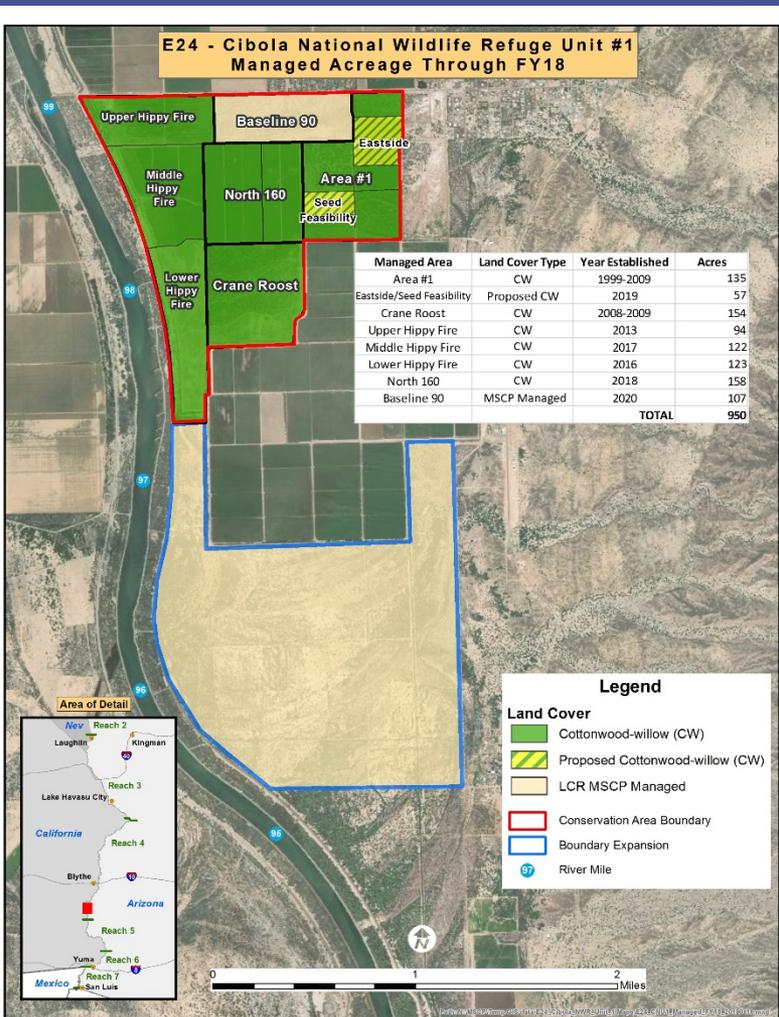
## Cibola Valley Conservation Area

- Phase 11 Planted
- Established 193 acres of HM
- Over 1,100 acres established



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## Cibola Refuge Unit #1

- North 160 Planted
- Established 158 acres of CW
- 786 acres established

# Development of Mohave Valley Conservation Area



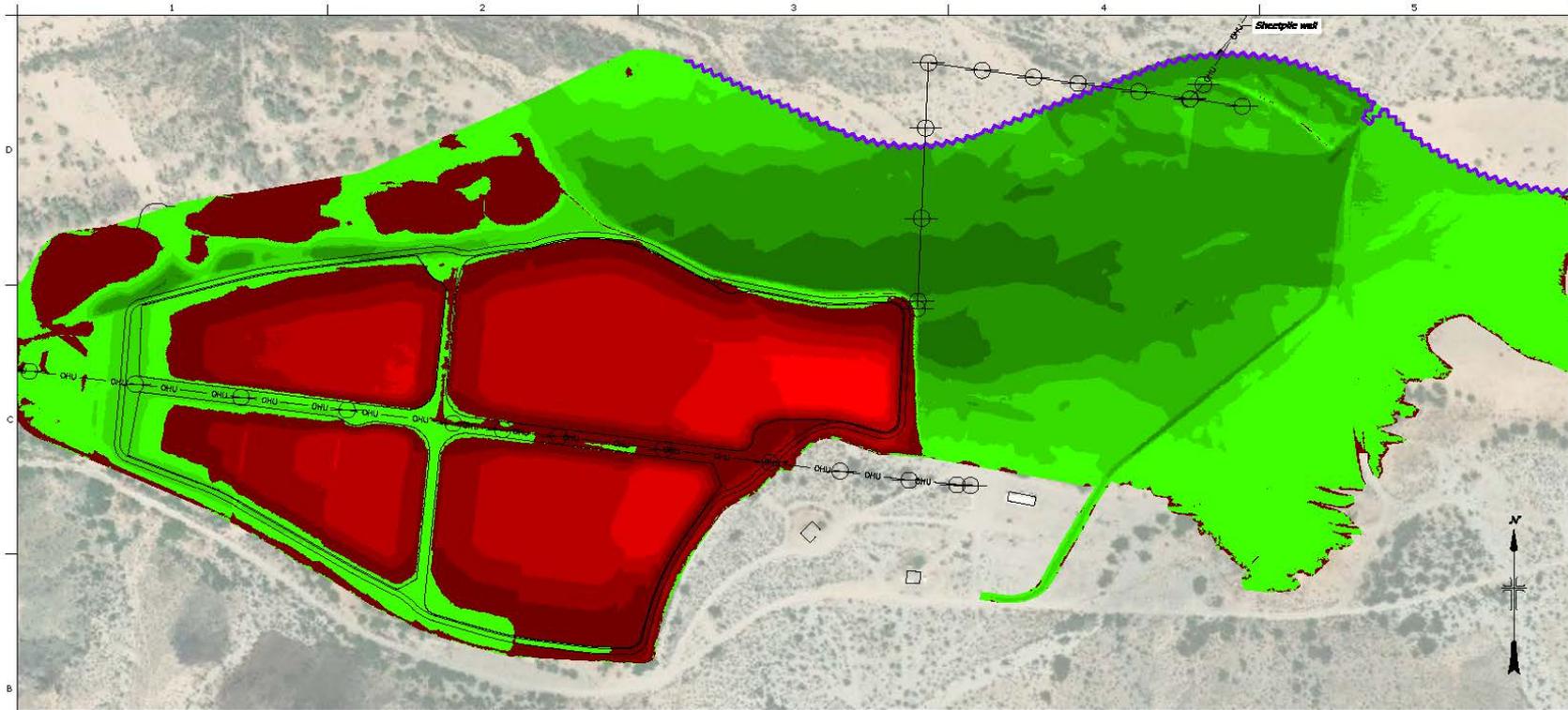
# Development of Mohave Valley Conservation Area - Bridges



# Development of Mohave Valley Conservation Area - Dredging



# Planet Ranch Design Set (32 pages)



Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-18.00	-17.00	7.63	Red
2	-17.00	-16.00	10851.89	Red
3	-16.00	-15.00	24340.33	Red
4	-15.00	-14.00	45435.22	Red
5	-14.00	-13.00	77523.80	Red
6	-13.00	-12.00	89283.89	Red
7	-12.00	-11.00	49796.89	Red
8	-11.00	-10.00	178616.44	Red
9	-10.00	-9.00	243921.83	Red
10	-9.00	-8.00	322095.40	Red

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
11	-8.00	-7.00	286817.57	Red
12	-7.00	-6.00	323042.70	Red
13	-6.00	-5.00	381067.06	Red
14	-5.00	-4.00	216383.28	Red
15	-4.00	-3.00	173148.63	Red
16	-3.00	-2.00	190358.94	Red
17	-2.00	-1.00	305120.70	Red
18	-1.00	0.00	546721.34	Red
19	0.00	1.00	1032286.70	Red
20	1.00	2.00	795789.09	Red

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
21	2.00	3.00	470398.89	Green
22	3.00	4.00	814834.89	Green
23	4.00	5.00	808488.35	Green
24	5.00	6.00	686038.82	Green
25	6.00	7.00	728110.45	Green
26	7.00	8.00	332918.65	Green
27	8.00	9.00	31852.36	Green

FINISHED GRADE CUT AND FILL



RECLAMATION  
Managing Water to the West

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR  
MULTI-SPECIES CONSERVATION PROGRAM

PLANET RANCH  
FISH REFUGIA PONDS

Author: Tomlin, P.E.  
Design: Andrew Pender, P.E.  
Checked: John Rowland, P.E.  
Reviewed: Scott Whelan, P.E.  
Date: 10/10/2017

PROJECT NUMBER: 1000 2017-04-01

FINISHED GRADE CUT AND FILLS

3693-418-60005

34117



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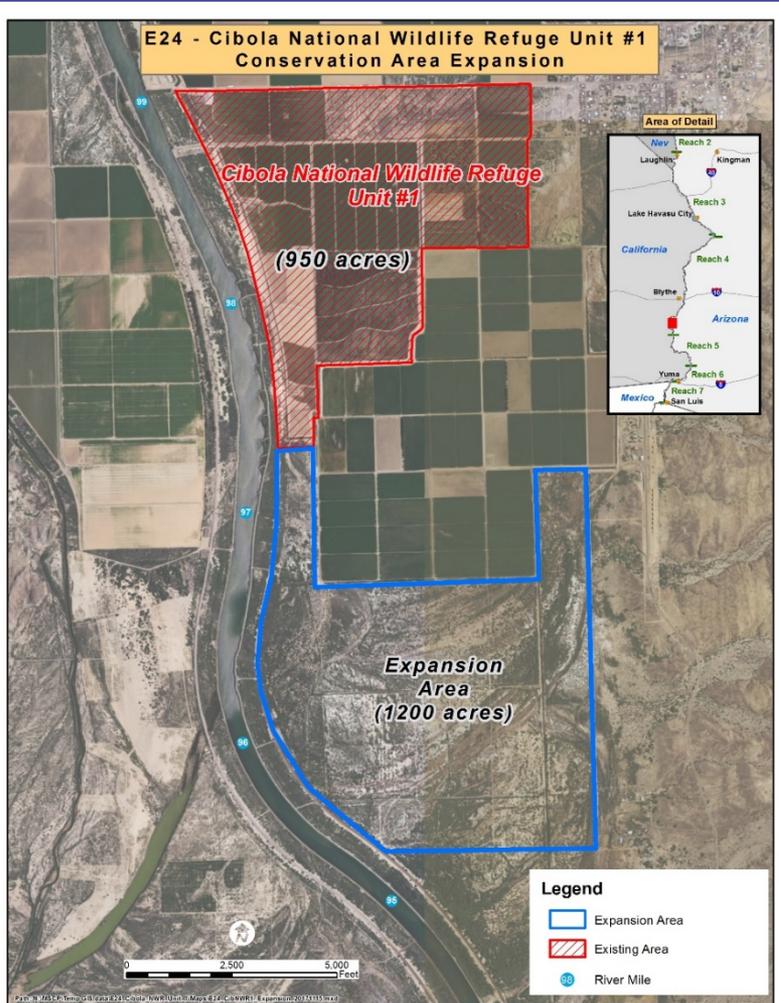
*Balancing Resource Use and Conservation*

- Conservation Area Expansion in FY18
  - Cibola NWR Unit #1 expanded by 1,200 acres to 2,150 acres
  - Beal Lake expanded by 567 acres to 1,000 acres



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## Cibola Refuge Unit #1 Expansion

- 1,200 acres
- 400 acres of dense CW
- 400 acres of low density CW
- 400 acres of HM

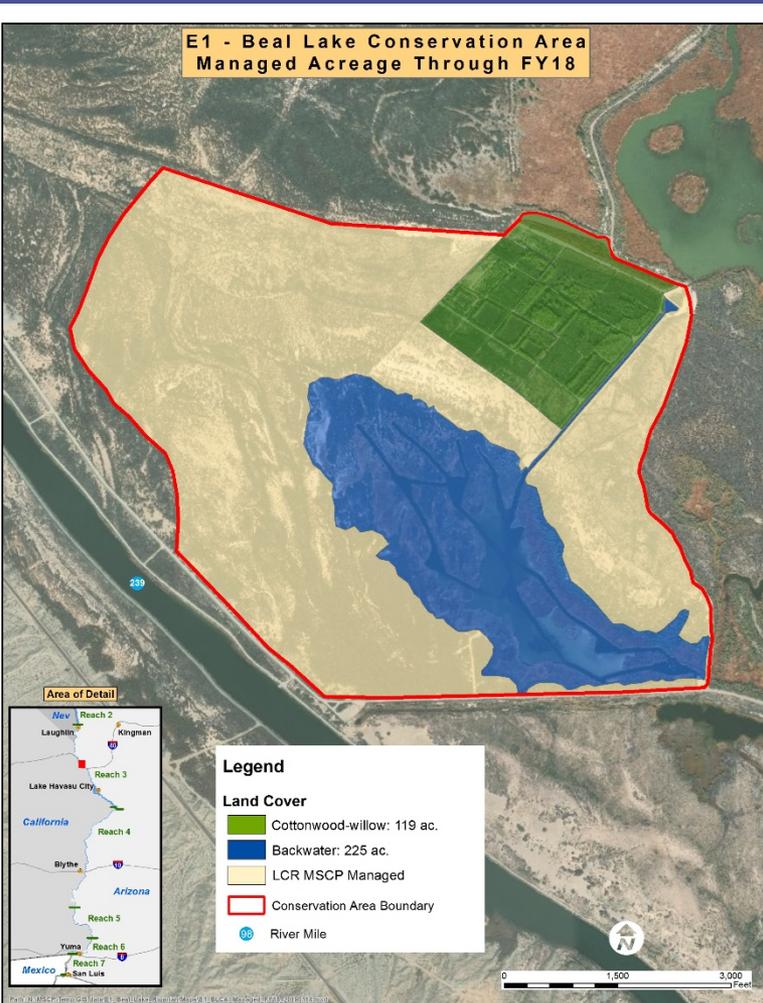


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## Beal Lake Expansion

- 300-400 acres
- 1/3 acreage with dense CW
- 1/3 acreage with low density CW
- 1/3 acreage with honey mesquite & marsh





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- New Conservation Area in FY18
  - Three Fingers Lake
  - Yuma Meadows Conservation Area
- Proposed new Conservation Areas
  - Dennis Underwood Conservation Area
  - Palo Verde Ecological Reserve - South





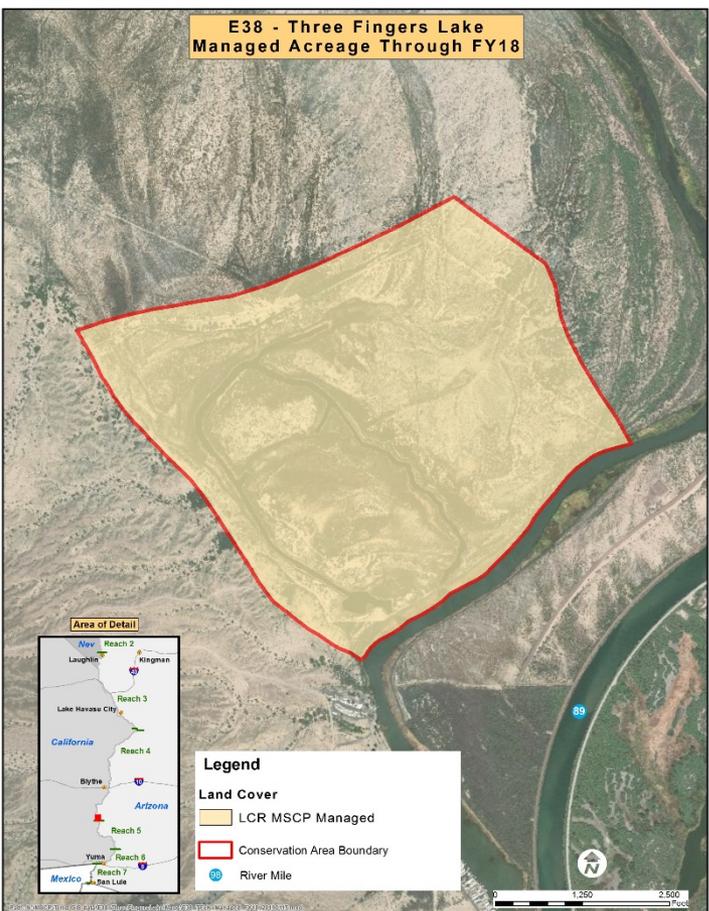
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E38 - Three Fingers Lake  
Managed Acreage Through FY18

## Three Fingers Lake

- 680 acres in California
- Cibola NWR
- Marsh and/or backwater





# Lower Colorado River Multi-Species Conservation Program

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## Yuma Meadows Conservation Area

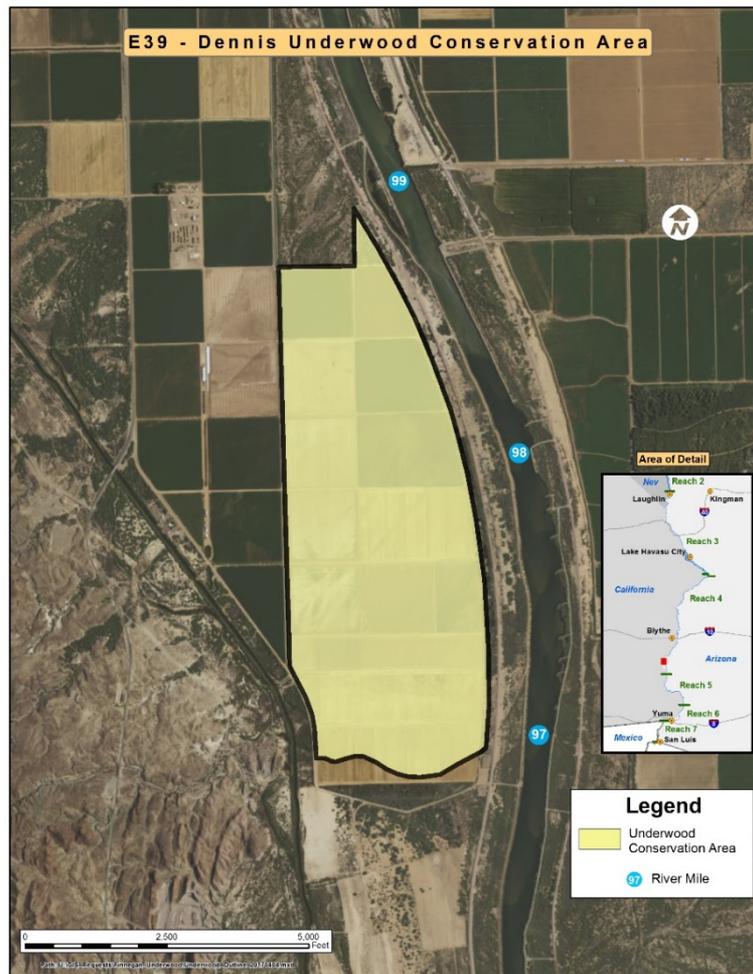
- 433 acres in California
- Reclamation withdrawn land
- Targeting disconnected backwaters

E40 - Yuma Meadows Conservation Area  
Managed Acreage Through FY18



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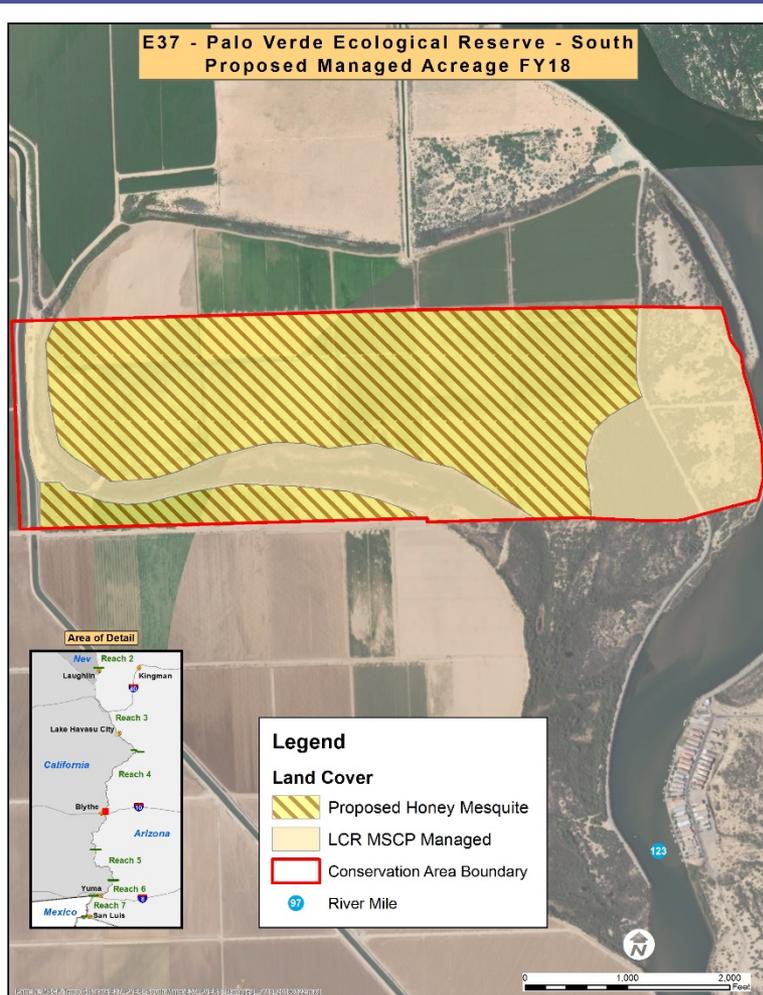
## Dennis Underwood Conservation Area

- 635 acres in California
- Targeting cottonwood-willow & honey mesquite



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## PVER-South

- Approximately 350 acres in California
- Honey mesquite



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Table 1-13.—Acreage by Conservation Area Through FY18

Conservation Area	Established Land Cover <sup>1</sup>	LCR MSCP Managed Acreage <sup>2</sup>	Available Acreage <sup>3</sup>	Total Conservation Area Acreage <sup>4</sup>
Beal Lake Conservation Area (Arizona)	119	434	119	434
Big Bend Conservation Area (Nevada)	15	15	15	15
Cibola National Wildlife Refuge Unit #1 Conservation Area (Arizona)	786	950	950	950
Cibola Valley Conservation Area (Arizona)	1,122	1,159	1,245	1,309
Hart Mine Marsh (Arizona)	255	255	255	255
Hunters Hole (Arizona)	44	44	44	44
Imperial Ponds Conservation Area (Arizona)	92	126	126	126
Laguna Division Conservation Area (Arizona and California)	1,171	1,171	1,171	1,171
Palo Verde Ecological Reserve (California)	1,023	1,023	1,023	1,352
Parker Dam Camp (California)	80	204	80	204
Planet Ranch Conservation Area (Arizona)	396*	3,418**	660	3,418***
Pretty Water Conservation Area (California)	566	566	566	566
Yuma East Wetlands (Arizona)	380	380	380	380
Yuma Meadows Conservation Area (California)				
<b>Total</b>	<b>6,049</b>	<b>9,745</b>	<b>6,634</b>	<b>10,224</b>

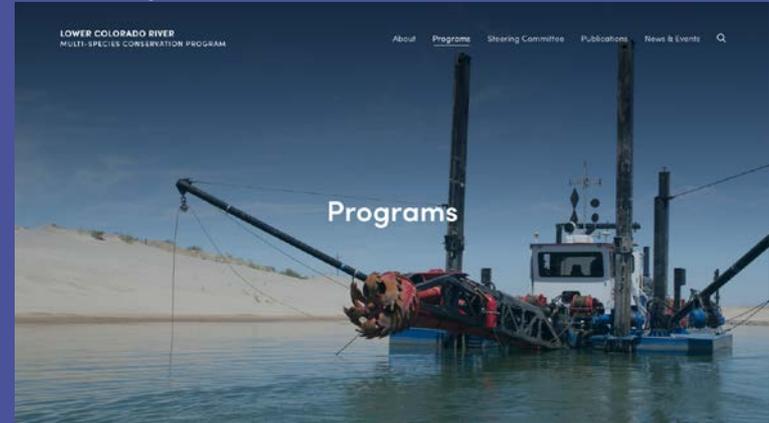
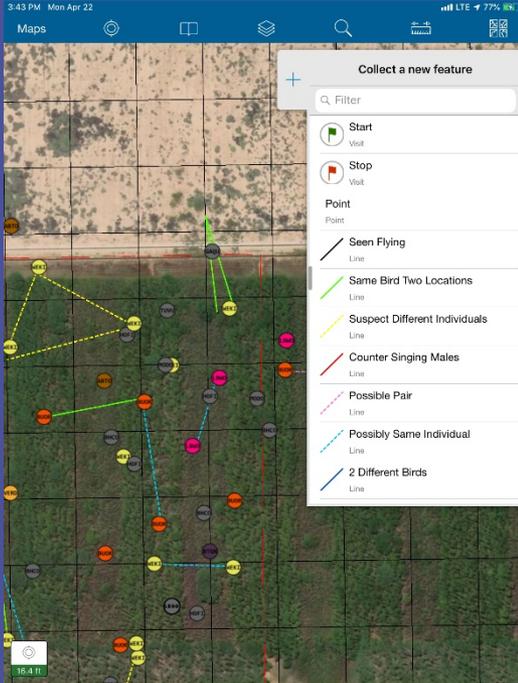




# Lower Colorado River Multi-Species Conservation Program

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## FY18 Adaptive Management Program Accomplishments





# Lower Colorado River Multi-Species Conservation Program

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## Adaptive Management

### General accomplishments

- Peer review of approximately 35 monitoring and research reports
- Publication of Five-Year Monitoring and Research Priorities: 2018-2022
- Provided support to staff on study plan designs and statistical analyses
- Initial development of Adaptive Management Plans
- Conceptual Ecological Model
  - Updates on all existing models
  - New models for evaluation species and NMGS
  - Training for LCR MSCP staff on how to use the models





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Adaptive Management (cont.)

## Fish-related accomplishments

- Fish genetics review panel
- Continued support of the LCR Native Fish Database and the Remote Scanning database

## Wildlife-related accomplishments

- Riparian bird monitoring review
  - Vegetation mapping
  - Lidar data for whole LCR
- Field data collection improvements





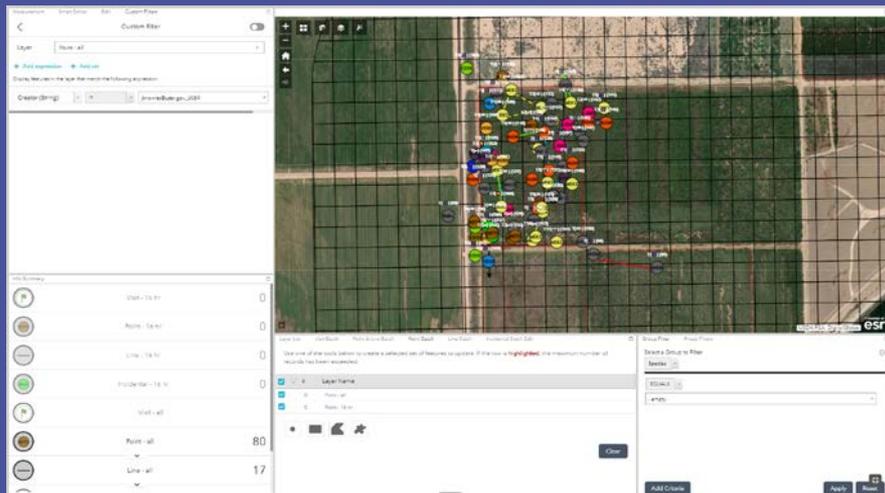
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Data Management

## Data management accomplishments

- Improvements in field data collection techniques and data processing workflows
- Development of QA/QC tools for MSCP staff and contractors
- LCR MSCP website redesign





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## Salinity and Soil Moisture Monitoring

Established network at six conservation areas:

- Beal Lake Conservation Area
- Palo Verde Ecological Reserve
- Cibola National Wildlife Refuge Unit #1
- Cibola Valley Conservation Area
- Yuma East Wetlands
- Hunters Hole

Parameters:

- Soil moisture and salinity
- Groundwater level and salinity



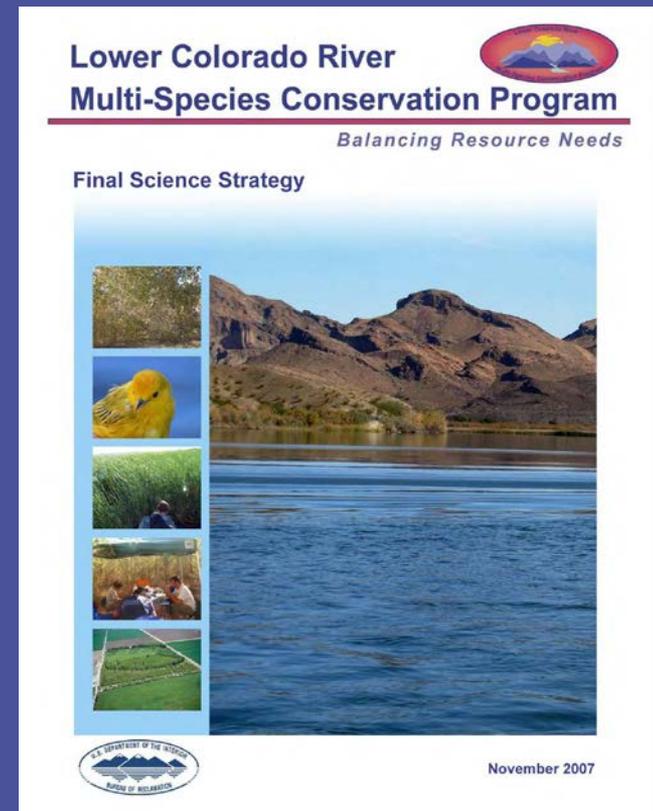


# Lower Colorado River Multi-Species Conservation Program

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## Adaptive Management Plans

- Formalize all existing research and monitoring plans into a standardized format
- Ensure they contain all components referenced in HCP
- Ensure that our monitoring and research provides necessary information for the Adaptive Management Program and other LCR MSCP needs





# Lower Colorado River Multi-Species Conservation Program

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Proposed FY20 Program Work Plan and Budget





# Lower Colorado River Multi-Species Conservation Program

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FY20 Funding Requirements  
(Preliminary Inflation Rate = 1.501%)

Funding Entity	FY20 Contributions	FY20 Adjusted Contributions
<b>Federal</b>	<b>\$16,634,082.00</b>	<b>\$16,634,082.00</b>
<b>Non-Federal</b>	<b>\$16,634,082.00</b>	<b>\$16,634,082.00</b>
<i>California</i>	<i>\$ 8,317,041.00</i>	<i>\$ 7,921,919.64</i>
<i>Arizona</i>	<i>\$ 4,158,520.50</i>	<i>\$ 4,948,763.23</i>
<i>Nevada</i>	<i>\$ 4,158,520.50</i>	<i>\$ 3,763,399.14</i>
<b>TOTAL</b>	<b>\$33,268,164.00</b>	<b>\$33,268,164.00</b>





# Lower Colorado River Multi-Species Conservation Program

## *Balancing Resource Use and Conservation* FY20 Proposed Work Plans

Program Administration	\$ 1,528,018
Fish Augmentation	\$ 2,325,000
Species Research	\$ 906,000
System Monitoring	\$ 3,025,000
Conservation Area D&M	\$ 13,631,000
Post Development Monitoring	\$ 2,870,000
AMP	\$ 1,540,000
Remedial Measures Fund	\$ 1,194,796
Public Outreach	\$ 125,000
<b>TOTAL WORK PLANS</b>	<b>\$ 27,144,814</b>
Land and Water Fund	\$ 0
<b>TOTAL FY19 BUDGET</b>	<b>\$ 27,144,814*</b>

\*The proposed annual program budget is less than the minimum required funding due to current construction capability. The balance will be held in reserve by Reclamation and used in future years to complete conservation measure requirements, especially habitat creation and management activities.

