

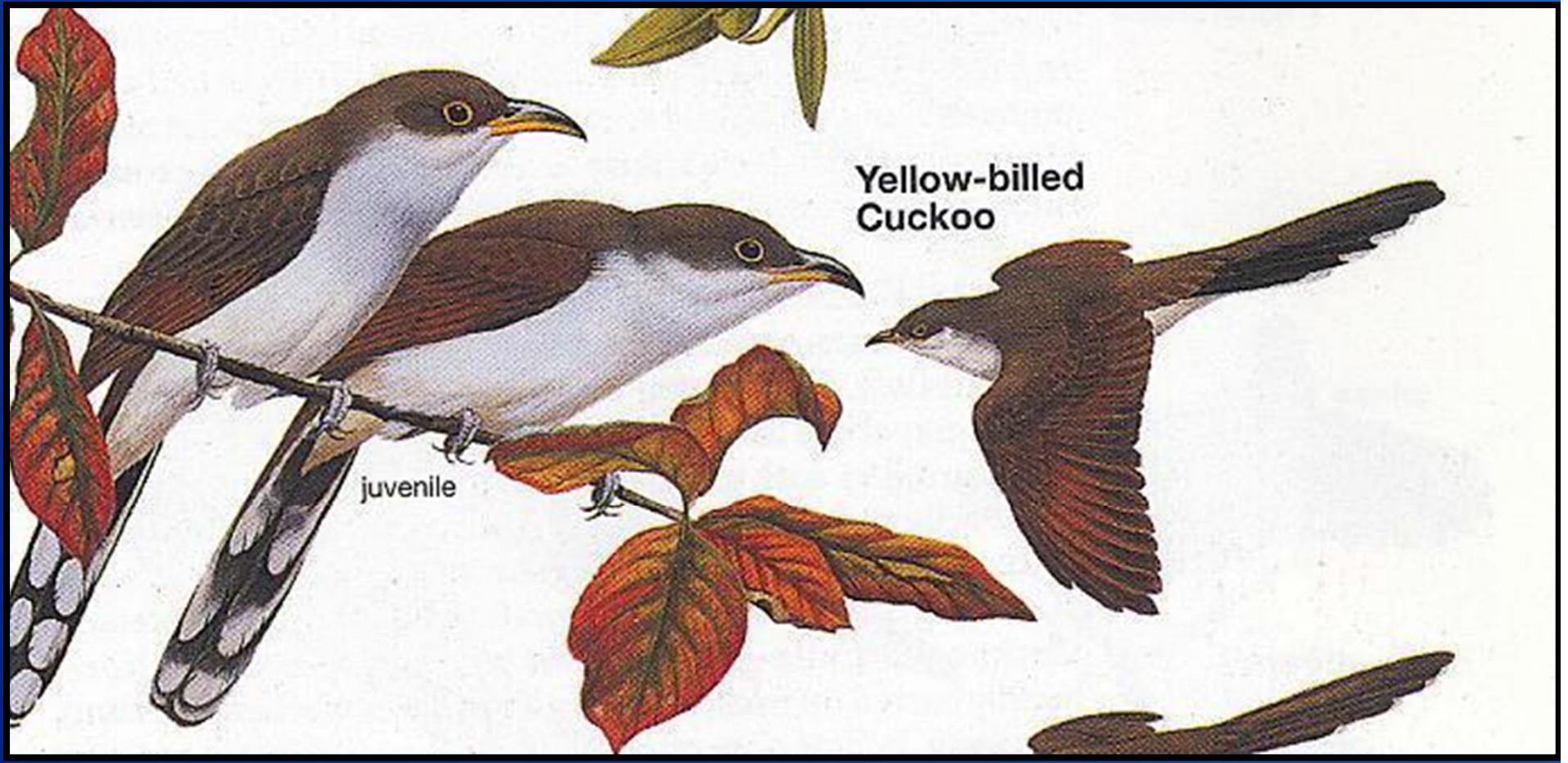
RECLAMATION

Managing Water in the West

Yellow-billed Cuckoo Studies on the Middle Rio Grande, New Mexico



U.S. Department of the Interior
Bureau of Reclamation



- **Initially petitioned for ESA listing in 1998**
- **Listed as a Candidate Species by USFWS in July 2001**
- **Western Yellow-billed Cuckoo comprised a Distinct Population Segment**



YBCU in New Mexico:



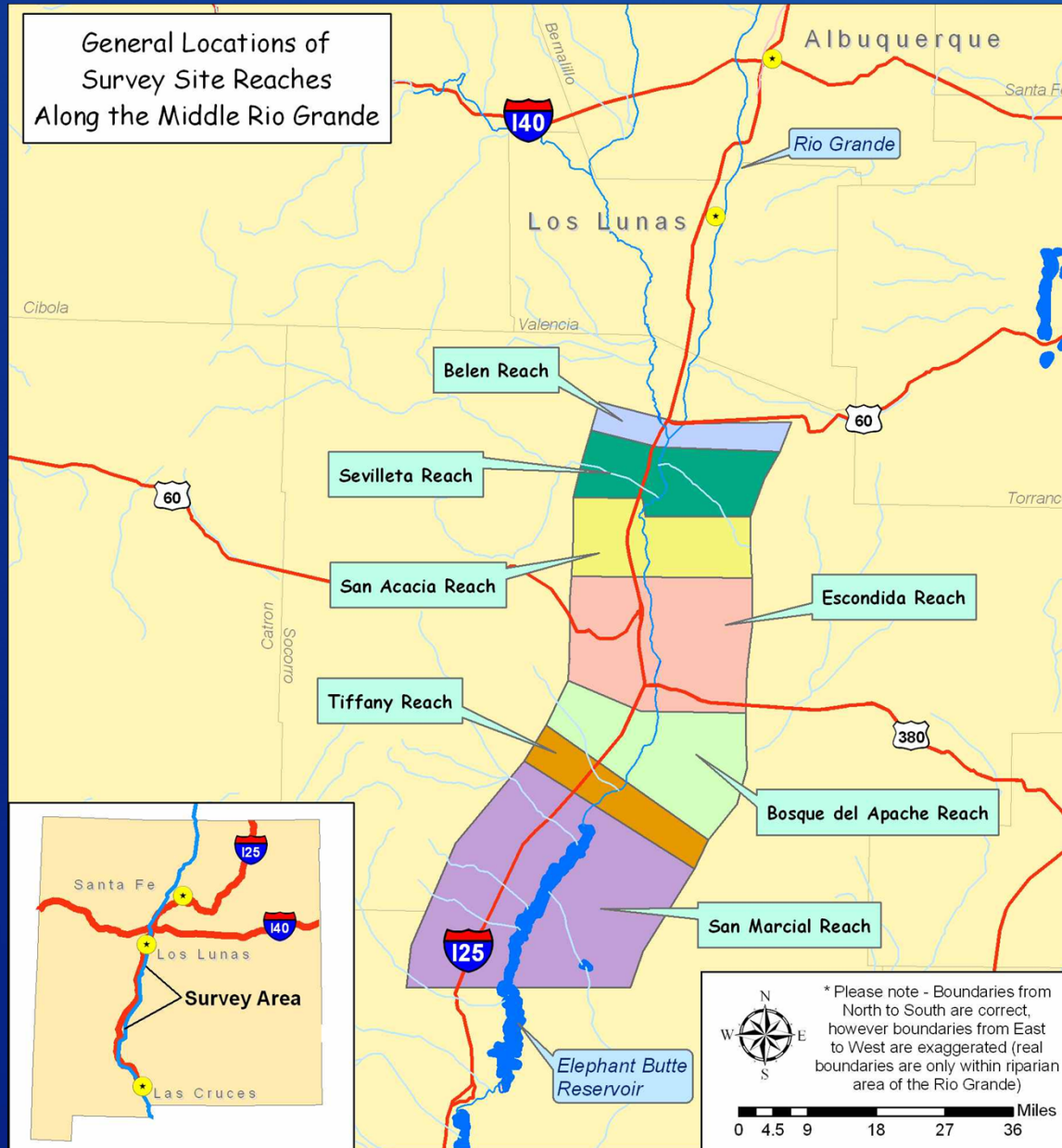
- **Historically rare statewide, but common along riparian areas of Pecos and Rio Grande (Bailey 1928, Hubbard 1978)**
- **Listed as sensitive but recent trend data lacking**
- **Recorded during Rio Grande WIFL surveys between 1997 and 2005**
- **Formal surveys beginning 2006**

Studies including:

- Protocol surveys
- Radio telemetry
- Habitat quantification
- Migration



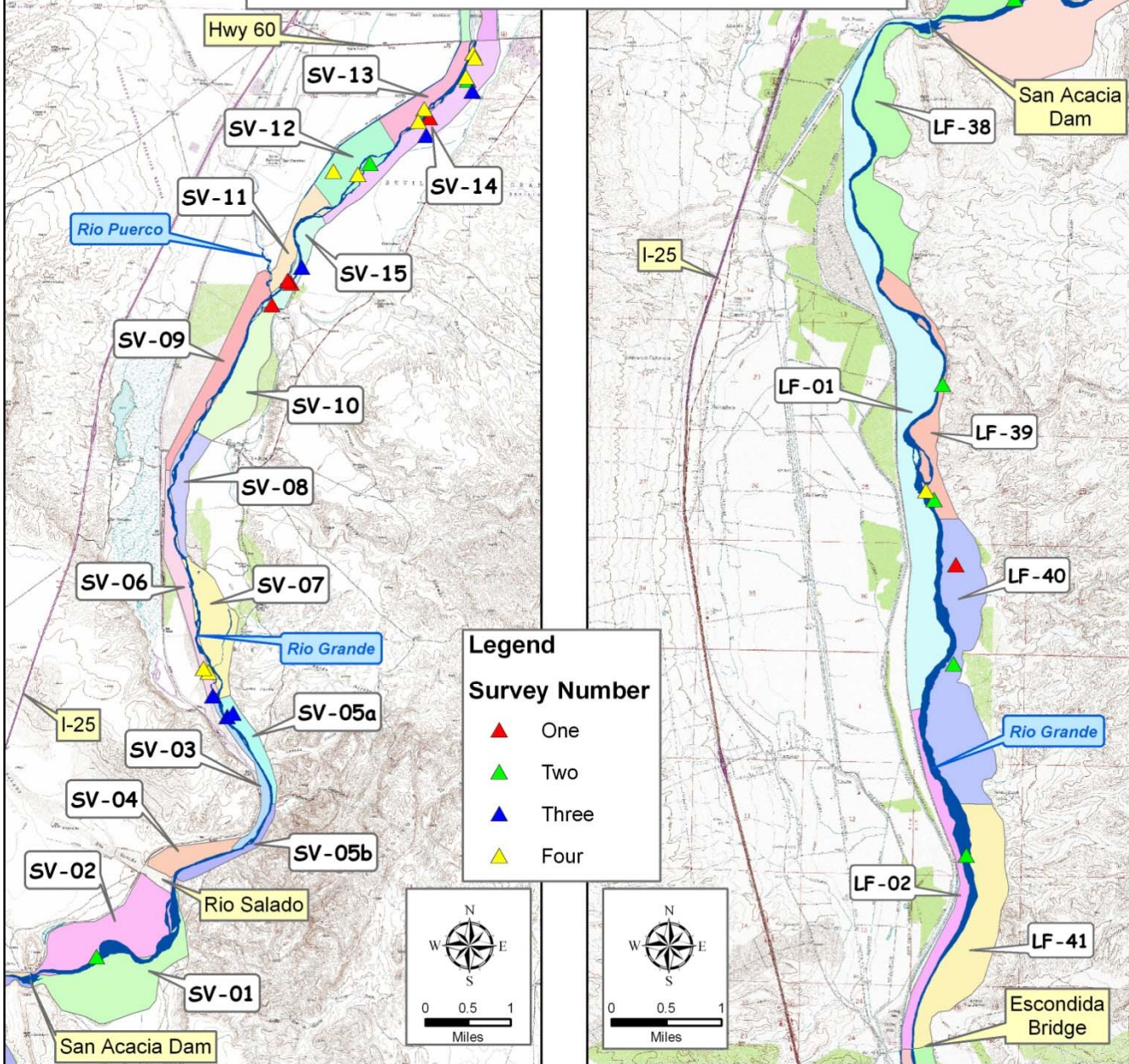
2011 Protocol Surveys

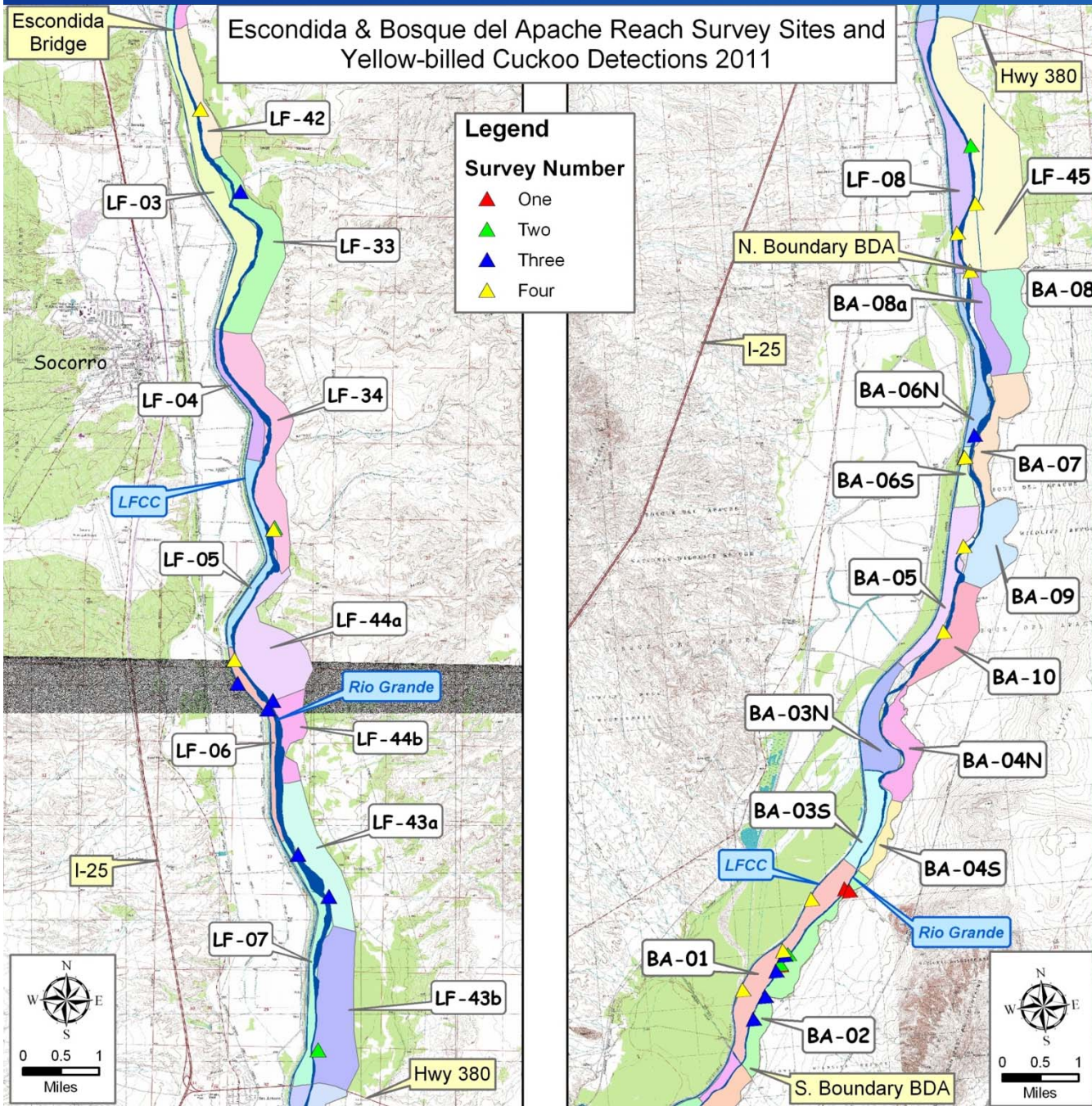


River Reach	Length
Belen	4.0 river miles
Sevilleta NWR/La Joya	10.5 river miles
San Acacia	12.0 river miles
Escondida	20.0 river miles
Bosque del Apache NWR	10.0 river miles
Tiffany	5.5 river miles
San Marcial	27.5 river miles
Total	89.5 river miles

CLAMATION

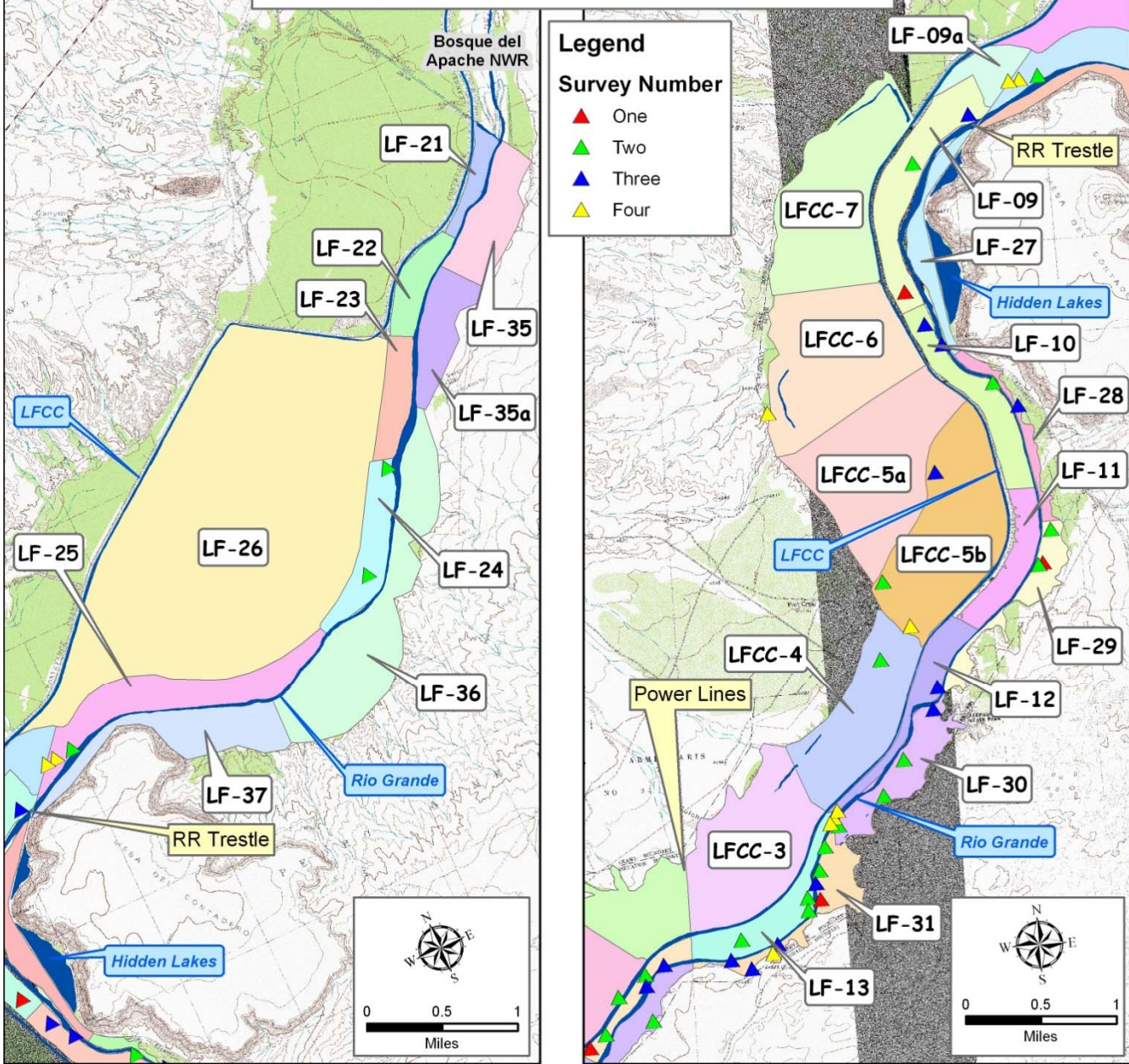
Belen, Sevilleta & San Acacia Reach Survey Sites and Yellow-billed Cuckoo Detections 2011



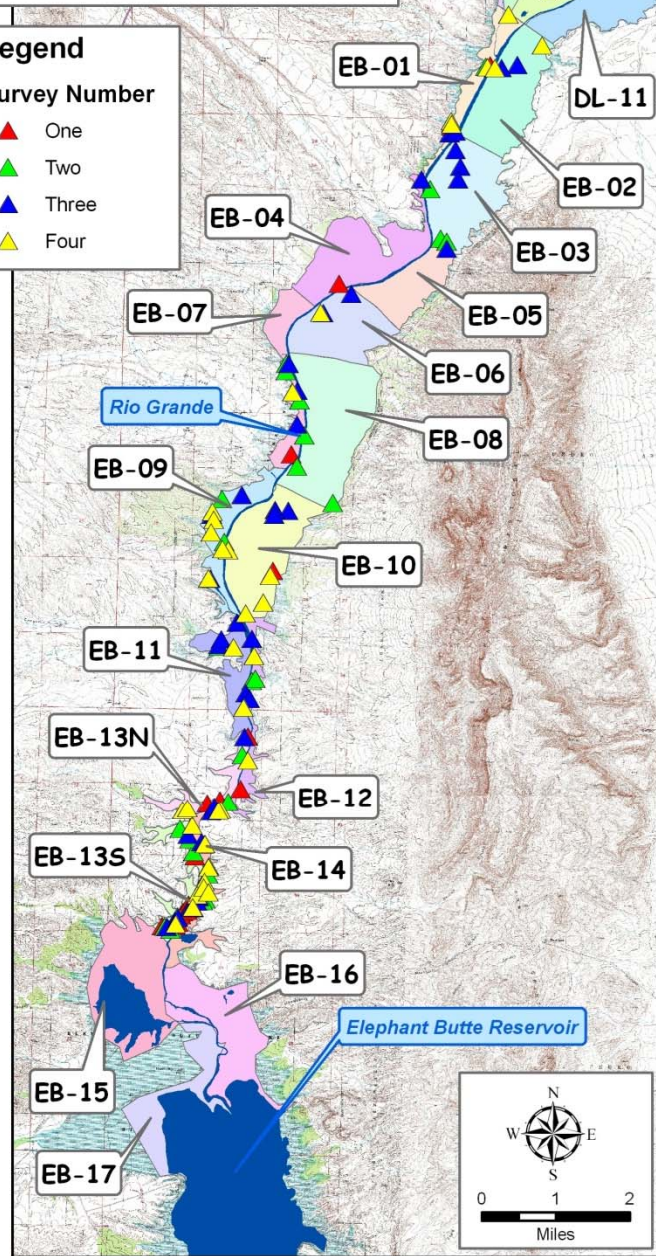
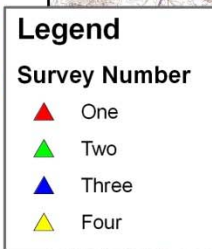
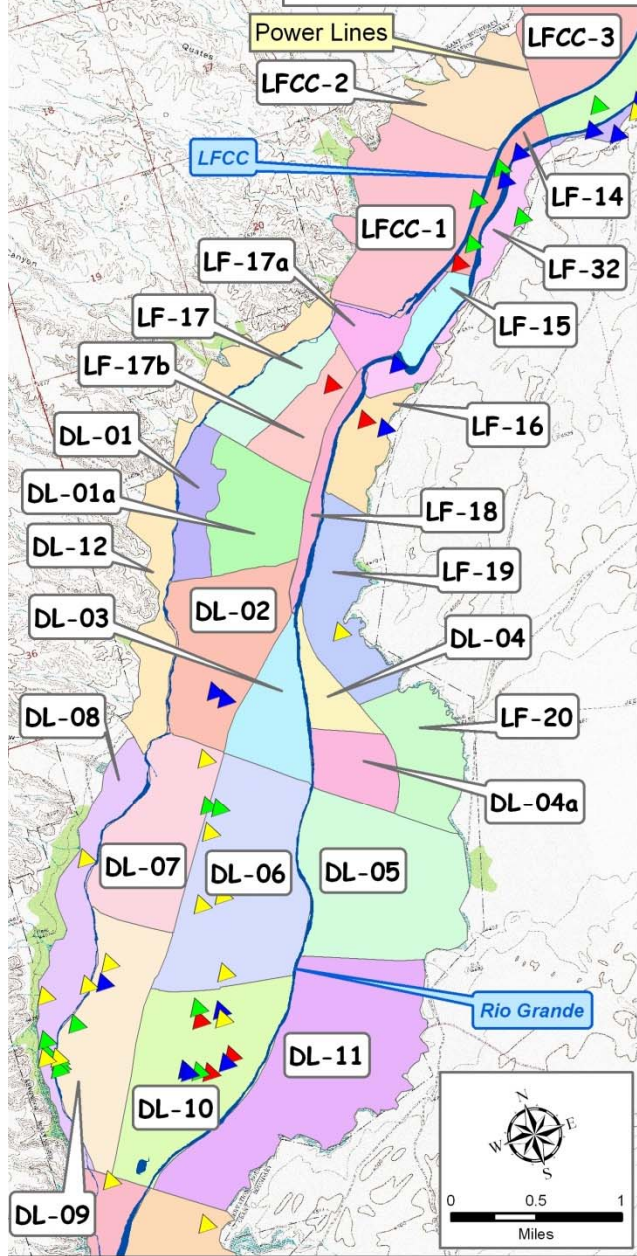


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San Marcial (Northern Area) Reach Survey Sites and Yellow-billed Cuckoo Detections 2011



San Marcial (Southern Area - Delta & Narrows) Reach
Survey Sites and Yellow-billed Cuckoo Detections 2011



2011 Survey Results



River Reach	YBCU Detections	
	Number of Detections	Percent of Detections
Belen Reach	16	6%
Sevilleta NWR/La Joya Reach	6	2%
San Acacia Reach	6	2%
Escondida Reach	15	6%
Bosque del Apache NWR Reach	17	6%
Tiffany Reach	4	2%
San Marcial Reach	202	76%
Totals	266	100%
Elephant Butte Reservoir (Subset of San Marcial Reach)	159	60%

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Historic Survey Results



River Reach	YBCU Detections					
	2006	2007	2008	2009	2010	2011
Belen	NS	NS	NS	1	3	16
Sevilleta/La Joya	NS	NS	NS	4	1	6
San Acacia	NS	NS	NS	8	3	6
Escondida	NS	3	19	29	6	15
Bosque del Apache	NS	22	35	47	14	17
Tiffany	10	12	7	10	2	4
San Marcial	106	222	299	257	249	202
Totals	116	259	360	356	278	266
Elephant Butte Reservoir (Subset of San Marcial Reach)	76	182	252	211	222	159

Detections ≠ Territories

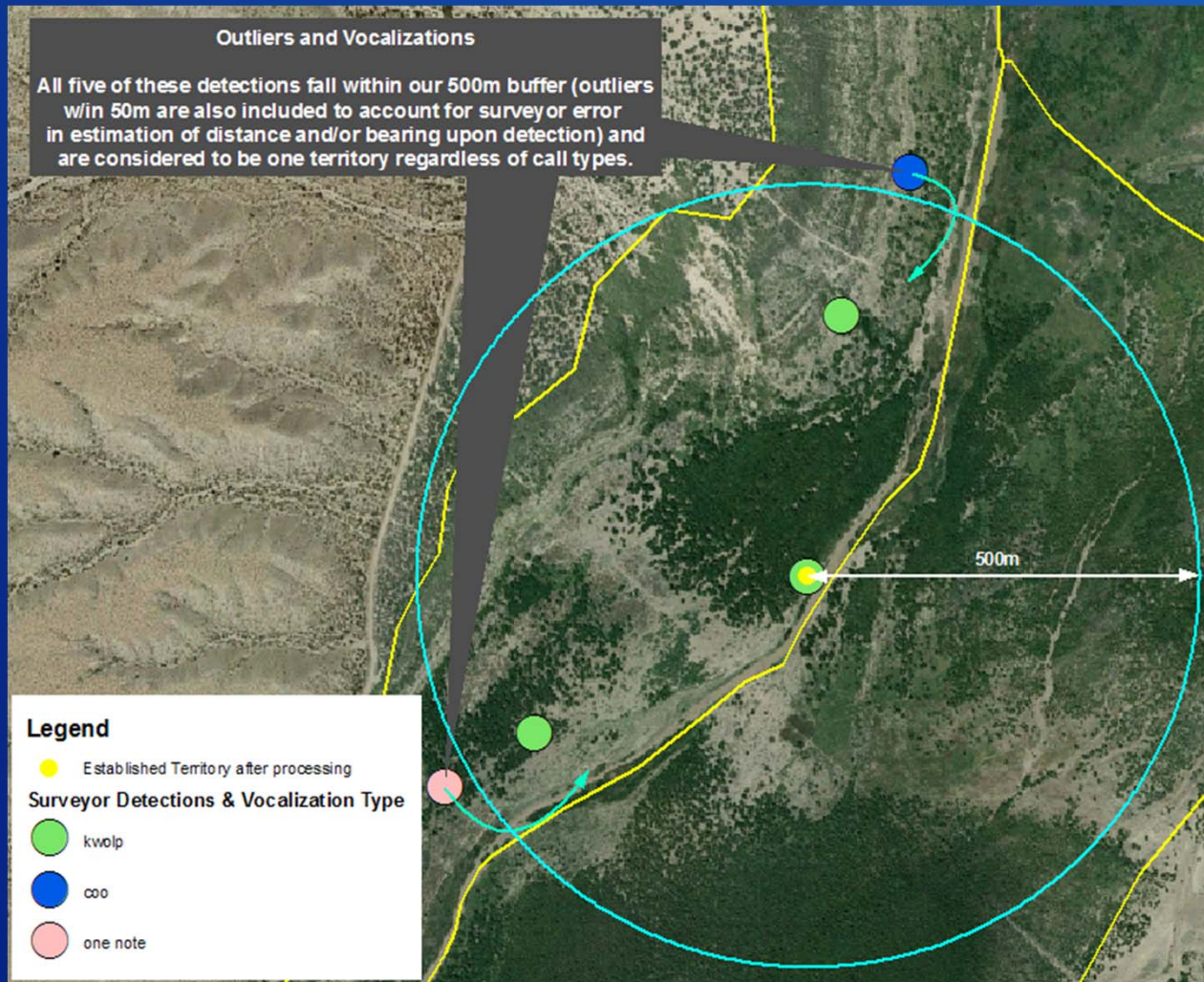
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“Territory” Delineation Difficulties

- Breeding territories = 2 or 3 adults
- Both males and females vocalize
- YBCUs have large, undefended territories that can overlap and they move around A LOT
- Actual YBCU locations are calculated based on surveyor coordinates and estimated distance and bearing to the bird, all of which have inherent error
- Surveys conducted later in the breeding season (i.e. surveys 3 and 4) could detect hatch year fledglings that have dispersed from the nest site into surrounding areas



“Territory” Delineation



Problem: underestimation or overestimation

500m radius = 78.5ha;

Mean MCP (Sechrist *et al.* 2009) = 81.6ha

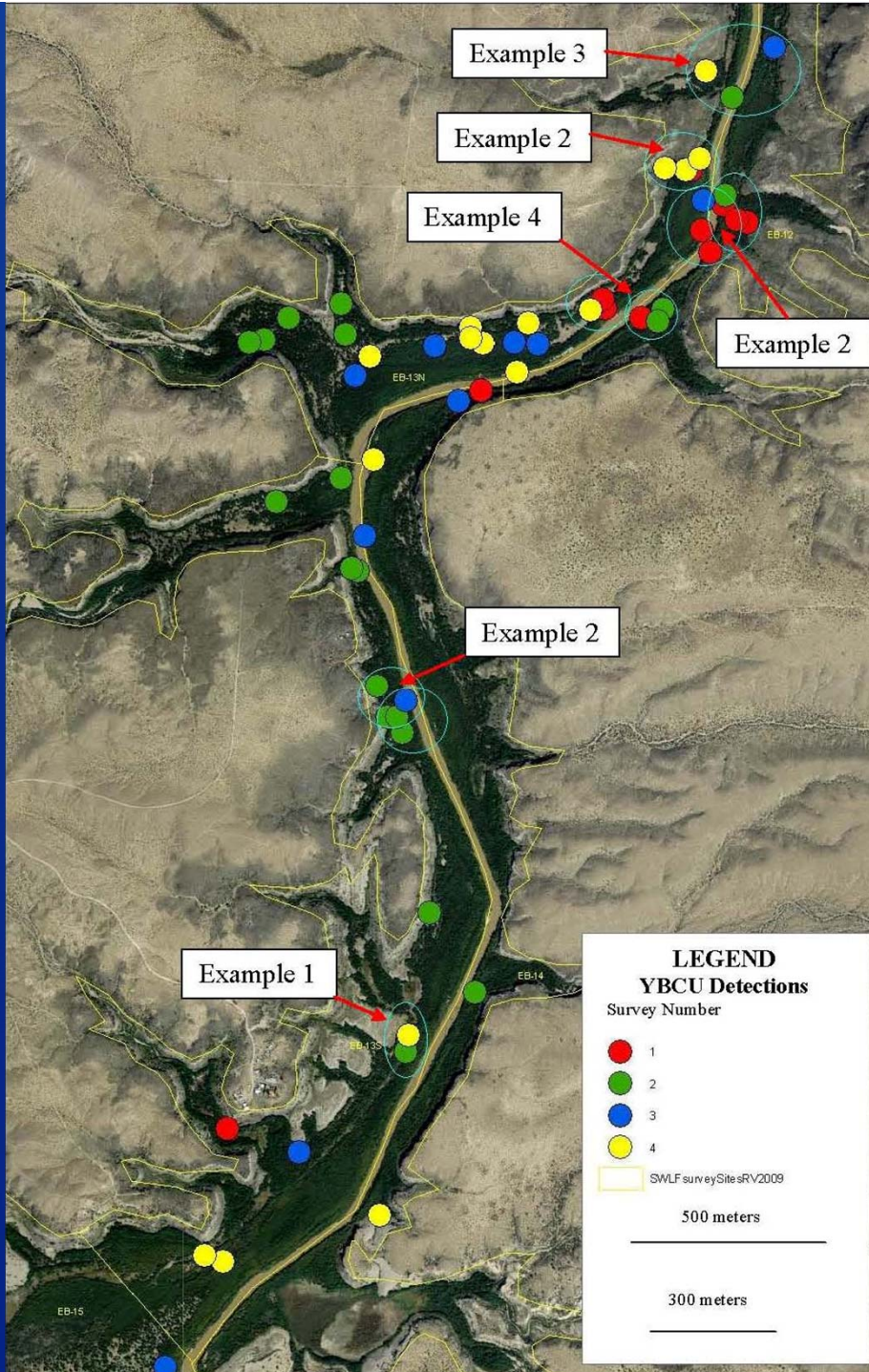
RECLAMATION

“Territory” Delineation - New

“Territory” = min of 2 detections over 4 surveys –
<300 m apart during the same survey or <500 m
apart during at least 2 surveys – otherwise
detections not considered part of a breeding territory, but as
“random/floater” detections



RECLAMATION

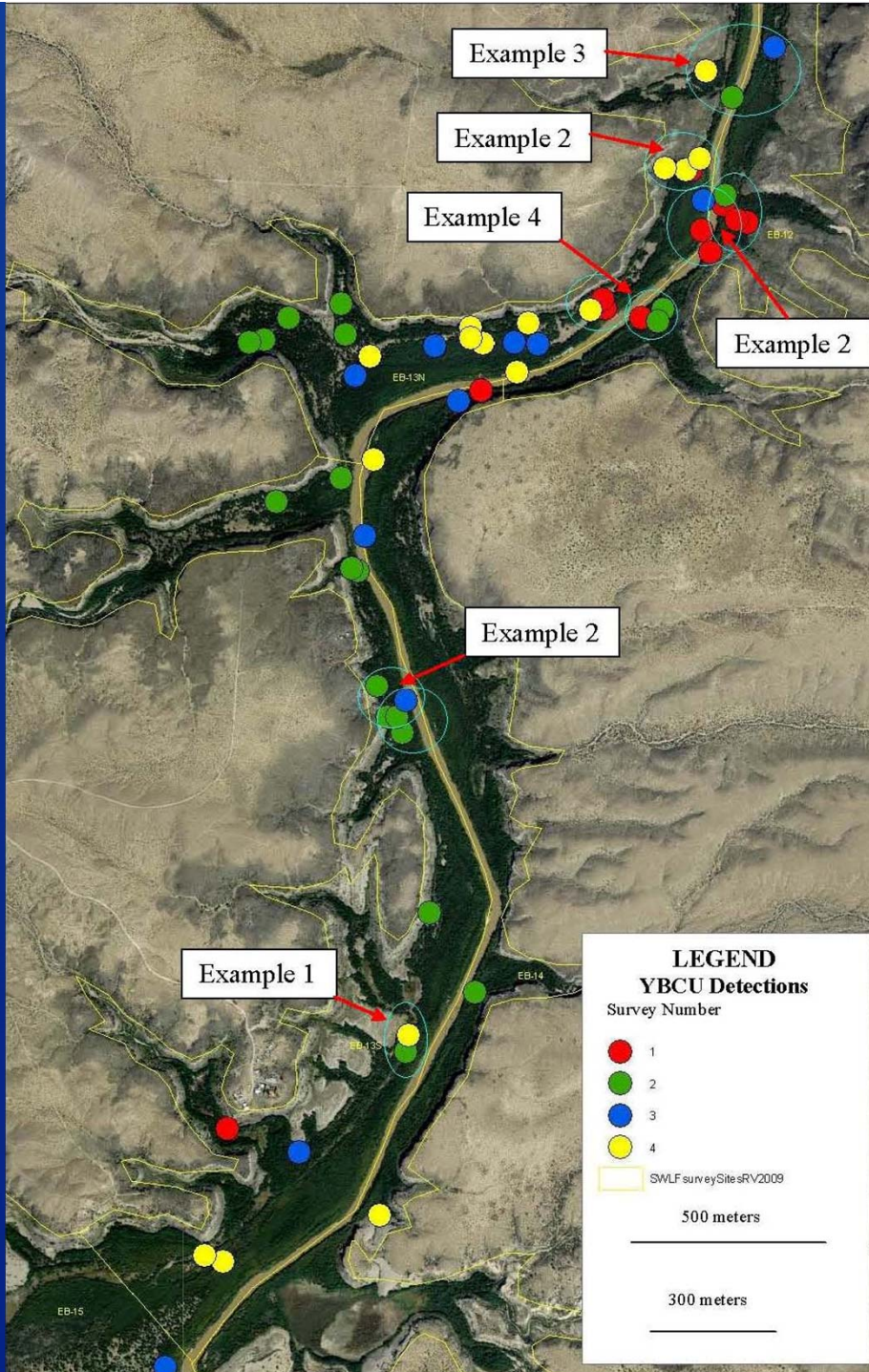


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- No more than 3 detections within 300 m during the same survey - more than 3 YBCU detections during the same survey period in an area <300 m suggests multiple breeding territories



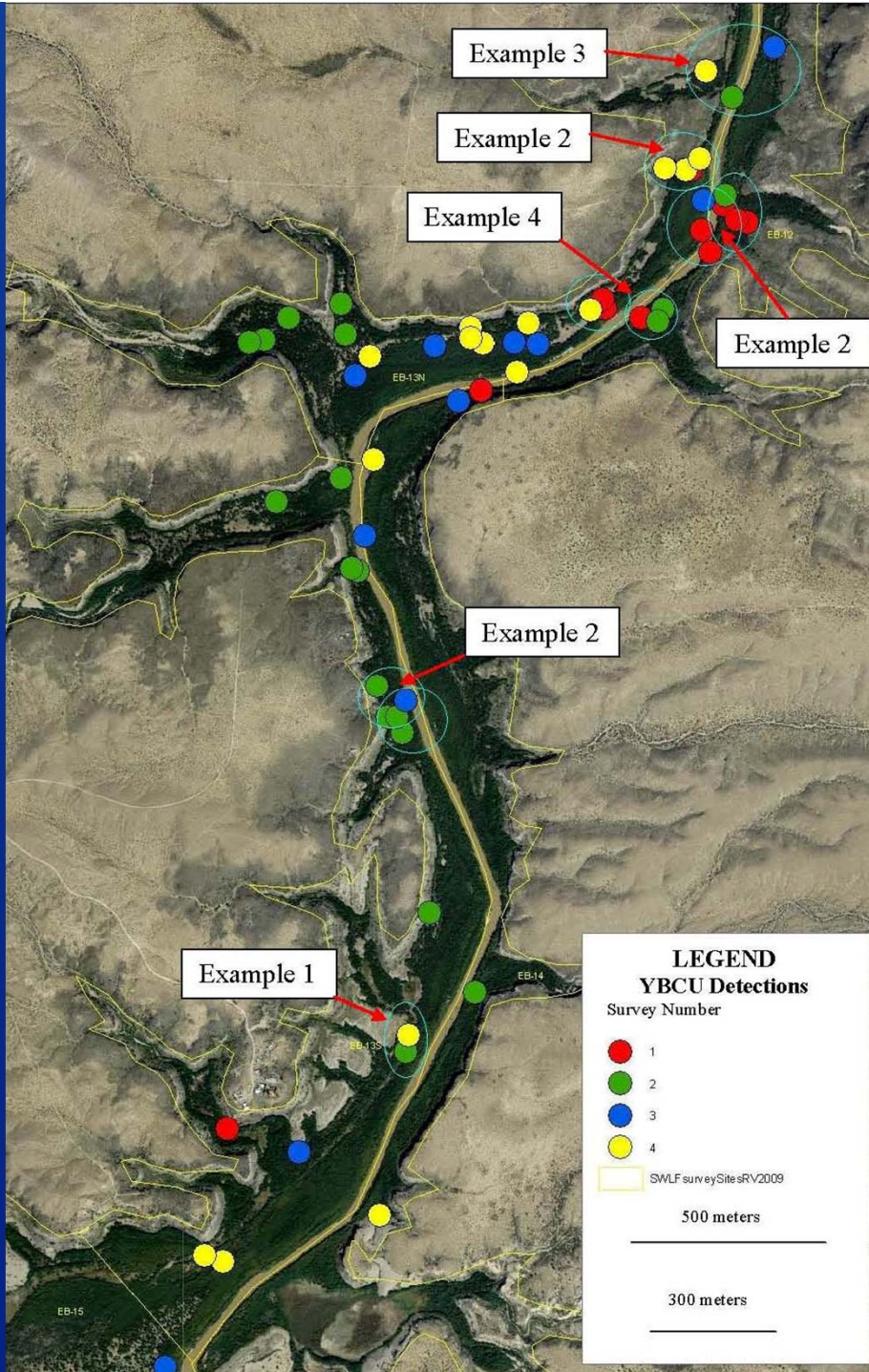


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- Detection patterns evaluated based on number and proximity of detections during individual survey periods. Ideally, multiple discreet detections within 300 m of each other over multiple surveys are needed to confirm a breeding “territory”



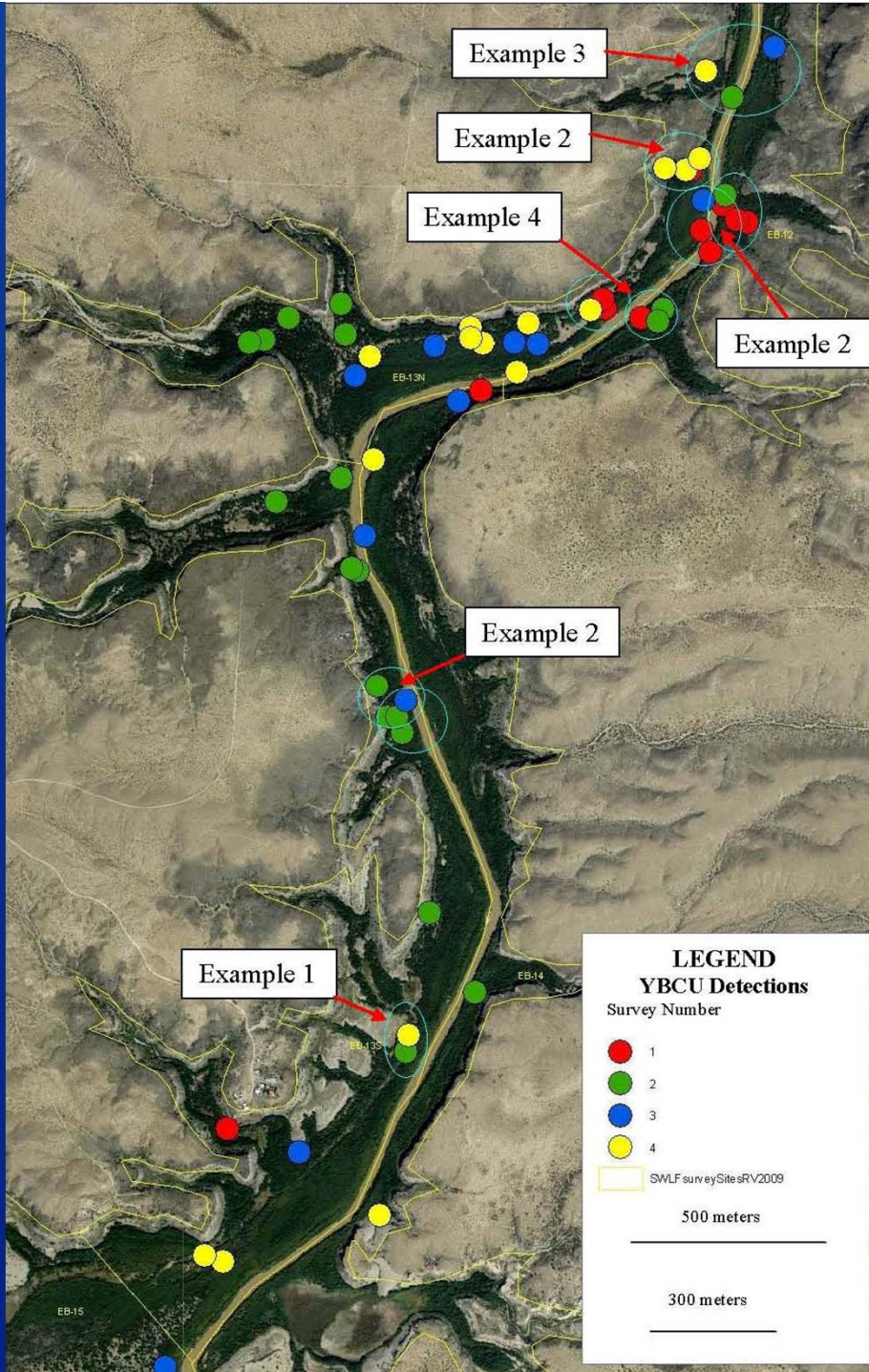


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- Detection patterns evaluated based on number and proximity of detections during individual survey periods. Ideally, multiple discreet detections within 300 m of each other over multiple surveys are needed to confirm a breeding “territory”
- Although YBCU territories can overlap, natural breaks between detection clumps should be considered
- “Best biological opinion” is often consulted





RECLAMATION

2011 Survey Results and “Territory” Delineations



River Reach	YBCU Detections		YBCU Territories	
	Number of Detections	Percent of Detections	Number of Territories	Percent of Territories
Belen Reach	16	6%	4	5%
Sevilleta NWR/La Joya Reach	6	2%	2	3%
San Acacia Reach	6	2%	1	1%
Escondida Reach	15	6%	3	4%
Bosque del Apache NWR Reach	17	6%	4	5%
Tiffany Reach	4	2%	1	1%
San Marcial Reach	202	76%	58	80%
Totals	266	100%	73	100%
Elephant Butte Reservoir (Subset of San Marcial Reach)	159	60%	46	63%

RECLAMATION

Studies including:

- Protocol surveys
- **Radio telemetry**
- Nesting habitat quantification
- Migration



Bureau of Reclamation 2007 & 2008 General Cuckoo Netting Locations



LAMATION



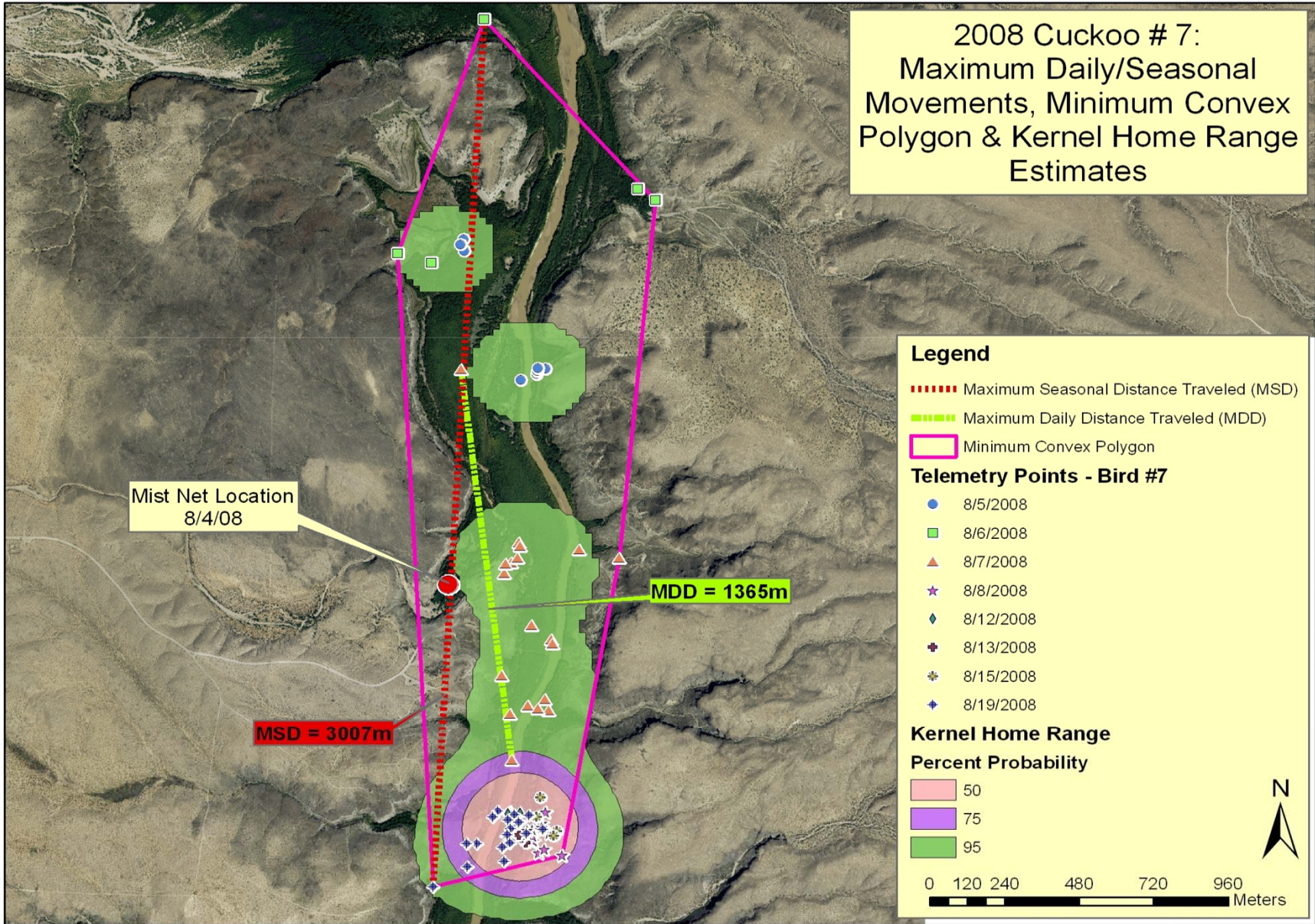


2007-2008

- 12 YBCU's instrumented; data from 10 used
- Average of 94 locs/bird
- *Southwestern Naturalist* Feb 2012



2008 Cuckoo # 7:
Maximum Daily/Seasonal
Movements, Minimum Convex
Polygon & Kernel Home Range
Estimates



Mean home range:

- Combined MCP = 81.6 ha
- Combined 50 % KHR = 7.1 ha
- Combined 95 % KHR = 56.3 ha



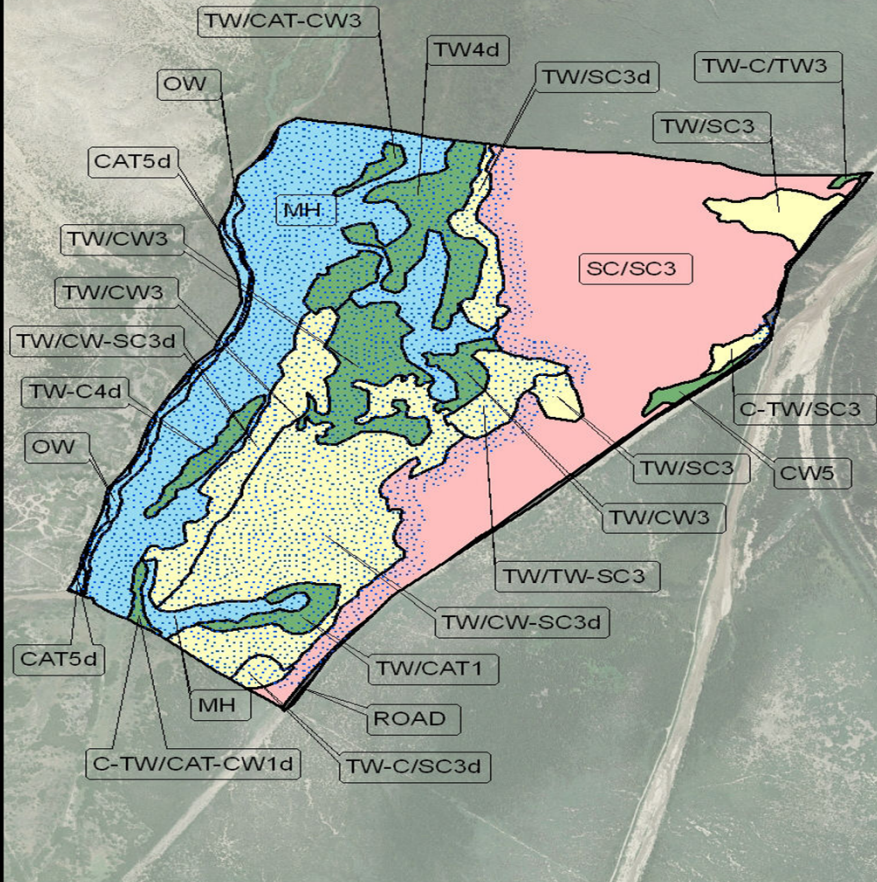
Mean daily and seasonal movement:

- Combined max daily distance travelled = 786 m
- Combined max seasonal distance travelled = 1.6 km

Habitat Utilization

- Individual cuckoo habitat utilization was calculated based on the 50 and 95 % KHR probabilities
- Cuckoo habitat utilization was estimated from a modified Hink and Ohmart (1984) vegetation community and structure classification system

General Plant Communities DL-02



Legend

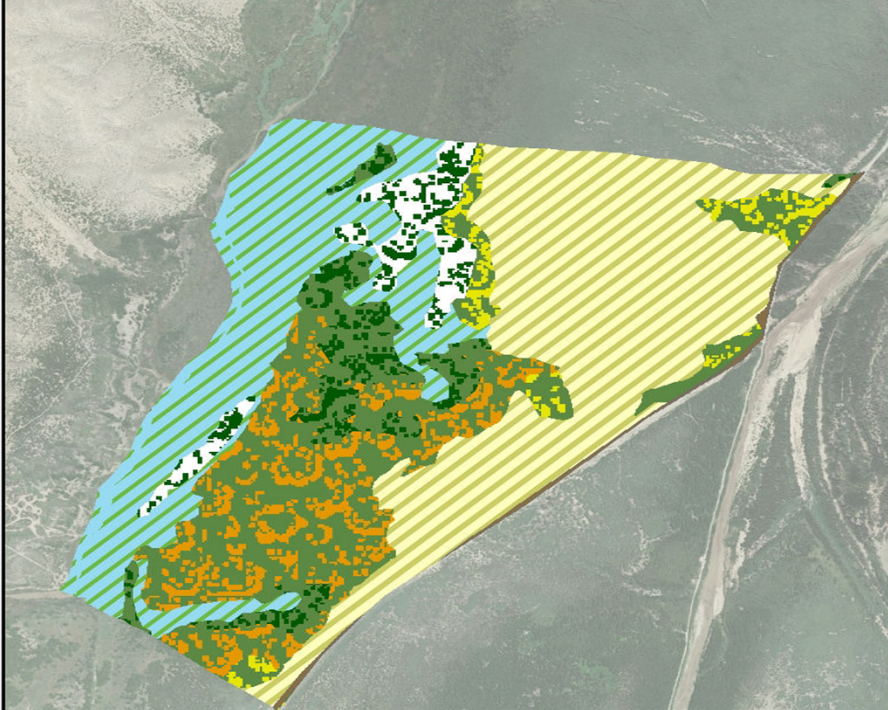
Area within 50m of Water

General Plant Communities

- Native
- Mixed
- Exotic
- Open Water/Marsh
- Non-Habitat

0 112.5 225 450 675 900 Meters

Major Plant Structure & Communities DL-02



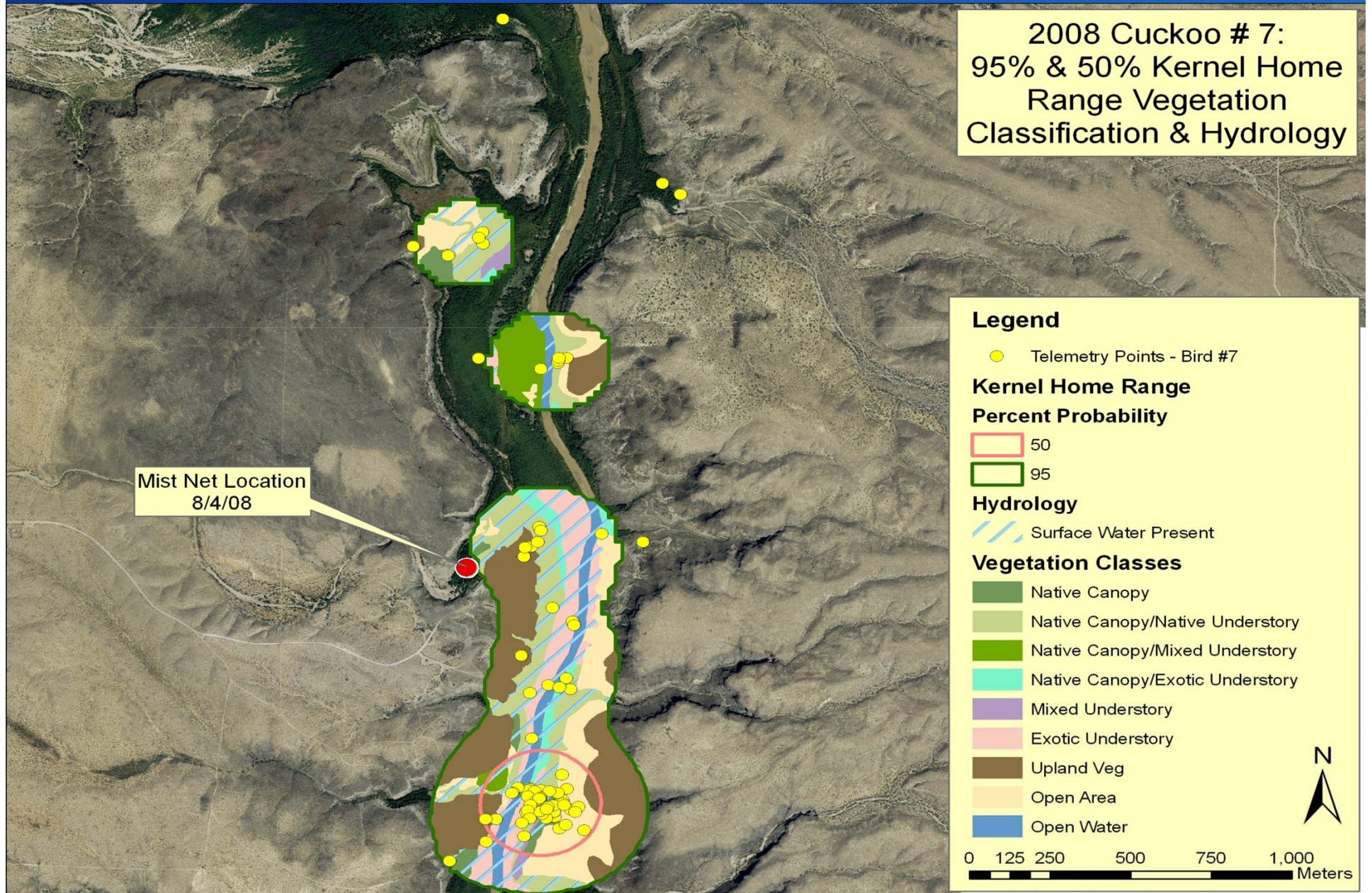
Legend

- Native Canopy / Native Understory
- Native Canopy / Mixed Understory
- Native Canopy / Exotic Understory
- Mixed Canopy / Native Understory
- Exotic Canopy / Exotic Understory
- Native Canopy
- Native Understory
- Marsh
- Open Water
- Opening
- Road

0 112.5 225 450 675 900 Meters

Habitat Utilization

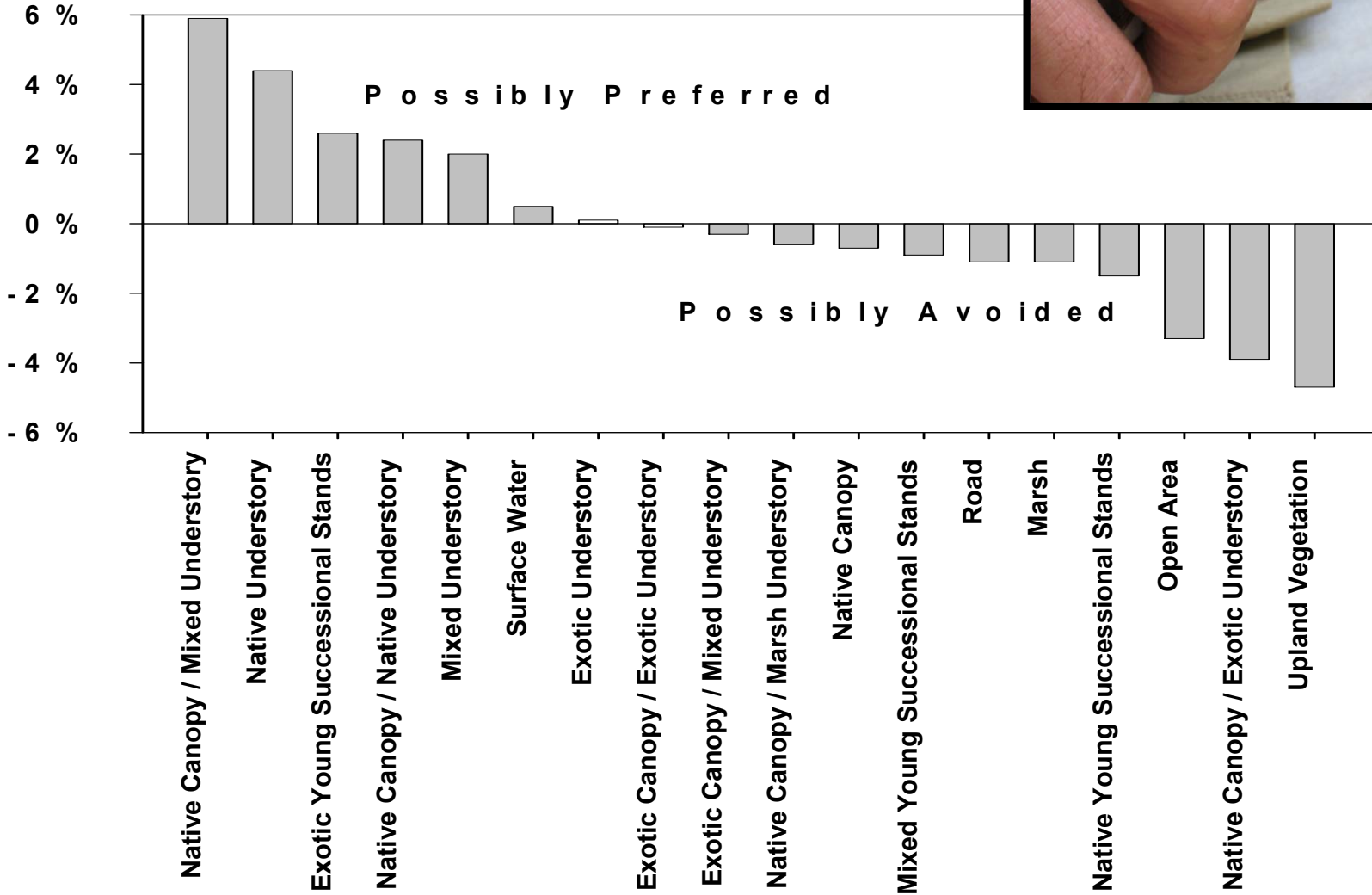
2008 Cuckoo # 7:
95% & 50% Kernel Home
Range Vegetation
Classification & Hydrology



Habitat Utilization



Proportional Use Difference Between 50% and 95% KHR



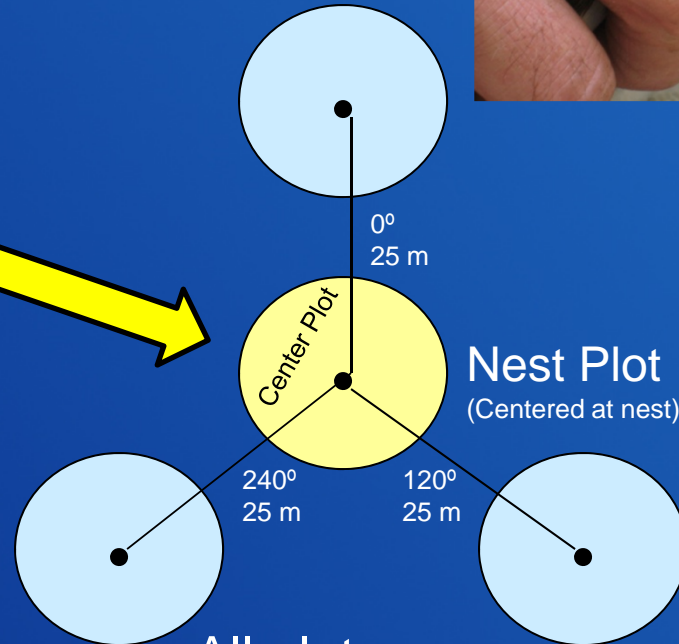
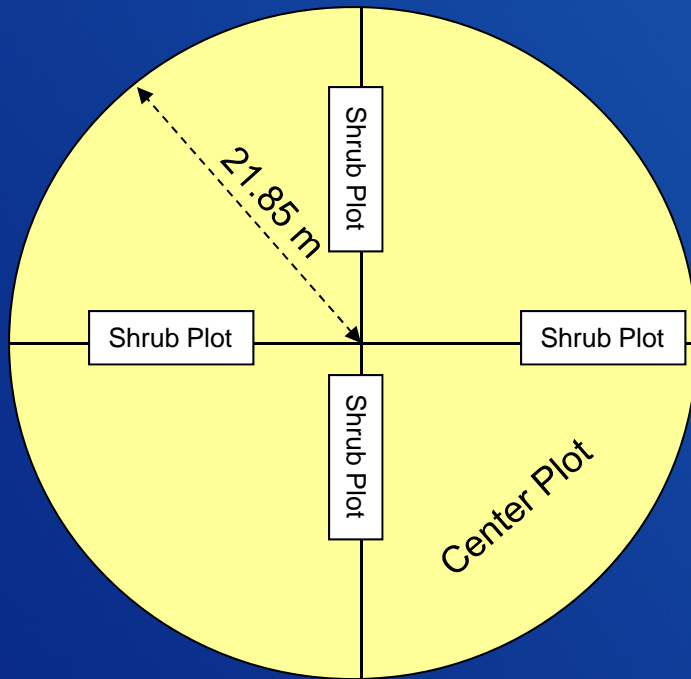
Modified Hink and Ohmart Vegetation Types

Studies including:

- Protocol surveys
- Radio telemetry
- **Nesting habitat quantification**
- Migration



Nesting Habitat Quantification



Center plots only:

- ☀ Tally trees (> 5 cm DBH) by species, DBH class and live/dead in 0.15 ha plot
- ☀ Tally shrubs (0.5 to 5 cm DBH) within 1x4m plots by species and live/dead
- ☀ Ground cover (bare, litter, grass, forbs) by %
- ☀ Record nest data including nest height, nest substrate species and height, distance to riparian edge, water, etc.

All plots:

- ☀ Vegetated volume estimate for 4 height zones (0-3 m, 3-6 m, 6-9 m, 9-12 m) within 5 m radius of plot center
- ☀ Point-centered quarter measurements for each canopy layer (shrub and canopy)

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Nest Site Data (n = 3)

- All nests in Goodding's willow
- Canopy height = 10.3 m (9.8 to 10.6 m)
- Nest height = 4.2 m (2.9 to 6.2 m)
- Nest substrate height = 9.6 m (7.6 to 10.6 m)
- Substrate DBH = 21 cm (11 to 34 cm)
- Distance to riparian edge = 23.3 m (12.0 to 40.0 m)
- Distance to perennial water = 223 m (70 to 460 m)



Center Plot Data (n = 3)

- Live trees (>5 cm DBH) per hectare = 1,691 (1,014 to 2,756)
- 98% *Salix*, 2% saltcedar, 28% dead
- 44% Class 1, 43% Class 2, 13% Class 3
- Live shrub stems (<5 cm DBH) per m² = 1.5 (0.8 to 3.1)
- 77% *Salix*, 23% *Baccharis*, 37% dead



Subplot Data (n = 11)

- Canopy trees per hectare = 708 (87 to 2,500)
- Average canopy tree height = 8.1 m (6.0 to 9.9)
- Shrubs per hectare = 74,147 (152 to 640,000)
- Average shrub height = 1.8 m (0.5 to 4.8 m)
- Vegetated volume 0 to 3 m = 52.1%
- Vegetated volume 3 to 6 m = 46.0%
- Vegetated volume 6 to 9 m = 31.4%
- Vegetated volume 9 to 12 m = 8.3%



Studies including:

- Protocol surveys
- Radio telemetry
- Nesting habitat quantification
- **Migration**



Migration Studies



RECLAMATION

2009 Geolocator Study

- 13 Cuckoos captured and outfitted with 1.3 g mk14 BAS geolocators
- Backpack attachment methodology based on work by Paxton (USGS), Rappole and Tipton (1991) and Naef-Daenzer (2007)
- Provides continuous Lat/Long coordinates based on day length and absolute time of midday and midnight



Questions:

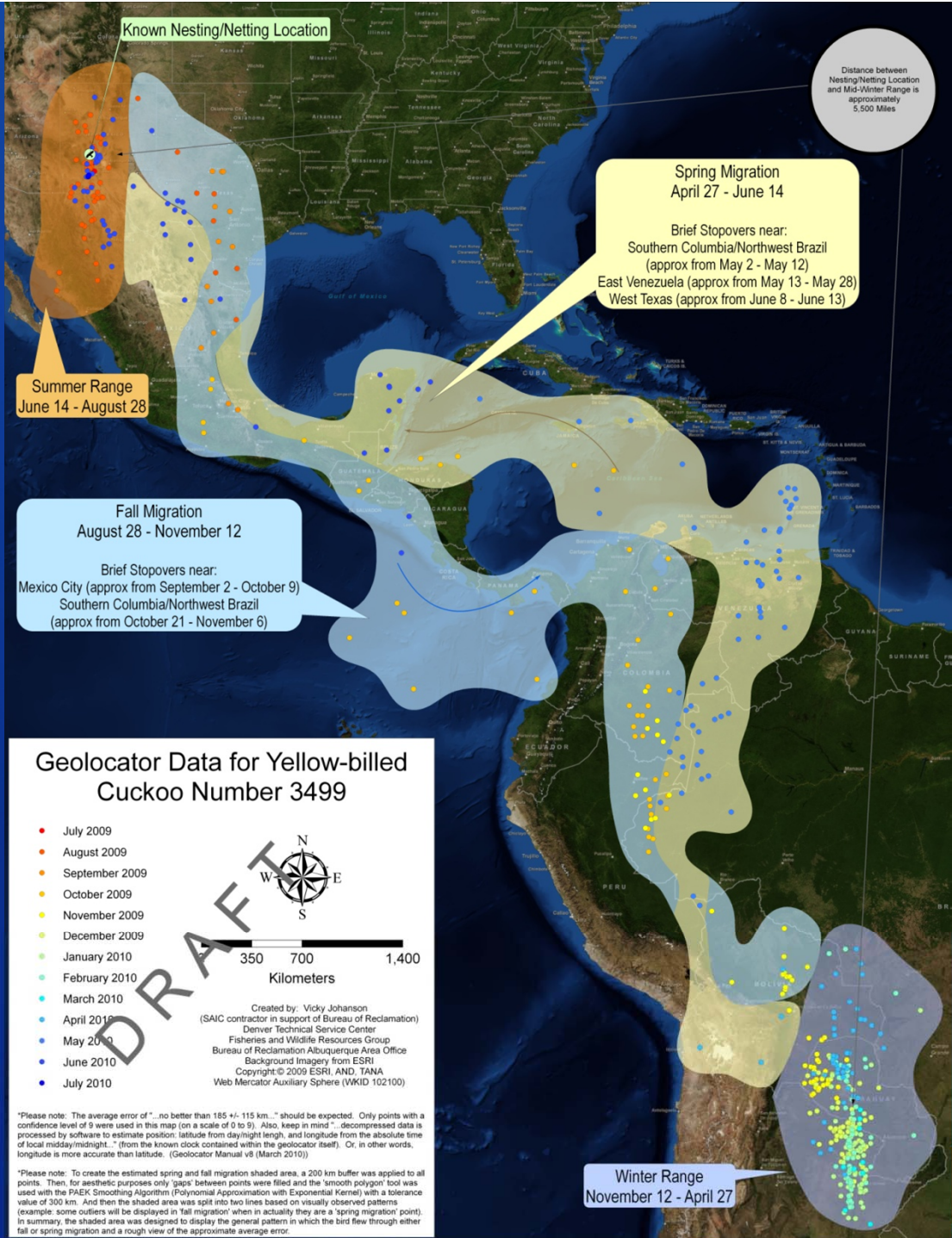
- Riparian corridor utilization –
Pecos? Rio Grande? Others?
- Double breeding strategy? (Rowher *et al.*)
- Site fidelity
- Migration stopover and winter range



Results (n = 1)

- Recaptured 1.5 km from initial capture location
- Appeared to use Pecos River as migratory corridor – NOT Rio Grande
- Approx 9000 km between summer and winter locations
- *Western Birds* publication
- 4 Cuckoos instrumented with new generation Lotek radio transmitter/geolocator on Pecos River in 2011





Distance between Nesting/Netting Location and Mid-Winter Range is approximately 5,500 Miles

Spring Migration
 April 27 - June 14

Brief Stopovers near:
 Southern Columbia/Northwest Brazil (approx from May 2 - May 12)
 East Venezuela (approx from May 13 - May 28)
 West Texas (approx from June 8 - June 13)

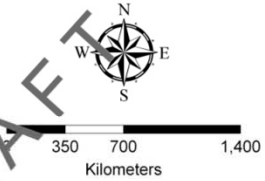
Summer Range
 June 14 - August 28

Fall Migration
 August 28 - November 12

Brief Stopovers near:
 Mexico City (approx from September 2 - October 9)
 Southern Columbia/Northwest Brazil (approx from October 21 - November 6)

Geolocator Data for Yellow-billed Cuckoo Number 3499

- July 2009
- August 2009
- September 2009
- October 2009
- November 2009
- December 2009
- January 2010
- February 2010
- March 2010
- April 2010
- May 2010
- June 2010
- July 2010



DRAFT

Created by: Vicky Johanson
 (SAIC contractor in support of Bureau of Reclamation)
 Denver Technical Service Center
 Fisheries and Wildlife Resources Group
 Bureau of Reclamation Albuquerque Area Office
 Background Imagery from ESRI
 Copyright © 2009 ESRI, AND, TANA
 Web Mercator Auxiliary Sphere (WKID 102100)

*Please note: The average error of "...no better than 185 +/- 115 km..." should be expected. Only points with a confidence level of 9 were used in this map (on a scale of 0 to 9). Also, keep in mind "...decompressed data is processed by software to estimate position: latitude from daylight length, and longitude from the absolute time of local midday/midnight..." from the known clock contained within the geolocator itself). Or, in other words, longitude is more accurate than latitude. (Geolocator Manual v8 (March 2010))

*Please note: To create the estimated spring and fall migration shaded area, a 200 km buffer was applied to all points. Then, for aesthetic purposes only "gaps" between points were filled and the "smooth polygon" tool was used with the PAEK Smoothing Algorithm (Polynomial Approximation with Exponential Kernel) with a tolerance value of 300 km. And then the shaded area was split into two lines based on visually observed patterns (example: some outliers will be displayed in "fall migration" when in actuality they are a "spring migration" point); in summary, the shaded area was designed to display the general pattern in which the bird flew through either fall or spring migration and a rough view of the approximate average error.

Winter Range
 November 12 - April 27

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Future

- Continue surveys
- Find nests and increase nest habitat sample size
- Recapture instrumented Pecos River Cuckoos
- Update veg maps



Thanks!



- Bureau of Reclamation Albuquerque Area Office and Science and Technology Program for funding
- Darrell Ahlers, Durel Carstensen, Rob Doster, Murrelet Halterman, Seth Kennedy, Eben Paxton, Vicky Ryan, Juddson Sechrist and scores of others...

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