



# Avian Surveys on the Lower Colorado River 2008

Amy Leist and Elisabeth Ammon, Great Basin Bird Observatory

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

\*\* 1<sup>st</sup> 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:

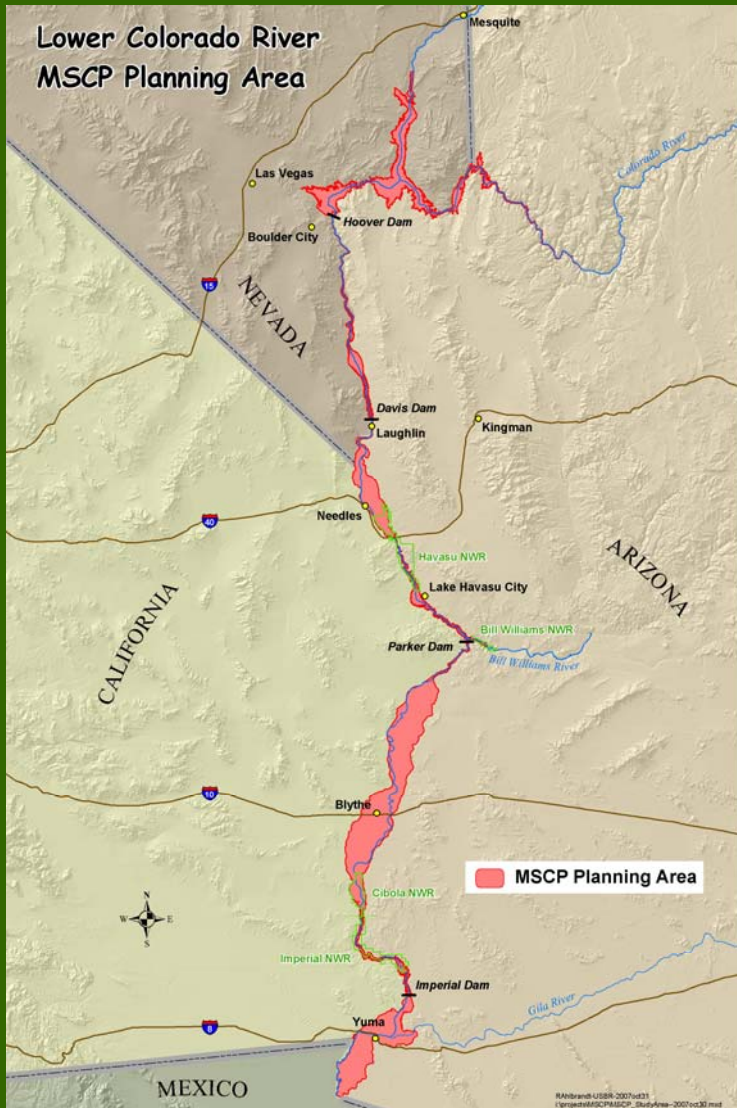
1. 1914 - Grinnell
2. 1974-1984 - “Lower Colorado River Project,” Ohmart, Anderson, and collaborators
3. 2005-present - LCR-MSCP



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

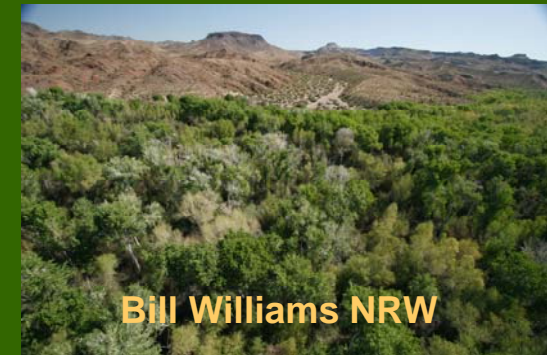


- Habitats include riparian corridor with some overlap into the Mohave and Sonoran deserts

- 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

## Habitat Creation Plots



Nature Trail restoration site at Cibola NWR



Imperial 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*)



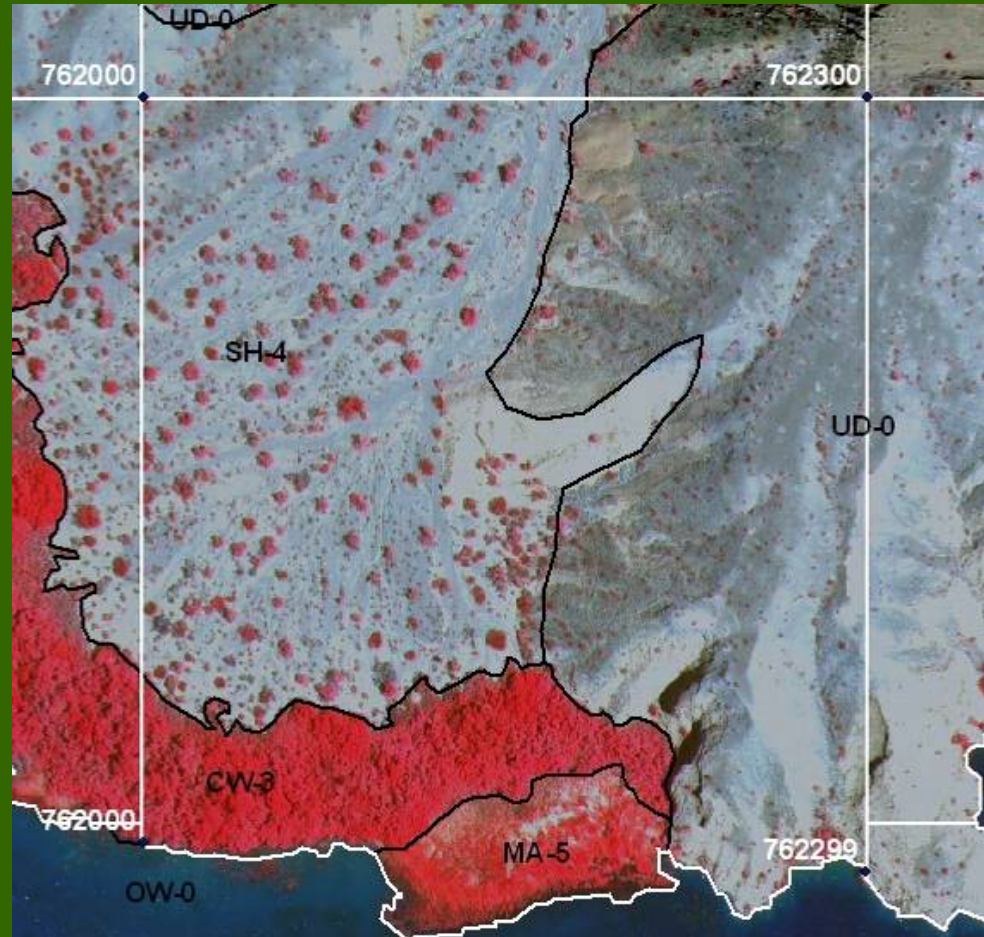


# Methods: Area Searches

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



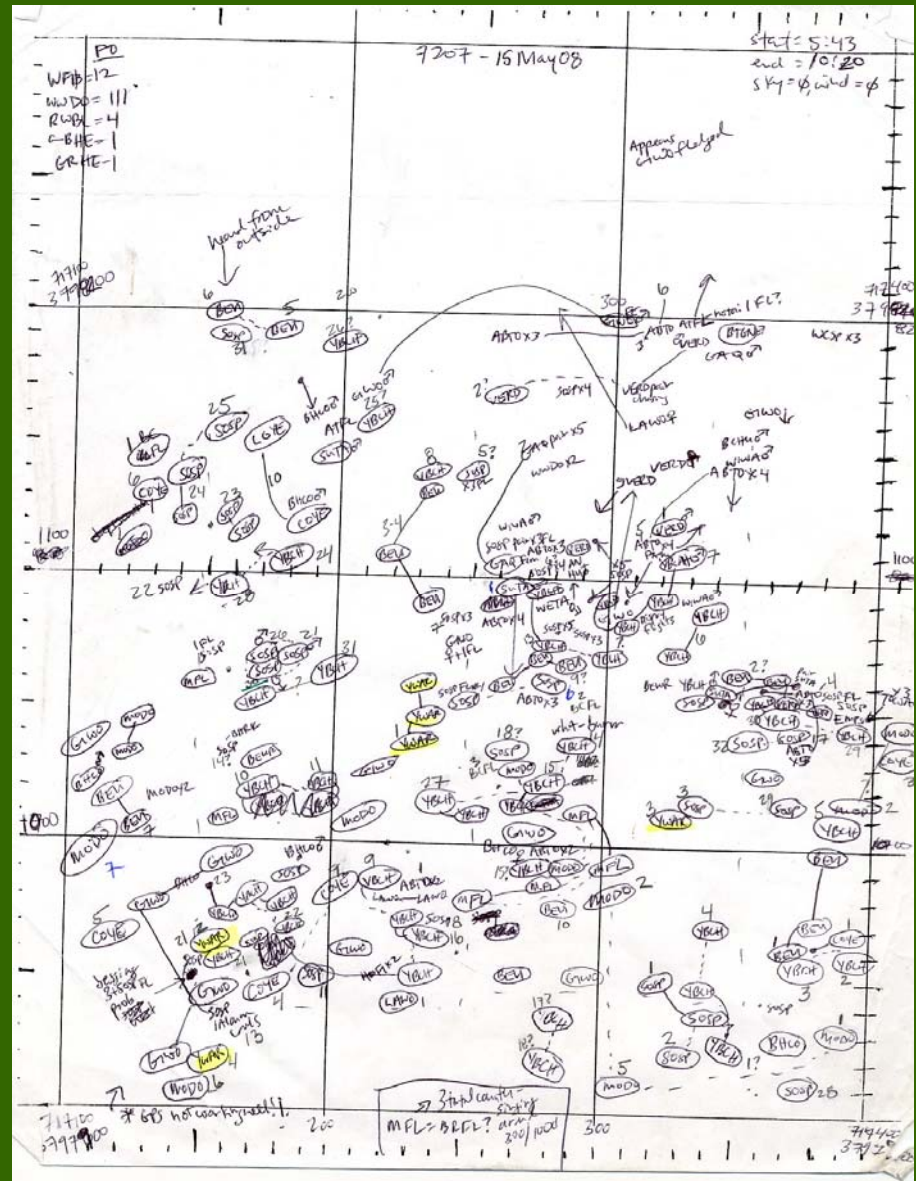
# Methods: Area Searches

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



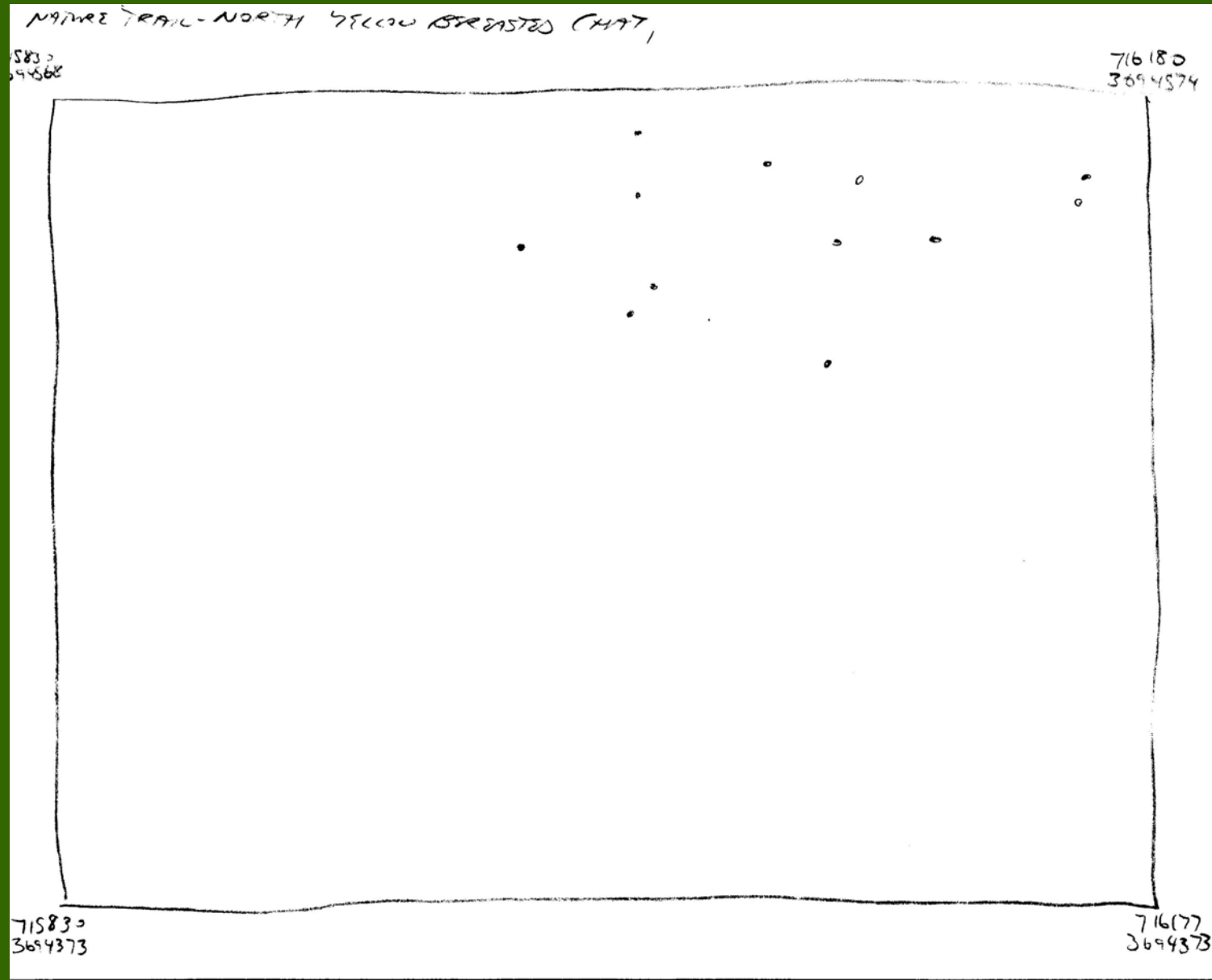
# Habitat Creation Plot Example: Intensive Survey





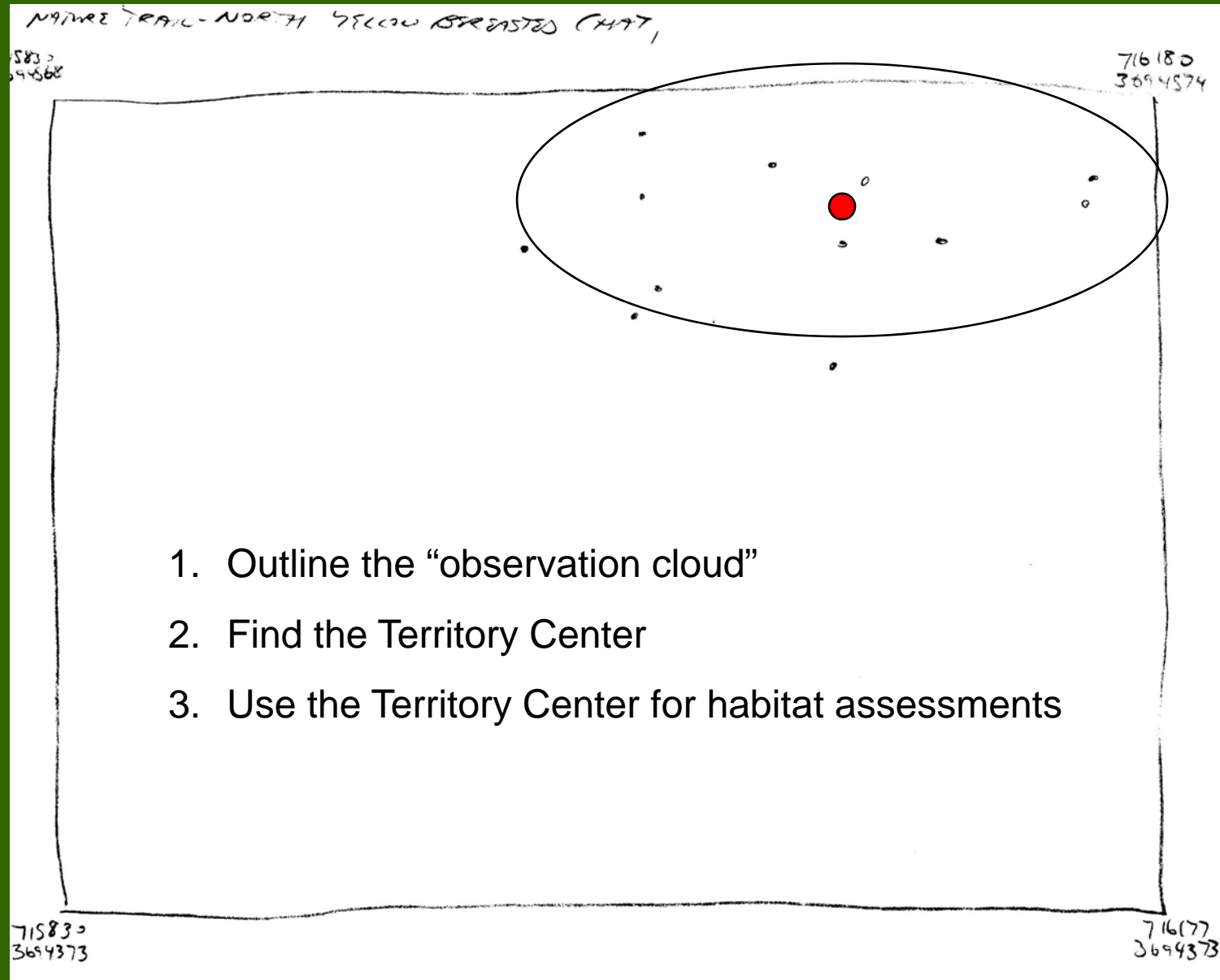


# Habitat Creation Plot Example: Intensive Survey





# Habitat Creation Plot Example: Intensive Survey



# 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



Cindy Marple



# 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

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



# 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

<u>Species</u>	<u>Number of Territories</u>
Yellow-breasted Chat	61
Song Sparrow	54
Yellow Warbler*	29
Common Yellowthroat	24
Bell's Vireo*	21
White-winged Dove	17
Black-tailed Gnatcatcher	16
Lucy's Warbler	16
Verdin	16
Abert's Towhee	14
Gambel's Quail	14
Mourning Dove	14
Ash-throated Flycatcher	7
Gila Woodpecker*	6



# *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



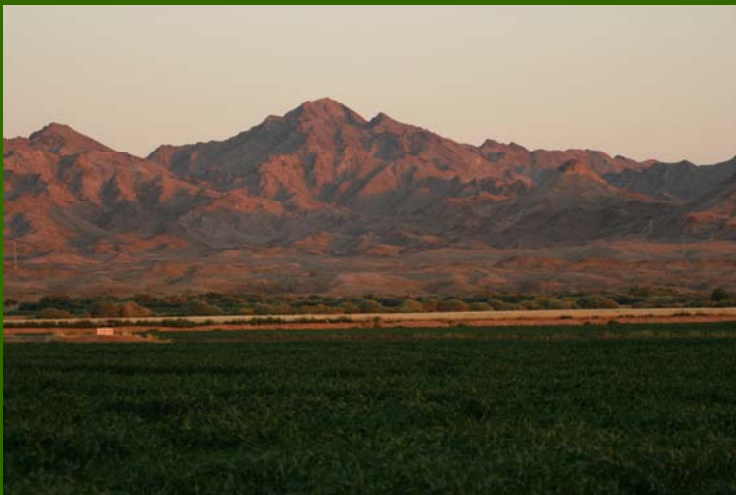
- **Habitat Creation plots: 231 breeding individuals of 32 species**
- Four of our six covered species, Bell's Vireo, Yellow Warbler, Summer Tanager, and Vermilion Flycatcher, were confirmed as breeders in post-development habitat creation sites
- Gila Woodpecker and Gilded Flickers were not recorded 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

<u>Species</u>	<u>Average</u>
Red-winged Blackbird	341
Mourning Dove	42.5
House Finch	35.5
Yellow-headed Blackbird	33
Brown-headed Cowbird	23.5
Abert's Towhee	21.5
Horned Lark	18.5
Gambel's Quail	17
Cliff Swallow	13
White-winged Dove	12

# 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*

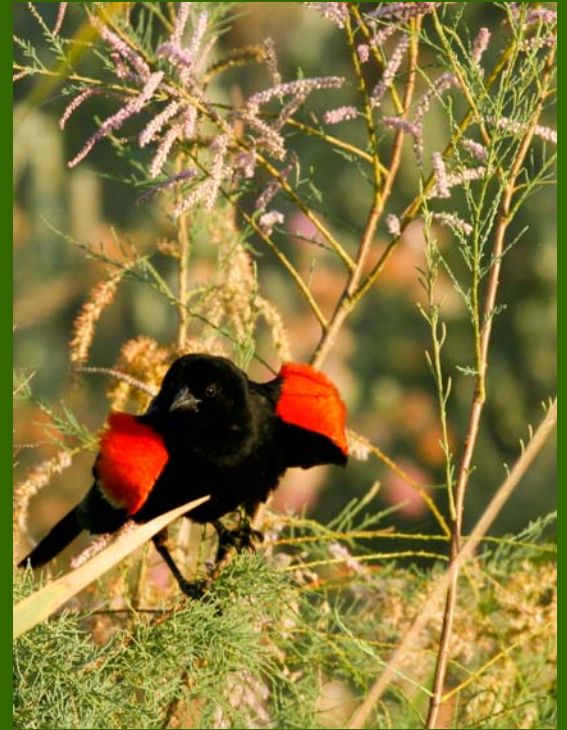
- The LCR corridor has a large variety of both breeding birds and migrants
- Overall abundances is greatest in generalist species
- Most abundant breeders included mostly riparian specialists
- Data indicate a substantial seasonal effect in some species





# 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

<b>Grinnell (1914)</b>	<b>Birds of the LCRV (1974-1984)</b>	<b>Current Research (2008)</b>
<b>nested commonly in saguaros</b>	<b>total population in LCRV and BWD = ~270 individuals</b>	<b>no confirmed sightings</b>



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



<b>Grinnell (1914)</b>	<b>Birds of the LCRV (1974-1984)</b>	<b>Current Research (2008)</b>
<b>common everywhere throughout the LCRV</b>	<b>less common than 1914, isolated in areas of large cottonwoods, willows, and saguaros</b>	<b>common in areas with large trees and saguaros</b>



# 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

<b>Grinnell (1914)</b>	<b>Birds of the LCRV (1974-1984)</b>	<b>Current Research (2008)</b>
<b>numerous from Blythe to Yuma in large clearings by cottonwood stands</b>	<b>rare (~10 pair), mostly used developed edges, more common in winter</b>	<b>only 3 pair found, using open mature mesquite and mesquite restoration</b>

# 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



<b>Grinnell (1914)</b>	<b>Birds of the LCRV (1974-1984)</b>	<b>Current Research (2008)</b>
<b>common, characteristic bird of cottonwood- willow habitat</b>	<b>rare and uncommon breeder, very low population estimates</b>	<b>uncommon breeder, dense riparian forest with native trees</b>

# 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

Grinnell (1914)	Birds of the LCRV (1974-1984)	Current Research (2008)
very common and abundant (until ~1950)	rare / uncommon breeder, considered one of the most threatened birds in the LCRV, pop. dropped from 202 to 88 from '76-'86	fairly common, found on system-wide and restoration sites, mixed habitat with mesquite near water



Bill Horn



# Sonoran Yellow Warbler

## (*Dendroica petechia sonorana*)

James Ownby



- 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



Grinnell (1914)	Birds of the LCRV (1974-1984)	Current Research (2008)
very common in cottonwood-willow, huge breeding population in the LCRV	numerous during migration, totally absent during breeding, handful of breeding records in 10 years	fairly common, found on system-wide and restoration sites, dense riparian near water

# Results

	System-wide	Restoration
YWAR	20	10
BEVI	19	4
GIWO	19	0
SUTA	8	3
VEFL	1	2
GIFL	0	0



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 vari

