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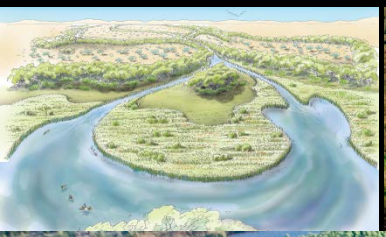
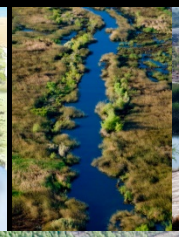




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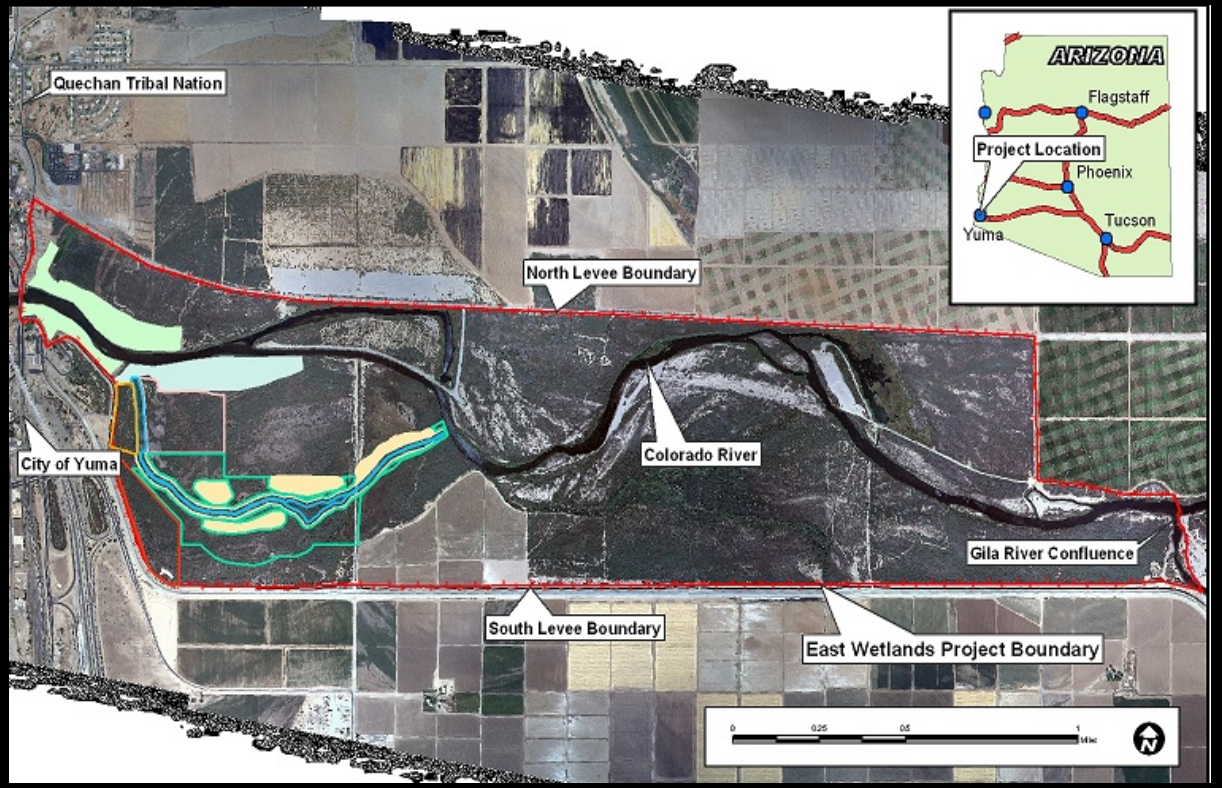
Bird and Butterfly Recovery at the Yuma East Wetlands

Heidi Trathnigg
FPC 2015

Yuma East Wetlands Restoration

- 936 acres proposed
- Goal to restore wildlife habitat
- Evaluate wildlife recovery
  - Birds
  - Invertebrates
  - Mammals
  - Amphibians & Reptiles
  - Fish



Baseline Research (2007-2008)

Birds

- Reference sites had significantly higher richness and abundance
- No difference between immature restored and control sites

Invertebrates

- Ag and reference sites had highest richness
- Some butterfly species only found in reference and mature riparian habitats
- Large scope not enough detail

Herpetofauna and Mammals

- Need more time to re-colonize site

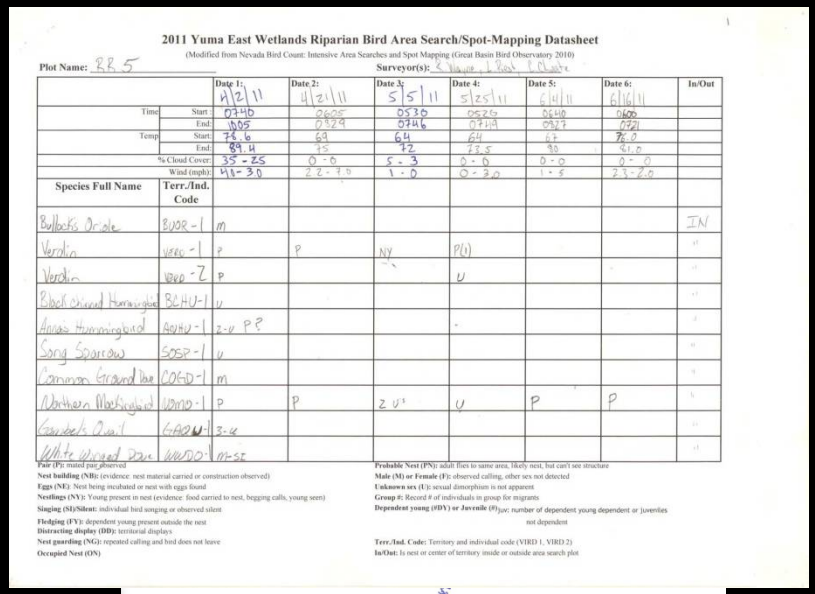
Rational and Hypothesis

- Bird Community
  - Quickly re-colonize restored areas (Passell 2000, Gardali et al. 2006)
  - Habitats have matured
- Butterfly Community
  - Quickly re-colonize restored areas
  - Good indicators of herbaceous community health (Scoble 1992)
  - Easy to identify quickly

Hypothesis: Bird and butterfly richness and abundance will be greater in restored verses control sites.

Bird Surveys

- Intensive Area Searches (Great Basin Bird Observatory 2010 and Bart et al. 2010)
  - 10 Riparian Plots
  - 1-3 h/plot
  - 6 surveys during April-June
- Variable circular plots (Reynolds et al. 1980)
  - 16 Marsh Plots
  - 10 m increment bands up to 100 m
  - Marsh bird monitoring protocol



2011 Yuma East Wetlands Riparian Bird Area Search/Spot-Mapping Datasheet

(Modified from Nevada Bird Count: Intensive Area Searches and Spot Mapping (Great Basin Bird Observatory 2010))

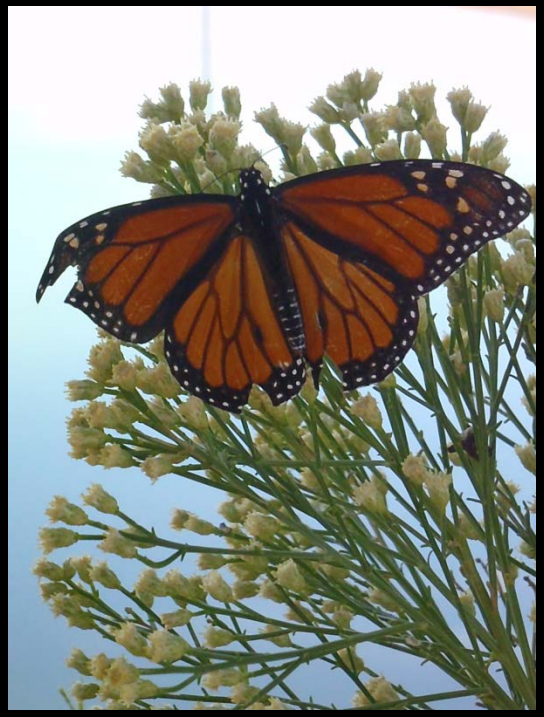
Plot Name: RR 5 **Surveyor(s):** [illegible]

		Date 1: 4/2/11	Date 2: 4/21/11	Date 3: 5/5/11	Date 4: 5/25/11	Date 5: 6/4/11	Date 6: 6/16/11	In/Out
Time	Start:	0740	0625	0530	0625	0540	0600	
	End:	1005	0829	0746	0918	0827	0721	
Temp	Start:	78.6	69	64	64	67	76.0	
	End:	89.4	75	72	73.5	90	91.0	
% Cloud Cover:		35 - 25	0 - 0	5 - 3	0 - 0	0 - 0	0 - 0	
Wind (mph):		4.3 - 3.0	2.2 - 7.0	1 - 0	0 - 3.0	1 - 5	2.3 - 2.0	
Species Full Name	**Terr./Ind. Code**							
Bullock's Oriole	BUOR-1	m						IN
Verdin	VERD-1	P	P	NY	P(1)			
Verdin	VERD-2	P			U			
Black-chinned Hummingbird	BCHU-1	U						
Anna's Hummingbird	ANHU-1	2-U P?						
Song Sparrow	SOSP-1	U						
Common Ground-dove	COGD-1	m						
Northern Mockingbird	NOMO-1	P	P	2 U+	U	P	P	
Gambel's Quail	GAQU-1	3-4						
White-winged Dove	WWDO-1	M+SI						

Pair (P): mated pair observed
Nest building (NB): (evidence: nest material carried or construction observed)
Eggs (NE): Nest being incubated or nest with eggs found
Nestlings (NY): Young present in nest (evidence: food carried to nest, begging calls, young seen)
Singing (SI)/Silent: individual bird songing or observed silent
Fledging (FY): dependent young present outside the nest
Distracting display (DD): territorial displays
Nest guarding (NG): repeated calling and bird does not leave
Occupied Nest (ON)
Probable Nest (PN): adult flies to same area, likely nest, but can't see structure
Male (M) or Female (F): observed calling, other sex not detected
Unknown sex (U): sexual dimorphism is not apparent
Group #: Record # of individuals in group for migrants
Dependent young (#DY) or Juvenile (#)[juv]: number of dependent young dependent or juveniles not dependent
Terr./Ind. Code: Territory and individual code (VIRD 1, VIRD 2)
In/Out: Is nest or center of territory inside or outside area search plot

Butterfly Surveys

- 10 transects through riparian plots
- Surveyed 4 times (April, May, June, & Sept.)
- Timed searches (1 min/ 20m), not including pursuit time
- Behavior was recorded



Habitat and Nectar Resource Sampling

- Habitat Characteristics
  - 1 time per plot (July and September)
  - 30 plots in riparian and 20 plots in wetland
  - TVV and cover (3m radius circle) recorded
  - Butterfly host plant frequency and abundance; bird habitat
- Nectar Resources
  - 4 times (after butterfly sampling)
  - 3m diameter plots every 10m along transect
  - Tally blooming flowers by species
  - Number of inflorescence tallied

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Ecosystem Restoration Land Planning

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Yuma Crossing National Heritage Area
180 West First Street,
Suite E Yuma,AZ 85364

YEW Monitoring Locations

11-172 WPF Research Proposal Avifauna and Butterfly (Lepidoptera) Recovery in Restored Wetland adn Riparian Habitats

YUMA, ARIZONA

Aerial Map

Scale: 1" = 1000'

0' 250' 500' 1000' 1500' NORTH

DATE: APRIL 4, 2011
JOB NO.: 11005-2
DRAWN BY: KI
DESIGNED BY: HT
CHECKED BY:

FIGURE 1

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YUMA, ARIZONA

Aerial Map

Scale: 1" = 500'

0' 125' 250' 500' 750' NORTH

DATE: APRIL 4, 2011
JOB NO.: 11005-2
DRAWN BY: KI
DESIGNED BY: HT
CHECKED BY:

FIGURE 2

Bird Results

- 72 resident and migrating species detected in riparian and wetland sites

  Riparian

  – 15 resident species in restored

  – 9 resident species in control

  Wetland

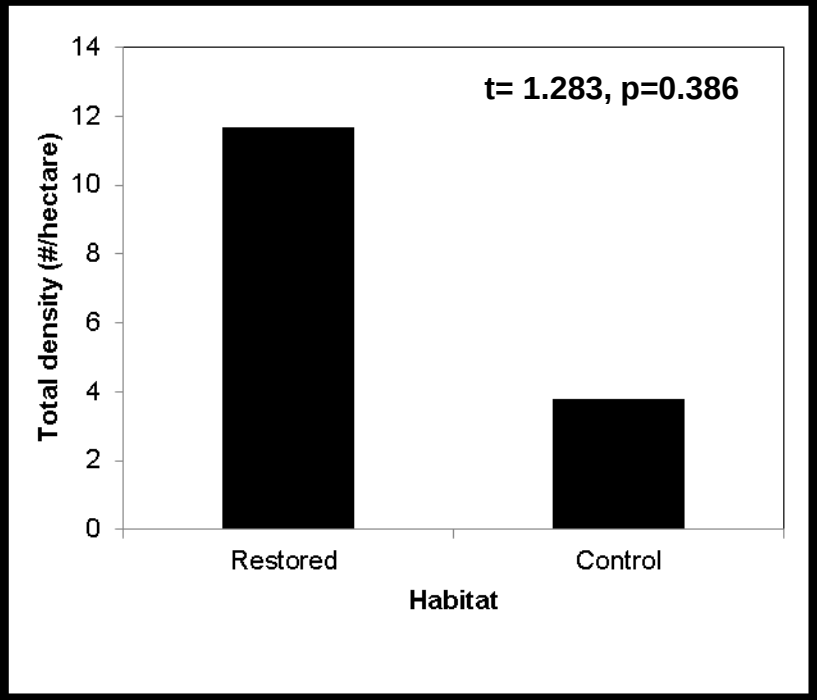
  – 14 species in restored

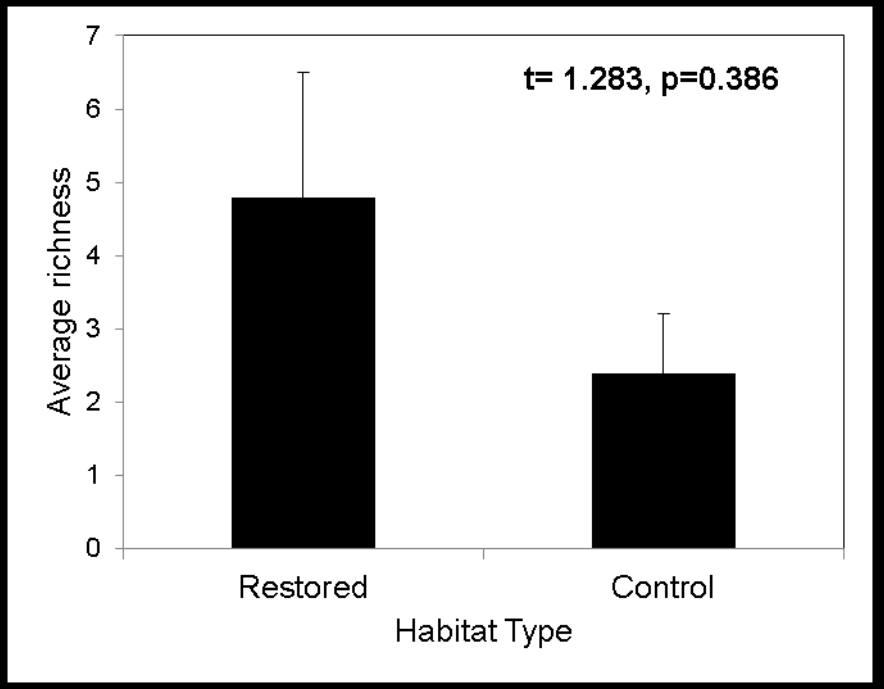
  – 10 species in control

Resident Riparian Birds

Genus species	Common Name	Total Number Detected		Density (#/hectare)	
		Restored Riparian	Control Riparian	Restored Riparian	Control Riparian
Pipilo aberti	Abert's Towhee	10	0*	1.03	0.00
Calypte anna	Anna's hummingbird	2	0*	0.21	0.00
Myiarchus cinerascens	Ash-throated flycatcher	0*	2	0.00	0.26
Vireo bellii	Bell's vireo	1	0	0.10	0.00
Polioptila melanura	Black-tailed gnatcatcher	2	3	0.21	0.39
Geothlypis trichas	Common yellowthroat	1	0*	0.10	0.00
Toxostoma crissale	Crissal thrasher	1	0*	0.10	0.00
Callipepla gambelii	Gambel's quail	9	0*	0.93	0.00
Melanerpes uropygialis	Gila woodpecker	3	0*	0.31	0.00
Quiscalus mexicanus	Great-tailed grackle	2	0	0.21	0.00
Carpodacus mexicanus	House finch	11	2	1.14	0.26
Picoides scalaris	Ladder-backed woodpecker	2	0*	0.21	0.00
Chordeiles acutipennis	Lesser nighthawk	0*	2	0.00	0.26
Zenaida macroura	Mourning Dove	26	6	2.69	0.78
Mimus polyglottos	Northern mockingbird	3	0	0.31	0.00
Melospiza melodia	Song sparrow	0*	1	0.00	0.13
Auriparus flaviceps	Verdin	36	6	3.72	0.78
Tyrannus verticalis	Western kingbird	0*	2	0.00	0.26
Zenaida asiatica	White winged dove	4	5	0.41	0.65

Resident Riparian Birds





- **Four times higher total resident bird density in restored vs. control, not significant**
- **No difference in species richness**

Riparian Vegetation

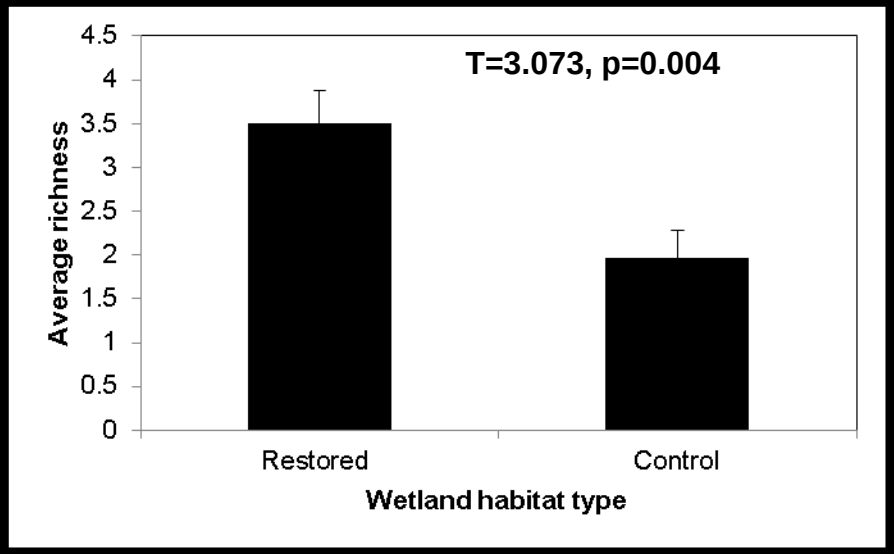
- Higher species diversity in restored verses control sites
- Higher % herbaceous cover in restored verses control, not significant
- No correlations with resident riparian birds and vegetation characteristics

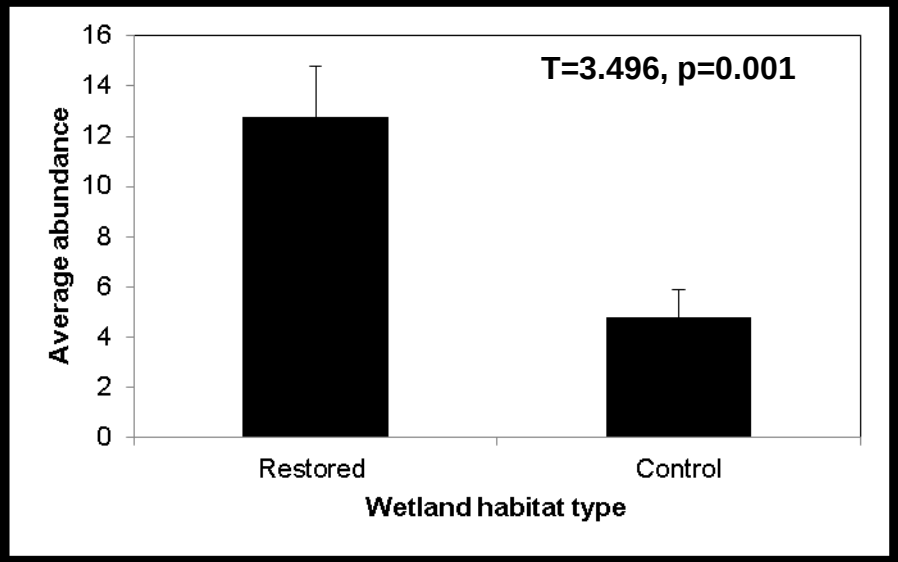
Average Values	**Restored**	**Control**	**t**	***p*-value**
TVV	0.183	0.200	-0.239	0.817
Species Diversity (H')	1.383	0.658	2.822	0.022*
% Herb Cover	18	0	2.5	0.293
% Shrub Cover	14	16	12	0.744
% Mid-canopy	18	32	12	0.429

Marsh Birds

Genus species	Common Name	Total Number Detected	
		Restored Wetland	Control Wetland
Fulica americana	American coot	6	39
Himantopus mexicanus	Black-necked Stilt	4	0
Aythya valisineria	Canvasback	0	1
Anas cyanoptera	Cinnamon teal	12	0
Rallus longirostris	Clapper rail	6	0
Gallinula chloropus	Common Moorhen	0	6
Geothlypis trichas	Common yellowthroat	12	8
Ardea herodias	Great blue heron	1	1
Charadrius vociferus	Killdeer	10	0
Ixobrychus exilis	Least bittern	1	1
Cistothorus palustris	Marsh wren	22	4
Podilymbus podiceps	Pied-billed grebe	0	2
Agelaius phoeniceus	Red-winged blackbird	1	0
Egretta thula	Snowy egret	3	0
Melospiza melodia	Song Sparrow	10	0
Porzana carolina	Sora	1	3
Xanthocephalus xanthocephalus	Yellow-headed blackbird	54	19

Marsh Birds





- **Two-fold higher total resident bird richness in restored wetlands vs. control**
- **Three-fold higher wetland bird abundance in restored vs. control**

Marsh Vegetation

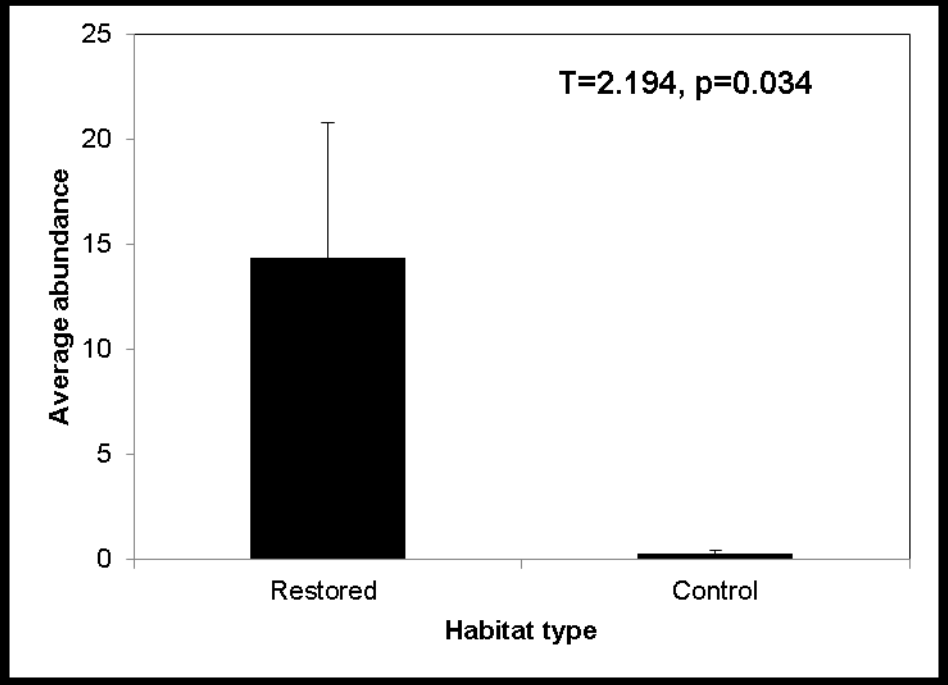
- Higher % herbaceous cover in restored verses control
- Higher % open water in control verses restored
- No correlations with marsh birds and vegetation characteristics

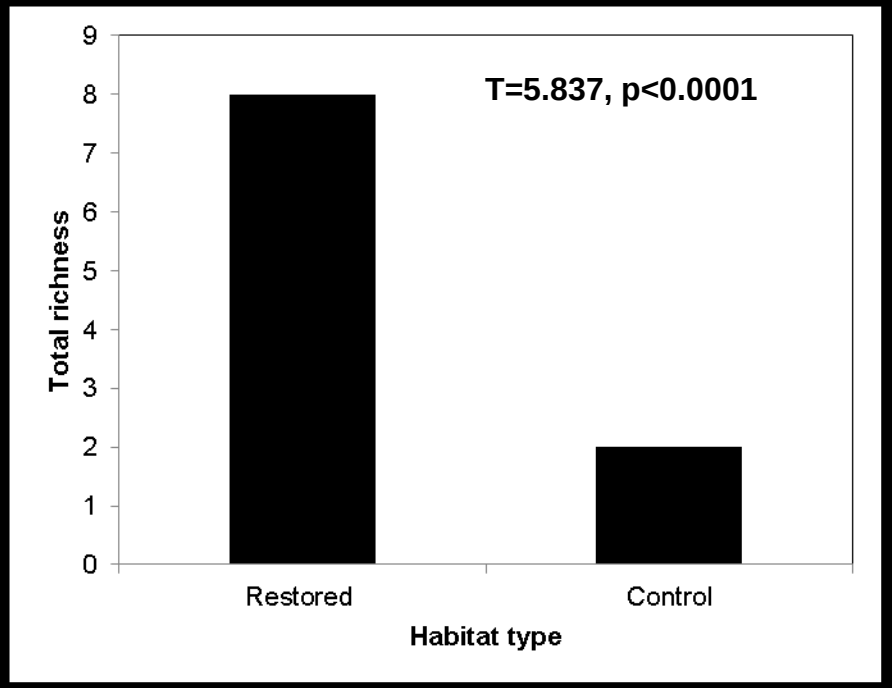
Average Values	Restored	Control	t	*p*-value
Species Diversity (H')	1.521	1.231	1.151	0.269
% Herb Cover	28	4	4.59	0.001*
% Shrub Cover	42	60	-1.489	0.159
% Open Water	2	10	-2.292	0.038*

Butterflies

Family	Scientific Name	Common Name	Host plant family	Restored observations	Control Observations
Hesperiidae	*Pyrgus communis*	Common Checkered-skipper	Malvaceae	1	0
Lycaenidae	*Brephidium exile*	Western Pygmy-Blue	Chenopodiaceae	245	0
Lycaenidae	*Hemiargus ceraunus*	Ceraunus Blue	Fabaceae	26	0
Lycaenidae	*Leptotes marina*	Marine Blue	Fabaceae	1	0
Lycaenidae	*Strymon melinus*	Gray Hairstreak	Fabaceae and Malvaceae	1	0
Pieridae	*Pieris rapae*	Small White	Brassicaceae	1	1
Pieridae	*Nathalis iole*	Dainty Sulphur	Asteraceae (Tagetes)	5	0
Pieridae	*Colias eurytheme*	Orange Sulphur	Fabaceae	6	5

Butterflies





- **48 times higher abundance in restored verses control sites**
- **4 times higher richness in restored vs. control**

Nectar Resource

TBPA= total blooming plant abundance
TI= total inflorescence

Common Name	Scientific Name	Restored Riparian		Control Riparian	
		TBPA	TI	TBPA	TI
Desert marigold	*Baileya multiradiata*	3	3	-	-
Lambsquarters	*Chenopodium album*	6	2	-	-
Canadian horseweed	*Conyza canadensis*	12	78	-	-
Salt heliotrope	*Heliotropium curassavicum*	160	1399	-	-
White sweetclover	*Melilotus alba*	56	464	-	-
Yellow sweetclover	*Melilotus officinalis*	19	144	-	-
Mexican evening primrose	*Oenothera mexicana*	690	1529	-	-
Saltmarsh fleabane	*Pluchea odorata*	5	120	-	-
Western sea-purslane	*Sesuvium verrucosum*	34	2710	-	-
Silverleaf nightshade	*Solanum elaeagnifolium*	1	2	-	-
Common sowthistle	*Sonchus oleraceus*	12	105	-	-
Violet	*Viola* sp.	1	7	-	-
Baccharis	*Baccharis spp.*	14	569	-	-
Arrowweed	*Pluchea sericea*	82	552	190	1972
Sandbar willow	*Salix exigua*	101	226	-	-
Saltcedar	*Tamarix* spp.	11	834	178	13636
Honey mesquite	*Prosopis glandulosa*	35	336	1	10
Screwbean mesquite	*Propsopis pubescens*	44	403	5	39
Goodding willow	*Salix gooddingii*	1	10	-	-

Host Plant and Nectar Resource

- No difference in host plant abundance or frequency in restored vs control
- Host plants adjacent to riparian plots: agriculture and upland
- Four times higher flowering species richness (t=5.386, p=0.002) and abundance (t=1.334, p=0.065) in restored verses control
- 1.6 times higher number of inflorescences in control vs. restored-saltcedar

Variable	**Pearson Correlation**	***p*-value**
Flowering species richness	0.611	0.061
Flowering species abundance	0.639	0.047
Vegetation species diversity	0.581	0.078
% herbaceous vegetation	0.621	0.055

Discussion

- Structural complexity of native riparian and wetland communities can have positive effect on birds and butterflies
- Diverse native understory provides
  - Competition to invasive vegetation
  - Nectar resources and host plants for butterflies
  - Habitat complexity for bird and other wildlife

- Flood irrigation may help butterflies
  - May increase nectar production
  - Host plant production
  - Drinking water source

Discussion

- No riparian obligate butterfly species present (Fatal metalmark, Viceroy, and Moarning cloak)
  - Indicates need to connect source populations with habitat islands
  - Potential for introduction
- Four resident riparian obligate birds present. Prefer structural complexity.
  - Gila woodpecker
  - Bell's vireo
  - Abert's towhee
  - Crissal thrasher

- Not all riparian obligate species present during study. Some migrants others have been detected since- blue grosbeak and yellow-billed cuckoo- sites were immature
- Endangered Yuma clapper rail, least bittern and soras resided in restored wetland

Management Implications

- Need to plant native understory in restoration projects
- The site will support riparian obligate butterfly re-introductions
- Native understory help provide food source for birds and other wildlife
- Understory supports the largest known population of Yuma hispid cotton rat on the LCR

Acknowledgements

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YUMA CROSSING NATIONAL HERITAGE AREA
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MCKVEY FAMILY
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THE YARD DOGS ROAD SHOW
KEITH SECOLA AND THE WILD JAVALINS
THUNDERBIRD
VLA PROJECT
696 PROJECT
DRIFTWOOD

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