Avian Surveys on the Lower Colorado River 2008

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Lower Colorado River Multi-Species Conservation Plan

System Monitoring for Riparian Obligate Avian Species (Work Task D6) and Avian Use of Restoration Sites (Work Task F2)
Introduction

Our Purpose:

1. Implement long-term system-wide monitoring of riparian birds on the Lower Colorado River
2. Study the effects of habitat restoration measures on the Lower Colorado River

** 1st year of a 2-year study
Goals for 2008

1. Determine presence and estimated abundance of covered species on the Lower Colorado River and in habitat creation sites
2. Locate breeding territories of covered species and estimate population sizes of other riparian landbirds present along the Lower Colorado River
3. Provide a baseline of bird data on pre-development habitat creation sites
Historic Perspective

Survey Efforts for Birds on the Lower Colorado River:

1. 1914 - Grinnell
3. 2005-present - LCR-MSCP

How do populations of LCR-MSCP covered species today compare with surveys?
Study Area:
Colorado River from Separation Point (above Lake Mead) to the Southerly International Boundary with Mexico

• Habitats include riparian corridor with some overlap into the Mohave and Sonoran deserts
• All plots within the historic floodplain of the Lower Colorado River
• Randomly selected
• Plots size ~300m x 300m
Study Area

System-wide Plots

Lake Mead NRA

Imperial NWR

Habitat Creation Plots

Nature Trail restoration site at Cibola NWR

Cibola Valley Conservation Area Restoration
LCR-MSCP Covered Species

- **Gila Woodpecker**
  (*Melanerpes uropygialis*)
- **Arizona Bell’s Vireo**
  (*Vireo bellii arizonae*)
- **Summer Tanager**
  (*Piranga rubra*)
- **Sonoran Yellow Warbler**
  (*Dendroica petechia sonorana*)
- **Vermilion Flycatcher**
  (*Pyrocephalus rubinus*)
- **Gilded Flicker**
  (*Colaptes chrysoides*)
Methods: Area Searches
Late April - July 1, 2008

Type 1- Rapid Area Searches:
• 70 system-wide plots, 9 habitat creation plots
• Each plot surveyed twice (~once in May and once in June)
• Area search to ID, count, and tally all birds of all species within the plot

Sample map used during system-wide survey
Methods: Area Searches
Late April - July 1, 2008

Type 2- Intensive Area Searches:

• Subset of 10 system-wide plots
• 18 habitat creation plots
• Each plot surveyed 8 times
• Area search to ID, count, and tally all birds and record breeding evidence
• Map territories of all breeding birds

Sample of an intensive plot with territory mapping
Habitat Creation Plot Example: Intensive Survey
Habitat Creation Plot Example: Intensive Survey
Habitat Creation Plot Example: Intensive Survey
Habitat Creation Plot Example: Intensive Survey

1. Outline the “observation cloud”
2. Find the Territory Center
3. Use the Territory Center for habitat assessments
Survey Techniques

- Surveys begin at sunrise and must finish by noon
- Surveyor must pass within 50m of all points on the plot
- Hiking, kayaks, and canoes, and powerboats used for access
Results

• 158 species detected

• All LCR MSCP covered species, except the Gilded Flicker, were detected in at least one site

• Breeding populations of four of the six covered species on many habitat creation sites with > 1yr growth

• No Gila Woodpecker and Gilded Flicker on habitat creation sites

• No covered species on pre-development habitat creation sites
System-wide Rapid surveys

• **system-wide plots:** 7943 **individuals of 147 species**
• Most common of the covered sp.: Bell’s Vireo
• Rarest covered sp.: Vermilion Flycatcher
• Gilded Flickers absent
• Other LCR MSCP species detected: Clapper Rail, Willow Flycatcher, and Yellow-billed Cuckoo.

System-wide averages of detections

<table>
<thead>
<tr>
<th>Species</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gambel's Quail</td>
<td>339</td>
</tr>
<tr>
<td>Mourning Dove</td>
<td>294.5</td>
</tr>
<tr>
<td>Red-winged Blackbird</td>
<td>234</td>
</tr>
<tr>
<td>Verdin</td>
<td>230</td>
</tr>
<tr>
<td>White-winged Dove</td>
<td>226.5</td>
</tr>
<tr>
<td>Black-tailed Gnatcatcher</td>
<td>210.5</td>
</tr>
<tr>
<td>Brown-headed Cowbird</td>
<td>158</td>
</tr>
<tr>
<td>Song Sparrow</td>
<td>151.5</td>
</tr>
<tr>
<td>Yellow-breasted Chat</td>
<td>148.5</td>
</tr>
<tr>
<td>Common Yellowthroat</td>
<td>147.5</td>
</tr>
<tr>
<td>Great-tailed Grackle</td>
<td>146</td>
</tr>
<tr>
<td>Abert's Towhee</td>
<td>134</td>
</tr>
<tr>
<td>Lucy's Warbler</td>
<td>113.5</td>
</tr>
</tbody>
</table>
System-wide Intensive surveys

- System-wide plots: 362 breeding individuals of 45 species
- 4 of the covered species were breeding

Total number of confirmed breeding territories by species

<table>
<thead>
<tr>
<th>Species</th>
<th>Number of Territories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow-breasted Chat</td>
<td>61</td>
</tr>
<tr>
<td>Song Sparrow</td>
<td>54</td>
</tr>
<tr>
<td>Yellow Warbler*</td>
<td>29</td>
</tr>
<tr>
<td>Common Yellowthroat</td>
<td>24</td>
</tr>
<tr>
<td>Bell's Vireo*</td>
<td>21</td>
</tr>
<tr>
<td>White-winged Dove</td>
<td>17</td>
</tr>
<tr>
<td>Black-tailed Gnatcatcher</td>
<td>16</td>
</tr>
<tr>
<td>Lucy’s Warbler</td>
<td>16</td>
</tr>
<tr>
<td>Verdin</td>
<td>16</td>
</tr>
<tr>
<td>Abert’s Towhee</td>
<td>14</td>
</tr>
<tr>
<td>Gambel’s Quail</td>
<td>14</td>
</tr>
<tr>
<td>Mourning Dove</td>
<td>14</td>
</tr>
<tr>
<td>Ash-throated Flycatcher</td>
<td>7</td>
</tr>
<tr>
<td>Gila Woodpecker*</td>
<td>6</td>
</tr>
</tbody>
</table>
System-Wide Population Size Estimates

• Applied detection ratio of 0.93 to the covered species
• Calculated population size estimates for the strata surveyed in 2008

We estimate a minimum population size of:

– more than 6,800 Bell’s Vireos
– more than 5,100 Yellow Warblers
– more than 1,700 Gila Woodpeckers
– more than 1,100 Summer Tanagers
– Vermilion Flycatcher and Gilded Flicker were too rare (or absent) to be subject to detection ratio calculations
**System-Wide Population Size Estimates**

- **Bell’s Vireo** - highest estimated population size system-wide
- **Yellow Warbler** - occurred in more strata than Bell’s Vireo (8 and 6, respectively)
- **Gila Woodpecker** occurred in 5 strata
- **Summer Tanager** occurred in 4 strata
Intensive surveys at Habitat Creation Sites

- Habitat Creation plots: 231 breeding individuals of 32 species

- Four of our six covered species, Bell’s Vireo, Yellow Warbler, Summer Tanager, and Vermilion Flycatcher, were confirmed as breeders in post-development habitat creation sites

- Gila Woodpecker and Gilded Flickers were not recorded in the habitat creation sites.
Rapid Surveys on Habitat Creation Plots

- **Habitat Creation plots**: 1267 individuals of 51 species.
- Pre-development and first-season planting sites only
- No covered species found

**Average number of detections during rapid area searches on habitat creation plots**

<table>
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<tr>
<td>Red-winged Blackbird</td>
<td>341</td>
</tr>
<tr>
<td>Mourning Dove</td>
<td>42.5</td>
</tr>
<tr>
<td>House Finch</td>
<td>35.5</td>
</tr>
<tr>
<td>Yellow-headed Blackbird</td>
<td>33</td>
</tr>
<tr>
<td>Brown-headed Cowbird</td>
<td>23.5</td>
</tr>
<tr>
<td>Abert's Towhee</td>
<td>21.5</td>
</tr>
<tr>
<td>Horned Lark</td>
<td>18.5</td>
</tr>
<tr>
<td>Gambel's Quail</td>
<td>17</td>
</tr>
<tr>
<td>Cliff Swallow</td>
<td>13</td>
</tr>
<tr>
<td>White-winged Dove</td>
<td>12</td>
</tr>
</tbody>
</table>
**Discussion- Species Richness Patterns**

**Patterns**
1. Gilded Flicker may be absent from the LCR MSCP project area
2. Bell’s Vireo, Yellow Warbler, and Gila Woodpecker are regularly found
3. Summer Tanager: locally uncommon with spotty distribution
4. Vermilion Flycatcher: uncommon and has a spotty distribution

System-wide survey results showed the highest species richness:
- High diversity of habitat types represented in the sample
- Greater survey effort compared to habitat creation sites

Three patterns from the species lists of the habitat creation sites compared with system-wide plots:
1. There were fewer upland species in habitat creation sites
2. Waterbirds and marshbirds are currently fairly rare in the habitat creation sites
3. Species associated with old-growth riparian trees are less prevalent in habitat creation sites
Conclusion - System-Wide Surveys

- The LCR corridor has a large variety of both breeding birds and migrants
- Overall abundances is greatest in generalist species
- Most abundant breeders included mostly riparian specialists
- Data indicate a substantial seasonal effect in some species
Conclusion - *Habitat Creation Sites*

- The post-development habitat creation sites (> 1 year of growth) supported breeding populations of four of the six covered species, with only Gila Woodpecker and Gilded Flicker being absent.

- Habitat creation effort probably caused the presence of covered bird species in habitat creation sites.
Discussion - Considerations for Future Bird Monitoring Work on the Lower Colorado River

- Pool 2007 and 2008 data to develop combined population size estimates
- Complete the software that calculates detection ratios and population size estimates based on the data collected in this project
- Complete habitat assessments for the covered species
- Complete habitat models for covered species
- Advance the survey season 2 weeks (mid-April to mid-June) in 2009
Acknowledgements

• US Bureau of Reclamation: John Swett, Beth Sabin, and all boat drivers
• USGS Snake River Field Station: Jon Bart and Ann Manning
• GBBO Field Technicians 2008: Karen Hochgraf, Gina Botello, Dayna Hawes, Marcus Hopkins, Bob Baez, Ben Smith, Chivia Horton
• GBBO Staff: Jennifer Ballard and Dana Hartley
• Lower Colorado River National Wildlife Refuge Staff and Biologists, Lake Mead National Recreation Area, Quechan and Ft. Mohave tribes
Future Analysis

Collect habitat data at use and non-use sites for covered species including:

• Photograph of the site
• Qualitative data on landscape and habitat features present
• Cover and foliage height diversity via point-intercept and a 5 m pole with marked heights
• Tree and snag densities and sizes
• Shrub density
• Canopy closure
• Soil moisture
Gilded Flicker (*Colaptes chrysoides*)

- Habitat: riparian woodlands and saguaro desert washes and uplands (big trees with cavities)
- Changes in distribution - large decline in the last 100 years
- Decline: loss of native trees and saguaros in the valley
- Still a relatively common bird east of the LCR

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<tbody>
<tr>
<td>nested commonly in saguaros</td>
<td>total population in LCRV and BWD = ~270 individuals</td>
<td>no confirmed sightings</td>
</tr>
</tbody>
</table>

Cindy Marple
Gila Woodpecker (*Melanerpes uropygialis*)

- Habitat: riparian woodlands and saguaro desert washes and uplands (big trees with cavities)
- Reduced populations due to lack of suitable habitat: patch size and lack of dispersal sites

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<tbody>
<tr>
<td>common everywhere throughout the LCRV</td>
<td>less common than 1914, isolated in areas of large cottonwoods, willows, and saguaros</td>
<td>common in areas with large trees and saguaros</td>
</tr>
</tbody>
</table>
Vermilion Flycatcher  
(*Pyrocephalus rubinus*)

- Habitat: clearings in riparian woodland, developed areas such as parks and golf courses
- Decline: changes in water management and loss of suitable habitat

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</thead>
<tbody>
<tr>
<td>numerous from Blythe to Yuma in large clearings by cottonwood stands</td>
<td>rare (~10 pair), mostly used developed edges, more common in winter</td>
<td>only 3 pair found, using open mature mesquite and mesquite restoration</td>
</tr>
</tbody>
</table>
Summer Tanager (*Piranga rubra*)

- Habitat: mature cottonwood-willow, mature tamarisk
- More common in other riparian systems (e.g. Kern River, Virgin River)
- May have similar status today as 20-30 years ago

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>common, characteristic bird of cottonwood-willow habitat</td>
<td>rare and uncommon breeder, very low population estimates</td>
<td>uncommon breeder, dense riparian forest with native trees</td>
</tr>
</tbody>
</table>
Arizona Bell’s Vireo (*Vireo bellii arizonae*)

- Habitat: willow, seepwillow, mesquite near water
- Decline attributed to (in 1980’s) loss of willow habitat, increased pressure from Brown-headed Cowbirds (with increase of agricultural habitat, loss of natural flows on river)
- Population on the LCRV seems to have increased in the last 20 years

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</thead>
<tbody>
<tr>
<td></td>
<td>very common and abundant (until ~1950)</td>
<td>rare / uncommon breeder, considered one of the most threatened birds in the LCRV, pop. dropped from 202 to 88 from ’76-’86</td>
<td>fairly common, found on system-wide and restoration sites, mixed habitat with mesquite near water</td>
</tr>
</tbody>
</table>

Bill Horn
Sonoran Yellow Warbler
(Dendroica petechia sonorana)

- Habitat: Cottonwood-willow, dense riparian forest
- Sudden drastic decline in 1950’s, likely due to loss of habitat, increased parasitism by Brown-headed Cowbirds, and lack of habitat replacement
- Huge population increase sometime in the last 20 years

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</thead>
<tbody>
<tr>
<td>very common in cottonwood-willow, huge breeding population in the LCRV</td>
<td>numerous during migration, totally absent during breeding, handful of breeding records in 10 years</td>
<td>fairly common, found on system-wide and restoration sites, dense riparian near water</td>
</tr>
</tbody>
</table>

James Ownby
Results

<table>
<thead>
<tr>
<th></th>
<th>System-wide</th>
<th>Restoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>YWAR</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>BEVI</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>GIWO</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>SUTA</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>VEFL</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>GIFL</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Number of plots where covered species were found (system-wide (n=80) and restoration (n=27) in 2008.

- Relatively low # of plots with covered species
- Density and distribution of covered species varies