Final Implementation Report, FY20 Work Plan and Budget, FY18 Accomplishment Report
# Lower Colorado River Multi-Species Conservation Program

## LCR MSCP FY18 Overview Funding Summary

<table>
<thead>
<tr>
<th>FY18 Total Required Funding</th>
<th>FY18 Approved Estimate</th>
<th>FY18 Actual Obligations</th>
<th>Cumulative Program Accomplishment</th>
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<td>$31,251,240.00</td>
<td>$33,496,740.00</td>
<td>$24,858,154.65</td>
<td>$298,057,688.71</td>
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## FY18 Program Element Accomplishment

<table>
<thead>
<tr>
<th>Program Element</th>
<th>Amount</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Program Administration</td>
<td>$1,288,045.42</td>
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<tr>
<td>Fish Augmentation</td>
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<td>Conservation Area D&amp;M</td>
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<td>Post Development Monitoring</td>
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<td>Public Outreach</td>
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<td><strong>TOTAL</strong></td>
<td><strong>$24,858,154.65</strong></td>
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</table>
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

Balancing Resource Use and Conservation

FY18 Fisheries Accomplishments

Razorback sucker contacted via remote PIT scanning (Reach 2)
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
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>LAKE MOHAVE</th>
<th>DAVIS-PARKER</th>
<th>BELOW PARKER</th>
<th>GRAND TOTAL</th>
<th>AUGMENTATION TOTAL</th>
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<tbody>
<tr>
<td>RAZORBACK SUCKER</td>
<td>126,016*</td>
<td>94,086</td>
<td>99,177</td>
<td>319,279</td>
<td>193,263</td>
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<td>BONYTAIL</td>
<td>2,110</td>
<td>59,039</td>
<td>39,112</td>
<td>100,261</td>
<td>100,261</td>
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<td>TOTAL</td>
<td>126,016*</td>
<td>153,125</td>
<td>138,289</td>
<td>417,430</td>
<td>291,414</td>
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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
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
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
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.
Predation of native fish by avian predators was monitored for 10 days following selected stocking events.

- Approximately 3% of bonytail stocked in Laughlin Lagoon in December were consumed by avian predators.
- Predation by striped and largemouth bass was also observed.
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
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
FY18 Wildlife Accomplishments
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
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

- Yuma Clapper Rail
- Western Least Bittern
- California Black Rail
- Virginia Rail

Survey Years


Marsh Birds Detected

0 20 40 60 80 100 120
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.
<table>
<thead>
<tr>
<th>Conservation Area</th>
<th>Count of LCR MSCP Terrestrial Species Detected (FY05-FY18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beal Lake Conservation Area</td>
<td>19</td>
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<tr>
<td>Big Bend Conservation Area</td>
<td>7</td>
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<tr>
<td>Cibola NWR Unit #1 Conservation Area</td>
<td>12</td>
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<tr>
<td>Cibola Valley Conservation Area</td>
<td>11</td>
</tr>
<tr>
<td>Hart Mine Marsh</td>
<td>6</td>
</tr>
<tr>
<td>Hunters Hole</td>
<td>7</td>
</tr>
<tr>
<td>Imperial Ponds Conservation Area</td>
<td>5</td>
</tr>
<tr>
<td>Laguna Division Conservation Area</td>
<td>8</td>
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<tr>
<td>Palo Verde Ecological Reserve</td>
<td>13</td>
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<tr>
<td>Planet Ranch</td>
<td>11</td>
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<tr>
<td>Pretty Water Conservation Area</td>
<td>4</td>
</tr>
<tr>
<td>Yuma East Wetlands</td>
<td>13</td>
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</tbody>
</table>
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.
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)
Other Species Highlights:

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

* Detected but breeding behavior was not observed during the survey visits
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.
Lower Colorado River
Multi-Species Conservation Program

Balancing Resource Use and Conservation

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

- Conservation Area Development
- Conservation Area Expansion
- Proposed new Conservation Areas
Conservation Area Development (16 existing)

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

- Phase 11 Planted
- Established 193 acres of HM
- Over 1,100 acres established
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
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
Cibola Refuge Unit #1 Expansion

- 1,200 acres
- 400 acres of dense CW
- 400 acres of low density CW
- 400 acres of HM
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
• 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
Three Fingers Lake

- 680 acres in California
- Cibola NWR
- Marsh and/or backwater
Yuma Meadows Conservation Area

- 433 acres in California
- Reclamation withdrawn land
- Targeting disconnected backwaters
Dennis Underwood Conservation Area

- 635 acres in California
- Targeting cottonwood-willow & honey mesquite
Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

PVER-South

- Approximately 350 acres in California
- Honey mesquite
**Lower Colorado River Multi-Species Conservation Program**

**Balancing Resource Use and Conservation**

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

<table>
<thead>
<tr>
<th>Conservation Area</th>
<th>Established Land Cover¹</th>
<th>LCR MSCP Managed Acreage²</th>
<th>Available Acreage³</th>
<th>Total Conservation Area Acreage⁴</th>
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<tbody>
<tr>
<td>Beal Lake Conservation Area (Arizona)</td>
<td>119</td>
<td>434</td>
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<tr>
<td>Big Bend Conservation Area (Nevada)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<td>Cibola National Wildlife Refuge Unit #1 Conservation Area (Arizona)</td>
<td>786</td>
<td>950</td>
<td>950</td>
<td>950</td>
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<td>Cibola Valley Conservation Area (Arizona)</td>
<td>1,122</td>
<td>1,159</td>
<td>1,245</td>
<td>1,309</td>
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<tr>
<td>Hart Mine Marsh (Arizona)</td>
<td>255</td>
<td>255</td>
<td>255</td>
<td>255</td>
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<tr>
<td>Hunters Hole (Arizona)</td>
<td>44</td>
<td>44</td>
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<td>44</td>
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<tr>
<td>Imperial Ponds Conservation Area (Arizona)</td>
<td>92</td>
<td>126</td>
<td>126</td>
<td>126</td>
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<tr>
<td>Laguna Division Conservation Area (Arizona and California)</td>
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<td>1,023</td>
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<td>1,352</td>
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<td>Parker Dam Camp (California)</td>
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<td>204</td>
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<td>Planet Ranch Conservation Area (Arizona)</td>
<td>396*</td>
<td>3,418**</td>
<td>660</td>
<td>3,418***</td>
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<tr>
<td>Pretty Water Conservation Area (California)</td>
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<td>566</td>
<td>566</td>
<td>566</td>
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<tr>
<td>Yuma East Wetlands (Arizona)</td>
<td>380</td>
<td>380</td>
<td>380</td>
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<tr>
<td>Yuma Meadows Conservation Area (California)</td>
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<td><strong>Total</strong></td>
<td><strong>6,049</strong></td>
<td><strong>9,745</strong></td>
<td><strong>6,634</strong></td>
<td><strong>10,224</strong></td>
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Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

FY18 Adaptive Management Program Accomplishments
Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

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
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
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
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
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

Balancing Resource Use and Conservation

Proposed FY20 Program Work Plan and Budget
## FY20 Funding Requirements
(Preliminary Inflation Rate = 1.501%)

<table>
<thead>
<tr>
<th>Funding Entity</th>
<th>FY20 Contributions</th>
<th>FY20 Adjusted Contributions</th>
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<tr>
<td>Federal</td>
<td>$16,634,082.00</td>
<td>$16,634,082.00</td>
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<tr>
<td>Non-Federal</td>
<td>$16,634,082.00</td>
<td>$16,634,082.00</td>
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<tr>
<td>Nevada</td>
<td>$4,158,520.50</td>
<td>$3,763,399.14</td>
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<td><strong>$33,268,164.00</strong></td>
<td><strong>$33,268,164.00</strong></td>
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## Lower Colorado River Multi-Species Conservation Program

**Balancing Resource Use and Conservation**

**FY20 Proposed Work Plans**

<table>
<thead>
<tr>
<th>Program/Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Administration</td>
<td>$1,528,018</td>
</tr>
<tr>
<td>Fish Augmentation</td>
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<tr>
<td>Species Research</td>
<td>$906,000</td>
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<tr>
<td>System Monitoring</td>
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<tr>
<td>Conservation Area D&amp;M</td>
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<tr>
<td>Post Development Monitoring</td>
<td>$2,870,000</td>
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<tr>
<td>AMP</td>
<td>$1,540,000</td>
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<td>Remedial Measures Fund</td>
<td>$1,194,796</td>
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<tr>
<td>Public Outreach</td>
<td>$125,000</td>
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<td><strong>TOTAL WORK PLANS</strong></td>
<td><strong>$27,144,814</strong></td>
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<table>
<thead>
<tr>
<th>Fund</th>
<th>Amount</th>
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<tr>
<td>Land and Water Fund</td>
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<tr>
<td><strong>TOTAL FY19 BUDGET</strong></td>
<td><strong>$27,144,814</strong></td>
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</table>

*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.*