Lower Colorado River Riparian Birds 2009

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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)

Today's Talk

1. **Report on 2009 Field Season**

- **System-wide area searches**
- **Habitat creation area searches**
- **Habitat modeling**
- **Protocol updates**

2. **Preview of 2010 Season**

Introduction

***Our Purpose**:*

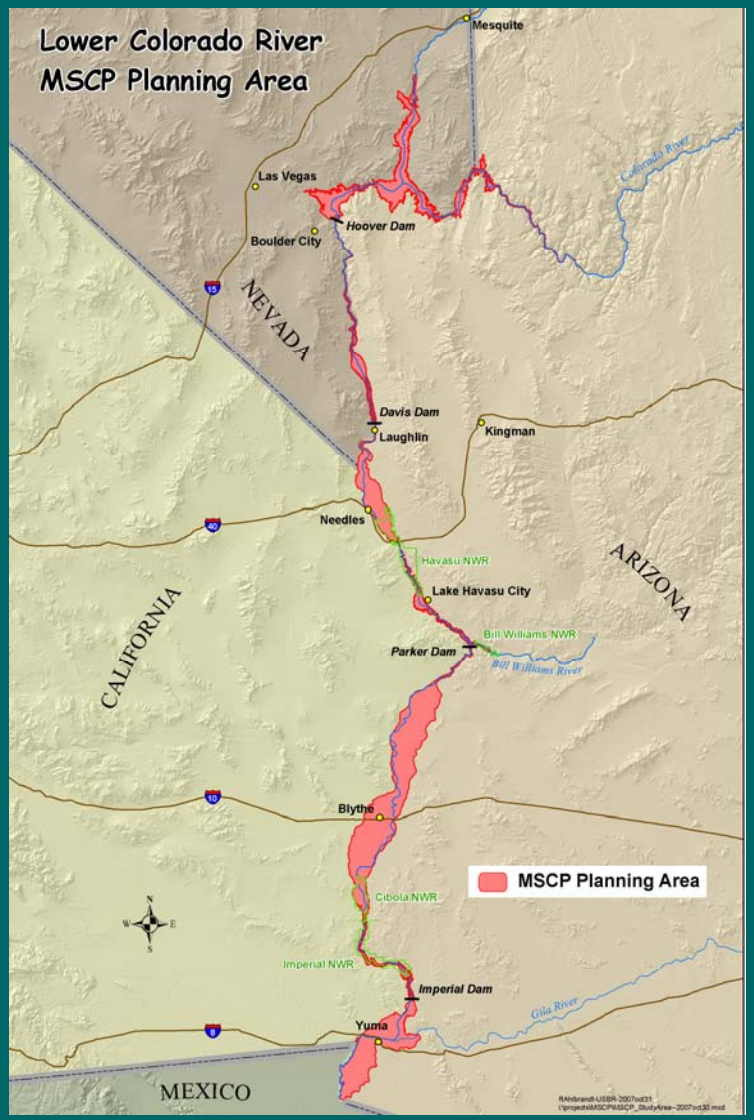
1. Implement long-term system-wide monitoring of riparian birds on the Lower Colorado River
2. Study the effects of habitat restoration measures on the Lower Colorado River

Goals in 2009:

1. Determine presence and estimate breeding population sizes of covered species on the Lower Colorado River and in habitat creation sites
2. Estimate presence and abundances of other riparian landbirds
3. Determine habitat associations for the covered species based on field habitat assessments
4. Derive recommendations for habitat creation and continued bird monitoring under the adaptive management process outlined in the LCR MSCP Science Strategy (USBR 2006)

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 from river reaches
- Plots size based on habitat, 300m x 300m or larger

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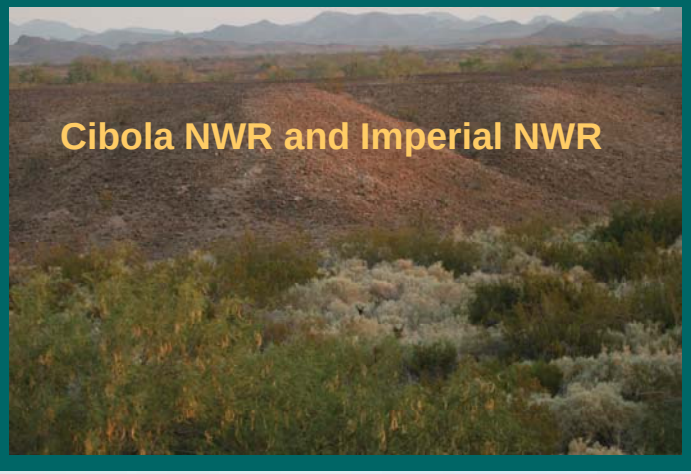
Study Area: System-wide

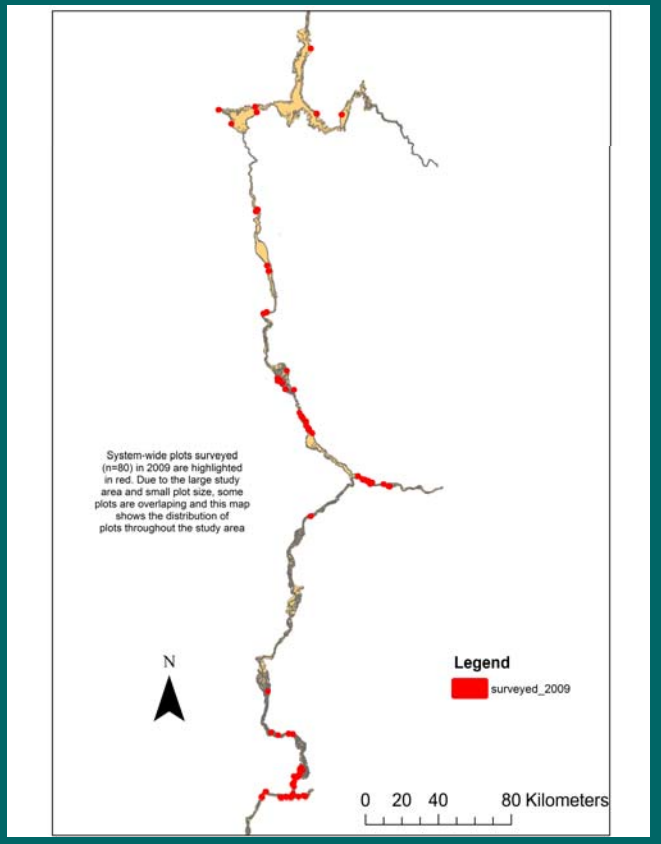


Plots 2009

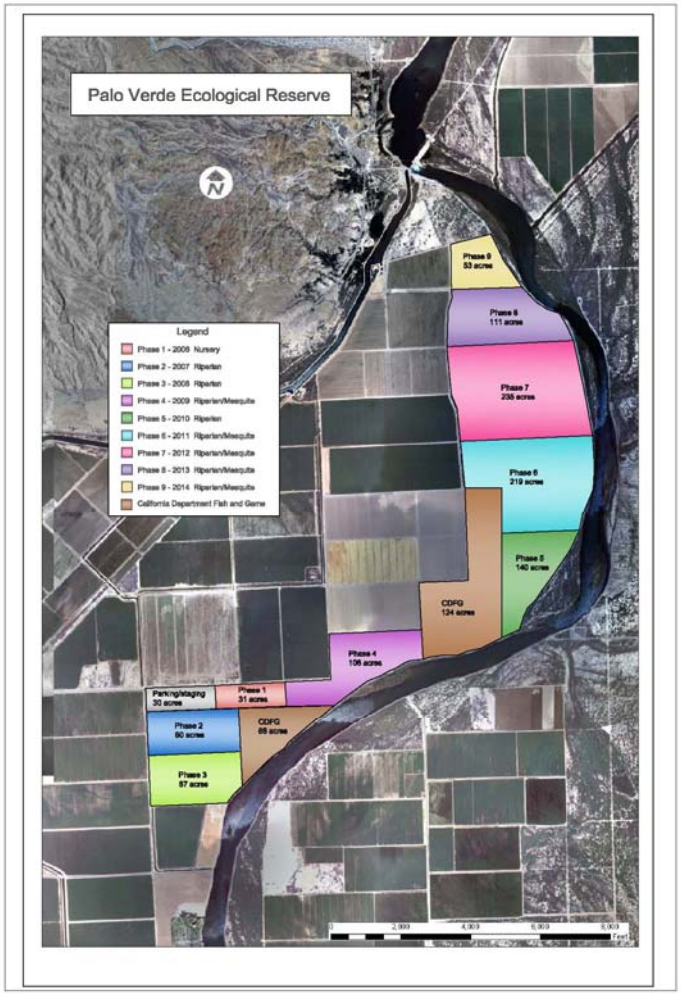
Stratified random selection:
(Habitat = selection stratum)

Weighted for “good” habitat

		Habitat						
Region	Region Name	0-U	1-GT	2-GL	3-F	4-P	5-M	Total
3	Lake Mead	3				4		7
4	Hoover Dam to Davis Dam	1			3			4
5	Davis Dam to Bill Williams NWR (excluding Havasu NWR)		1		4	1	3	9
6	Havasu NWR	1	4		1		2	8
7	Bill Williams NWR	1	1	3	1	7	1	14
8	Bill Williams to Cibola excluding CRIT		1					1
10	Cibola NWR					1		1
11	Imperial NWR	1					3	4
12	Colorado River from the Imperial NWR to Yuma		12	16	1	1		30
13	Yuma to Southerly International Border		1	1				2
	Total	**7**	**20**	**20**	**10**	**14**	**9**	**80**



Study Area: Habitat Creation Plots



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Habitat Creation Sites

Site and Plot	Restoration Work Phase	Dominant Vegetation	Survey Type 2009
Beal Lake Riparian Habitat Creation Project			
Beal A	planted 2004	screwbean mesquite	intensive*
Beal B	planted 2004	cottonwood-willow	intensive*
Beal C	planted 2004	cottonwood-willow	intensive*
Beal D	planted 2004	screwbean mesquite	intensive*
Colorado River Indian Tribe			
CRIT 9A	planted 2001	screwbean mesquite	intensive*
CRIT 9B	planted 2001	cottonwood-willow	intensive*
CRIT 9C	planted 2002	cottonwood-willow/screwbean mesquite	intensive*
CRIT 9D	planted 2003	cottonwood-willow/honey mesquite	intensive*
CRIT 9E	planted 2005	cottonwood-willow	intensive*
Cibola Valley Conservation and Wildlife Area			
CVCA 1A	planted 2006	cottonwood-willow	intensive
CVCA 1B	planted 2006	cottonwood-willow	intensive
CVCA 1C and D	planted 2006	cottonwood-willow	intensive
CVCA 2 (A,B,C)	planted 2008	cottonwood-willow	not surveyed**
CVCA 3 A & B	planted 2007	cottonwood-willow	intensive
CVCA 3 C & D	planted 2007	cottonwood willow/baccaris	intensive
Cibola Nature Trail			
NT-north	planted 1999	mesquite-cottonwood-willow	intensive
NT-south	planted 1999	mesquite-cottonwood-willow	intensive
Mass Planting	planted 2005	cottonwood-willow	intensive
Palo Verde Ecological Preserve			
PVER 2A	planted 2007	cottonwood-willow	intensive
PVER 2B	planted 2007	cottonwood-willow	intensive
PVER 3	planted 2008	cottonwood-willow	not surveyed**

* Surveyed by BOR in 2009, will be surveyed by GBBO in 2010

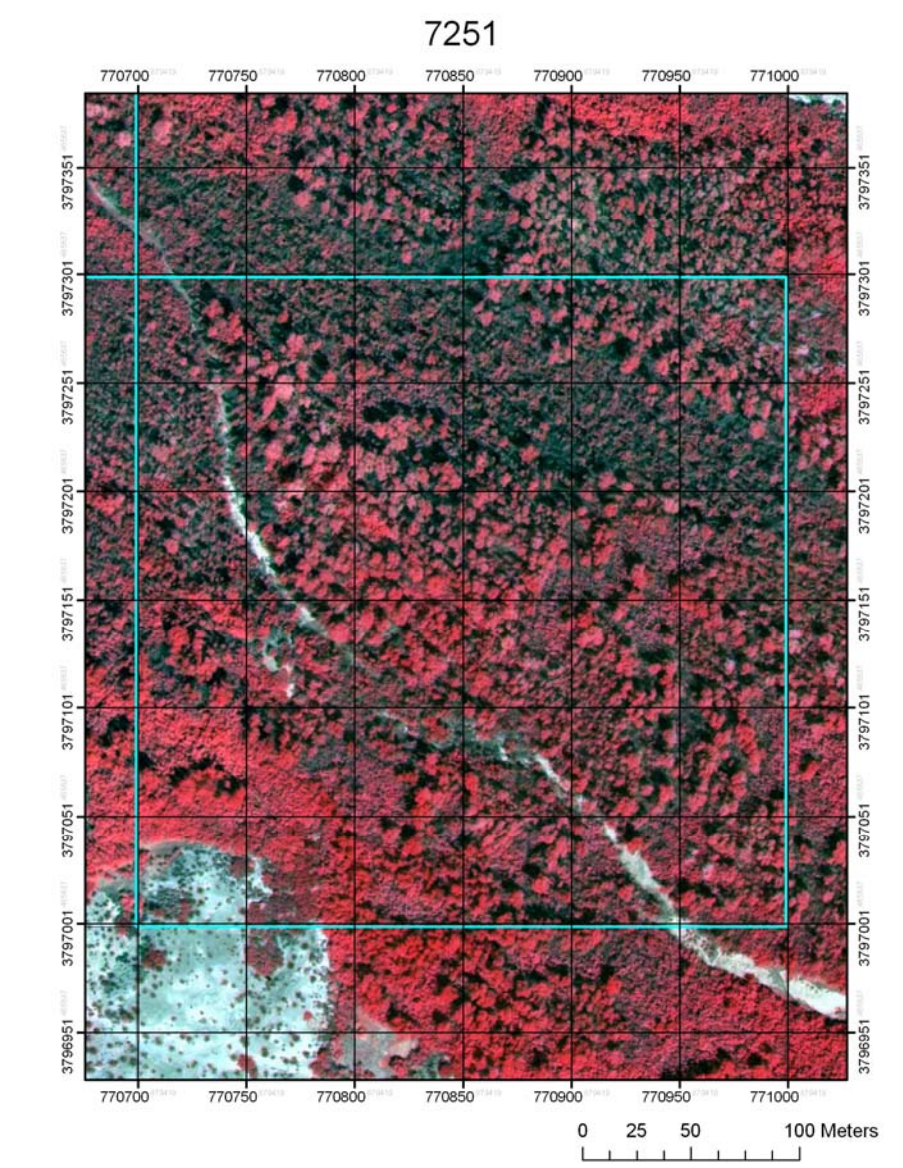
** New intensive surveys in 2010

Methods: Bird Surveys

Mid- April to Mid-June, 2009

Type 1- Rapid Method:

- 80 system-wide plots
- Each plot surveyed twice
- Area search to ID and count all birds of all species within the plot….and collect behavioral information…
- Evolution from 2008: collected more breeding info……



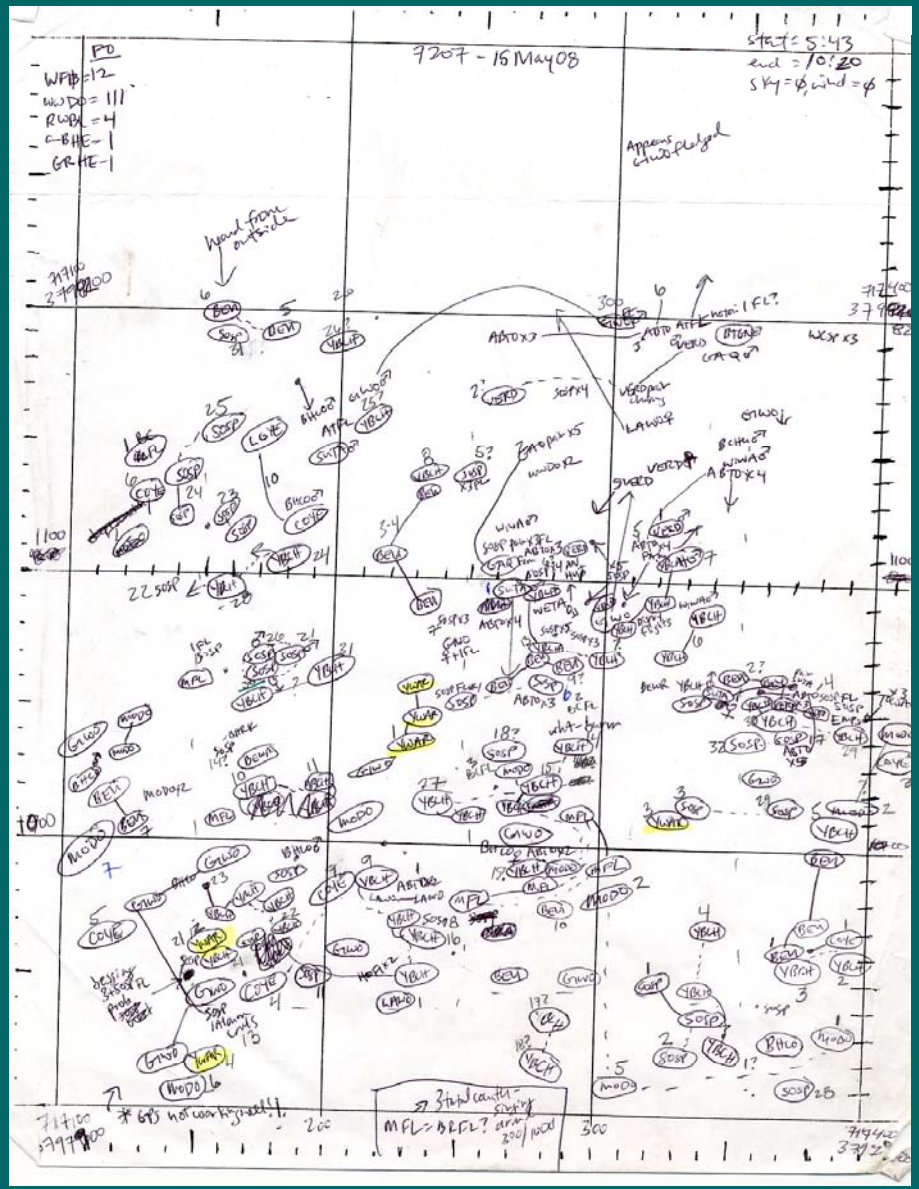
Sample map from Mosquito Flats, Bill Williams NWR

Methods: Bird Surveys

Mid- April to Mid-June, 2009

Type 2- Intensive Method:

- Subset of 8 system-wide plots, 19 restoration plots
- Each plot surveyed 8 times (~once a week for 8 weeks)
- Area search to ID, count, and tally all birds of all species within the plot and record breeding evidence
- Map territories of all breeding birds



Sample of an intensive plot with territory mapping

Survey Techniques

- All surveys began at sunrise and last several hours (must finish by noon)
- Surveyor passed within 50m of all points on the plot
- Hiking, kayaks, and power boats were used to access plots
- Data was summarized immediately after each survey

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)*

Protocol Evolution

- Large project with long-term goals
- Take advantage of what we learn each year to make the protocol better
- Change between 2007 and 2009: count territories instead of birds
- Major change in 2009: collect much more breeding data
- Rapid method has been the hardest to nail down

Double-Sampling

- All rapid bird survey techniques may result in biased estimates of birds that are less detectable than others.
- Also, birds that are temporarily undetectable may be missed entirely.
- To obtain an estimate of effect size of this bias, intensive and rapid area searches can be used in a double-sampling approach.
- For this, a surveyor other than the one conducting intensive area searches visits the intensive area search plot to conduct a standard rapid area search without any prior knowledge of the plot and its birds.
- Using the detections during the rapid area search + the actual number of territories present on the plot (determined in the intensive area search) the detection ratio can be estimated

Habitat Assessments

We collected habitat data at *use* and *non-use* sites for covered species including:

- Photograph of the site
- Qualitative data on landscape and habitat features
- Cover and foliage height diversity via point-intercept using a 5m veg. pole
- Tree / snag densities and sizes
- Shrub density
- Canopy closure (densiometer)
- Soil moisture

Habitat Assessment

- 6 different covered species with different habitat needs
- Measured lots of variables: goal was to provide specifics for restoration planners
- Different scales: macro and micro
- Habitat models: patterns that matter

Results

Rapid surveys

- system-wide plots (n = 80): 21,789 individuals of 149 species
- 83 species were presumed breeders and 66 were migrants or presumed non-breeders

Intensive surveys

- system-wide plots (n = 8): 527 breeding territories of 43 species
- 4 of the covered species nesting in intensive area search plots
  - 22 Yellow Warbler territories
  - 9 Bell's Vireo territories
  - 6 Gila Woodpecker territories
  - 1 Summer Tanager territory

Results

- 172 species of birds were detected in all 2009 surveys
- 192 species recorded between 2008 and 2009
- All covered species except the Gilded Flicker were detected in at least one site
- All but the Gilded Flicker and Gila Woodpecker were found nesting in at least one habitat creation site
- Most widespread and common covered species were Bell's Vireo and Yellow Warbler
- Vermilion Flycatcher and Summer Tanager occurred sporadically and in low numbers throughout the project area

Results: System-wide population size estimates

- Combined all three of the first years of this project (2007-2009) to calculate a double sampling-based detection ratio
- System-wide population size estimates for presumed breeders of the covered species:
- ~4000 Bell’s Vireo territories
- ~3600 Yellow Warbler territories
- ~2700 Gila Woodpecker territories
- ~720 Summer Tanager territories
- ~190 Vermilion Flycatcher territories
- 10 most abundant breeders system-wide: Abert's Towhee, Brown-headed Cowbird, Black-tailed Gnatcatcher, Common Yellowthroat, Gambel's Quail, Marsh Wren, Mourning Dove, Verdin, White-winged Dove, Yellow-breasted Chat

Results: Habitat Creation Sites

- Intensive area searches (n=17) on habitat creation sites: 559 breeding territories of 34 species
- Four of six covered species (Bell's Vireo, Yellow Warbler, Summer Tanager, and Vermilion Flycatcher) were found breeding in the habitat creation sites
- Gila Woodpecker and Gilded Flickers were not detected on habitat creation sites

Results: Habitat Models

- Data collection began in spring 2008 and completed in June of 2009
- Two-year goal of assessing 20 territories per covered species paired with 20 non-use sites from the same region/habitat stratum
- Only three of the six covered species were common enough in the system to approach this sample size: Bell's Vireo, Yellow Warbler, and Gila Woodpecker
- We assessed:
  - Bell's Vireo - 34 territories
  - Yellow Warbler - 35 territories
  - Gila Woodpecker- 15 territories
- Summer Tanager, Vermilion Flycatcher and Glided Flicker too rare: sample size could not be met in 2 years
- In 2010 we will collect more data on Summer Tanager and Vermillion Flycatcher to reach goals

Results: Habitat Models

- Gila Woodpeckers: associated with the presence of large-diameter snags and patches of upland habitat within the riparian habitat mosaic
- Vermilion Flycatcher: associated with tall tree cover and the presence of mid-story mesquite, but appeared to avoid salt cedar
- Bell's Vireo: positively associated with tall riparian tree cover, particularly cottonwood, and the presence of shrub mesquite
- Yellow Warbler: found in tall and low riparian canopy covers, particularly cottonwood and willow, but avoided mesquite, upland habitat patches, and patches dominated by low ground vegetation
- In our habitat summaries, we included a full list of habitat variable measurements for all territories that were assessed in the field to serve as a reference sheet for potential use in planting efforts.

Results: Habitat Models

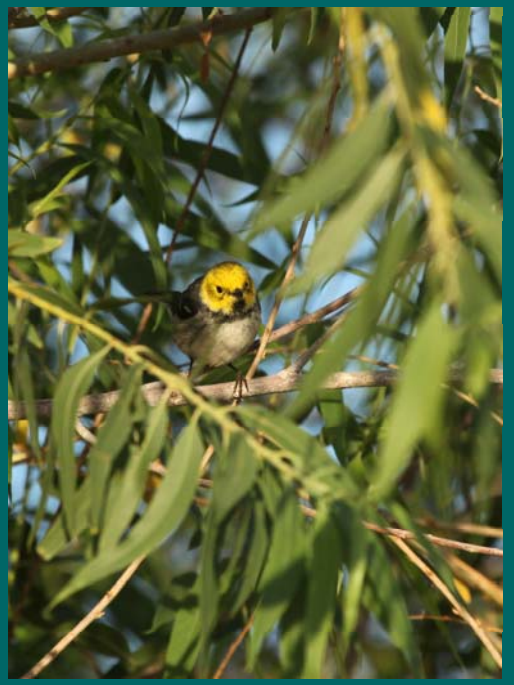
Categorical Habitat Variable	Gila Woodpecker		Bell's Vireo		Yellow Warbler		Non-Use Sites (All Species)	
	%Terr.	n	%Terr.	n	%Terr.	n	%Terr.	n
Landscape Features								
Water source in territory	14	14	23	35	52	33	32	96
Water source w/in 100 m	14	14	49	35	71	31	57	96
Water source w/in 1000 m	**86**	14	**94**	34	**100**	31	**94**	96
Dry wash > 5 ft wide in territory	57	14	34	35	6	33	30	96
Dry wash > 5 ft wide w/in 100 m	64	14	69	35	29	34	51	96
Dry wash > 5 ft wide w/in 1000 m	**79**	14	**91**	35	70	33	**88**	96
Availability of Large Trees and Snags								
Trees >12 cm DBH in territory	**86**	14	**94**	35	**85**	34	60	96
Trees >12 cm DBH w/in 100 m	**100**	14	**94**	35	**91**	32	**79**	96
Trees >12 cm DBH w/in 1000 m	**100**	14	**97**	34	**100**	31	**95**	96
Snags >12 cm DBH in territory	43*	14	26	34	47	34	11	96
Snags >12 cm DBH w/in 100m	29	14	52	33	67	33	20	96
Snags >12 cm DBH w/in 1000 m	71	14	**97**	33	**85**	33	68	96

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?



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

Grinnell (1914)	Birds of the LCRV (1974-1984)	Current Research (2009)
nested commonly in saguaros	total population in LCRV and BWD = ~270 individuals	no confirmed sightings

Cindy Marple

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

Grinnell (1914)	Birds of the LCRV (1974-1984)	Current Research (2009)
numerous from Blythe to Yuma in large clearings by cottonwood stands	rare (~10 pair), mostly used developed edges, more common in winter	only 3 pair found, using open mature mesquite and mesquite restoration

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

Grinnell (1914)	Birds of the LCRV (1974-1984)	Current Research (2009)
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 migrant and breeder, found on system-wide and restoration sites, dense riparian near water

Improvements and the Future

- **1 more field season in 2010**
- **Report in December 2010 combining 3 years of data**
- **Review and submit updated protocols, field manual, and summary of the “process”**

Acknowledgements

- US Bureau of Reclamation: Beth Sabin, Barbara Raulston, Theresa Olson, all wildlife folks and boat drivers
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