Key Findings from Monitoring Riparian Birds on the Lower Colorado River 2011-2015

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Lower Colorado River Multi-Species Conservation Program

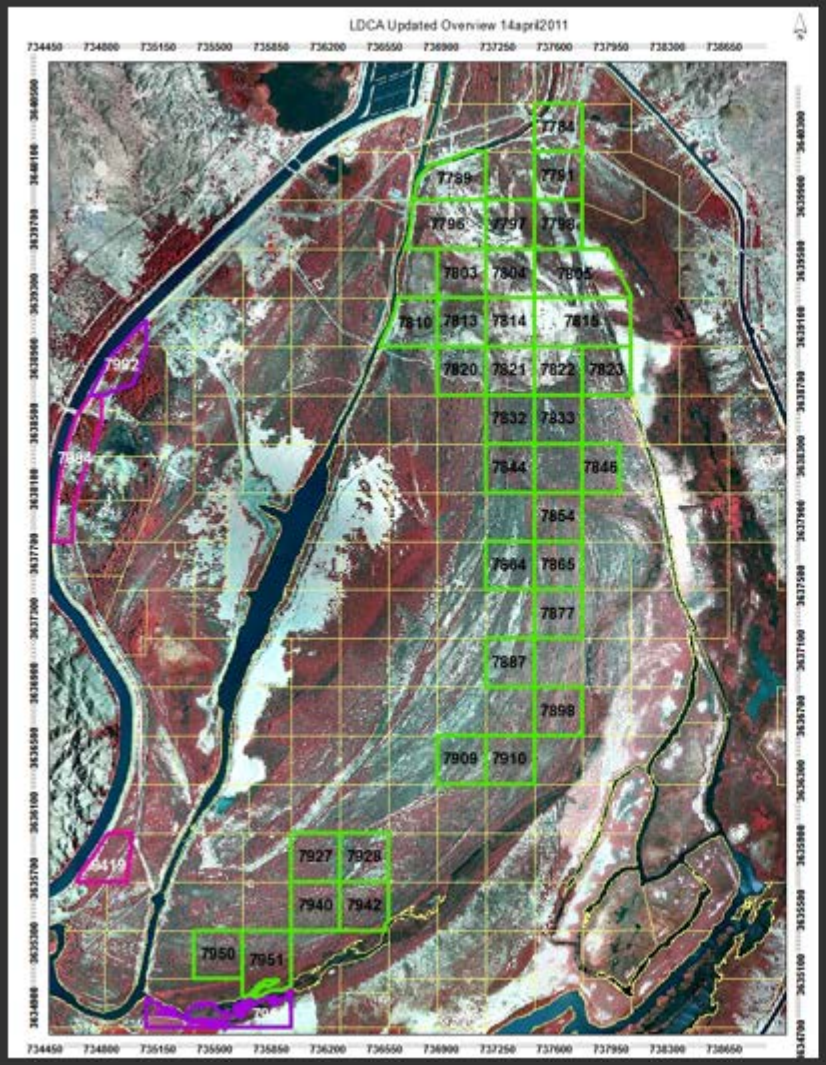
GBBO

Project Components:

1) System-wide and HCA monitoring of riparian birds including six covered species.
2) Pre-development surveys of the Laguna Division Conservation Area
3) Testing the accuracy of the double-sampling method of the Riparian Bird Survey project
4) Habitat surveys
5) Monitoring impacts of *Diorhabda* (saltcedar beetle) on riparian bird populations.

Component 2: Pre-Development Monitoring at Laguna Division Conservation Area 2011

pre-development baseline inventory- before-after-control-impact data to evaluate bird responses to the habitat creation site



Component 3: Testing the Assumptions of the Double-Sampling Method

- Tested the assumption that "intensive area searches result in unbiased estimates of bird numbers"
- 2011 to 2013
- A subset of plots surveyed by independent observers using 3 survey efforts:
  1. standard rapid area search (2x / season)
  2. standard intensive area search (8x/ season)
  3. Extra-intensive (EI) area search (16x / season)

Component 4: Habitat Surveys

- Detailed habitat assessment for four LCR MSCP covered species
- Followed vegetation monitoring protocol for the LCR MSCP
- Surveyed a total of 436 vegetation plots for the four years of data collection, including 274 use and 162 non-use plots

Component 5: Monitoring Impacts of *Diorhabda* on Riparian Bird Populations

- Detailed habitat assessment for four LCR MSCP covered species on willow flycatcher plots for modeling impacts
- Model impacts on riparian birds in SWLF plots, but the study was discontinued and we were not asked to analyze the results

Component 1: Population Estimates of Avian Species

Background

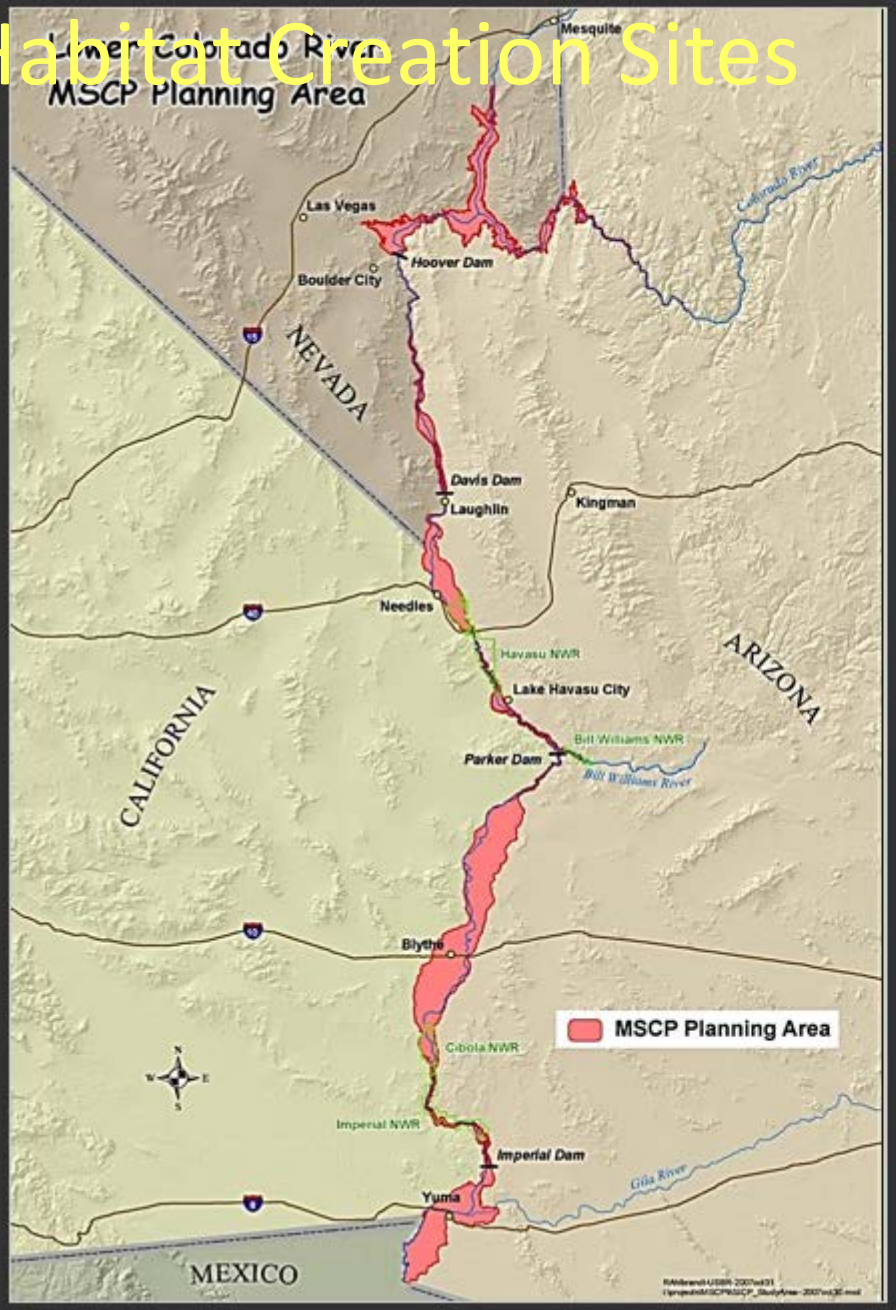
Implement long-term system-wide monitoring of riparian birds with focus placed on six LCRMSCP covered species

Our primary monitoring goal for both system-wide and HCA surveys

— To establish a baseline data set for long-term monitoring that allows detection of trends in population size and occupancy of the covered species and other riparian birds

- Arizona Bell's Vireo
- Gila Woodpecker
- Gilded Flicker
- Sonoran Yellow Warbler
- Summer Tanager
- Vermilion Flycatcher

Habitat Creation Sites



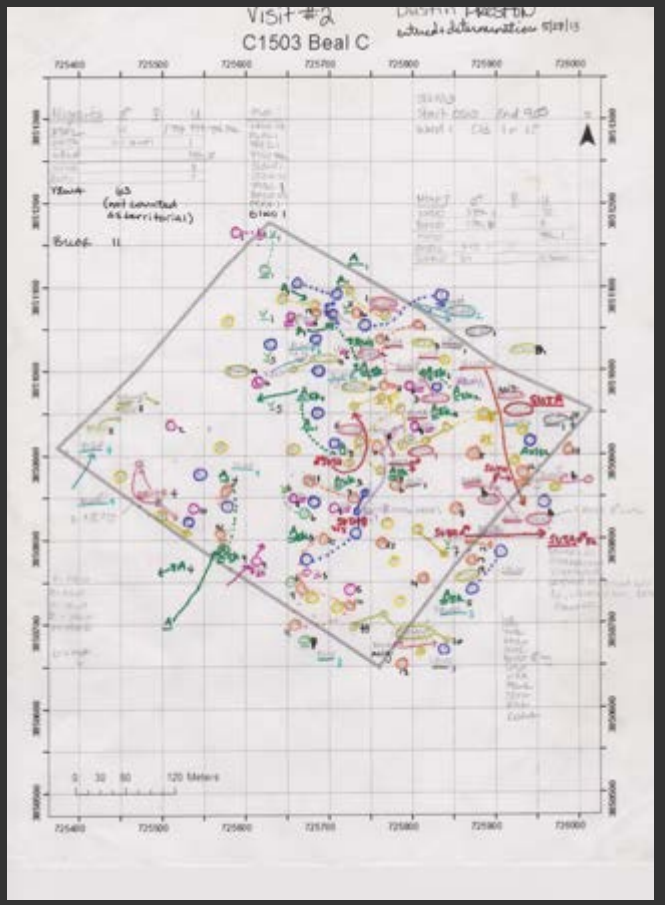
Study Area

Double Sampling

- Two survey approaches (Rapid and Intensive), Stratified random plots selection
- Rapid surveys (two times/season) may result in biased estimates
- Intensive surveys (eight times/season) used to obtain an estimate of biases through detection ratios
- Detection ratios are used to account for biases associated with rapid surveyor effort in our population size estimates

Survey Methods

— Area search method
— Starts at sunrise, covers whole plot
— Passes all plot locations within 50
— All birds recorded including breeders and migrants
— All breeding evidence recorded



Component 1 Survey effort:

2011 - 2015:

— 400 system-wide rapid area searches
— 374 HCA rapid area searches
— 40 system-wide intensive area searches
— 20 HCA intensive area searches
— *330 unique plots, some of which were surveyed in two or more years

Overall Results 2011-2015

- Approximately 200 species detected in 5 years
- System-wide: 74 territorial breeding species with over 14,000 territories recorded in 5 years
- HCA: 55 territorial breeding species with over 4,800 territories recorded in 5 years

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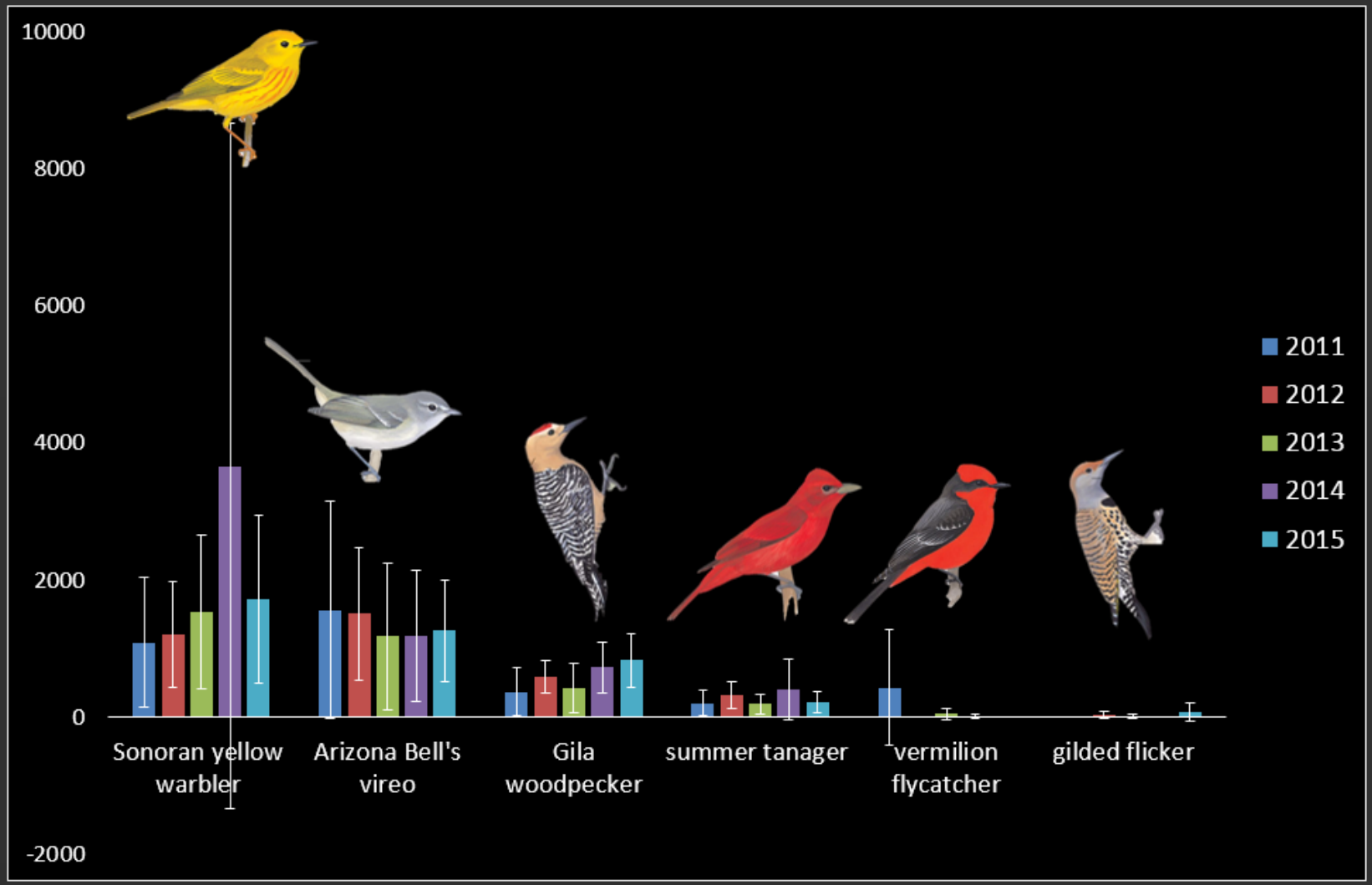
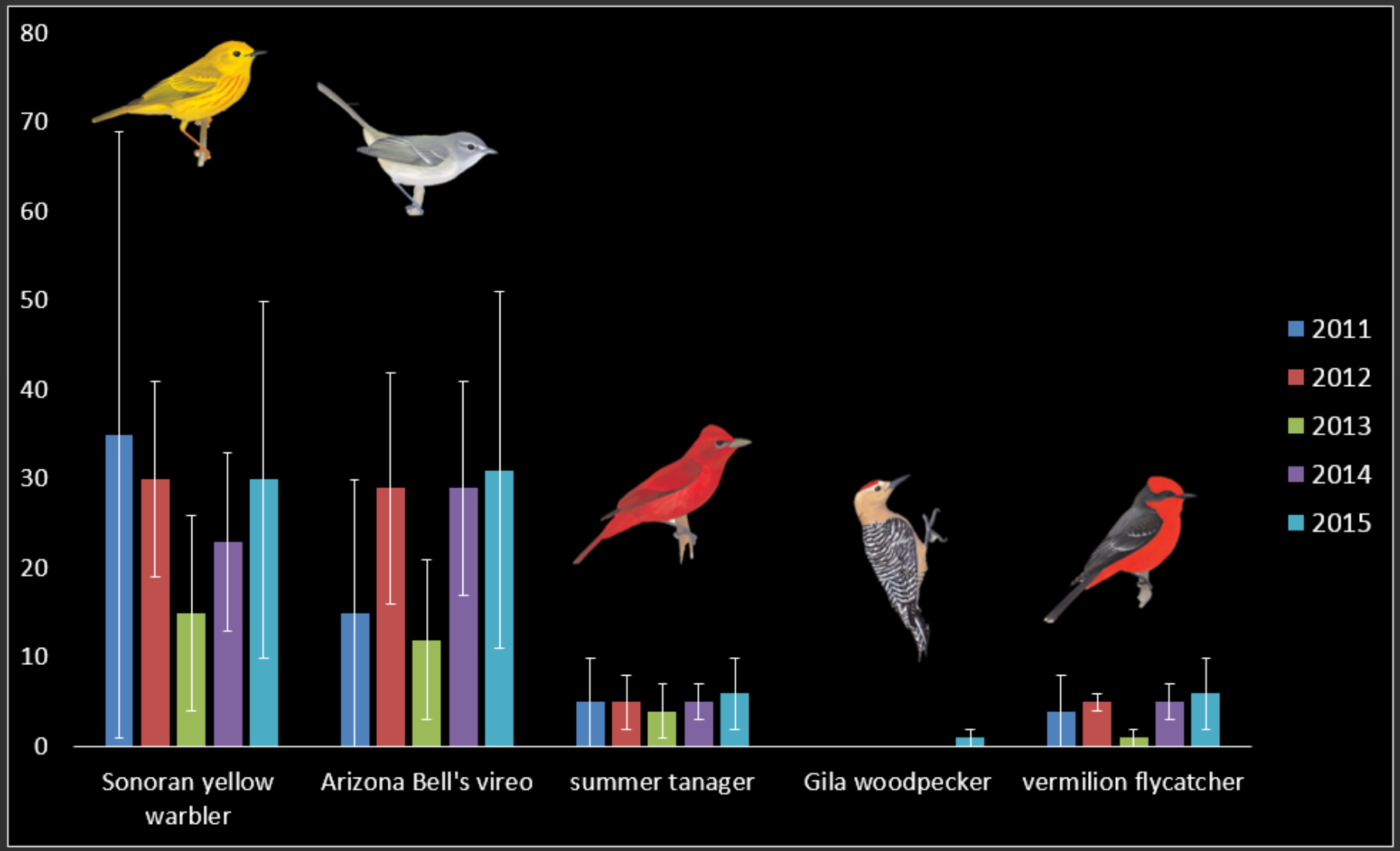
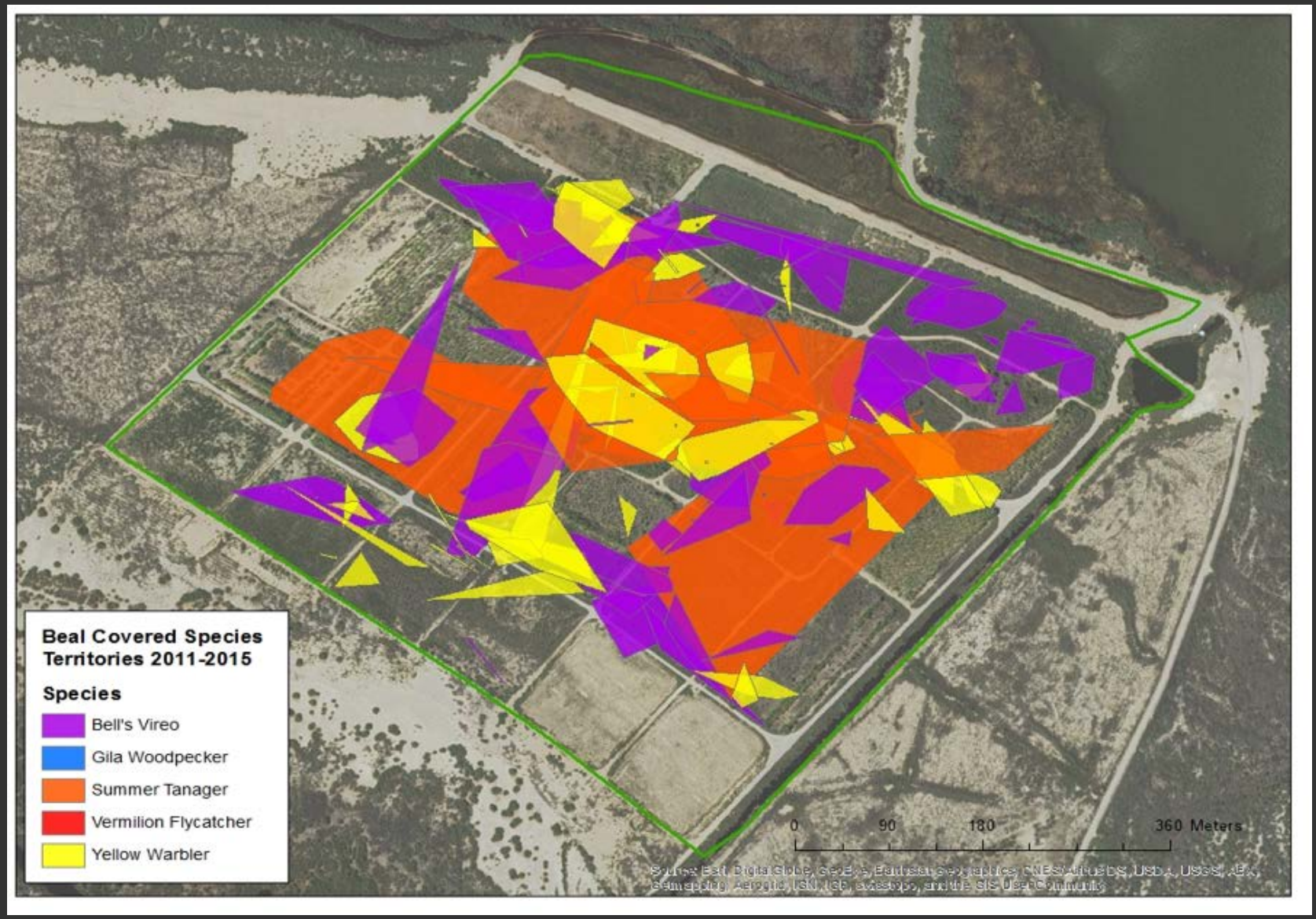
Population size estimates of covered species: **system-wide**



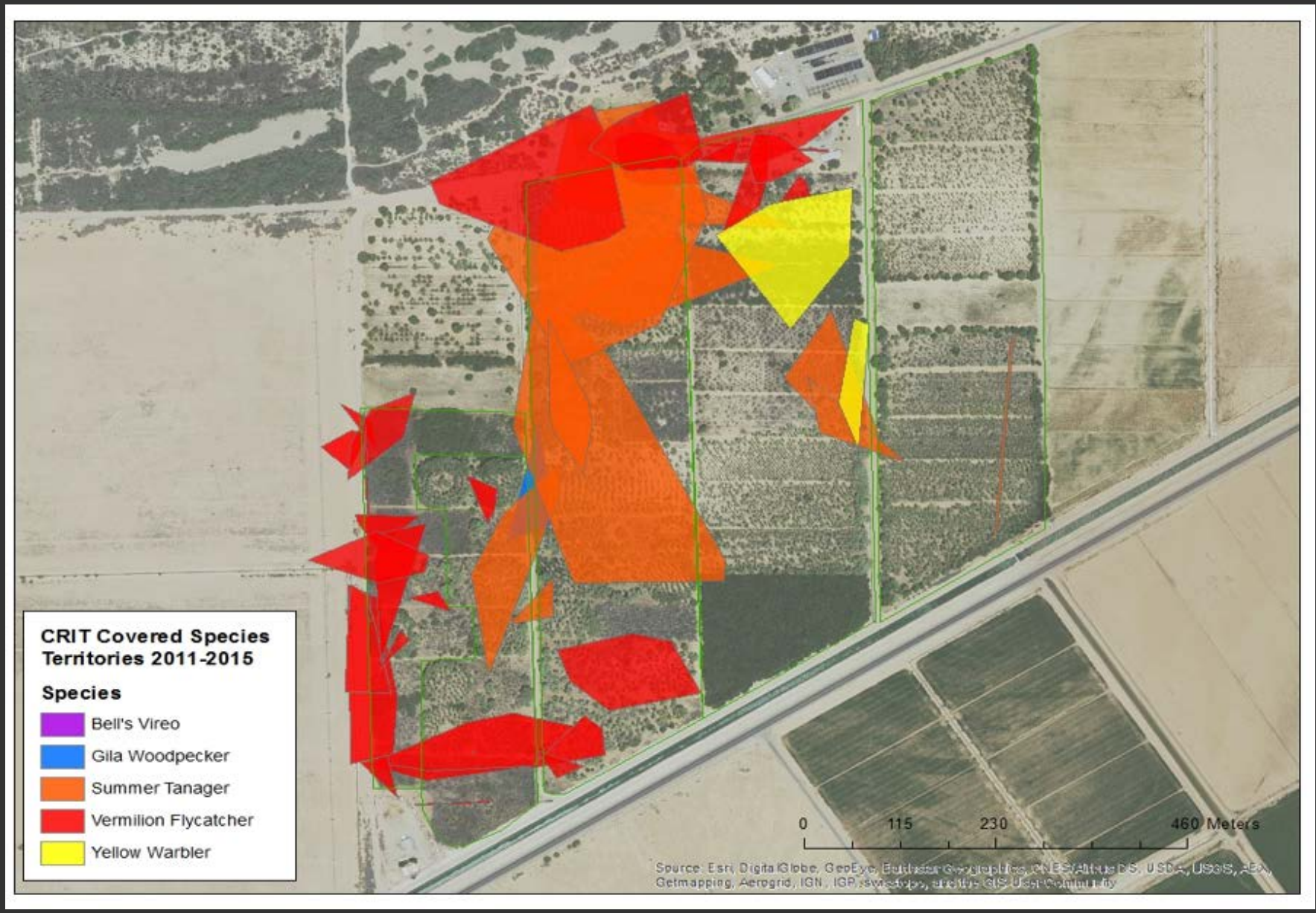
Population size estimates of covered species: **habitat creation areas**



Covered species breeding at BEAL 2011-2015



Covered species breeding at CRIT 2011-2015



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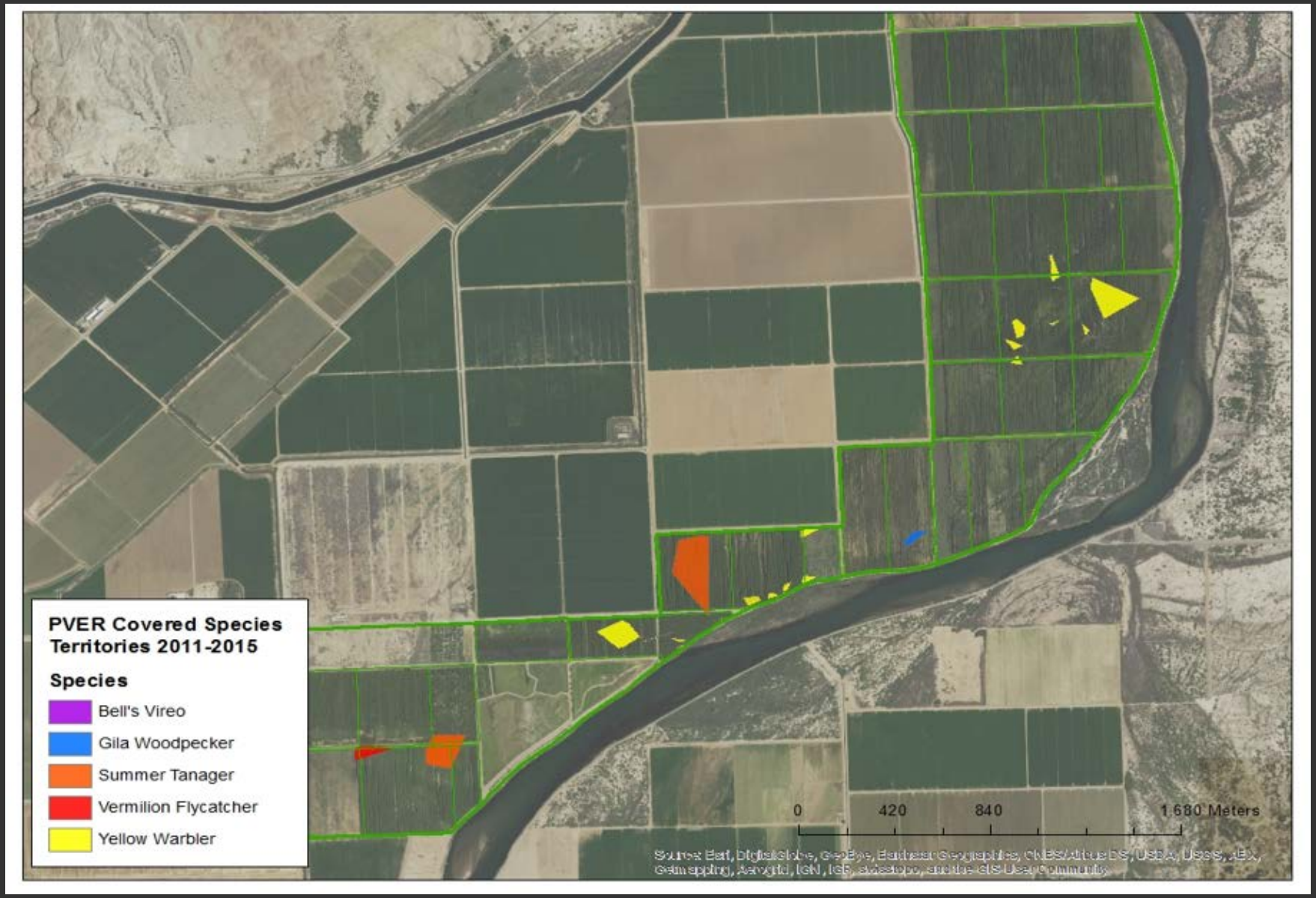
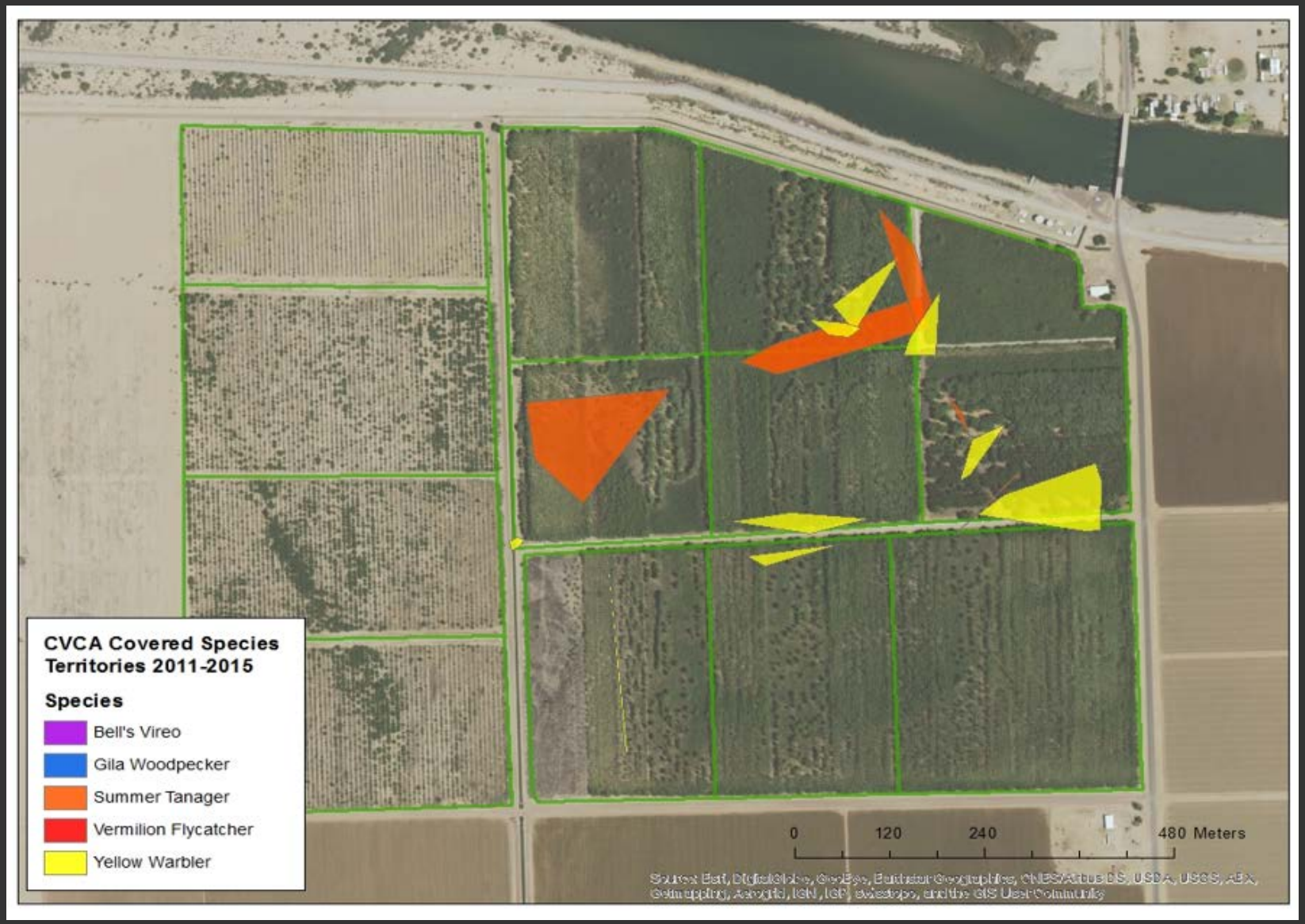
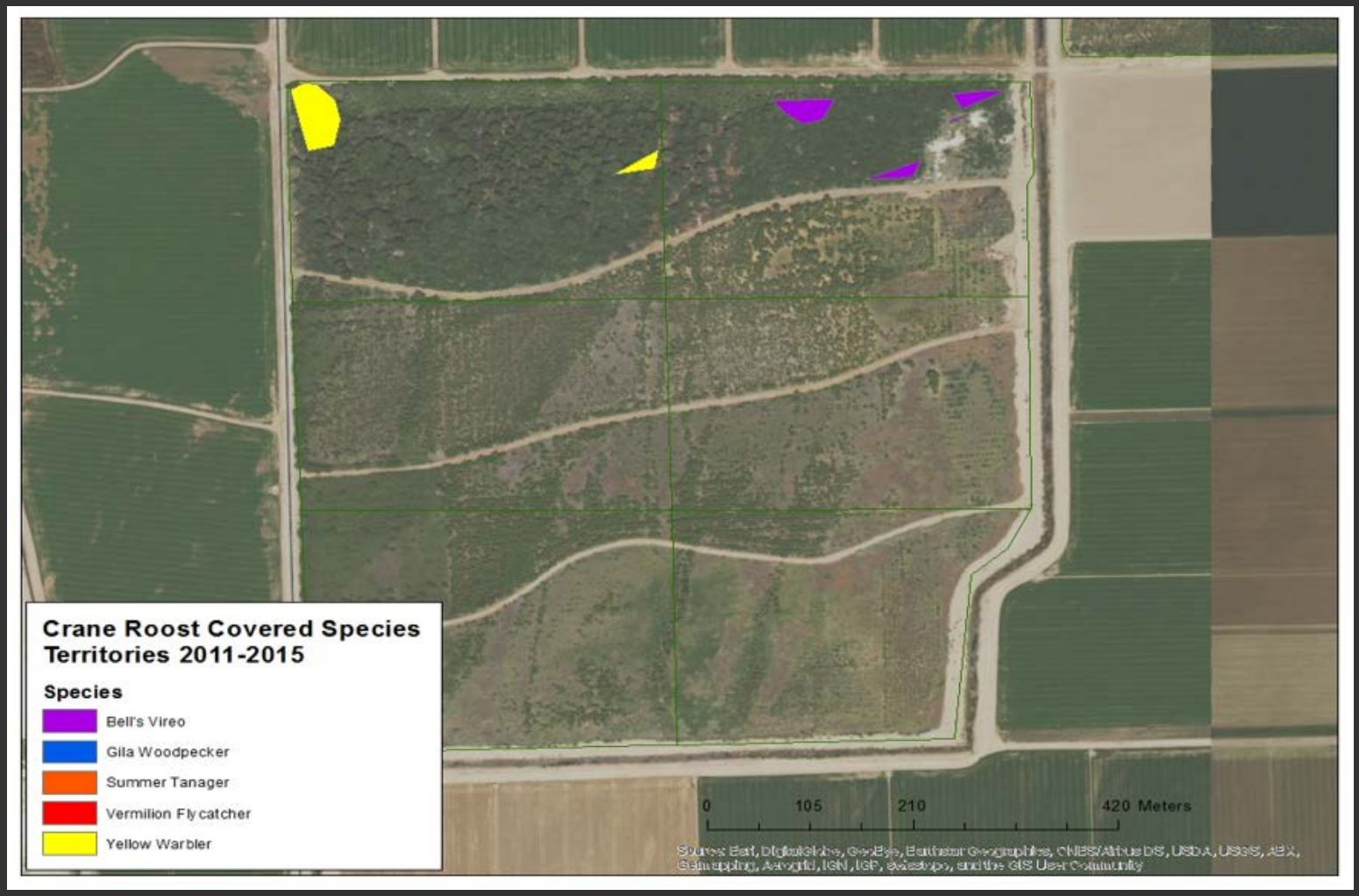
Covered species breeding at PVER 2011-2015



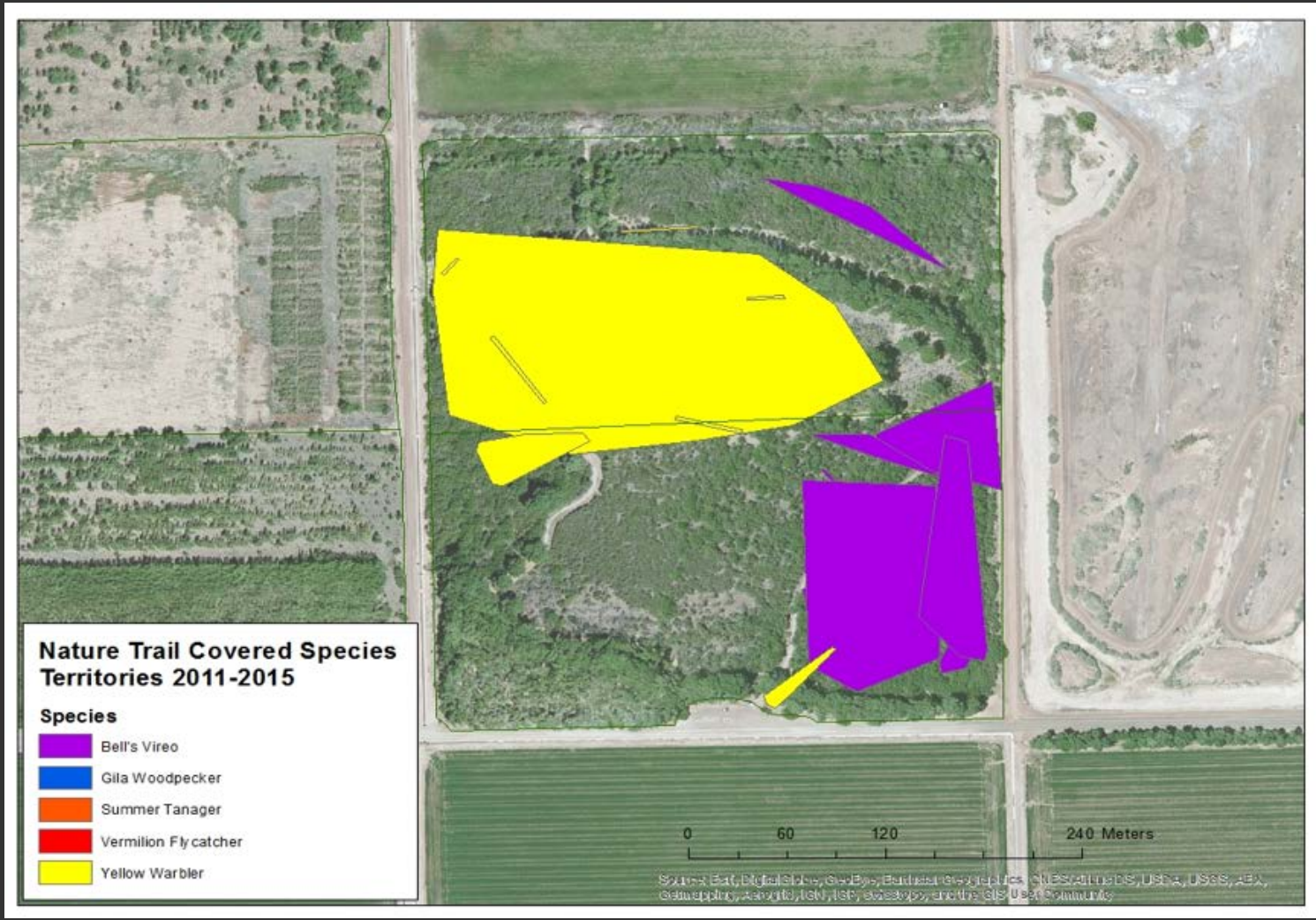
Covered species breeding at CVCA 2011-2015



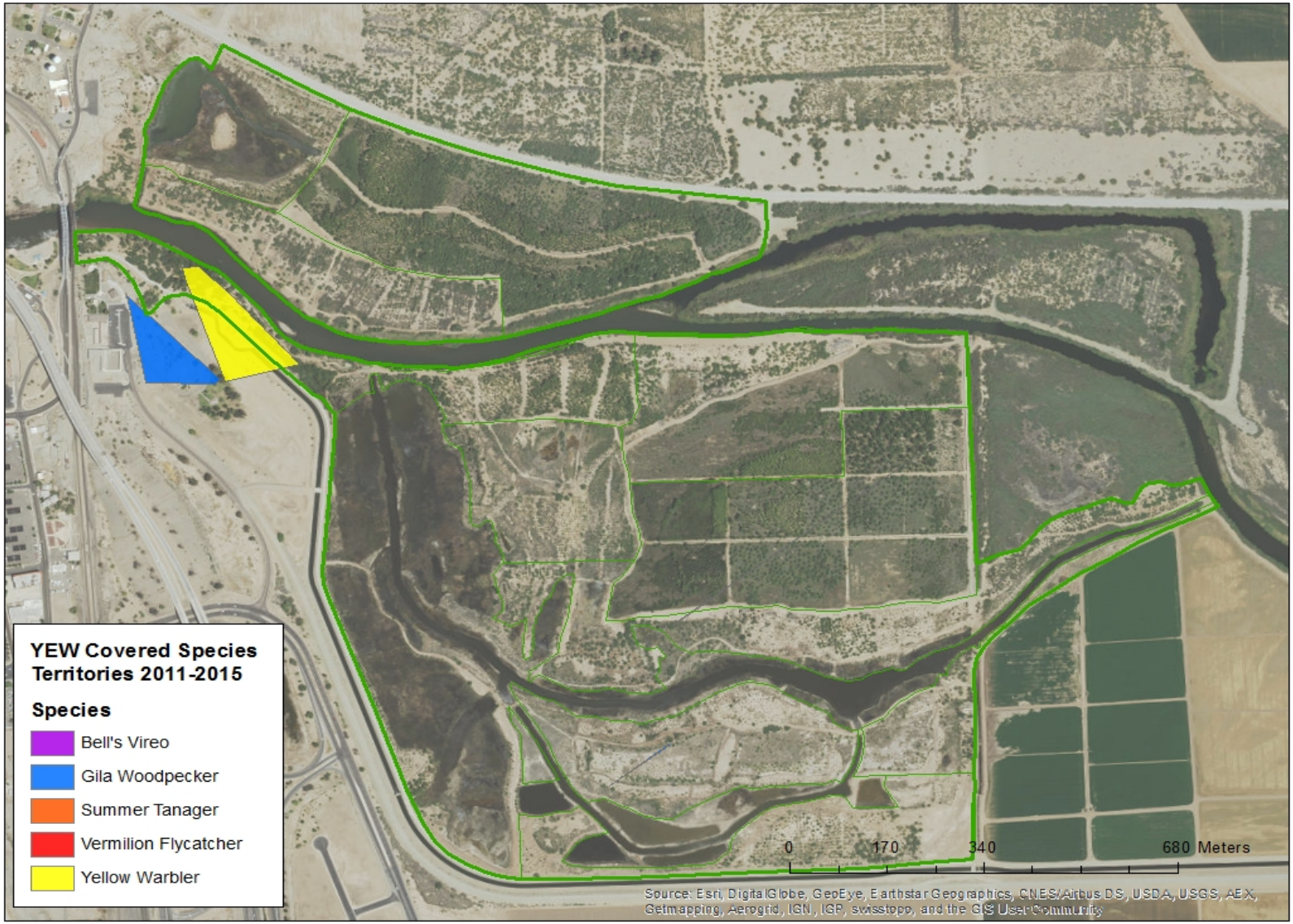
Covered species breeding at Cibola NWR Farm Unit 1 and Crane Roost 2011-2015



Covered species breeding at Cibola NWR Farm Unit 1: Nature Trail 2011-2015



Covered species breeding at YEW 2011-2015



Surveillance monitoring vs Effectiveness monitoring

surveillance monitoring

- detecting trends based on region-wide random samples
- system-wide monitoring

effectiveness monitoring

- determine net effects of local conservation action
- habitat conservation monitoring

Tip of the iceberg…..

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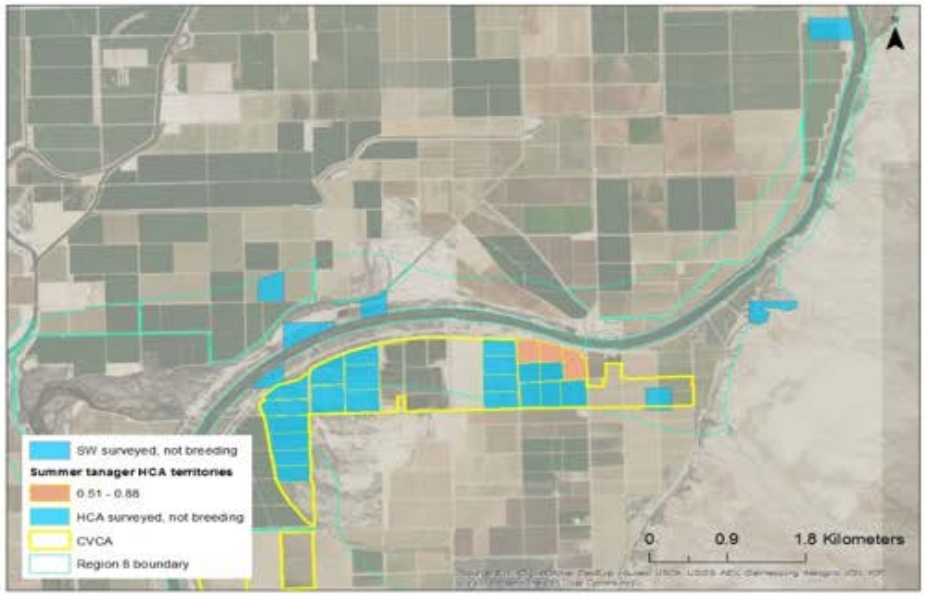
Distribution and Natural History of the MSCP Covered Species

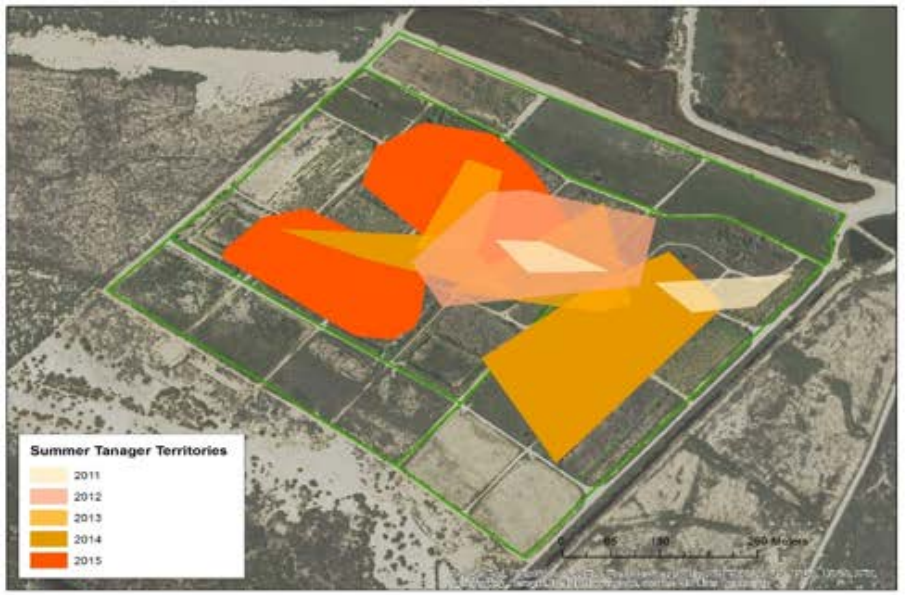
Elisabeth Ammon,
Great Basin Bird Observatory, Reno, NV

Distributional Maps:

— Maps depict the distribution of territories for covered species in two ways:

1. Average number of territories per plot.
2. Minimum convex polygons within and near habitat conservation areas.





100 Years of Demographic Data:
Yellow Warbler

Surveys	Year	Population Trend
Grinnell	1910	Numerous in cottonwood-willow
Monson	1950	Steep population decline
Rosenberg et al.	1974-1984	Almost extirpated from the LCRV
McKernan & Braden	1996-2001	Confirmed breeding at all sites
GBBO	2011-2015	1,853 pairs

Habitat Selection: Yellow Warbler

— Cottonwood-willow habitat
— Use areas containing saltcedar when a few large willow trees and inundated soils are present.
— Found in sites with nearby water.

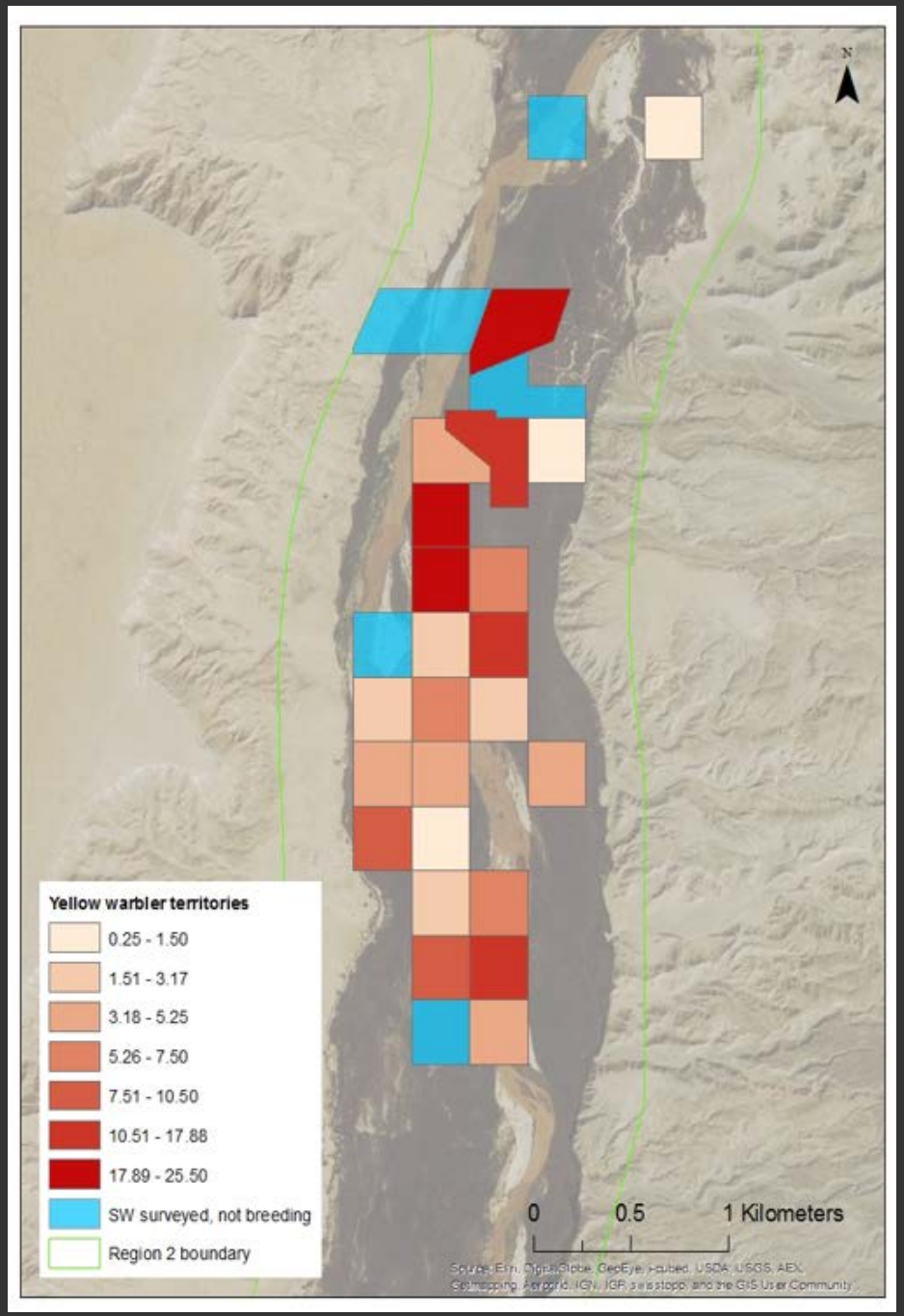
Recommendations for Riparian Restoration: Yellow Warbler

— Mimic natural disturbance regimes, such as flooding
— Nearby wetlands may be important to this species based on high territory densities in these areas
— Goodding's willow as a dominant tree and other willows as understory may potentially improve site suitability

Virgin River: Yellow Warbler

— Area high in Tamarisk and low in cottonwood-willow

— High water table and natural flooding



Lake Mohave: Yellow Warbler

— High breeding numbers found in pockets on Lake Mohave

— As many as 31 pairs (*note this includes partial territories)

100 Years of Demographic Data:

Bell's Vireo

Surveys	Year	Population Trend
Grinnell	1910	Abundant
Rosenberg et al.	1974-1984	57% population decline during surveys
McKernan & Braden	1996-2001	Found breeding at every site
GBBO	2011-2015	1351 pairs

Habitat Selection: Bell's Vireo

— Tied to mesquite, although have been found breeding within other understory associations

— Proximity to water and open space might be important factors

— Absent or uncommon in some apparently suitable habitats

Recommendations for Riparian Restoration:

Bell's Vireo

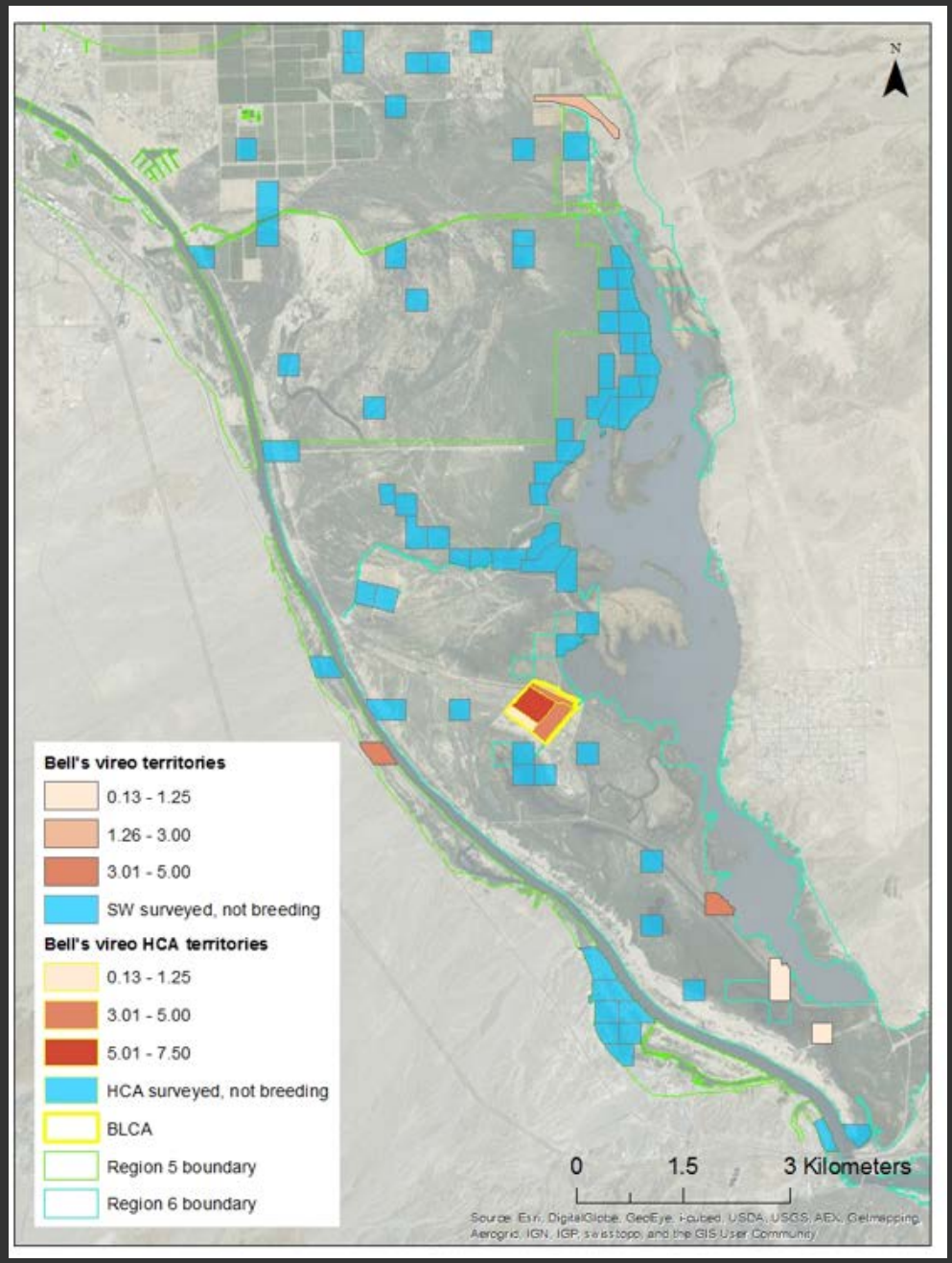
— Mesquite plantings with dense understory

— Xeric plantings surrounded by cottonwood-willow that mimic natural riparian zones

— Planting close to water

Havasu NWR:
Bell's Vireo

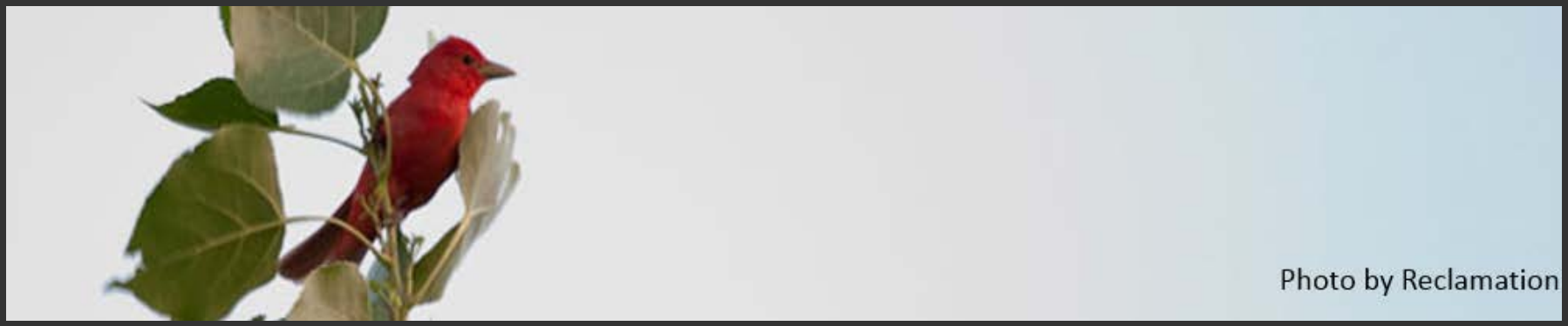
- High concentrations at Beal
- Absent throughout much Havasu NWR



Territories at Beal 2011-2015: Bell's Vireo

100 Years of Demographic Data:
Summer Tanager

Surveys	Year	Population Trend
Grinnell	1910	Characteristic species of cottonwood-willow
Rosenberg et al.	1974-1984	Uncommon (~138 individuals)
McKernan & Braden	1996-2001	Breeding throughout study area
GBBO	2011-2015	~269 pairs



Habitat Selection: Summer Tanager

— Found in cottonwood and willow.

— Areas containing at least a few tall trees, among saltcedar forest, and in other cases featured a continuous or broken canopy of cottonwoods and/or willows.

— Contiguous native riparian gallery forest is most suitable for this species

Recommendations for Riparian Restoration: Summer Tanager

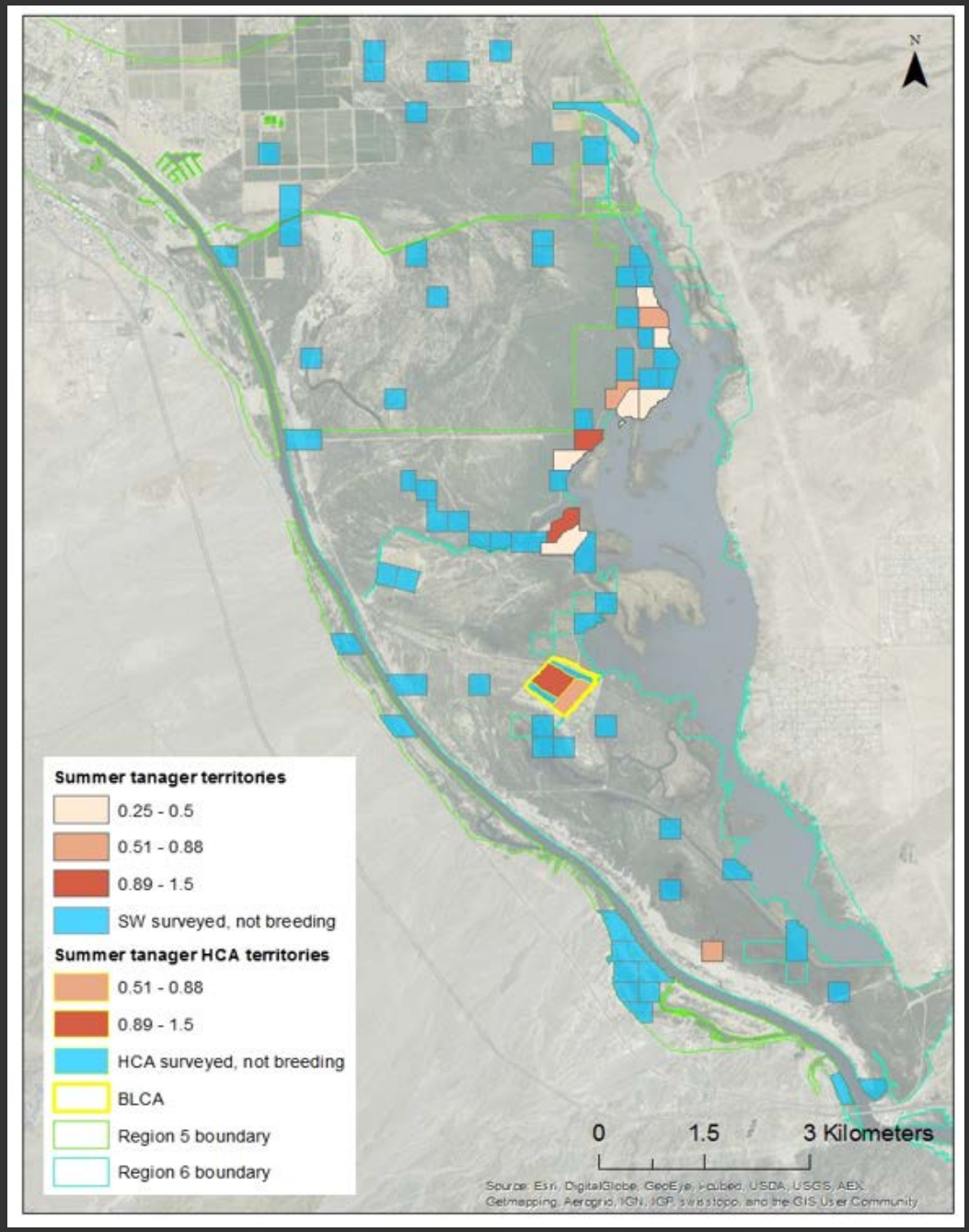
— Densities remain low at HCAs.

— Possible factors to increase densities:

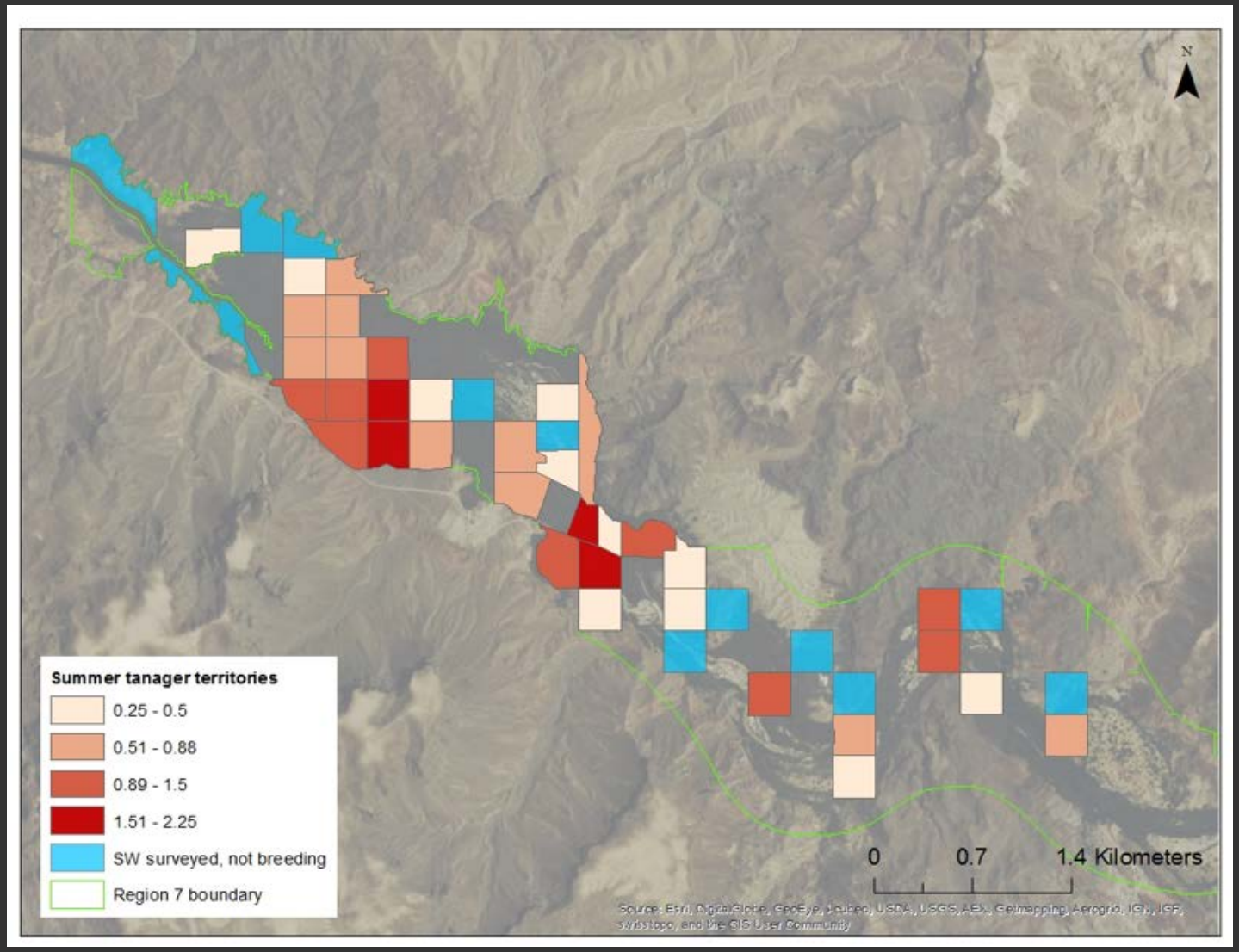
1. Increase shrub cover (which may optimize invertebrate resources)
2. Increase canopy density
3. Change hydrology (may affect microclimate, nest success, and insect abundance)

Havasu NWR:
Summer Tanager

— At least one to two territories found each year at Beal



Bill Williams River NWR: Summer Tanager



100 Years of Demographic Data:
Gila Woodpecker

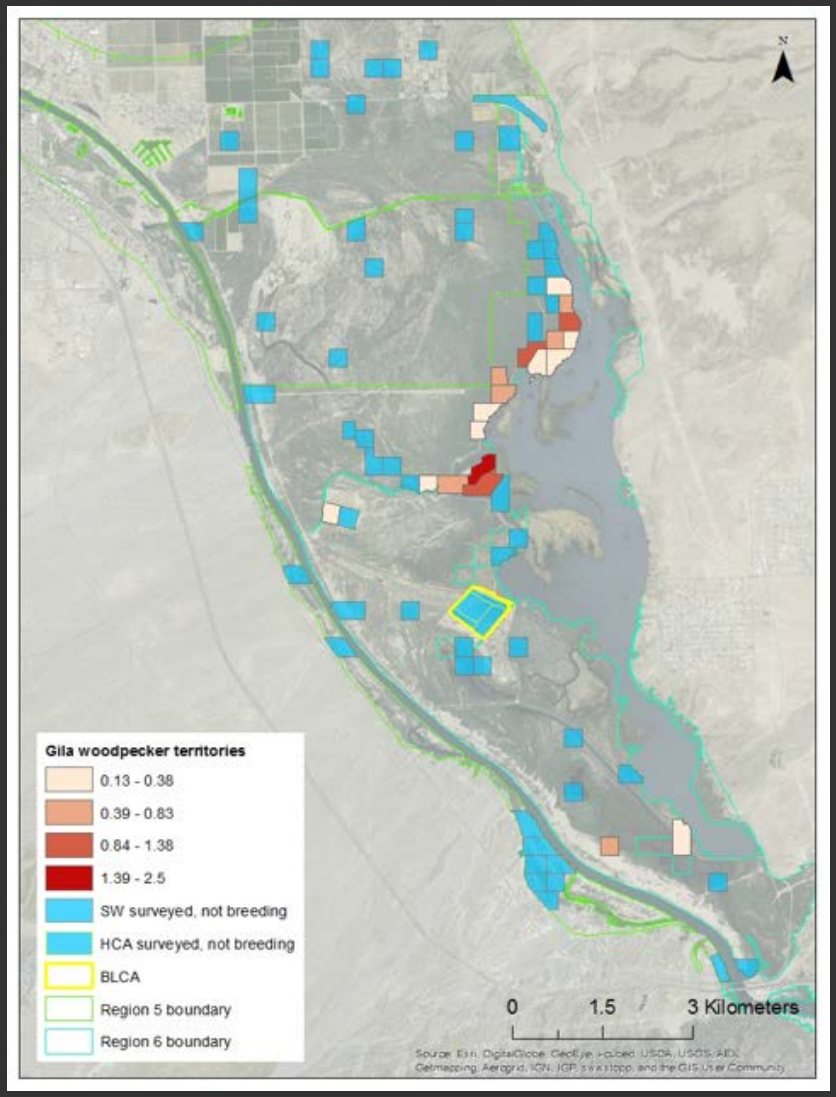
Surveys	Year	Population Trend
Grinnell	1910	Common and widespread
Rosenberg et al.	1974-1984	Estimated 1,000 individuals
GBBO	2011-2015	Apparently stable; 589 pairs

Habitat Selection: Gila Woodpecker

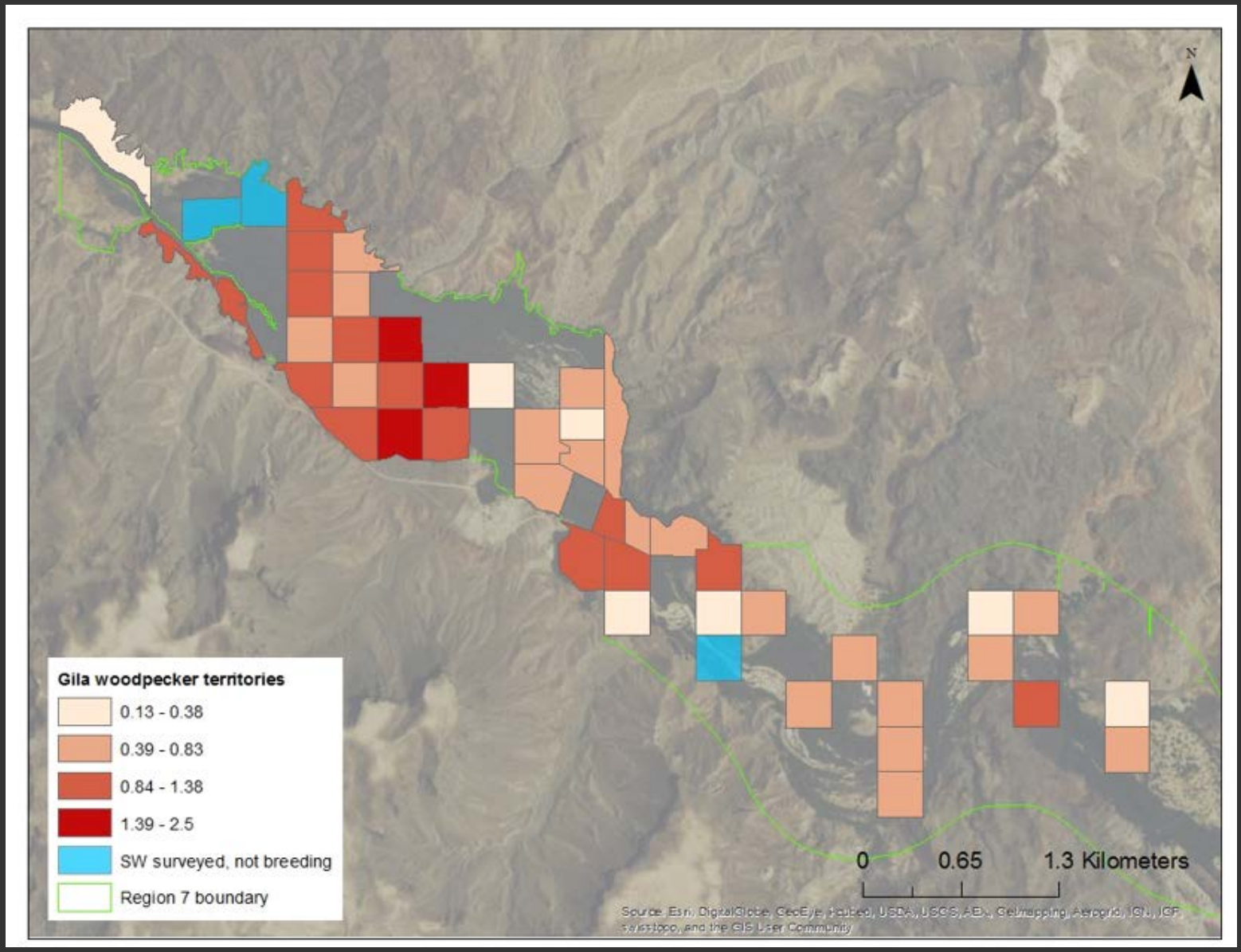
- Nesting habitat: often saguaros or large cottonwoods at Bill Williams. Nests also found in Goodding's Willow, Athel Tamarisk
- Seems to use any site with suitable large, decadent trees for nesting
- 2015: First year using created habitats during breeding
  - PVER, Yuma East Wetlands; also at 'Ahakhav Tribal Preserve

Havasu NWR: Gila Woodpecker

Topock Marsh: Northern limit of range



Bill Williams River: Gila Woodpecker



Recommendations for Riparian Restoration: Gila Woodpecker

- Decadent trees seem to be the most important habitat requirement
- Over the long term, continued growth and aging of plantings expected to attract this species
  - Partial territories in created habitats first established in 2015 were in plantings of 5, 9, and 14 years old

100 Years of Demographic Data: Gilded Flicker

Surveys	Year	Population Trend
Grinnell	1910	Common where saguaros present
Rosenberg et al.	1974-1984	Fairly common at Bill Williams River, rare elsewhere
McKernan & Braden	1996-2001	Confirmed breeding at numerous sites along the mainstem
GBBO	2011-2015	Nearly extirpated

Upper Bill Williams River: Gilded Flicker

Habitat Requirements: Gilded Flicker

- Using upland saguaros for breeding, riparian areas for foraging
- Some movement into riparian areas in fall and winter
- Absent from the rest of the Bill Williams River despite apparently suitable habitat
- Saguaros seem to be critical at this point

100 Years of Demographic Data:
Vermilion Flycatcher

Surveys	Year	Population Trend
Grinnell	1910	Numerous from Ehrenberg to Yuma
Rosenberg et al.	1974-1984	<10 pairs
GBBO	2011-2015	Very local. 99 pairs estimated

Distribution: Vermilion Flycatcher

- Very few using native habitat
- Preferred nesting areas include cemeteries, parks, golf courses

Recommendations for Riparian Restoration:

Vermilion Flycatcher

- Factors that may attract this species:
  - Moist soil
  - Grassy understory
  - Open strips or patches with a few large trees (mesquites)

Acknowledgements

- US Bureau of Reclamation Wildlife Group
- USGS Snake River Field Station: Jon Bart
- National Wildlife Refuge Staff
- Awesome field crews over the years