Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Lower Colorado River Riparian Bird Surveys

2011–2015 Summary Report

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ACRONYMS AND ABBREVIATIONS

BLCA	Beal Lake Conservation Area
Cibola NWR Unit #1	Cibola National Wildlife Refuge Unit #1 Conservation Area
CRIT 9	Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09
CV	coefficient of variation
CVCA	Cibola Valley Conservation Area
CW	cottonwood-willow
DR	detection ratio
EI	enhanced intensive
FPC	finite population correction
GBBO	Great Basin Bird Observatory
GIS	Geographic Information System
HOBO	environmental data logger units
LCR	lower Colorado River
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
LDCA	Laguna Division Conservation Area
MS	Microsoft
MCP	minimum convex polygon
MVCA	Mohave Valley Conservation Area
N	entire sample size
n	a subset of the entire sample
n/a	not applicable
Nature Trail	Cibola National Wildlife Refuge Unit #1 Conservation Area Nature Trail
program DS	Double Sampling Analysis Program
PVER	Palo Verde Ecological Reserve
PWCA	Pretty Water Conservation Area
Reclamation	Bureau of Reclamation
SAS	Version 9.4 of the SAS System for Windows
SE	standard error
USGS	U.S. Geological Survey
YEW	Yuma East Wetlands

Symbols

>	greater than
≥	greater than or equal to
<	less than
≤	less than or equal to
%	percent
±	plus or minus

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EXECUTIVE SUMMARY

The goal of the lower Colorado River riparian bird project is to provide a baseline for monitoring long-term population trends of riparian obligate birds throughout the lower Colorado River and Bill Williams River as well as in the Lower Colorado River Multi-Species Conservation Program's (LCR MSCP) conservation areas and the Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09 (CRIT 9). Monitoring focused on 6 of the 12 LCR MSCP covered bird species, referred to in this report as the LCR MSCP covered focal species.

In this summary report, we focus on five components of the project:

(1) System-wide and conservation area and CRIT 9 monitoring of riparian land birds, including the LCR MSCP covered focal species: Arizona Bell's vireo (*Vireo bellii arizonae*), Sonoran yellow warbler (*Dendroica petechia sonorana = Setophaga petechia sonorana*), Gila woodpecker (*Melanerpes uropygialis*), summer tanager (*Piranga rubra*), vermilion flycatcher (*Pyrocephalus rubinus*), and gilded flicker (*Colaptes chrysoides*), as well as the most common riparian land bird species. This monitoring included pre-development surveys at the Pretty Water Conservation Area and Mohave Valley Conservation Areas.

(2) Pre-development surveys of the Laguna Division Conservation Area.

(3) Testing the accuracy of the double sampling method for riparian land bird surveys.

(4) Habitat surveys.

(5) Monitoring impacts of *Diorhabda* spp. (the saltcedar [*Tamarix* spp.] beetle) on riparian bird populations.

The majority of this report focuses on the findings of components 1 and 3, which describe the results of monitoring that document the LCR MSCP covered focal species' and other riparian land birds' occupancy of system-wide and conservation areas and CRIT 9, as well as a discussion of the survey methods used. Each component discussion focuses on what was learned and observations for improving the effectiveness of methods. This report contains updated population estimates for 2011–15 from those previously published by the LCR MSCP and attachment 4 that provides insights into the natural history of the LCR MSCP covered focal species.

Component 1: Population Estimates of Avian Species within the Lower Colorado River Multi-Species Conservation Program Boundaries and Conservation Areas

INTRODUCTION

Monitoring of riparian land birds occurred in system-wide areas along the lower Colorado River (LCR) and the Bill Williams River as well as the Lower Colorado River Multi-Species Conservation Program's (LCR MSCP) conservation areas and the Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09 (CRIT 9) from 2011 to 2015. This monitoring focused on 6 of the 12 LCR MSCP covered bird species: the Arizona Bell's vireo (*Vireo bellii arizonae*), Sonoran yellow warbler (*Dendroica petechia sonorana = Setophaga petechia sonorana*), Gila woodpecker (*Melanerpes uropygialis*), summer tanager (*Piranga rubra*), vermilion flycatcher (*Pyrocephalus rubinus*), and the gilded flicker (*Colaptes chrysoides*) These six species are referred to in this report as the LCR MSCP covered focal species. The primary monitoring goal for both system-wide and conservation area and CRIT 9 monitoring was to establish a baseline dataset for long-term monitoring that allows for detection of trends in population size and occupancy of the LCR MSCP covered focal species and other riparian land birds. We used a double sampling method recommended by Bart and Earnst (2002) to estimate abundance for these species. Double sampling uses counts from relatively low (rapid) and high intensity (intensive) area search surveys on a subset of sample plots to estimate a detection ratio (DR) that is used to correct rapid area search survey counts for the entire sample. Between 2011 and 2015, we performed 400 system-wide rapid area search surveys and 374 conservation area and CRIT 9 rapid area search surveys as well as 40 system-wide intensive area search surveys and 20 conservation area and CRIT 9 intensive area search surveys. Rapid and intensive area search survey data were used to estimate the total number of territories of the six LCR MSCP covered focal species and the most common territorial riparian land birds. The rationale and methods for population monitoring based on double sampling used in this project were developed in the first 3 years (2008–10) of riparian area search monitoring for the LCR MSCP (Bart and Manning 2008; Bart et al. 2010; Great Basin Bird Observatory [GBBO] 2011).

Component 1 formed the backbone of the entire project, and it included the majority of the data collection effort. The sampling plan for component 1 underwent changes throughout the years that were designed to streamline data collection and optimize data output for LCR MSCP covered focal species under a limited budget. In this report, we summarize the main results of this effort and discuss new findings from the 5-year dataset. We further dedicate a significant

portion of this report to summarizing conclusions from this study and to developing suggestions for future bird monitoring and habitat creation planning. Finally, this component, along with Component 3 (Testing the Assumptions of the Double Sampling Method) produced a wealth of new knowledge on the natural history of the LCR MSCP covered focal species that variously affects their detection rates, which we summarize in attachment 4.

Methods

Study Area

The project area for system-wide bird monitoring spans the Colorado River from Separation Canyon, upstream of Lake Mead, to the Southerly International Boundary with Mexico as well as portions of the Bill Williams and Virgin Rivers. The borders were defined by intersecting the 2004 vegetation layer with the LCR MSCP boundary layer in order to target riparian habitat within the LCR MSCP area. The conservation areas that were monitored separately from system-wide areas included the Mohave Valley Conservation Area (MVCA), Beal Lake Conservation Area (BLCA), Cibola National Wildlife Refuge Unit #1 Conservation Area (Cibola NWR Unit #1), Cibola Valley Conservation Area (CVCA), Palo Verde Ecological Reserve (PVER), Pretty Water Conservation Area (PWCA), and Yuma East Wetlands (YEW). The MVCA and PWCA were monitored as pre-development areas. CRIT 9 is a habitat creation area outside the LCR MSCP and was also included in plot selection.

System-Wide Plot Selection

For system-wide areas, we randomly selected 80 plots each year from a plot grid of approximately 10,000 plots. The sample was stratified using four habitat strata (low woody, tall woody, herbaceous, and unsuitable) (table 1), and the plots were distributed through eight geographic regions. Some regions of the study area had to be excluded from system-wide sampling, specifically Region 1 (access problems), Region 2, Region 3 (lack of riparian vegetation and fluctuating lake levels), the majority of Region 9 (permit unattainable; therefore, area search surveys were only conducted on ‘Ahakhav Tribal Preserve land in this region), and Region 13 (border safety concerns). Survey effort was distributed among the strata such that habitat types that were likely to have LCR MSCP covered focal species were sampled more often than those that were less suitable. Specifically, the tall woody habitat type is found in several regions of the project area, which is favored by most LCR MSCP covered focal species, and these regions therefore received a higher number of surveyed plots each year than other regions. The details on how plots were classified and the definitions of habitat strata and regions can be reviewed in Bart et al 2010. Regions and habitat strata were delineated by the U.S. Geological Survey (USGS) Snake River Field Office with the Bureau of Reclamation’s (Reclamation) input.

Table 1.—Number of system-wide area search plots per region and habitat strata surveyed in 2011–15
(Plots that were surveyed multiple years were counted multiple times in this table.)

Region number	Region name	LCR MSCP reach	Tall woody	Low woody	Herbaceous	Unsuitable	Herbaceous/ unsuitable[1]	Total
1	Separation Canyon to Lake Mead	1	0	0	0	0	0	0
2	Virgin River	1	0	0	0	0	0	0
3	Lake Mead	1	0	0	0	0	0	0
5	Hoover Dam to Bill Williams River (excluding the Havasu National Wildlife Refuge)	2–3	19	28	0	12	3	62
6	Havasu National Wildlife Refuge	3	20	14	14	1	4	53
7	Bill Williams River from the confluence with Lake Havasu to Alamo Dam – includes the Bill Williams National Wildlife Refuge and other private and public land	3	35	31	0	6	3	75
8	Parker Dam to the Cibola National Wildlife Refuge, excluding Colorado River Indian Tribal land	4	7	12	0	11	0	30
9	Colorado River Indian Tribal land	4	0	0	0	1	0	1
10	Cibola National Wildlife Refuge	4	16	23	0	12	1	52
11	Imperial National Wildlife Refuge	5	16	18	7	1	2	44
12	Colorado River from the Imperial National Wildlife Refuge to Yuma, Arizona	6	33	30	9	8	3	83
13	Yuma, Arizona, to the Southerly International Boundary with Mexico	7	0	0	0	0	0	0
	Total		**146**	**156**	**30**	**52**	**16**	**400**

[1] Herbaceous/unsuitable were combined in 2011.

In 2011–15, we performed 400 system-wide rapid area search surveys as well as 40 system-wide intensive area search surveys. This included 329 unique plots, some of which were surveyed in 2 or more years.

Plot Selection in Conservation Areas and CRIT 9

The total area of developed (planted) conservation areas and CRIT 9 increased by 200–400 acres per year throughout the study. It was possible to monitor all developed conservation areas and CRIT 9 in 2011–13, but then we switched to the same stratified random sampling approach as used for system-wide monitoring in 2014 because of the increased area. Starting in 2014, we randomly selected 80 conservation area and CRIT 9 plots, stratified first by conservation area or CRIT 9, then by habitat type. The number of plots selected on each conservation area or CRIT 9 was proportional to its percentage of total area of all conservation areas and CRIT 9. Conservation area and CRIT 9 plots were divided into three specific habitat strata: Fremont cottonwood (*Populus fremontii*)-willow (*Salix* spp.) (entire plot consisted of cottonwood-willow), mesquite (*Prosopis* spp.) (entire plot consisted of mesquite), and mixed (plots where cottonwood-willow and mesquite were both present). We subdivided the total number of plots to be surveyed in each habitat type proportionally to their availability on a given conservation area or CRIT 9 (table 2).

In 2011–15, 374 rapid area search surveys were performed on conservation area and CRIT 9 plots, and 20 intensive area search surveys were done on a subset of these plots (attachment 1; tables 2–4); plus, an additional 6 intensive area search surveys were conducted at YEW by Fred Phillips Consulting, LLC. Included in these 374 area search surveys were 11 rapid area search surveys performed on pre-development plots at 2 conservation areas, the MVCA and PWCA. These pre-development area search surveys were done in 1 year only for each area (table 3); results were previously reported in annual reports and will not be discussed in this report or included with results from developed conservation areas or CRIT 9.

Intensive Area Search Plot Selection

To select plots for intensive area search surveys, we randomly selected a subset of plots each year from the pool plots selected for system-wide area search surveys (eight per year) and for conservation areas and CRIT 9 (four per year). Between 2011 and 2015, we conducted 60 intensive area search surveys, including 40 system-wide and 20 conservation area and CRIT 9 intensive area search surveys. This did not include three plots surveyed with intensive area search surveys at YEW in 2 years by Fred Phillips Consulting, LLC (table 4; attachment 1).

Table 2.—Number of conservation area and CRIT 9 plots surveyed using rapid area search surveys in 2011–15

Conservation area/CRIT 9	2011	2012	2013	2014	2015
Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09	5	5	5	5	5
Beal Lake Conservation Area	4	2	4	4	4
Cibola National Wildlife Refuge Unit #1 Conservation Area	12	13	13	11	13
Cibola Valley Conservation Area	20	23	23	21	18
Palo Verde Ecological Reserve	19	26	34	31	27
Yuma East Wetlands	n/a*	n/a	n/a	8	7
Total	**60**	**69**	**79**	**80**	**74**

* n/a = not applicable.

Table 3.—Number of pre-development conservation area plots surveyed using rapid area search surveys in 2011–15

Conservation area	2011	2012	2013	2014	2015
Mohave Valley Conservation Area	n/a*	n/a	n/a	n/a	7
Pretty Water Conservation Area	n/a	n/a	4	n/a	n/a

* n/a = not applicable.

Table 4.—List of plots that were surveyed using intensive area search surveys in 2011–15 for conservation areas and CRIT 9

Conservation area/CRIT 9	2011	2012	2013	2014	2015
Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09	1	1	0	1	0
Beal Lake Conservation Area	0	1	0	0	1
Cibola National Wildlife Refuge Unit #1 Conservation Area	1	0	2	2	0
Cibola Valley Conservation Area	2	2	0	0	0
Palo Verde Ecological Reserve	0	0	2	1	3
Yuma East Wetlands	n/a*	3**	3**	0	0
Total	**4**	**7**	**7**	**4**	**4**

* n/a = not applicable.
** Plots surveyed by Fred Phillips Consulting, LLC.

Avian Monitoring Methods

To monitor birds of the LCR in system-wide and conservation area and CRIT 9 plots, we conducted double sampling using rapid and intensive area search surveys. Our goal for the rapid area search survey was to obtain the most accurate estimate of territories while optimizing the balance between geographic survey coverage and survey effort. The goal for the intensive area search survey was to find and document all territories present on each plot.

Rapid area search surveys for this project employ the same field methods as intensive area search surveys, but the reduced number of visits (two, compared with eight in intensive area search surveys) may result in different estimated breeding densities than in intensive area search surveys, as some breeding birds may be missed during both visits. Intensive area search surveys involved a more accurate delineation of territories of all birds present on the plot, which was accomplished by using the cumulative knowledge from eight visits. We counted the birds that were either known, or presumed to be, non-breeders (species known to only occur as migrants in the project area, resident LCR birds using but not defending a mate or territory in the plot, or birds that bred outside the plot but foraged in the plot post-breeding) separately from breeders. For a summary of field methods, see our past reports (GBBO 2011–15). For complete and detailed methods, contact the LCR MSCP Wildlife Group.

Each day surveyors entered their data in a Microsoft (MS) Access database created in 2012. We used breeding justifications and data from all visits to determine how many territories were active on a plot and which individuals were only passing through the plot but not breeding. Additional time was spent mapping and observing birds on the edges of survey plots in order to determine what percentage of the bird's territory was in the survey plot. For more details on data entry and a data summary, see past reports (GBBO 2011–15).

Data Quality Assurance/Quality Control

All bird data collected from 2011 to 2015 were entered by each surveyor during the field season. To ensure these data were entered completely and correctly (quality assurance), GBBO field technicians and supervisors checked the following for accuracy and completeness during and immediately following the end of the field season: field data sheets (daily field maps), MS Access and MS Excel data, and Geographic Information System (GIS) data. During this vetting process, we also confirmed that all field maps and species summary maps were scanned into a digital format and that each pair had a percent territory recorded. To determine whether or not all the GIS data were entered for the LCR MSCP covered focal species for the intensive and rapid area search surveys, we compared all LCR MSCP covered focal species records listed as having a territory in MS Access or MS Excel to those recorded as territories in GIS. The initial GIS data entry process itself also acted as a data check for the MS Access database

since the person entering the data needed to compare their final species maps to the MS Access database in order to determine which species to enter as territories in GIS. If a LCR MSCP covered focal species territory was digitized in GIS, then it also had to be recorded as a territory in MS Access and vice versa.

In addition, after the field season and before processing data, project managers again checked each dataset to ensure that all area search surveys of each survey type were entered correctly in MS Access. We also checked breeding justifications, territory, and partial territory numbers on every plot to ensure that all were entered and there was no conflicting information on any breeding pairs. In these thousands of rows of data checked, our error rate was < 3%. The final vetting of the data occurred when the data were converted into analysis files and report tables.

Population Size Analyses

The accuracy and precision of double sampling estimates calculated with DRs are based on two main assumptions (Cochran 1977): (1) a large number of secondary samples (plots in which intensive area search surveys were conducted on) to minimize the bias of DR (> 30) and (2) a coefficient of variation (CV) (< 0.1) for both average rapid area search surveys and average intensive area search survey counts. For double sampling estimates to be more precise than a single sample, rapid and intensive area search survey counts must be highly correlated and fall along a line running through the origin. If counts are correlated, but the linear relationship does not pass through the origin, a regression estimator is more appropriate for obtaining estimates from double samples (Collins 2007; Lohr 2010).

Low CV and high correlation between counts are difficult to achieve with bird counts, which are often variable due to a clumped distribution and very low density. The small number of plots that intensive area search surveys were conducted on in this study adds to this problem, as larger samples are required for accurate estimates of low abundance. For example, simulation work by Collins (2007) suggests that bias may be relatively small (≤ 5%) even for secondary sample sizes as low as 5–10, provided detection probability is relatively high (> 0.5) or the total number of individuals across the intensive area search survey sample is not too small (at least 20–25). Because the abundance for most individual species was well below this threshold, we estimated a single overall DR using data for all territorial riparian land birds for population estimates of all species. We only included confirmed breeders in our calculations of DR and the resulting breeding bird population size estimates, which were expressed in total number of territories of a species. The use of an overall DR for correcting population estimates of all species assumes that errors in detection are similar for all species, which is unlikely.

To automate the DR calculation for double sampling using rapid and intensive area search surveys, the USGS (Bart and Manning 2008; Bart 2008, personal communication) wrote the Double Sampling Analysis Program (program DS) (Bart and Hartley 2011), which we used in 2011–14 for all DR calculations and population size estimations for system-wide area search surveys and conservation areas. Program DS is not currently supported by the USGS, and it is difficult to install on current versions of Windows OS. In 2015, Reclamation developed a method for calculating double sampling estimates and standard errors (SE) with Version 9.4 of the SAS System for Windows (SAS) (SAS Institute 2012) using statistical formulae provided in the program DS manual (Bart and Hartley 2011). As with double sampling estimates from past years, the SAS program treats both region and habitat as stratification variables even though samples were only formally stratified by habitat. Following the advice of Thompson (2012), variance estimates are calculated with the standard formula for stratified sampling (i.e., not the post-stratification formula for the unconditional variance with sample size as a random variable for region). The variance estimates are therefore conditional on the observed sample sizes in regions. The SAS code includes an option for applying a finite population correction (FPC) to the variance of the density estimates, which is not available in DS. Applying an FPC correction increases precision by reducing the SE (Thompson 2012). This is recommended when > 5% of the total sampling universe is surveyed, as was the case for conservation areas. Reclamation produced population estimates for all past years using SAS to validate and, where necessary, correct the population estimates and retain consistency and include corrections to total area (and number of available plots) for certain region-habitat strata, retroactive to 2011. The updated population estimates for 2011–15 from SAS are presented in this report.

The average system-wide population size was also estimated by combining all 5 years of territory data for the LCR MSCP covered focal species and the 10 most abundant species. Year was treated as an additional stratum along with habitat and region, which treats plots as independent samples over time. Fifty-five plots (16%) were sampled in more than 1 year because of a limited amount of available habitat: 41 twice, 12 three times, and 2 four times (attachment 1). The resample rate was highest for tall woody habitat, where 34 (44%) of the plots were sampled more than once. Because some species show fidelity for nesting sites, density may have been temporally autocorrelated in these plots, resulting in a biased estimate of the SE for tall woody habitat. The average 5-year estimates were also calculated using SAS.

For population size estimates, we removed all non-territorial and colonial species: white-winged dove (*Zenaida asiatica*), mourning dove (*Zenaida macroura*), Eurasian collared-dove (*Streptopelia decaocto*), rock pigeon (*Columba livia*), brown-headed cowbird (*Molothrus ater*), European starling (*Sturnus vulgaris*), Gambel's quail (*Callipepla gambelii*), ring-necked pheasant (*Phasianus colchicus*), greater roadrunner (*Geococcyx californianus*), red-winged blackbird (*Agelaius phoeniceus*), yellow-headed blackbird (*Xanthocephalus*

xanthocephalus), great-tailed grackle (*Quiscalus mexicanus*), house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), cliff swallow (*Petrochelidon pyrrhonota*), black-crowned night-heron (*Nycticorax nycticorax*), snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), cattle egret (*Bubulcus ibis*), double-crested cormorant (*Phalacrocorax auritus*), and white-faced ibis (*Plegadis chihi*). The double sampling area search method was developed to count territorial riparian song birds and never designed to accurately count species of shore birds, water birds, raptors, or other colonial and non-territorial species. It was often difficult to determine the breeding status and territory location of these species during our area search surveys because of their large home ranges, clustered occurrences, or secretive nature. These species were not included in the population estimates because of the rarity in which breeding could be confirmed for these species. If we were confident one of these species was breeding in a plot, we recorded them in the breeding bird tables within the report. The species used for annual DR and population estimation calculations from 2011 to 2015 and the 5-year average are listed in attachment 2. The DR species list for the 5-year average was standardized across years.

Creation of Maps

For this report, we prepared distributional maps by using the average number of territories per plot from all five survey years from system-wide area search surveys and by using minimum convex polygons (MCPs) to show territories within and near conservation areas and CRIT 9. For the distributional maps, the number of territories per plot was aggregated from all area search surveys from 2011 to 2015. For plots that were surveyed in more than 1 year, the average from every year that the plot was surveyed was used. For both types of maps created (i.e., distributional and MCP maps), we used the highest-effort area search survey results for each plot in each year it was surveyed – that is, when a plot was surveyed with an enhanced intensive (EI) (16 visits) area search survey, that survey would be used to provide the number of territories for that plot and year. If an EI area search survey was not performed but an intensive (eight visits) area search survey was, the results from the intensive area search survey would be used. Otherwise, we used rapid (two visits) area search survey data. MCPs were constructed from points entered into a GIS for each territory in conservation areas and CRIT 9 using georeferenced survey maps. To create the MCPs, we split the GIS shapefiles that contained the observation points for the LCR MSCP covered focal species by surveyor. We created territory polygons from those observation points using minimum bounding geometry in ArcMap10 and grouped the territory code and the plot for each surveyor's shapefile. There was no overlap in polygon generation as long as the points were split up by territory code, area search survey type, and plot within each surveyor's shapefile.

Although we used the highest-effort area search survey type associated with a plot when possible to create MCPs, those based on rapid area search surveys may have only one or two observations. These would appear on a map as a point (one

point) or a line (two points). Territory sizes based on a single or even a few point locations are less accurate than those with many points; however, in the maps provided here, they are meant to demonstrate the overall location of territories. Territories shown in these maps are provided to give readers a general sense of territory locations and density, but in many cases, they do not represent accurate territory size or delineations, specifically those polygons based on only a few observations.

Note that some MCPs represent only partial territories, especially for those species with larger territories like summer tanagers and Gila woodpeckers. Because surveyors were typically only able to map these birds in the immediate vicinity of the survey plot, mapped territories may be smaller than the true territory.

Distributional maps are shown in attachment 4, and MCP maps are shown in component 1 and attachment 4.

Changes in Methods, 2011–2015

Several minor changes have occurred in the methods used for this project over the past 5 years; however, there have been no major changes since we began collecting data for this project in 2008. The changes only involve differences in plot selection, data entry, and data reporting. Here, we provide a summary of the most substantive changes in methods over the 5-year span. Prior reports (GBBO 2011–15) provide more detailed descriptions of the methods used each year and explanations of these changes.

- Important changes to methods that have occurred since the last summary report in 2010:
    - Starting in 2011, we used double sampling for conservation area and CRIT 9 monitoring rather than complete-coverage intensive area search surveys.
    - We discontinued defining whether a territory was inside or outside a plot based on territory centroid; instead, we now use the more precise method of reporting partial territories to the nearest 25%.
    - Vegetation sampling was separated into a new project component (component 4), and vegetation surveys were performed according to Reclamation's general vegetation monitoring protocol (see component 4 in this report) rather than the habitat assessment method that was used in 2008–10.

- Important changes in methods within the past 5 years (2011–15):
    - In the year 2011 only, the herbaceous and unsuitable strata were combined into a single habitat stratum during selection; however, the results were still reported by separate strata.
    - The stratified random sampling design changed slightly every year with regard to the number of plots selected from the herbaceous and unsuitable strata:
        - In 2011, these 2 strata were combined in selection, and 20 plots were surveyed.
        - In 2012, we surveyed 10 herbaceous and 10 unsuitable plots.
        - In 2013, we surveyed 7 herbaceous and 13 unsuitable plots.
        - In 2014, we surveyed 6 herbaceous and 14 unsuitable plots.
        - In 2015, we surveyed 10 herbaceous and 10 unsuitable plots.
    - In 2012, an MS Access database provided by Reclamation was used for data entry in conjunction with the previously used MS Excel spreadsheets. In 2013–15, data entry was done in MS Access only.
    - Due to the evolving MS Access database, non-territorial breeding species were reported differently among years:
        - Prior to 2012, the number of pairs was reported as an average of individuals per plot detected across area search surveys.
        - In 2012, only presence/absence data were reported for these species.
        - In 2013–15, surveyors estimated the number of pairs on each plot based on their own observations.
    - Standardized codes representing the rules for “counting” a pair as a breeder were introduced in 2013.

- Beginning in 2014, we randomly sampled conservation area and CRIT 9 plots rather than attempting to survey all conservation area and CRIT 9 plots, as the amount of available habitat had increased. Eighty plots were surveyed in 2014 and 2015.

- In 2014, the habitat types for conservation area plots were changed from tall woody and low woody to cottonwood-willow, mesquite, and mixed.

- Area search survey start dates varied from year to year from April 2 to 13 and end dates from June 5 to 17. In 2011, we started area search surveys in the first week of April, but after reviewing the data, we shifted to start area search surveys the 2nd week of April (2012–15) to better capture the breeding season of the LCR MSCP covered focal species and to avoid excessive overlap with migration.

- Starting in 2015, data analysis for population size estimates was performed using SAS code, replacing program DS. To be consistent, all data prior to 2015 was rerun using the program SAS. Reclamation used double sampling formulas to recreate the analysis in SAS and added FPC-corrected SE. FPC is useful when sampling over 5% of the total statistical population, which is the case in conservation areas. Reclamation also corrected data on total area (and available survey plots) for some region-habitat strata, retroactive to 2011. Results for 2011–15 in this report include these corrections and were generated with SAS.

Results

Rapid Area Search Surveys

System-Wide Monitoring

From 2011 to 2015, 74 species (table 5) were recorded breeding during 400 system-wide rapid area search surveys. The Mexican duck (*Anas platyrhynchos diazi*) is a subspecies of the mallard (*Anas platyrhynchos*) and does not add to the overall species diversity at system-wide plots; even though it is listed in the table, it is not included in the species total (table 5). Of the top 10 species, the first 3 are in consistent order in terms of abundance across years (song sparrow [*Melospiza melodia*], common yellowthroat [*Geothlypis trichas*], and yellow-breasted chat [*Icteria virens*] respectively), and Lucy's warbler (*Oreothlypus luciae*) was in the top 4 most abundant species with the exception of 2011 (table 5). Territory numbers for many species were relatively similar among years, such as those for the Crissal thrasher (*Toxostoma crissale*) and summer tanager. Common yellowthroats showed the largest range in territories

Table 5.—Number of territories, by species, detected at system-wide areas during rapid area search surveys in 2011–15

(Species are listed in descending order of abundance. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded from this list.)

Species (N = 74)[1]	2011	2012	2013	2014	2015	Average
Song sparrow	407	485.75	533.5	573	522.75	504.4
Common yellowthroat	332	397	358	542	509	427.6
Yellow-breasted chat	234.25	207.5	301.75	306.25	286	267.15
Lucy's warbler	133.75	144.75	161	208	233.5	176.2
Marsh wren	119.5	144	119.25	207	160.75	150.1
Black-tailed gnatcatcher	163	117.5	123.5	162.5	164.25	146.15
Abert's towhee	184.75	130.75	126.25	125.75	145	142.5
Verdin	151.75	132.75	145.75	168	98.5	139.35
Sonoran yellow warbler	**109**	**68**	**144.25**	**160.75**	**114.25**	**119.25**
Bewick's wren	71	92.25	100.25	121.5	67	90.4
American coot	54.25	53.75	24.25	122.75	73.75	65.75
Arizona Bell's vireo	**54.75**	**41.25**	**53.5**	**44.75**	**45.75**	**48**
Ash-throated flycatcher	45.75	44.25	39.75	33.75	41.75	41.05
Ladder-backed woodpecker	38.25	35.5	33	44	49.25	40
Black-chinned hummingbird	33.75	40	32.5	48.25	37.75	38.45
Least bittern	40	23.75	17.5	38.75	56.25	35.25
Pied-billed grebe	17.25	20.75	29.5	47.75	56.25	34.3
Lesser nighthawk	74	22.75	23	21.5	29	34.05
Common gallinule	13	30.75	27.5	37	50.5	31.75
Phainopepla	43.25	14	32.5	9.75	18.5	23.6
Blue grosbeak	32.25	22	24	11.75	25.75	23.15
Anna's hummingbird	42.75	28.25	15.5	11.25	14.25	22.4
Crissal thrasher	24.25	22	22	19.5	24.25	22.4
Gila woodpecker	**19.75**	**17**	**16**	**18.5**	**24.75**	**19.2**
Brown-crested flycatcher	13	10.25	17.5	16.25	22.5	15.9
Virginia rail	24.5	22.75	6.75	9	11.5	14.9
Western kingbird	19.5	4.75	15	5	16.25	12.1
Yuma clapper rail	6	21.25	13	9.75	29	15.8
Horned lark	3	15.5	3.75	5.25	30.25	11.55
Canyon wren	11.25	9	9.75	12	15.5	11.5
Summer tanager	**12**	**13.25**	**11.75**	**11**	**9.25**	**11.45**
Lesser goldfinch	32.5	12.25	3	4.5	1.75	10.8
Bullock's oriole	9.75	13	10.25	5.25	6.25	8.9
Killdeer	20.75	3.25	7.5	10.5	2.5	8.9
Green heron	1.5	6	10.25	11.25	12.5	8.3
Northern rough-winged swallow	0.25	1.25	2.75	8.25	9.5	4.4
Black phoebe	3.75	4.25	6.75	3.25	2.75	4.15
Costa's hummingbird	7.75	4.25	0.75	2.75	2.25	3.55
Say's phoebe	7	3	2.75	2.75	2.25	3.55
Northern mockingbird	4.25	6.75	3	2.75	0	3.35

Table 5.—Number of territories, by species, detected at system-wide areas during rapid area search surveys in 2011–15

(Species are listed in descending order of abundance. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded from this list.)

Species (N = 74)[1]	2011	2012	2013	2014	2015	Average
California black rail	9.75	8.75	2.25	1	1	4.55
Cactus wren	1.25	1	7.25	1	0	2.1
White-throated swift	4.25	1	0.5	1	1.75	1.7
Black-necked stilt	4.5	0	1.5	1	1	1.6
Mallard	3	0	2.75	1.25	1	1.6
Clark's grebe	0	1	0.75	5.25	0.75	1.55
Common ground-dove	4.25	1	0	1	1.5	1.55
Common raven	2.75	0.75	1.25	0.25	2.25	1.45
Great horned owl	1.25	2.25	1.25	0.5	0.75	1.2
American kestrel	1.5	0.25	0.25	1.25	2.25	1.1
Western grebe	0	1	1.25	2.5	0.5	1.05
Vermilion flycatcher	**2**	**0**	**2.75**	**0.25**	**0**	**1**
Cooper's hawk	1	1	0.5	1.5	0.5	0.9
Redhead	0	0	0.25	0	4.25	0.9
Violet-green swallow	4	0	0	0	0.5	0.9
Black-throated sparrow	2.25	0	0.75	0	0.5	0.7
Burrowing owl	0.5	0.25	1	0	1.75	0.7
Hooded oriole	1	0	0	0.5	1	0.5
Rock wren	0.5	0	0.75	0	1.25	0.5
Gilded flicker	**0.25**	**0.25**	**0.25**	**0.25**	**1**	**0.4**
Turkey vulture	0.25	1	0	0	0.5	0.35
Western screech-owl	0	0	0	0	1.75	0.35
Bronzed cowbird	1.5	0	0	0	0	0.3
Western meadowlark	0.5	0.5	0	0.5	0	0.3
Common poorwill	0	0.5	0.5	0	0.25	0.25
Lawrence's goldfinch	0	0	1.25	0	0	0.25
Long-eared owl	0	1	0	0	0	0.2
Northern cardinal	0	0.5	0	0	0.5	0.2
White-tailed kite	0	0	1	0	0	0.2
Indigo bunting	0	0	0.5	0	0	0.1
Mexican duck	0	0	0	0.5	0	0.1
Northern harrier	0	0	0.25	0.25	0	0.1
Red-tailed hawk	0	0.25	0.25	0	0	0.1
Ruddy duck	0	0	0.5	0	0	0.1
Peregrine falcon	0	0	0	0	0.25	0.05
Total	**2,662.25**	**2,509.25**	**2,658**	**3,223.25**	**3,049.5**	**2,820.45**

[1] Scientific names of the species are listed in attachment 3.

Note: The species that is both bold and italicized is a subspecies, not a separate unique species, and it is not included in the species total.

recorded each year with ± 210 territories. Attachment 3 lists avian species detected in components 1, 2, 3, and 5 of this report, which includes flyovers and incidental observations.

The Sonoran yellow warbler was the most abundant LCR MSCP covered focal species system-wide, and this species was also among the most abundant of all the territorial species system-wide. Sonoran yellow warbler territory numbers ranged from the low to mid 100s, with the exception of 2012, when only 68 territories were recorded (table 5). Arizona Bell's vireo territories were stable throughout the study with an average of 48 territories and a range spanning 13.5 territories from 2011 to 2015 (table 5). Gila woodpecker and summer tanager territories also remained relatively constant throughout the study, and vermilion flycatchers and gilded flickers were rarely detected on surveyed areas across all years. Additional LCR MSCP covered focal species information and distribution maps are available in attachment 4.

Conservation Area and CRIT 9 Monitoring

During conservation area and CRIT 9 area rapid area search surveys in 2011–15 (n = 363, excluding 11 pre-development plots), we recorded 55 species as territorial breeders (table 6). We classified five of the six LCR MSCP covered focal species as breeders in the conservation areas and CRIT 9. As in system-wide plots, the Sonoran yellow warbler was the most common breeder of the LCR MSCP covered focal species at conservation areas and CRIT 9, with an average of 27.15 territories, followed by the Arizona Bell's vireo with an average of 17.25 territories (table 6). We recorded an average of 4.24 territories for summer tanagers and average of 3.43 for vermilion flycatchers at conservation areas and CRIT 9 (table 6). In 2015, Gila woodpeckers were recorded for the first time using conservation areas and CRIT 9 for a portion of their territories (table 6). Gilded flickers were not recorded on conservation areas or CRIT 9 in any of the 5 years. The most common breeders at conservation areas and CRIT 9 were Abert's towhee (*Pipilo aberti*), blue grosbeak (*Passerina caerulea*), and common yellowthroat, with average numbers of territories over 100 (table 6). The remaining 52 species recorded on conservation areas and CRIT 9 had average territory numbers of under 100 (table 6). Attachment 3 lists all avian species detected in components 1, 2, 3, and 5 of this report, which includes flyovers and incidental observations.

Beal Lake Conservation Area

The BLCA had relatively consistent numbers of territories, both in common riparian and LCR MSCP covered focal species, throughout the 5 years (table 7). This small conservation area was surveyed in its entirety from 2011 to 2015, with the exception of 2012, when only two of the four plots were surveyed.

Table 6.—Number of territories, by species, detected at conservation areas and CRIT 9 during rapid area search surveys in 2011–15

(Species are listed in descending order of abundance. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 55)[1]	2011 (N = 60)	2012 (N = 69)	2013 (N = 79)	2014 (N = 80)	2015 (N = 75)	Average
Abert's towhee	115.9	148.75	116.75	175.25	187.75	148.88
Common yellowthroat	83.5	85.25	135.25	145.25	166.5	123.15
Blue grosbeak	85.5	105.75	68.25	123.5	201.5	116.9
Verdin	20.95	31	42.5	169.5	144.25	81.64
Song sparrow	46	56.5	60.5	70.75	80.5	62.85
Western kingbird	38.5	72.5	46.25	60	64.25	56.3
Black-tailed gnatcatcher	26.75	31	42.75	80.5	90	54.2
Bullock's oriole	36.85	43.25	38.25	53	61.75	46.62
Black-chinned hummingbird	13.5	21.75	25	54.5	89.25	40.8
Yellow-breasted chat	15.3	21.5	39.5	36.5	61.25	34.81
Lucy's warbler	20	18.5	17.25	38.25	48.25	28.45
Anna's hummingbird	24.5	25	11.75	38.75	38.5	27.7
Sonoran yellow warbler	**59.75**	**17**	**23**	**13.5**	**22.5**	**27.15**
Ladder-backed woodpecker	10.5	14.75	12.5	32	41.5	22.25
Arizona Bell's vireo	**14.5**	**12**	**18.25**	**17**	**24.5**	**17.25**
Ash-throated flycatcher	6.5	10.5	3.5	18	24.5	12.6
Crissal thrasher	3	12.5	3.25	14.5	12.25	9.1
Lesser goldfinch	11.75	4.5	1	10.25	13.75	8.25
Killdeer	2.25	1.75	2.25	11	16	6.65
Indigo bunting	2	4.25	5.75	7	11.5	6.1
Northern mockingbird	0.35	4.25	0.75	19	4.75	5.82
Summer tanager	**4.7**	**3**	**5.25**	**3.25**	**5**	**4.24**
Great horned owl	2.5	7.75	2.5	4	3.5	4.05
Vermilion flycatcher	**3.65**	**4**	**1.75**	**3**	**4.75**	**3.43**
Western meadowlark	14.5	0.5	0	0	0	3
Inca dove	0	0	0	4	8.75	2.55
Brown-crested flycatcher	0	0.25	0.5	3	4.75	1.7
Common ground-dove	1.5	0	0	3.5	3.5	1.7
Lesser nighthawk	0	0	0	5.75	1.25	1.4
Costa's hummingbird	2	0.5	0	3	1.25	1.35

Table 6.—Number of territories, by species, detected at conservation areas and CRIT 9 during rapid area search surveys in 2011–15

(Species are listed in descending order of abundance. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 55)[1]	2011 (N = 60)	2012 (N = 69)	2013 (N = 79)	2014 (N = 80)	2015 (N = 75)	Average
Horned lark	3.25	2.75	0	0	0	1.2
Barn owl	2.25	2.5	0	0.5	0.25	1.1
Common raven	2	0	0.75	2	0.5	1.05
Black-necked stilt	0	0	0	4.25	0.75	1
Loggerhead shrike	2.75	0.5	0	1	0	0.85
Black phoebe	0	0.5	0.25	1.75	1	0.7
Green heron	0	0.25	0	2.75	0.25	0.65
Bewick's wren	2.5	0	0	0.25	0	0.55
American kestrel	0	0	0	0.75	0.75	0.3
Northern rough-winged swallow	0	0.25	0	0.5	0.75	0.3
Say's phoebe	0.25	0	0	0	0.75	0.2
White-tailed kite	0.25	0.75	0	0	0	0.2
Yuma clapper rail	0	0	0	1	0	0.2
Gila woodpecker	**0**	**0**	**0**	**0**	**0.75**	**0.15**
Hooded oriole	0.75	0	0	0	0	0.15
Northern harrier	0	0.25	0	0.5	0	0.15
Tropical kingbird	0	0.25	0.25	0.25	0	0.15
Cooper's hawk	0.25	0.25	0	0	0	0.1
Red-tailed hawk	0.5	0	0	0	0	0.1
American coot	0	0	0	0.25	0	0.05
Common gallinule	0	0	0	0.25	0	0.05
Mallard	0	0	0	0.25	0	0.05
Marsh wren	0	0	0	0	0.25	0.05
Yellow-billed cuckoo	0	0	0.25	0	0	0.05
Turkey vulture	0.1	0	0	0	0	0.02
Total	**681.55**	**766.5**	**725.75**	**1,233.75**	**1,443.75**	**970.26**

[1] Scientific names of the species are listed in attachment 3.

Table 7.—Number of territories, by species, detected at the BLCA during rapid area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 26)[1]	2011 (N = 4)	2012 (N = 2)	2013 (N = 4)	2014 (N = 4)	2015 (N = 4)
Abert's towhee	20.25	10	12.5	11	11.75
Anna's hummingbird	5.25	4	1	0	3
Arizona Bell's vireo	**12.5**	**11**	**17.25**	**13**	**19.5**
Ash-throated flycatcher	2	0.25	0.25	0	0.75
Bewick's wren	1	0	0	0	0
Black-chinned hummingbird	0	0	2.5	0.25	5.25
Black-tailed gnatcatcher	18.5	7.75	18.5	16.25	19.25
Blue grosbeak	3	0	3.75	1.5	1
Brown-crested flycatcher	0	0.25	0.5	1	0.75
Bullock's oriole	2.75	1.5	6.25	1.5	3.5
Common yellowthroat	8.5	7.25	4.5	1.25	0.75
Costa's hummingbird	2	0	0	0	0
Crissal thrasher	1.75	2.25	1	1.75	2
Great horned owl	0	0.5	0	0	0
Indigo bunting	0	0	0.5	0	0
Killdeer	0.5	0	0.25	0.5	0
Ladder-backed woodpecker	0.25	1.25	2.25	2.75	1.5
Lesser goldfinch	1.25	0	0	0	0
Lesser nighthawk	0	0	0	0	0.5
Lucy's warbler	9.5	7.5	15.25	5	8.75
Northern harrier	0.25	0	0	0	0
Song sparrow	0.25	0	0.5	4.75	0
Sonoran yellow warbler	**8.25**	**7**	**20**	**7.5**	**13**
Summer tanager	**2.25**	**0.75**	**1.75**	**1.75**	**4**
Verdin	12.75	3	12	13	9.25
Yellow-breasted chat	8.5	9.25	25.75	18.25	16.5
Total	**121.25**	**73.5**	**146.25**	**101**	**121**
Species richness	**21**	**16**	**20**	**17**	**18**

[1] Scientific names of the species are listed in attachment 3.

Planting at the BLCA was completed by 2005, and the habitat was fairly mature by 2011 (see figure 1). This conservation area consistently supported relatively high numbers of Sonoran yellow warbler and Arizona Bell's vireo territories compared with other conservation areas and CRIT 9, and it had high habitat complexity combined with proximity to natural wetlands and riparian areas . Figure 1 displays the layout of all LCR MSCP covered focal species territories recorded during the study; note that almost all of them were located within the interior of the conservation area, leaving an approximately 50-meter buffer of unoccupied edge.

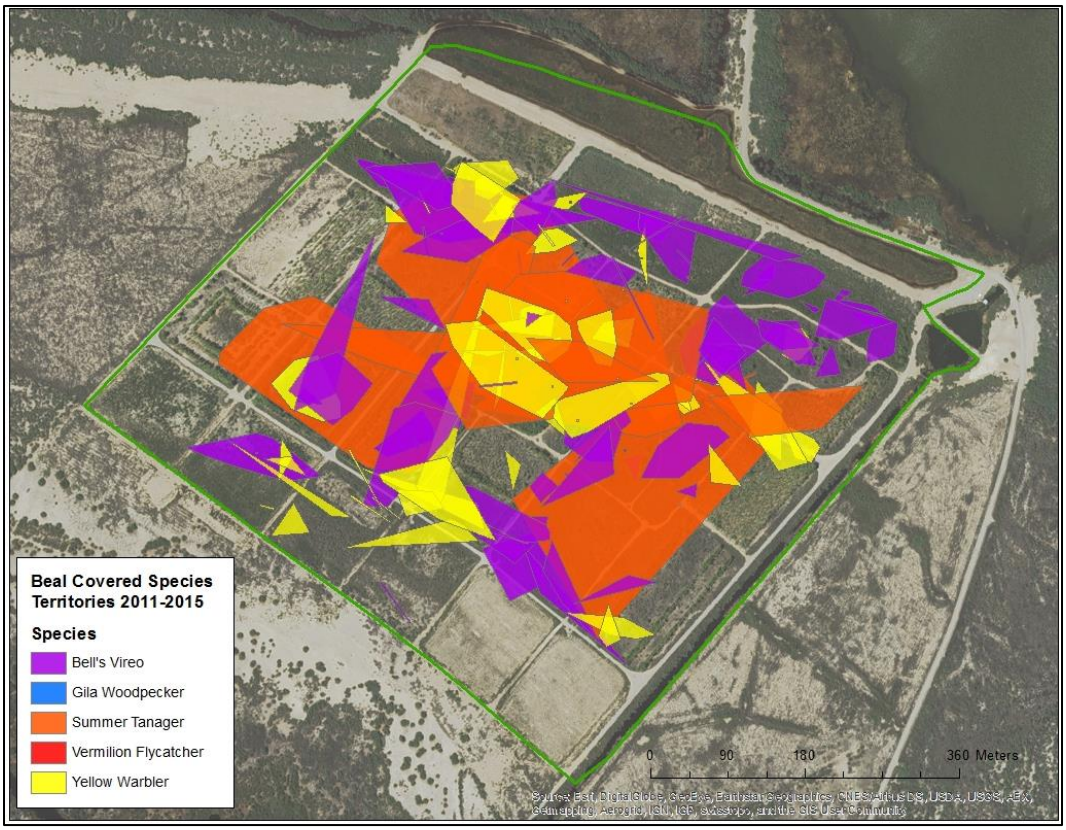

Figure 1.—MCPs of LCR MSCP covered focal species territories at the BLCA in 2011–15.
The highest-effort area search survey type was used to display MCPs for each plot in each year.

Plot C1504 (formerly named Plot D) includes smaller trees relative to the rest of the BLCA, which are still maturing, and we recorded the first Arizona Bell's vireo territory on this plot in 2015. Several cavity-nesting birds, including ladder-backed woodpeckers (*Dryobtates scalaris*), ash-throated flycatchers (*Myiarchus cinerascens*), brown-crested flycatchers (*Myiarchus tyrannulus*), and Lucy's warblers have used the BLCA for breeding in all years, although the two LCR MSCP covered focal species that nest in cavities, Gila woodpeckers and gilded flickers, were absent (see table 7).

Colorado River Indian Tribes' 'Ahakhav Tribal Preserve Habitat Creation Area 09

CRIT 9 has been surveyed in its entirety each year since 2011. This habitat creation area was planted in 2001–05, prior to the LCR MSCP, and was never incorporated into the program. However, survey results from this area are incorporated into population size estimates for conservation areas. This is a unique area in that vermilion flycatchers was recorded as a breeder there every year since 2011 (table 8; figure 2). At least a partial territory of summer tanagers is also typically recorded at CRIT 9 every year (table 8). In 2015, the first territory of Gila woodpeckers was documented at CRIT 9, and cavity nesters in general increased as the plantings matured over the past 2 years, including multifold increases in species such as ash-throated and brown-crested flycatchers and ladder-backed woodpeckers (table 8). Species richness of territorial riparian land birds also increased at CRIT 9 over the past 5 years by 35% from 13 to 22species (table 8). Total territory numbers increased by 46% from 49.25 to 91 (table 8).

Figure 2 illustrates the distribution of LCR MSCP covered focal species territories found at CRIT 9 from 2011 to 2015. We note that, unlike most of the LCR MSCP covered focal species at the BLCA, vermilion flycatcher territories are mostly located near the edges of CRIT 9, and vermilion flycatchers prefer open park-like mesquite woodlands that are either irrigated or close to a surface water source (Raulston 2013), similar to areas found at the edge of plantings at CRIT 9.

Table 8.—Number of territories, by species, detected at CRIT 9 during rapid area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 26)[1]	2011 (N = 5)	2012 (N = 5)	2013 (N = 5)	2014 (N = 5)	2015 (N = 5)
Abert's towhee	12	8	12.25	8.75	14.5
American kestrel	0	0	0	0.5	0.5
Anna's hummingbird	7.5	10.75	5.75	5.5	13.25
Ash-throated flycatcher	0.5	2	0.75	2.75	4.5
Barn owl	0.5	0.5	0	0	0
Black phoebe	0	0.5	0.25	0.25	0.25
Black-chinned hummingbird	1.75	0.5	0.25	6	3.75
Black-tailed gnatcatcher	1.5	1.5	2.75	1	7
Blue grosbeak	1	0	0	4	3.25
Brown-crested flycatcher	0	0	0	1.75	1.25
Bullock's oriole	5.5	4.75	2.75	5.5	3.75
Common ground-dove	0	0	0	0.5	0
Common raven	0	0	0	0.5	0.25
Crissal thrasher	0	0	0.5	1.25	1
Gila woodpecker	**0**	**0**	**0**	**0**	**0.25**
Great horned owl	0	1.5	0.5	1	0.5
Ladder-backed woodpecker	3.75	4.5	2.5	7.25	8.5
Lesser goldfinch	7	1.5	0	1	1
Lucy's warbler	0	5.75	2	7	6.5
Northern mockingbird	0	0	0	0	0.25
Sonoran yellow warbler	**0**	**0**	**1**	**0**	**0**
Summer tanager	**0**	**0.75**	**2.75**	**1.5**	**0**
Tropical kingbird	0	0.25	0.25	0.25	0
Verdin	1.25	4.75	6.5	7.25	10.5
Vermilion flycatcher	**3.75**	**4**	**1.75**	**3**	**4.75**
Western kingbird	3.25	1.75	5.25	6	5.5
Total	**49.25**	**53.25**	**47.75**	**72.5**	**91**
Species richness	**13**	**17**	**17**	**22**	**21**

[1] Scientific names of the species are listed in attachment 3.

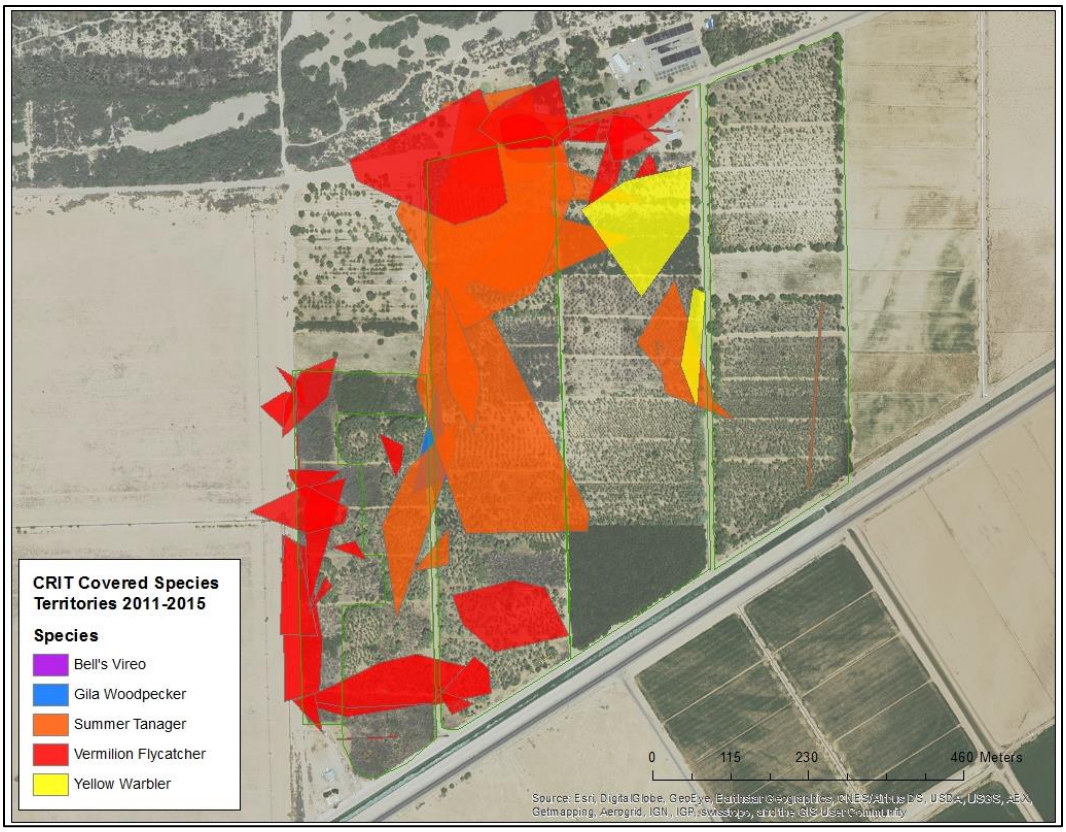

Figure 2.—MCPs of LCR MSCP covered focal species territories at CRIT 9 in 2011–15.
The highest-effort area search survey type was used to display MCPs for each plot in each year.

Palo Verde Ecological Reserve

The PVER had the most acres restored during the 5-year period of this study of any conservation area, with planting occurring each year from 2006 to 2014. Species richness of breeding birds was relatively stable through the study, with 22 species found in 2011 and 2012, 16 in 2013, 24 in 2014, and 25 in 2015 (table 9). Many of the species detected at the PVER were only seen in 1 year, so although species richness has been relatively constant, the species recorded changed from year to year. However, we observed an almost 350% increase in total territories recorded at the PVER over the past 5 years, during which the newly planted acreage increased substantially. Blue grosbeaks, song sparrows, common yellowthroats, and black-chinned hummingbirds (*Archilochus alexandri*) contributed most to this increase (table 9). These species are associated with brushy riparian habitats, which include newly created areas with young woody plantings.

Small numbers of Sonoran yellow warblers bred consistently at the PVER, and they tended to be found in areas of young plantings (figure 3). Partial territories of a Gila woodpecker pair and a vermilion flycatcher pair were recorded at the PVER for the first time in 2015 (table 9; figure 3); the vermilion flycatcher territory was only recorded during an intensive area search survey, so it is not included in table 9. Despite the large size of this conservation area, only a few LCR MSCP covered focal species territories were found, and these tended to be scattered near the river channel (figure 3).

Table 9.—Number of territories, by species, detected at the PVER during rapid area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 35)[1]	2011 (N = 19)	2012 (N = 26)	2013 (N = 34)	2014 (N = 31)	2015 (N = 27)
Abert's towhee	19.25	31	19.75	51.25	54
Anna's hummingbird	2.75	1	2	2	3.5
Ash-throated flycatcher	0.25	1	0	2.75	1
Barn owl	1.5	2	0	0.5	0.25
Bewick's wren	1	0	0	0	0
Black-chinned hummingbird	5.5	10.25	12.75	22.75	41.75
Black-tailed gnatcatcher	0	3	0	4.75	5.25
Blue grosbeak	28.5	56.5	37.5	68.5	120.25
Bullock's oriole	5.5	11.75	7	22.25	25.75
Common ground-dove	0	0	0	1.75	0.25
Common raven	0	0	0.75	1.5	0.25
Common yellowthroat	50.5	61.75	126.25	136	144.5
Cooper's hawk	0.25	0	0	0	0
Costa's hummingbird	0	0.5	0	0	0
Crissal thrasher	0	2	0	1.25	0.5
Gila woodpecker	**0**	**0**	**0**	**0**	**0.25**
Great horned owl	0.5	0.5	0.75	2	1.25
Hooded oriole	0.25	0	0	0	0
Inca dove	0	0	0	0.5	1
Indigo bunting	0	0.25	5.25	5.5	10.25
Killdeer	0	0	0	0	0.5
Ladder-backed woodpecker	0	0.25	3.25	6	14.5
Lesser goldfinch	0	0	0	0	2.5
Loggerhead shrike	1	0	0	0	0
Lucy's warbler	1.5	3	0	9.5	19.25
Northern harrier	0.5	0.25	0	0.5	0
Northern mockingbird	0	2.75	0	1	0
Red-tailed hawk	0.25	0	0	0	0
Song sparrow	21.25	38.5	32	30.75	65.25
Sonoran yellow warbler	**8**	**4**	**2**	**5**	**7**
Summer tanager	**0**	**0**	**0.75**	**0**	**0**
Verdin	1.25	1	0.25	8	5.75
Western kingbird	7.75	26.5	9	12.5	10.5
White-tailed kite	0.25	0	0	0	0
Yellow-breasted chat	0.25	7.25	1.75	12	29.75
Total	**157.75**	**265**	**261**	**408.5**	**565**
Species richness	**22**	**22**	**16**	**24**	**25**

[1] Scientific names of the species are listed in attachment 3.

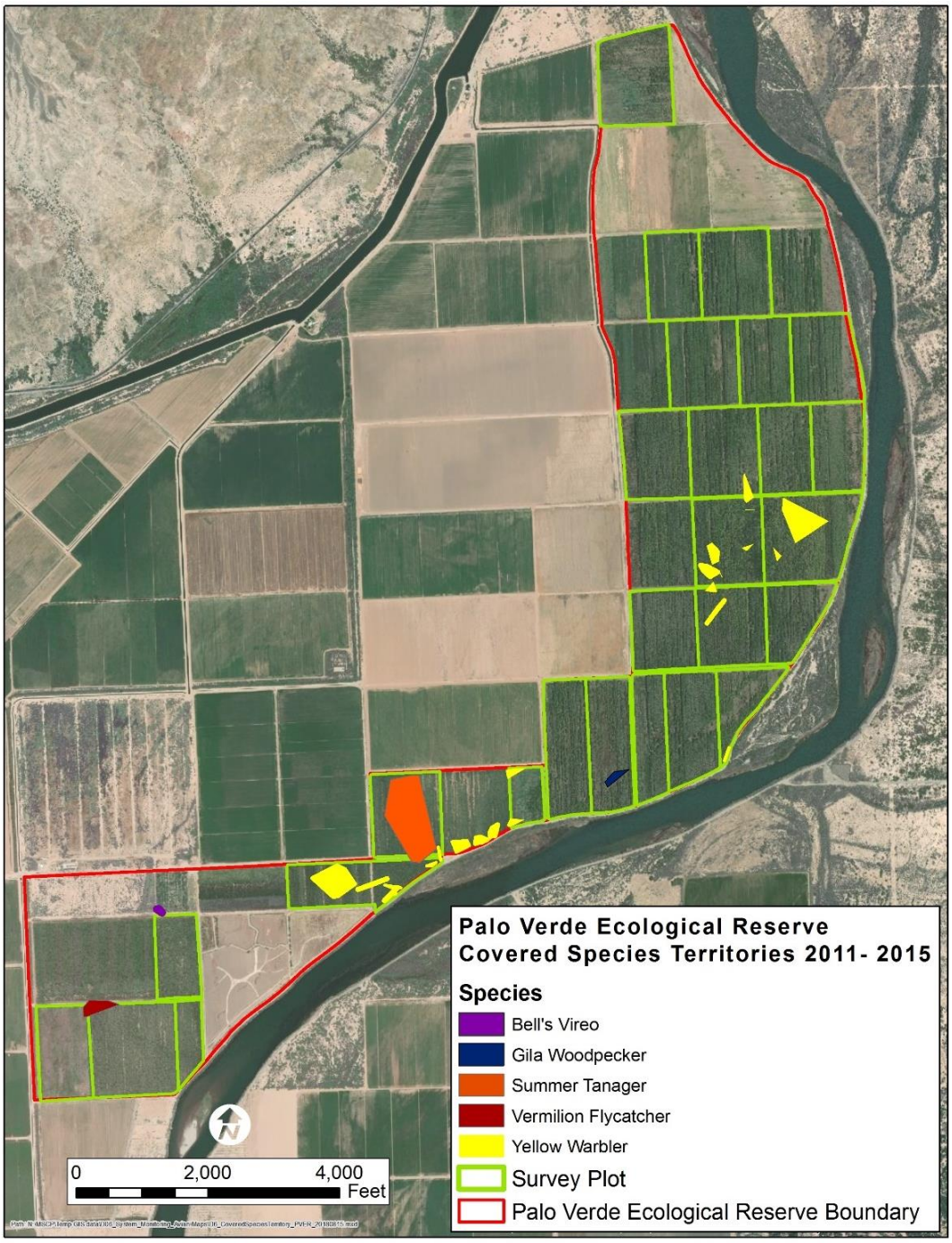

Figure 3.—MCPs of LCR MSCP covered focal species territories at the PVER in 2011–15.
The highest-effort area search survey type was used to display MCPs for each plot in each year.

Cibola Valley Conservation Area

The majority of the CVCA was surveyed each year since 2011. Thirty-three species were found nesting at this conservation area, ranging from 13 to 27 per year with no obvious trend (table 10). A few species were only recorded as breeders in 1 year, particularly raptors such as the Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), and red-tailed hawk (*Buteo jamaicensis*) (table 10). In 2015, yellow-breasted chats were recorded as breeders for the first time at the CVCA (table 10). The most common breeders at this conservation area were Abert's towhee and blue grosbeak, which had relatively constant numbers of territories throughout the 5-year period, averaging 48 and 26 territories, respectively. Other species, such as verdin (*Auriparus flaviceps*), black-tailed gnatcatchers (*Polioptila melanura*), and black-chinned hummingbirds, showed multifold increases in territory totals at CVCA over the 5 years, and overall territory numbers at the CVCA increased by 35% over the past 5 years from 166.5 to 259.5 (table 10). Several territories of Sonoran yellow warblers and summer tanagers were recorded in 2011 and 2012, but these species were not detected breeding here in 2013–15 (except a partial summer tanager territory in 2015; table 10). The territories of these two species in 2011 and 2012 were scattered through the center and near the river (figure 4), similar to the pattern observed at the PVER.

Table 10.—Number of territories, by species, detected at the CVCA during rapid area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 33)[1]	2011 (N = 20)	2012 (N = 23)	2013 (N = 23)	2014 (N = 20)	2015 (N = 18)
Abert's towhee	43	61.25	37	49.75	50.5
Anna's hummingbird	1.5	2	1	0.5	0
Ash-throated flycatcher	1	2.75	0.25	2.5	5.25
Black-chinned hummingbird	3.75	8.5	3.75	10.25	12
Black-tailed gnatcatcher	3.75	14	19.25	35.25	37.5
Blue grosbeak	34.5	28.25	12	23.25	32.25
Bullock's oriole	10.75	12	13.25	12.75	19
Common ground-dove	1.5	0	0	1.25	3.25
Common raven	2	0	0	0	0
Common yellowthroat	10	6.5	0	0	1
Cooper's hawk	0	0.25	0	0	0
Crissal thrasher	1	5.5	0.75	4.5	6
Great horned owl	1.75	3.75	0.5	0.75	1.5
Hooded oriole	0.25	0	0	0	0
Horned lark	0	2.75	0	0	0
Indigo bunting	2	4	0	0.5	0.75
Inca dove	0	0	0	3.5	7.25
Killdeer	0.5	0	1	0	0
Ladder-backed woodpecker	3.5	5	3.25	6.5	5.75
Lesser goldfinch	1.5	3	0	3.5	1.5
Lesser nighthawk	0	0	0	2	0.5
Loggerhead shrike	0.25	0.5	0	0	0
Lucy's warbler	4	0.25	0	11	4
Northern harrier	5	0	0	0	0
Northern mockingbird	0.25	1.25	0	0	0
Red-tailed hawk	0.25	0	0	0	0
Say's phoebe	0	0	0	0	0.25
Song sparrow	14	4	0	0	0
Sonoran yellow warbler	**5.75**	**3**	**0**	**0**	**0**
Summer tanager	**2.5**	**1.5**	**0**	**0**	**0.25**
Verdin	0.75	9.25	13	45	37
Western kingbird	11.5	23.5	14.5	24	29
Yellow-breasted chat	0	0	0	0	5
Total	**166.5**	**202.75**	**119.5**	**236.75**	**259.5**
Species richness	**27**	**23**	**13**	**18**	**21**

[1] Scientific names of the species are listed in attachment 3.

Figure 4.—MCPs of LCR MSCP covered focal species territories at the CVCA, 2011–15.
The highest-effort area search survey type was used to display MCPs for each plot in each year.

Cibola National Wildlife Refuge Unit #1 Conservation Area

Phases of this conservation area are separated into five areas, three of which were already planted and thus surveyed, and each of which is distinct enough that we report each separately here. Area 1 – Research and Development consists of several subphases, including the Cibola National Wildlife Refuge Unit #1 Conservation Area Nature Trail (Nature Trail). The Nature Trail, consisting of two plots, is discussed separately from the rest of Area 1 because of differences in planting age, strategy, and structure. Area 2 – Upper Hippy Fire consists of three plots first surveyed in 2015. Area 5 – Crane Roost is also distinct in structure and avifauna within Cibola NWR Unit #1.

Area 1 – Research and Development

Area 1 is a diverse area of plantings within Cibola NWR Unit #1, consisting of the subphases Nature Trail, Mass Planting, Seed Feasibility, Cottonwood Genetics, and Existing Cottonwoods. Numbers reported here do not include Nature Trail, which is covered in table 11. A Sonoran yellow warbler territory was detected in 2012 (figure 5). Species richness and the number of total territories varied from year to year with no apparent trend (table 11).

Table 11.—Number of territories, by species, detected at Cibola NWR Unit #1, area 1, excluding the Nature Trail, during rapid area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 27)[1]	Area 1 – Research and Development				
	2011 (N = 4)	2012 (N = 5)	2013 (N = 5)	2014 (N = 4)	2015 (N = 4)
Abert's towhee	5.75	14.1	6	8.25	5.5
American coot	0	0	0	0.25	0
American kestrel	0	0	0	0.25	0
Anna's hummingbird	2	0	0	0	1.25
Ash-throated flycatcher	0.5	1	1.25	3.25	2.25
Bewick's wren	0	0	0	0.25	0
Black-chinned hummingbird	0	2	2	1.25	0.75
Black-tailed gnatcatcher	0	0.5	0	1.75	0.5
Blue grosbeak	4.25	7.1	2.75	7	4.25
Bullock's oriole	2.5	7.7	4	4.75	4.75
Common yellowthroat	11	5.3	0	0.5	0
Costa's hummingbird	0	0	0	0.75	0
Crissal thrasher	0	0.5	0	1.75	0.25
Great horned owl	0	1	0.5	0.25	0
Indigo bunting	0	0	0	1	0
Killdeer	1	0	0	1	0
Ladder-backed woodpecker	0	0.5	0.25	1.5	1.5
Lesser goldfinch	0	0	0	1.75	1
Lesser nighthawk	0	0	0	1	0
Lucy's warbler	0	0	0	0.5	0
Northern mockingbird	0	0	0	1.5	0
Song sparrow	0	0.3	0	1.25	0
Sonoran yellow warbler	**0**	**0.8**	**0**	**0**	**0**
Verdin	0	1.5	0.5	2.25	1.5
Western kingbird	6.5	12.3	12	8.75	8.5
White-tailed kite	0	0.8	0	0	0
Yellow-breasted chat	0	0	1	0	0
Total	**33.5**	**55.4**	**30.25**	**50.75**	**32**
Species richness	**8**	**15**	**10**	**23**	**12**

[1] Scientific names of the species are listed in attachment 3.

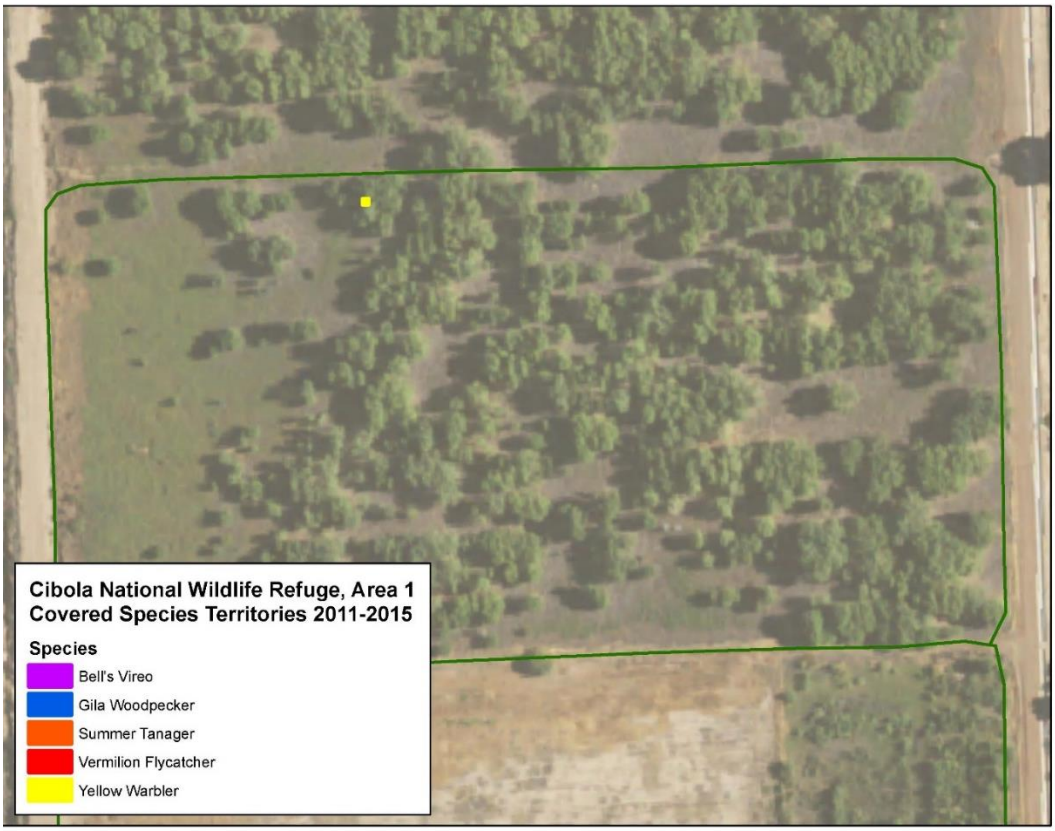

Figure 5.—MCPs of LCR MSCP covered focal species territories at Cibola NWR Unit #1, area 1, excluding the Nature Trail, 2011–15.
The highest-effort area search survey type was used to display MCPs for each plot in each year.

Nature Trail – The Nature Trail, a subphase of area 1 within Cibola NWR Unit #1 consisting of two small plots, was surveyed in its entirety each year since 2011. We found a similar number of territories and similar species richness each year (table 12). In the first year (2012), we found the highest number of territories in these plots, with a total of 68, with Nature Trail North having 30.75 and Nature Trail South having 37.25 (table 12). The most common species, including Abert's towhee, western kingbird (*Tyrannus verticalis*), blue grosbeak, and Bullock's oriole (*Icterus bullockii*), remained stable in territory numbers, with only slight variations observed each year (table 12). Sonoran yellow warblers were recorded as breeders in 2011 and 2012 but not since then (table 12; figure 6). Arizona Bell's vireos were found breeding once on the Nature Trail North plot in 2014, and every year on the Nature Trail South plot (table 12; figure 6). Other than the unexplained disappearance of Sonoran yellow warblers as breeders, the Nature Trail seems to support relatively stable numbers of territories of other territorial species.

Table 12.—Number of territories, by species, detected at Cibola NWR Unit #1, area 1 (Nature Trail), during rapid area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 23)[1]	Nature Trail North					Nature Trail South				
	2011 (N = 1)	2012 (N = 1)	2013 (N = 1)	2014 (N = 1)	2015 (N = 1)	2011 (N = 1)	2012 (N = 1)	2013 (N = 1)	2014 (N = 1)	2015 (N = 1)
Abert's towhee	3	4.75	7.5	2.5	4.25	7.5	9.5	3.25	5	4
Anna's hummingbird	1	5	1	0	0.25	4.5	1.75	1	0	1.5
Arizona Bell's vireo	**0**	**0**	**0**	**1**	**0**	**2**	**1**	**1**	**3**	**1**
Ash-throated flycatcher	0	1.25	0.5	0.25	3	1	0	0.5	1	0.75
Black-chinned hummingbird	1	0	2	2	4.75	1	0	0	0	1
Black-tailed gnatcatcher	1	2.75	1.25	0.75	0	1	0.5	0	0	0
Blue grosbeak	2	0	1.25	1	2.75	2.75	3	0.75	2	1.75
Bullock's oriole	4	1.75	2	1	2.5	4.5	2	0.75	2	1.5
Common yellowthroat	0	0	1	0	0	1.5	1.5	1	0	0
Costa's hummingbird	0	0	0	0	0	0	0	0	0.5	0
Crissal thrasher	0	0.5	1	0	1	0	0.75	0	1.25	0.25
Great horned owl	0	0.5	0	0	0.25	0	0	0.25	0	0
Indigo bunting	0	0	0	0	0	0	0	0	0	0.5
Ladder-backed woodpecker	1	1	0.5	0.75	2	0.5	1	0.5	1	0.5
Lesser goldfinch	1	0	1	0	1	0.5	0	0	0	0
Lucy's warbler	3	2	0	0	2	0	0	0	0	0
Northern mockingbird	0	0.25	0	0	0	0	0	0	0	0
Say's phoebe	0.25	0	0	0	0	0.25	0	0	0	0
Song sparrow	0	0	0	0	0	1	0	0	0	0
Sonoran yellow warbler	**4.5**	**2**	**0**	**0**	**0**	**2.25**	**0.25**	**0**	**0**	**0**
Verdin	3	3	4.5	4.75	3.5	1	3.5	3.75	9.25	5.5
Western kingbird	5	1.5	2	2.75	3.5	3.5	3.5	2	3	2.5
Yellow-breasted chat	1	0	1	0.5	0	2.5	0	0	0	2
Total	**30.75**	**26.25**	**26.5**	**17.25**	**30.75**	**37.25**	**28.25**	**14.75**	**28**	**22.75**
Species richness	**14**	**13**	**14**	**11**	**13**	**17**	**12**	**11**	**10**	**13**

[1] Scientific names of the species are listed in attachment 3.

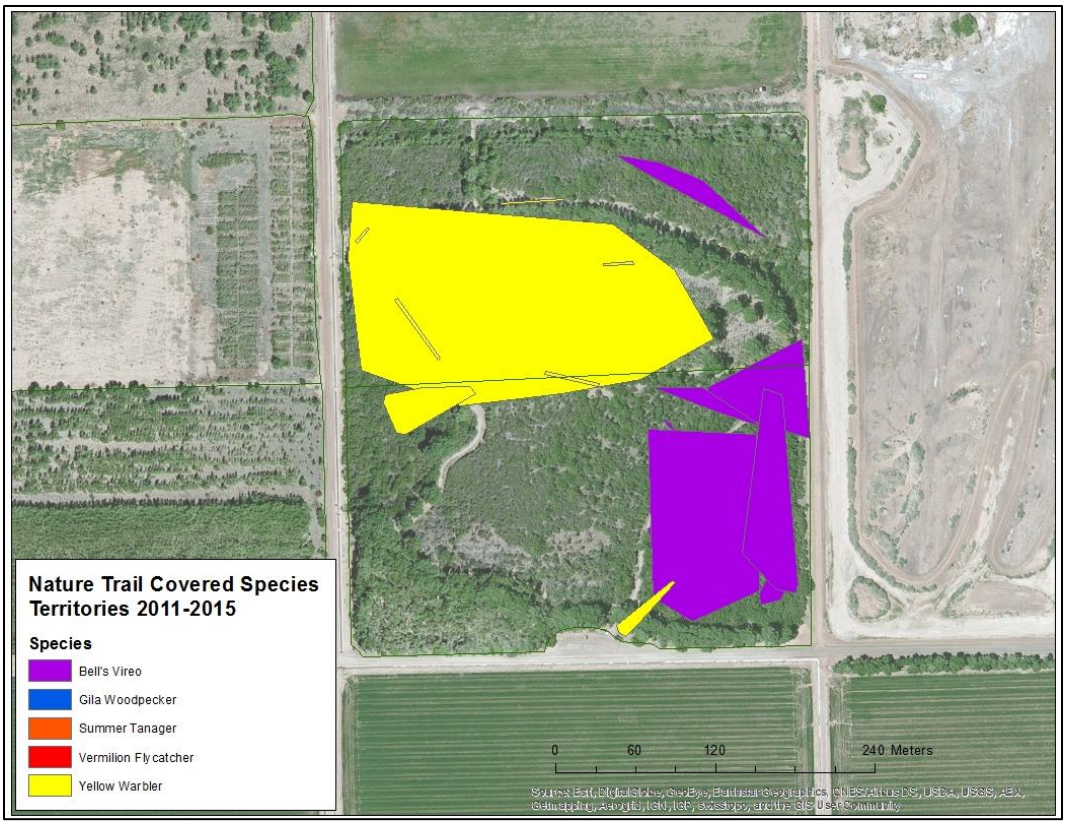

Figure 6.—MCPs of LCR MSCP covered focal species territories at Cibola NWR Unit #1, area 1 (Nature Trail), 2011–15.
The highest-effort area search survey type was used to display MCPs for each plot in each year.

Area 2 – Upper Hippy Fire

Upper Hippy Fire consists of three plots planted in 2013; it was first surveyed in 2015. We found a total of four species breeding here (table 13).

Table 13.—Number of territories, by species, detected at Cibola NWR Unit #1, Area 2 – Upper Hippy Fire, during rapid area search surveys in 2015

(Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (n = 4)[1]	Area 2 – Upper Hippy Fire
	2015 (N = 3)
Abert's towhee	2.25
Blue grosbeak	12.5
Common yellowthroat	10.5
Western kingbird	0.75
Total	**26**

[1] Scientific names of the species are listed in attachment 3.

Area 5 – Crane Roost

While species richness remained relatively constant over the 5 years, total territories increased every year, with an overall 5-year increase of 58% from 2011 to 2015 (table 14). We found the first four territories of Arizona Bell's vireos at Crane Roost in 2015 (table 14). In the same area, we also observed the arrival and increase in number of detected Sonoran yellow warbler territories in 2014–15 (table 14). The observed territories of LCR MSCP covered focal species were scattered throughout the area, and there were too few to reveal any occupancy patterns (figure 7).

Table 14.—Number of territories, by species, detected at Cibola NWR Unit #1, area 5 (Crane Roost), during rapid area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded. The "N" value following the year is the number of plots surveyed.)

Species (N = 28)[1]	Crane Roost				
	2011 (N = 6)	2012 (N = 6)	2013 (N = 6)	2014 (N = 6)	2015 (N = 6)
Abert's towhee	5.25	10.4	18.5	14.5	14.75
Anna's hummingbird	0	0.5	0	0.5	0
Arizona Bell's vireo	**0**	**0**	**0**	**0**	**4**
Ash-throated flycatcher	1.25	2.4	0	1.25	4.25
Barn owl	0.25	0	0	0	0
Bewick's wren	0.5	0	0	0	0
Black-chinned hummingbird	0.5	0.5	1.75	2	6
Black-tailed gnatcatcher	1	1	1	5	1
Blue grosbeak	9.5	12.1	10.25	9.5	16.75
Bullock's oriole	1	2.1	2.25	3.25	1
Common yellowthroat	2	4	2.5	2.75	4
Crissal thrasher	0.25	1	0	1.25	0.5
Great horned owl	0.25	0	0	0	0
Green heron	0	0.3	0	0	0
Hooded oriole	0.25	0	0	0	0
Killdeer	0.25	1.8	1	0	0
Ladder-backed woodpecker	1.5	1.3	0	2.25	3
Lesser goldfinch	0.5	0	0	0.5	0.25
Loggerhead shrike	1.5	0	0	1	0
Lucy's warbler	2	0	0	2.75	7.75
Northern mockingbird	0	0	0.75	4.25	3
Northern rough-winged swallow	0	0.3	0	0	0
Say's phoebe	0	0	0	0	0.25
Song sparrow	9.5	13.8	28	23.75	14.25
Sonoran yellow warbler	**0**	**0**	**0**	**1**	**1.75**
Verdin	1	5	2	13	8
Western kingbird	1	3.5	1.5	2	3.25
Yellow-breasted chat	3	5	10	5.75	8
Total	**42.25**	**65**	**79.5**	**96.25**	**101.75**
Species richness	**21**	**17**	**12**	**19**	**19**

[1] Scientific names of the species are listed in attachment 3.

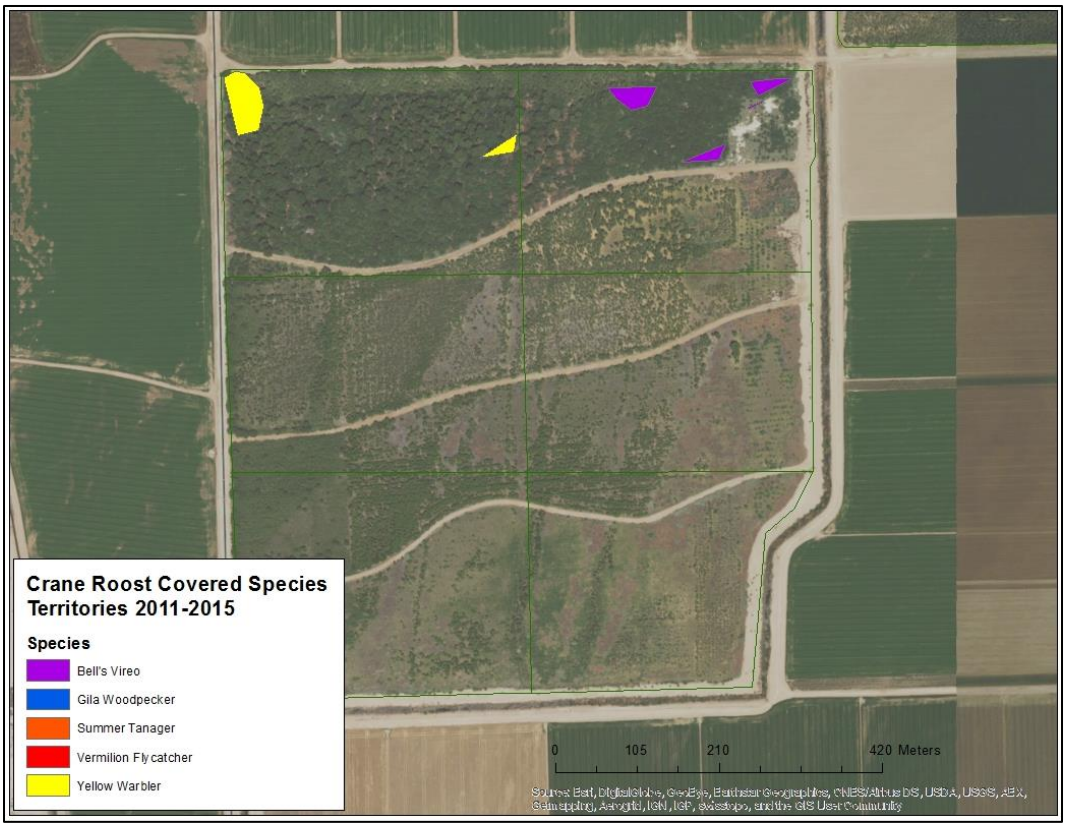

Figure 7.—MCPs of LCR MSCP covered focal species territories at Cibola NWR Unit #1, area 5 (Crane Roost), 2011–15.
The highest-effort area search survey type was used to display MCPs for each plot in each year.

Yuma East Wetlands

Both the area surveyed and the survey effort at YEW changed over the period of this study. YEW was added as a conservation area to the LCR MSCP in 2013 and was thus not surveyed until 2012. In 2012 and 2013, Fred Phillips Consulting, LLC, surveyed a portion of the conservation area using only the intensive area search survey method. In 2014 and 2015, GBBO added YEW to the conservation area plot selection for the project and surveyed the entire acreage of the conservation area, including seven additional plots, using rapid area search surveys. As this conservation area matured, species richness and overall territory numbers increased, and in 2015, 190 territories of 29 species were recorded here (tables 15 and 16). Partial territories for Gila woodpeckers, summer tanagers, and Sonoran yellow warblers were found at YEW for the first time in 2015 (tables 15 and 16). Territories of these LCR MSCP covered focal species were concentrated in the narrow flood plain section near the bridge, where there is a narrow band of structurally diverse riparian vegetation (figure 8).

Table 15.—Number of territories, by species, detected at YEW, plots C4701, C4702, and C4703, during rapid area search surveys in 2014–15 and during intensive area search surveys in 2012–13

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded.)

	C4701		C4702				C4703			
Species (N = 20)[1]	**2012**	**2013**	**2012**	**2013**	**2014**	**2015**	**2012**	**2013**	**2014**	**2015**
Abert's towhee	2.5	3	1	4	8.25	4.75	2	1.75	2.5	6.5
American kestrel	0	0	0	0	0	0.25	0	0	0	0
Anna's hummingbird	0	1.75	1	2	8	3.5	1	4	6.25	4
Ash-throated flycatcher	0	0	0	2.5	0.75	0.5	0	0	1	0
Black-chinned hummingbird	0	0	0	0	0.75	1.5	0	0	1.75	5.25
Black-necked stilt	0	0	0	0	0.5	0	0	0	0	0
Black-tailed gnatcatcher	1	0.25	0	0	1.5	2.25	0	0	1	2.75
Blue grosbeak	0	0	1	1	0.25	2.25	0	3	2.5	3.25
Brown-crested flycatcher	0	0	0	0	0	0	0	0	0	0.75
Common yellowthroat	0	0	1	0	0	0	0	0	0	2.25
Costa's hummingbird	0	0	0	0	0	1.25	0	0	0	0
Crissal thrasher	0	1	0	0	0	0	0	0	0	0
Killdeer	0	0.5	0	0.25	1	1	0	0	0	0
Ladder-backed woodpecker	0	0.75	0	0.5	1.5	0.5	0	0.75	0.75	0.25
Lesser goldfinch	0	0	0	0	3	1.25	0	0	0	5
Lucy's warbler	0	0	0	0	2.5	0	0	0	0	0
Northern mockingbird	0	0	0	0	1	0	0	0	0	0
Song sparrow	1	0	0	0	1.75	0	0	0	0	0
Summer tanager	**0**	**0**	**0**	**0**	**0**	**0.75**	**0**	**0**	**0**	**0**
Verdin	6.75	11.5	5	7.25	19.5	12.75	2.75	5	4.5	12.75
Total	**11.25**	**18.75**	**9**	**17.5**	**50.25**	**32.5**	**5.75**	**14.5**	**20.25**	**42.75**
Species richness	**4**	**7**	**5**	**7**	**14**	**13**	**3**	**5**	**8**	**10**

[1] Scientific names of the species are listed in attachment 3.

Table 16.—Number of territories, by species, detected at YEW, plots C4704, C4705, C4706, C4708, C4709, C4710, and C4711, during rapid area search surveys in 2014–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are excluded.)

	C4704		C4705		C4706		C4708	C4709		C4710	C4711
Species (N = 30)[1]	**2014**	**2015**	**2014**	**2015**	**2014**	**2015**	**2014**	**2014**	**2015**	**2014**	**2015**
Abert's towhee	2.75	4	3	3.5	2.75	4	3.25	0	0.5	1.75	3
Anna's hummingbird	0.75	1	2.75	1.5	2	2	4.75	3	1.25	2.75	2.5
Ash-throated flycatcher	0.25	0.25	0.5	0.75	0.25	0.5	0.5	0.5	0.25	0.5	0.5
Black phoebe	0	0	0	0	0	0	0	1	0.25	0.5	0.5
Black-chinned hummingbird	1	1.75	0	0.5	0	1.75	4.75	1	0.25	0.75	3
Black-necked stilt	1	0.5	0	0	1.5	0.25	0	0.25	0	1	0
Black-tailed gnatcatcher	2.25	3.25	3.75	3.75	1.75	3.75	3.25	1	1.5	1.25	2.25
Blue grosbeak	0	0.5	0	0	0	0	3	0	0	1	0.75
Brown-crested flycatcher	0	0	0.25	0	0	0.5	0	0	1	0	0.5
Common gallinule	0	0	0	0	0.25	0	0	0	0	0	0
Common yellowthroat	0	0	0	0.75	0.5	0.25	3	0	0.5	1.25	2
Costa's hummingbird	1	0	0	0	0	0	0	0	0	0.75	0
Crissal thrasher	0	0.25	0	0.25	0	0	1.5	0	0	0	0.25
Gila woodpecker	**0**	**0**	**0**	**0**	**0**	**0.25**	**0**	**0**	**0**	**0**	**0**
Green heron	1	0	0	0	0.25	0	1.25	0.25	0	0	0.25
Inca dove	0	0	0	0	0	0	0	0	0	0	0.5
Killdeer	1	1.5	0.5	2.5	4.75	3	0	1.25	7.5	1	0
Ladder-backed woodpecker	0	1.25	0.5	0.5	0.25	0.5	0.75	0	0.25	0.25	1
Lesser goldfinch	0	0	0	0	0	0	0.5	0	0	0	0.25
Lesser nighthawk	0	0	0	0	1.25	0	0	1.5	0.25	0	0
Mallard	0	0	0	0	0.25	0	0	0	0	0	0
Marsh wren	0	0	0	0	0	0	0	0	0	0	0.25
Northern mockingbird	2	0	2.25	0	3.25	1.25	0	3	0	0.75	0.25
Northern rough-winged swallow	0	0	0	0	0.5	0	0	0	0.75	0	0
Say's phoebe	0	0	0	0	0	0.25	0	0	0	0	0
Song sparrow	5.5	0.25	0	0	2	0.25	0	0	0	1	0.5
Verdin	4.5	6.5	8.25	8.25	8	5.5	9.75	5	4.25	7.5	9.25
Western kingbird	1	0.25	0	0	0	0	0	0	0.25	0	0.25
Sonoran yellow warbler	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.75**
Yuma clapper rail	0	0	0	0	0	0	1	0	0	0	0
Total	**24**	**21.25**	**21.75**	**22.25**	**29.5**	**24**	**37.25**	**17.75**	**18.75**	**22**	**28.5**
Species richness	**13**	**13**	**9**	**10**	**16**	**15**	**13**	**11**	**14**	**15**	**20**

[1] Scientific names of the species are listed in attachment 3.

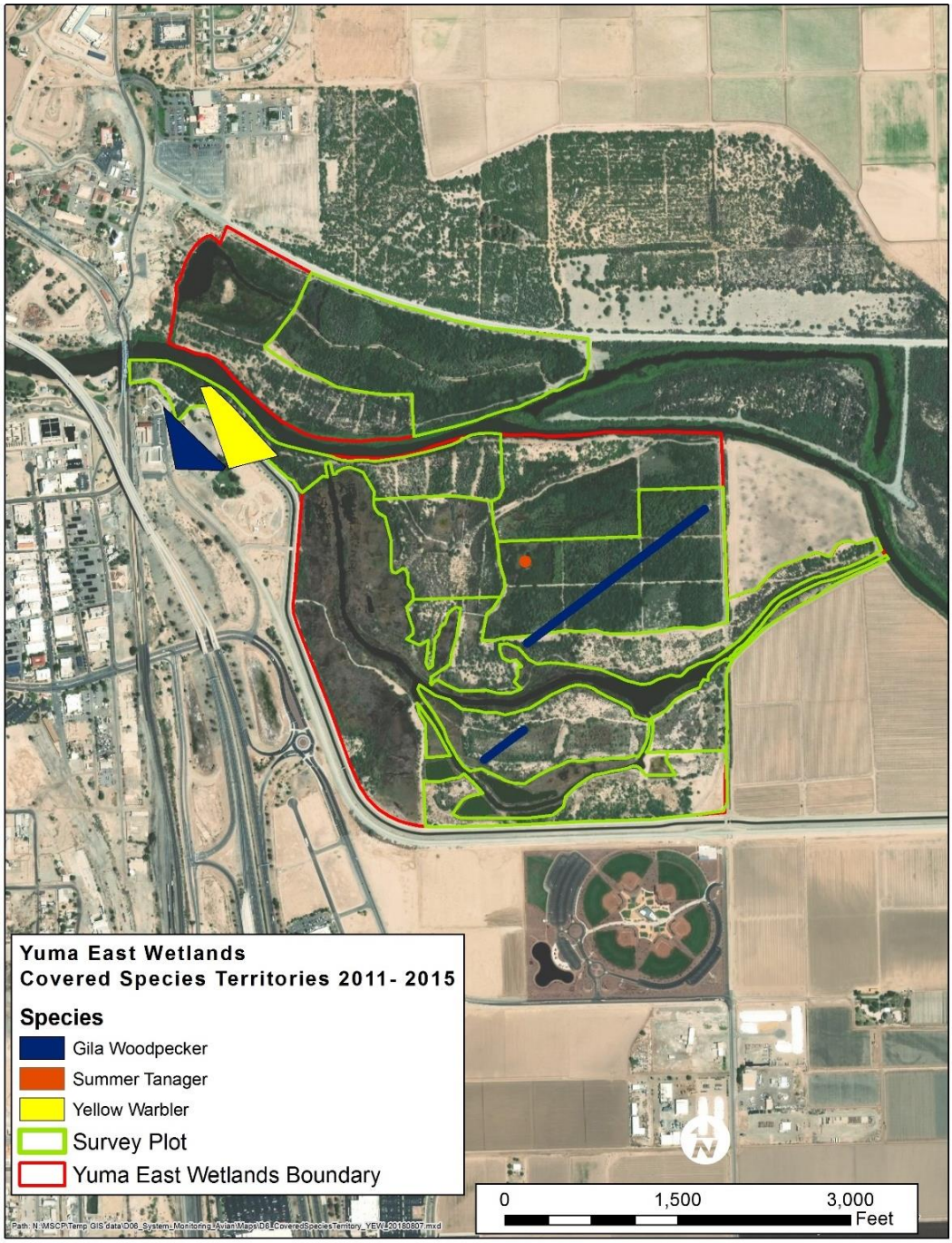

Figure 8.—MCPs of LCR MSCP covered focal species territories at YEW, 2011–15. The highest-effort area search survey type was used to display MCPs for each plot in each year.

Detection Ratios

Each year during this study, we calculated DRs from the double sampling effort using all territorial breeding riparian land birds for population estimates. DRs were calculated separately for system-wide plots and for the conservation areas and CRIT 9. DRs varied among years, with values > 1 indicating that surveyors during rapid area search surveys likely overestimated territory numbers and values < 1 indicating that these were likely underestimated (table 17). Overall DRs for system-wide plots since 2011 have been close to 1, with a median value of 0.97 (range: 0.8–1.08) (table 17). DRs at conservation areas and CRIT 9 were more variable, with a median value of 0.89 (range: 0.62–1.50) (table 17).

Table 17.—DRs for territorial breeding riparian land birds combined in system-wide and conservation area and CRIT 9 area search surveys in 2011–15

	System-wide			Conservation areas		
Year	DR	SE	CV	DR	SE	CV
2011	0.97	0.13	0.13	0.96	0.48	0.50
2012	0.80	0.10	0.12	0.78	0.12	0.15
2013	1.08	0.14	0.13	1.50	0.56	0.38
2014	0.83	0.18	0.21	0.62	0.12	0.20
2015	0.99	0.18	0.18	0.89	0.29	0.32

We calculated individual DRs for the most common territorial breeders and LCR MSCP covered focal species for this report to illustrate how bias in rapid area search survey counts varied among species and over time (tables 18 and 19). Individual species' DRs were not used to calculate annual population size estimates because most species were encountered in a few plots and at low density and because some were absent from plots in which intensive area search surveys were conducted.

In general, conspicuous species with large territories, such as flycatchers (Tyrannidae) and woodpeckers (Picidae), were more likely to be overestimated in rapid area search surveys than were species with smaller territories. This may be a result of surveyors during rapid area search surveys being likely to count widely separated detections as separate territories when, in some cases, they may have been the same individual moving over a large territory. Sonoran yellow warblers were consistently underestimated in rapid area search surveys (DR range: 0.51–0.88) on system-wide plots (table 18). DRs at conservation areas and CRIT 9 were more variable because of the lower density and small N (table 19). Summer tanagers were often overestimated on system-wide plots

(DR range: 0.7–1.67), and their DR was variable in conservation area and CRIT 9 plots as well (DR range: 0.8–3.0) (tables 18 and 19). The DRs for Gila woodpeckers and Arizona Bell's vireos varied between overestimations and underestimations for system-wide sampling (table 18). The pattern was similar for Arizona Bell's vireos at conservation areas and CRIT 9; no Gila woodpeckers were encountered during intensive area search surveys for these sites (table 19). DRs for vermilion flycatchers and gilded flickers could not be estimated because of their overall rarity in the study area. Missing DR values in tables 18 and 19 reflect the absence of a species from the intensive area search surveys. Generally, the high variation in individual DRs among years, particularly in conservation area and CRIT 9 area search surveys, are likely attributable to lower numbers of intensive area search surveys (compared with system-wide sampling) and/or rarity of the species on the landscape.

Population Size Estimates

System-Wide Monitoring

We report here the annual system-wide minimum population size estimates (number of territories) for LCR MSCP covered focal species, and the 10 most common riparian species, along with average estimates over 2011–15. The annual and average estimates below were calculated using the overall territorial land bird DR, but the list of species used for the average estimate was standardized for all years. Stratifying by year, rather than treating all years as a simple random sample, provided estimates that were 8% more precise (smaller SE) on average.

Total population size estimates across all habitat strata and regions reported in this report are based on revised annual estimates. Annual estimates for individual region and stratum were reported in the 2011, 2012, 2013, 2014, and 2015 annual reports (GBBO 2012–2015). Errors in calculations were found after these annual reports were published and posted to the LCR MSCP Web site. The corrected population estimates for individual habitat stratum and regions for 2011–15 are presented in this report (attachment 5). The previous published annual reports have not been revised.

The total population estimate and associated standard error for the combined habitat strata (all) and/or combined regions (all) is not equal to the sum of individual habitat stratum or individual region estimates because the sampling plots are not all the same size. Habitat stratum and region estimates are based on density, or the total number of territories divided by the total area of sampled plots. Because plot area varies, the population total over habitat strata and regions must be calculated by summing the total birds and plot area over habitat strata and regions, calculating territories per unit area from these sums, and then multiplying that by the total area over all habitat strata and regions.

Table 18.—Annual DRs of LCR MSCP covered focal species and other territorial riparian land bird species based on system-wide area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. n/a = not available due to low sample size. SE and CV are 0 for species encountered on only one plot during intensive area search surveys).

Species[1]	2011			2012			2013			2014			2015		
	DR	SE	CV	DR	SE	CV	DR	SE	CV	DR	SE	CV	DR	SE	CV
Abert's towhee	0.94	0.13	0.14	0.98	0.19	0.20	0.81	0.16	0.20	1.25	0.28	0.22	1.13	0.10	0.09
Anna's hummingbird	1.14	0.52	0.46	4.00	2.62	0.65	n/a[2]			n/a			1.06	0.73	0.68
Arizona Bell's vireo	**2.08**	**0.29**	**0.14**	**0.90**	**0.19**	**0.21**	**n/a**			**0.70**	**0.25**	**0.35**	**0.86**	**0.39**	**0.45**
Ash-throated flycatcher	1.31	0.39	0.30	1.00	0.19	0.19	0.93	0.23	0.25	0.90	0.32	0.35	1.35	0.48	0.36
Bewick's wren	0.60	0.19	0.31	0.54	0.14	0.25	0.89	0.20	0.22	0.70	0.19	0.27	0.83	0.28	0.34
Black-chinned hummingbird	0.33	0.40	1.21	1.83	1.49	0.81	0.97	0.22	0.23	2.47	1.38	0.56	1.06	0.75	0.71
Black-tailed gnatcatcher	0.98	0.18	0.18	0.95	0.35	0.37	0.61	0.32	0.52	1.78	0.41	0.23	1.14	0.20	0.18
Black phoebe	n/a			n/a			n/a			0.67	0.00	0.00	n/a		
Blue grosbeak	0.95	0.23	0.23	1.00	0.48	0.48	1.4	0.97	0.69	0.33	0.44	1.33	1.78	0.64	0.36
Brown-crested flycatcher	n/a			0.67	0.24	0.36	1.22	0.61	0.50	0.52	0.26	0.50	0.75	0.19	0.25
Bullock's oriole	n/a			0.57	0.49	0.86	1.75	1.51	0.86	0.29	0.16	0.55	n/a		
Canyon wren				1.22	0.62	0.50	1.00	0.00	0.00	0.61	0.29	0.48	0.88	0.48	0.55
Common yellowthroat	1.03	0.26	0.25	0.86	0.26	0.31	1.29	0.25	0.19	0.87	0.22	0.26	1.32	0.29	0.22
Costa's hummingbird	n/a			n/a			n/a			n/a			2.33	2.02	0.86
Crissal thrasher	0.48	0.21	0.44	1.17	0.27	0.23	0.38	0.13	0.34	0.33	0.18	0.55	2.25	0.58	0.26
Gila woodpecker	**2.30**	**0.78**	**0.34**	**0.92**	**0.31**	**0.33**	**1.86**	**1.06**	**0.57**	**0.60**	**0.18**	**0.30**	**0.92**	**0.16**	**0.18**
Gilded flicker	**n/a**			**n/a**			**n/a**			**n/a**			**n/a**		
Ladder-backed woodpecker	1.94	0.49	0.25	0.63	0.10	0.16	0.90	0.17	0.19	0.82	0.14	0.17	1.08	0.18	0.17
Lesser goldfinch	8.00	3.02	0.38	2.00	3.02	1.51	n/a			0.83	0.80	0.96	1.67	2.31	1.39
Lucy's warbler	0.89	0.30	0.33	0.6	0.20	0.33	0.62	0.35	0.57	0.94	0.37	0.39	1.11	0.37	0.33
Marsh wren	1.94	0.08	0.04	n/a			1.55	0.00	0.00	2.67	1.46	0.55	n/a		
Phainopepla	n/a			n/a			n/a			n/a			2.42	0.00	0.00
Say's phoebe	1.00	1.51	1.51	1.25	1.73	1.39	n/a			n/a			n/a		
Song sparrow	0.63	0.22	0.34	0.78	0.07	0.09	1.33	0.25	0.19	0.76	0.19	0.25	0.72	0.23	0.32
Sonoran yellow warbler	**0.88**	**0.18**	**0.21**	**0.30**	**0.08**	**0.27**	**0.51**	**0.02**	**0.03**	**0.57**	**0.16**	**0.27**	**0.71**	**0.10**	**0.14**
Summer tanager	**0.70**	**0.03**	**0.04**	**1.09**	**0.31**	**0.28**	**1.67**	**1.01**	**0.60**	**1.00**	**0.22**	**0.22**	**1.57**	**0.67**	**0.43**
Verdin	1.25	0.36	0.29	1.16	0.62	0.53	1.06	0.22	0.21	1.39	0.40	0.29	0.96	0.07	0.07
Vermilion flycatcher	**n/a**			**n/a**			**n/a**			**n/a**			**n/a**		
Western kingbird	0.6	0.15	0.25	n/a			1.11	0.00	0.00	n/a			1.67	0.83	0.50
Yellow-breasted chat	1.42	0.28	0.19	0.91	0.31	0.34	1.12	0.07	0.06	0.85	0.15	0.18	0.79	0.16	0.20

[1] Scientific names of the species are listed in attachment 3.

Table 19.—Annual DRs of LCR MSCP covered focal species and other territorial riparian land bird species based on conservation area and CRIT 9 area search surveys in 2011–15

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. n/a = not available due to low sample size. SE and CV are 0 for species encountered on only one plot during intensive area search surveys).

Species[1]	2011			2012			2013			2014			2015		
	DR	SE	CV	DR	SE	CV	DR	SE	CV	DR	SE	CV	DR	SE	CV
Abert's towhee	0.92	0.56	0.60	0.49	0.07	0.13	1.55	0.94	0.61	0.79	0.24	0.31	0.77	0.17	0.22
Anna's hummingbird	0.47	0.32	0.68	1.09	0.03	0.03	n/a			1.50	0.54	0.36	n/a		
Ash-throated flycatcher	0.46	0.33	0.71	1.20	0.57	0.47	2.00	0.00	0.00	1.50	1.24	0.83	n/a		
Arizona Bell's vireo	**2.00**	**0.00**	**0.00**	**0.73**	**0.00**	**0.00**	**n/a**			**n/a**			**2.06**	**0.00**	**0.00**
Black-chinned hummingbird	0.24	0.28	1.17	0.50	0.82	1.63	4.00	1.63	0.41	0.62	0.59	0.95	1.09	0.21	0.19
Black-tailed gnatcatcher	0.43	0.13	0.31	0.59	0.17	0.28	n/a			1.00	0.00	0.00	1.10	0.00	0.00
Blue grosbeak	0.92	0.59	0.64	0.33	0.14	0.42	1.69	0.46	0.27	0.54	0.18	0.34	0.81	0.37	0.45
Brown-crested flycatcher	n/a			0.50	0.00	0.00	n/a			1.00	0.00	0.00	0.75	0.00	0.00
Bullock's oriole	0.89	0.68	0.77	0.52	0.18	0.34	0.69	0.76	1.10	0.45	0.23	0.51	0.56	0.29	0.51
Common yellowthroat	1.50	0.00	0.00	3.75	6.12	1.63	1.40	0.33	0.23	0.60	0.09	0.15	0.35	0.00	0.00
Crissal thrasher	n/a			1.33	0.59	0.44	n/a			n/a			n/a		
Gila woodpecker	**n/a**			**n/a**			**n/a**			**n/a**			**n/a**		
Indigo bunting	n/a			n/a			n/a			n/a			0.50	0.82	1.63
Ladder-backed woodpecker	0.29	0.12	0.43	1.22	0.52	0.43	2.00	0.00	0.00	0.83	0.16	0.19	1.20	0.30	0.25
Lesser goldfinch	0.34	0.14	0.41				n/a			0.19	0.08	0.45	n/a		
Lucy's warbler	n/a			0.50	0.00	0.00	n/a			0.64	0.42	0.66	0.24	0.06	0.25
Song sparrow	n/a			n/a			1.18	0.17	0.14	0.39	0.00	0.00	0.44	0.36	0.82
Summer tanager	**0.80**	**1.31**	**1.63**	**0.33**	**0.00**	**0.00**	**3.00**	**0.00**	**0.00**	**n/a**			**1.63**	**0.00**	**0.00**
Verdin	0.36	0.07	0.21	1.08	0.39	0.36	1.06	0.00	0.00	0.89	0.12	0.14	0.41	0.00	0.00
Vermilion flycatcher	**0.03**	**0.00**	**0.00**	**3.00**	**0.00**	**0.00**	**n/a**			**n/a**			**n/a**		
Western kingbird	0.78	0.42	0.53	1.47	0.41	0.28	1.00	0.35	0.35	1.00	0.09	0.09	0.58	0.19	0.32
Yellow-breasted chat	2.50	0.00	0.00	0.89	0.32	0.36	n/a			0.56	0.00	0.00	1.56	0.26	0.16
Sonoran yellow warbler	**1.08**	**0.58**	**0.53**	**0.91**	**0.00**	**0.00**	**n/a**			**1.00**	**0.00**	**0.00**	**1.63**	**0.00**	**0.00**

[1] Scientific names of the species are listed in attachment 3.

Of the LCR MSCP covered focal species, Sonoran yellow warblers had the largest population size with 1,786 territories estimated to be present system-wide on average (table 20). Population estimates for Sonoran yellow warbler were fairly stable between years, except in 2014, when populations were much higher than in other years (figure 9). Population size estimates for Arizona Bell's vireo were the most stable of the LCR MSCP covered focal species during the project with an average of 1,365 territories (see table 22) and a difference among years of up to about 400 territories (figure 10). Gila woodpecker and summer tanager population estimates varied among years, with an apparent system-wide increase in Gila woodpecker territories in the last 2 years of the project (table 20; figures 11 and 12). Very few vermilion flycatcher and gilded flicker territories were recorded throughout the project, and their rarity on the landscape produces wide confidence intervals that make annual attempts at population size estimates for these species tenuous (table 20).

Eight species were among the 10 most common riparian land birds every year of this project: Abert's towhee, black-tailed gnatcatcher, common yellowthroat, Lucy's warbler, marsh wren (*Cistothorus palustris*), song sparrow, verdin, and yellow-breasted chat (table 21). The remainder of the 10 most common riparian land birds varied from year to year during the project. Population size estimates were highest overall for common yellowthroats, with an average territory number estimate of 17,014 system-wide (table 23). The song sparrow and Lucy's warbler had the next highest average population size estimates for the 5-year period (table 23). The remainder of the top 10 common riparian land birds had an average population site estimate of less than 10,000 (table 23 and table 24).

Conservation Area and CRIT 9 Monitoring

Estimated LCR MSCP covered focal species territories at conservation areas and CRIT 9 were fairly consistent among the 5 years of the project (table 25; figures 13–16). Sonoran yellow warblers and Arizona Bell's vireos were the most common breeders of the LCR MSCP covered focal species in the conservation areas and CRIT 9, followed by summer tanagers and vermilion flycatchers (table 25). In 2015, the first Gila woodpeckers were observed using conservation areas and CRIT 9 as part of their territories (table 25), with partial territories at the PVER and YEW, and also at CRIT 9.

Estimates of common riparian land bird territories on conservation areas and CRIT 9 increased from 2011 to 2015 (table 26). All population size estimates of the common riparian land bird territories on conservation areas and CRIT 9 apparently increased from 2013 to 2014, during which time additional areas were developed, then stayed fairly consistent from 2014 to 2015 (table 26).

Table 20.—Estimated number of territories (± SE) for LCR MSCP covered focal species based on system-wide area search surveys completed in 2011–15
(Species are listed in alphabetical order.)

Species[1]	2011		2012		2013		2014		2015	
	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE
Arizona Bell's vireo	1,565	811	1,529	500	1,180	546	1,186	485	1,263	380
Gila woodpecker	371	176	591	124	417	182	722	191	829	199
Gilded flicker	1	1	27	27	11	11	2	2	71	72
Sonoran yellow warbler	1,084	484	1,226	401	1,534	576	3,659	2,553	1,721	629
Summer tanager	207	91	320	103	194	73	404	222	221	82
Vermilion flycatcher	432	431	0	0	45	45	14	14	0	0

[1] Scientific names of the species are listed in attachment 3.

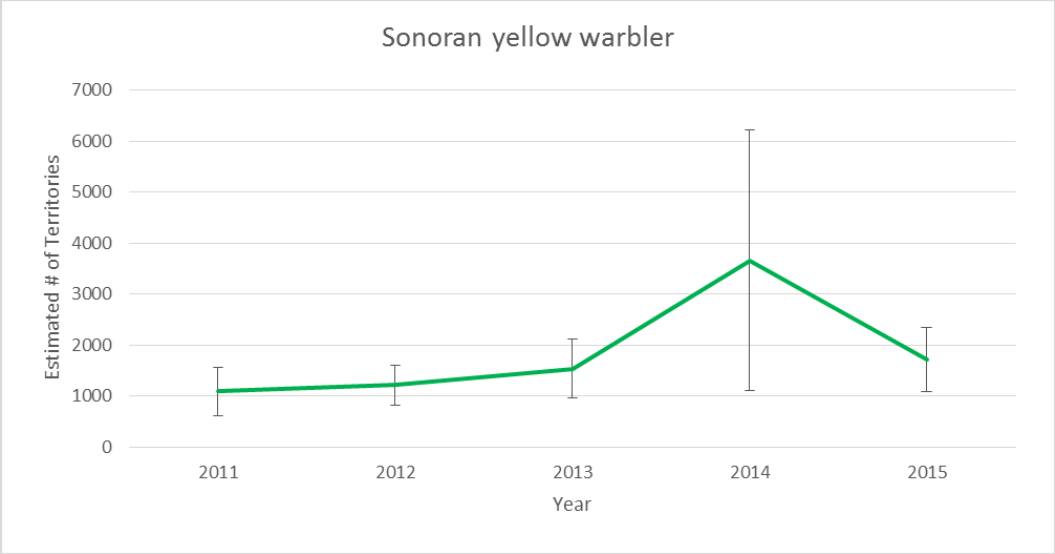

Figure 9.—Estimated number of territories (± SE) for Sonoran yellow warblers based on system-wide area search surveys completed in 2011–15.

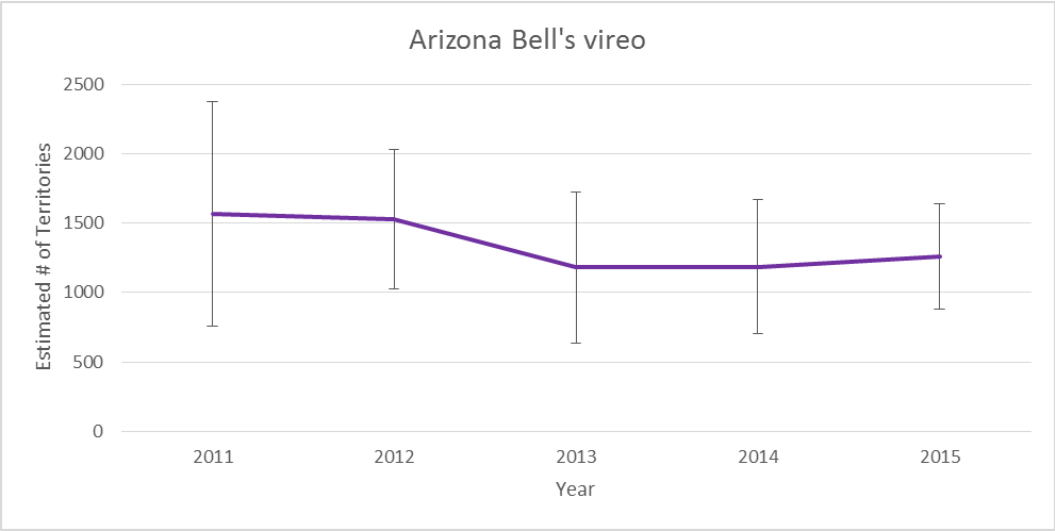

Figure 10.—Estimated number of territories (± SE) for Arizona Bell's vireos based on system-wide area search surveys completed in 2011–15.

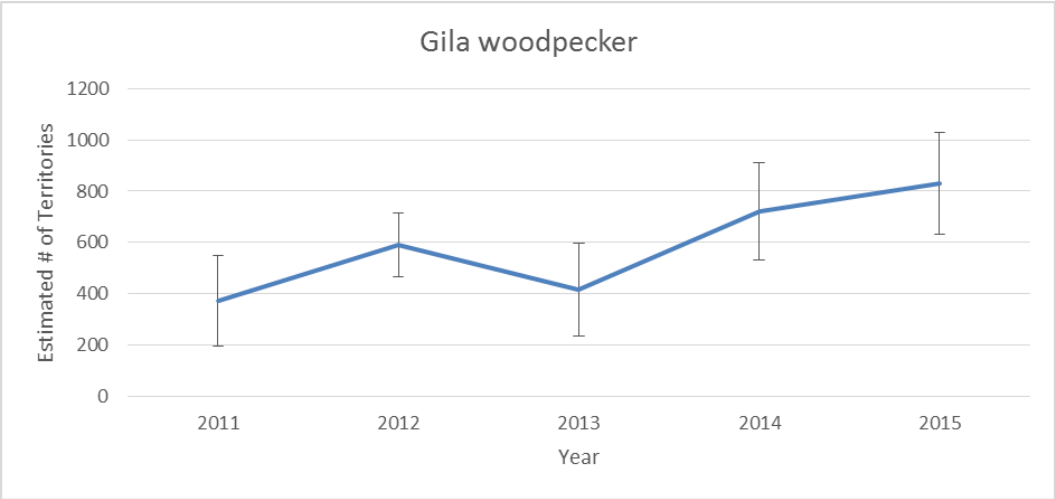

Figure 11.—Estimated number of territories, (± SE) for Gila woodpeckers based on system-wide area search surveys completed in 2011–15.

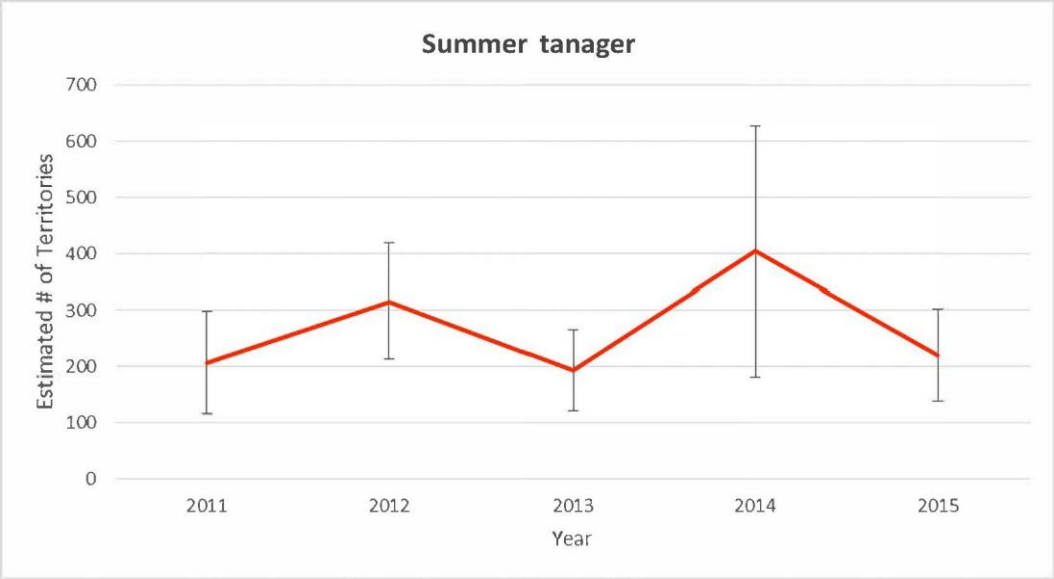

Figure 12.—Estimated number of territories (± SE) for summer tanagers based on system-wide area search surveys completed in 2011–15.

The total population estimate and associated standard error for the combined habitat strata for each conservation area (all habitats) and all conservation area totals (all) is not equal to individual habitat stratum or individual conservation area estimates. Habitat stratum and conservation area estimates are based on density, or the total number of territories divided by the total area of sampled plots. Because plot area varies, the population total over habitat strata and conservation areas must be calculated by summing the total birds and plot area over habitat strata and conservation areas, calculating territories per unit area from these sums, and then multiplying that by the total area over all habitat strata and conservation areas.

Population size estimates calculated by combining the 5 years of data were not performed for conservation areas or CRIT 9 because of the confounding variable of changing survey coverage over the course of the project. Additionally, the total area for extrapolation changed over time because of additional plantings.

Table 21.—Estimated number of territories (± SE) of the 10 most common riparian land birds based on system-wide area search surveys completed in 2011–15

(Species are listed in alphabetical order. n/a indicates species that were not among the 10 most common riparian land birds in a given year.)

Species[1]	2011		2012		2013		2014		2015	
	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE
Abert's towhee	9,419	1,473	12,301	1,856	5,620	852	7,715	1,889	7,963	1,573
Ash-throated flycatcher	n/a	n/a	2,877	523	n/a	n/a	n/a	n/a	n/a	n/a
Bewick’s wren	n/a	n/a	n/a	n/a	2,147	614	5,254	1,953	n/a	n/a
Black-chinned hummingbird	n/a	n/a	3,396	706	n/a	n/a	3,462	1,500	n/a	n/a
Black-tailed gnatcatcher	9,052	1,776	9,944	1,748	6,123	1,204	11,998	2,821	10,937	2,290
Common yellowthroat	10,323	2,285	16,156	3,269	11,497	2,960	31,425	9,006	18,730	4,892
Horned lark	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4,997	1,321
Lesser nighthawk	3,950	960	n/a	n/a	1,673	439	n/a	n/a	n/a	n/a
Lucy's warbler	6,300	1,359	11,898	2,218	5,875	1,010	15,573	5,362	13,604	3,981
Marsh wren	3,530	972	6,105	1,775	5,578	3,622	5,914	2,585	4,530	1,858
Phainopepla	2,434	1,626	n/a	n/a	n/a	n/a	n/a	n/a	3,096	2,814
Song sparrow	7,125	1,789	17,047	3,884	11,374	2,475	26,040	102,236	14,914	4,156
Verdin	6,138	1,354	9,824	1,695	5,970	1,086	8,821	2,159	5,147	1,671
Yellow-breasted chat	4,364	1,448	6,834	1,741	5,812	1,320	10,555	4,022	8,917	2,712

[1] Scientific names of the species are listed in attachment 3.

Table 22.—Five-year average of estimated number of territories (± SE) of the LCR MSCP covered focal species by and over habitat types based on system-wide area search surveys completed in 2011–15

Habitat	Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE
Tall woody	673	93	198	31	84	11	59	9	0	0	1	0.4
Low woody	1,003	452	956	257	337	50	174	48	13	11	16	14
Herbaceous	46	25	27	14	9	4	4	3	0	0	0	0
Unsuitable	44	31	172	61	139	57	22	13	100	100	5	5
All	**1,786**	**484**	**1,365**	**282**	**573**	**85**	**262**	**54**	**112**	**100**	**22**	**15**

[1] Scientific names of the species are listed in attachment 3.

Table 23.—Five-year average of estimated number of territories (± SE) of the first 5 of the 10 most common riparian land birds by and over habitat types based on system-wide area search surveys completed in 2011–15

Habitat	Common yellowthroat[1]		Song sparrow[1]		Lucy's warbler[1]		Black-tailed gnatcatcher[1]		Abert's towhee[1]	
	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE
Tall woody	1,220	150	2,127	263	424	51	307	44	361	39
Low woody	10,118	1,667	9,609	1,904	8,559	1,245	7,078	798	6,075	619
Herbaceous	1,688	192	672	113	129	24	154	31	116	16
Unsuitable	3,941	602	2,208	392	1,003	190	1,865	261	1,986	258
All	**17,014**	**2,135**	**14,720**	**2,201**	**10,210**	**1,362**	**9,465**	**997**	**8,587**	**845**

[1] Scientific names of the species are listed in attachment 3.

Table 24.—Five-year average of estimated number of territories (± SE) of the second 5 of the 10 most common riparian land birds by and over habitat types based on system-wide area search surveys completed in 2011–15

Habitat	Verdin[1]		Yellow-breasted chat[1]		Marsh wren[1]		Bewick's wren[1]		Black-chinned hummingbird[1]	
	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE
Tall woody	458	57	1,267	148	87	30	441	59	112	22
Low woody	4,532	599	4,914	938	2,365	995	1,744	382	1,452	278
Herbaceous	127	21	259	51	1,585	289	7	5	32	8
Unsuitable	2,016	314	638	95	1,130	380	384	65	719	186
All	**7,165**	**823**	**7,143**	**1,063**	**5,142**	**1,170**	**2,599**	**429**	**2,324**	**368**

[1] Scientific names of the species are listed in attachment 3.

Table 25.—Estimated number of territories (± SE) for LCR MSCP covered focal species based on conservation area and CRIT 9 area search surveys completed in 2011–15

(Species are listed in alphabetical order. n/a indicates species were not detected in conservation areas or CRIT 9 for that year.)

Species[1]	2011		2012		2013		2014		2015	
	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE
Arizona Bell's vireo	15	7	29	7	12	5	29	6	34	11
Gila woodpecker	n/a		n/a		n/a		n/a		1	0.4
Sonoran yellow warbler	35	17	30	6	15	6	23	5	41	14
Summer tanager	5	2	5	1	4	1	5	1	9	3
Vermilion flycatcher	4	2	5	1	1	0.4	5	1	6	2

[1] Scientific names of the species are listed in attachment 3.

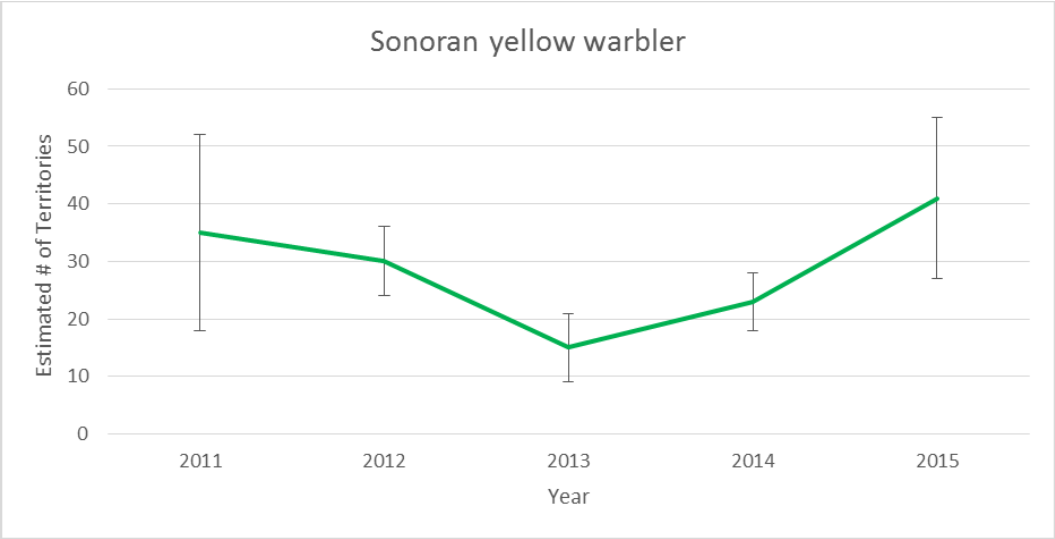

Figure 13.—Estimated number of territories (± SE) for Sonoran yellow warblers based on conservation area and CRIT 9 area search surveys completed in 2011–15.

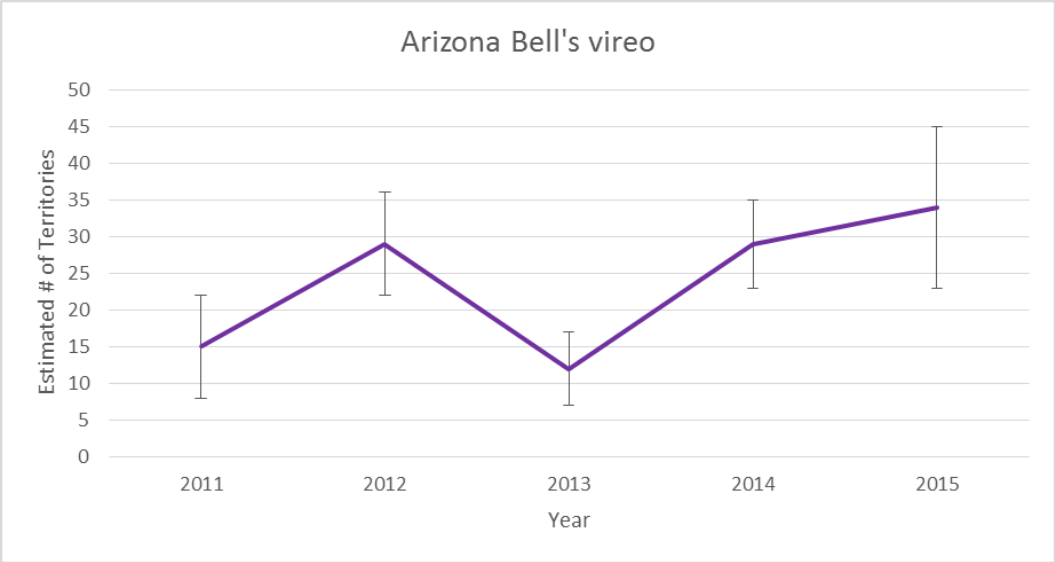

Figure 14.—Estimated number of territories (± SE) for Arizona Bell's vireos based on conservation area and CRIT 9 area search surveys in 2011–15.

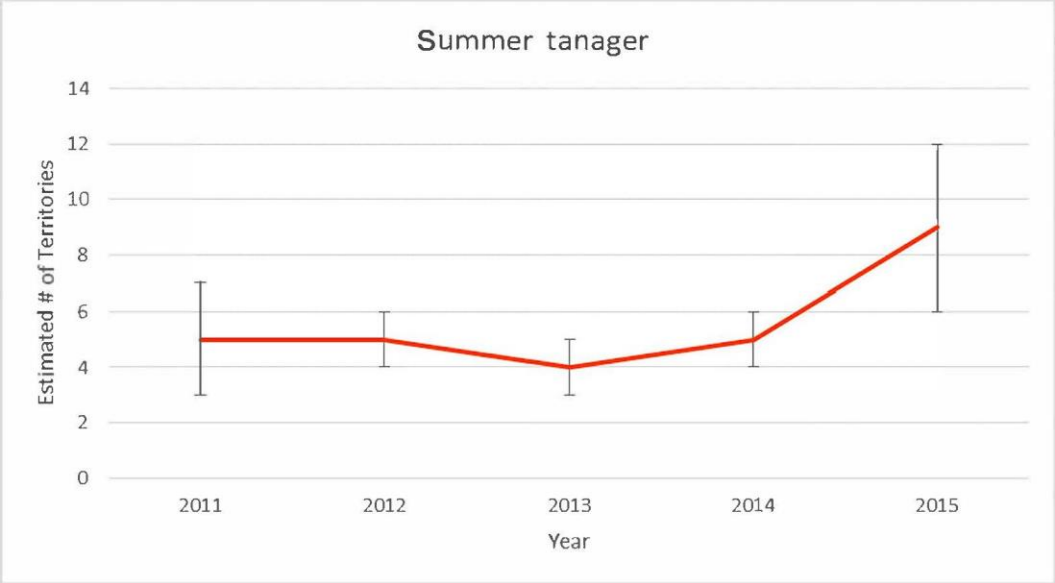

Figure 15.—Estimated number of territories (± SE) for summer tanagers based on conservation area and CRIT 9 area search surveys in 2011–15.

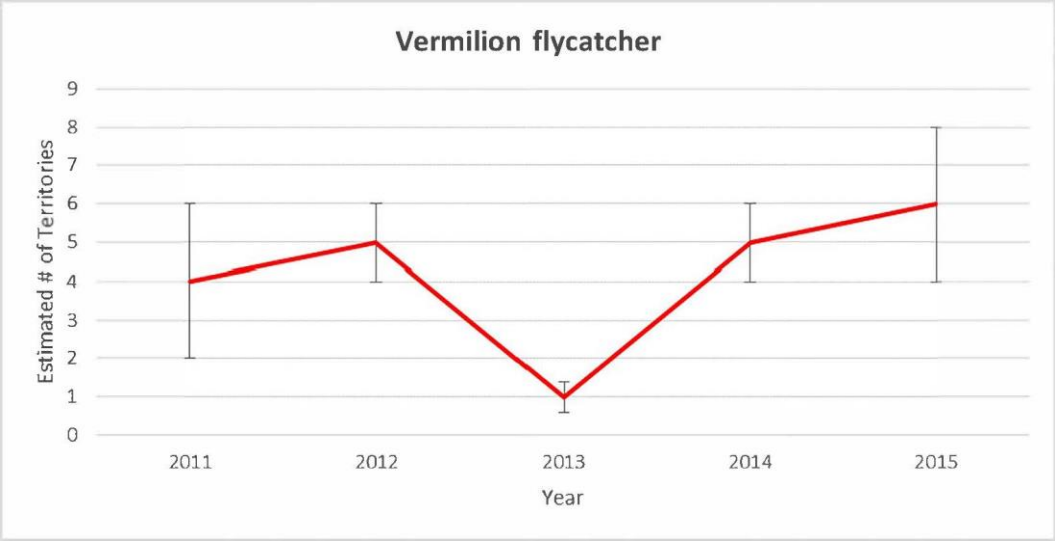

Figure 16.—Estimated number of territories (± SE) for vermilion flycatchers based on conservation area and CRIT 9 area search surveys in 2011–15.

Table 26.—Estimated number of territories (± SE) of the 10 most common riparian land birds based on conservation area and CRIT 9 searches completed in 2011–15

(Species are listed in alphabetical order. n/a indicates species that were not among the 10 most common riparian land birds in a given year.)

Species[1]	2011		2012		2013		2014		2015	
	Population size	SE	Population size	SE	Population size	SE	Population size	SE	Population size	SE
Abert's towhee	120	60	202	31	78	29	317	63	280	90
Anna's hummingbird	25	13	37	6	n/a	n/a	72	14	n/a	n/a
Black-chinned hummingbird	n/a	n/a	28	4	17	6	102	21	128	42
Black-tailed gnatcatcher	28	14	50	11	29	11	143	29	133	43
Blue grosbeak	89	44	137	21	46	17	228	46	306	98
Bullock's oriole	38	19	57	9	26	10	96	19	95	31
Common yellowthroat	87	43	124	20	90	34	265	55	257	87
Lucy's warbler	21	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Song sparrow	48	24	72	11	40	15	128	27	119	40
Verdin	22	11	43	8	28	11	305	62	218	70
Western kingbird	40	20	93	14	31	12	109	22	93	31
Yellow–breasted chat	n/a	n/a	n/a	n/a	26	10	n/a	n/a	96	32

[1] Scientific names of the species are listed in attachment 3.

Discussion

System-Wide Monitoring

In our system-wide bird monitoring of 2011–15, we collected data that allowed us to estimate breeding population sizes for territorial riparian land birds of the LCR, including the LCR MSCP covered focal species addressed in this study. Population size estimation provides the means toward eventual trend estimation in long-term monitoring projects, and DRs can be used to correct data from rapid area search survey counts using intensive area search survey counts that represent as close to a complete count of birds as feasible (Bart et al. 2010). Regardless of this data correction from DRs, sample size sufficiency for adequate precision and rarity of some of the LCR MSCP covered focal species is a concern. Uncertainty in the population estimate increases with the rarity of the species and the more likely it is that the species is poorly represented in the sample based on its occurrence in regions, habitat types, or seasons that received less survey effort than did others. Over the course of GBBO's involvement in the LCR MSCP riparian bird project (9 years), we refined the sampling plan progressively based on accumulated data from the project, optimizing distribution of the monitoring effort to better estimate LCR MSCP covered focal species populations while also ensuring adequate estimation of other territorial riparian land birds and habitat types that may be less suitable for LCR MSCP covered focal species. Including monitoring plots that are not classified as the most suitable cover type for LCR MSCP covered focal species is critical for precision of population estimates not only because their actual vegetation cover changes over time but also because they may contain highly suitable habitat patches for LCR MSCP covered focal species that are too small to change the plot classification. For example, several LCR MSCP covered focal species territories were documented in plots classified as other than tall woody based on the fact that small portions of these territories actually fell into that vegetation type.

In previous annual reports for this project (GBBO 2011–15), we documented in detail the regions and habitat types where we found LCR MSCP covered focal species and other riparian land birds. In summary, the regions that feature the greatest amount of structurally diverse riparian woodlands (especially tall woody) tended to have the highest concentrations of LCR MSCP covered focal species and the greatest species richness of other riparian land birds. These regions included: Region 7 (Bill Williams River), part of Region 6 (Havasu National Wildlife Refuge), and part of Region 5 (Lake Mohave). These regions contain forests with Goodding's willow (*Salix gooddingii*) as one of the dominant tree species that transitions into mesquite-dominated stands in the ecotone. We also note that the areas with the highest breeding concentrations of riparian land birds all contained lakes, rivers, or wetlands in the immediate vicinity of structurally complex riparian woodlands, and these areas were often seasonally inundated.

Region 11 (the Imperial National Wildlife Refuge) is also largely covered by a seasonally inundated forest, mostly dominated by saltcedar (*Tamarisk* spp.) with some small willow stands, which also support a fair diversity of species, albeit fewer LCR MSCP covered focal species. Areas dominated by agricultural lands, such as sections of Regions 5, 8, 10, and 12, tended to have low overall breeding bird abundances.

In 2015, an outlier in the population size estimates brought to our attention one potential problem in the random plot selection for the project. Because the stratification favors the tall woody and low woody habitat types as the most suitable for LCR MSCP covered focal species, some strata are poorly represented in the sample, which can potentially influence population size estimates. For example, horned larks (*Eremophila alpestris*) were calculated as 1 of the 10 most common breeding species system-wide in 2015, with population size estimates of roughly 5,000 pairs. The majority of these birds (n = 2,578) were estimated to be in Region 5's "unsuitable" habitat type. These numbers were a result of only a single plot being selected within this region's habitat stratum, where the surveyor recorded 4.5 horned lark territories. Because there were no additional plots in this region-habitat combination and because a large area is represented by this region and habitat combination, densities for horned larks were likely overestimated based on the single randomly selected plot. This is a risk with drawing strong conclusions from annual population size estimates. After combining multiple years for population size estimates (see tables 23 and 24), the horned lark was no longer 1 of the 10 most abundant species, and the SEs for population size estimates were improved.

As part of the analysis procedures from the original study plan, an overall DR that included all territorial riparian land birds was calculated annually for population size estimates. Some species' individual DRs may have deviated from this combined DR, and further research may be beneficial to address which species should be grouped together for combined DRs based on shared natural history, vocal qualities, and recommended survey techniques (attachment 4). For instance, warblers (Parulidae) can reasonably be grouped together based on their shared typical vocalization patterns, behaviors, and habitat use while in the project area.

While individual DRs were not calculated for annual population estimates, we calculated them for the whole project period for each of the LCR MSCP covered focal species when sufficient data were available and for the 10 most abundant territorial birds. We noted that the highest deviations from a DR of 1 tended to be for species with very large numbers on a single plot (a pattern we saw during the EI area search study and when comparing rapid to intensive area search surveys). This is likely a result of the difficulty in accurately delineating territories when 20 or more pairs of a given species are present on a plot. We predict that the best way to deal with this deviation would be through thorough surveyor training that emphasizes less conservative mapping on rapid area search surveys, which should

result in the improved territory estimates for the most abundant species. We also noted a fair amount of year-to-year variation for individual species' DRs. In part, this variation might be the effect of an intensive area search survey on a single plot strongly skewing the overall results. This year-to-year variation in DRs among individual species may be a result of the rarity of the species on the landscape and/or a low sample size for intensive area search surveys (see the "Suggestions for Monitoring" section below).

While the LCR MSCP understandably focuses on breeding populations of LCR MSCP covered focal species, it is important to recognize the substantive role of the LCR as a migration corridor and wintering area for many North American land birds that breed elsewhere. A large community of other species uses the project area year round, often outnumbering the breeding birds (GBBO 2011–15.

Conservation Area and CRIT 9 Monitoring

We found all LCR MSCP covered focal species of this monitoring project, except gilded flickers, occupying territories in at least one of the conservation areas or CRIT 9 during the 5-year project. So far, the BLCA has become one of the most successful conservation areas in terms of providing reliable breeding populations of three of the six LCR MSCP covered focal species, including Sonoran yellow warblers, summer tanagers, and Arizona Bell's vireos. Our area search surveys show Arizona Bell's vireo is rather uncommon elsewhere in Region 6, and the BLCA has become a hotspot for that species in this region. Similarly, the Arizona Bell's vireo has breeding populations at the Nature Trail and Crane Roost plantings in Cibola NWR Unit #1, and virtually no other territories were found in the plots between the Bill Williams River and Imperial Dam (although we did not survey Region 9, the area between Parker, Arizona, and Blythe, California). This success may be due to the fact that both conservation areas have the most developed shrub understory, consisting mainly of mesquite, arrowweed (*Pluchea sericea*), and *Baccharis* species. The structural complexity of vegetation has long been recognized as promoting bird species diversity in riparian woodlands (Sanders and Edge 1998), thus also increasing the chances of supporting the rarer LCR MSCP covered focal species. In addition, we also note that proximity to wetlands or other sources of surface water may be important to some species that nest in riparian woodlands, particularly Arizona Bell's vireos and Sonoran yellow warblers (GBBO 2010), and this variable may be important in attracting at least some of the LCR MSCP covered focal species to newly created conservation areas.

CRIT 9 supported the largest breeding population of vermilion flycatchers found on any area search surveys for this project, with up to 4.75 territories located within the planting area and additional territories in the adjacent park. This species differs from other LCR MSCP covered focal species in its habitat requirements in that it appears to prefer open park-like stands of mature riparian trees, often at woodland edges, and even low-intensity agricultural and

ornamental landscapes over the more typical setting of interior riparian forests preferred by other LCR MSCP covered focal species (Raulston 2013). We are not aware of previous efforts to quantitatively model vermilion flycatcher breeding habitat, and constructing a habitat model may help pinpoint how this species can best be integrated into habitat creation planning.

We found some variation in plot occupancy in all species from year to year in the conservation areas and CRIT 9. While this may be simply a result of natural population fluctuation, further research may shed light on the presence and effect size of local factors that would inform adaptive management. For instance, the role of availability of surface water near territories, irrigation regimes, species composition of conservation areas and CRIT 9, and their effects on territory occupancy may be examined. In some cases, key habitat features are already known for LCR MSCP covered focal species, such as the dependence of Gila woodpeckers and gilded flickers on the availability of large trees and snags that support cavities. Additional research and habitat modeling could possibly shed further light on habitat requirements of other species. Finally, this research could also be combined with a formal analysis of the LCR MSCP covered focal species responses to planting type and age, as these may begin to vary enough to learn more about colonization patterns and bird responses to habitat creation strategies.

Suggestions for Monitoring

Bird monitoring should be designed around specific monitoring objectives, and it can be classified broadly into surveillance (system-wide) and effectiveness (conservation area) monitoring (sensu Sutherland 2006, pp. 67 ff). The primary objective of surveillance is to detect trends in bird species populations based on region-wide random samples, and this approach applies to the system-wide monitoring of the LCR MSCP. Besides detecting regional trends, surveillance is critical for being able to detect shifts in distribution and habitat use as well as setting a baseline for “ambient” breeding population densities that can be expected in the project area. The baseline can thus not only be used for determining how bird populations change based on factors beyond the control of the LCR MSCP but also to provide the appropriate backdrop for any changes observed in the conservation areas or CRIT 9. For instance, if a species is regionally declining or experiencing a shift in distribution that is unrelated to project activities, it is crucial to take these changes into account when quantifying the success of conservation actions taken under the program.

A universal difficulty in designing a surveillance monitoring project is the challenge of balancing wide geographical coverage with the ability to collect reliable, bias-free data. For breeding populations, the basic metric used in population size estimates is the number of territories (or alternatively, the number of individuals that hold a breeding territory, which was not used in this project) (Bart et al. 2010). Rapid area search surveys provide large geographic coverage,

but they have the disadvantage of relative uncertainty of breeding status of individuals observed, which results in uncertainty in the number of territories. Intensive area search surveys involve lower sample sizes, but they have the advantage of improved certainty of territory abundance and distribution. The approach taken by the LCR MSCP combines rapid and intensive area search surveys to balance geographical coverage with the need for reliable data through estimating DR for territories missed, or overestimated, in the rapid area search surveys. This approach is powerful and, in our view, the most cost-effective way to achieve system-wide monitoring objectives, but further refinements could be considered to optimize the monitoring plan (see suggestions below).

Effectiveness monitoring has the objective of determining net effects of local conservation actions, which is applicable to the conservation area and CRIT 9 monitoring of this project. To conduct effectiveness monitoring for the conservation areas and CRIT 9, the targeted species are surveyed with the goal of determining trends within the areas of conservation action. To determine the effect size of bird responses and whether these effects are related to conservation actions, this monitoring needs to be coupled with monitoring of control areas and/or set against the background of regional (system-wide) monitoring. For this reason, the same monitoring methods are used for the conservation areas and CRIT 9 as for system-wide monitoring in this project. Other projects have also found it useful to identify a so-called reference area for conservation action, which is an intact relic landscape that represents most of the species and habitat qualities desired to be achieved by the project's conservation actions (Rey Benayas et al. 2009). In the case of the LCR MSCP, the Bill Williams River may provide such reference qualities, but other areas could also be added as reference sites representing a slightly different setting that may be favored by other LCR MSCP covered focal species that are not found at the Bill Williams River (e.g., vermilion flycatchers).

The suggestions based on the findings of component 1 of the project cover future monitoring for system-wide and conservation area populations of LCR MSCP covered focal species and other riparian land birds.

Habitat Type Classifications of System-Wide Plots

The system-wide monitoring plan stratifies the plot grid by habitat stratum. All such stratifications are done solely to optimize survey coverage for the targeted species rather than to learn about bird-habitat associations. We feel that this has led to some confusion in the past partly based on unclear language used in the original stratification. For instance, one of the habitat strata is called "unsuitable," which implies that the plot classified this way is unlikely to have LCR MSCP covered focal or other riparian land bird species. Yet, many plots classified as unsuitable have riparian obligate and even LCR MSCP covered focal species because, under the stratification scheme, a small portion of a plot may have highly suitable habitat for these species but is still called "unsuitable" based

on the rules for plot classification. While these plots usually do have some breeding birds typical of open grassland, agriculture, or degraded uplands, such as horned larks, western meadowlarks (*Sturnella neglecta*), or American kestrels (*Falco sparverius*), most of the survey effort may be better spent in appropriate habitat for the LCR MSCP covered focal species and riparian breeding birds. To address this, one may explore the possibility of reclassifying those plots that have some minimum cover (e.g., > 10%) of other habitat types into a new stratum and/or removing those plots that completely fall into the "unsuitable" stratum from the sampling area. In these cases, it would be necessary to recalculate population size estimates from previous years in order to make the data comparable going forward.

To avoid the confusion in language, we first suggest exploring the option of creating an "observed habitat type" attribute in the database, which will allow the surveyor to field-truth the habitat types present in a plot at the time of the area search survey. If system-wide data need to be reported by habitat type, this field would narrow down the possibilities for confusion, such as the above example of LCR MSCP covered focal species occurring in "unsuitable" plots. The attribute can allow for a variety of prescribed data recording options, such as recording the four cover types to the nearest 25% based on visual estimates. We further suggest simply renaming the "unsuitable" habitat class to something less value laden (e.g., "other," "uplands," or "non-riparian"). However, any system-wide population size estimates need to be done according to the original classification of each plot to allow for consistency in population estimates, at least until the entire project area is restratified according to new spatial data. The "observed habitat type" field would solely serve the purpose of reporting the data in a way that allows the reader to intuitively understand population data in the context of habitat type.

Secondly, the issue of mixed habitat types or recent habitat conversion in plots also creates a problem for annual population size estimates. Several plots classified as "tall woody" were recently converted to agriculture in Region 12, affecting what we consider a sizeable portion of the "tall woody" sample each year. While this issue should not inherently affect long-term trend estimation (Bart et al. 2010), it adds to the number of outliers in the dataset that lead to greater uncertainty of population size estimates. As discussed earlier, several "unsuitable" plots that have a small portion of suitable habitat for LCR MSCP covered focal species may significantly inflate system-wide annual population estimates for these species. Conversely, "tall woody" plots that have recently been converted to agriculture may deflate population size estimates for these species while inflating population estimates for species associated with agriculture, such as horned larks. Outliers tend to "wash out" with very large sample size, such as those of the national Breeding Bird Survey, which consists of at least tens of thousands of survey points each year. However, in an annual sample of 80 plots for a relatively diverse region like the LCR, outliers can significantly affect population estimates.

Several options exist for evaluating outliers to avoid misinterpreting results with respect to monitoring and management objectives. First, the data should be statistically screened for outliers, and these should be reviewed on a case-by-case basis to determine if they result from errors in data entry, data management, or statistical analysis. Outliers can occur for several other reasons, including the above-mentioned habitat conversions or misclassifications that can greatly inflate population estimates, mismeasurement of the metric (which does not apply to the data collected so far), and actual clustering of birds on the landscape that is not explained by the habitat strata. The latter would be an important new fact of potential interest to management. Second, the chances of creating outliers as a result of sampling design can be addressed prior to data collection through the refinements discussed below. For instance, vegetation types can be reclassified based on current information, such as vegetation layers that are revised on a regular basis, and thus reflect recent habitat conversions. To reclassify the habitat type within the plots layer, we suggest a basic method in ArcGIS, where the new vegetation layer is overlaid with the plots layer. A spatial join can then be used so that the attributes from the new vegetation layer are added to the plots layer's attribute table. Performing a spatial join allows for the option of keeping all original information in the attribute table for the plots layer while adding new information from each new vegetation layer.

"Herbaceous" Habitat Classification

Based on our field observations, the majority of system-wide plots classified as "herbaceous" consist predominantly of cattail (*Typha* spp.) or bulrush (*Scirpus* spp.) marshes on the LCR. A small set of system-wide plots was dedicated to this habitat type each year, and these tended to be very difficult plots to survey because they usually involved the use of kayaks and often contained some sections that were impossible to access. The majority of species recorded on these plots are aquatic (rails [Rallidae], American coots [*Fulica Americana*], etc.) or wetland vegetation breeders (marsh wrens, red-winged blackbirds, etc.). Reclamation already conducts marsh bird surveys that document the presence and abundance of secretive marsh birds, and few LCR MSCP covered focal species in the riparian bird project or other riparian woodland species actually use marshes as part of their territory. Since marsh is a "stand alone" habitat type with unique properties, it may receive a habitat classification of its own, and sampling it for the riparian bird project can be reduced or eliminated to allow for better coverage in habitat types that are more appropriate for the LCR MSCP covered focal species.

Repeatedly Selected Plots

Some system-wide plots are randomly selected repeatedly year after year because few plots are available in some region-habitat combinations. As a result, we suspect that we repeatedly survey territories of the same birds, due to site

fidelity, at least in some portions of these repeat plots. This can be addressed by examining the data from repeat plots for similarity in species detections, territory locations, and territory boundaries. If this data review supports the notion that at least a portion of the territories belong to the same individuals in multiple years, this may be addressed by revising the sampling plan by purposely designating several of these plots as permanent monitoring plots that are surveyed every year and using randomly selected plots elsewhere in the study area in a panel design for long-term monitoring.

Other Considerations in Future System-Wide Monitoring

Monitoring Plan

The current sampling plan for system-wide monitoring was a result of power analyses that used data collected elsewhere and with different methods, and we believe that the sampling plan can be validated or improved by conducting a new power analysis using local data from this study and others. Data simulations could look at the following scenarios to see if they may improve population estimates:

- Increasing the number of plots in which rapid area search surveys are conducted while decreasing the number of visits and/or number of plots in which intensive area search surveys are conducted

- Changing the number of visits for intensive area search surveys

- Using multi-year monitoring intervals rather than annual population size estimates using the same annual system-wide coverage (i.e., rotating survey effort annually among regions to combine them into multi-year datasets or conducting thorough "sweeps" of the river every few years interspersed with years of reduced survey coverage)

- Surveying some plots permanently and using randomly selected system-wide plots in a panel design

An alternate approach for estimating population sizes that may be informative is predictive modeling. This approach has been successfully used to predict the presence of rare species based on habitat suitability (Dettmers and Bart 1999; Conkin and Alisauskas 2013), and it also has been used to predict relative abundance (Thogmartin et al. 2007) and regional population size of rare species (Mathewson et al. 2012). In the case of this project, reliable and current spatial vegetation data that are updated regularly would be ideal for exploring the use of this tool for population size estimation based on habitat modeling. Predictive habitat models would have to be created that are spatially explicit for each of the species of interest, using variables that can be mapped. This would take some upfront modeling effort, but it would provide an alternative to extrapolating

directly from survey data, and it may produce more precise estimates. For instance, if a LCR MSCP covered focal species is reliably found at some density in one or a few mappable cover types (combined with other spatial data that appropriately describe habitat suitability, such as patch size, patch connectivity, or distance to surface water), a population size estimate can be derived from predicted abundances that are based on empirically measured densities during the system-wide area search surveys. This can be mapped without regard to plot boundaries and plot classifications. It is unknown how much it would improve the certainty of population estimates. It may remove all or most of the above-mentioned complications in estimating population sizes directly from survey data, which is done currently without regard to environmental variables other than broad habitat classes.

Increasing Precision of Population and Trend Estimates

We suggest refining the sampling plan and data analysis by (1) reducing the possibility of outliers based on habitat restratification of sampling plots and (2) by combining multiple years of surveys for population size estimates.

Low sample sizes in some strata can create biased population estimates. Restratification measures may reduce the chances of having outliers in both population estimates and DRs based on habitat factors, but even in the absence of outlier plots, the annual survey effort may not be sufficient for producing population size estimates with low precision. One of the most common causes of imprecise estimates is encountering birds in very few plots in variable environments. Using multi-year blocks of surveys for a combined population estimate should improve precision. In addition, several species, including some LCR MSCP covered focal species, will likely have a significant number of plots with zero detections, and future data analyses could include statistical procedures that take into account datasets with a large proportion of zeros.

Variation in population size and DRs estimated from year to year can also be simply a reflection of random plot selection, and despite stratification of survey effort, the overall sample size still allows for underrepresented region-habitat combinations in a given year. We therefore suggest exploring the approaches of formally stratifying by region (and as before, habitat) and using LCR MSCP data to conduct power analyses for determining the optimal number of plots for rapid and intensive area search surveys to meet monitoring objectives and for investigating how increasing rapid counts and/or combining multiple years of data may influence the precision of population size estimates.

Detection Ratios

The current methods of applying DRs entail using all riparian territorial land birds (excluding non-territorial species and non-breeders) to calculate an overall DR

for the project. We have also calculated individual DRs for each LCR MSCP covered focal species and the most common riparian land birds (see tables 18 and 19). When calculated by species, we observed large variation in DRs among species, and we attribute these to both cryptic behaviors in some species (leading to uncertainty of breeding status) and small sample sizes for some species (leading to the relative inability to calculate a reliable DR if the species was absent on a portion of the plots during intensive area search surveys).

DR calculations could be examined for whether the removal of any species or grouping species would improve DRs for better population size estimation. Species with similar detectability, based on similar natural history, might be combined for a grouped DR (Bart 2008, personal communication) to allow calculation of DRs for species that are too rare by themselves to provide enough data. If this method is used, species groups should be selected carefully for appropriate assemblages with similar detectability (the natural history findings for LCR MSCP covered focal species from this project may prove useful for this) (attachment 4).

DR accuracy can be influenced by a variety of factors, including secretive behaviors of birds, obstruction by vegetation, density of birds, and surveyor ability. For instance, we found that DRs tended to improve with increasing intensity in training and increased knowledge by the survey crew about the local populations. We also used mostly the same survey crew for the past 3 years of the project, which likely contributed to the improved detection rates. We wonder, thus, how frequently it is necessary to calculate DRs under these circumstances and whether it would be feasible to determine an “average” DR for typical survey settings that can be used until sufficient data are collected to set a DR with reasonable precision.

Conservation Area Monitoring

The monitoring of conservation areas and CRIT 9 was designed based on the system-wide survey plan in order to allow comparisons of conservation areas with regional data provided from the system-wide monitoring of the LCR MSCP planning area. Therefore, all issues and potential solutions discussed for system-wide monitoring (see above) apply also to conservation area and CRIT 9 monitoring. DRs at conservation areas and CRIT 9 were more variable because of the small sample size and lower densities of species in some years/planting ages, yielding a big effect on the DR from a small difference between rapid and intensive area search survey counts. Conservation area and CRIT 9 monitoring differs from system-wide monitoring in that intensive area search surveys were only conducted on four plots (compared to eight), which led to larger variations in DRs calculated from these plots for several species.

If more precise DRs are required, they might be improved by combining some intensive area search surveys done for system-wide area search surveys with those

done on conservation areas (see also comments above on DRs in general) and CRIT 9. For instance, if predictive mapping is utilized, it might identify system-wide areas that are similar in vegetation to particular conservation areas and CRIT 9, and identify plots in these areas that could also be used with plots from conservation areas to calculate DRs.

We found that species may take 4 to 8 years to establish a breeding population in a conservation area and CRIT 9, and much is still left to be discovered about what happens to site suitability after that. As is typical for colonizing populations (Wiens 1989), some species' occupancy of conservation areas and CRIT 9 is still tenuous, and it is unknown how these populations fare as plantings mature.

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

INTRODUCTION

Component 2 was added to the LCR MSCP riparian bird project in 2011. It entailed a 1-year pre-development inventory of the future Laguna Division Conservation Area (LDCA). We reported the results in detail in GBBO (2012), and we summarize them here.

The existing area before construction of the LDCA encompassed over 1,000 acres of land with marsh, low woody, tall woody, and open sand habitat types that were comprised primarily of saltcedar, arrowweed, and degraded marsh. In 2011, we used the same survey techniques (rapid and intensive area search surveys) as described in component 1 to provide a baseline inventory of the future conservation area that can be compared to inventories after development to evaluate bird responses to habitat creation activities.

Methods

We randomly selected 35 plots from the system-wide plot grid area of the LDCA for rapid area search surveys, and 4 plots for intensive area search surveys, to be completed in 2011. We did not use DRs for correcting population estimates because the estimate for this area had low precision, and the LCR MSCP subsequently decided to use only rapid area search survey results for pre-development monitoring. All survey methods used for this component were the same as described for component 1.

The associated standard error for the combined habitat strata and/or combined regions is not equal to the sum of individual habitat stratum or individual region estimates because the sampling plots are not all the same size. Habitat stratum and region estimates are based on density, or the total number of territories divided by the total area of sampled plots. Because plot area varies, the population total over habitat strata and regions must be calculated by summing the total birds and plot area over habitat strata and regions, calculating territories per unit area from these sums, and then multiplying that by the total area over all habitat strata and regions.

Results and Discussion

We detected 114 species on all area search surveys conducted in the LDCA. Of these, 33 were classified as territorial breeders (table 27). The only LCR MSCP covered focal species recorded as a breeder at the LDCA was the Arizona Bell's vireo (table 27). Gila woodpeckers and yellow warblers were recorded using the plots, but we found no evidence of breeding for these species.

We found several riparian obligate species breeding along the small marshes throughout the area and in the extensive marsh complex on the eastern edge. In areas with decadent Goodding's willow, honey mesquite (*Prosopis glandulosa*), and saltcedar, we found cavity-nesting birds such as ladder-backed woodpeckers, Lucy's warblers, and ash-throated flycatchers, all of which were classified as breeders. These native riparian habitat patches appear important in sustaining several of the riparian species we detected.

In table 27, we report the recalculated population size estimates for 33 breeding species. These estimates are based solely on rapid area search results, without adjustment by DRs.

Attachment 3 lists all avian species detected in components 1, 2, 3, and 5 of this project, which includes flyovers and incidental observations.

Table 27.—Population size estimates (± SE) based on pre-development rapid area search surveys of the LDCA in 2011

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are not included.)

Species (n = 33)[1]	Habitat	Population size	± SE
Abert's towhee	Low woody	91.0	8.4
	Unsuitable	3.0	2.1
	Total	94.0	8.6
American coot	Low woody	11.2	3.1
	Unsuitable	0.0	0.0
	Total	11.2	3.1
Anna's hummingbird	Low woody	9.6	2.1
	Unsuitable	0.0	0.0
	Total	9.6	2.1
Ash-throated flycatcher	Low woody	29.1	3.9
	Unsuitable	2.5	0.9
	Total	31.6	4.0
Arizona Bell's vireo	**Low woody**	**0.4**	**0.2**
	Unsuitable	**0.0**	**0.0**
	Total	**0.4**	**0.2**
Bewick's wren	Low woody	3.2	1.4
	Unsuitable	0.0	0.0
	Total	3.2	1.4
Black-chinned hummingbird	Low woody	10.4	3.0
	Unsuitable	0.0	0.0
	Total	10.4	3.0
Black-necked stilt	Low woody	1.6	1.0
	Unsuitable	0.0	0.0
	Total	1.6	1.0
Black phoebe	Low woody	1.2	0.7
	Unsuitable	0.0	0.0
	Total	1.2	0.7
California black rail	Low woody	0.4	0.2
	Unsuitable	0.0	0.0
	Total	0.4	0.2
Black-tailed gnatcatcher	Low woody	114.2	7.9
	Unsuitable	5.0	0.7
	Total	119.2	7.9

Table 27.—Population size estimates (± SE) based on pre-development rapid area search surveys of the LDCA in 2011

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are not included.)

Species (n = 33)[1]	Habitat	Population size	± SE
Blue grosbeak	Low woody	21.2	3.0
	Unsuitable	5.0	2.5
	Total	26.2	3.9
Bullock's oriole	Low woody	0.8	0.3
	Unsuitable	0.0	0.0
	Total	0.8	0.3
Common ground-dove	Low woody	1.6	1.0
	Unsuitable	0.0	0.0
	Total	1.6	1.0
Common yellowthroat	Low woody	95.0	16.1
	Unsuitable	0	0.0
	Total	95.0	16.2
Crissal thrasher	Low woody	22.4	2.6
	Unsuitable	1.0	0.7
	Total	23.4	2.7
Green heron	Low woody	0.8	0.5
	Unsuitable	0.0	0.0
	Total	0.8	0.5
Indigo bunting	Low woody	2.8	1.3
	Unsuitable	0.0	0.0
	Total	2.8	1.3
Killdeer	Low woody	2.4	1.1
	Unsuitable	0.0	0.0
	Total	2.4	1.1
Ladder-backed woodpecker	Low woody	14.5	2.0
	Unsuitable	0.0	0.0
	Total	14.5	2.0
Lesser nighthawk	Low woody	80.7	8.0
	Unsuitable	5.5	0.4
	Total	86.2	8.0
Loggerhead shrike	Low woody	0.8	0.5
	Unsuitable	0.0	0.0
	Total	0.8	0.5

Table 27.—Population size estimates (± SE) based on pre-development rapid area search surveys of the LDCA in 2011

(Species are listed in alphabetical order. LCR MSCP covered focal species for this project are bolded. Non-territorial species are not included.)

Species (n = 33)[1]	Habitat	Population size	± SE
Lucy's warbler	Low woody	22.0	5.2
	Unsuitable	0.0	0.0
	Total	22.0	5.2
Marsh wren	Low woody	36.3	10.9
	Unsuitable	0.0	0.0
	Total	36.3	10.9
Phainopepla	Low woody	1.6	1.0
	Unsuitable	0.0	0.0
	Total	1.6	1.0
Pied-billed grebe	Low woody	4.0	2.0
	Unsuitable	0.0	0.0
	Total	4.0	2.0
Yuma clapper rail	Low woody	1.6	1.0
	Unsuitable	0.0	0.0
	Total	1.6	1.0
Say's phoebe	Low woody	1.6	1.0
	Unsuitable	0.0	0.0
	Total	1.6	1.0
Song sparrow	Low woody	37.9	11.6
	Unsuitable	0.0	0.0
	Total	37.9	11.6
Verdin	Low woody	88.6	9.3
	Unsuitable	4.0	1.4
	Total	92.6	9.4
Virginia rail	Low woody	3.2	1.4
	Unsuitable	0.0	0.0
	Total	3.2	1.4
Western kingbird	Low woody	1.6	1.0
	Unsuitable	0.0	0.0
	Total	1.6	1.0
Yellow-breasted chat	Low woody	46.7	9.6
	Unsuitable	0.0	0.0
	Total	46.7	9.6

[1] Scientific names of the species are listed in attachment 3.

Component 3: Testing the Assumptions of the Double Sampling Method

INTRODUCTION

The double sampling method developed for the LCR MSCP riparian bird project (Bart et al. 2010; GBBO 2011) was based on three important assumptions:

- Random selection of plots for intensive area search surveys from the total selection of random plots
- Uniformity in the implementation of rapid and intensive area search surveys
- Unbiased estimates of bird numbers during intensive area search surveys

The first two assumptions, random and uniform sampling, are met through the protocol, so the goal of component 3 was, therefore, to test the third assumption that unbiased estimates of bird numbers are obtained during intensive area search surveys. Factors that could bias these estimates or differentially affect detection probability during intensive area search surveys include secretive species that are difficult to detect, density of vegetation, and density of birds (see also Farnsworth et al. 2005).

In order to quantify if, and how many, birds are missed during standard intensive area search surveys, we performed a third, even more intensive survey effort on a subset of plots.

Methods

From 2011 to 2013, we selected a subset of plots that would be surveyed with three different types of area search surveys each year (attachment 1): (1) the standard rapid area search survey used for system-wide area search surveys, (2) the standard intensive area search survey used for system-wide area search surveys, and (3) an EI area search survey. The subset of plots was randomly chosen from areas of the study area that were known to contain high numbers of LCR MSCP covered focal species based on aerial imagery, previous data, and expert knowledge. The EI area search surveys involved 16 visits compared with 8 visits for standard intensive area surveys and 2 visits for rapid area search surveys. This allowed significantly more time to devote to delineating territories and detecting less conspicuous individuals than is possible during the standard intensive area search surveys. For each EI plot, we conducted the area search

surveys with three independent surveyors each using a different intensity, with stringent controls established to ensure that no communication occurred among surveyors regarding their findings during the field season. Further details on the methods of component 3 can be reviewed in GBBO (2012, 2013, 2014a).

Results and Discussion

We found that standard intensive area search surveys detected 84% of all territories of territorial species detected during EI area search surveys. The difference in territory detections was largely contributed by a few species, such as black-chinned hummingbirds, ash-throated flycatchers, and black-tailed gnatcatchers, rather than being random across species. The species that were most often under- or overestimated by standard intensive area search surveys were those that either breed early, arrive late, have cryptic behaviors, or have poorly defined territories. The ideal scenario for any type of breeding land bird monitoring that relies on visual and auditory cues is a species that displays territorial behaviors, including singing and counter-singing on every visit to the plot. Species with cryptic behaviors or poorly defined territories, or species whose breeding season differs from most other land birds, are more likely to be missed on any given visit, and thus their classification as a breeder or non-breeder, which relies on multiple observations of territorial behaviors, be may be affected.

For the LCR MSCP covered focal species, the results of this study varied. Intensive (42.25), EI (44), and rapid (44.25) area search surveys estimated very similar numbers of Arizona Bell's vireo territories. This species is relatively easy to detect and map because breeding pairs almost continuously vocalize throughout the breeding season and often sing from the same perch day after day. For Gila woodpeckers, intensive (11.5) area search surveys slightly underestimated the number of territories compared with the other methods, but surveyors during rapid (16.25) and EI (16) area search surveys obtained similar numbers. The reasons why rapid area search surveys were more effective in delineating territories than intensive area search surveys are unknown.

For Sonoran yellow warblers, rapid (135.5) area search surveys overestimated and intensive (97.75) area search surveys underestimated the number of territories compared to EI (109.75) area search surveys. One factor that may have caused high estimates on rapid area search surveys is that breeding Sonoran yellow warblers arrive in late March, while migrant populations usually arrive after mid-April, and detection of singing migrants may thus inflate territory estimates on rapid area search surveys, as such territorial behaviors can occur during migration stopovers in this species. One factor that may cause underestimation from intensive area search surveys are very high densities of territories coupled with small territory sizes, which can lead to problems in territory delineation in

high-density sites. Furthermore, Sonoran yellow warblers are often quiet on breezy days and may, therefore, not be detected on every visit, which can affect their classification as breeders.

Finally, summer tanager territory numbers were underestimated in both rapid (10.75) and intensive (15.5) area search surveys compared to EI (22.5) area search surveys. This species is particularly difficult to survey because of their late arrival from migration to the study area, which causes many of them to be absent during the first visit of a rapid area search survey. Also, males only sing for a brief period prior to nesting, usually before dawn, and females become cryptic and rarely observed when they have a nest. Summer tanager counter-singing is also fairly rare, which makes delineation of territory boundaries difficult for the surveyor.

The plots selected for this component were among the most challenging plots of the study area, and they are not representative of most of the LCR MSCP project area. This was done in order to increase coverage for LCR MSCP covered focal species, which tend to occur in their highest concentrations in plots that are very difficult to survey, such as areas with dense vegetation and a high species diversity and abundance of riparian land birds. Therefore, we also attributed many of the discrepancies between the intensive area search survey and EI area search surveys to the inherent logistical difficulties of surveying very difficult plots. For hard-to-survey plots (dense vegetation and high species diversity and abundance), we found that overall 17% fewer territories were reported on intensive area search surveys compared with EI area search surveys; this difference for moderately difficult (dense vegetation or high species diversity and abundance) and easy plots (sparse vegetation and low species diversity and abundance) was 15%. Most of the system-wide plots are in the easy or moderately difficult habitat categories, which were only moderately sampled in the EI component, and thus, the EI study probably measured the worst-case scenario for monitoring today's bird populations of the LCR.

Our findings confirmed that the basic approach of the double sampling method produced the desired monitoring data, and it resulted in additional indepth information about birds and their natural history on the LCR that was previously unavailable, including a better understanding of the arrival and departure times for migrants, differences in habitat use in migrants versus breeding birds, second clutches, and renesting attempts, as well as a better understanding of territory sizes and partial territories. The natural history information gathered about the LCR MSCP covered focal species and common riparian breeding species, reported in a separate document, will help future surveyors produce the best results possible.

Further analysis of the EI area search survey data may clarify how many visits and during which time period it took to arrive at the final territory numbers for

species such as Sonoran yellow warblers, Gila woodpeckers, and summer tanagers. For instance, a slight increase in the number of visits and/or a slight shift in survey season may better capture breeding related behaviors in some of these species.

Another option for refining monitoring effectiveness could be to identify the most difficult-to-survey species and exclude them from the survey. Removing them from the detectability analyses would likely also improve detectability estimates for groups in which they were included previously. If LCR MSCP covered focal species fall into this category, the option of separating them out completely from the multi-species monitoring program, as is currently done for other LCR MSCP covered species such as yellow-billed cuckoos (*Coccyzus americanus*), is also an option.

We also emphasize that the population size estimates (estimated number of total territories in the study area) hinge on the definitions for classifying detected birds as breeders. This is done by a set of rules for detecting possible (or better) breeding evidence for a set number of consecutive visits. These rules may be re-examined to determine whether (1) they are sufficient and appropriate across all species and (2) whether they need to be parsed out by species, at least for the LCR MSCP covered focal species. For instance, one informative review of the data collected would be to determine whether hard-to-detect breeders, such as summer tanagers, were in fact detected during rapid area search surveys, but then did not enter the population size estimate because there was insufficient evidence of breeding based on the breeder classification rules. If a species like this went undetected altogether in rapid area search surveys as opposed to being detected but not counted as a breeder, these outcomes would have very different implications. We have not revised the rules for classifying breeders throughout the 5-year project in order to retain consistency of survey methods throughout the project. The natural history of LCR MSCP covered focal species should be consulted when reviewing the classification rules for breeders.

The only way to *truly* know how many birds are nesting on a plot would be through a full nest study and/or a fully color-banded population, either of which is even more intensive in survey effort than the EI area search surveys used in this study. Even in a nest study, a small amount of uncertainty remains because nests that were attempted and quickly abandoned or depredated, which may go undetected even with the most intensive of all methods. The challenge in refining the monitoring methods for a large project area such as the LCR is to find the most optimized middle-ground option for monitoring the birds we are most interested in for the goals of the program.

Attachment 3 lists all avian species detected in components 1, 2, 3, and 5 of this project, which includes flyovers and incidental observations.

Component 4: Habitat Surveys

INTRODUCTION

The goal of component 4 was to perform a detailed habitat assessment for four LCR MSCP covered focal species: the Gila woodpecker, Arizona Bell's vireo, Sonoran yellow warbler, and the summer tanager. For each species, this assessment was conducted at randomly selected vegetation plots within confirmed territories and in paired vegetation plots where the species was not recorded that year. The assessment was comprised of a wide range of measured variables that describe vegetation structure, plant species composition, and abiotic factors.

The vegetation monitoring methods followed the general vegetation monitoring protocol for the LCR MSCP developed by Reclamation, which we were asked to implement as is, including subsequent changes. Using this protocol has the advantage that the collected data are directly comparable to other vegetation assessments of the LCR MSCP, but we recommend that caution be applied when attempting to use the data to model habitat use of LCR MSCP covered bird species for which the protocol was not designed. This can be done, but the variables for constructing models need to be carefully selected to ensure that they address the appropriate scale and environmental gradient to which birds are likely to respond in their habitat use. Given these considerations, we are reporting the methods used for the habitat assessments for these four LCR MSCP covered focal species rather than reporting results or conducting any analyses.

Methods

In the autumn of 2011–14, we conducted vegetation assessments at 10 randomly selected territories for each of the 4 LCR MSCP covered focal species ("use vegetation plots") and at 10 paired locations where the species were not documented to occur ("non-use vegetation plots") each year. These non-use locations were randomly selected from bird plots where a given species were not recorded during bird surveys and therefore presumed to be absent that year. To assess abiotic factors, including temperature and relative humidity, we deployed environmental data logger units (HOBO) within territories in 6 of the 10 use sites and in 6 of the 10 non-use sites for each of the 4 species each year. For a thorough description on how vegetation plots and HOBO locations were selected, see GBBO (2015).

Data collection methods followed detailed survey protocols provided by Reclamation, with data collected on a large array of habitat characteristics (GBBO 2014a, 2014b; Parametrix, Inc., and GeoSystems Analysis, Inc. 2015).

The vegetation protocol was still in the process of being developed throughout much of this 2011–15 project, and in some years missing details in the protocol or training process prevented full consistency among surveyors, years, and different contractors.

Vegetation Plots Selected in 2011–2015

We surveyed 436 vegetation plots throughout the 4 years of data collection, including 274 use and 162 non-use vegetation plots (some of the non-use vegetation plots were paired with more than one species). Tables 28–31 list the regions and habitat types for all surveyed vegetation plots. We surveyed 40 use and 42 non-use vegetation plots for Arizona Bell's vireos among 8 regions and 6 habitat types (table 28) and 123 use and 40 non-use vegetation plots for Gila woodpeckers among 6 regions and 4 habitat types (table 29). We surveyed 69 use and 40 non-use vegetation plots for summer tanagers among 5 regions and 5 habitat types (table 30) and 42 use and 40 non-use vegetation plots for Sonoran yellow warblers among 9 regions and 5 habitat types (table 31). For use sites, one vegetation plot was surveyed for every acre of a territory. Gila woodpeckers and summer tanagers have larger territory sizes than Arizona Bell's vireos and Sonoran yellow warblers; therefore, a larger number of use vegetation plots were surveyed for these two species.

Table 28.—Number of vegetation plots surveyed from 2011 to 2014 by region and habitat type for Arizona Bell's vireos at use and non-use sites

(Habitat codes: CW = cottonwood-willow, H = herbaceous, LW = low woody, TW = tall woody, and U = unsuitable.)

	Region 2	Region 5	Region 6	Region 7	Region 8	Region 9	Region 10	Region 11	Total
Non-use	**1**	**2**	**12**	**22**	**1**	**1**	**0**	**3**	**42**
CW	0	0	0	0	1	1	0	0	2
H	0	0	3	0	0	0	0	0	3
LW	0	2	3	3	0	0	0	1	9
TW	0	0	4	17	0	0	0	0	21
U	1	0	2	2	0	0	0	2	7
Use	**1**	**2**	**8**	**25**	**0**	**1**	**1**	**2**	**40**
Mixed	0	0	0	0	0	0	1	0	1
H	0	0	2	0	0	0	0	0	2
LW	0	0	1	9	0	0	0	2	12
TW	0	2	0	15	0	0	0	0	17
U	1	0	5	1	0	1	0	0	8
Total	**2**	**4**	**20**	**47**	**1**	**2**	**1**	**5**	**82**

Table 29.—Number of vegetation plots surveyed from 2011 to 2014 by region and habitat type for Gila woodpeckers at use and non-use sites
(Habitat codes: H = herbaceous, LW = low woody, TW = tall woody, and U = unsuitable.)

	Region 6	Region 7	Region 8	Region 10	Region 11	Region 12	Total
Non-use	**25**	**2**	**1**	**2**	**3**	**7**	**40**
H	4	0	0	0	0	0	4
LW	11	0	0	1	3	4	19
TW	6	1	0	0	0	3	10
U	4	1	1	1	0	0	7
Use	**2**	**89**	**2**	**3**	**6**	**21**	**123**
H	1	0	0	0	0	1	2
LW	1	28	2	3	6	5	45
TW	0	56	0	0	0	15	71
U	0	5	0	0	0	0	5
Total	**27**	**91**	**3**	**5**	**9**	**28**	**163**

Table 30.—Number of vegetation plots surveyed from 2011 to 2014 by region and habitat type for summer tanagers at use and non-use sites
(Habitat codes: CW = cottonwood-willow, H = herbaceous, LW = low woody, TW = tall woody, and U = unsuitable.)

	Region 6	Region 7	Region 8	Region 9	Region 10	Total
Non-use	**13**	**19**	**2**	**4**	**2**	**40**
CW	0	0	1	1	0	2
H	1	0	0	0	0	1
LW	6	6	0	0	1	13
TW	3	8	0	0	0	11
U	3	5	1	3	1	13
Use	**6**	**46**	**4**	**12**	**1**	**69**
LW	5	10	0	0	0	15
TW	0	35	0	0	0	35
U	1	1	4	12	1	19
Total	**19**	**65**	**6**	**16**	**3**	**109**

Table 31.—Number of vegetation plots surveyed from 2011 to 2014 by region and habitat type for Sonoran yellow warblers at use and non-use sites
(Habitat codes: H = herbaceous, LW = low woody, TW = tall woody, and U = unsuitable.)

	Region 2	Region 5	Region 6	Region 7	Region 8	Region 9	Region 10	Region 11	Region 12	Total
Non use	**2**	**3**	**13**	**13**	**1**	**0**	**4**	**2**	**2**	**40**
H	0	0	1	0	0	0	0	0	0	1
LW	0	2	7	4	0	0	1	2	2	18
TW	0	1	4	4	0	0	0	0	0	9
U	2	0	1	5	1	0	3	0	0	12
Use	**2**	**2**	**4**	**22**	**2**	**1**	**5**	**2**	**2**	**42**
LW	0	0	2	7	0	0	0	0	0	9
Mixed	0	0	0	0	0	0	3	0	0	3
TW	0	2	0	13	0	0	0	2	2	19
U	2	0	2	2	2	1	2	0	0	11
Total	**4**	**5**	**17**	**35**	**3**	**1**	**9**	**4**	**4**	**82**

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

INTRODUCTION

In 2013 and 2014, we monitored potential impacts of the saltcedar beetle on multiple riparian land bird species of the LCR MSCP in three areas: the Virgin River, Topock Marsh, and the Bill Williams River. Survey sites were located within plots that were previously delineated for monitoring the southwestern willow flycatcher (*Empidonax traillii extimus*), and they included both sites already affected by the beetle and sites not yet affected. The goal of component 5 was to determine concomitant impacts from the saltcedar beetle invasion on breeding riparian land birds. The southwestern willow flycatcher sites were used for this study because impacts to that species' breeding success from the saltcedar beetle invasion had already been documented, and the question remained whether other riparian obligate breeders, such as the LCR MSCP covered focal species of the riparian bird project, were similarly affected.

Methods

Plot Selection

The plots used for the saltcedar beetle study were randomly selected in 2013 within areas where the southwestern willow flycatcher had been documented to occur (GBBO 2014a). For the Bill Williams River and Topock Marsh sites, we used the system-wide riparian bird plots layer (Bart et al. 2010) to determine which riparian bird plots were located within southwestern willow flycatcher plots. Using ArcGIS 10.1, we overlaid the stitched riparian bird plots layer with the southwestern willow flycatcher plots layer. Boundaries of the southwestern willow flycatcher plots and riparian bird plots differed slightly, and only riparian bird plots that covered ≥ 95% of the area of southwestern willow flycatcher plots were included in the final plots layer for the saltcedar beetle study. From that group, we randomly selected a 30 plots that were surveyed in 2013 and 2014 within the Topock Marsh (Havasu National Wildlife Refuge) and Bill Williams River regions. The 28 plots located at the Virgin River were selected using the same method and were surveyed in 2013, but not in 2014, because of a lack of access.

Survey Methods

The field methods used for surveying riparian land birds in the saltcedar beetle study were the same as those used for rapid area search surveys in component 1 of the project. The goal of rapid area search surveys is to obtain the most accurate

possible estimate of territories while optimizing the balance between survey coverage and survey effort. We combined the rapid area search methods with DRs calculated from the system-wide LCR MSCP bird monitoring data to estimate population densities of priority riparian land birds in the saltcedar beetle areas. Since the saltcedar beetle study plots often fell within active or previously active nesting areas of the southwestern willow flycatcher, we took extreme care not to disturb active southwestern willow flycatcher territories while surveying. Additionally, we coordinated with the southwestern willow flycatcher survey crews to avoid interference with their survey activities.

Results

Fifty-eight plots were surveyed in 2013, and 30 of these were surveyed again in 2014 (the Virgin River was excluded for safety reasons). In total, we found 145 species at these plots, including 53 species classified as breeders. These totals included Sonoran yellow warblers, Arizona Bell's vireos, Gila woodpeckers, and summer tanagers. This diversity in birds was most often a reflection of the vegetative and floristic diversity present at the plots, which variously included open river channel, marsh, pure saltcedar stands, and mixed native/non-native stands. For full results from 2013 and 2014, see annual reports for these years (GBBO 2014a, 2014b). Attachment 3 lists all avian species detected in components 1, 2, 3, and 5 of this project, which includes flyovers and incidental observations.

Discussion

After its initial release in St. George, Utah, the saltcedar beetle quickly colonized areas downstream along the Colorado River, including several tributaries such as the Virgin and Muddy Rivers. Negative impacts to nesting southwestern willow flycatchers in these areas were quickly documented as a result of the beetle's presence, and continued invasion of downstream sites by the beetle was expected at a similar pace, potentially affecting the entire system-wide project area of the LCR MSCP (McLeod and Koronkiewicz 2009, 2010; Dobbs et al. 2011; McLeod and Pellegrini 2011). Therefore, the goal of this component was to quantify impacts of the beetle on riparian obligate species, including the LCR MSCP covered focal species, prior to complete saltcedar beetle colonization because, if these impacts were large, they could potentially significantly affect system-wide population estimates. Component 5 was discontinued after 2014. The last year of results is presented in GBBO (2015). Reclamation discontinued the component, as the beetle appeared to have slowed in its colonization rate in 2013 (see maps on www.tamariskcoalition.org), and there was an unexpected access closure to all Virgin River sites in 2014 that included the only survey sites with the beetle present at the time. Therefore, 2014 was the last year of this study, and detailed summary information on the results is presented in GBBO (2015).

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ATTACHMENT 1

All Area Search Plots Surveyed for Project Components 1, 2, 3, and 5 from 2011 to 2015

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
C1501	R					R			R		R
C1502	R			I		R			R		R
C1503	R			R	EI	R			R		I
C1504	R					R			R		R
C2101	R			R		R			R		R
C2102	R			R		R			R		R
C2103	R		EI	I		R			R		R
C2104	I			R		R			I		R
C2105	R			R		R			R		R
C2301	R			R		I			R		
C2302	R			R		R			R		
C2303	R			R		R			R		
C2304	R			R		R			R		R
C2305	R			R		R			R		R
C2306	R			R		R			R		I
C2307	R			R		R			R		R
C2308	R			R		R			R		R
C2309	R			R		I			R		I
C2310	R			R		R			R		
C2311	R			R		R			R		R
C2312	R			R		R			R		I
C2313	R			R		R			R		R
C2314	R			R		R			R		R
C2315	R			R		R			R		R
C2316	R			R		R			R		R
C2317	R			R		R			R		R
C2318	R			R		R			R		R
C2319	R			R		R			R		R
C2320				R		R			R		
C2321				R		R			R		R
C2322				R		R			R		R
C2323				R		R			R		R

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
C2324				R		R			R		R
C2325				R		R			R		R
C2326				R		R			R		R
C2327						R					
C2328						R			R		R
C2329						R					R
C2330						R			R		R
C2331						R					
C2332						R					R
C2333						R			R		R
C2334						R			I		
C2335									R		R
C2501	I			R		R			R		R
C2502	R			R		R			R		R
C2503	I			R		R			R		
C2504	R			R		R			R		R
C2505	R			R		R			R		
C2506	R			R		R			R		R
C2507	R			R		R			R		R
C2508	R			R		R			R		R
C2509	R			I		R			R		R
C2510	R			I		R			R		R
C2511	R			R		R					R
C2512	R			R		R			R		R
C2513	R			R		R			R		R
C2514	R			R		R			R		
C2515	R			R		R			R		
C2516	R			R		R			R		R
C2517	R			R		R			R		R
C2518	R			R		R			R		R
C2519	R			R		R			R		
C2520	R			R		R					R

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
C2521				R		R			R		R
C2522				R		R					R
C2523				R		R			R		R
C2701	R			R		R			R		R
C2702	R			R		R			R		R
C2703	R			R		I					
C2704	R			R		R			I		R
C2705	R			R		R			R		R
C2706	I			R	EI	I			R		R
C2707				R		R			R		R
C2720	R			R		R			R		R
C2721	R			R		R			R		
C2722	R			R		R			I		R
C2723	R			R		R					R
C2724	R			R		R			R		
C2725	R			R		R			R		R
C2726											R
C2727											R
C2728											R
C4701				I*		I*					
C4702				I*		I*			R		R
C4703				I*		I*			R		R
C4704									R		R
C4705									R		R
C4706									R		R
C4708									R		
C4709									R		R
C4710									R		
C4711											R
C5901											R
S1585	R					R					
S1586						R					

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S1645											R
S1659									R		
S1674						R					
S1694									R		
S1695									R		
S1705	R										
S1714									R		
S1738									R		
S1749						R					
S1767	R										
S1832						R					
S1857						R					
S1861									R		
S1877	R										
S1890	R										
S1908	R										
S1946						R					
S1955						R					
S1975									R		
S1987									R		
S1998						R					
S2001						R					
S2038									R		
S2084						R					
S2090	R										
S2115	R										
S2118											R
S2119	I										
S2176											R
S2183						I					R
S2219											R
S2232						R					

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S2268				R							
S2306									R		
S2315						R					
S2323											R
S2335											I
S2339								R		R	
S2371									R		
S2400											R
S2401								R		R	
S2424	I										
S2439						R					
S2457								R		R	
S2465									R		
S2475				R		R		R	R	R	
S2476								R		R	
S2477						I		R		R	
S2493								R		R	
S2495				R							
S2508								R		R	
S2522								R		R	
S2532								R		R	
S2549	I										
S2550						I					
S2556	R								R		
S2558								R		R	
S2559											R
S2584				R		R					
S2595				R							
S2614	R			R							
S2617	R										
S2631									R		
S2636	R								I		

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S2638											I
S2647	R										
S2648				R							
S2697	R										
S2715											R
S2716											R†
S2719								R	R	R	
S2738											R†
S2742								R		R	
S2744						R			R		
S2746											R†
S2747											R†
S2756											R†
S2757											R†
S2763				R							
S2812						R					
S2816											R
S2820											R
S2821											R
S2833	R										
S2854									R		
S2856	R										
S2858						R					
S2860						R			R		
S2861	I				EI	R					
S2863	R					R		R		R	
S2864	R					I	EI		R		R
S2865							EI				
S2867				I							
S2869					EI						
S2872				R					I		
S2873	R										

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S2876								R		R	
S2877				R							I
S2878	I		EI								
S2879						R	EI				
S2883				I							
S2885	R										
S2886							EI				
S2889								R		R	
S2890	R										
S2898						R					
S2901							EI				
S2903				R		R		R		R	
S2924	R										
S2926	R			R					I		R
S2928				R							
S2931											R
S2933				R							
S2965									R		
S2972						R					
S3014									R		
S3059	R										
S3064	R										
S3120											R
S3138	R										
S3320				R							
S3374											R
S3425				R					R		
S3433				R							
S3536						R					
S5135	R										
S5148									R		
S5187						R					

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S5188									R		
S5198						R					
S5216									R		
S5236									R		
S5242				R							
S5254											R
S5257				R							
S5261				R							
S5278				R							
S5290											R
S5317									R		
S5326				R							
S5331						R					R
S5383	R										
S5392											R
S5413									R		
S5415				R							
S5469											R
S5557											R
S5564						R					
S5572				R							
S5612	R										
S5614									R		
S5620						I					
S5645											R
S5663						R†					
S5665						R†					
S5675						R†					
S5676						R†					
S5723									R		
S5727						R					
S5747	R										

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S5752	R										
S5773									R		
S5780						R					
S5799				I							
S5810											R
S5821									R		
S5834	R										
S5842									R		
S5844									R		
S5851									R		
S5884						R					
S5898						R					
S5901						R					
S5902						R					
S5919						R					
S5977						R					
S6017									R		
S6018									R		
S6049									R		
S6056						I					
S6115	R										
S6157				R							
S6162	R										
S6185									R		
S6190									R		
S6212									R		
S6216											R
S6220				R					R		
S6222	R										
S6231											I
S6234				R							
S6235	R										

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S6343	R										
S6349				R							R
S6352											R
S6366						R					
S6394	R										
S6401											R
S6414									R		
S6415											R
S6431	R										
S6432	R										
S6436											R
S6443	R										
S6448											R
S6462	R								R		
S6469				R		R					R
S6470				R							
S6476				R							
S6490				R							
S6508											R
S6517				R							
S6523	R										
S6529	I		E1			R					
S6534									R		
S6536											R
S6538						R					
S6581	R					R					
S6589	R			R							
S6593				R							
S6597											R
S6606									R		
S6619									R		
S6633	R										

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S6678	R										
S6683											R
S6721	R										
S6732	R					R					I
S6750				R							
S6756				R							
S6785						R					
S6786	R										
S6787											R
S6927						R					
S6958						R					
S6985	R										
S6986						R					
S6990				R							
S7052						R					
S7054									R		R
S7059								R	I	R	
S7060									R		
S7102				R							
S7107	R							R		R	R
S7119									R		
S7179						R					R
S7186	R										
S7196											R
S7226	R										
S7334				I					I		
S7335						R					I
S7336	R			R				R	R	R	
S7337	R			R				R		R	R
S7338				R							
S7340											R
S7365											R

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S7369				R					R		R
S7500				R					R		
S7527											R†
S7531	R										
S7532						R					
S7592	R										
S7605											R
S7606	R										
S7608	R										R
S7643											R
S7654						R					
S7683				R							
S7705				R							
S7707						R					
S7733						R					R
S7740				R					R		
S7742						R			R		R
S7776						R					
S7779									R		
S7781				R							
S7784		I									
S7785				R							
S7786	R			R	EI						
S7789		R									
S7791		R									
S7796		R									
S7797		R									
S7798		R									
S7803		I									
S7804		R									
S7805		R									
S7810		R									

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S7813		R									
S7814		R									
S7815		R									
S7820		R									
S7821		R									
S7822		R									
S7823		R									
S7832		I									
S7833		R									
S7834		R									
S7837											R
S7838				R		I	EI				
S7846		R									
S7864		R									
S7865		R									
S7869											R
S7876		R									
S7877		R									
S7887		R									
S7898		R									
S7909		R									
S7910		R									
S7915				R							
S7927		I									
S7928		R									
S7932											R
S7937									R		
S7940		R									
S7942		R									
S7946									R		
S7950		R									
S7951		R									

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S7956				R		R			R		
S7960	I								R		R
S7975						R					
S7976						R					
S7984	R										
S7985						I	EI		R		
S7986				R							R
S7987				R							
S7992	I								R		
S8011	R				EI	R			I		
S8026									R		R
S8028						R					R
S8031				R							
S8076						R					
S8082											R
S8084				R							
S8218									R		
S8219									I		
S8223	R		EI		EI			R		R	
S8224											R
S8226			EI								
S8232											I
S8233						R					
S8242				R							
S8252			EI								
S8253	R			R							R
S8261						R			I		
S8262				R							
S8287				R					R		
S8291								R		R	
S8292								R		R	
S8293				R							

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S8295								R		R	
S8506											R
S8546	R										
S8568				R							
S8581				R							
S8606									R		
S8609									R		
S8641									R		R
S8650	R										
S8665						R					
S8668											R
S8675						R					
S8682			EI								
S8684				R							
S9015				I							
S9032						R					
S9047				R							
S9064								R		R	
S9065											R
S9066								R		R	
S9067								R		R	
S9068								R		R	
S9077											R
S9089						R					
S9113	R										
S9123				R							
S9124				I	EI		EI				
S9125								R		R	
S9151											R
S9268											R
S9291				R							
S9294									R		

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S9304				I							
S9323				I							
S9382				R							
S9385											R
S9386	R										
S9397						R			R		
S9401	R			R							R
S9403									R		
S9406						R					
S9413					EI						I
S9415				R							
S9419	R										
S9427	R										
S9429											R
S9438				R							
S9485											R
S10102								R			
S10104								R			
S10114								R			
S10115								R			
S10120								R			
S10123								R			
S10124								R			
S10125								R			
S10129								R			
S10133								R			
S10134								R			
S10137								R			
S10138								R			
S10139								R			
S10142								R			
S10143								R			

Table 1-1.—List of all area search plots surveyed for project components 1, 2, 3, and 5 from 2011 to 2015 (Columns C1, C2, C3, and C5 represent corresponding components. R = rapid area search surveys, I = intensive area search surveys, and EI = enhanced intensive area search surveys. Only the highest level of area search survey effort is indicated; all lower levels of effort were also performed in every case. * = surveyed by Fred Phillips Consulting, LLC, and † = pre-construction conservation area monitoring.)

	2011			2012		2013			2014		2015
Plot	**C1**	**C2**	**C3**	**C1**	**C3**	**C1**	**C3**	**C5**	**C1**	**C5**	**C1**
S10144								R			
S10147								R			
S10148								R			
S10150								R			
S10153								R			
S10154								R			
S10160								R			
S10161								R			
S10166								R			
S10167								R			
S10172								R			
S10173								R			

ATTACHMENT 2

List of Species Used to Calculate Detectability Ratios and Population Estimates for Both the Annual and Average Estimates, 2011 to 2015

Table 2-1.—Species used to calculate detectability ratio and population estimates, system-wide, 2011–15
(Species are listed in alphabetical order. Reported for annual estimates and for average estimates for the entire 5-year period, 2011–15. An "X" in a column means that the corresponding species was used that year or timeframe.)

Species	Scientific name	2011	2012	2013	2014	2015	2011–15
Abert's towhee	*Melozone aberti*	X	X	X	X	X	X
Anna's hummingbird	*Calypte anna*	X	X			X	X
Arizona Bell's vireo	*Vireo belli arizonae*	X	X	X	X	X	X
Ash-throated flycatcher	*Myiarchus cinerascens*	X	X	X	X	X	X
Bewick's wren	*Thryomanes bewickii*	X	X	X	X	X	X
Black chinned hummingbird	*Archilochus alexandri*	X	X	X	X	X	X
Black-tailed gnatcatcher	*Polioptila melanura*	X	X	X	X	X	X
Black-throated sparrow	*Amohispiza bilineata*	X					
Blue grosbeak	*Passerina caerulea*	X	X	X	X	X	X
Brown-crested flycatcher	*Myiarchus tyrannulus*	X	X	X	X	X	X
Bullock's oriole	*Icterus bullocki*	X	X	X	X		X
Canyon wren	*Catherpes mexicanus*	X	X	X	X	X	X
Common ground-dove	*Columbina passerina*	X					
Common yellowthroat	*Geothlypus trichas*	X	X	X	X	X	X
Costa's hummingbird	*Calypte costae*				X	X	X
Crissal thrasher	*Toxostoma crissale*	X	X	X	X	X	X
Gila woodpecker	*Melanerpes uropygialis*	X	X	X	X	X	X
House wren	*Troglodytes aedon*	X					X
Ladder-backed woodpecker	*Picoides scalaris*	X	X	X	X	X	X
Least bittern	*Ixobrychus exilis*					X	
Lesser goldfinch	*Spinus psaltria*				X	X	X
Lesser nighthawk	*Chordeiles acutipennis*	X		X	X	X	X
Loggerhead shrike	*Lanius ludovicianus*		X				
Lucy's warbler	*Oreothlypis luciae*	X	X	X	X	X	X
Marsh wren	*Cistothorus palustris*	X		X	X		X
Northern mockingbird	*Mimus polyglottos*		X	X			X
Northern rough-winged swallow	*Stelgidopteryx serripennis*		X				
Phainopepla	*Phainopepla nitens*	X	X	X	X	X	X
Say's phoebe	*Sayornis saya*	X					
Song sparrow	*Melospiza melodia*	X	X	X	X	X	X
Sonoran yellow warbler	*Dendroica petechia sonorana= Setophaga petechial sonorana*	X	X	X	X	X	X
Summer tanager	*Piranga rubra*	X	X	X	X	X	X
Verdin	*Auripus flaviceps*	X	X	X	X	X	X
Western kingbird	*Tyrannus verticalis*	X		X	X	X	X
Yellow-breasted chat	*Icteria virens*	X	X	X	X	X	X

Table 2-2.—Species used to calculate detectability ratio and population estimates for conservation areas and Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09, 2011–15

(Species listed in alphabetical order. Reported for annual estimates for 2011–15. An "X" in a column means that the corresponding species was used that year or timeframe.)

Species	Scientific name	2011	2012	2013	2014	2015
Abert's towhee	*Melozone aberti*	X	X	X	X	X
Anna's hummingbird	*Calypte anna*	X	X	X	X	X
Arizona Bell's vireo	*Vireo bellii arizonae*	X	X			X
Ash-throated flycatcher	*Myiarchus cinerascens*	X	X	X	X	X
Black chinned hummingbird	*Archilochus alexandri*	X	X	X	X	X
Black-tailed gnatcatcher	*Polioptila melanura*	X	X	X	X	X
Blue grosbeak	*Passerina caerulea*	X	X	X	X	X
Brown-crested flycatcher	*Myiarchus tyrannulus*		X			X
Brown-headed cowbird	*Molothrus ater*	X				
Bullock's oriole	*Icterus bullockii*	X	X	X	X	X
Common yellowthroat	*Geothlypus trichas*	X	X	X	X	X
Crissal thrasher	*Toxostoma crissale*		X	X	X	X
Eurasian collard-dove	*Streptopelia decaocto*	X				
European starling	*Sturnis vulgaris*	X				
Gambel's quail	*Callipepla gambellii*	X				
Great horned owl	*Bubo virginianus*	X	X			
Greater roadrunner	*Geococcyx californianus*	X				
House finch	*Haermorhous mexicanus*	X				
Indigo bunting	*Passerina cyanea*					X
Ladder-backed woodpecker	*Picoides scalaris*	X	X	X	X	X
Lawrence's goldfinch	*Spinus lawrencei*	X				
Lesser goldfinch	*Spinus psaltria*	X	X	X	X	X
Lucy's warbler	*Oreothlypis luciae*	X	X		X	X
Mourning dove	*Zenaida macroura*	X				
Red-tailed hawk	*Buteo jamaicensis*	X				
Red-winged blackbird	*Agelaius phoeniceus*	X				
Say's phoebe	*Sayornis saya*	X				
Song sparrow	*Melospiza melodia*	X		X	X	X
Sonoran yellow warbler	*Dendroica petechia sonorana = Setophaga petechial sonorana*	X	X	X	X	X
Summer tanager	*Piranga rubra*	X	X	X		X
Tropical kingbird	*Tyrannus melancholicus*	X			X	
Verdin	*Auripus flaviceps*	X	X	X	X	X
Vermilion flycatcher	*Pyrocephalus rubinus*	X	X		X	X
Western kingbird	*Tyrannus verticalis*	X	X	X	X	X
White-winged dove	*Zenaida asiatica*	X				
Willow flycatcher	*Empidonax traillii*	X				
Yellow-breasted chat	*Icteria virens*	X	X	X	X	X

ATTACHMENT 3

Comprehensive List of Species Recorded on All Area Search Survey Efforts, Components 1–5

American Ornithologists' Union (AOU). 2015. Checklist of North and Middle American birds. http://checklist.aou.org

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
Abert's towhee	*Melozone aberti*
American avocet	*Recurvirostra americana*
American bittern	*Botaurus lentiginosus*
American coot	*Fulica americana*
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American pipit	*Anthus rubescens*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
American white pelican	*Pelecanus erythrorhynchos*
American wigeon	*Mareca Americana*
Anna's hummingbird	*Calypte anna*
Arizona Bell’s vireo	*Vireo bellii Arizonae*
Ash-throated flycatcher	*Myiarchus cinerascens*
Baird's sandpiper	*Calidris bairdii*
Bald eagle	*Haliaeetus leucocephalus*
Baltimore oriole	*Icterus galbula*
Bank swallow	*Riparia riparia*
Barn owl	*Tyto alba*
Barn swallow	*Hirundo rustica*
Bell's vireo	*Vireo bellii*
Belted kingfisher	*Megaceryle alcyon*
Bewick's wren	*Thryomanes bewickii*
Black phoebe	*Sayornis nigricans*
Black swift	*Cypseloides niger*
Black tern	*Chlidonias niger*
Black-and-white warbler	*Mniotilta varia*
Black-bellied plover	*Pluvialis squatarola*
Blackburnian warbler	*Setophaga fusca*
Black-chinned hummingbird	*Archilochus alexandri*
Black-chinned sparrow	*Spizella atrogularis*
Black-crowned night-heron	*Nyticorax nyticorax*
Black-headed grosbeak	*Pheucticus melanocephalus*
Black-necked stilt	*Himantopus mexicanus*

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
Blackpoll warbler	*Setophaga striata*
Black-tailed gnatcatcher	*Polioptila melanura*
Black-throated gray warbler	*Setophaga nigrescens*
Black-throated sparrow	*Amphispiza bilineata*
Blue grosbeak	*Passerina caerulea*
Blue-gray gnatcatcher	*Polioptila cearulea*
Blue-winged teal	*Anas discors*
Bonaparte's gull	*Chroicephalus Philadelphia*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Broad-winged hawk	*Buteo platypterus*
Bronzed cowbird	*Molothrus aeneus*
Brown-crested flycatcher	*Myiarchus tyrannulus*
Brown-headed cowbird	*Molothrus ater*
Bufflehead	*Bucephala albeola*
Bullock's oriole	*Icterus bullockii*
Burrowing owl	*Athene cunicularia*
Bushtit	*Psaltriparus minimus*
Cactus wren	*Campylorhynchus brunneicapillus*
California black rail	*Laterallus jamaicencis*
California gull	*Larus californicus*
California scrub-jay	*Aphelocoma californica*
Calliope hummingbird	*Selasphorus calliope*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Canyon wren	*Catherpes mexicanus*
Caspian tern	*Hydroprogne caspia*
Cassin's kingbird	*Tyrannus vociferans*
Cassin's sparrow	*Peucaea cassinii*
Cassin's vireo	*Vireo cassinii*
Cattle egret	*Bubulcus ibis*
Cedar waxwing	*Bombycilla cedrorum*
Chipping sparrow	*Spizella passerina*
Cinnamon teal	*Anas cyanoptera*

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
Clark's grebe	*Aechmorphorus clarkii*
Clay-colored sparrow	*Spizella pallida*
Cliff swallow	*Petrochelidon pyrrhonota*
Common black hawk	*Buteogallus anthracinus*
Common gallinule	*Gallinula galeata*
Common goldeneye	*Bucephala clangula*
Common ground-dove	*Columbina passerine*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Common poorwill	*Phalaenoptilus nuttalli*
Common raven	*Corvus Corax*
Common tern	*Sterna hirundo*
Common yellowthroat	*Geothlypus trichas*
Cooper's hawk	*Accipiter cooperii*
Costa's hummingbird	*Calypte costae*
Crissal thrasher	*Toxostoma crissale*
Dark-eyed junco	*Junco hyemalis*
Dickcissel	*Spiza Americana*
Double-crested cormorant	*Phalacrocorax auritus*
Dusky flycatcher	*Empidonax oberholseri*
Eared grebe	*Podiceps nigricollis*
Elf owl	*Micrathene whitneyi*
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnis vulgaris*
Evening grosbeak	*Coccothraustes vespertinus*
Forster's tern	*Sterna forsteri*
Fox sparrow	*Passerella iliaca*
Franklin's gull	*Leucophaeus pipixcan*
Gadwall	*Anas strepera*
Gambel's quail	*Callipepla gambellii*
Gila woodpecker	*Melanerpes uropygialis*
Gilded flicker	*Colaptes chrysoides*
Golden eagle	*Aquila chrysaetos*
Grace's warbler	*Setophaga graciae*

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
Gray flycatcher	*Empidonax wrightii*
Gray vireo	*Vireo vicinior*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Great horned owl	*Bubo virginianus*
Greater roadrunner	*Geococcyx californianus*
Greater scaup	*Aythya marila*
Greater yellowlegs	*Tringa melanoleuca*
Great-tailed grackle	*Quiscalus mexicanus*
Green heron	*Butorides virescens*
Green-tailed towhee	*Pipilo chlorurus*
Green-winged teal	*Anas carolinensis*
Hammond's flycatcher	*Empidonax hammondii*
Hermit thrush	*Catharus guttatus*
Hermit warbler	*Setophaga occidentalis*
Hooded oriole	*Icterus cucullatus*
Hooded warbler	*Setophaga citrina*
Horned grebe	*Podiceps auritus*
Horned lark	*Eremophila alpestris*
House finch	*Haemorhous mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Hutton's vireo	*Vireo huttoni*
Inca dove	*Columbina inca*
Indigo bunting	*Passerina cyanea*
Killdeer	*Charadrius vociferus*
Ladder-backed woodpecker	*Picoides scalaris*
Lark sparrow	*Chondestes grammacus*
Lawrence's goldfinch	*Spinus lawrencei*
Lazuli bunting	*Passerina amoena*
Le Conte's thrasher	*Toxostoma lecontei*
Least bittern	*Ixobrychus exilis*
Least sandpiper	*Caladris minutilla*
Lesser goldfinch	*Spinus psaltria*

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
Lesser nighthawk	*Chordeiles acutipennis*
Lesser scaup	*Aythya affinis*
Lesser yellowlegs	*Tringa flavipes*
Lincoln's sparrow	*Melospiza lincolnii*
Little blue heron	*Egretta caerulea*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Long-eared owl	*Asio otus*
Lucy's warbler	*Oreothlypis luciae*
MacGillivray's warbler	*Geothlypus tolmiei*
Mallard	*Anas platyrhynchos*
Marbled godwit	*Limosa fedoa*
Marsh wren	*Cistothorus palustris*
Merlin	*Falco columbarius*
Mississippi kite	*Ictinia mississipiensis*
Mourning dove	*Zenaida macroura*
Nashville warbler	*Leiothlypis ruficapilla*
Neotropic cormorant	*Phalacrocorax brasilianus*
Northern cardinal	*Cardinalis cardinalis*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
Northern parula	*Setophaga americana*
Northern pintail	*Anas acuta*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Northern shoveler	*Anas clypeata*
Nutting's flycatcher	*Myiarchus nuttingi*
Olive-sided flycatcher	*Contopus cooperi*
Orange-crowned warbler	*Vermivora celata*
Osprey	*Pandion haliaetus*
Pacific loon	*Gavia pacifica*
Pacific-slope flycatcher	*Empidonax difficilis*
Palm warbler	*Setophaga palmarum*

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
Peregrine falcon	*Falco peregrinus*
Phainopepla	*Phainopepla nitens*
Pied-billed grebe	*Podilymbus podiceps*
Pine siskin	*Spinus pinus*
Plumbeous vireo	*Vireo plumbeus*
Prairie falcon	*Falco mexicanus*
Purple martin	*Progne subis*
Red-breasted merganser	*Mergus serrator*
Red-breasted nuthatch	*Sitta canadensis*
Redhead	*Aythya americana*
Red-necked phalarope	*Phalaropus lobatus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Ring-necked pheasant	*Phasianus colchicus*
Rock pigeon	*Columbia livia*
Rock wren	*Salpinctes obsoletus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Ruby-crowned kinglet	*Regulus calendula*
Ruddy duck	*Oxyura jamaicensis*
Rufous hummingbird	*Selasphorus rufus*
Savannah sparrow	*Passerculus sandwichensis*
Say's phoebe	*Sayornis saya*
Scott's oriole	*Icterus parisorum*
Semipalmated plover	*Charadrius semipalmatus*
Sharp-shinned hawk	*Accipiter striatus*
Short-billed dowitcher	*Limnodromus griseus*
Short-eared owl	*Asio flammeus*
Snow goose	*Chen caerulescens*
Snowy egret	*Egretta thula*
Snowy plover	*Charadrius nivosus*
Solitary sandpiper	*Tringa solitaria*

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
Song sparrow	*Melospiza melodia*
Sonoran yellow warbler	*Dendroica petechia sonorana = Setophaga petechia sonorana*
Sora	*Porzana carolina*
Spotted sandpiper	*Actitis macularius*
Spotted towhee	*Pipilo maculatus*
Summer tanager	*Piranga rubra*
Swainson's hawk	*Buteo swainsoni*
Swainson's thrush	*Catharus ustulatus*
Townsend's warbler	*Setophaga townsendi*
Tree swallow	*Tachycineta bicolor*
Tropical kingbird	*Tyrannus melancholicus*
Turkey vulture	*Cathartes aura*
Vaux's swift	*Chaetura vauxi*
Verdin	*Auripus flaviceps*
Vermilion flycatcher	*Pyrocephalus rubinus*
Vesper sparrow	*Pooecetes gramineus*
Violet-green swallow	*Tachycineta thalassina*
Virginia rail	*Leiothlypis virginiae*
Virginia's warbler	*Leiothlypis virginiae*
Warbling vireo	*Vireo gilvus*
Western bluebird	*Sialia Mexicana*
Western grebe	*Aechmophorus occidentalis*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western sandpiper	*Calidris mauri*
Western screech-owl	*Megascops kennicottii*
Western tanager	*Piranga ludoviciana*
Western wood-pewee	*Contopus sordidulus*
Whimbre	*Numenius phaeopus*
White ibis	*Eudocimus albus*
White-crowned sparrow	*Zonotrichia leucophrys*
White-faced ibis	*Plegadis chihi*
White-tailed kite	*Elanus leucurus*

Table 3-1.—Comprehensive list of species recorded on all area search survey efforts, components 1–5

Common name	Scientific name
White-throated sparrow	*Zonotrichia albicollis*
White-throated swift	*Aeronautes saxatalis*
White-winged dove	*Zenaida asiatica*
Willet	*Tringa semipalmata*
Willow flycatcher	*Empidonax traillii*
Wilson's phalarope	*Phalaropus tricolor*
Wilson's snipe	*Gallinago delicata*
Wilson's warbler	*Cardellina pusilla*
Wood duck	*Aix sponsa*
Yellow warbler	*Dendroica [Setophaga] petechia*
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*
Yellow-breasted chat	*Icteria virens*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellow-rumped warbler	*Setophaga coronata*
Yuma clapper rail (also known as Yuma Ridgeway's rail)	*Rallus longirostris yumanensis* = R. *obsoletus yumanensis*
Zone-tailed hawk	*Buteo albonotatus*

ATTACHMENT 4

Natural History and Distribution of Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Covered Focal Species

ACRONYMS AND ABBREVIATIONS

BLCA	Beal Lake Conservation Area
Cibola NWR	Cibola National Wildlife Refuge
Cibola NWR Unit #1	Cibola National Wildlife Refuge Unit #1 Conservation Area
CRIT 9	Colorado River Indian Tribes ’ ‘Ahakhav Tribal Preserve habitat creation area 09
CVCA	Cibola Valley Conservation Area
GBBO	Great Basin Bird Observatory
Imperial NWR	Imperial National Wildlife Refuge
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
PVER	Palo Verde Ecological Reserve
SE	standard error
YEW	Yuma East Wetlands

Symbols

>	greater than
<	less than

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INTRODUCTION

During 5 years of riparian land bird monitoring for the Lower Colorado River Multi-Species Conservation Program (LCR MSCP), we collected additional information on the natural history and distribution of 6 of the 12 LCR MSCP covered bird species, specifically the Arizona Bell's vireo (*Vireo bellii arizonae*), Sonoran yellow warbler (*Dendroica petechia sonorana = Setophaga petechia sonorana*), Gila woodpecker (*Melanerpes uropygialis*), summer tanager (*Piranga rubra*), vermilion flycatcher (*Pyrocephalus rubinus*), and the gilded flicker (*Colaptes chrysoides*). These species are referred to in this report as the LCR MSCP covered focal species. Below we summarize the current population status, information on habitat requirements, phenology (i.e., arrival and breeding season in the study area), survey techniques, and current distributional information in the form of territory density maps. We primarily focus on new information gathered during the 5-year project and refer to the Great Basin Bird Observatory (GBBO) (2011, 2014) for additional details on habitat requirements, natural history, and survey techniques for these species.

For each of the LCR MSCP covered focal species we summarize habitat use patterns, phenology, survey observations from the 5-year project on each species as they relate to survey effectiveness, and each species' current distribution (a thorough description of how the maps were created for each species can be found under component 1 in the "Methods" section), with a brief mention of status in the early 1900s (Grinnell 1914). Grinnell (1914) covers the Colorado River (not including tributaries) from Needles to Yuma on a general natural history and collecting expedition between February 15 and May 15, 1910. Grinnell's descriptions of species abundance were only qualitative, and in this Attachment, we give these descriptions to provide a historic backdrop for the 2011–15 project. All habitat use information presented here is also qualitative and based on GBBO's field observations during the 5-year project. Quantification of habitat associations may be explored in the future using the vegetation assessment data collected during the project.

Arizona Bell's Vireo

Observed Habitat Use in the Project Area

- Breeding Arizona Bell's vireos are generally associated with mesquite (*Prosopis* spp.), although along the Bill Williams and Virgin Rivers, they were found breeding in other plant associations away from mesquite, such as arrowweed (*Pluchea sericea*) and *Baccharis* spp.

- Many territories observed were within a few hundred meters of standing or running water; therefore, proximity to surface water appears to be an important habitat component. An analysis of field vegetation assessments in Arizona Bell's vireo territories collected during the project could shed further light on this issue.

- Areas that have an understory consisting mainly of saltcedar (*Tamarix* spp.) appear to be avoided. Shrub understory composition and density preferences are not well understood. In the Bill Williams River National Wildlife Refuge, Arizona Bell's vireos were absent from the Fremont cottonwood (*Populus fremontii*) (hereafter cottonwood) and willow (*Salix* spp.) forest interior when a dense understory or midstory of saltcedar was present. Small numbers (one to three territories per plot) were, however, consistently found breeding in closed-canopy cottonwood-willow forest with open understory and a small mesquite component.

- Arizona Bell's vireos were absent or uncommon (fewer than two territories per plot) in some apparently suitable habitats (e.g., in much of the Havasu National Wildlife Refuge, Lake Havasu, the Cibola National Wildlife Refuge [Cibola NWR], and the Picacho/Imperial National Wildlife Refuge [Imperial NWR] area north of Martinez Lake).

- The Beal Lake Conservation Area (BLCA) had higher numbers of territories than surrounding areas of the region; at least one territorial male was detected on the outskirts of the Palo Verde Ecological Reserve (PVER), and the one breeding site in the Cibola NWR was on plantings in the Cibola National Wildlife Refuge Unit #1 Conservation Area (Cibola NWR Unit #1) Nature Trail in 2011–15 and Crane Roost in 2015).

- The BLCA, PVER, and Cibola NWR Unit #1 all consist of mesquite plantings, sometimes with a cottonwood-willow overstory, often with other shrub understory plant components such as *Baccharis* spp., arrowweed, coyote willow (*Salix exigua*), Johnsongrass (*Sorghum halepense*), or quailbush (*Atriplex lentiformis*).

- Proximity to open spaces may be a positive factor for this species, as it is primarily found where dense riparian vegetation transitions into desert uplands, but this association has not yet been modeled.

Phenology in the Project Area

- Males arrive in early to mid-March (Rosenberg et al. 1991), prior to the start of LCR MSCP riparian bird surveys.

- At the start of the season, it is difficult to distinguish true migrants from males setting up territories. However, it appears, based on observations made by surveyors, that true migrants are infrequently detected. For example, surveyors rarely recorded this species using a plot on the first visit where they didn't find the species again on the second visit.

- Based on breeding evidence collected during the 5-year study, we observed a range of incubation initiation of April 8 to June 1. The peak of incubation initiation was in late April. This is consistent with previously published nesting phenology in the region (Rosenberg et al. 1991; Corman and Wise-Gervais 2005; Kus et al. 2010).

Surveying This Species

- Several factors contribute to the relative ease of assessing territories of Arizona Bell's vireos:

    1. Migrant individuals of this species are infrequently detected because of the limited northward extension of their breeding range.

    2. Arizona Bell's vireos are highly territorial and sing frequently throughout the season and throughout the day, including frequent counter-singing with neighbors.

    3. Arizona Bell's vireo territories are fairly small, typically about 1 hectare (GBBO, unpublished data).

    4. Territories are often evenly spaced in belts of suitable habitat (mesquite) between open areas (desert uplands) and more mesic riparian areas, making them relatively predictable for territory detection.

    5. Songs are distinctive and easy to identify; this is also the only breeding vireo in the project area.

Status and Distribution in 2011–2015

- Grinnell (1914) classifies this species as common and widespread in the LCR MSCP project area: "met with at all stations all the way down the river, being one of the most characteristic avifaunal elements in the riparian strip."

- Over 2011–15, the system-wide population size was estimated to be 1,365 (standard error [SE] = 282) breeding pairs of Arizona Bell's vireos.

- We found Arizona Bell's vireos from the northernmost project sites along the Virgin River south to Laguna Dam (figures 4-1 to 4-23). They were absent in all sites south of Laguna Dam, including the Gila River (figure 4-24).

- This species was also absent in the reach between the Bill Williams River and Martinez Lake, with the exception of small numbers breeding at Cibola NWR Unit #1 and the territory adjacent to PVER, although it is important to note that no system-wide area search surveys were conducted in Region 9, Colorado River Indian Tribes' lands (figures 4-12 to 4-21.

- The highest concentration of breeding Arizona Bell's vireos was found along the Bill Williams and Virgin Rivers, and on the shores of Lake Mohave (figures 4-2, 4-3, 4-10, and 4-11).

- Moderate to small numbers (fewer than five territories per plot) of breeding Arizona Bell's vireos were found at the Havasu National Wildlife Refuge and nearby areas, south Lake Havasu, Cibola NWR Unit #1, Martinez Lake, and Mittry Lake/Laguna Dam (figures 4-5, 4-8, 4-16 to 4-18, 4-22, and 4-23).

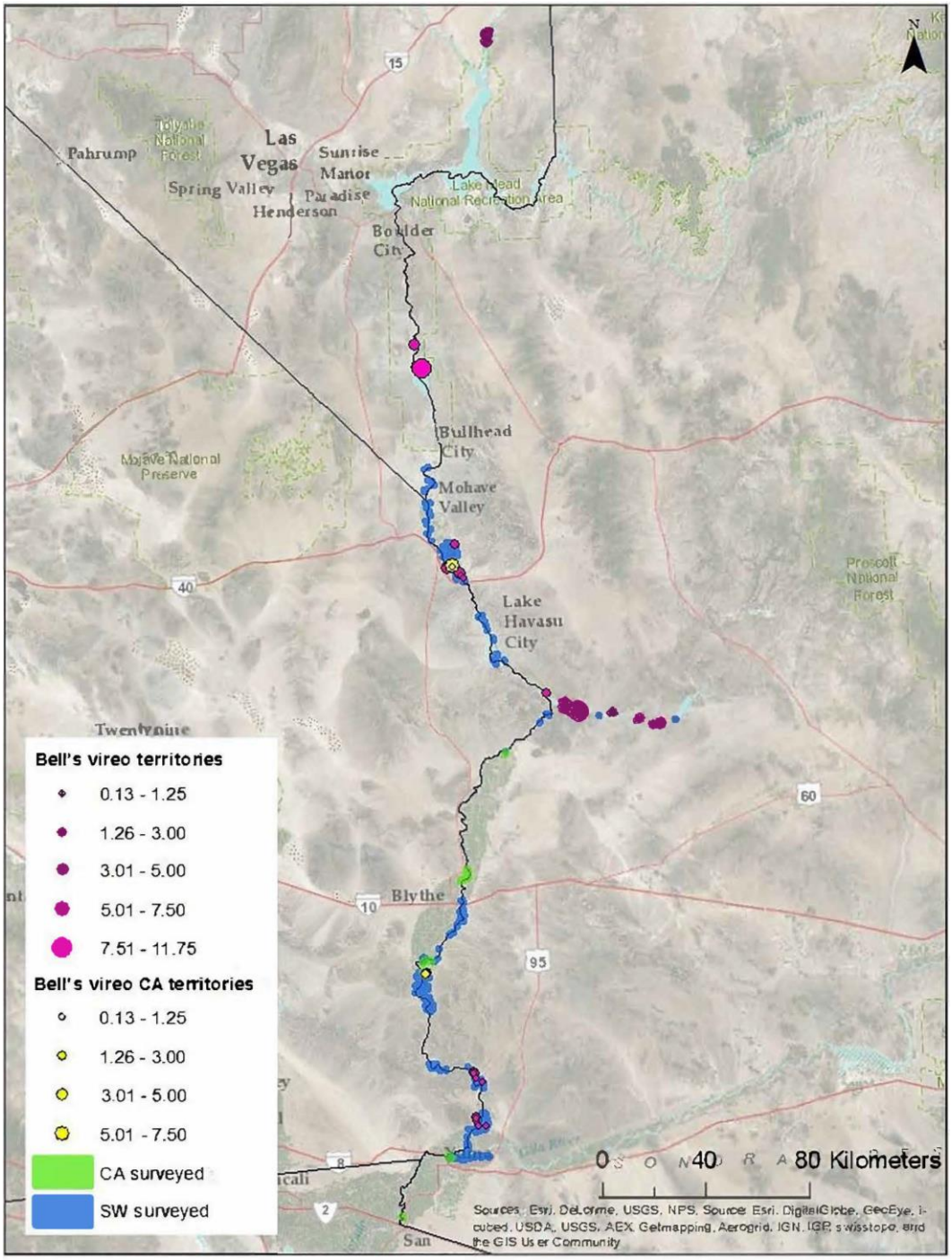

Figure 4-1.—Average number of Arizona Bell's vireo territories found throughout the LCR MSCP project area in 2011–15.

CA = surveyed as part of conservation area and Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09 (CRIT 9) coverage, and SW = surveyed as part of system-wide coverage.

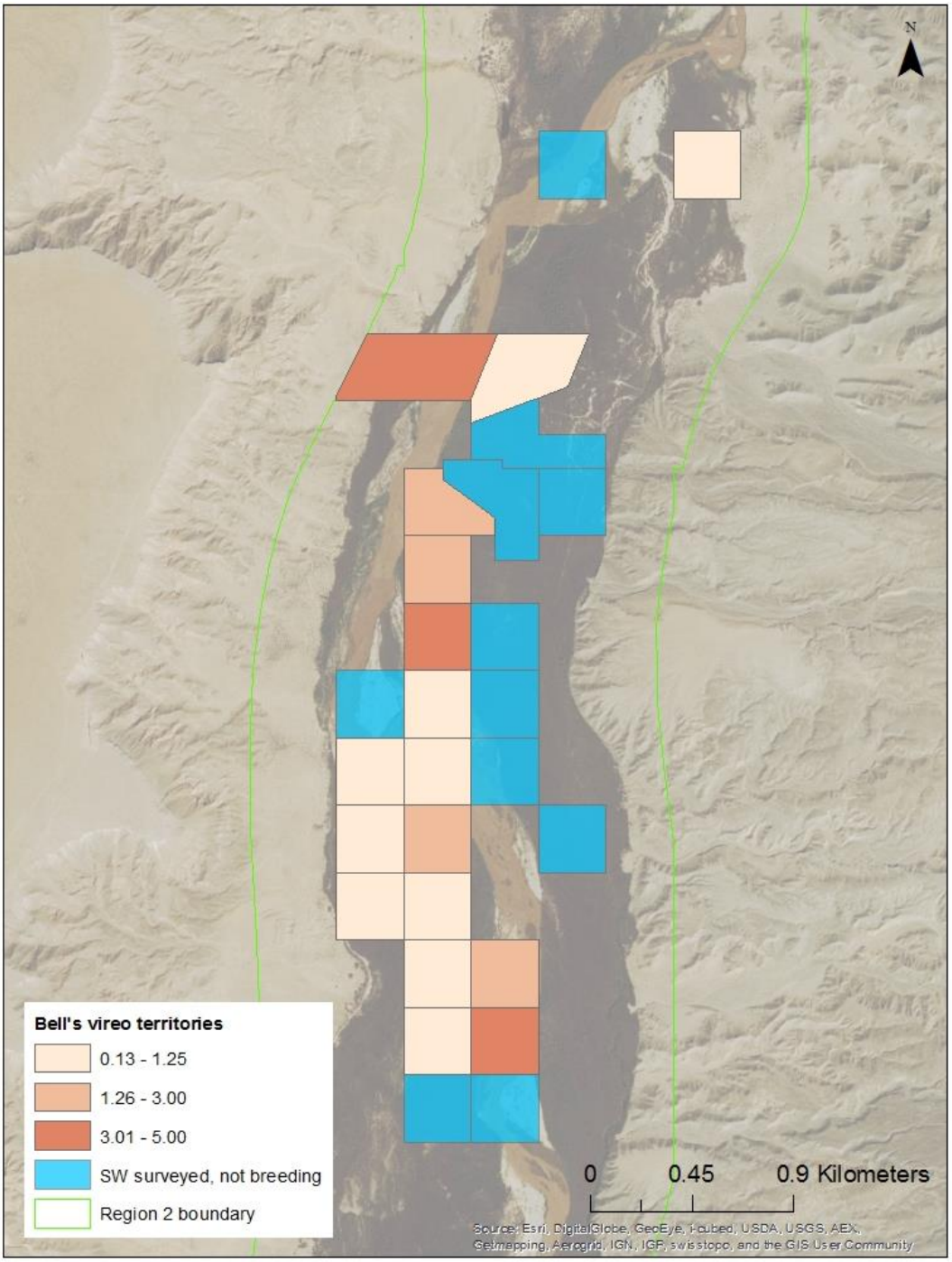

Figure 4-2.—Average number of Arizona Bell's vireo territories found in Region 2, Virgin River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

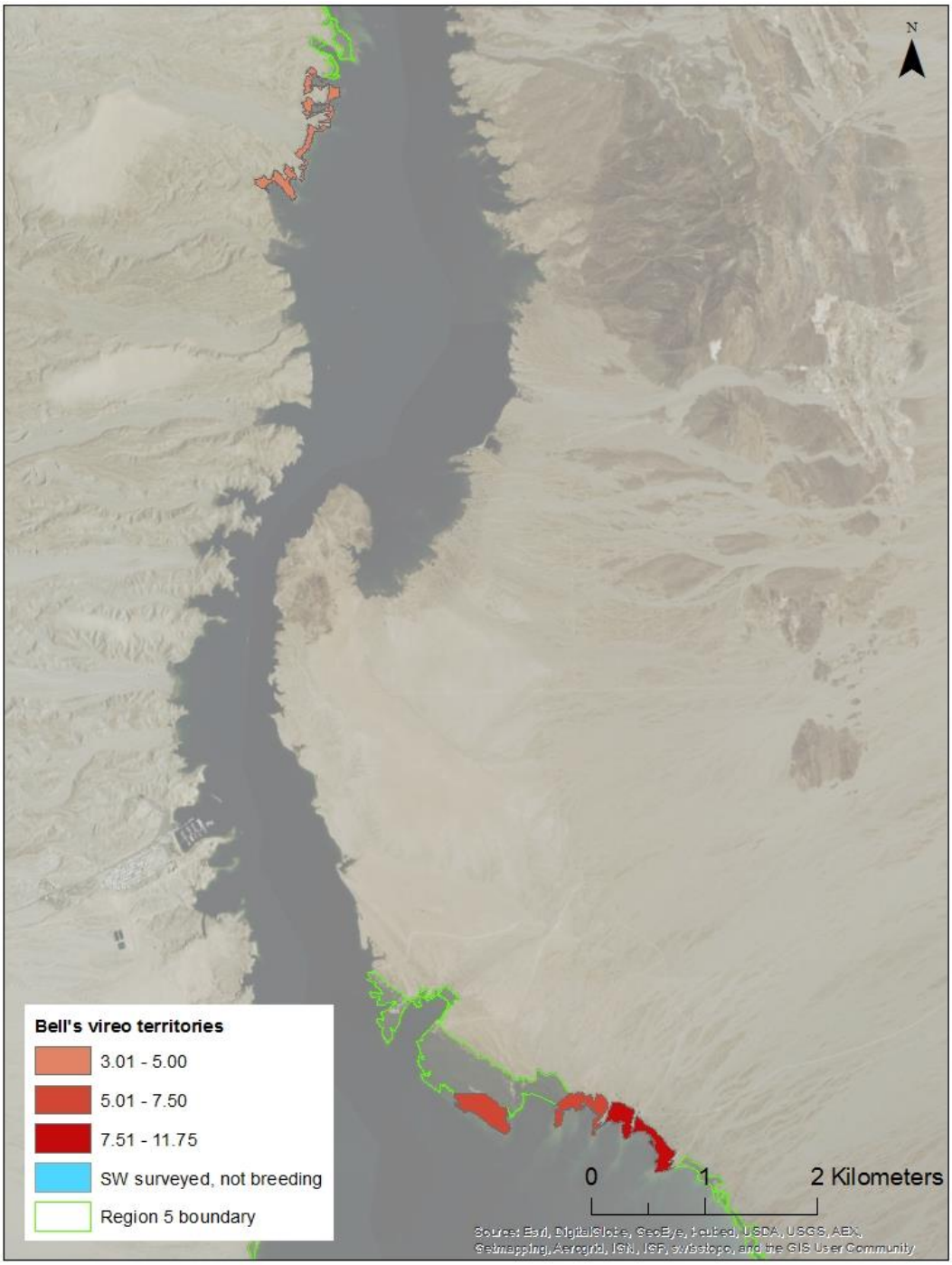

Figure 4-3.—Average number of Arizona Bell's vireo territories found in Region 5, Lake Mohave sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

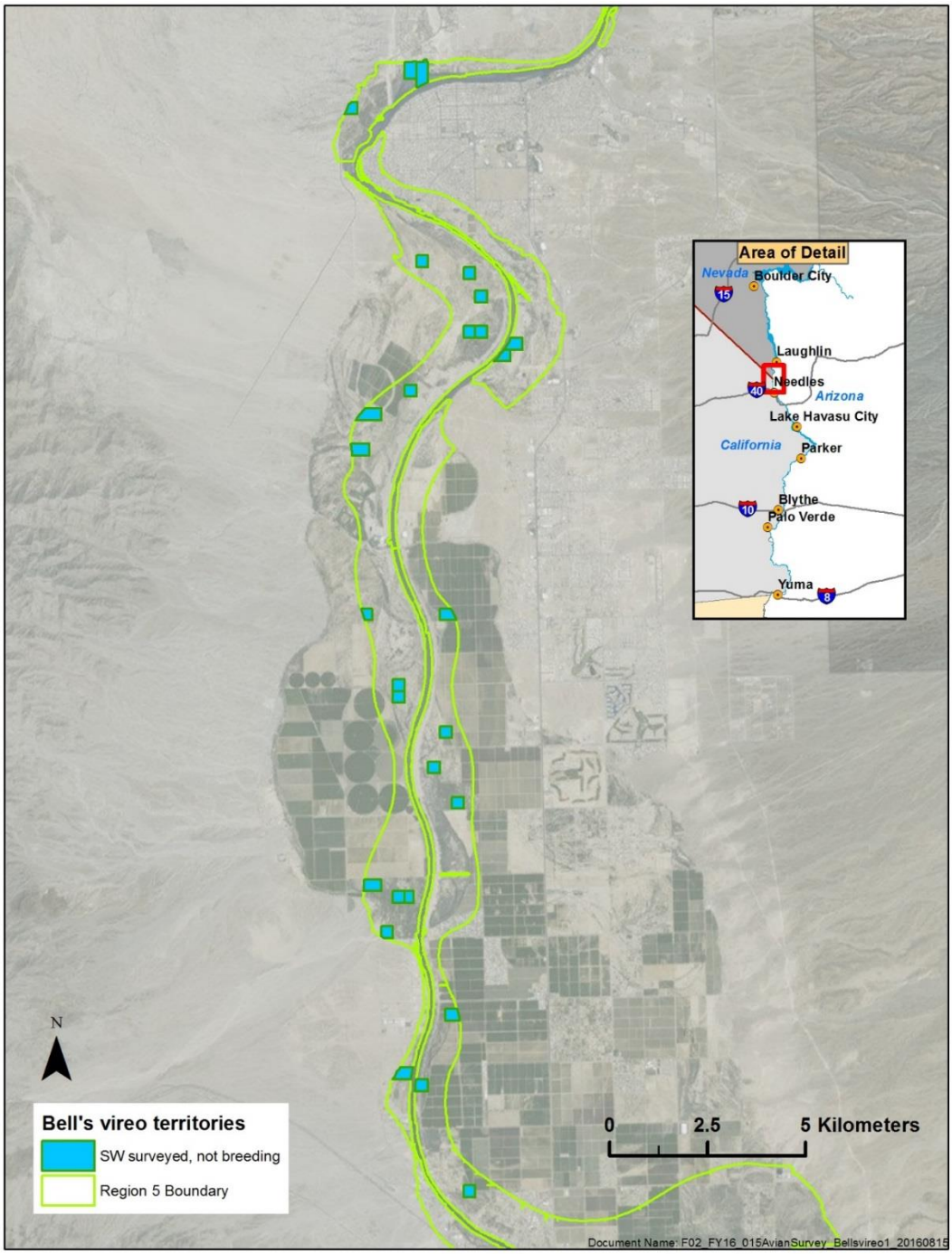

Figure 4-4.—Average number of Arizona Bell's vireo territories found in Region 5, Mohave Valley sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

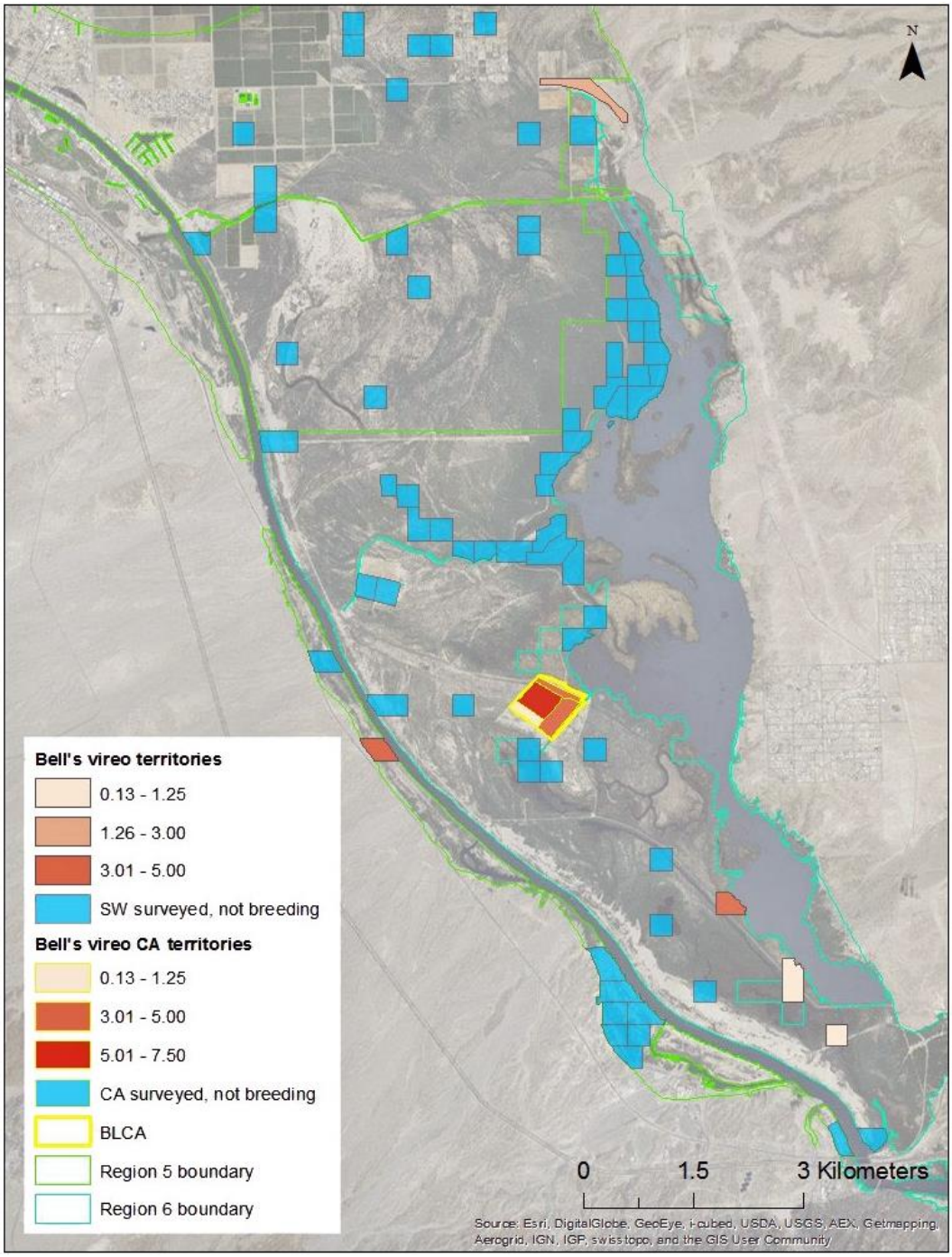

Figure 4-5.—Average number of Arizona Bell's vireo territories found in Regions 5 and 6, Topock Marsh sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-6.—Minimum convex polygons of Arizona Bell's vireo territories at the BLCA.

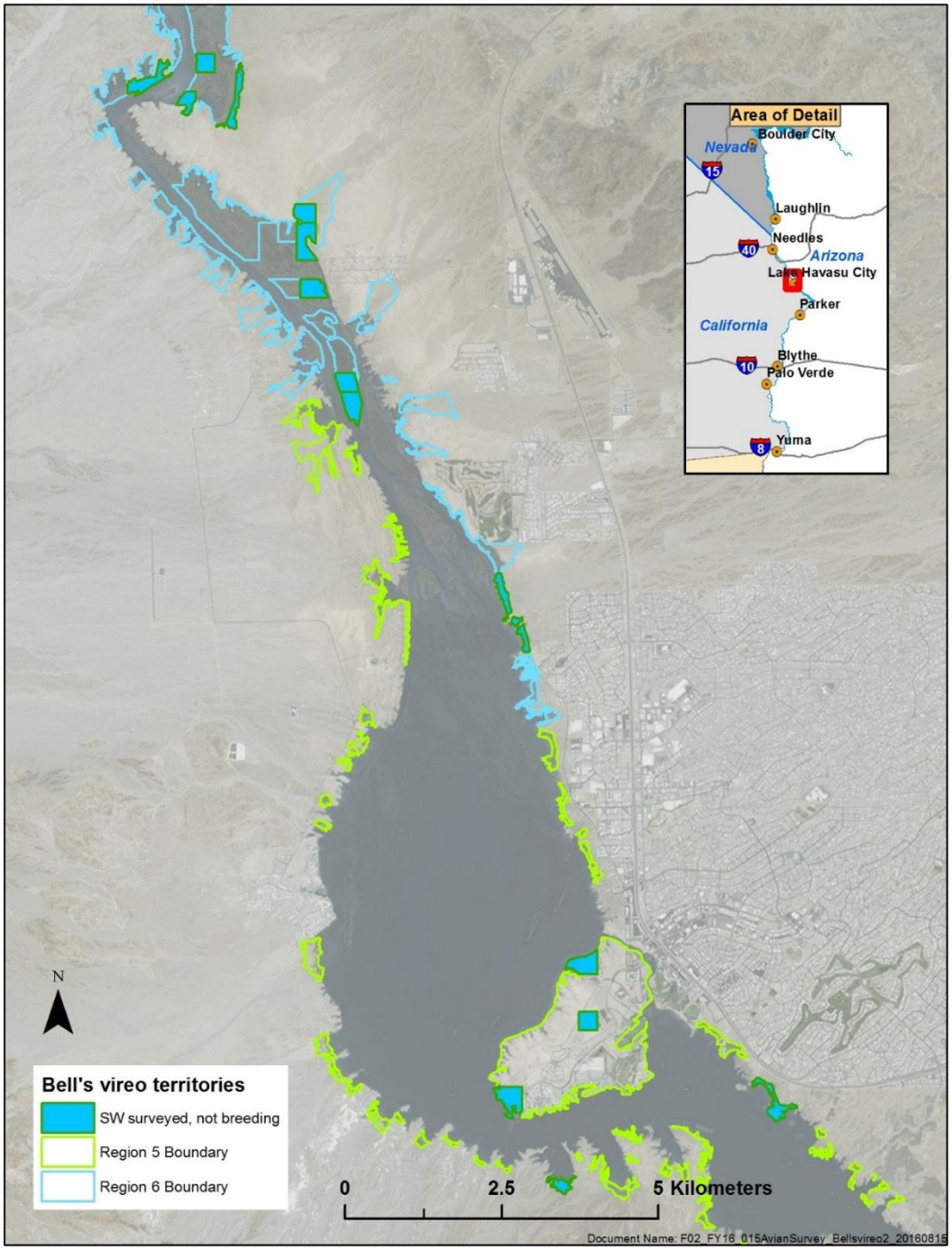

Figure 4-7.—Average number of Arizona Bell's vireo territories found in Regions 5 and 6, Topock Gorge and upper Lake Havasu sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

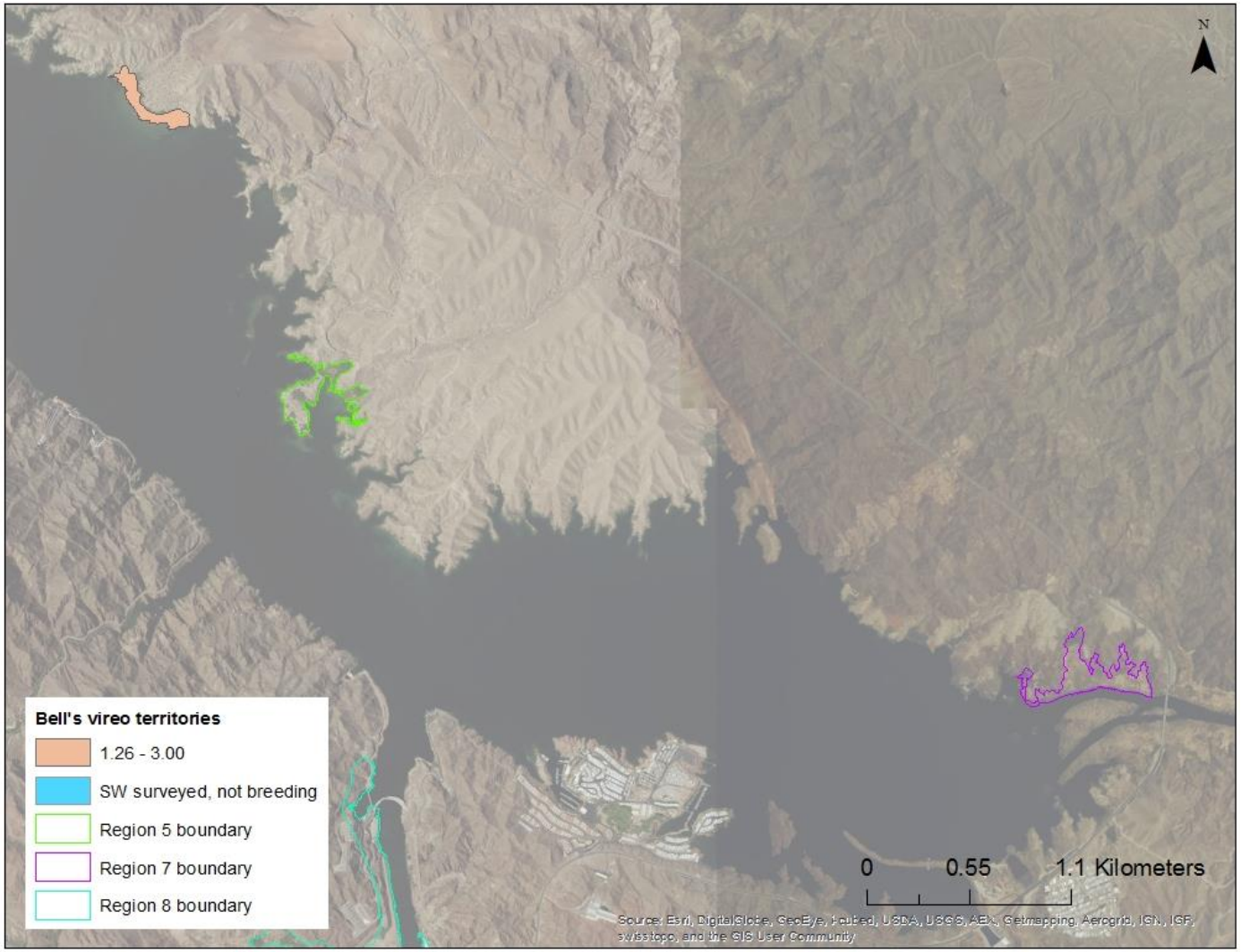

Figure 4-8.—Average number of Arizona Bell's vireo territories found in Region 5, lower Lake Havasu sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

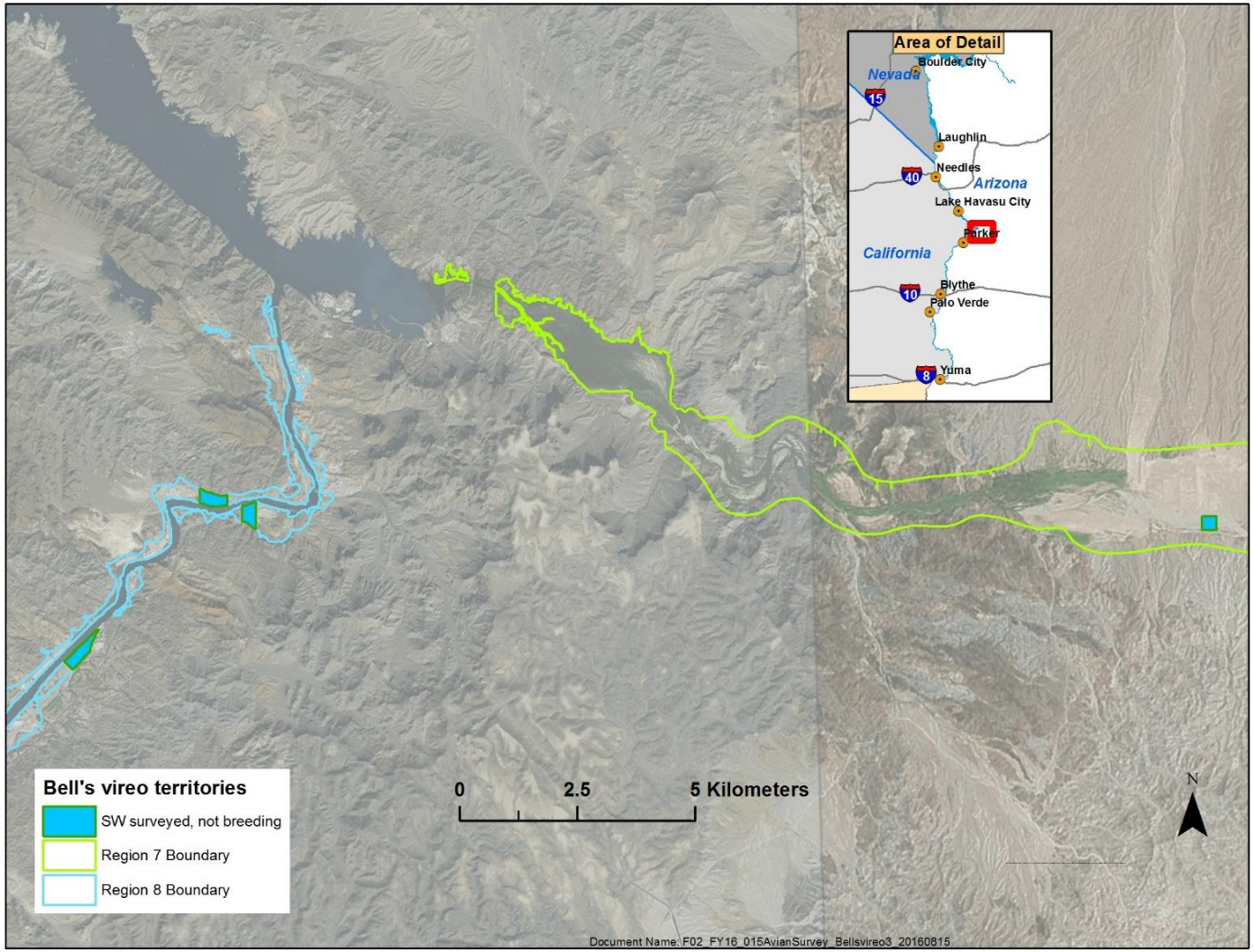

Figure 4-9.—Average number of Arizona Bell's vireo territories found in Regions 7 and 8, Bill Williams Delta and Parker Strip sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

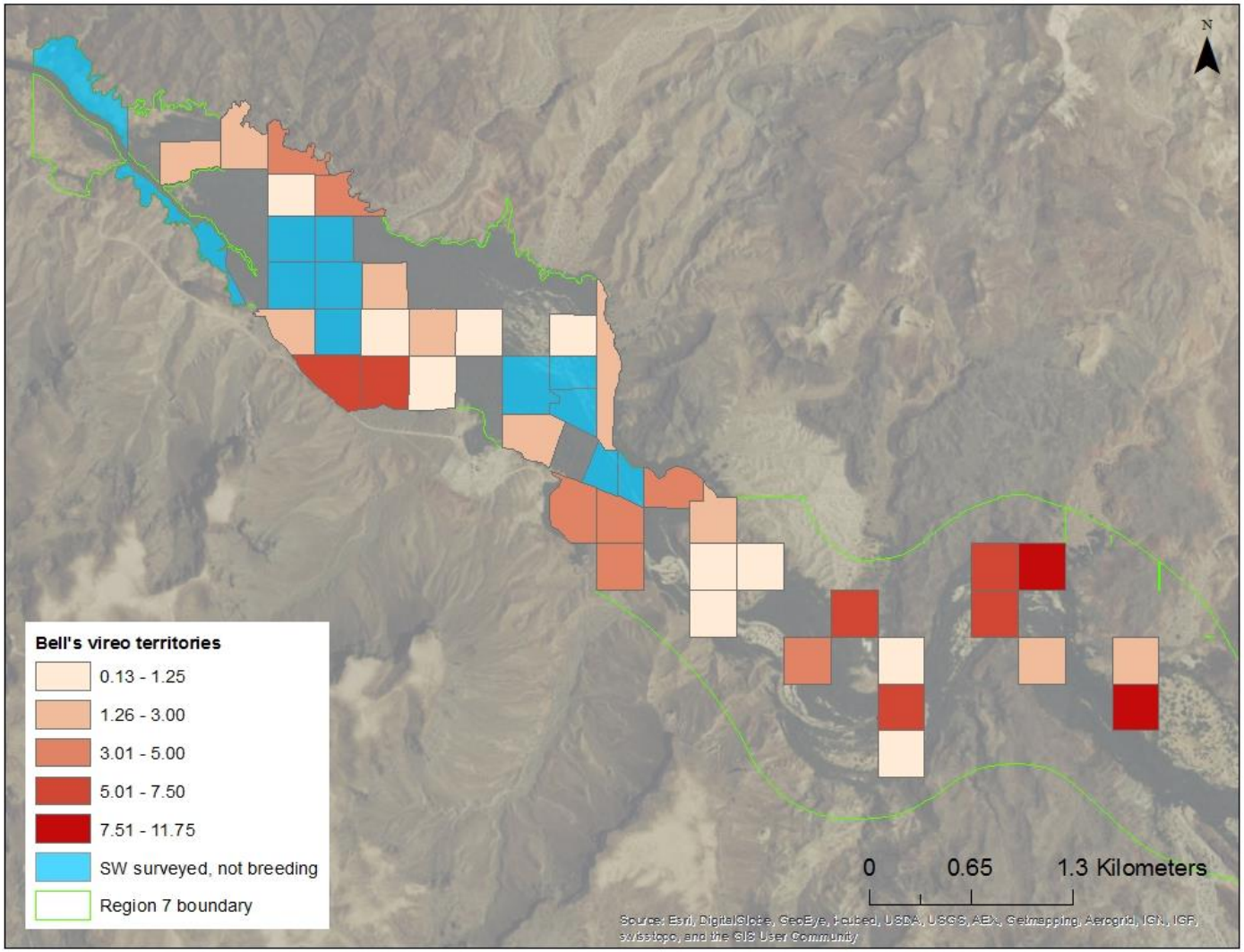

Figure 4-10.—Average number of Arizona Bell's vireo territories found in Region 7, lower Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

Figure 4-11.—Average number of Arizona Bell's vireo territories found in Region 7, upper Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

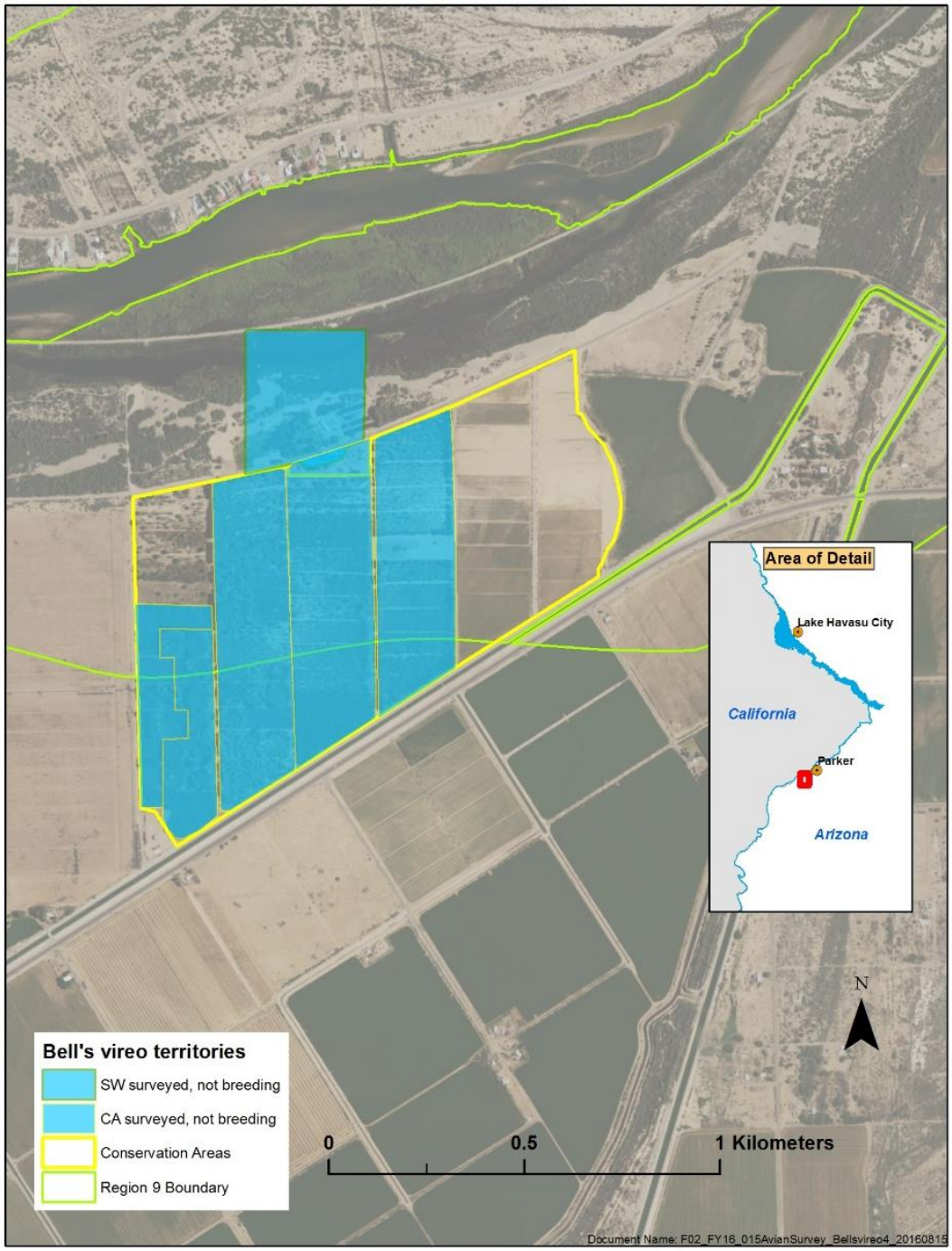

Figure 4-12.—Average number of Arizona Bell's vireo territories found in Region 9, Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

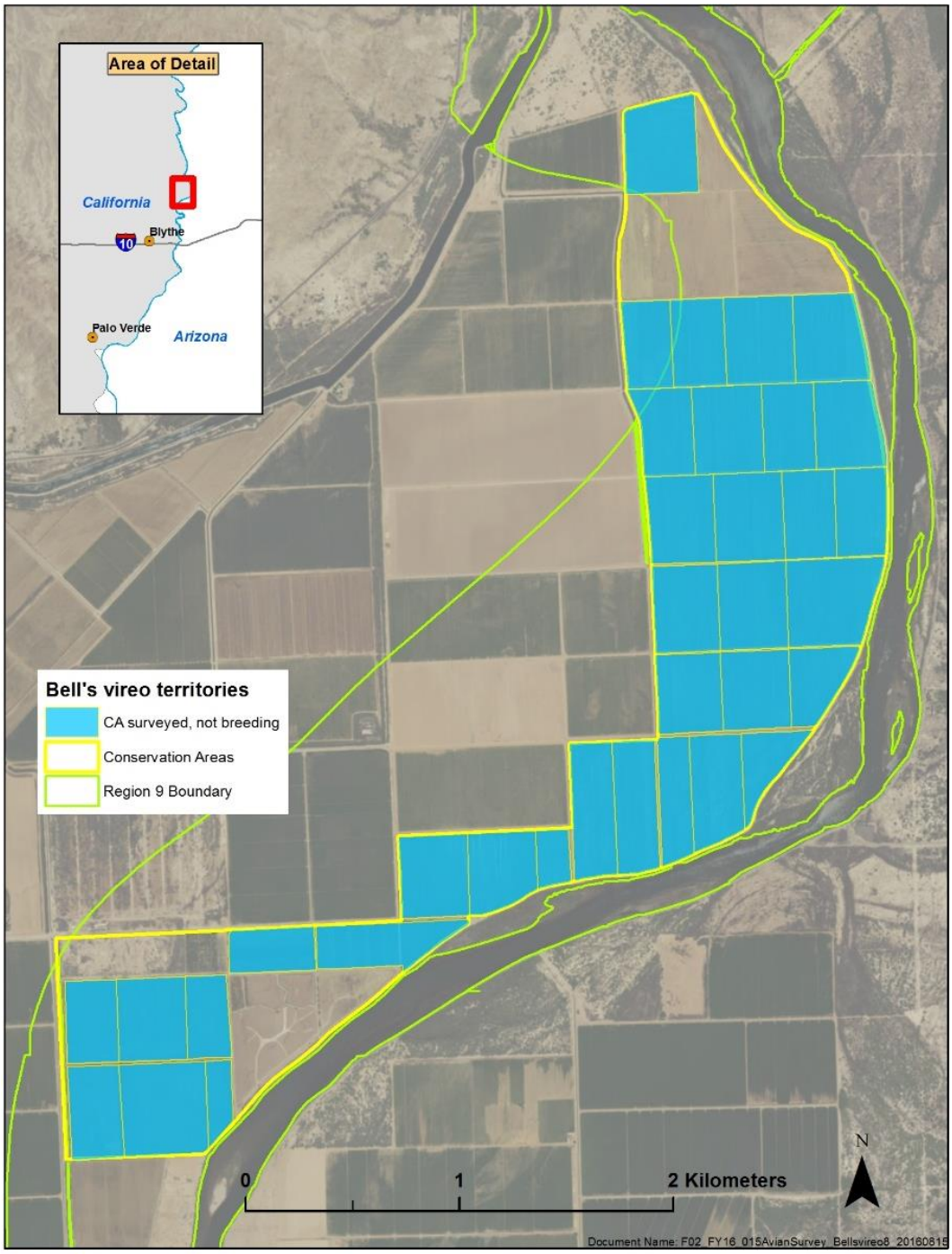

Figure 4-13.—Average number of Arizona Bell's vireo territories found in Region 9, the PVER, in 2011–15.
CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-14.—Minimum convex polygons of Arizona Bell's vireo territories at the PVER.
Territory was outside PVER boundaries near a plot that was surveyed in 2014 2014.

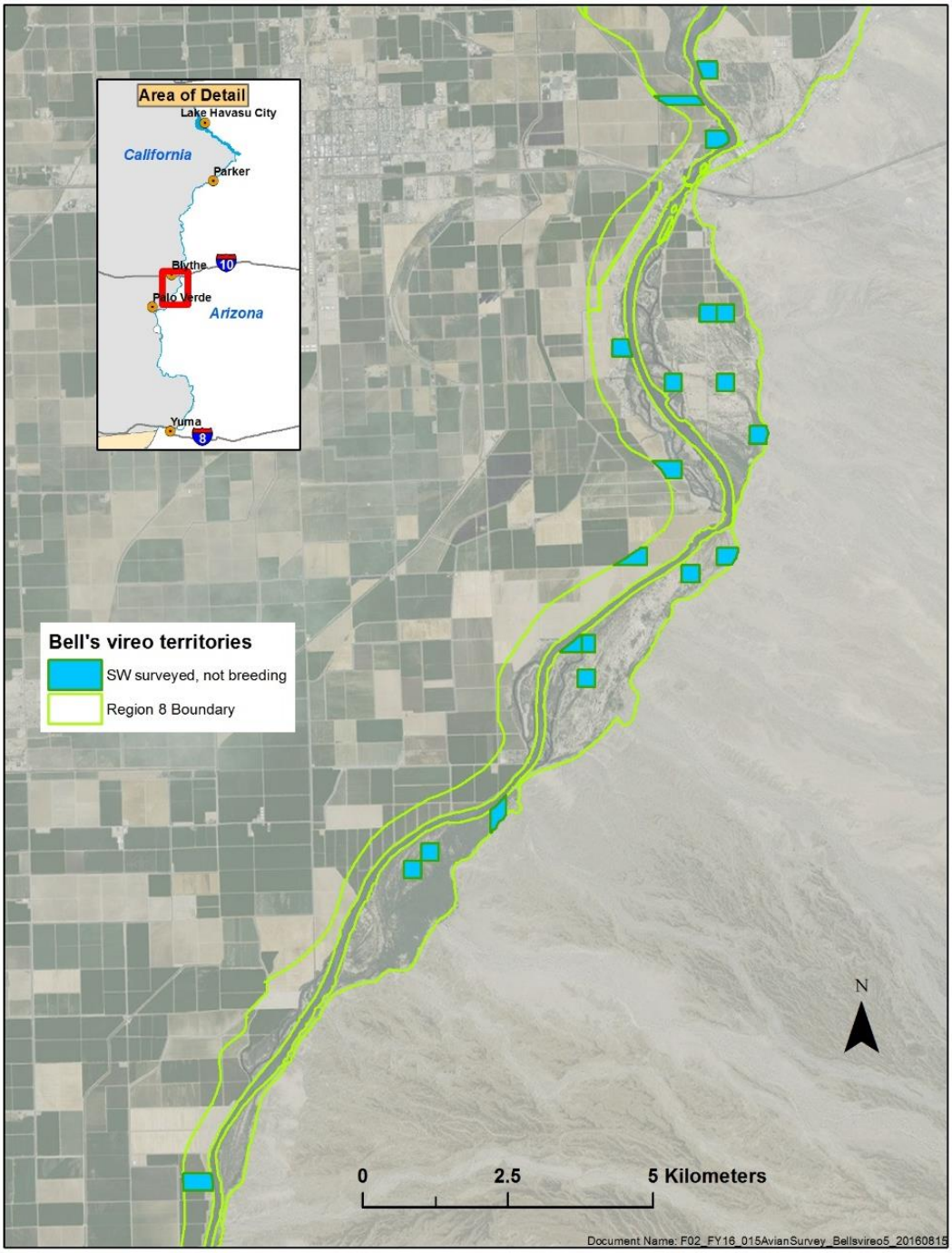

Figure 4-15.—Average number of Arizona Bell's vireo territories found in Region 8, Blythe and Palo Verde, California, sites, in 2011–15.

SW = surveyed as part of system-wide coverage.

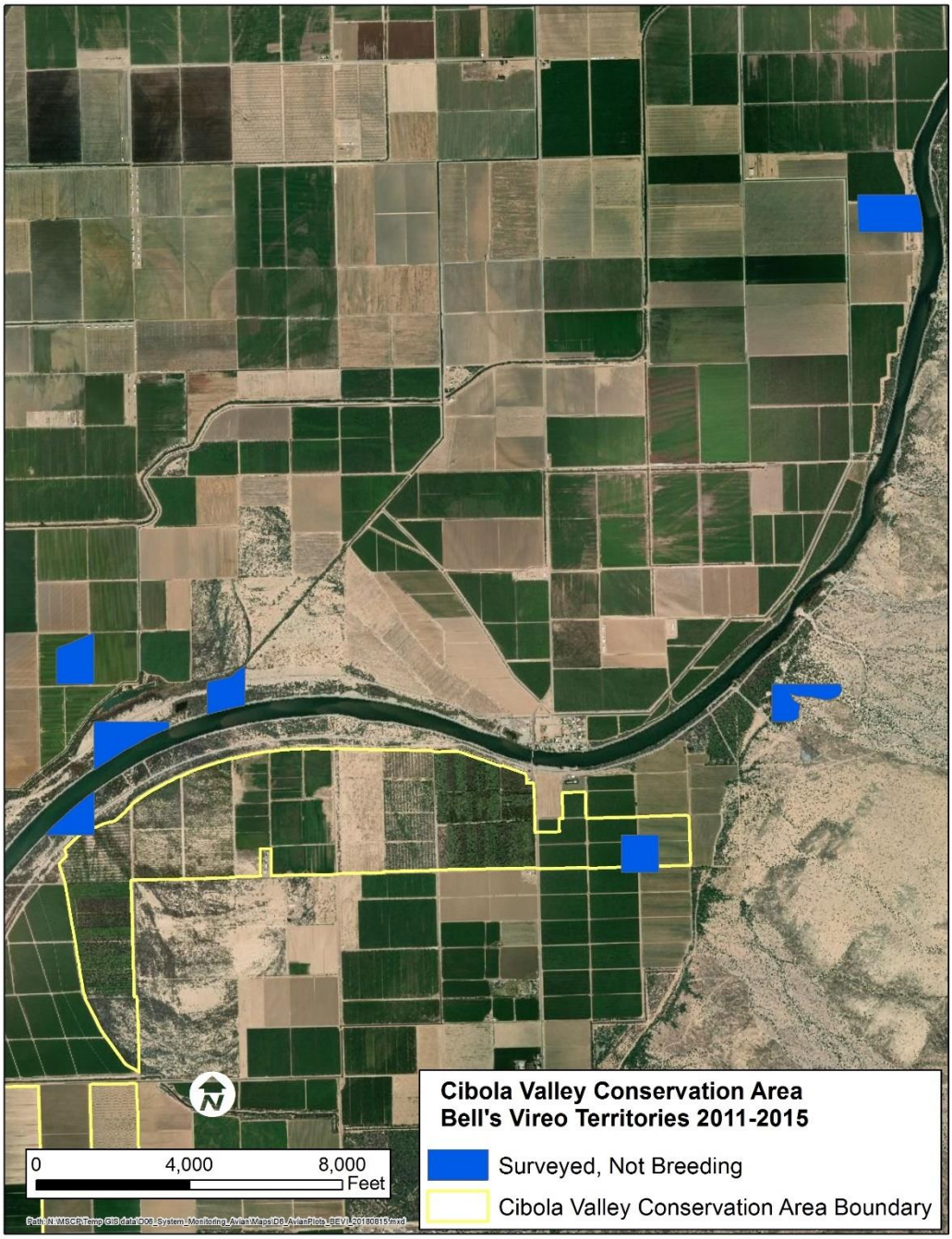

Figure 4-16.—Average number of Arizona Bell's vireo territories found in Region 8, Cibola Valley Sites, in 2011–15.

surveyed as part of system-wide coverage.

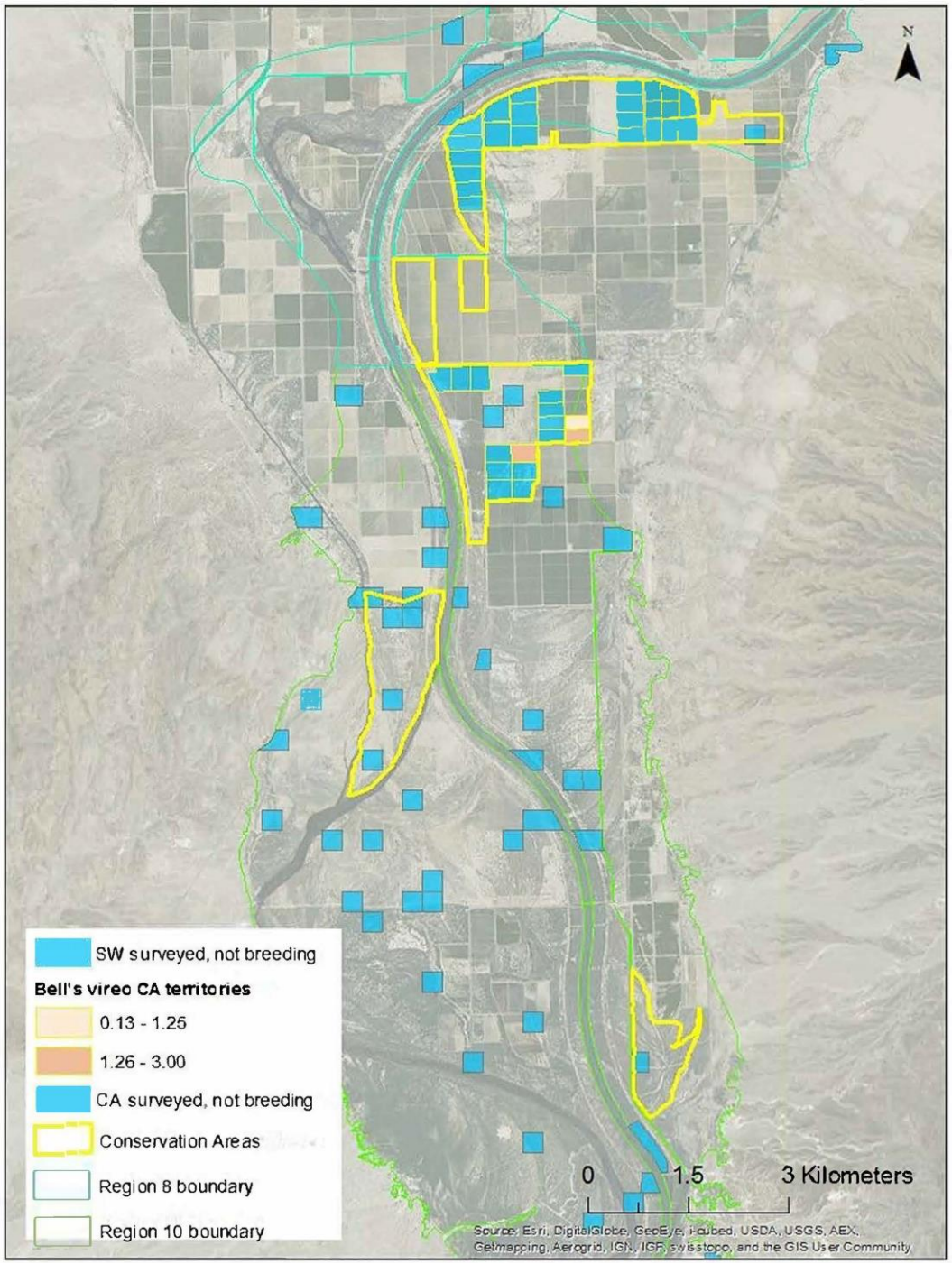

Figure 4-17.—Average number of Arizona Bell's vireo territories found in Regions 8 and 10, Cibola NWR and Cibola Valley sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

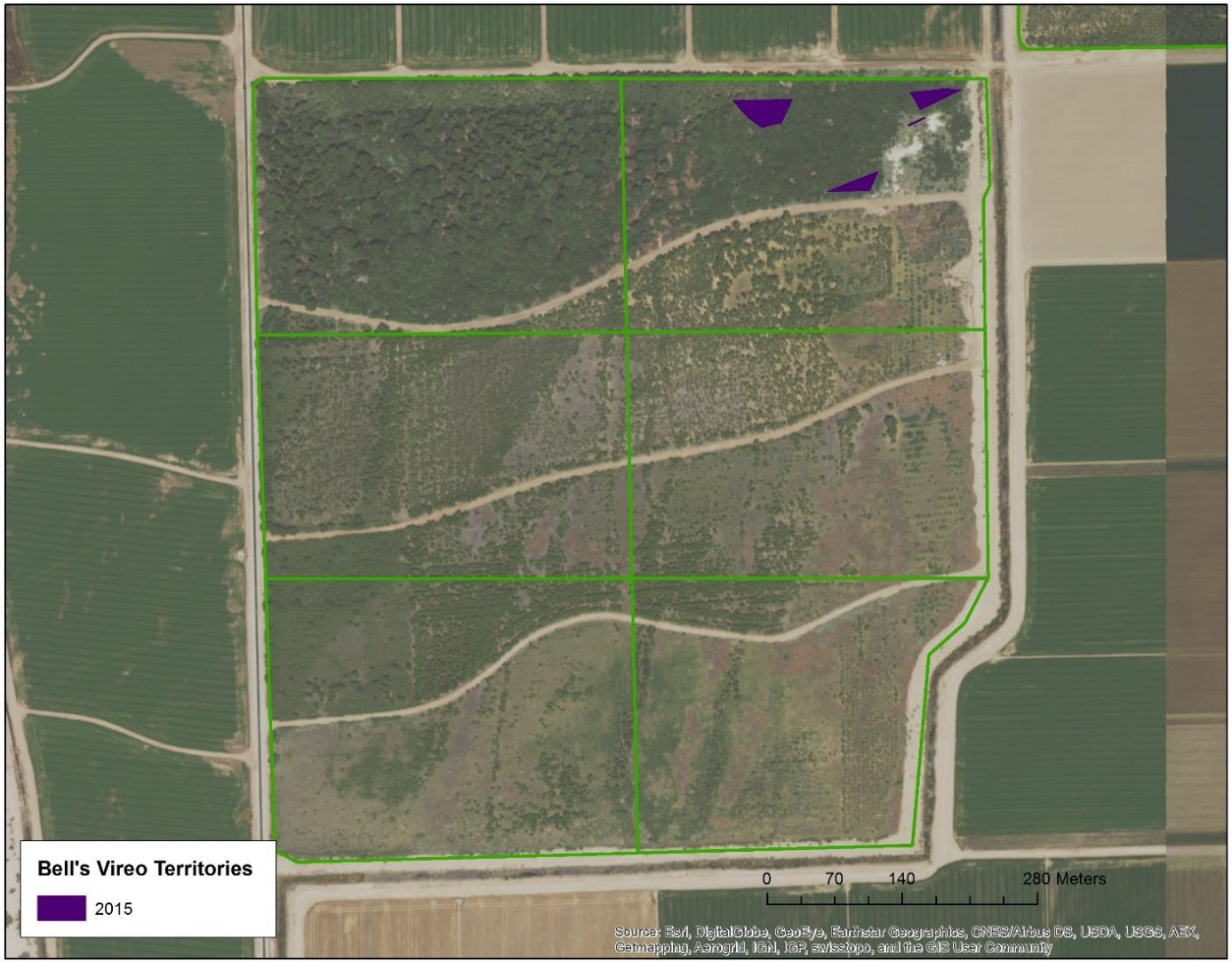

Figure 4-18.—Minimum convex polygons of Arizona Bell's vireo territories at Cibola NWR Unit #1, Crane Roost.

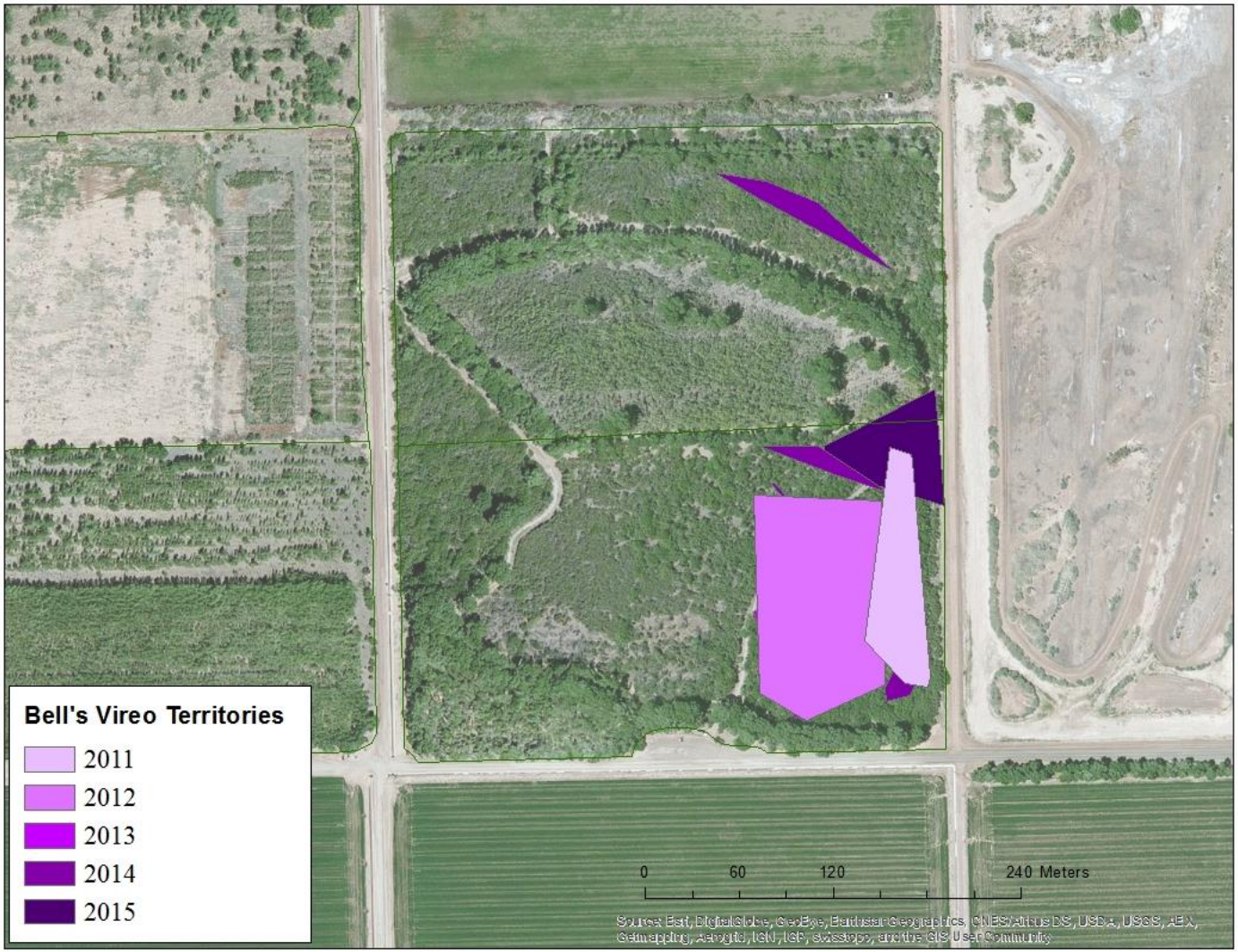

Figure 4-19.—Minimum convex polygons of Arizona Bell's vireo territories at Cibola NWR Unit #1, Nature Trail.

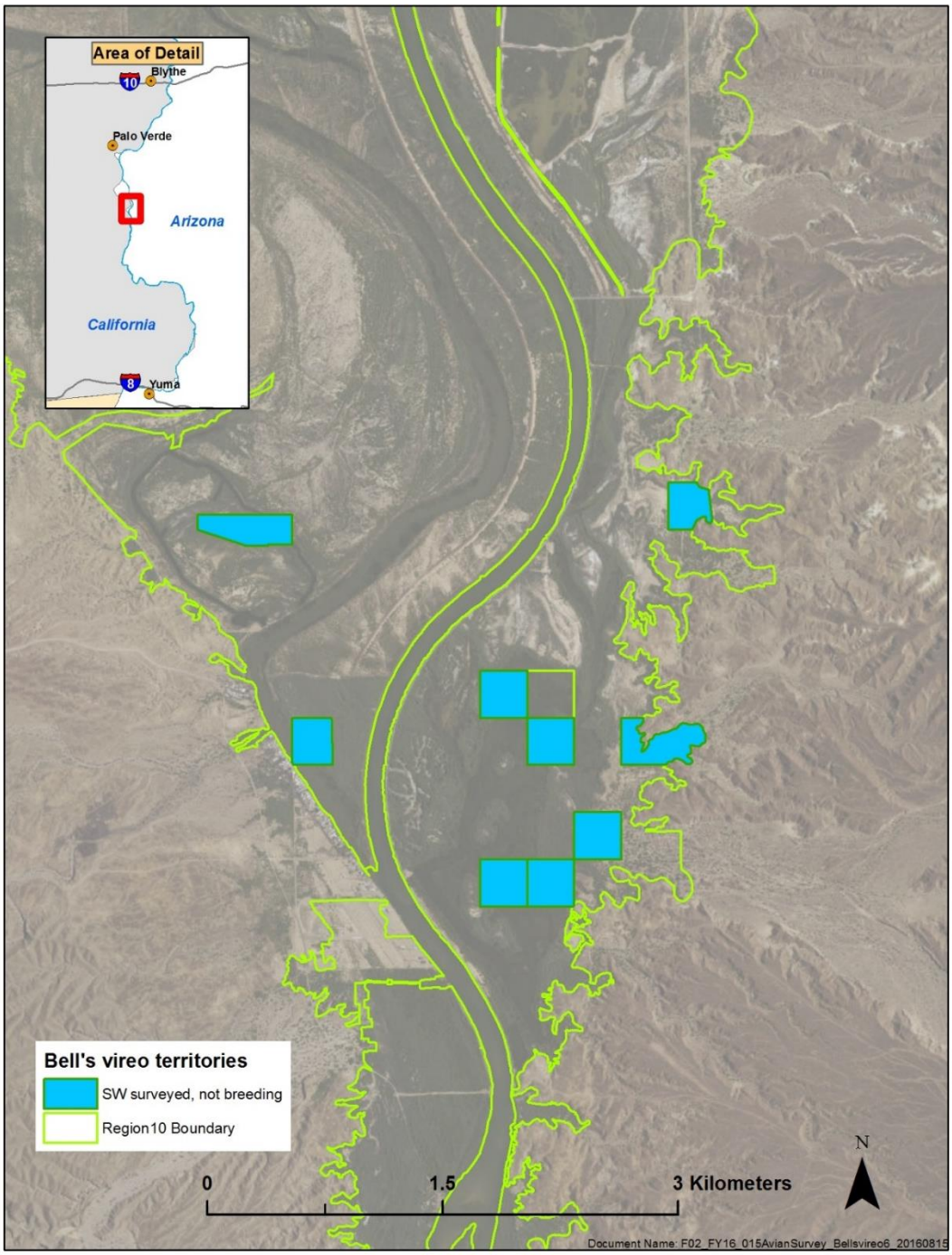

Figure 4-20.—Average number of Arizona Bell's vireo territories found in Region 10, southern Cibola NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

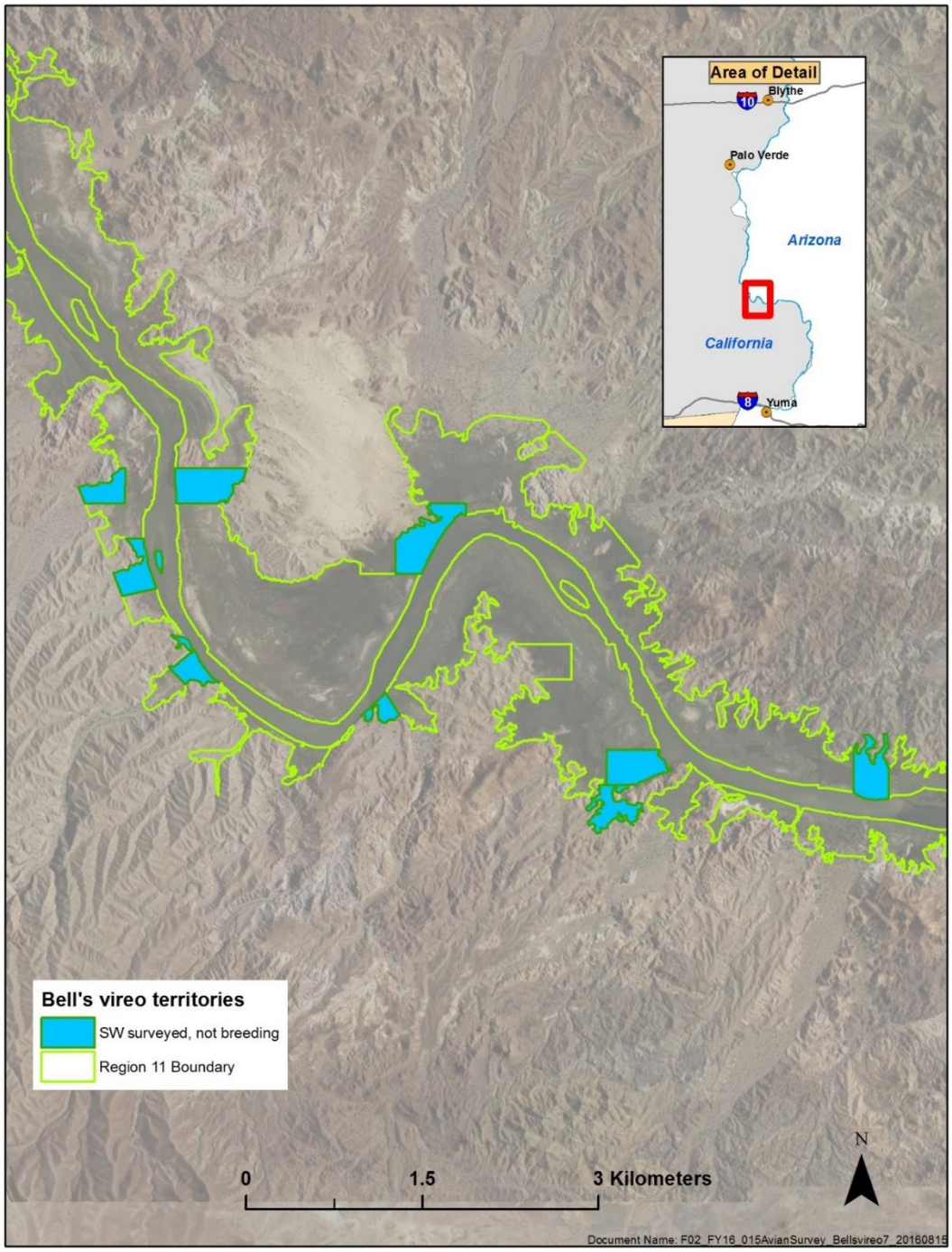

Figure 4-21.—Average number of Arizona Bell's vireo territories found in Region 11, northern Imperial NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

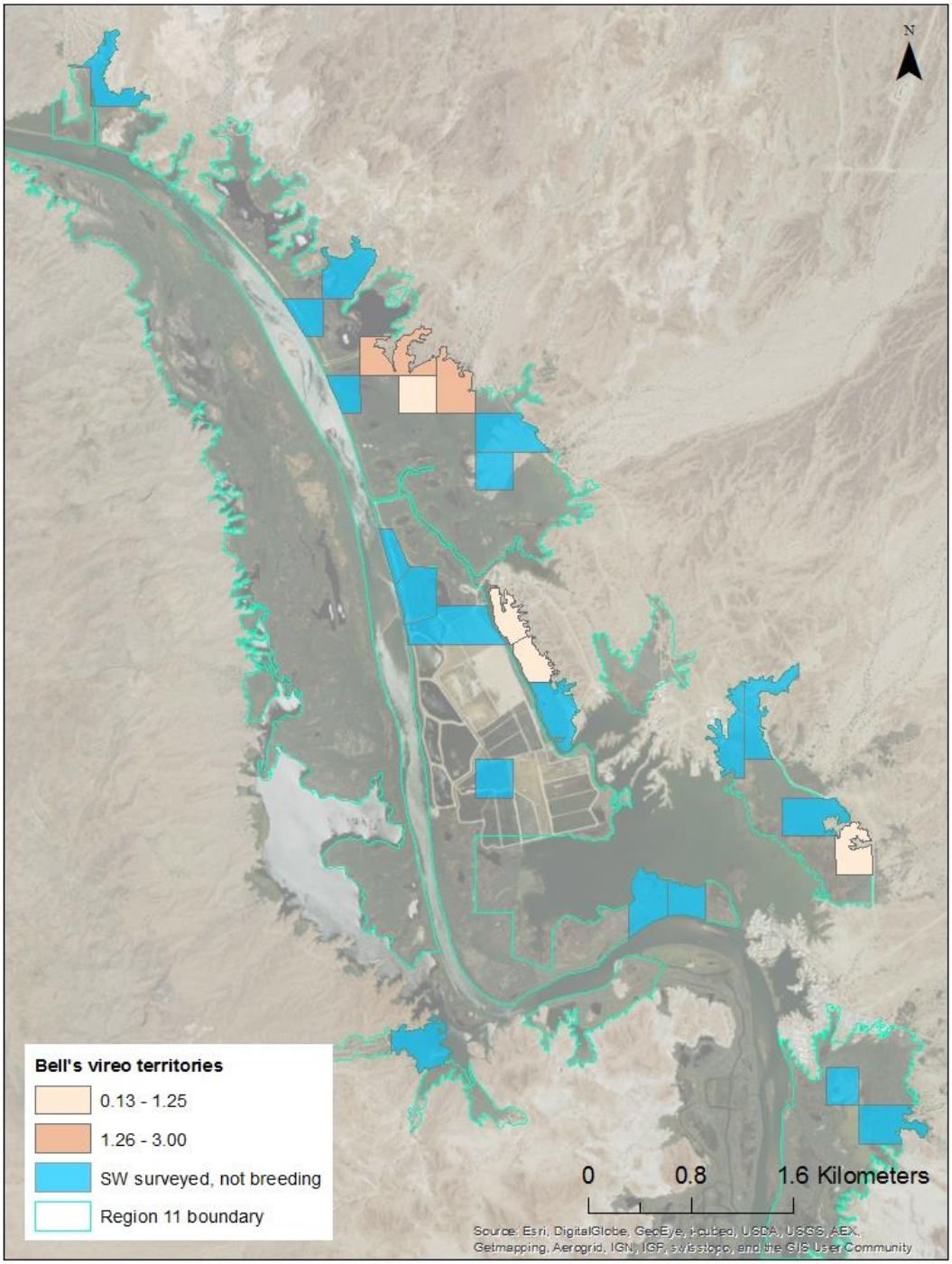

Figure 4-22.—Average number of Arizona Bell's vireo territories found in Region 11, Imperial NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

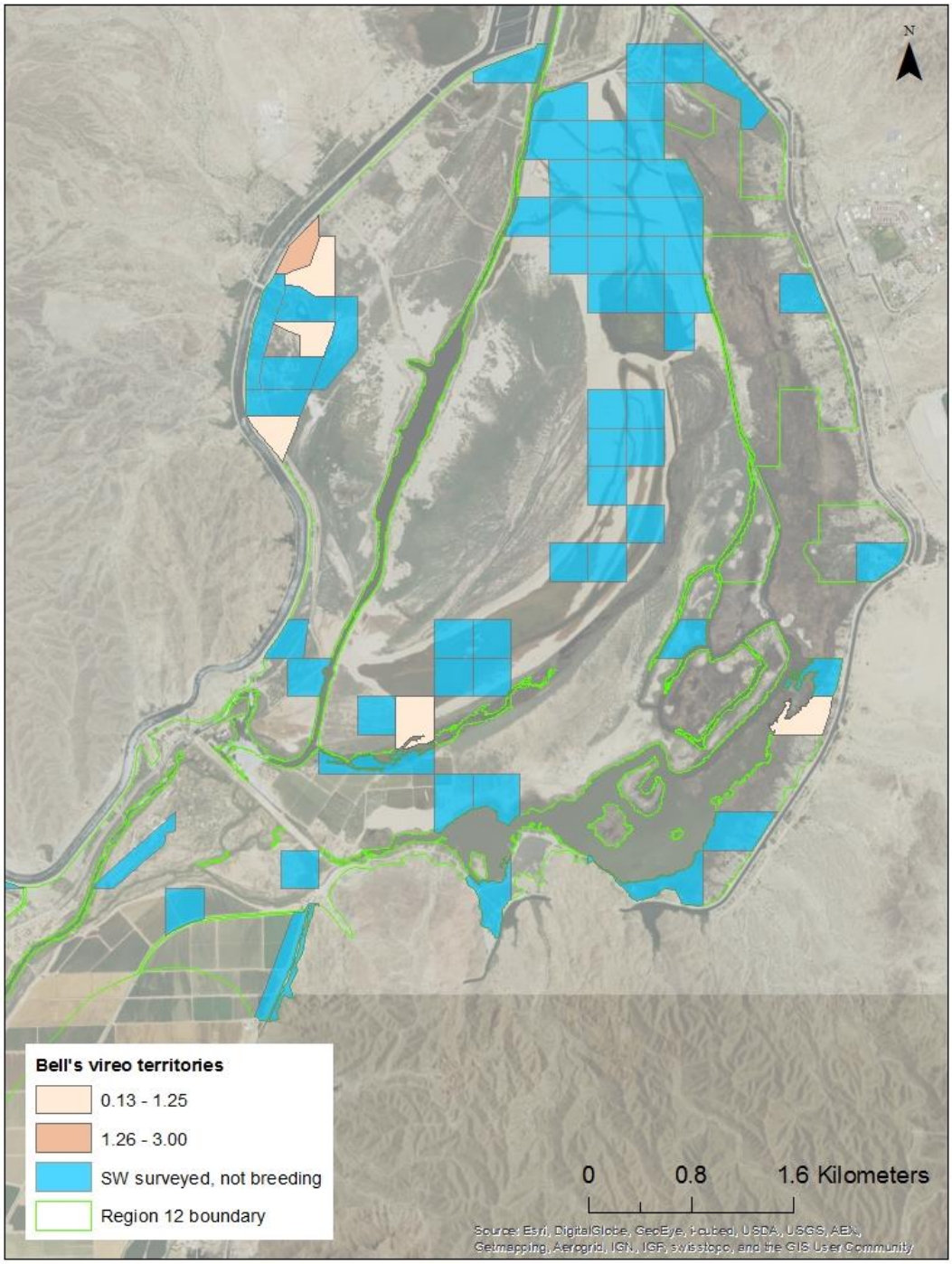

Figure 4-23.—Average number of Arizona Bell's vireo territories found in Region 12, Imperial/Laguna Dam area sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

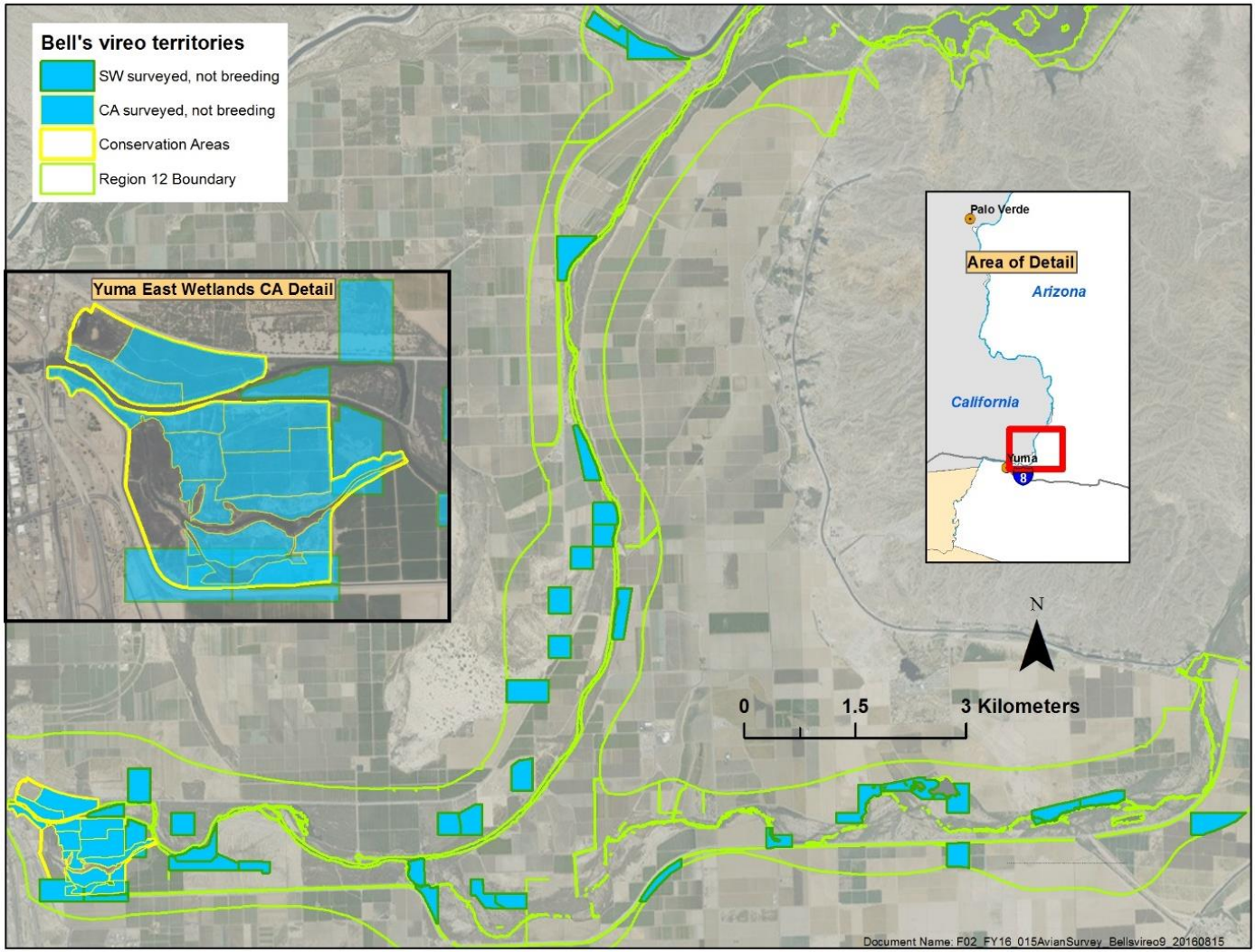

Figure 4-24.—Average number of Arizona Bell's vireo territories found in Region 12, Yuma/Gila River, Arizona, sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

Sonoran Yellow Warbler

Observed Habitat Use in the Project Area

- Sonoran yellow warblers are strongly tied to cottonwood-willow habitat associations along the lower Colorado River. We also found Sonoran yellow warblers using areas with a saltcedar component when a few large willow trees and inundated or moist soils are present.

- This species is primarily found in sites with nearby surface water, such as along river or lake shores or in areas that have been recently flooded. Nearby wetlands may be important to this species based on high territory densities in these areas.

Phenology in the Project Area

- Our observations of territories suggest that local breeders arrive in late March, consistent with published data (Phillips 1951; Phillips et al. 1964).

- Migrants appear to arrive mid- to late April (usually after April 20) and are present through early June.

- Observations of confirmed breeding provided a range of incubation initiation of April 19 to May 18, with a peak in late April. This is earlier than previously published nesting phenology in the region and elsewhere (Lowther et al. 1999; Corman and Wise-Gervais 2005), but breeding attempts may have also occurred later in the season after our field surveys had ended.

Surveying This Species

- Yellow warblers (*Dendroica petechia = Setophaga petechia*) are difficult to survey during any monitoring effort on the lower Colorado River because migrants and breeders are both present throughout much of the season. However, because migrants arrive after breeding pairs, late March and early April are key times to survey for this species, as this represents the window when migrants are still absent.

- We have observed territory establishment occurring later in the season in conservation areas than in system-wide sites. However, differences in phenology in different habitat and area search survey types have not been examined in detail.

- Yellow warblers and Lucy's warblers (*Oreothlypis luciae*) have similar songs and can present identification challenges for less-experienced surveyors.

- Rapid area search surveys tend to overestimate this species likely due to detection of migrant individuals. However, numbers are often underestimated in highly suitable habitat areas where this species is very abundant and territory delineation is difficult due to the high densities and small territory sizes.

Status and Distribution in 2011–2015

- Grinnell's original surveys (Grinnell 1914) in the early 1900s described Sonoran yellow warblers as abundant breeders throughout the lower Colorado River.

- Sonoran yellow warblers were recorded along the length of the lower Colorado River in the 5-year study of 2011–15 (figures 4-25 to 4-51).

- Our 2011–15 (5-year) population estimate was 1,786 (SE = 484) pairs for the LCR MSCP project area.

- Over the 5-year project in 2011–15, Sonoran yellow warbler territories documented on area search surveys fluctuated with a range of 68 territories recorded in 2012 to a high of 160.75 territories in 2014 likely due to random plot selection each year.

- We noted annual fluctuations and variation in habitat use at the conservation areas and CRIT 9, specifically with no Sonoran yellow warblers detected nesting at the Cibola Valley Conservation Area (CVCA) or the Nature Trail within Cibola NWR Unit #1 between 2013 and 2015 (figures 4-42, 4-43, and 4-46). At Crane Roost within Cibola NWR Unit #1, a territory was first detected in 2014 and again in 2015 (figure 4-45). For the first time since the conservation area was created, a territory of Sonoran yellow warblers was also recorded in Yuma East Wetlands (YEW) in 2015 (figures 4-50 and 4-51).

- The BLCA remains an important conservation area for Sonoran yellow warblers, as seen with the high numbers of Sonoran yellow warbler territories (range 7 to 20 per year) at this conservation area since 2011 (figures 4-29 and 4-30).

- We recorded a fairly large breeding population along the Virgin River, with all but 5 of the 28 surveyed plots containing Sonoran yellow warbler territories (figure 4-26).

- We also found the shoreline of Lake Mohave to be a hotspot for this species (figure 4-27). For example, 31 territories were found along an approximately 850-meter stretch of shoreline that featured large Goodding's willow (*Salix gooddingii*) as the dominant tree.

- Farther south, this species breeds most densely on the Bill Williams River (figures 4-34 and 4-35), with over 280 territories recorded, but it was also found breeding commonly at Topock Marsh (figure 4-29), with roughly 90 territories, and it is fairly common at the PVER (figure 4-38 to 4-40), with about 13 territories.

- Smaller numbers of breeding pairs were also found at Topock Gorge, CRIT 9, the CVCA, Cibola NWR Unit #1, the Cibola NWR near Cibola Lake, the Imperial NWR, and near Yuma at YEW and on the Gila River (figures 4-31, 4-36, 4-37, 4-42 to 4-48, 4-50, and 4-51).

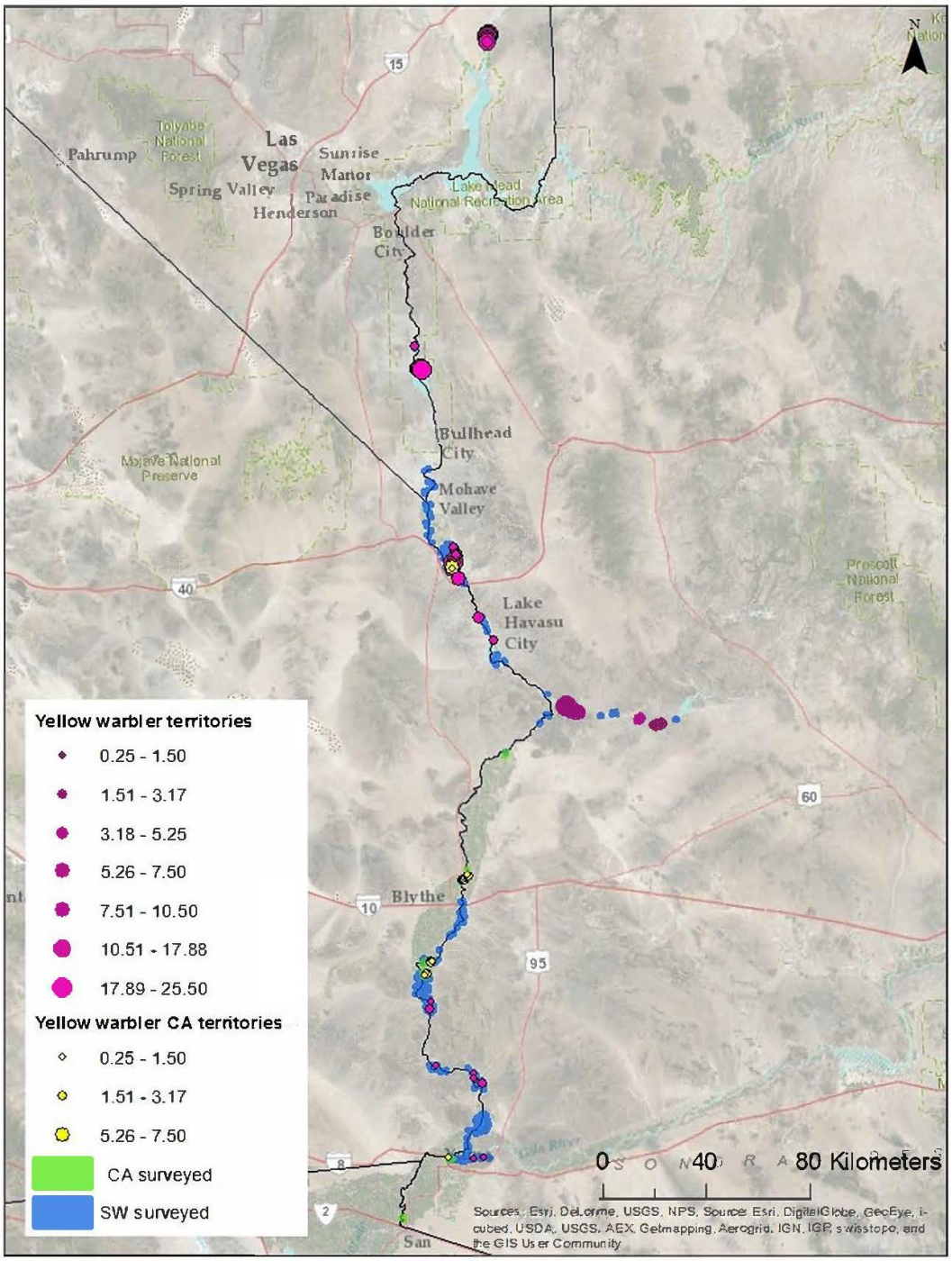

Figure 4-25.—Average number of Sonoran yellow warbler territories found throughout the LCR MSCP project area in 2011–15.
CA = surveyed as part of conservation area and CRIT 9 coverage, and SW = surveyed as part of system-wide coverage.

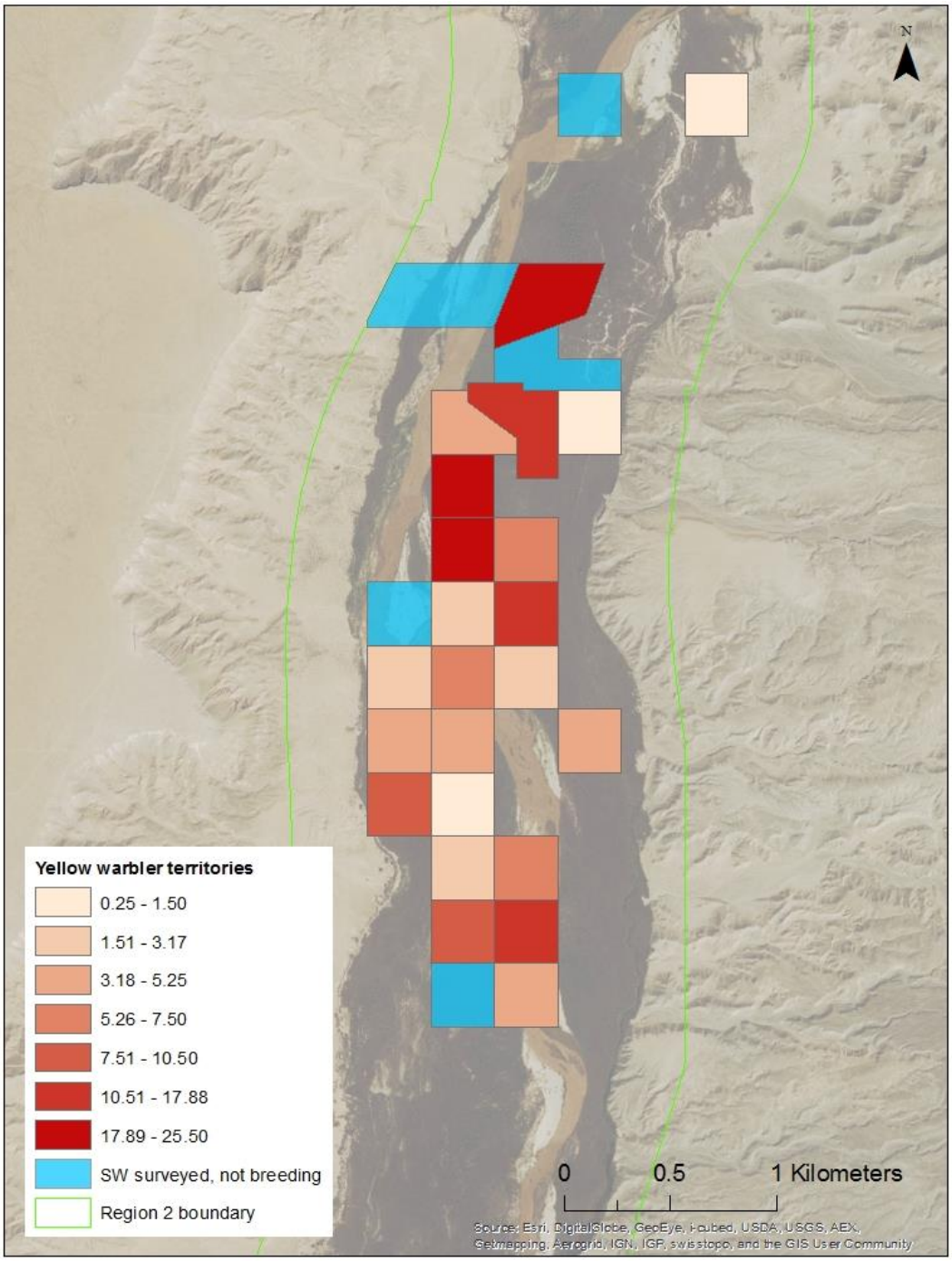

Figure 4-26.—Average number of Sonoran yellow warbler territories found in the Region 2, Virgin River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

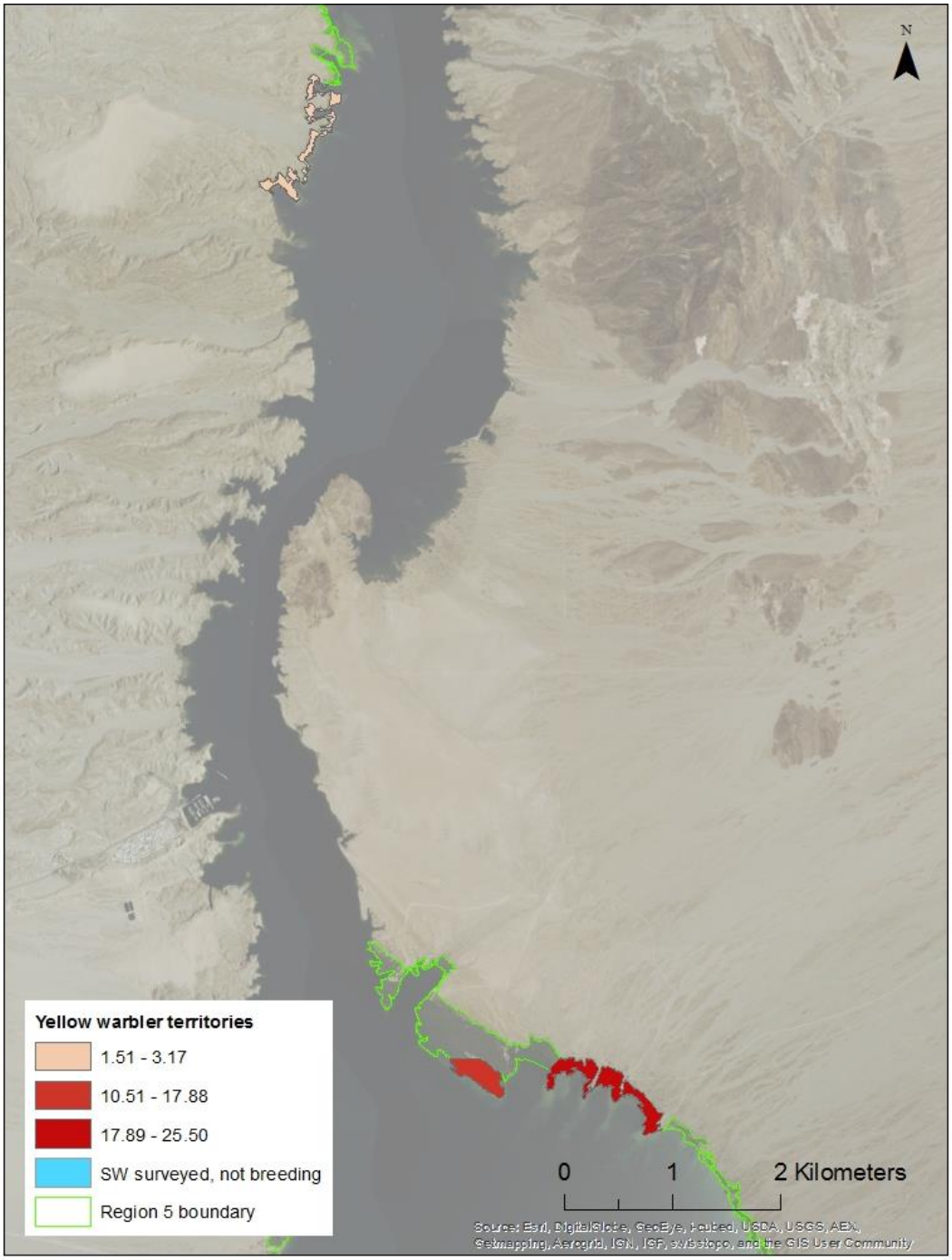

Figure 4-27.—Average number of Sonoran yellow warbler territories found in Region 5, Lake Mohave sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

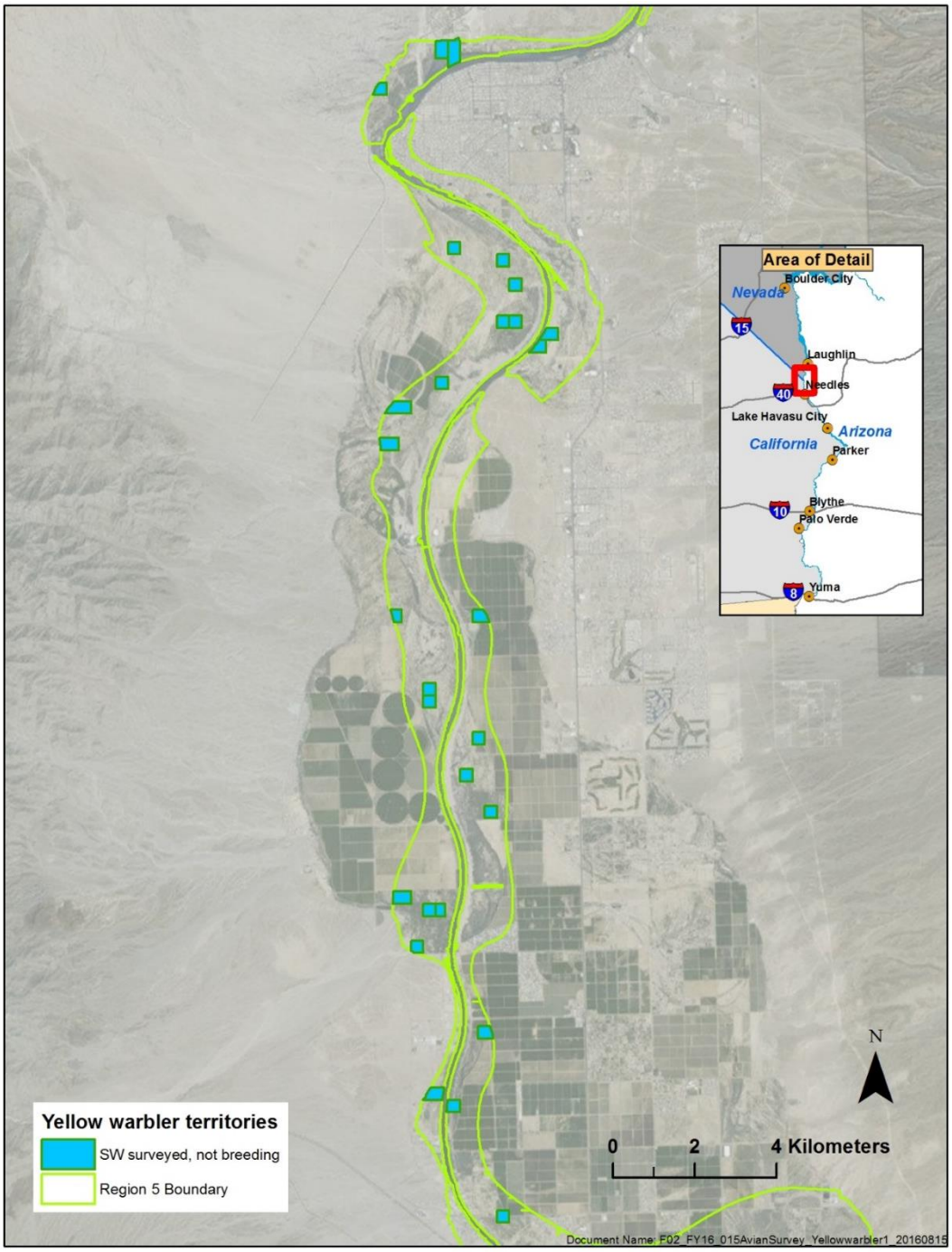

Figure 4-28.—Average number of Sonoran yellow warbler territories found in Region 5, Mohave Valley sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

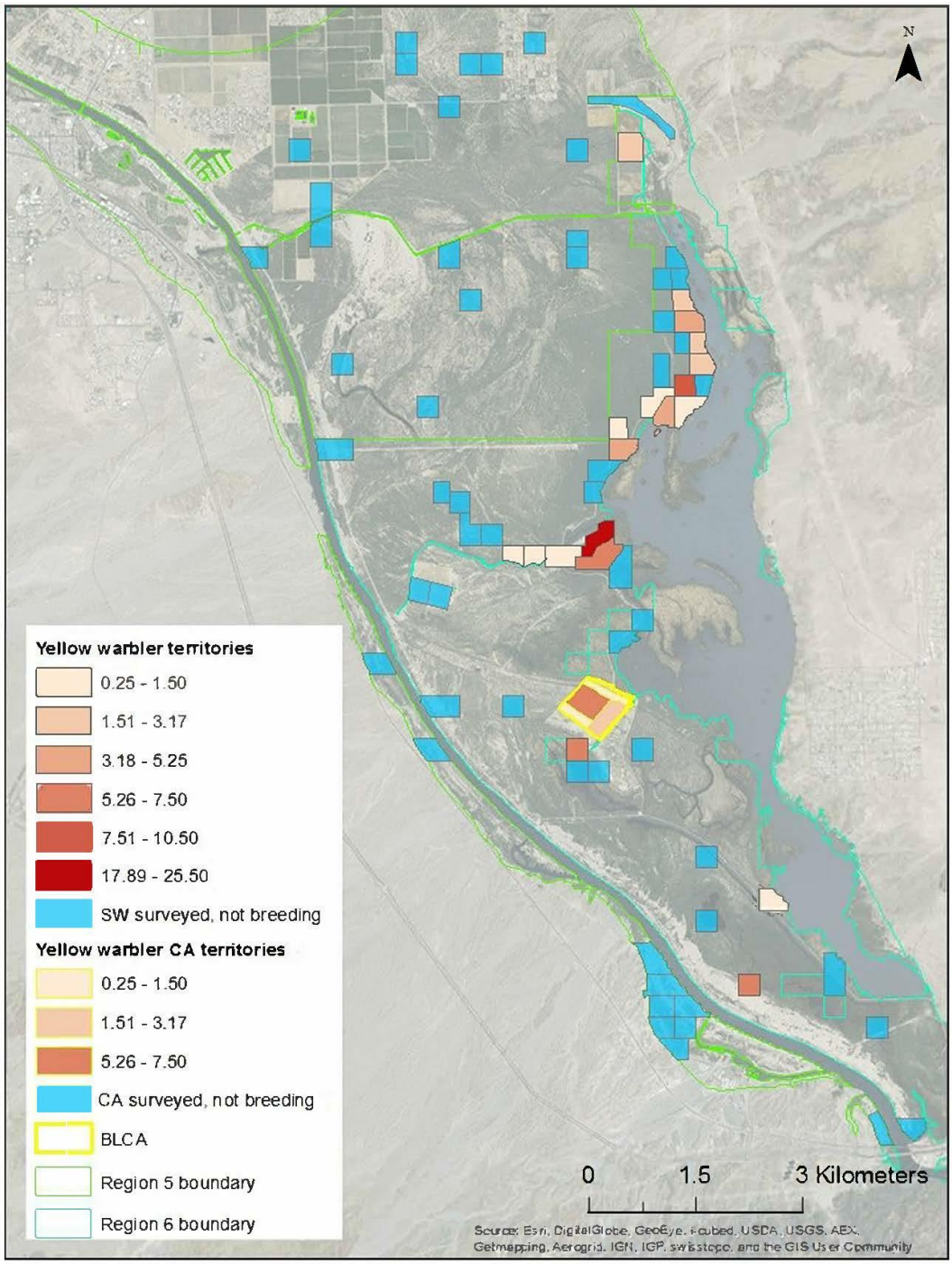

Figure 4-29.—Average number of Sonoran yellow warbler territories found in Regions 5 and 6, Topock Marsh sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

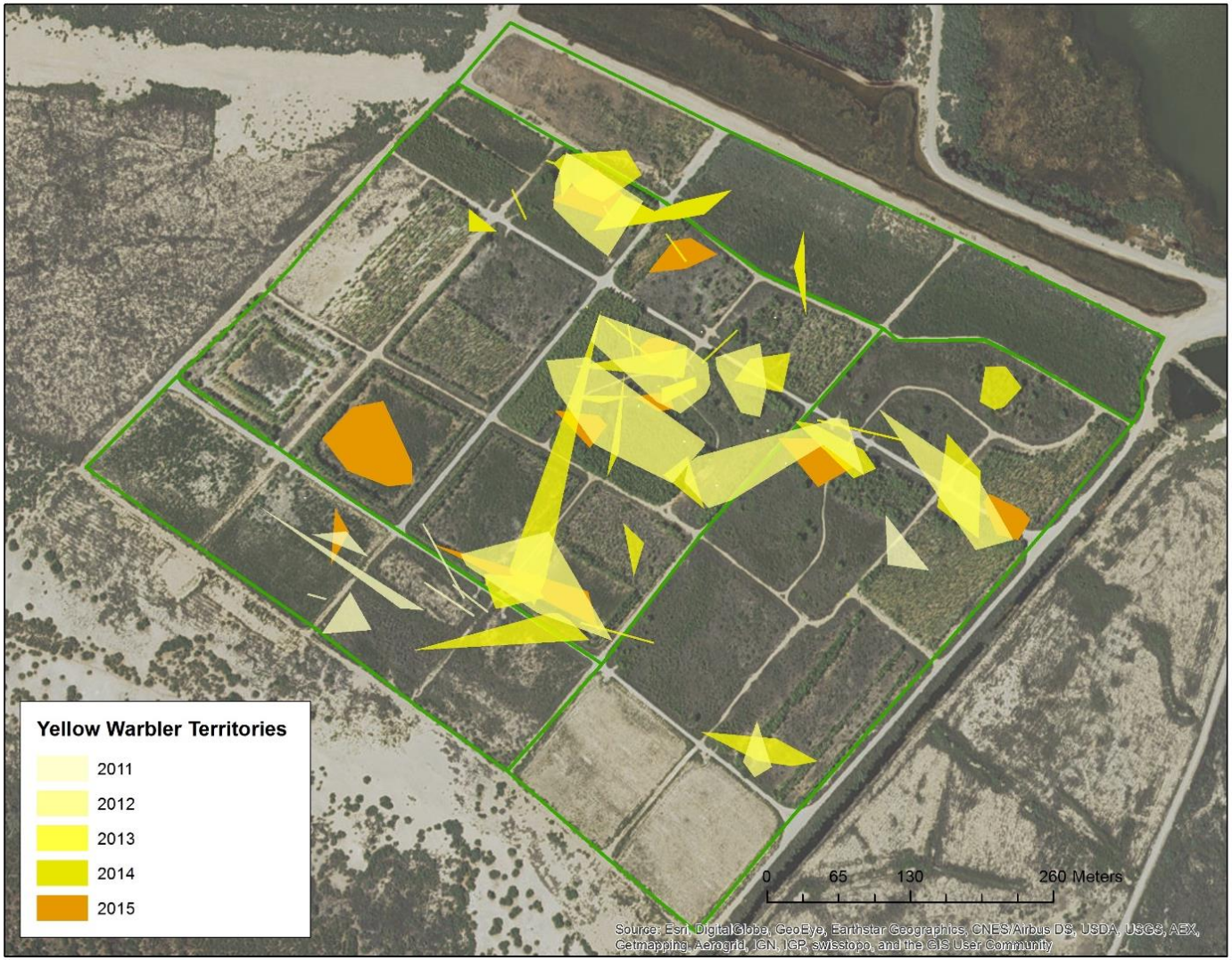

Figure 4-30.—Minimum convex polygons of Sonoran yellow warbler territories at the BLCA.

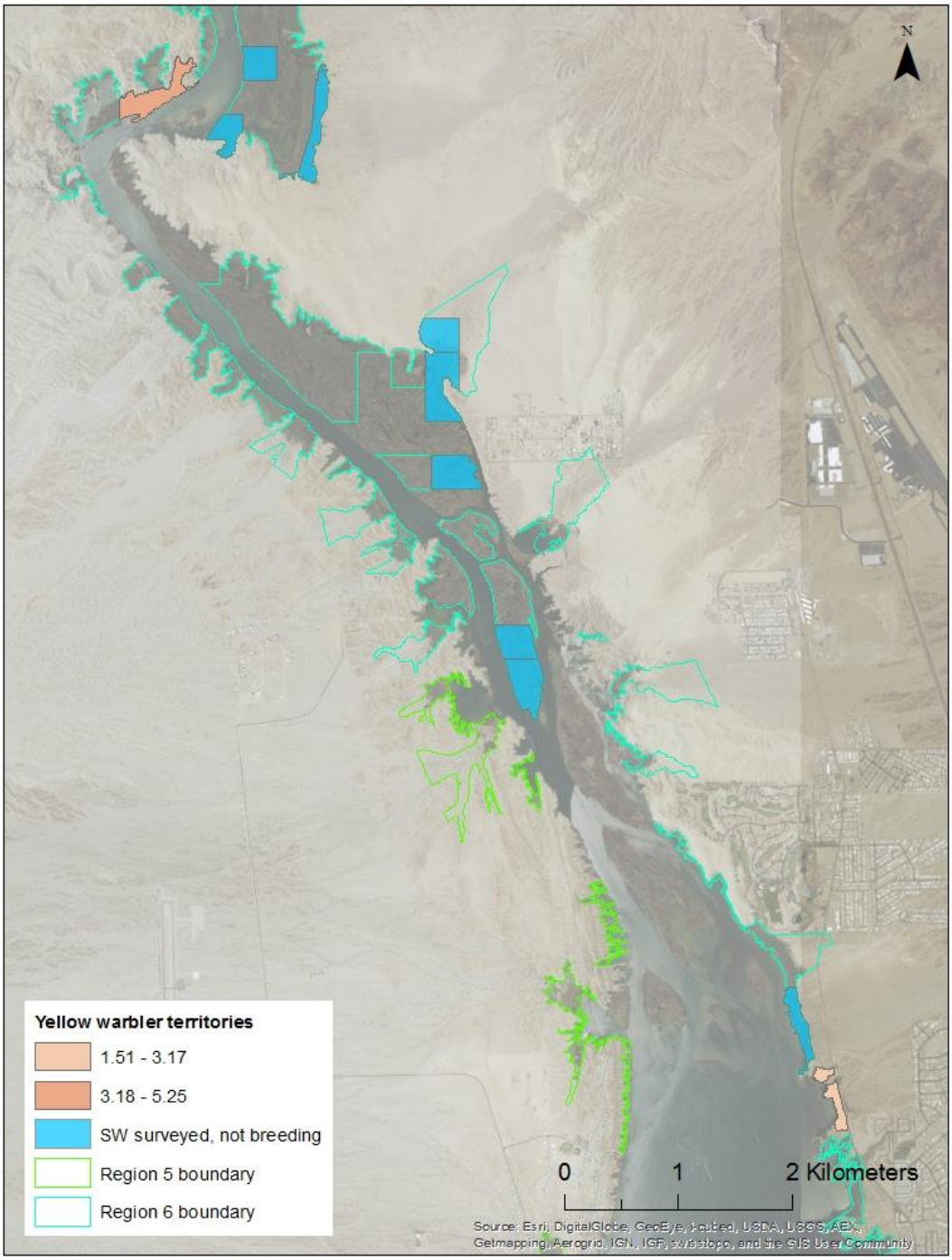

Figure 4-31.—Average number of Sonoran yellow warbler territories found in Regions 5 and 6, Topock Gorge sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

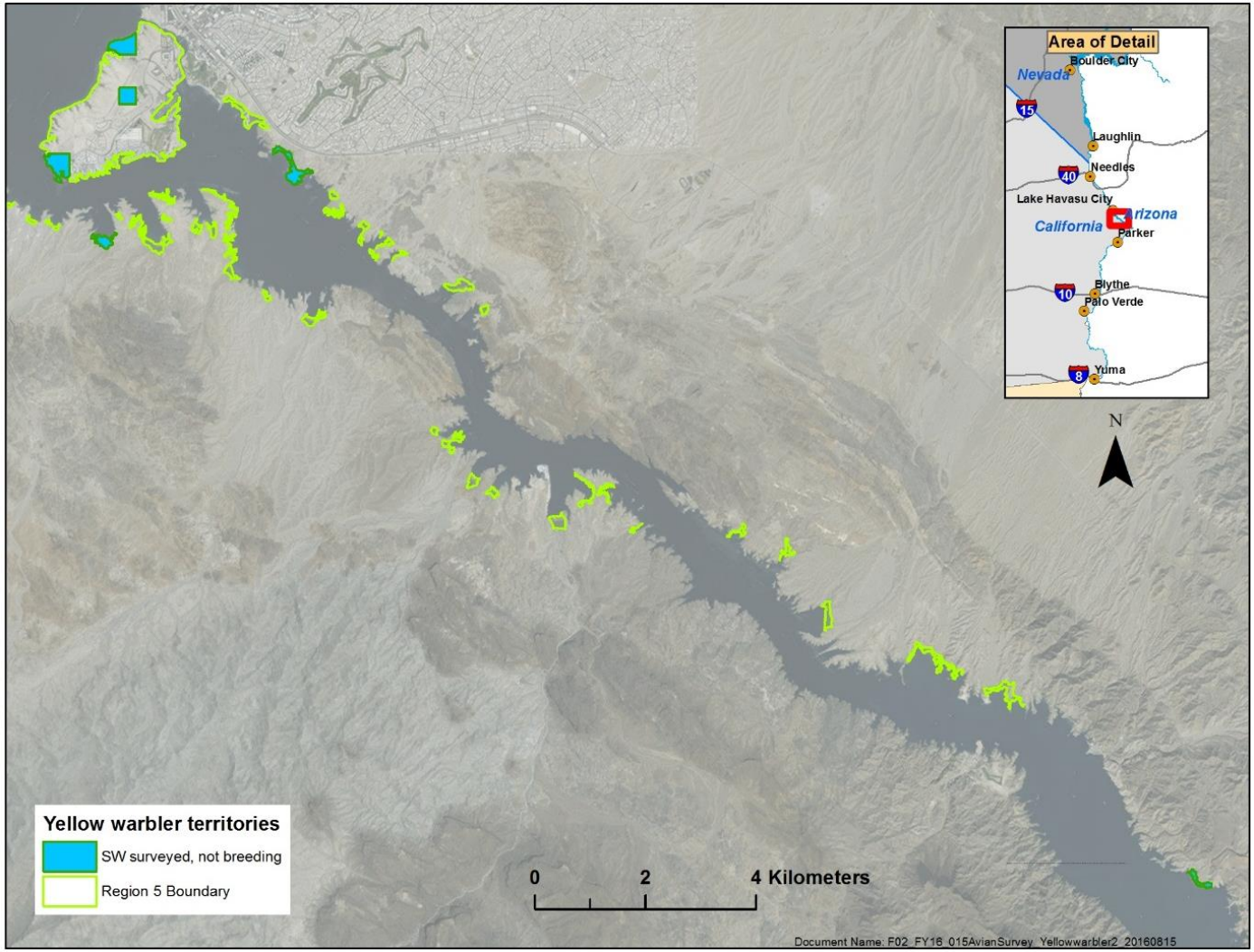

Figure 4-32.—Average number of Sonoran yellow warbler territories found in Region 5, upper and lower Lake Havasu sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

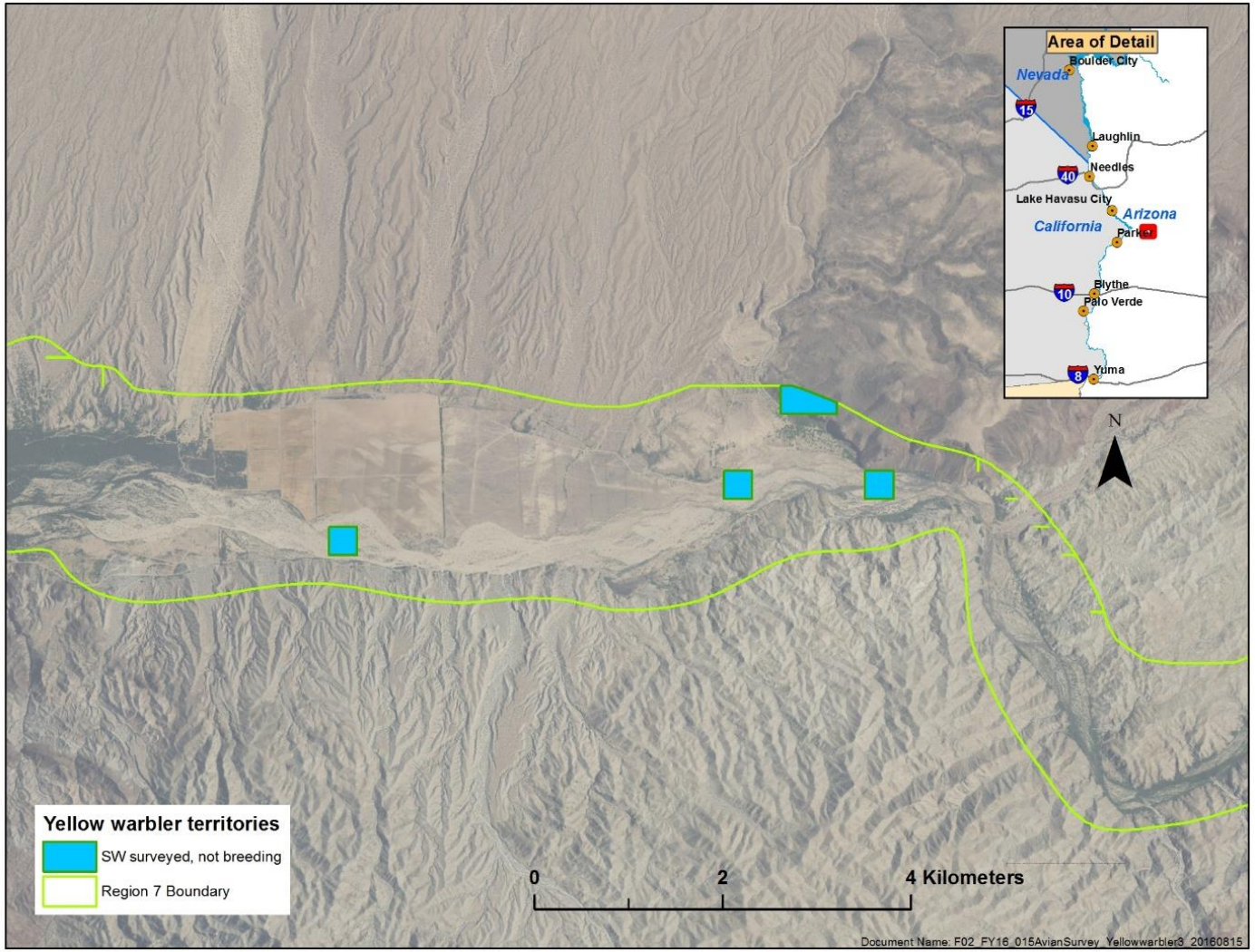

Figure 4-33.—Average number of Sonoran yellow warbler territories found in Region 7, Bill Williams Delta sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

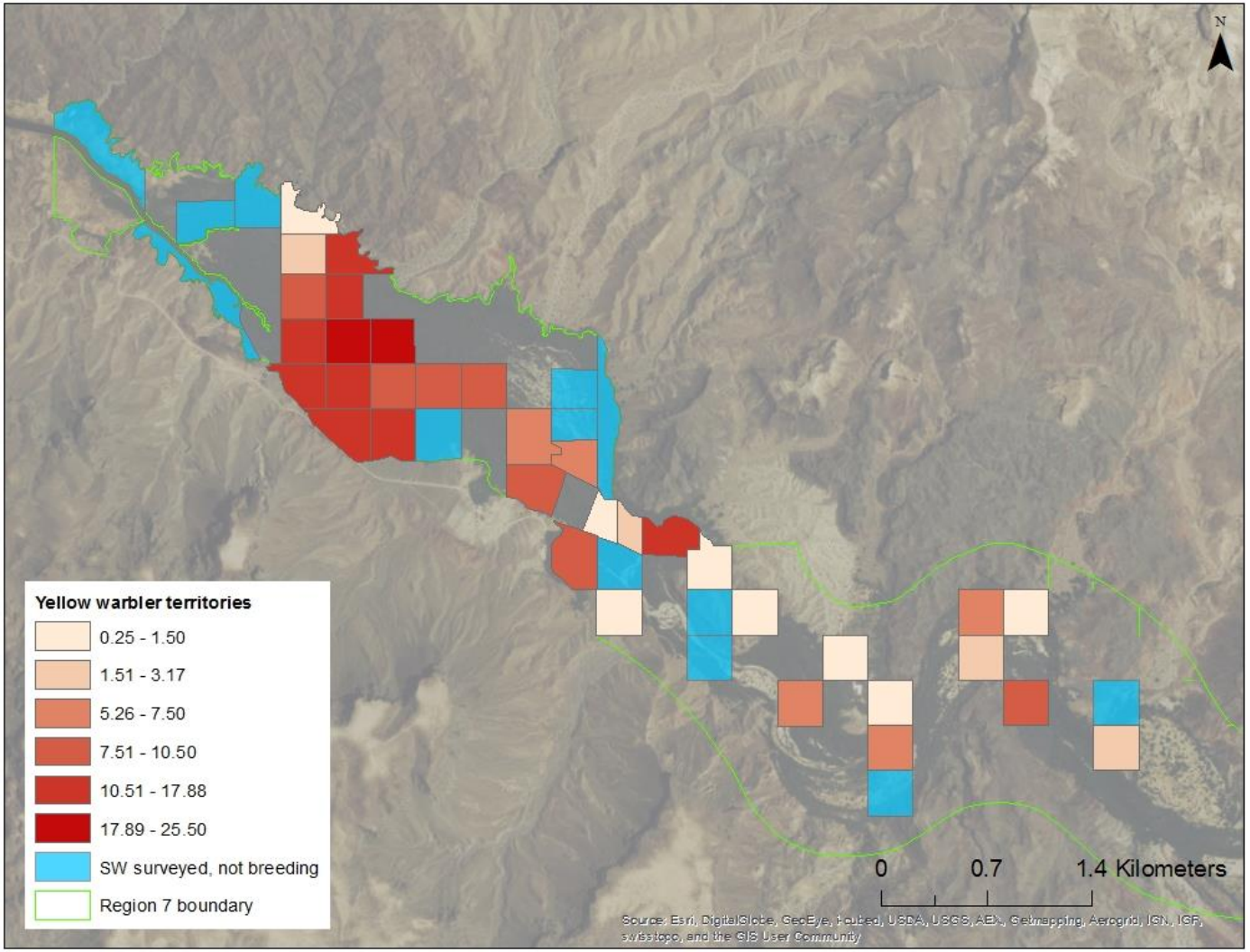

Figure 4-34.—Average number of Sonoran yellow warbler territories found in Region 7, lower Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

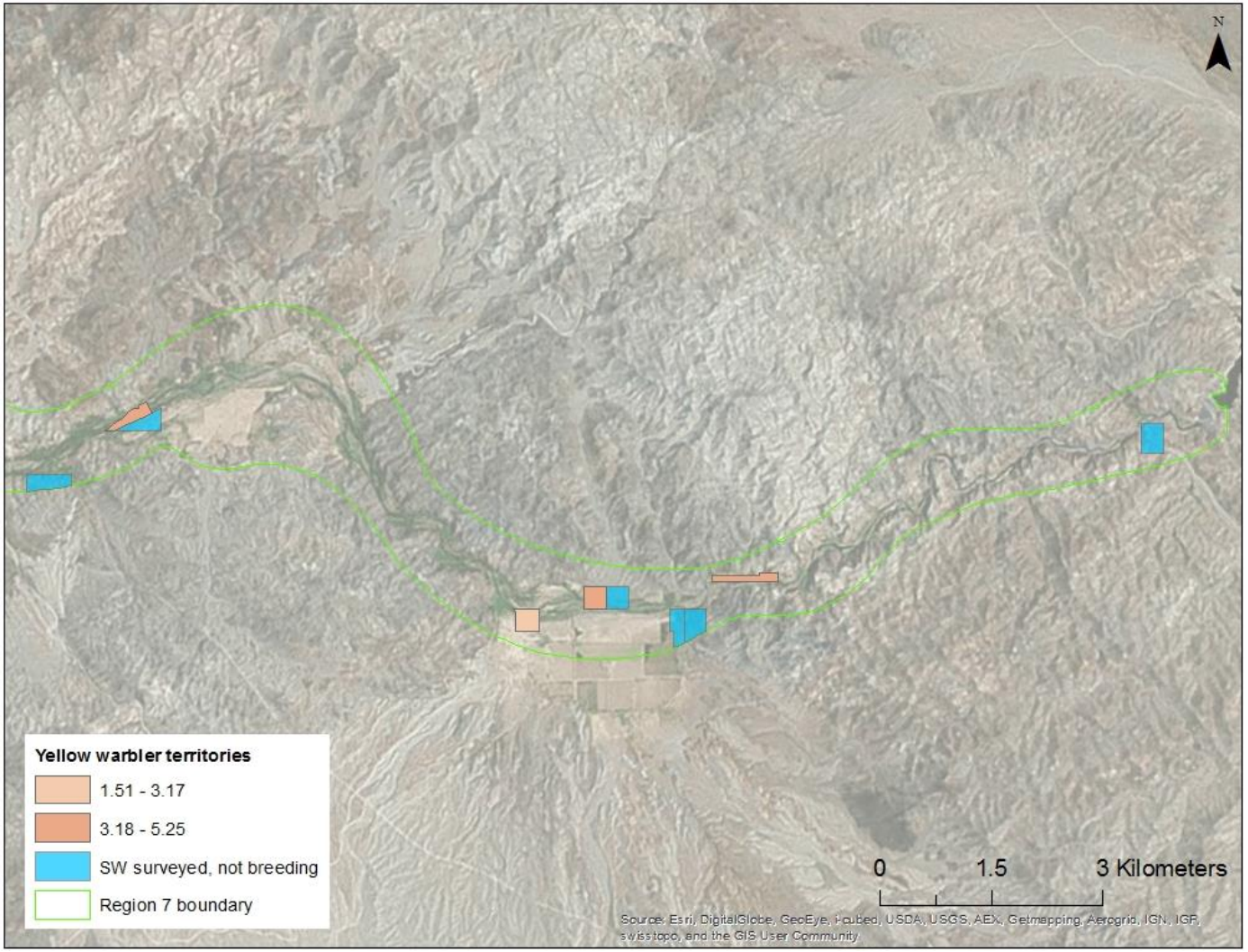

Figure 4-35.—Average number of Sonoran yellow warbler territories found in Region 7, upper Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

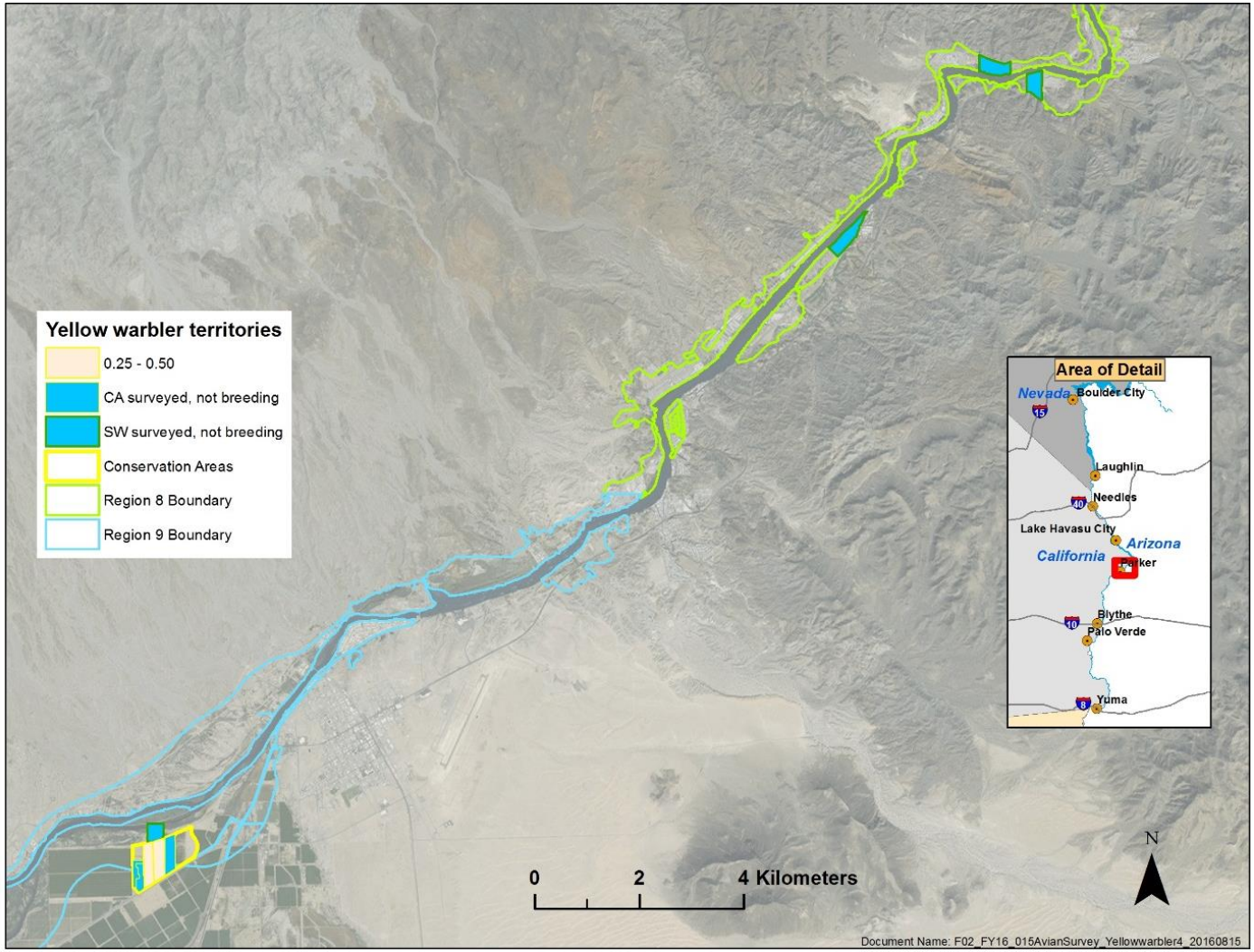

Figure 4-36.—Average number of Sonoran yellow warbler territories found in Regions 8 and 9, Parker Strip, in 2011–15.

CA = surveyed as part of conservation area and CRIT 9 coverage, and SW = surveyed as part of system-wide coverage.

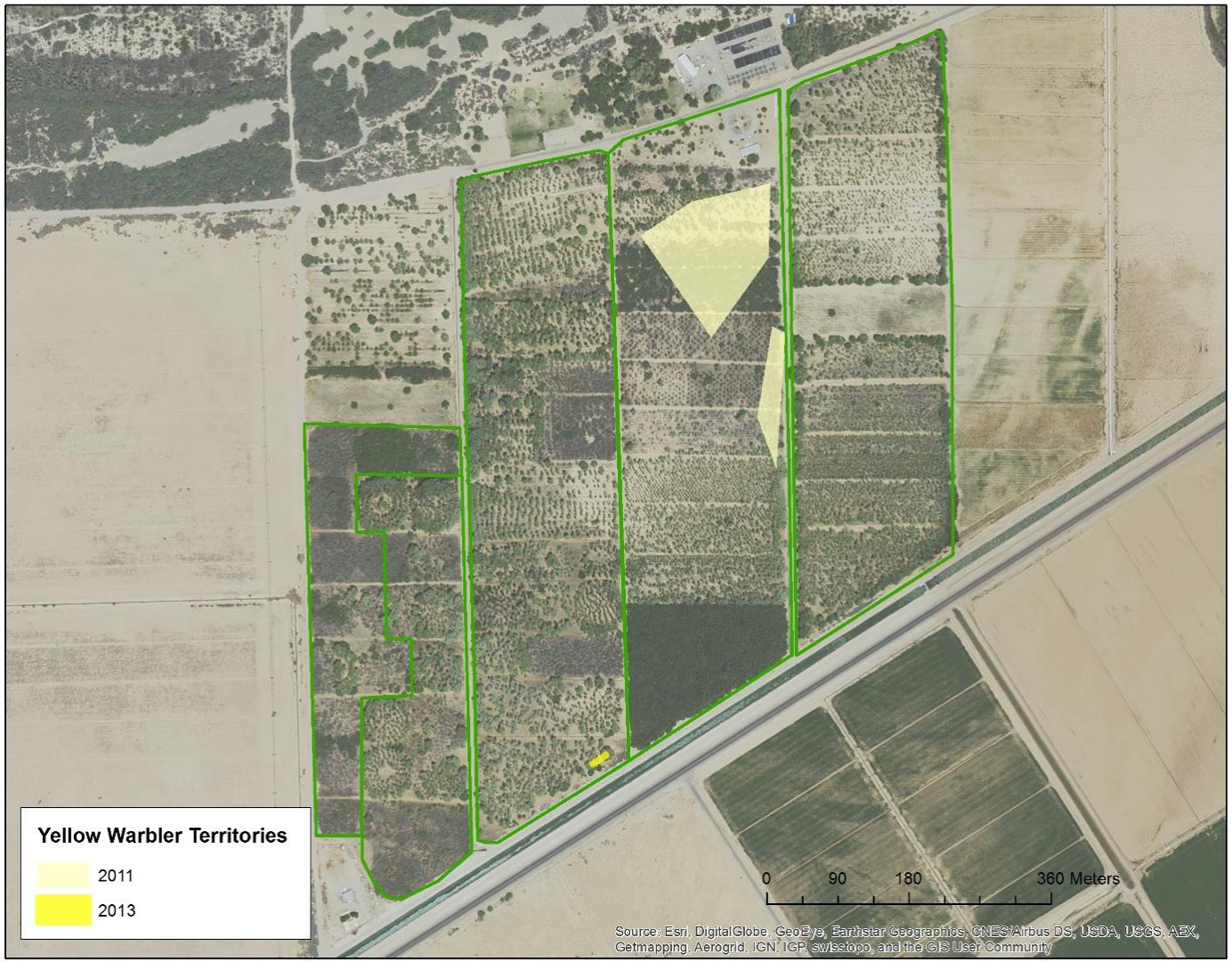

Figure 4-37.—Minimum convex polygons of Sonoran yellow warbler territories at CRIT 9.

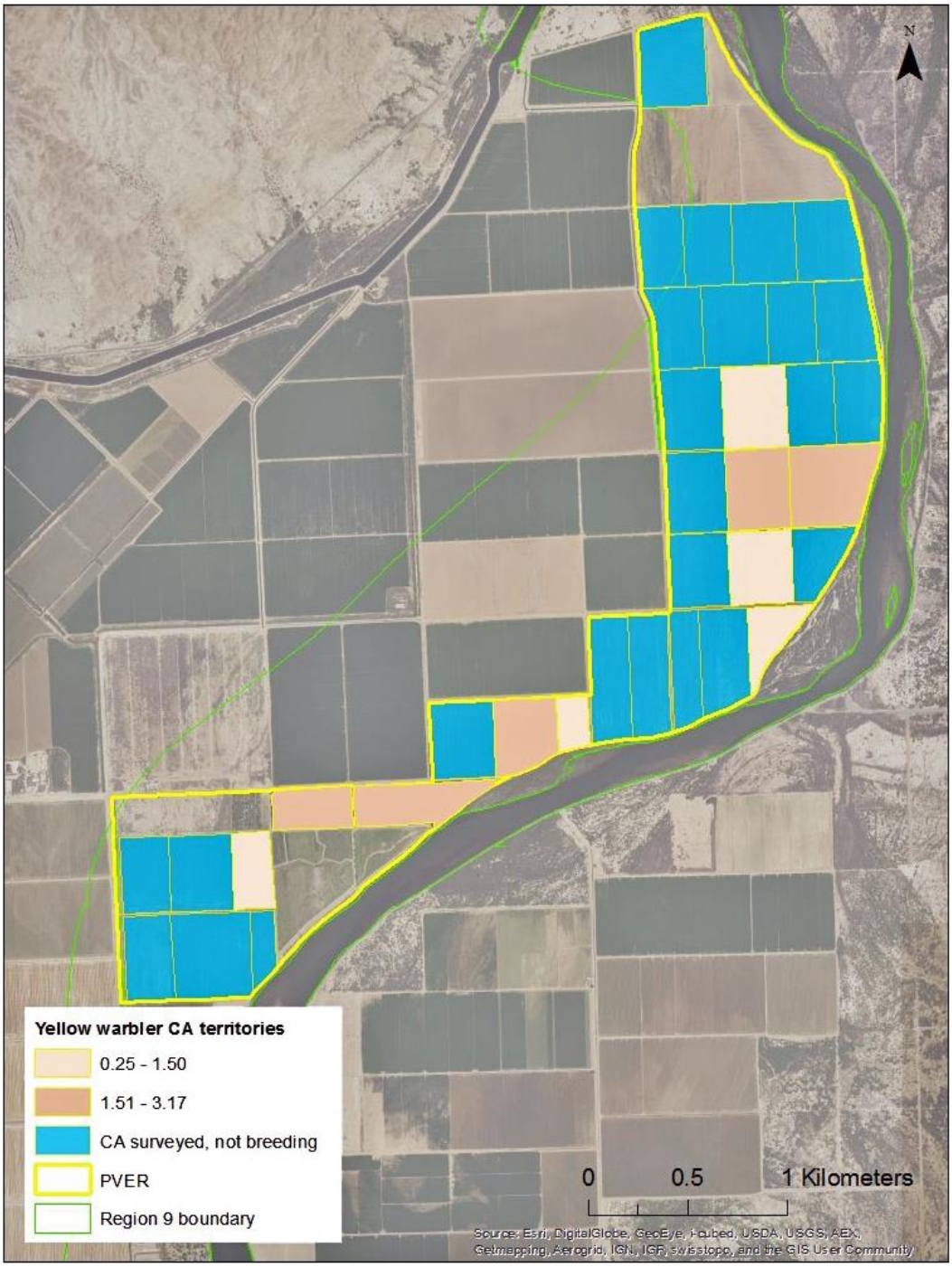

Figure 4-38.—Average number of Sonoran yellow warbler territories found in Region 9, PVER sites, in 2011–15.
CA = surveyed as part of conservation area and CRIT 9 coverage.

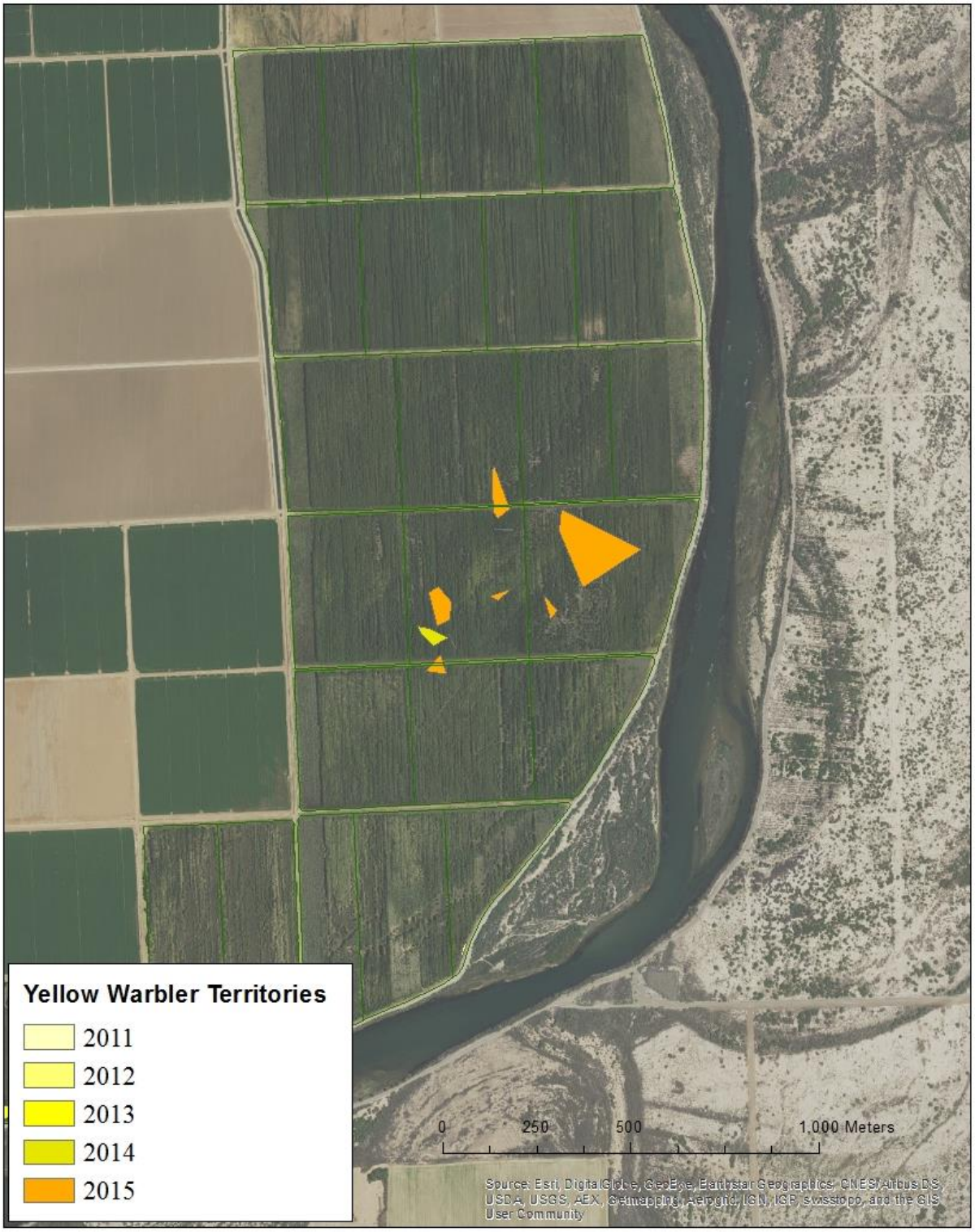

Figure 4-39.—Minimum convex polygons of Sonoran yellow warbler territories at PVER-North.

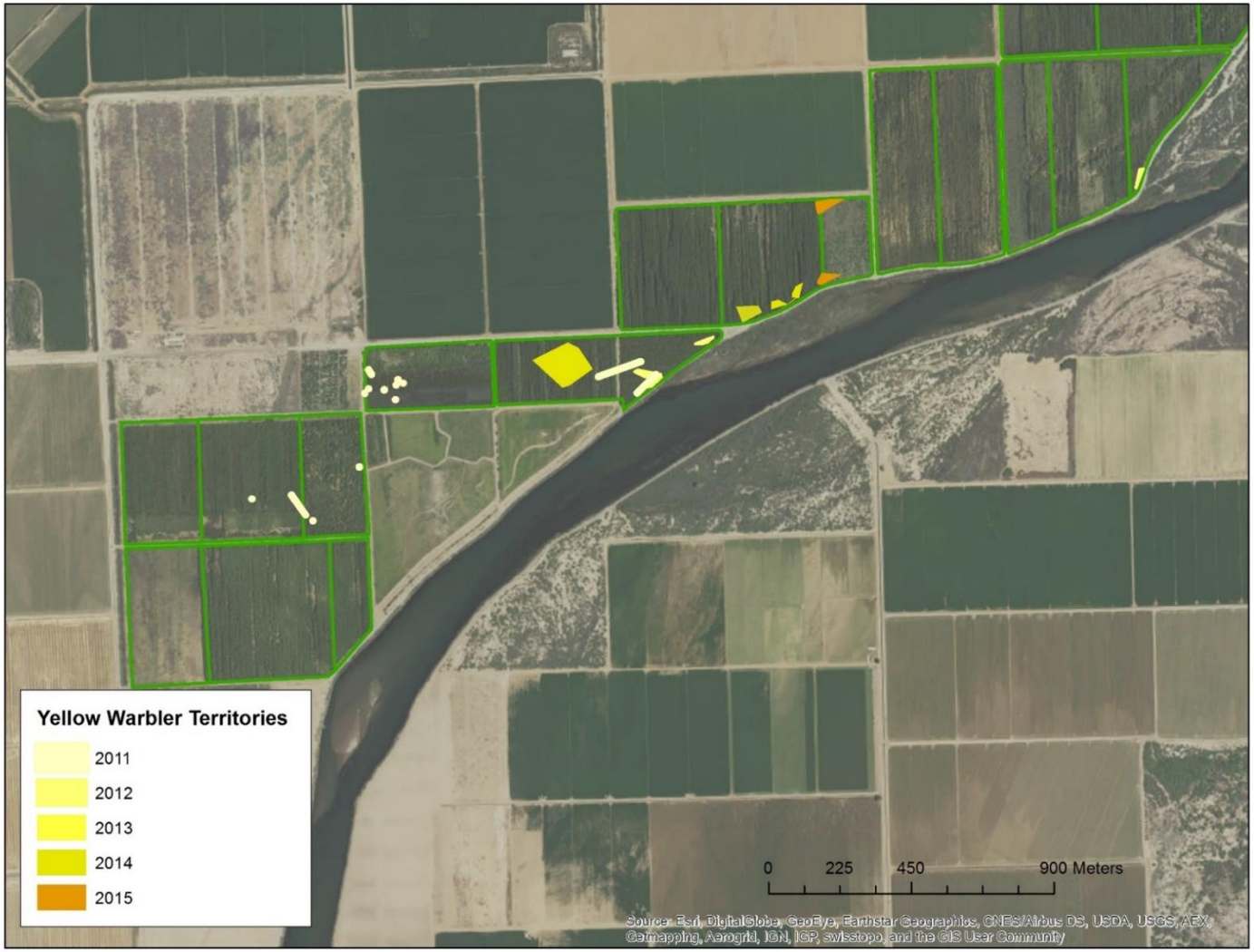

Figure 4-40.—Minimum convex polygons of Sonoran yellow warbler territories at PVER-South.

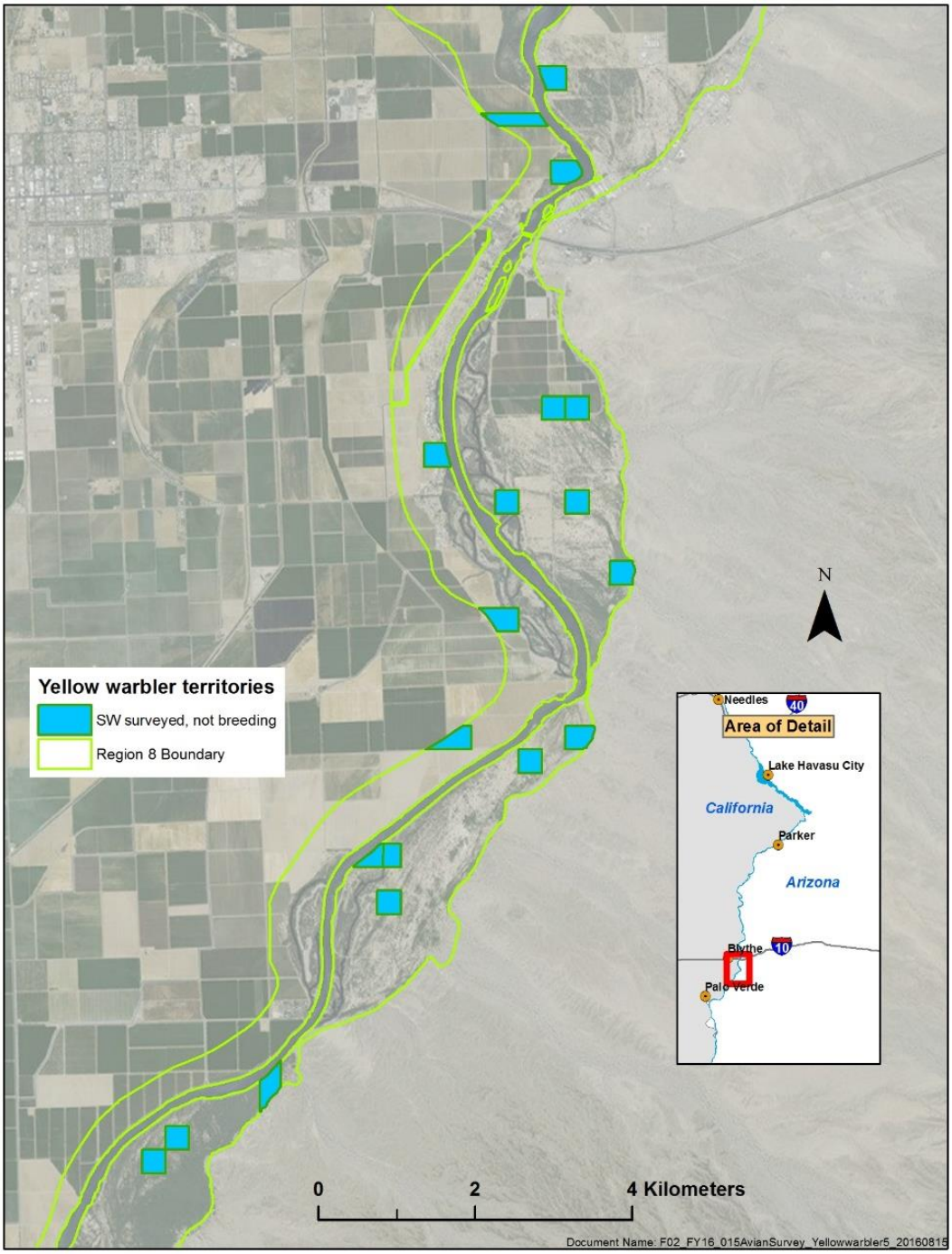

Figure 4-41.—Average number of Sonoran yellow warbler territories found in Region 8, Blythe and Palo Verde, California, sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

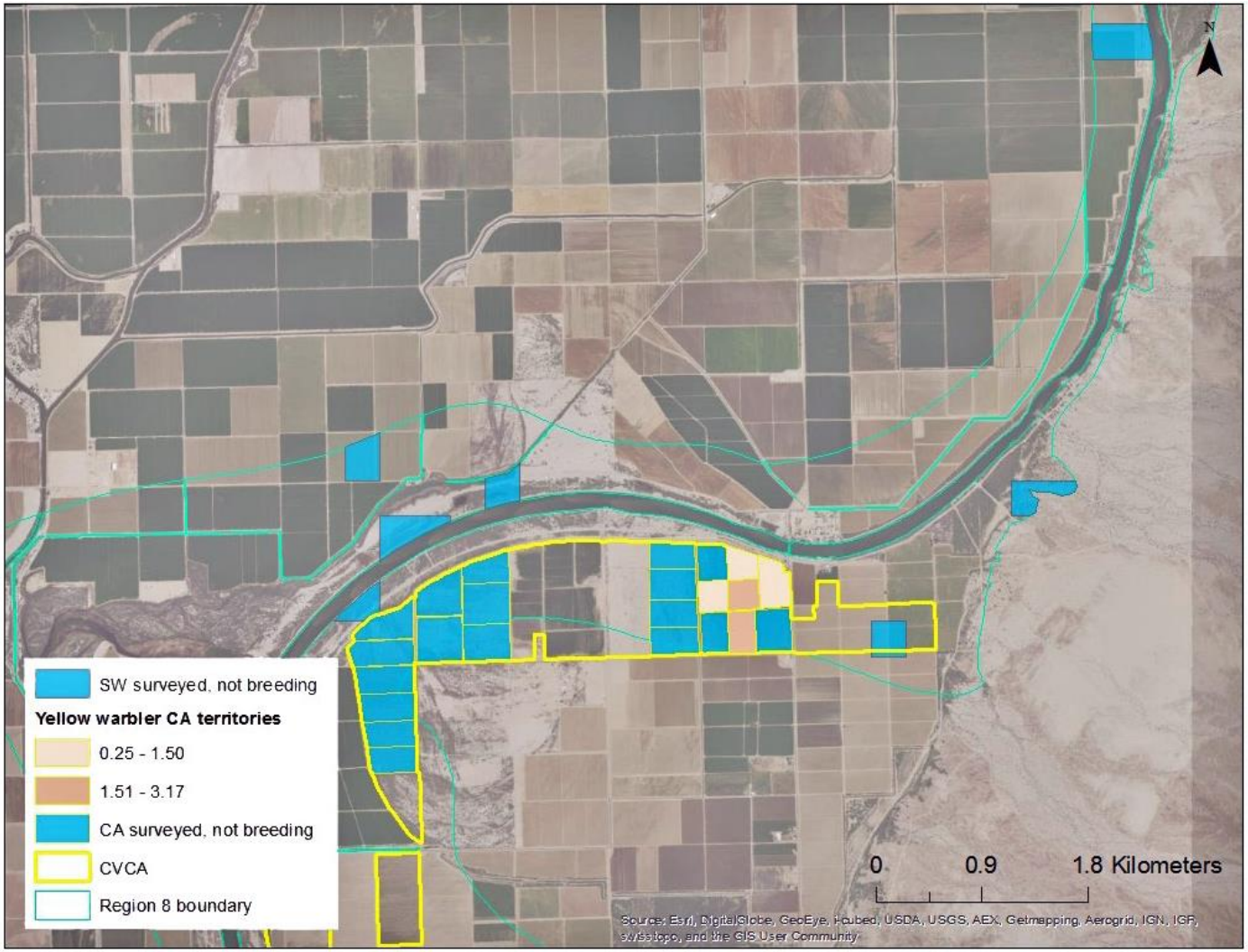

Figure 4-42.—Average number of Sonoran yellow warbler territories found in Region 8, CVCA sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-43.—Minimum convex polygons of Sonoran yellow warbler territories at the CVCA.

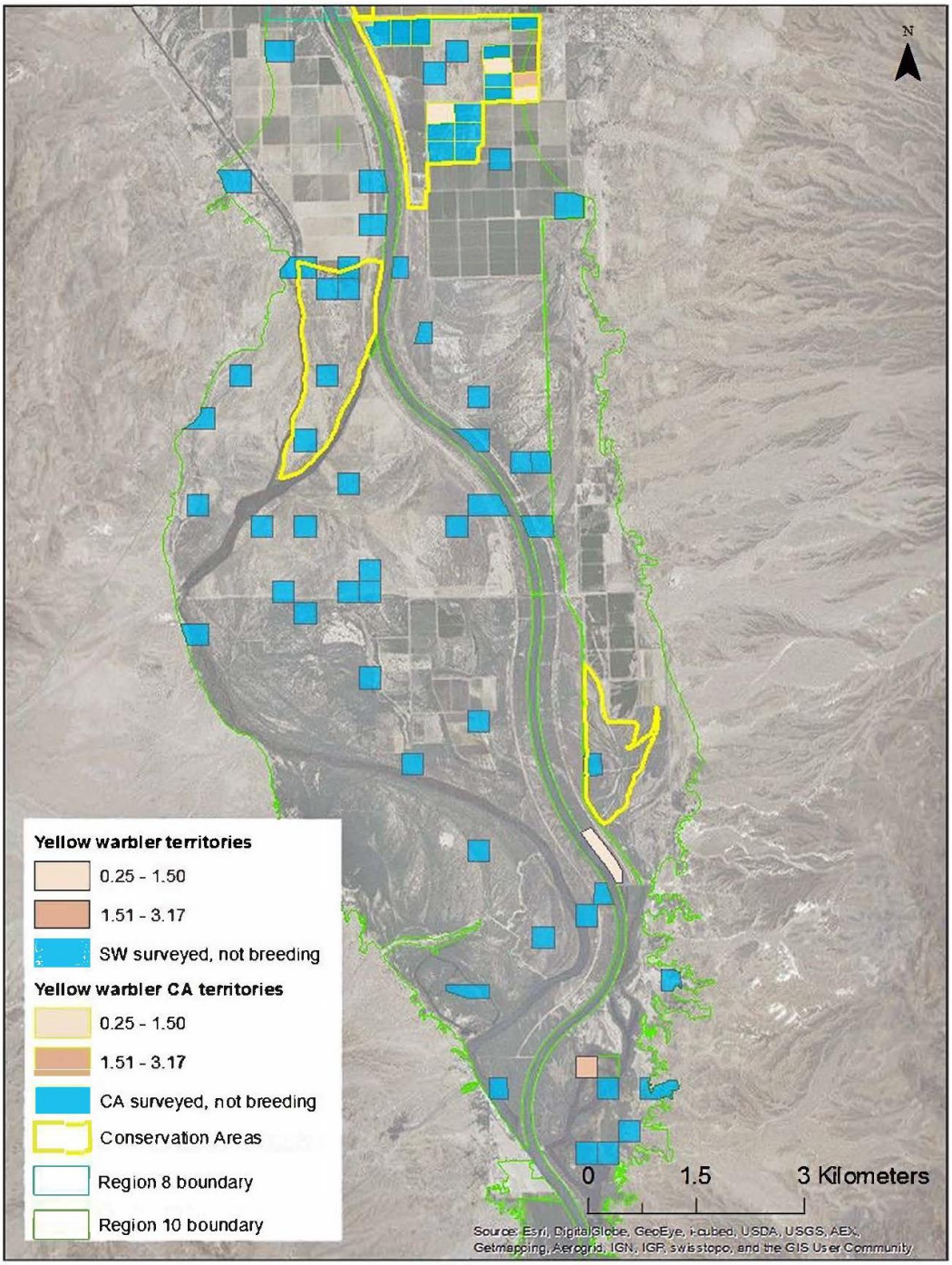

Figure 4-44.—Average number of Sonoran yellow warbler territories found in Region 10, Cibola NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-45—Minimum convex polygons of Sonoran yellow warbler territories at Cibola NWR Unit #1, Area 1, excluding Nature Trail.

Figure 4-46.—Minimum convex polygons of Sonoran yellow warbler territories at Cibola NWR Unit #1, Nature Trail.

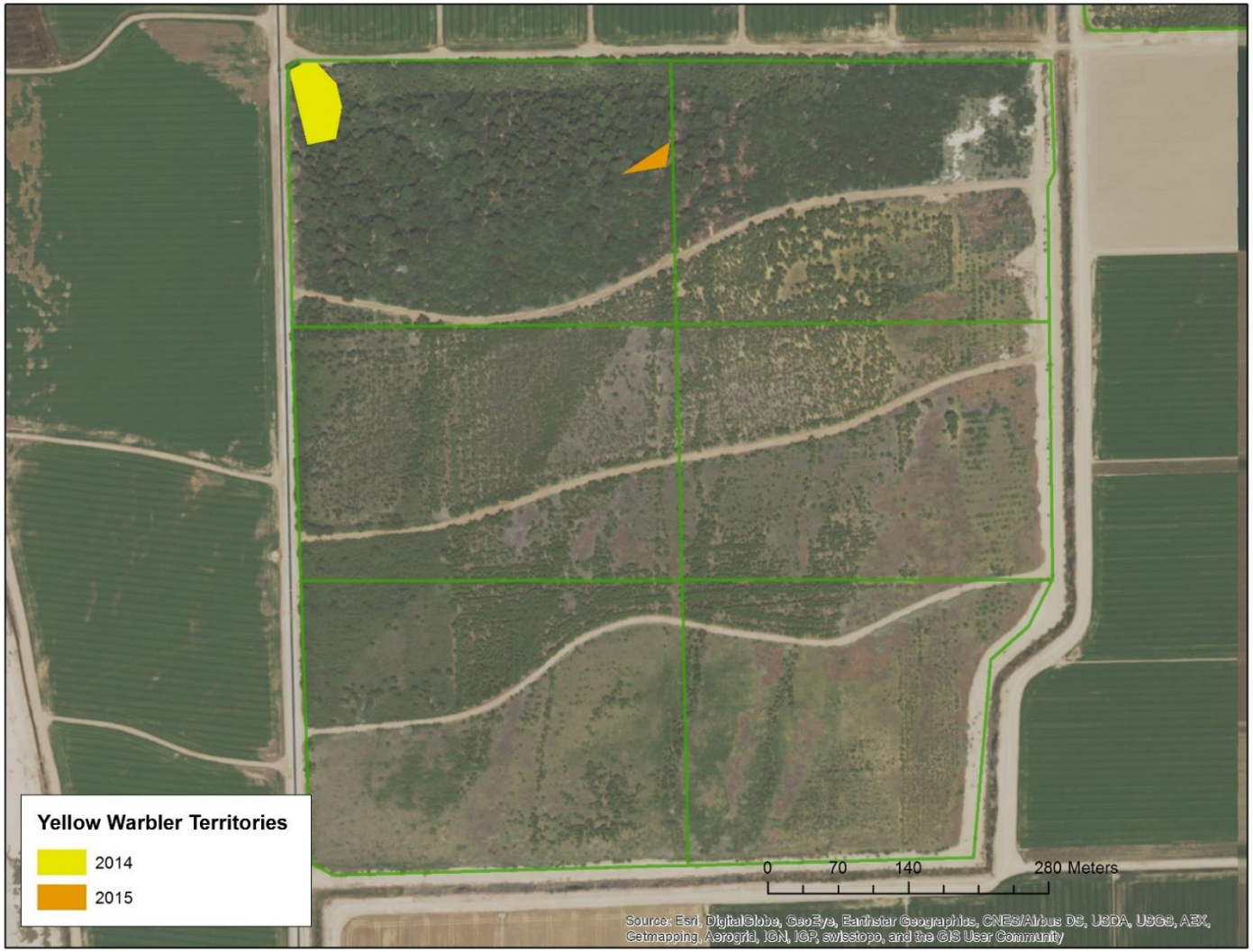

Figure 4-47.—Minimum convex polygons of Sonoran yellow warbler territories at Cibola NWR Unit #1, Crane Roost.

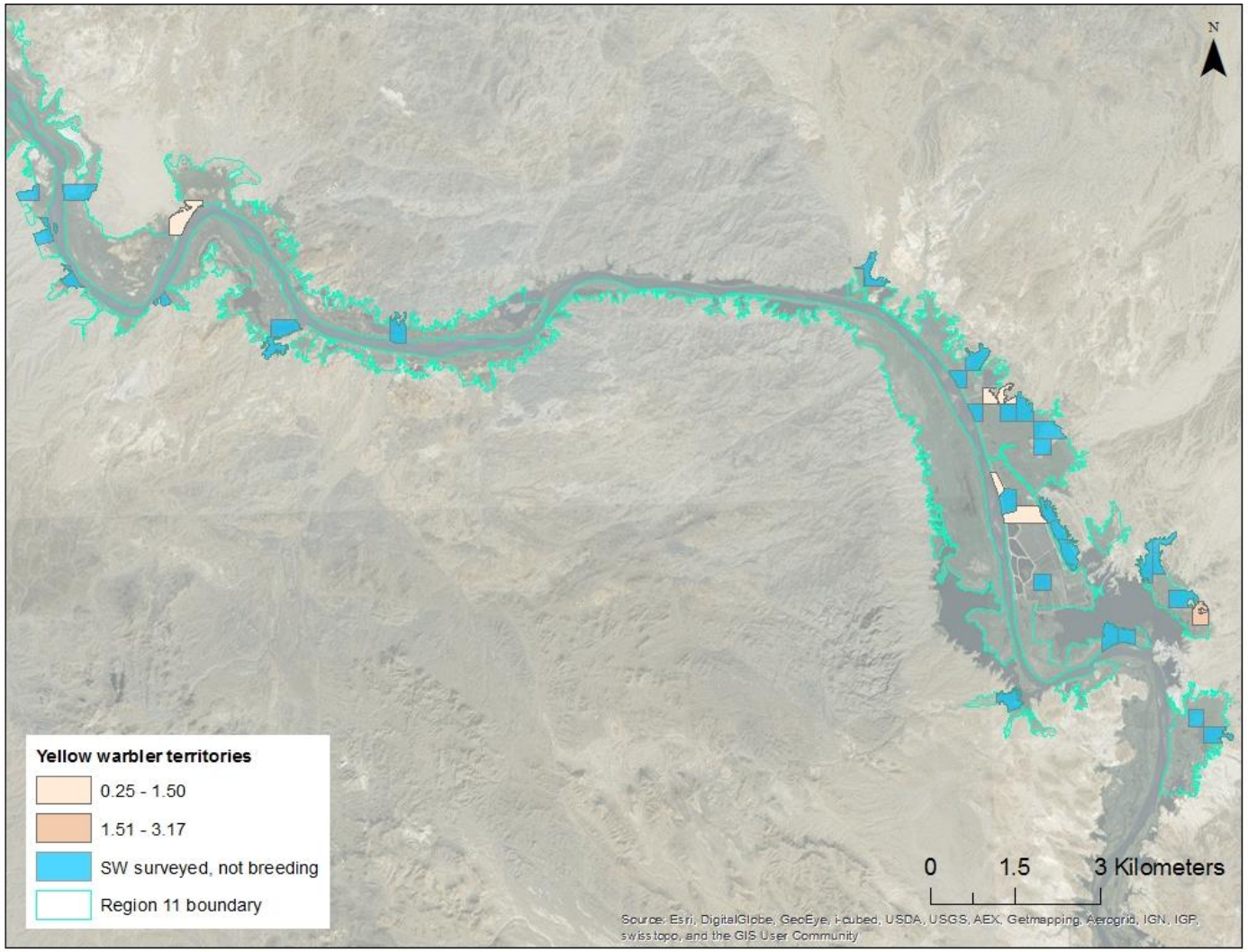

Figure 4-48.—Average number of Sonoran yellow warbler territories found in Region 11, Imperial NWR sites, in 2011–15.

SW = surveyed as part of system-wide coverage.

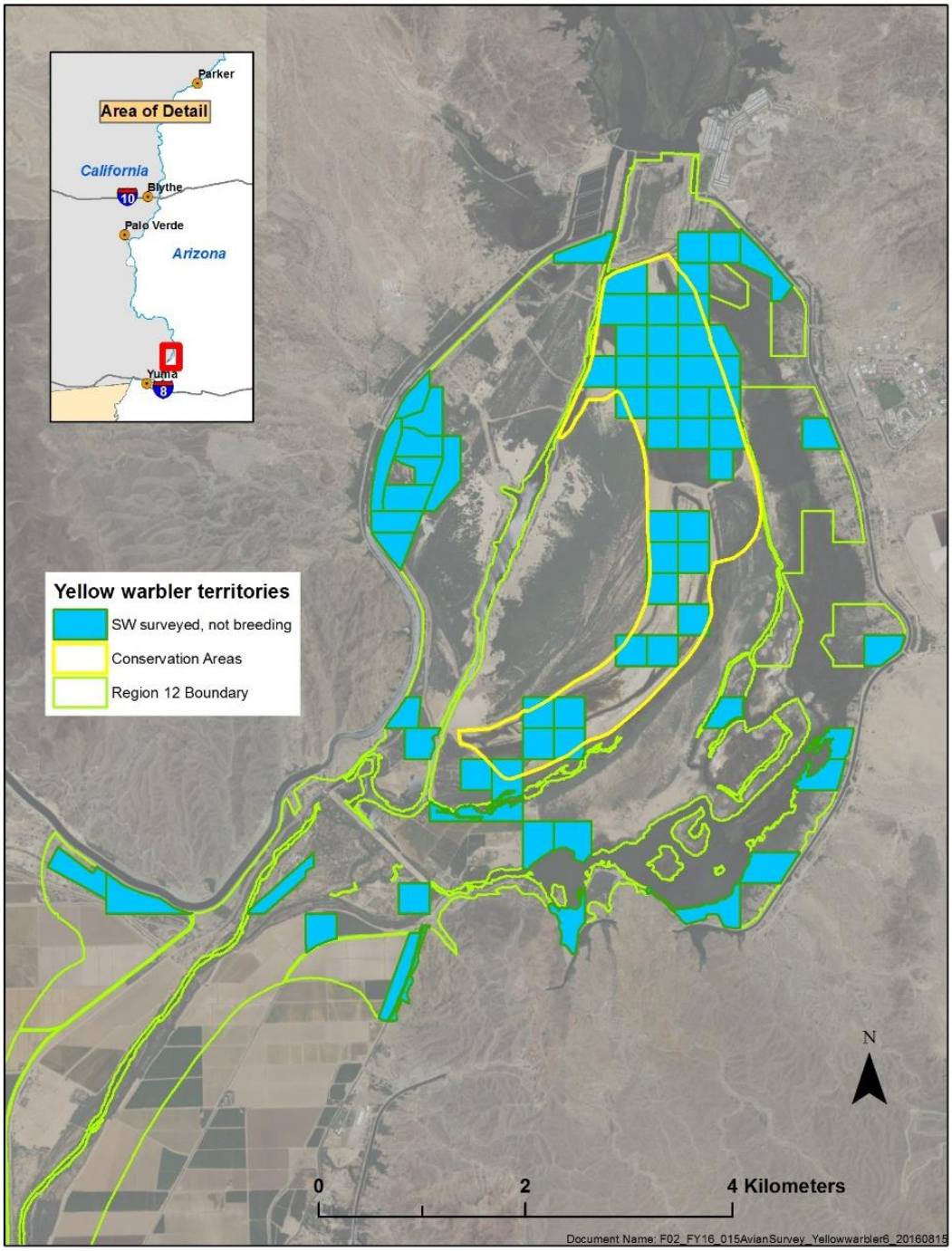

Figure 4-49.—Average number of Sonoran yellow warbler territories found in Region 12, Imperial/Laguna Dam sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

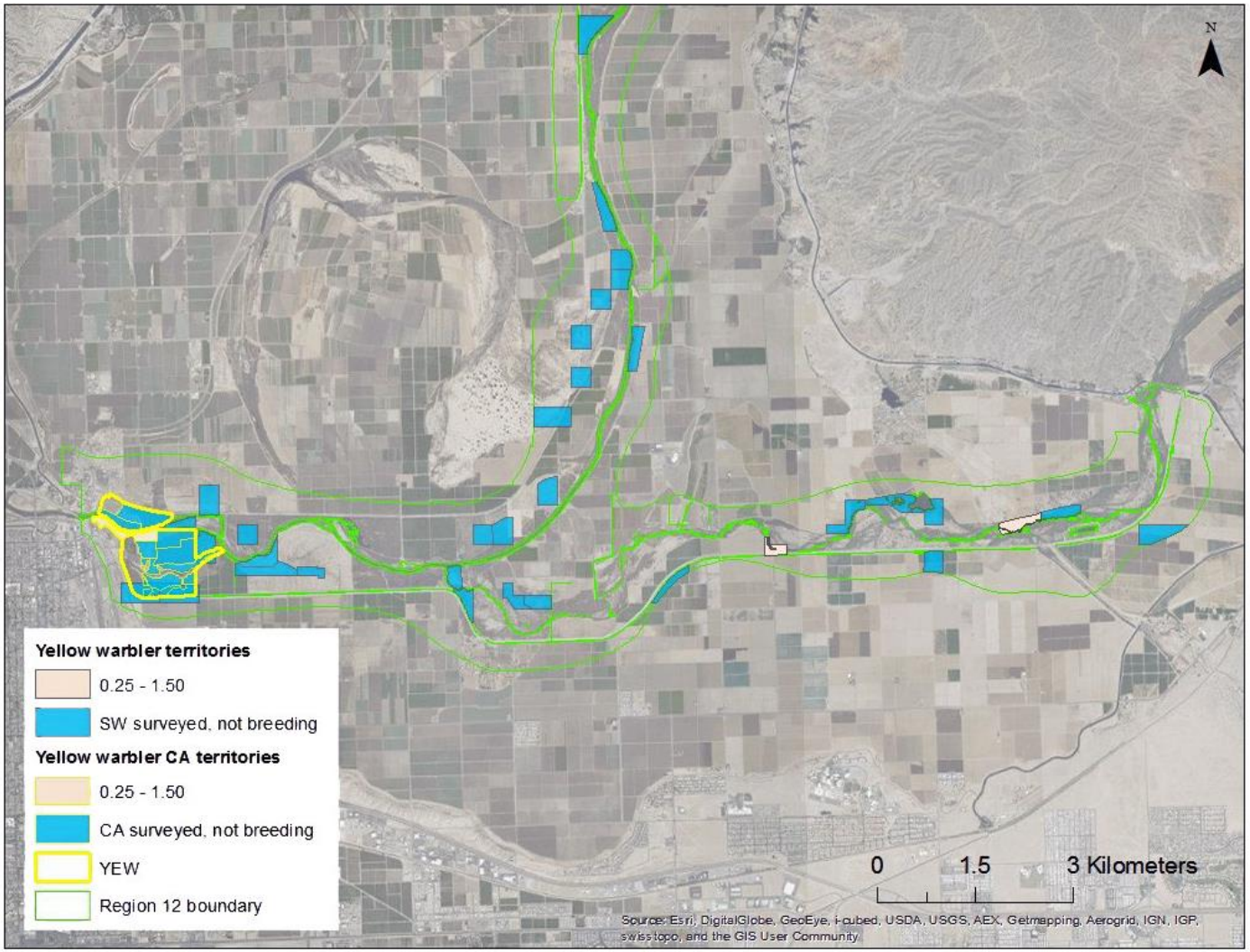

Figure 4-50.—Average number of Sonoran yellow warbler territories found in Region 12, Yuma/Gila River, Arizona, sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

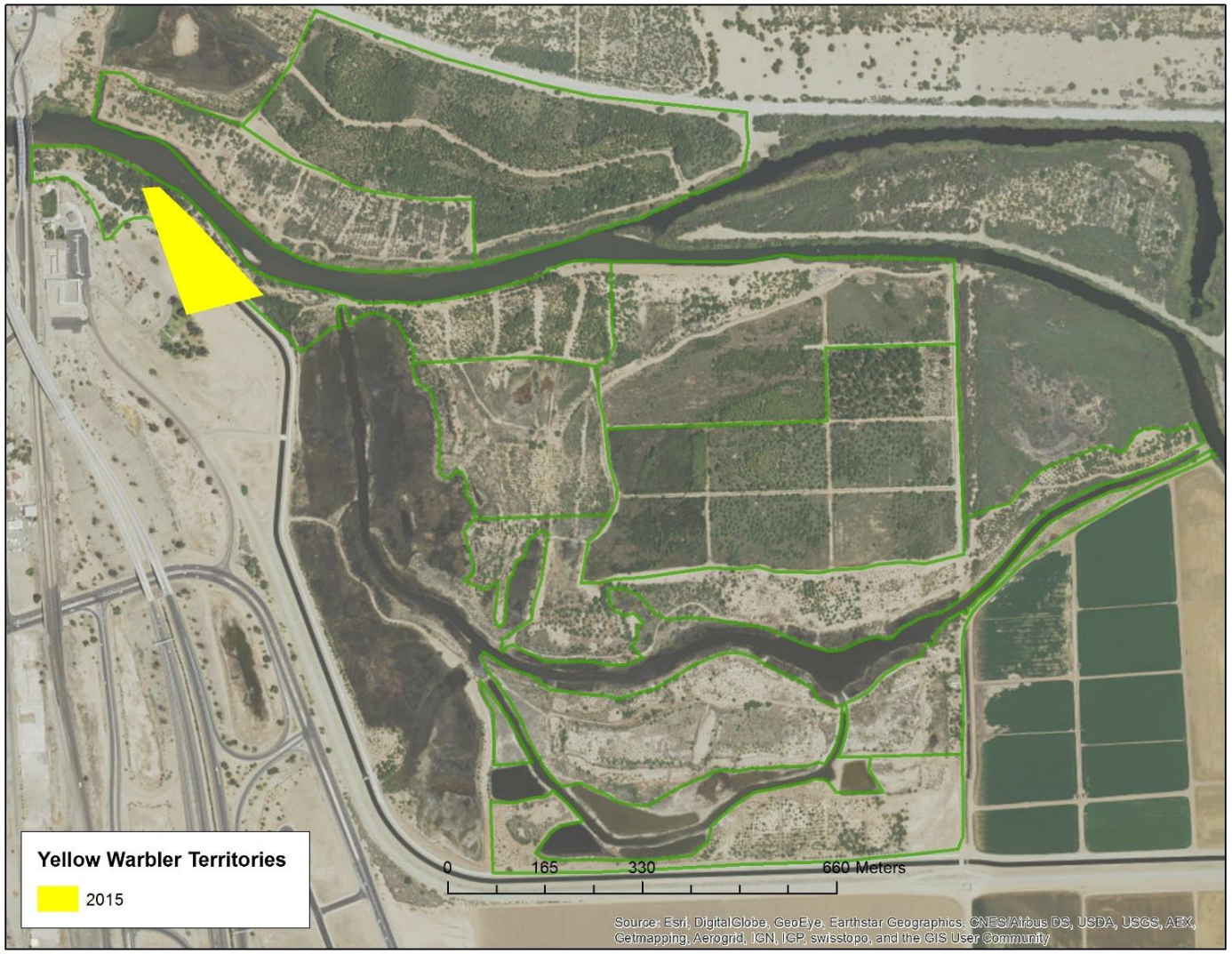

Figure 4-51.—Minimum convex polygons of Sonoran yellow warbler territories at YEW.

Gila Woodpecker

Observed Habitat Use in the Project Area

- Gila woodpeckers require mature trees, snags, saguaro cacti (*Carnegiea gigantea)*, or manmade substrates such as telephone poles for nest cavities.

- The species appears to be most common in areas dominated with native riparian trees (e.g., Bill Williams River area) but is also found where a few sizeable trees are interspersed with non-native or other habitat types (e.g., the Havasu National Wildlife Refuge) and near human settlements that feature some large trees, including the non-native *Eucalyptus* spp. and Athel tamarisk (*Tamarix aphylla*).

- In the Bill Williams River area, most nests are in saguaros on the fringes of the riparian corridor, but nests are also commonly built in large cottonwoods, even when there are apparently suitable saguaros in the territory.

- Based on habitat data collected from 2008 to 2010, Gila woodpeckers were more likely to establish a territory if large trees, large snags, and large branches were available within or nearby the territory than if they were not available. The presence of Goodding's willows ($p < 0.006$) and Fremont cottonwoods ($p < 0.06$) were significantly positively correlated with the presence of a breeding territory (GBBO 2011). In addition, Gila woodpeckers selected territories with tall canopy trees (> 10 meters tall) and a denser canopy than was found in non-use sites ($p < 0.05$ for each) (GBBO 2011).

Phenology in the Project Area

- Gila woodpeckers are year-round residents in the project area. Nest construction occurs mainly in February, before the start of the area search surveys conducted each year in 2011–15 (Corman and Wise-Gervais 2005).

- Based on confirmed breeding evidence collected in 2011–15, we calculated a range of incubation initiation of March 27 to May 4. The peak of clutch initiation was in mid-April. This is consistent with previously published nesting phenology in the region (Grinnell 1914; Rosenberg et al. 1991; Edwards and Schnell 2000; Corman and Wise-Gervais 2005).

Surveying This Species

- In our study examining assumptions of the double sampling method, we found that intensive area search surveys (8 visits) underestimated Gila woodpecker territories while rapid area search surveys (2 visits) estimated similar numbers to the EI area search survey method (16 visits); reasons for this are unknown.

- Detection and identification of this species are relatively easy compared to some other LCR MSCP covered focal species.

- The main difficulty in surveying for the Gila woodpecker is the lack of consistent, easily detectable territorial defense behavior. For most other species, counter-singing is the primary means of determining territory boundaries. However, in Gila woodpeckers, both sexes drum and give the same vocalizations during breeding, so counter-calling and counter-drumming cannot be easily used for territory delineation.

- Territories are poorly defined and variably defended, as is the case with most woodpeckers (Picidae).

Status and Distribution in 2011–2015

- Grinnell (1914) describes Gila woodpeckers as being common and widespread.

- We found an estimated 573 (SE = 85) pairs from 2011–15 data.

- Figures 4-52 to 4-73 show the distribution of Gila woodpeckers in the LCR MSCP project area and in particular sites, including conservation areas and CRIT 9.

- Gila woodpeckers were found commonly in areas near Topock Marsh at the Havasu National Wildlife Refuge, where there were at least a few large trees available for nesting (figure 4-57).

- The highest densities of Gila woodpeckers were found on the Bill Williams River, where they were detected on nearly every plot surveyed (figures 4-60 and 4-61). We often observed more than one pair of Gila woodpeckers per plot in this region.

- Moderate densities were found in native riparian areas with large trees throughout the project area south of Topock Marsh (figures 4-62 to 4-67 and 4-69 to 4-73. Smaller densities were also detected in several non-native and/or disturbed habitat types where large trees or other nesting substrates around parks or housing provided nesting habitat.

- Gila woodpeckers were largely absent from the conservation areas and CRIT 9, although partial territories were recorded at CRIT 9, the PVER, and YEW for the first time in 2015 (4-63 to 4-66, 4-72, and 4-73). Based on behavioral observations, these birds appeared to be nesting outside of the conservation areas and CRIT 9, and using the conservation areas and CRIT 9 for foraging. Birds could have been nesting in the parks adjacent to YEW or in the nearby residential/urban areas. At the PVER, nest locations were unknown but could have been in snags across the Colorado River or in large trees at nearby farm houses. Gila woodpeckers have large territories and travel a long way to forage.

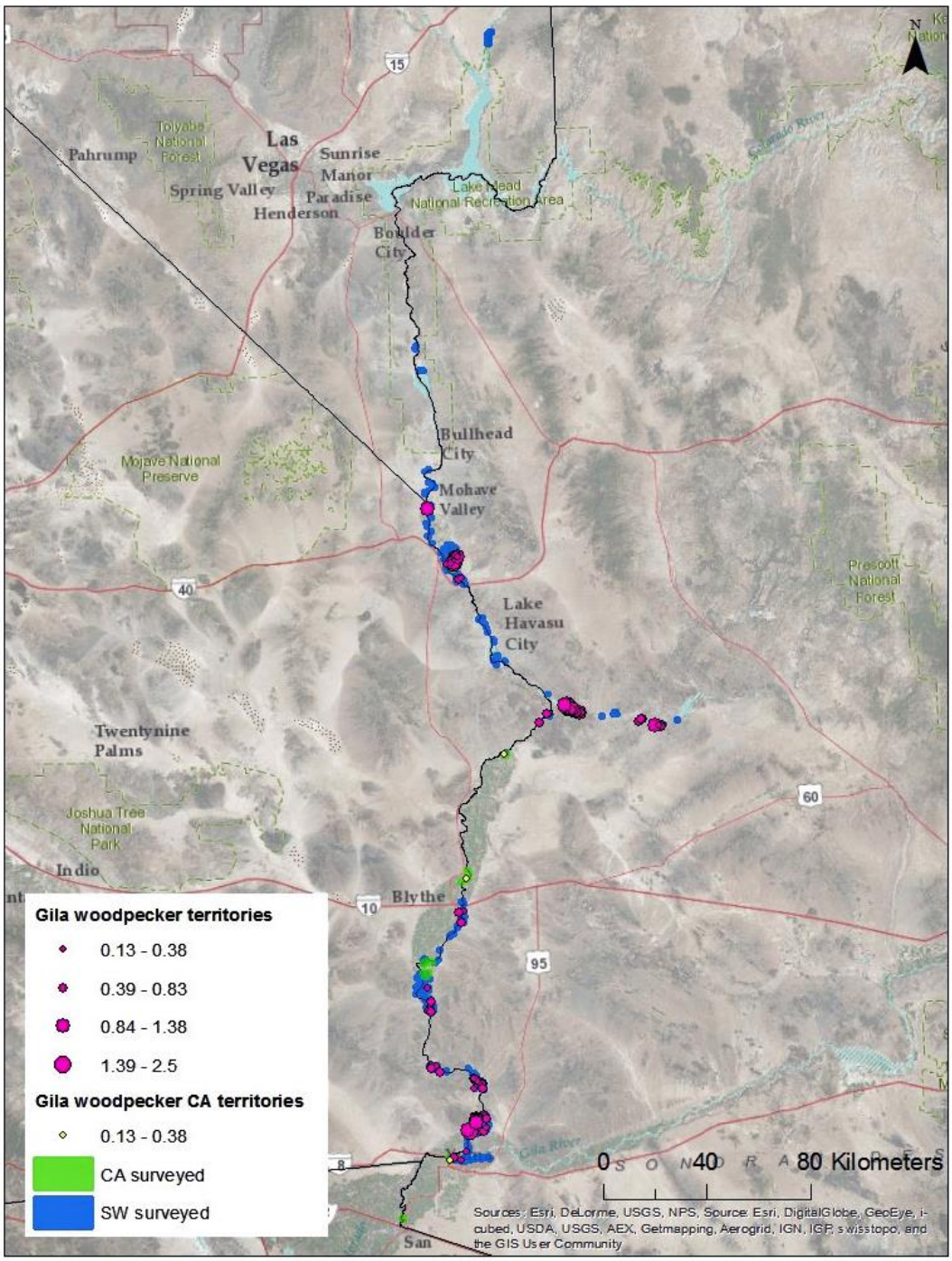

Figure 4-52.—Average number of Gila woodpecker territories found throughout the LCR MSCP project area in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

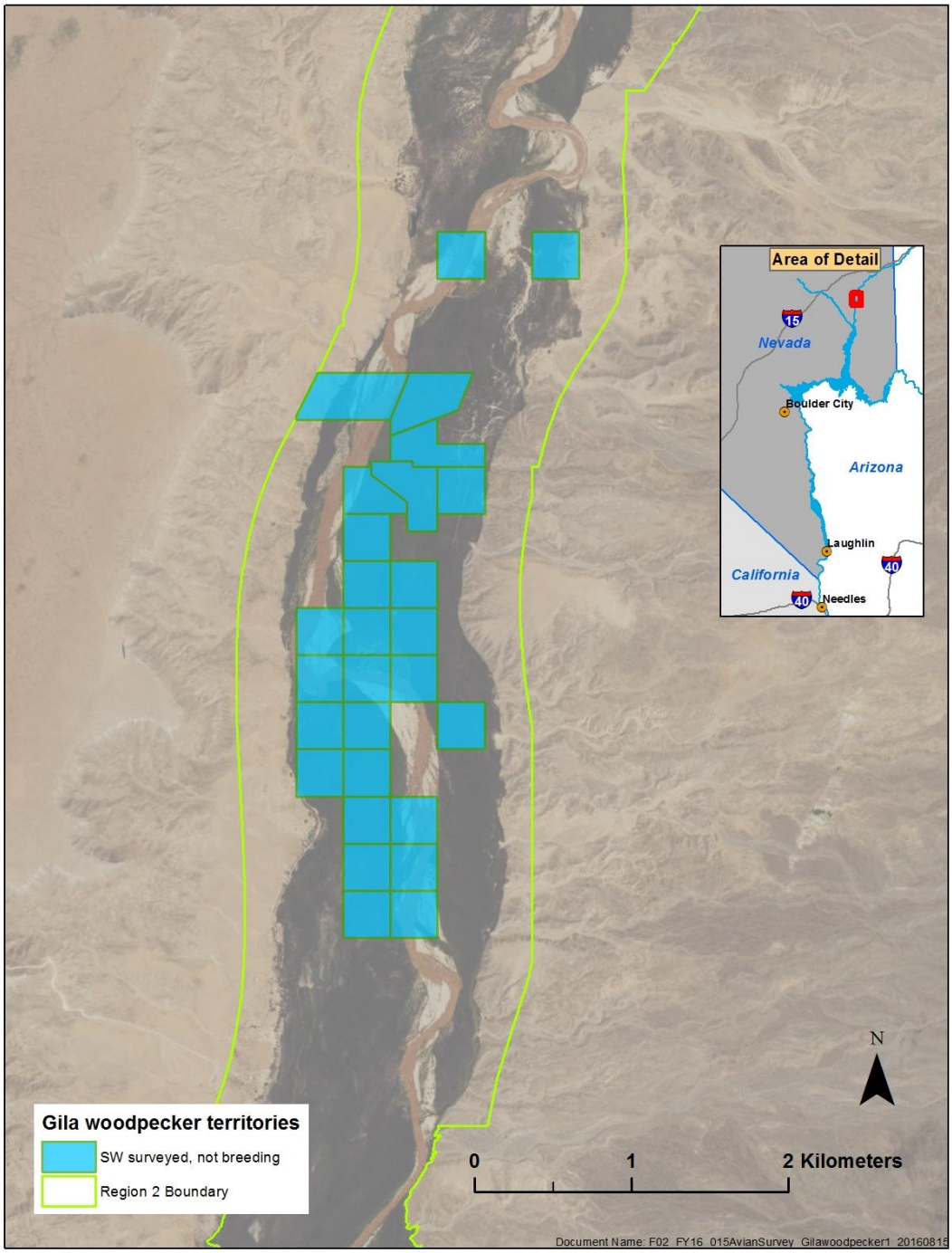

Figure 4-53.—Average number of Gila woodpecker territories found in Region 2, Virgin River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

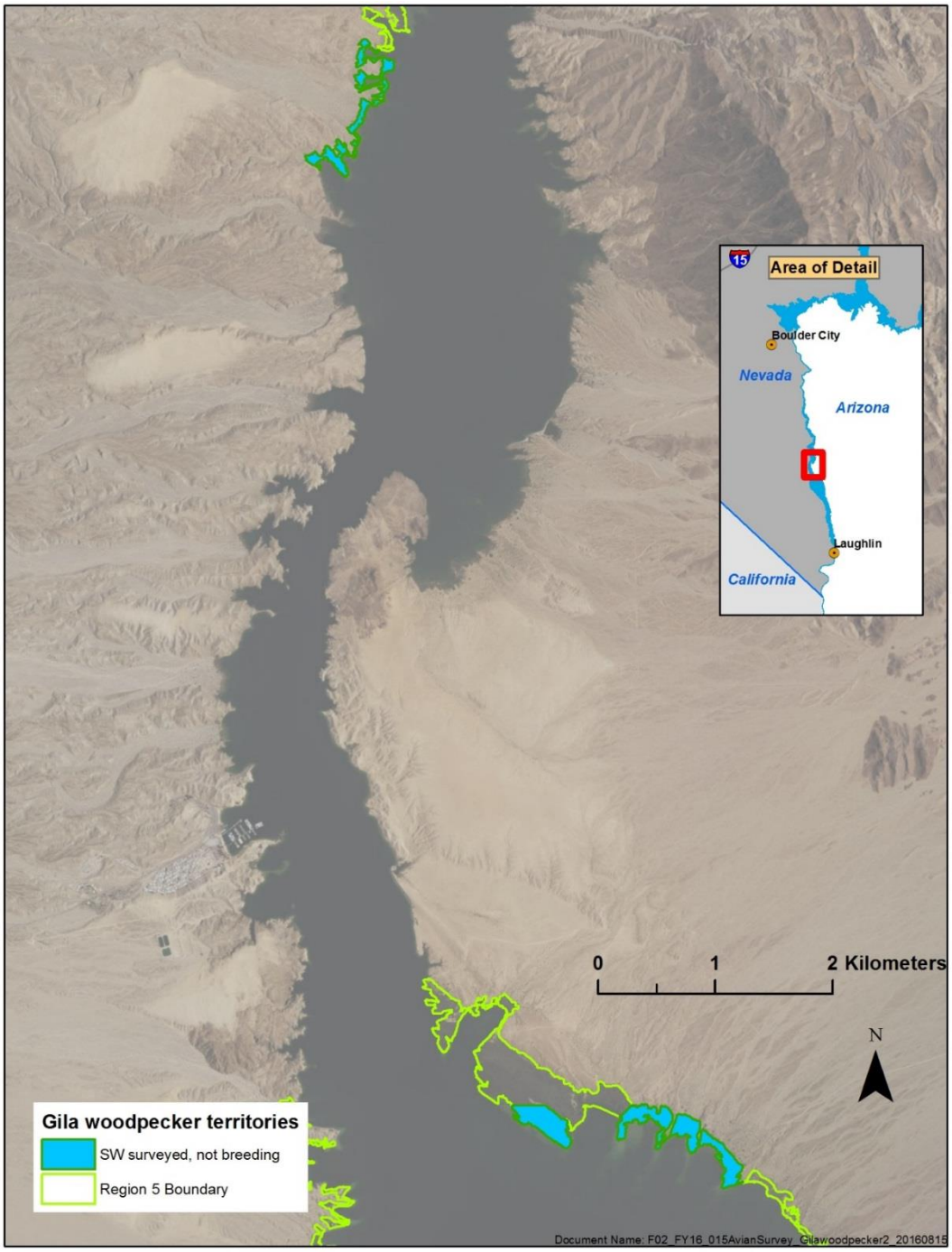

Figure 4-54.—Average number of Gila woodpecker territories found in Region 5, Lake Mohave sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

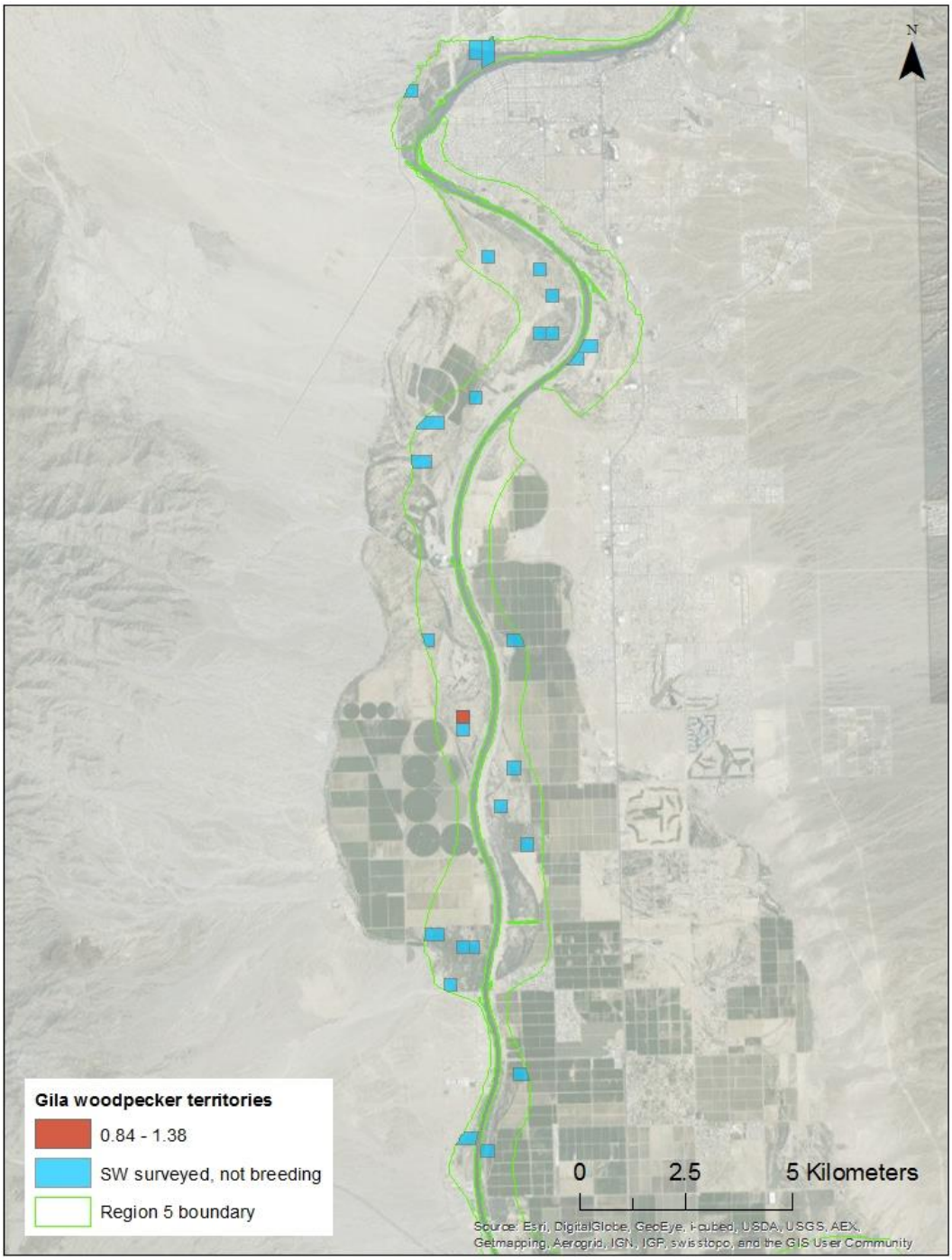

Figure 4-55.—Average number of Gila woodpecker territories found in Region 5, Mohave Valley sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

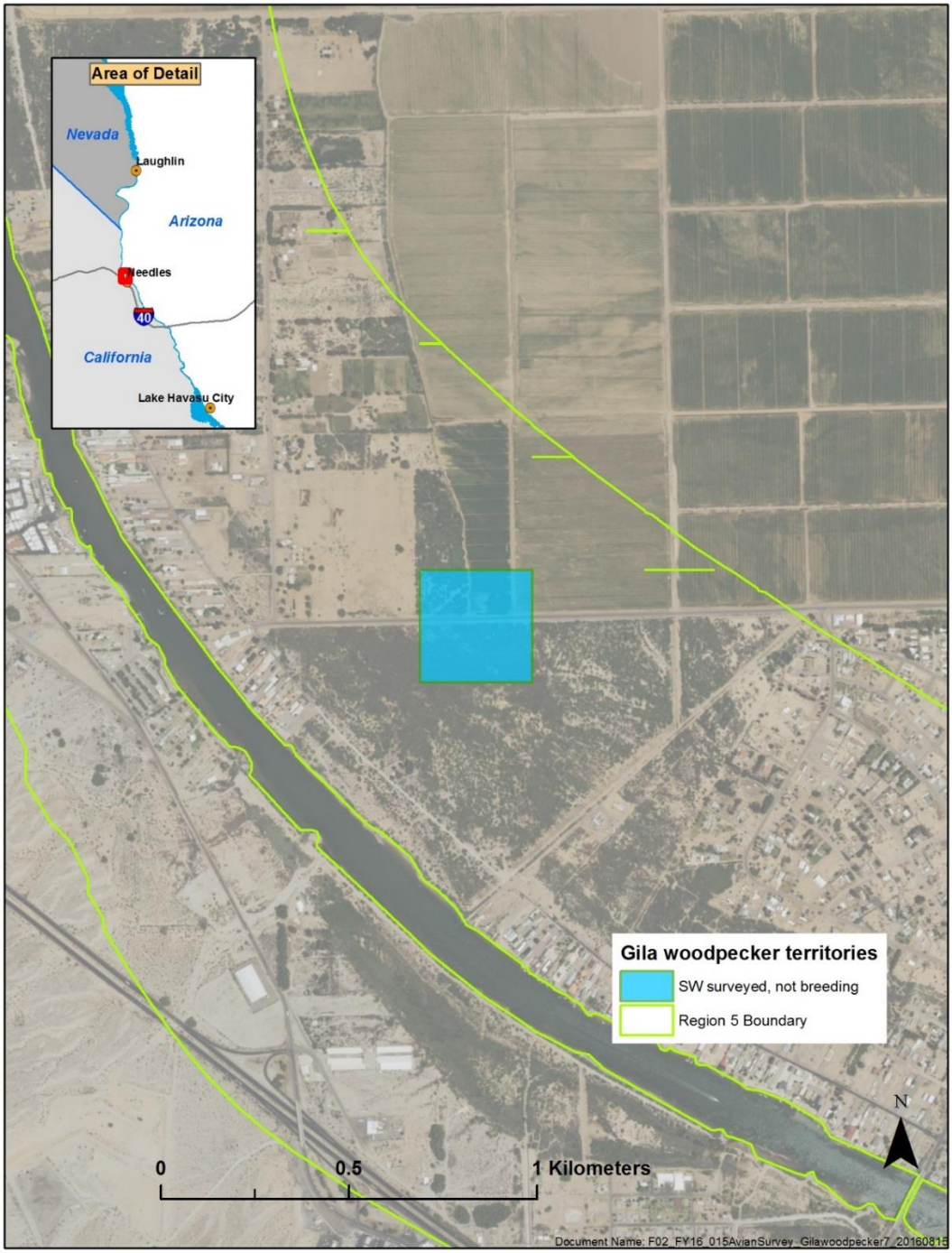

Figure 4-56.—Average number of Gila woodpecker territories found in Region 5, Needles sites, in 2011–15.

SW = surveyed as part of system-wide coverage.

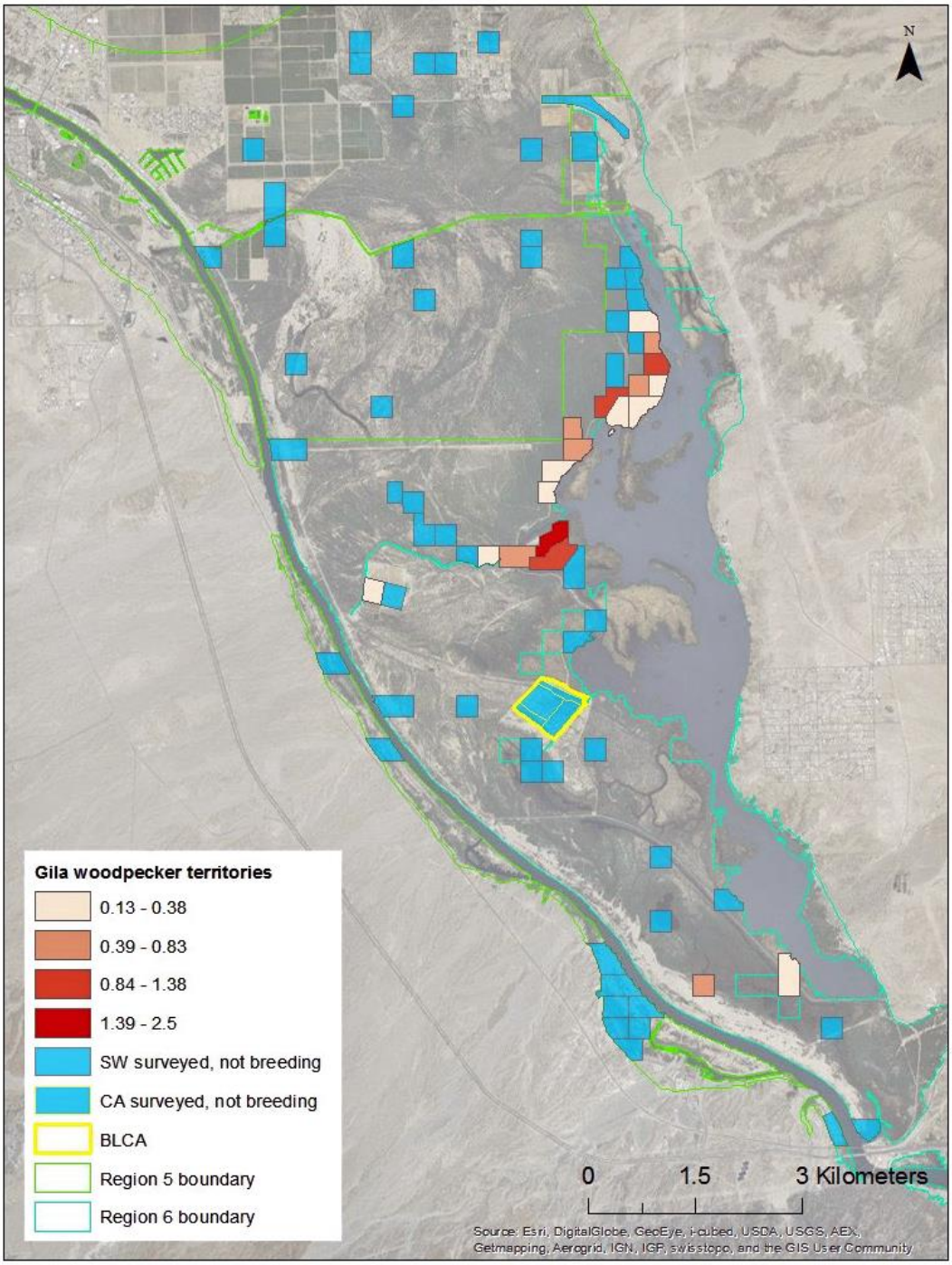

Figure 4-57.—Average number of Gila woodpecker territories found in Regions 5 and 6, Topock Marsh sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

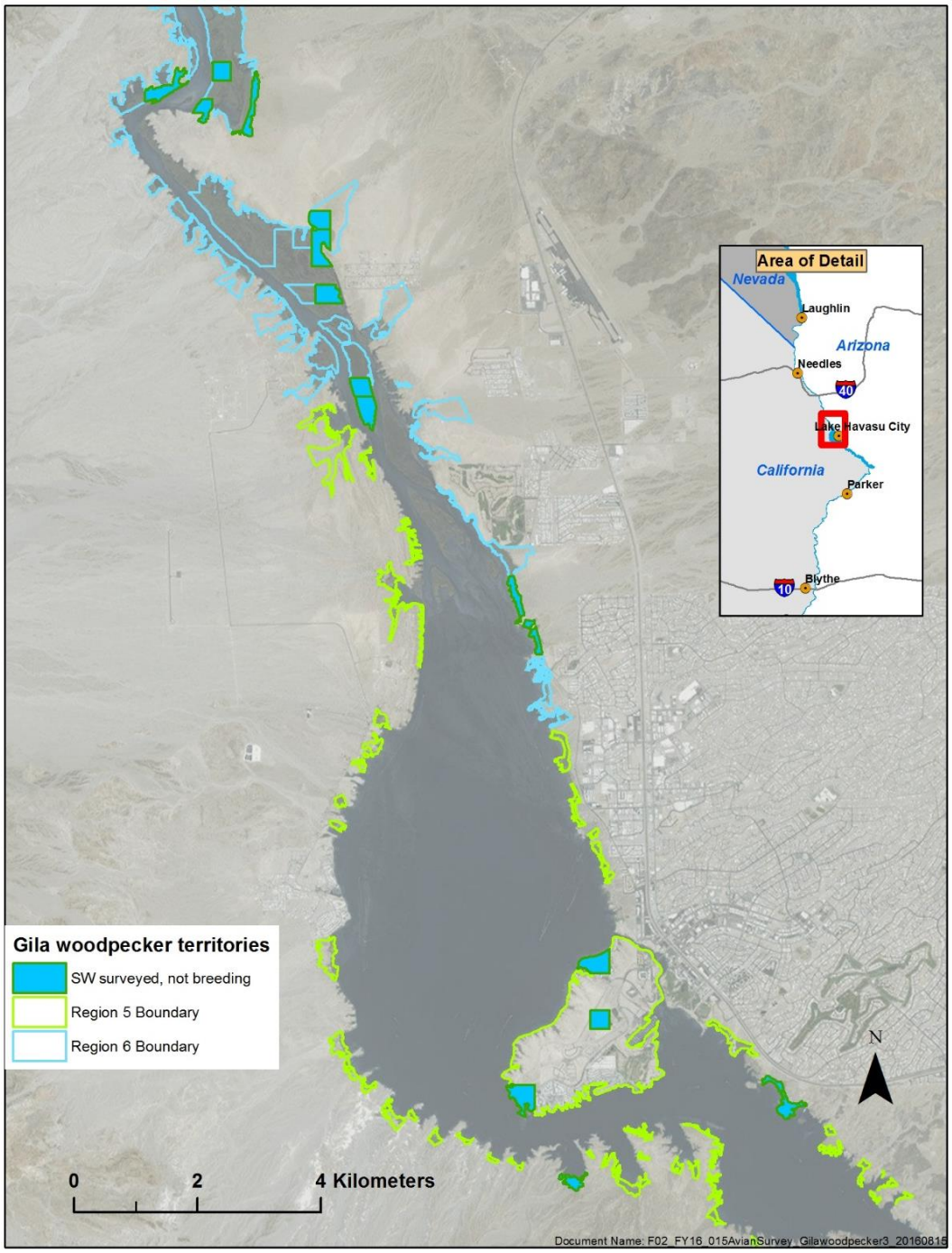

Figure 4-58.—Average number of Gila woodpecker territories found in Regions 5 and 6, Topock Gorge and upper and lower Lake Havasu sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

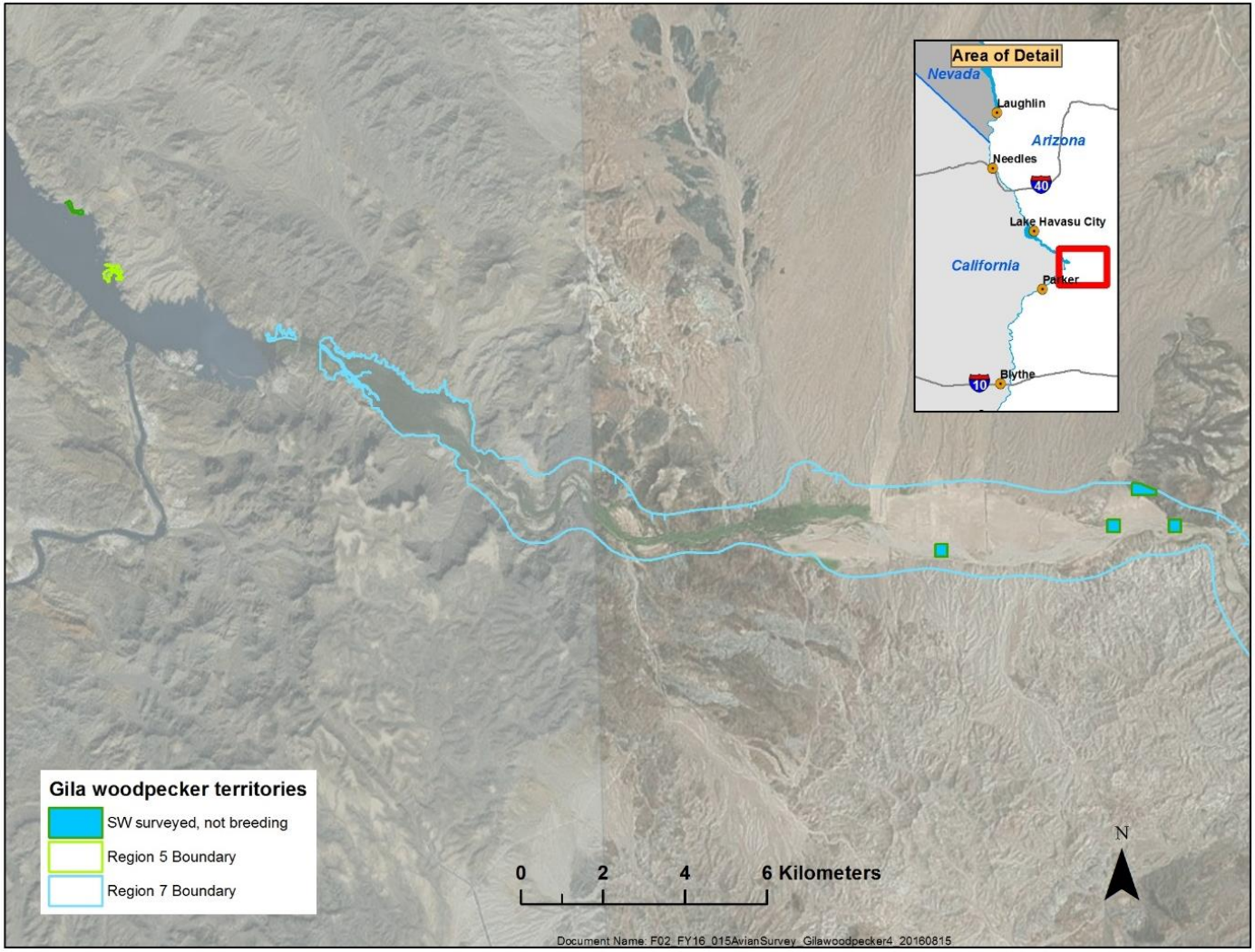

Figure 4-59.—Average number of Gila woodpecker territories found in Region 7, Bill Williams Delta sites, in 2011–15.

SW = surveyed as part of system-wide coverage.

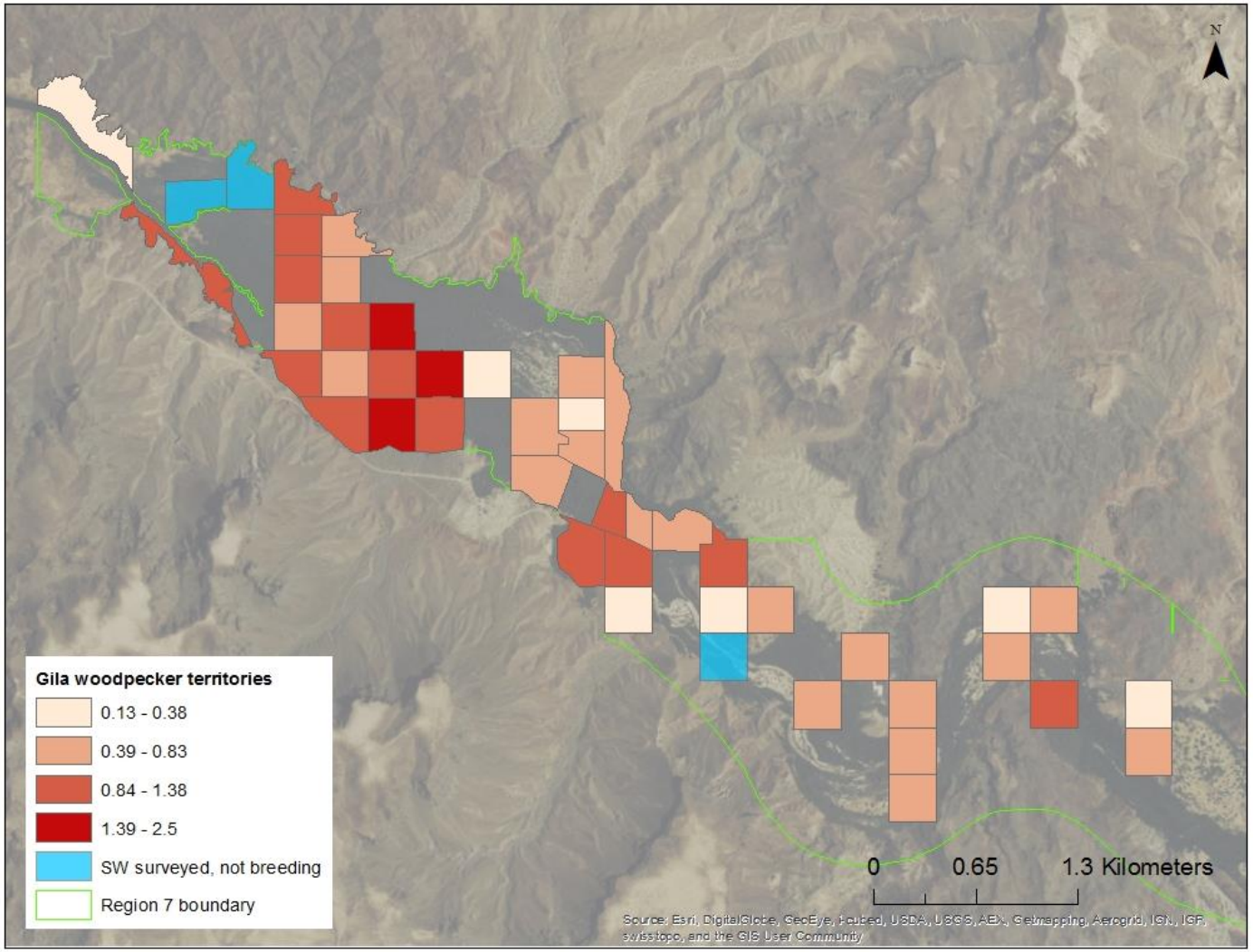

Figure 4-60.—Average number of Gila woodpecker territories found in Region 7, lower Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

Figure 4-61.—Average number of Gila woodpecker territories found in Region 7, upper Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

Figure 4-62.—Average number of Gila woodpecker territories found in Region 8, Parker Strip sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

Figure 4-63.—Average number of Gila woodpecker territories found in CRIT 9, in 2011–15.

SW = surveyed as part of system-wide survey, and CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-64.—Minimum convex polygons of Gila woodpecker territories at CRIT 9.

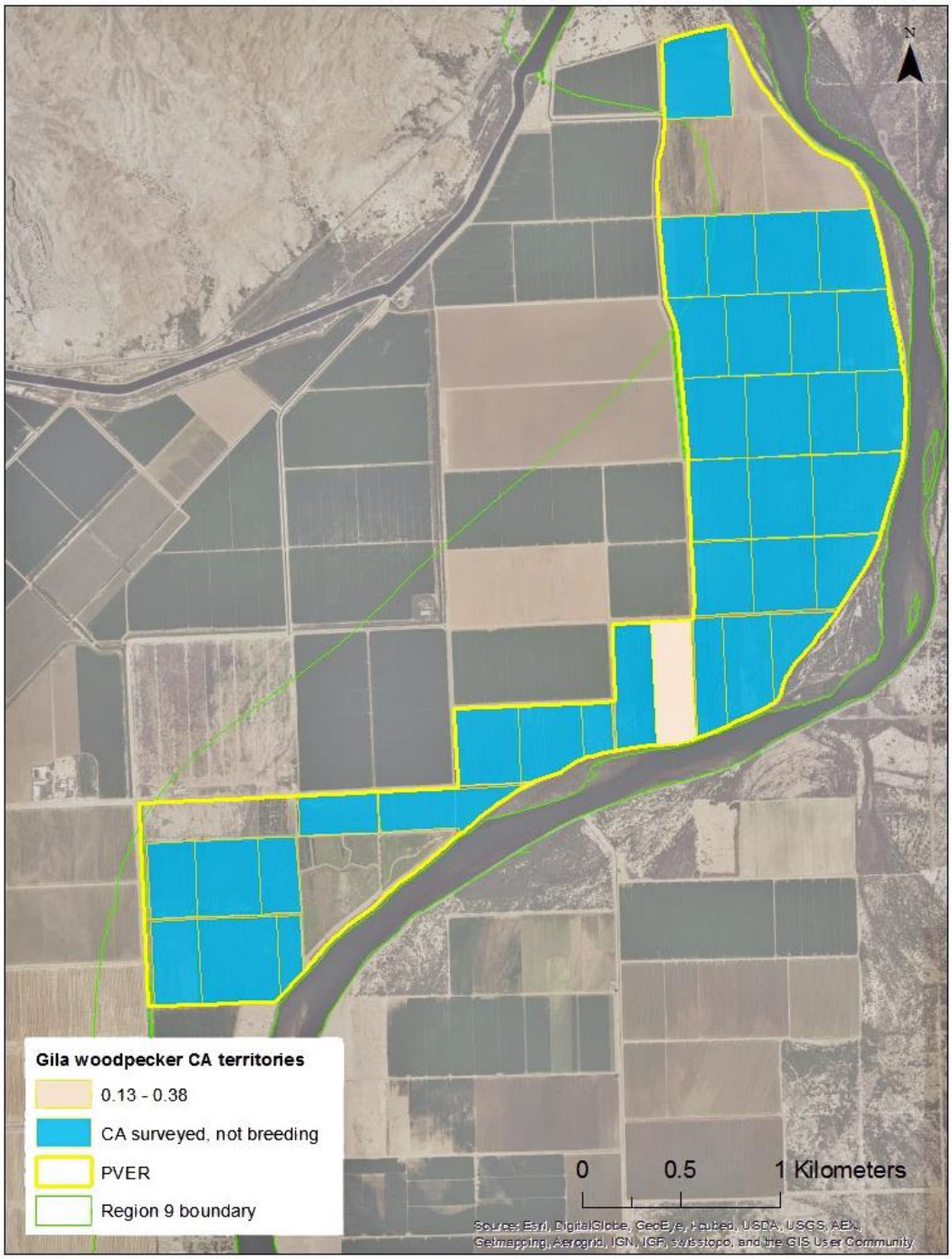

Figure 4-65.—Average number of Gila woodpecker territories found in Region 9, PVER sites, in 2011–15.
CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-66.—Minimum convex polygons of Gila woodpecker territories at the PVER.

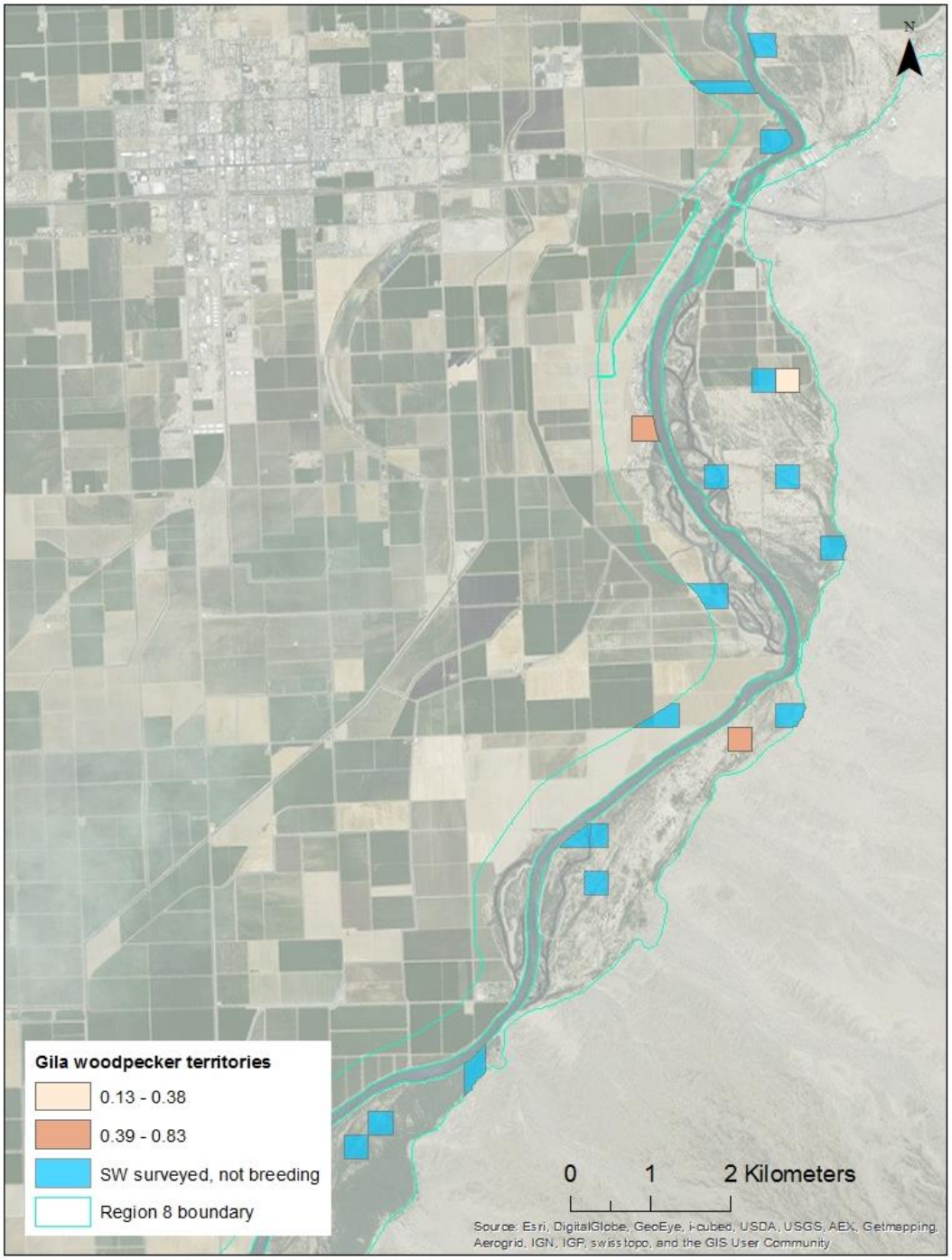

Figure 4-67.—Average number of Gila woodpecker territories found in Region 8, Blythe and Palo Verde, California, sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

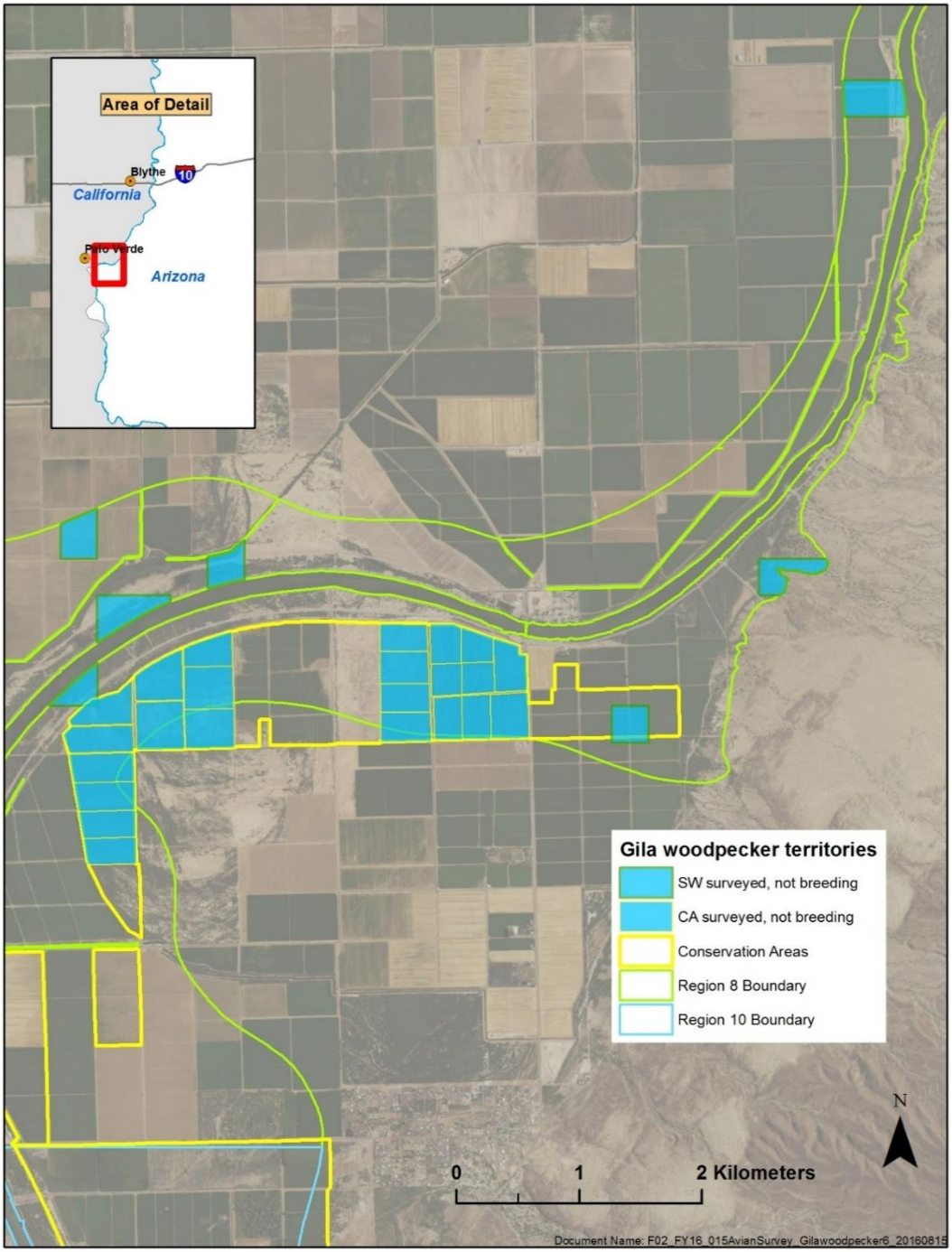

Figure 4-68.—Average number of Gila woodpecker territories found in Region 8, Cibola Valley sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

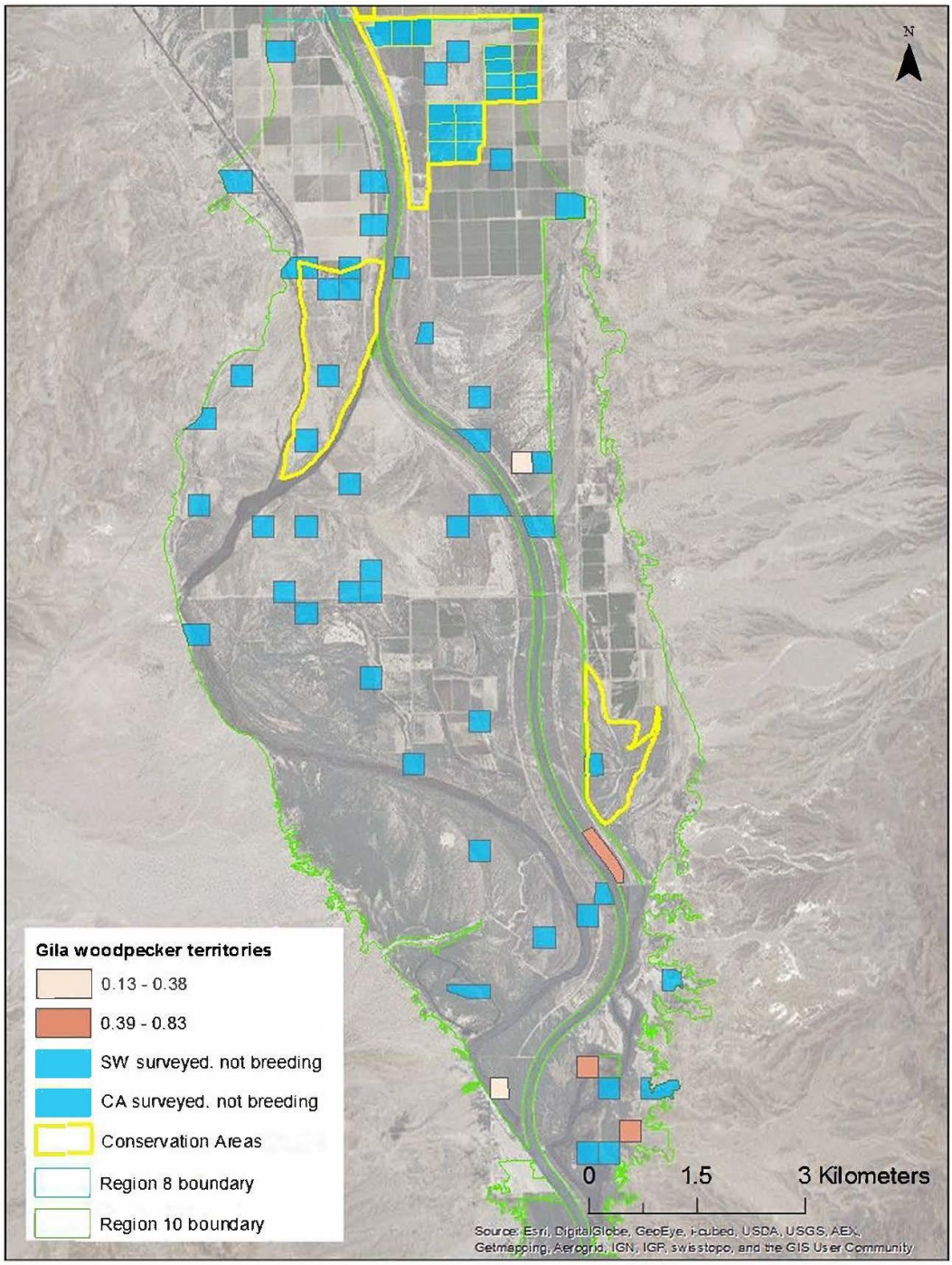

Figure 4-69.—Average number of Gila woodpecker territories found in Region 10, Cibola NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

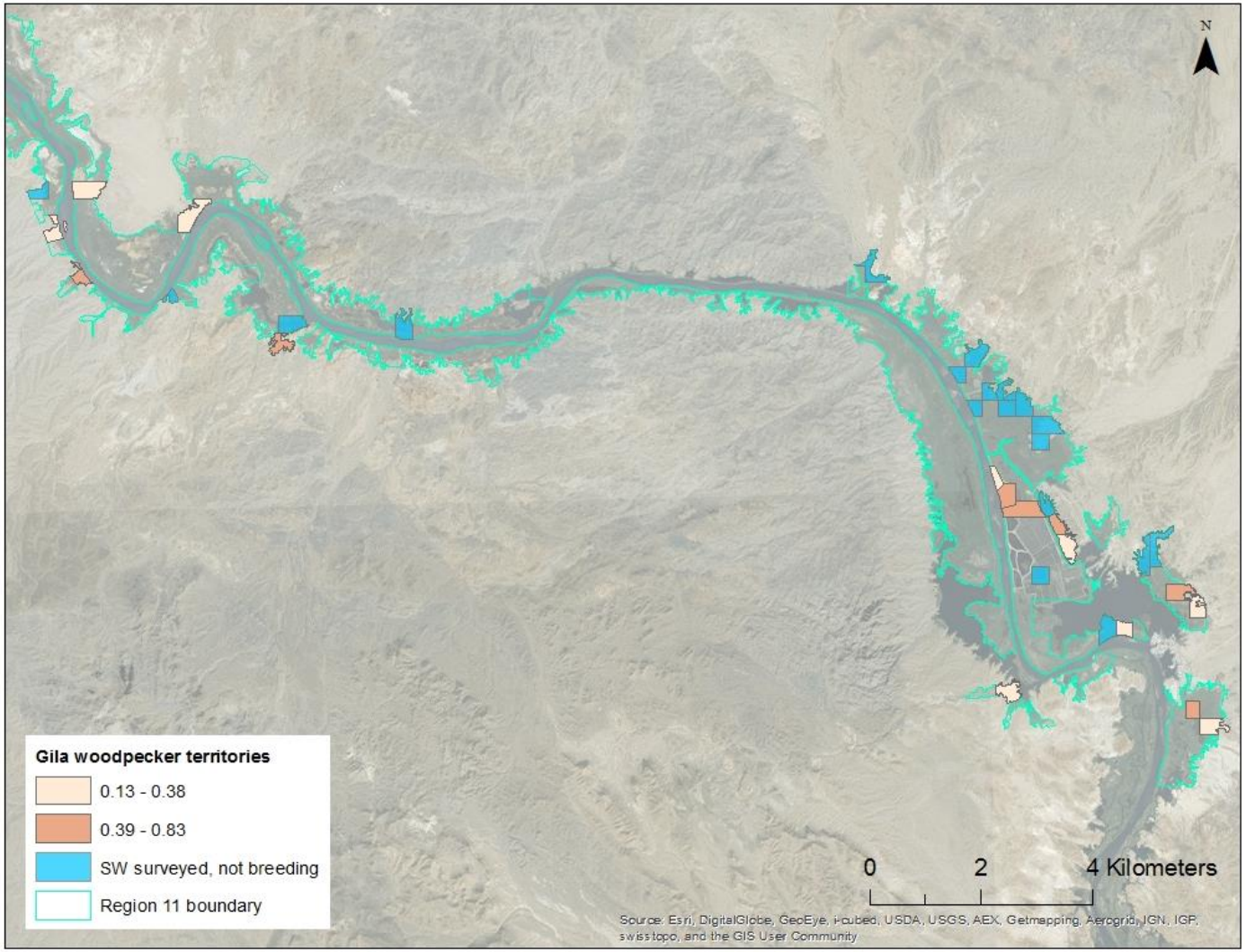

Figure 4-70.—Average number of Gila woodpecker territories found in Region 11, Imperial NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

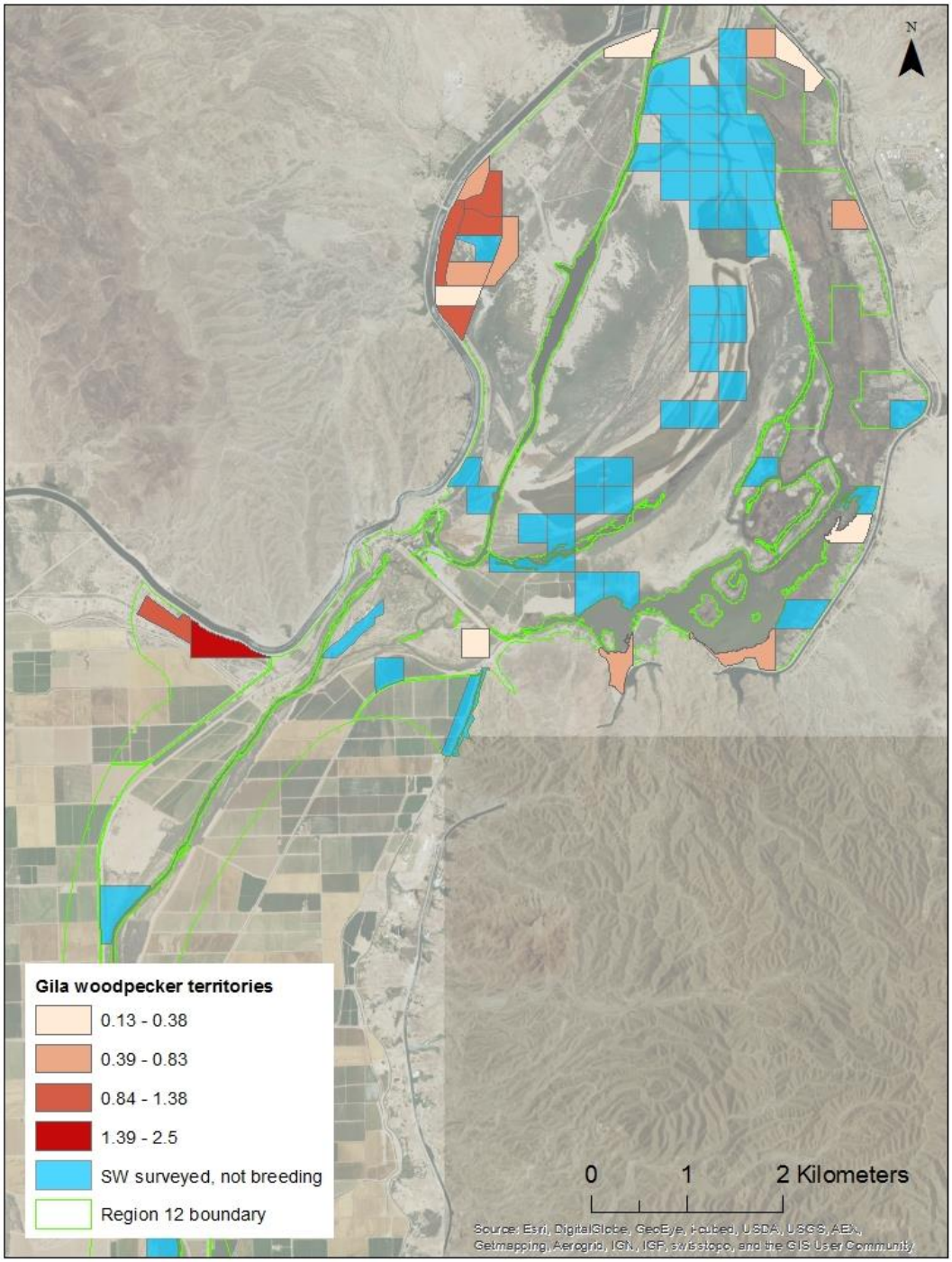

Figure 4-71.—Average number of Gila woodpecker territories found in Region 12, Imperial/Laguna Dam sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

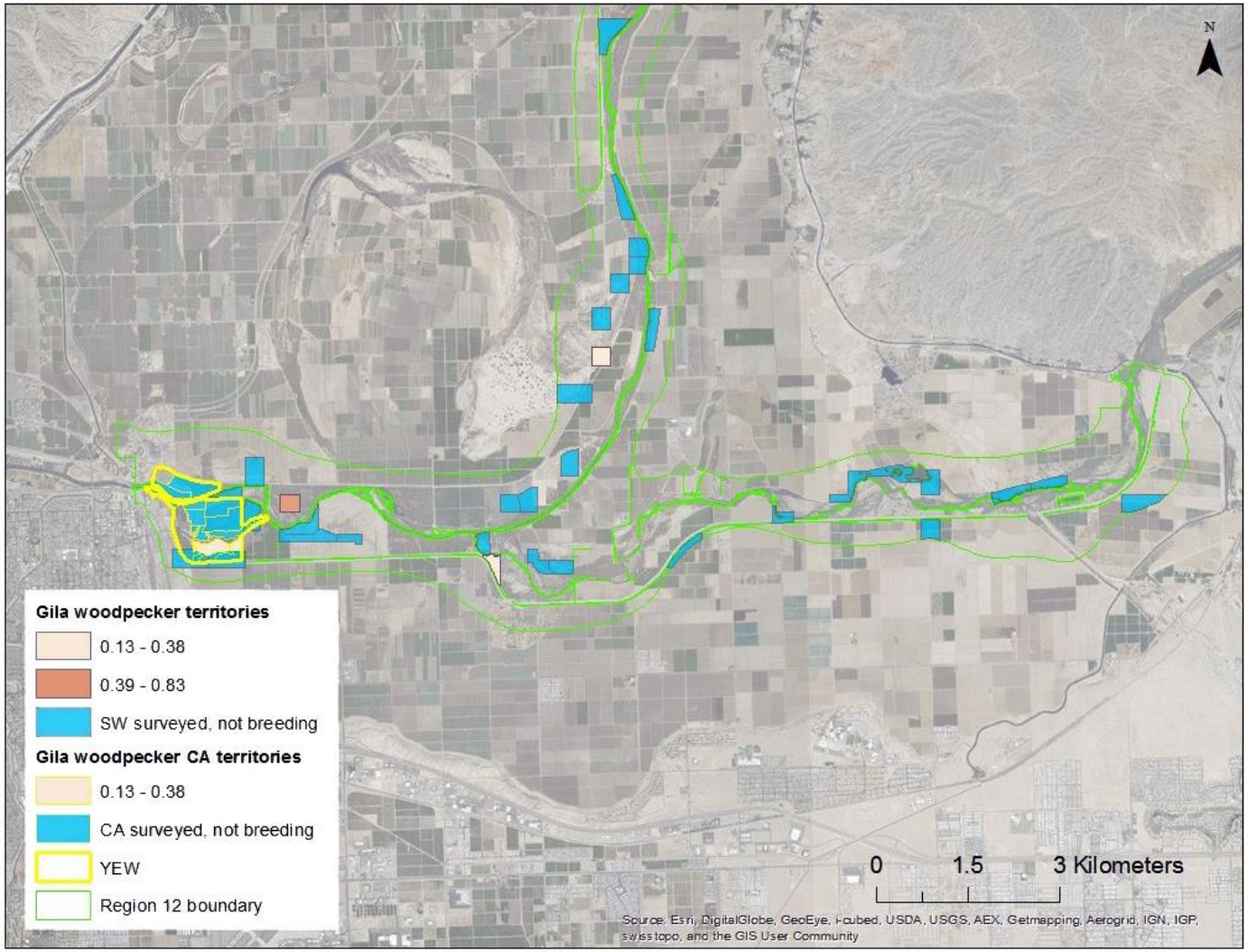

Figure 4-72.—Average number of Gila woodpecker territories found in Region 12, Yuma/Gila River, Arizona, sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

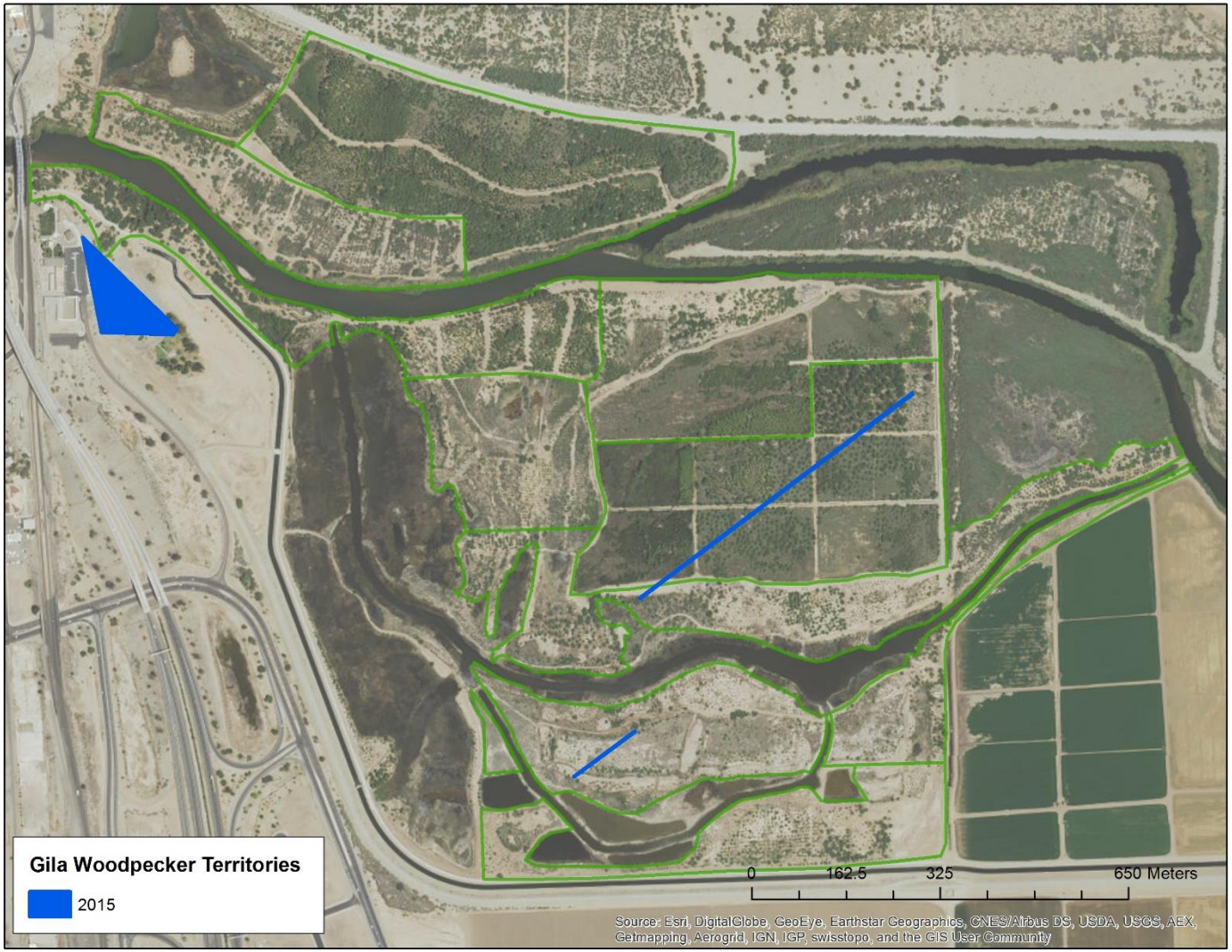

Figure 4-73.—Minimum convex polygons of Gila woodpecker territories at YEW.

Summer Tanager

Observed Habitat Use in the Project Area

- Cottonwood-willow was the only habitat type where we consistently found breeding summer tanagers during 2011–15. These areas contained at least a few tall trees, sometimes just one or two willow trees among saltcedar forest, and in other cases they featured a continuous or broken canopy of cottonwoods and/or willows.

Phenology in the Project Area

- Over the 5-year study, the average date of first detection of summer tanagers was April 18.

- Based on confirmed breeding evidence, we calculated a range of incubation initiation by summer tanagers of May 15 to June 13. The peak of incubation initiation was in late May. This is consistent with previously published nesting phenology in the region (Rosenberg et al. 1991; Corman and Wise-Gervais 2005; Robinson 2012).

Surveying This Species

- Surveying for summer tanagers is somewhat complex compared to other LCR MSCP covered focal species. We found that higher-intensity survey efforts, on average, detect a higher number of territories than lower-intensity survey efforts.

- Some of the challenges in surveying for summer tanagers include:

    1. Early visits to plots will not result in detections of this species, which arrives at breeding sites from mid-April to early May.

    2. Males do not sing consistently, and most singing occurs at dawn or pre-dawn and is sometimes limited to the time prior to incubation.

    3. Their song can be confused with the song of the black-headed grosbeak (*Pheuticus melanocephalus*) and the call of the western tanager (*Piranga ludoviciana*), both common migrants in the region.

4. Territories are large, vary in delineation through the breeding season, and do not necessarily abut one another; therefore, counter-singing is relatively infrequent.

5. Both sexes are somewhat cryptic, particularly females, and as a canopy species, summer tanagers can be difficult to observe.

6. Migrants are observed in April, and surveyors tend to be conservative in their classification of breeders during this time period.

7. To further optimize the survey techniques for summer tanagers, the raw survey data could be examined to see if breeding rules could be changed for this species.. This would be a relatively small effort because of the limited number of territories, but it might prove useful to narrow down classification rules for breeders of this species. For instance, it might turn out that all or most birds observed after mid-April are breeders, and even rapid area search surveys may then use single summer tanager records for determining territories.

Status and Distribution in 2011–2015

- Grinnell (1914) describes summer tanagers as being common everywhere visited along the Colorado River in May.

- Summer tanagers occurred from the Virgin River south to Yuma, Arizona, during our 2011–15 area search surveys (figures 4-74 to 4-96.

- Our survey results estimated a population size from 2011 to 2015 of 262 (SE = 54) pairs.

- The highest breeding densities were recorded at the Bill Williams River, Region 7, with just over 32 territories recorded (figure 4-83 and 4-84, and fairly high densities were at Topock Marsh, with about 7 territories found (figures 4-78).

- Few pairs were found in other areas, including the Virgin River, Topock Gorge, the Cibola NWR, the Imperial NWR, and upstream of Laguna Dam (figures 4-75, 4-80 4-92 to 4-94)

- Summer tanagers also nested in cottonwood and willow plantings at conservation areas and CRIT 9, including the BLCA, CRIT 9,the PVER the CVCA, and YEW (4-78, 4-79, 4-85 to 4-88, 4-95, and 4-96).

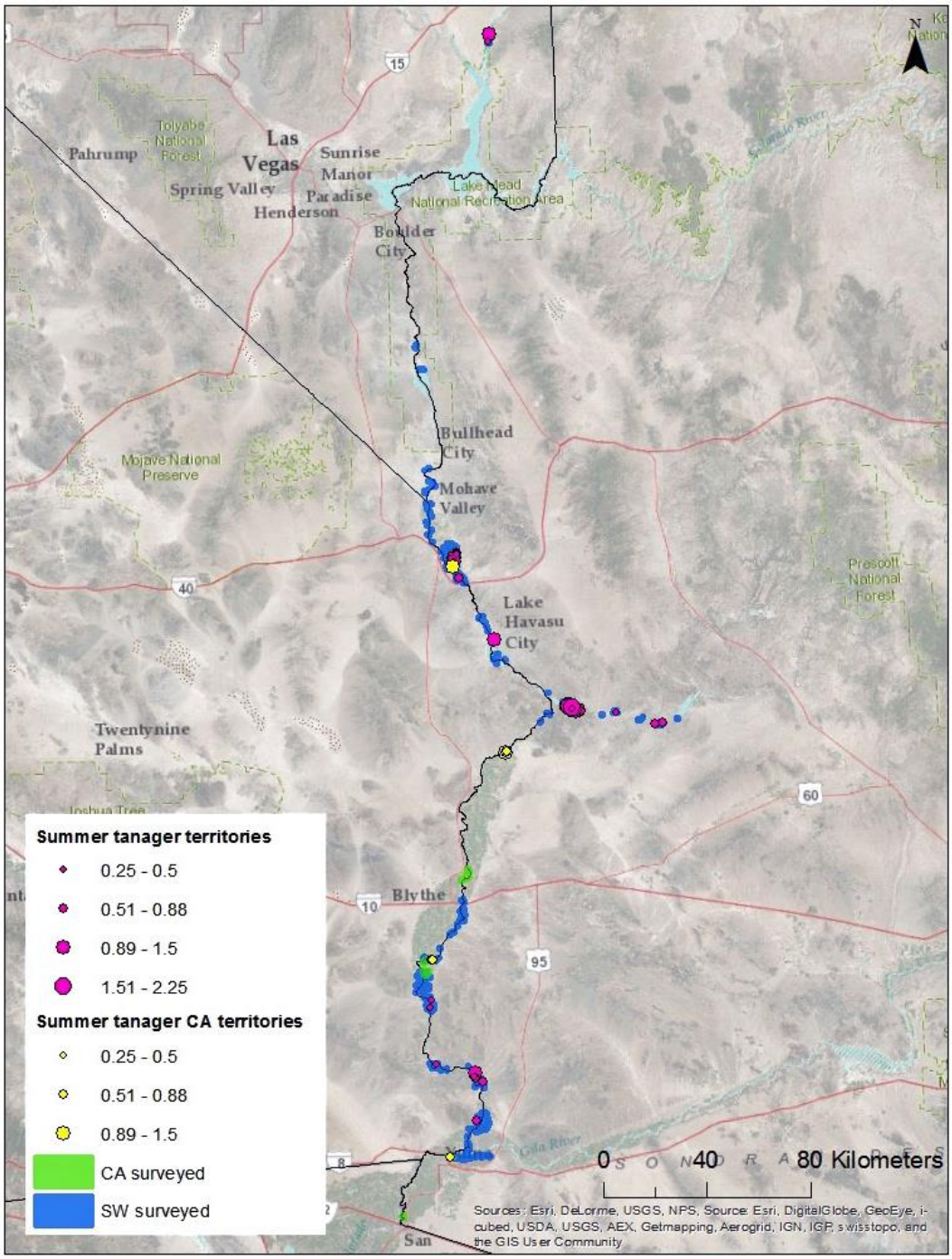

Figure 4-74.—Average number of summer tanager territories found throughout the LCR MSCP project area in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

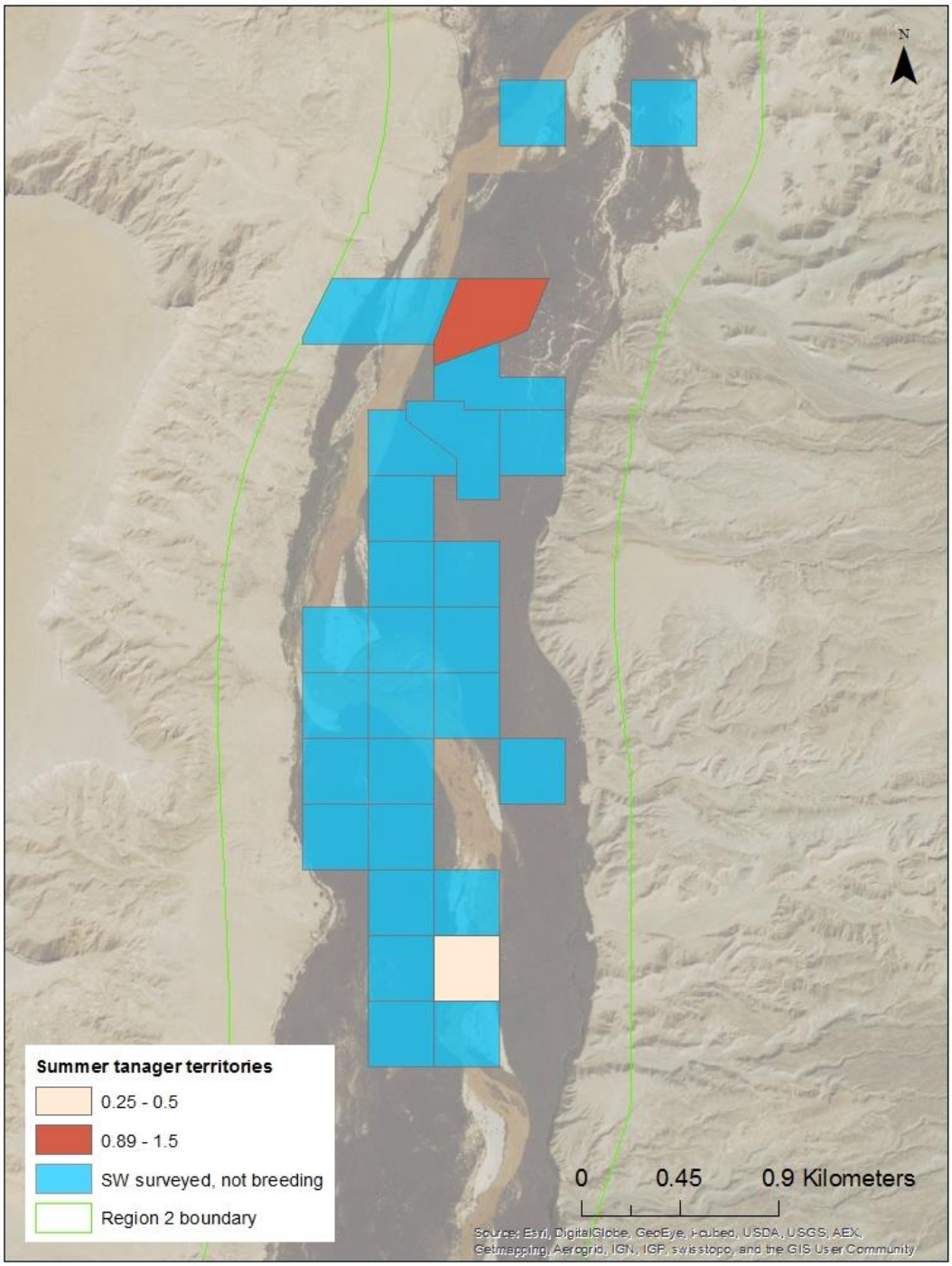

Figure 4-75.—Average number of summer tanager territories found in Region 2, Virgin River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

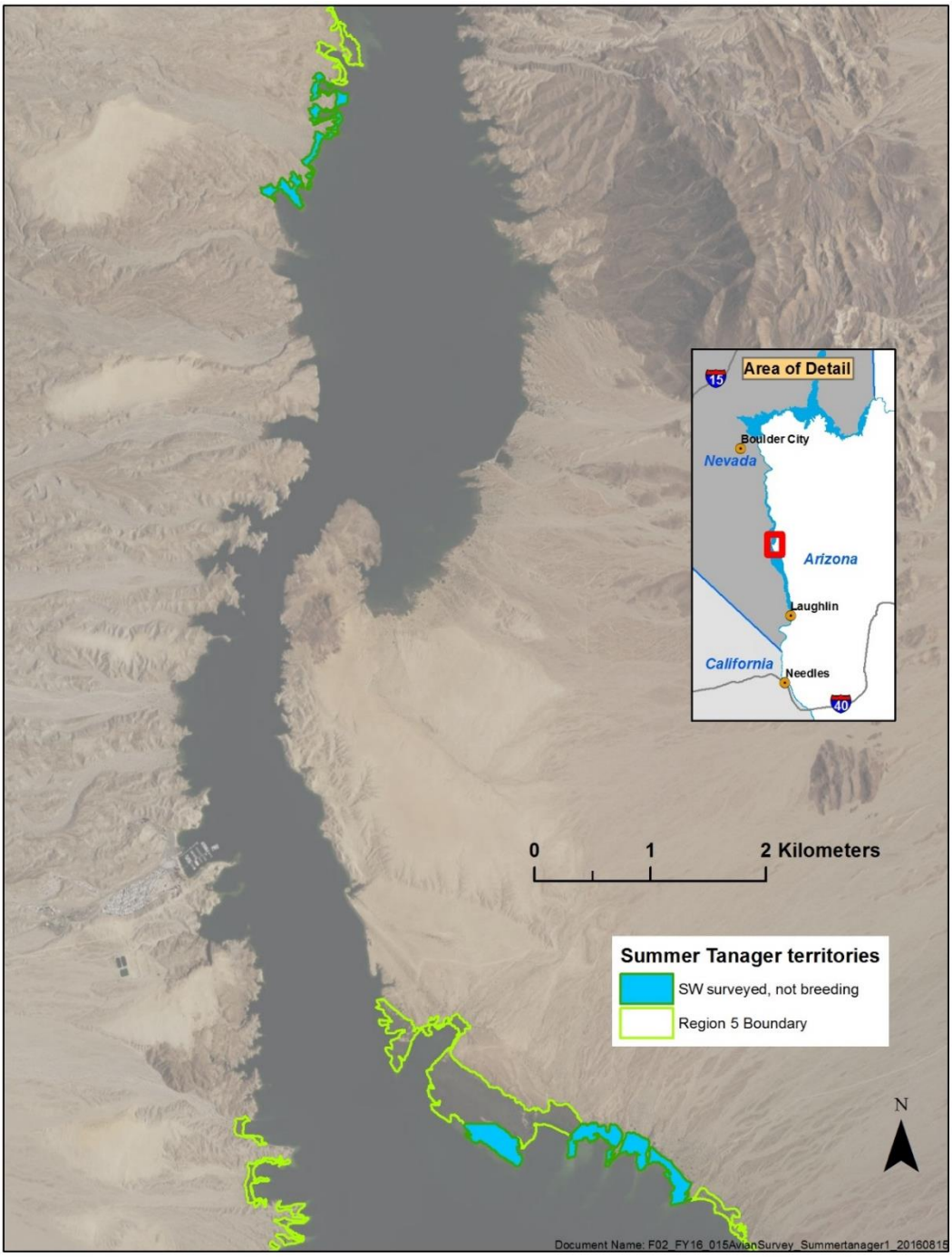

Figure 4-76.—Average number of summer tanager territories found in Region 5, Lake Mohave sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

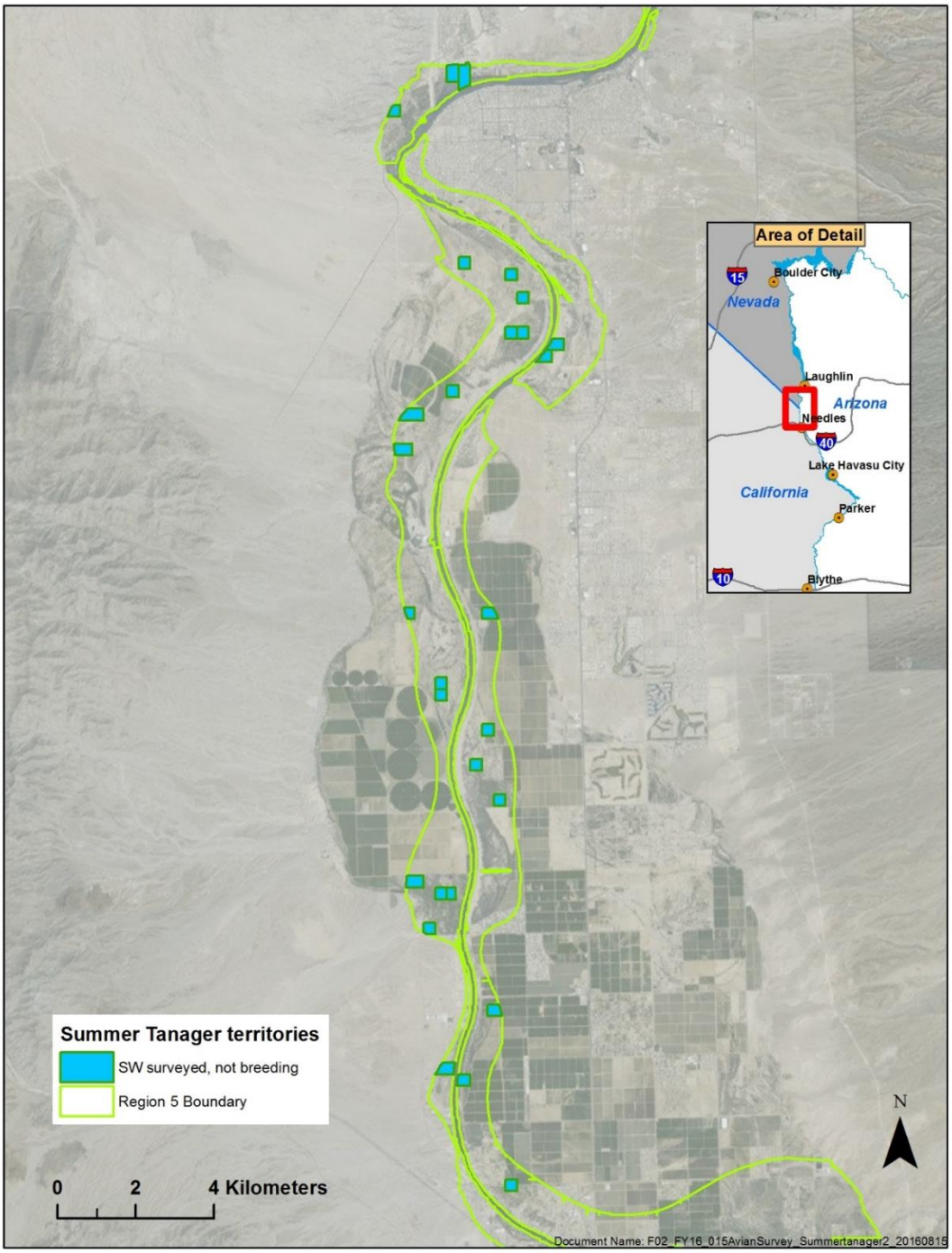

Figure 4-77.—Average number of summer tanager territories found in Region 5, Mohave Valley sites, in 2011–15.
SW = surveyed as part of system-wide survey coverage.

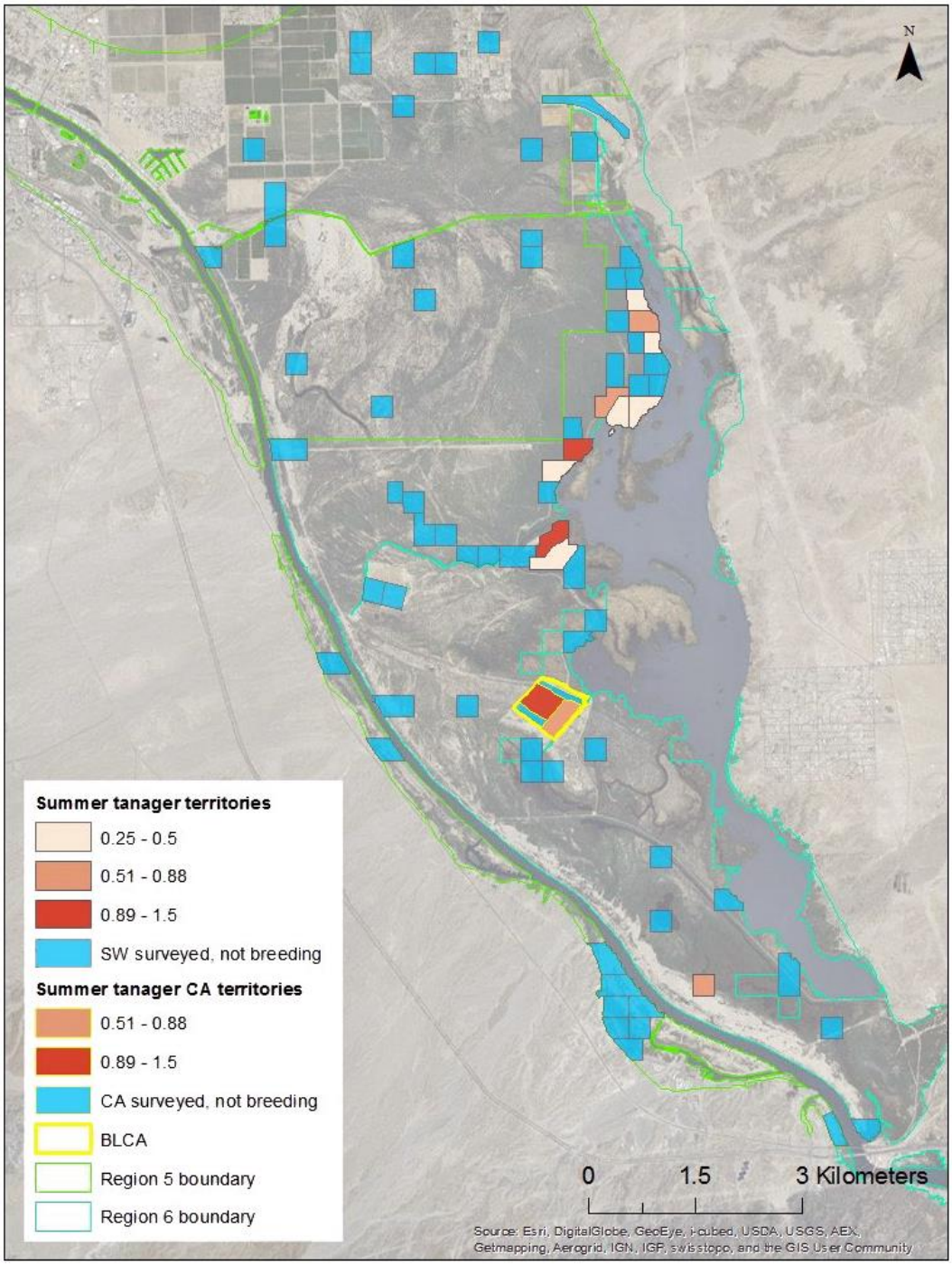

Figure 4-78.—Average number of summer tanager territories found in Regions 5 and 6, Topock Marsh sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-79.—Minimum convex polygons of summer tanager territories at the BLCA.

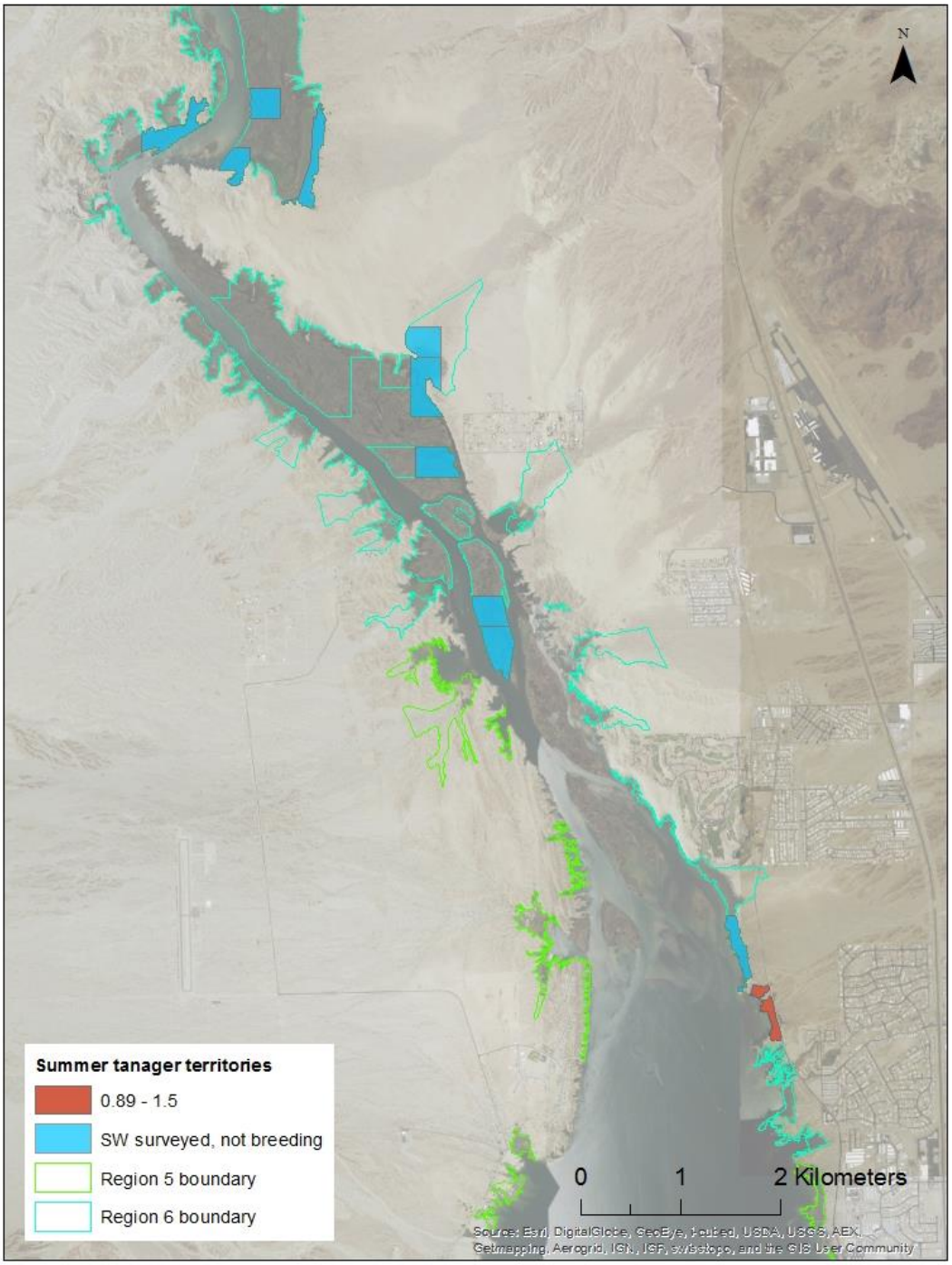

Figure 4-80.—Average number of summer tanager territories found in Regions 5 and 6, Topock Gorge sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

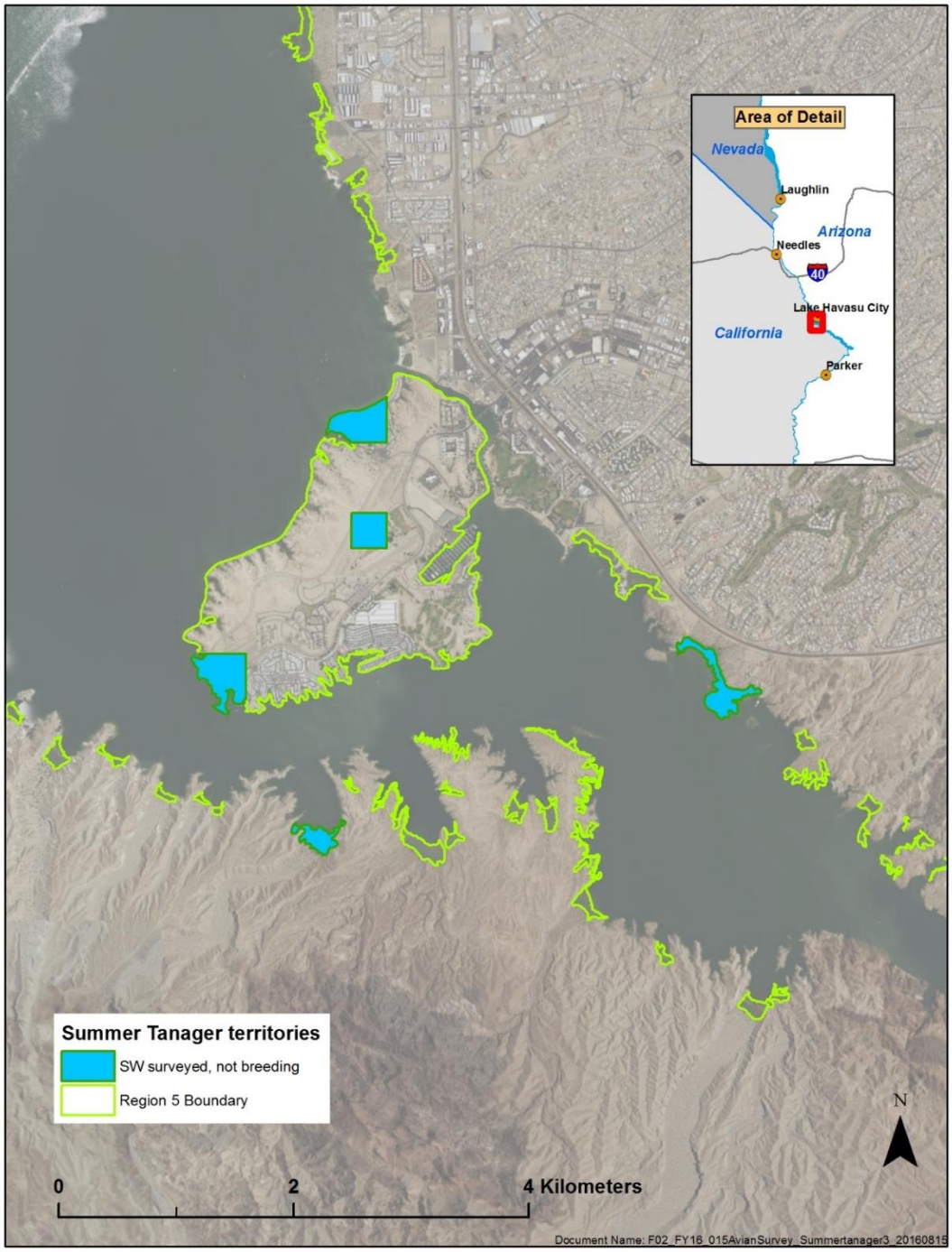

Figure 4-81.—Average number of summer tanager territories found in Region 5, Lake Havasu sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

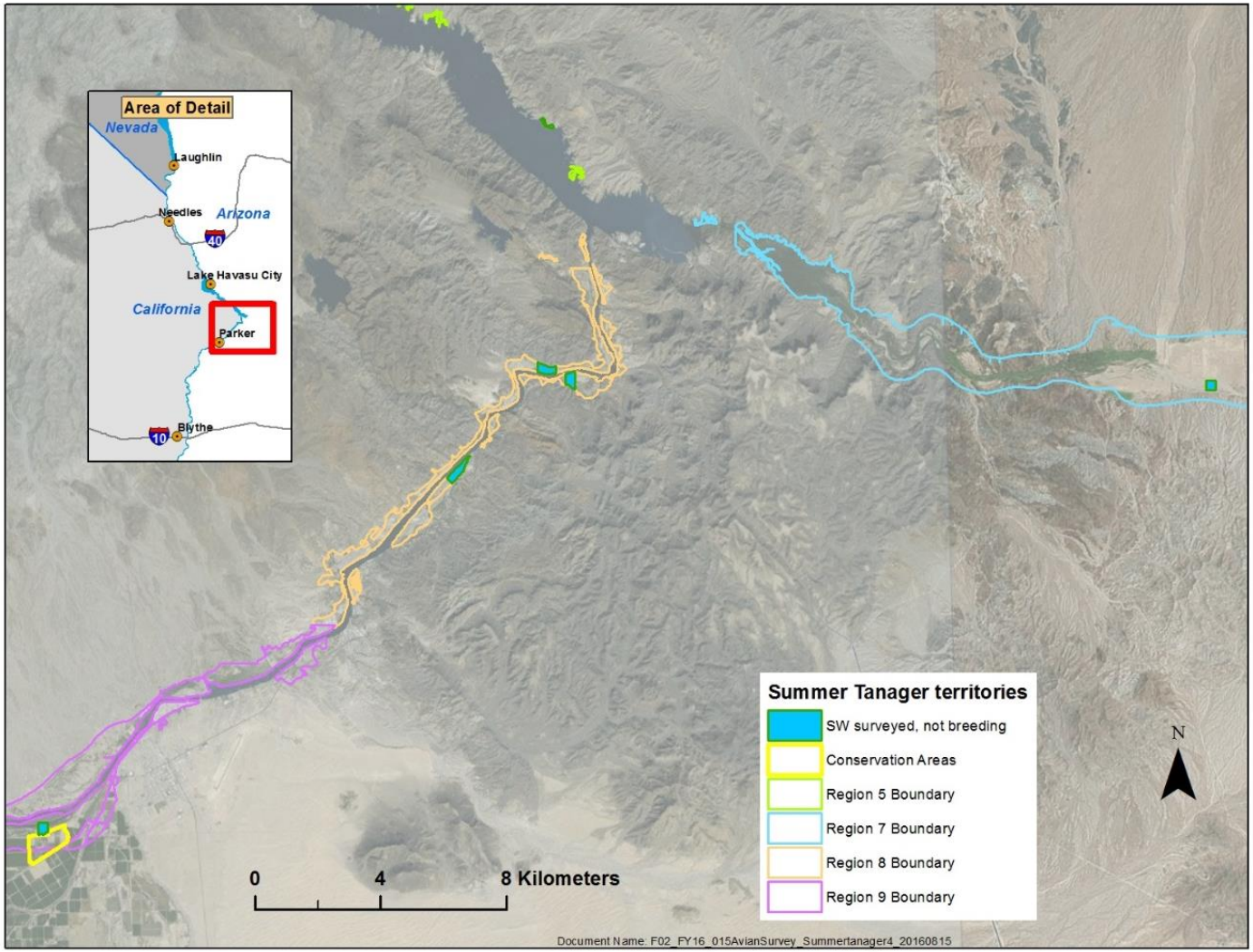

Figure 4-82.—Average number of summer tanager territories found in Regions 5, 7, 8, and 9, Bill Williams Delta and Parker Strip sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

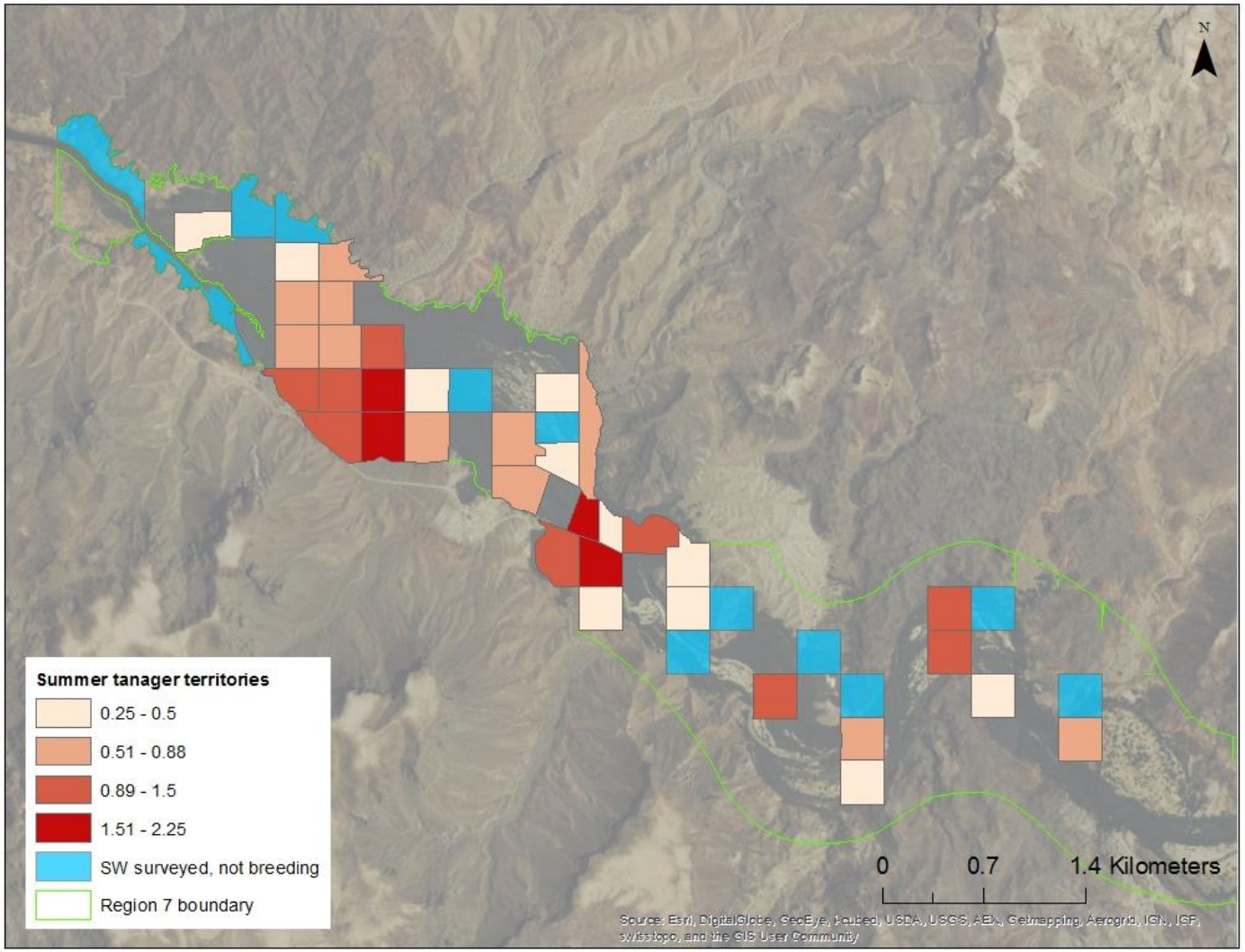

Figure 4-83.—Average number of summer tanager territories found in Region 7, lower Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

Figure 4-84.—Average number of summer tanager territories found in Region 7, upper Bill Williams River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

Figure 4-85.—Average number of summer tanager territories found in Region 9, Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09, in 2011–15.

CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-86.—Minimum convex polygons of summer tanager territories at Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09.

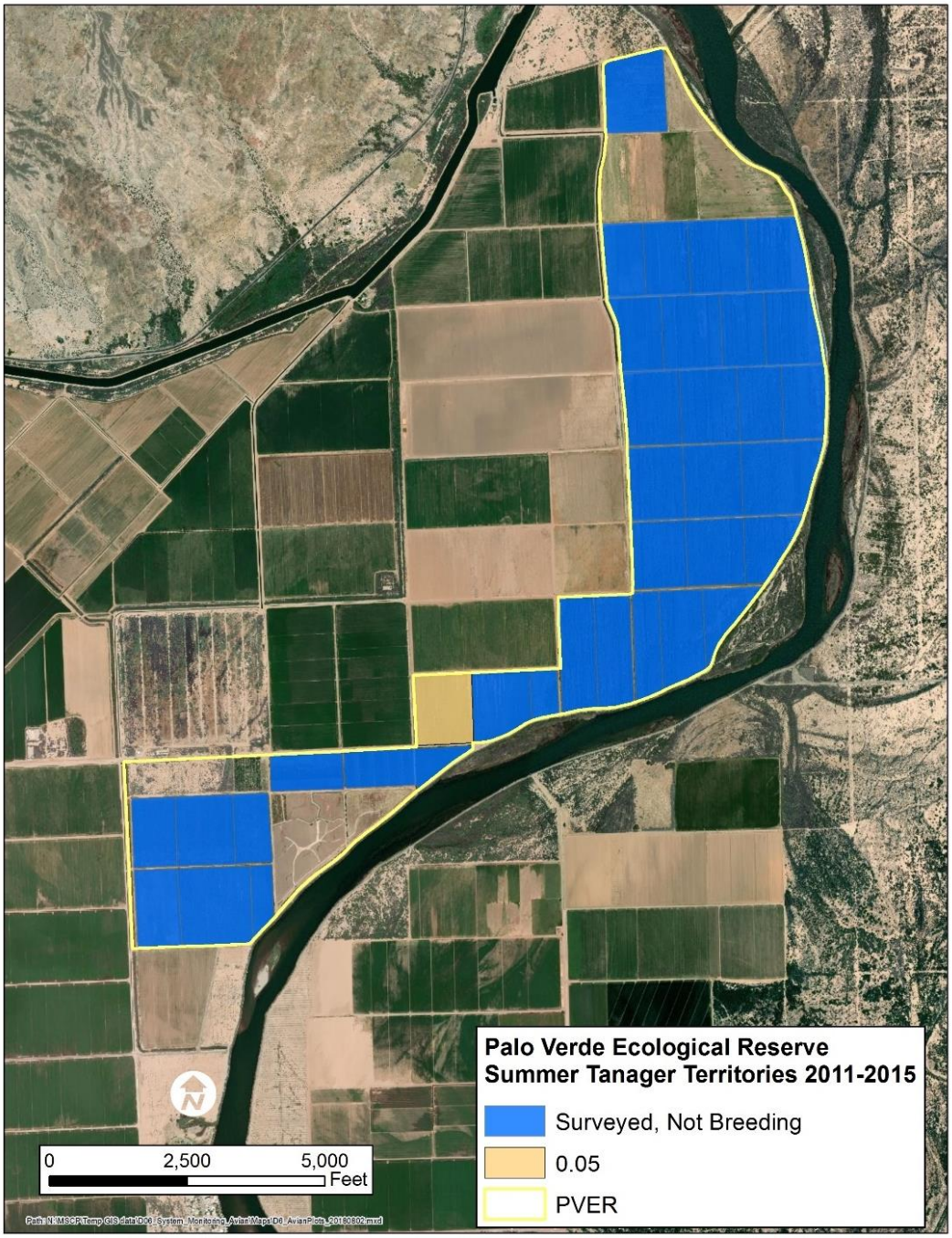

Figure 4-87.—Average number of summer tanager territories found in Region 9, PVER sites, in 2011–15.
CA = surveyed as part of conservation area and CRIT 9 coverage.

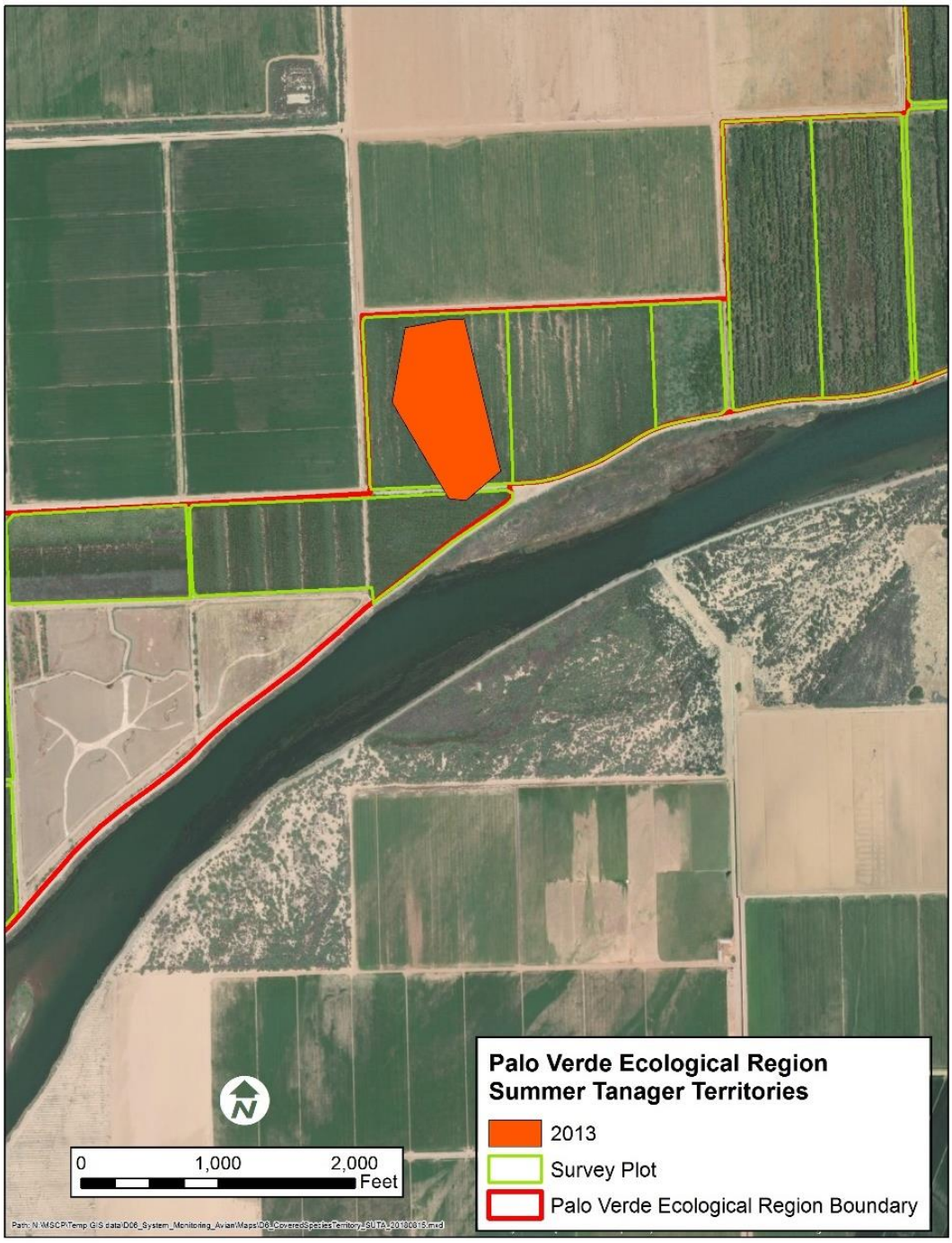

Figure 4-88.—Minimum convex polygons of summer tanager territories at the PVER.

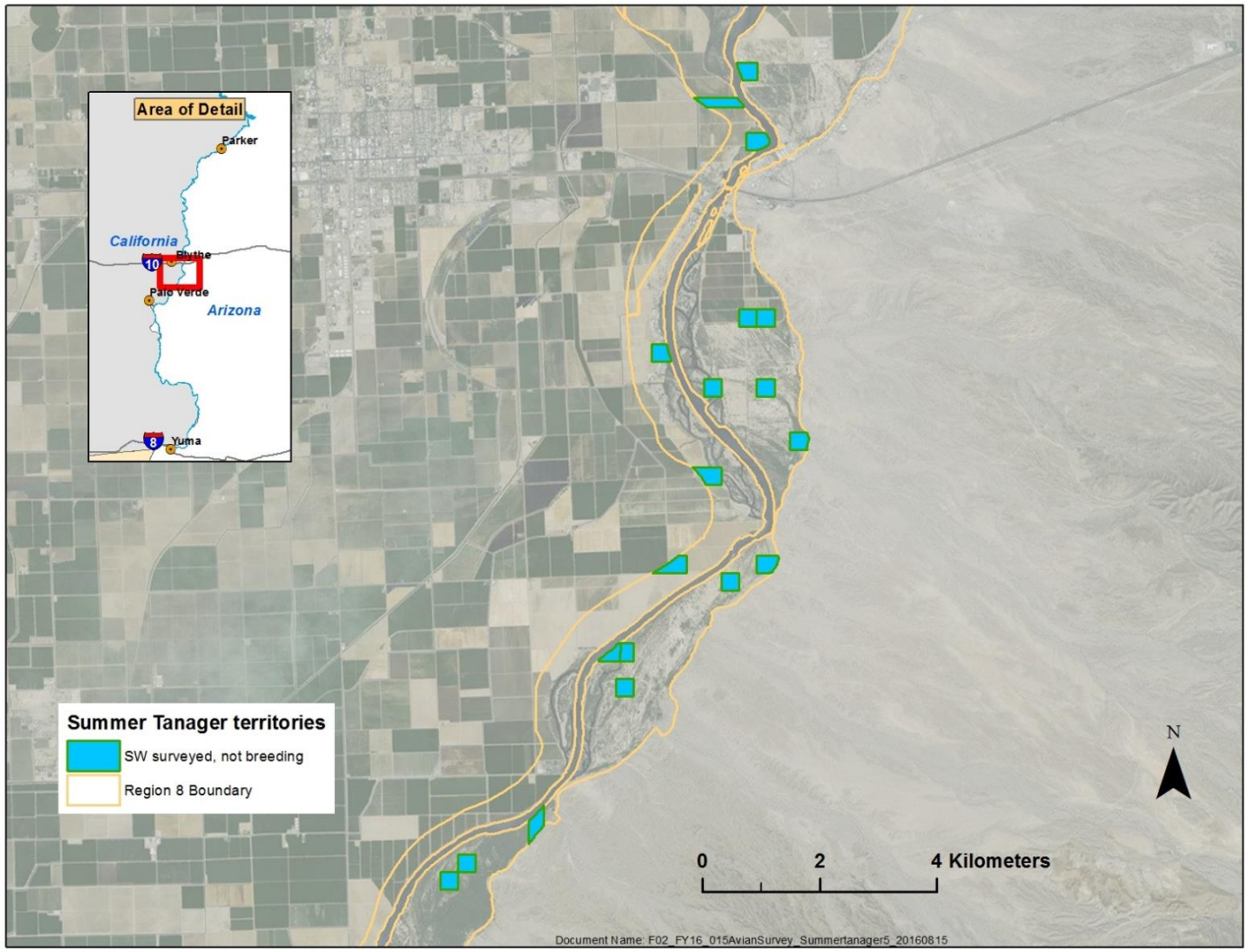

Figure 4-89.—Average number of summer tanager territories found in Region 8, Blythe and Palo Verde sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

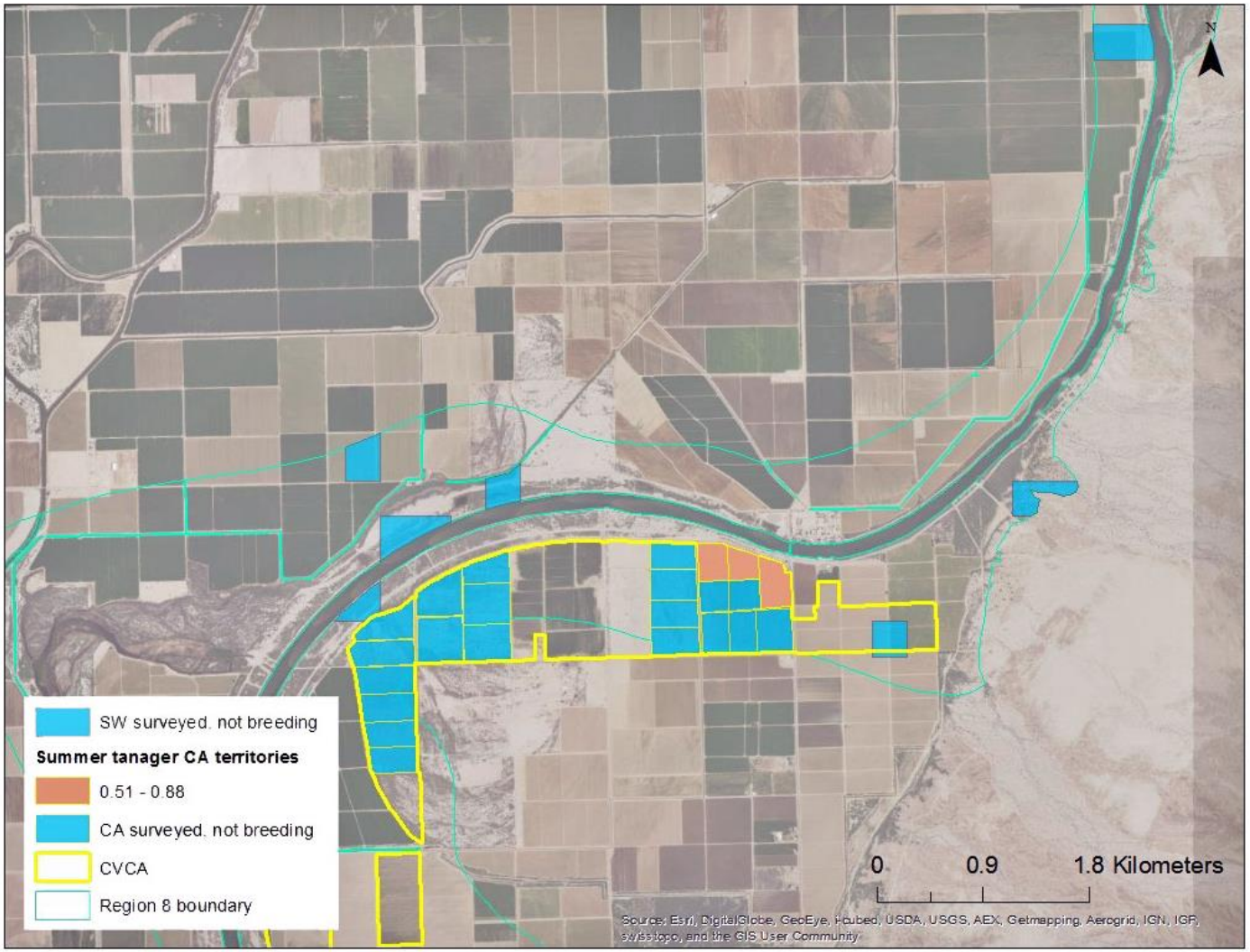

Figure 4-90.—Average number of summer tanager territories found in Region 8, CVCA sites, in 2011–15. SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

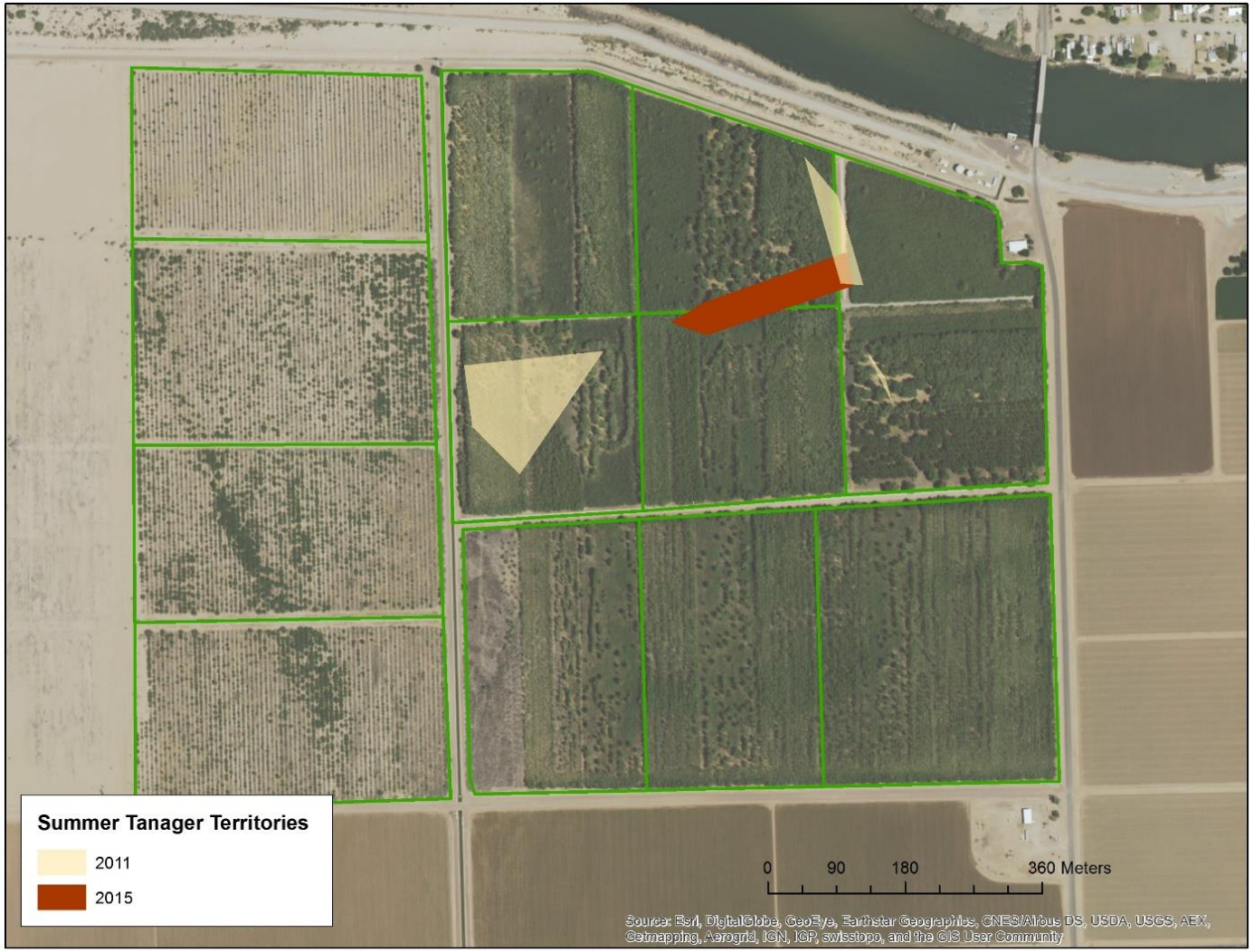

Figure 4-91.—Minimum convex polygons of summer tanager territories at the CVCA.

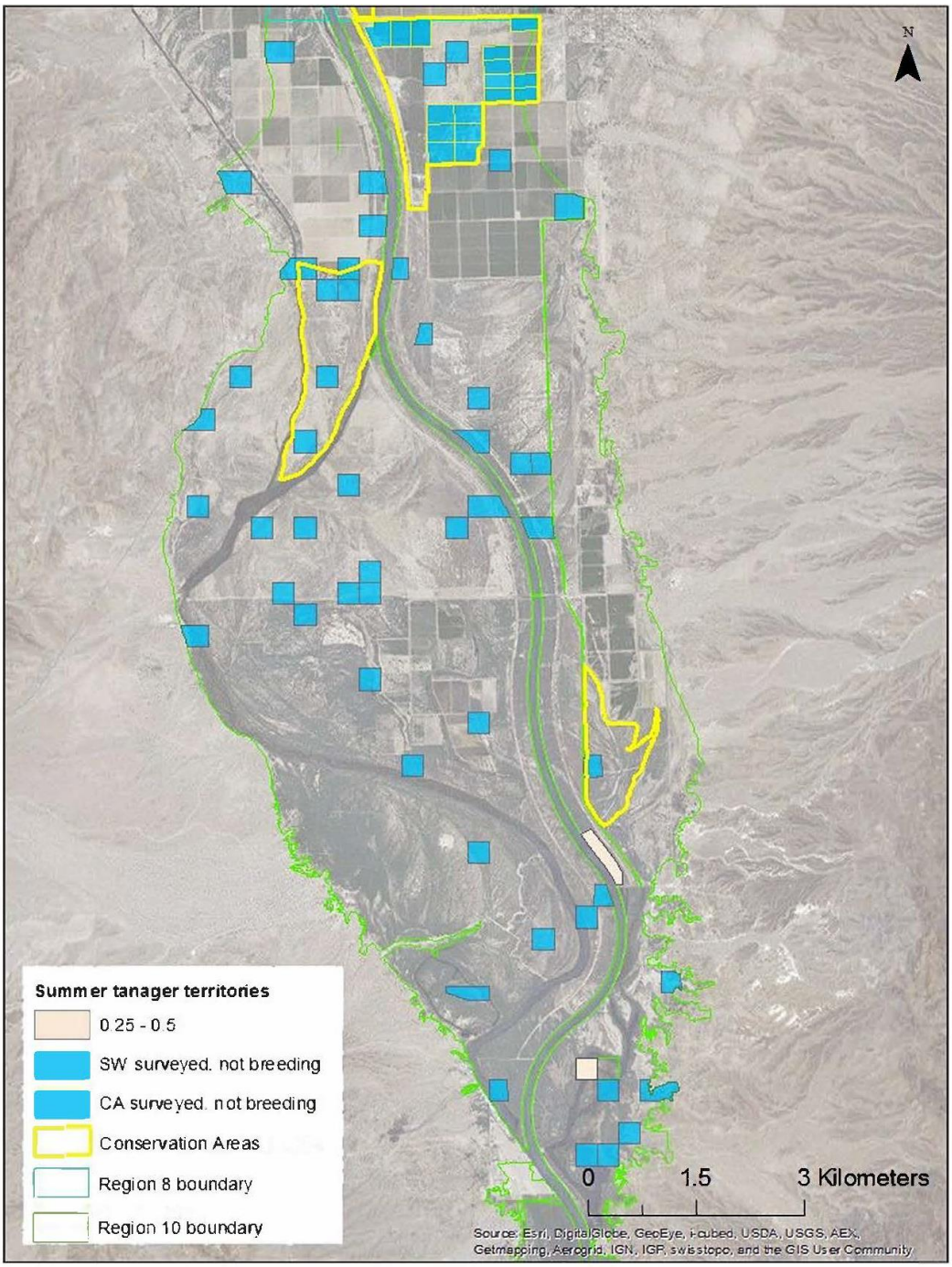

Figure 4-92.—Average number of summer tanager territories found in Region 10, Cibola NWR sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

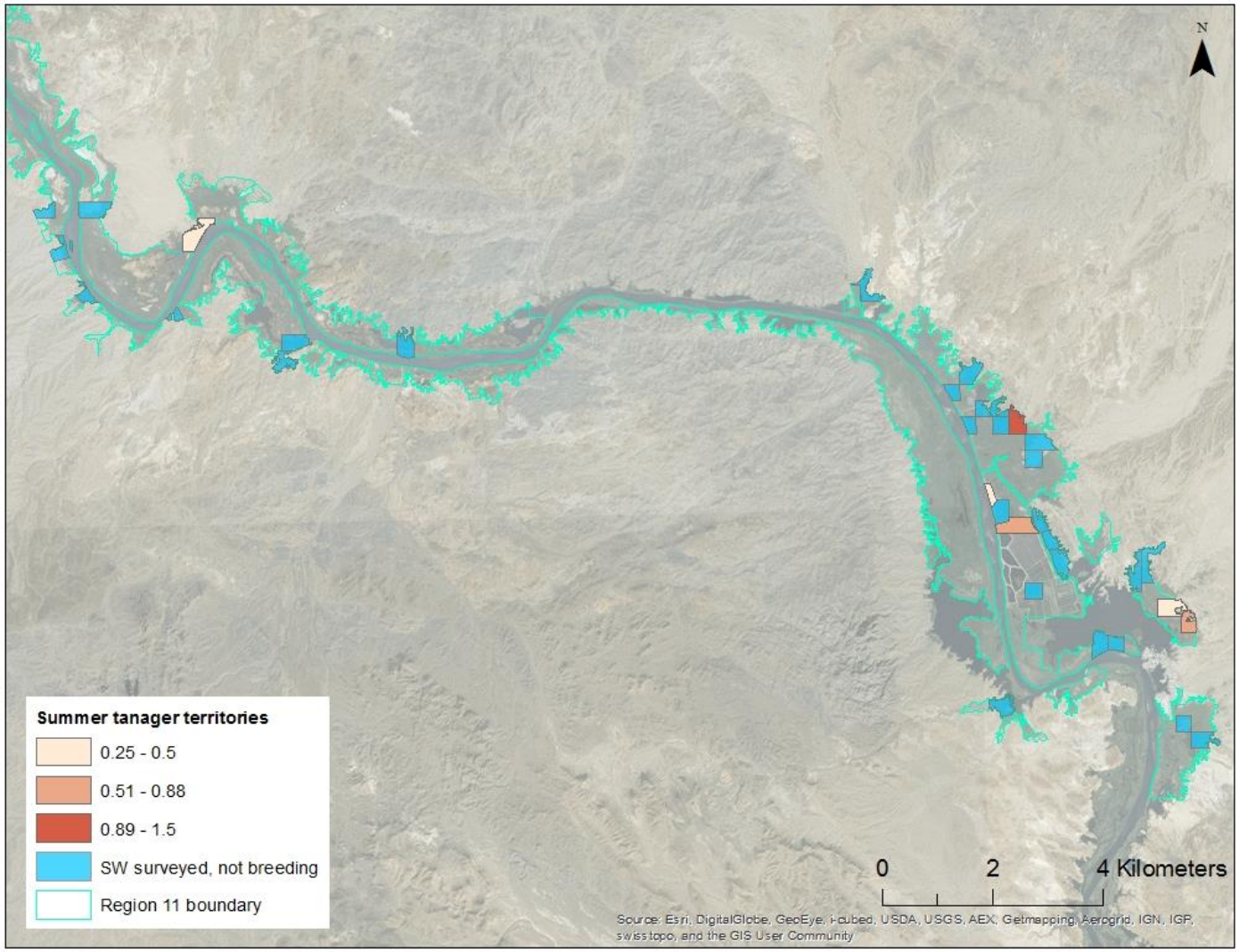

Figure 4-93.—Average number of summer tanager territories found in Region 11, Imperial NWR sites, in 2011–15.

SW = surveyed as part of system-wide coverage.

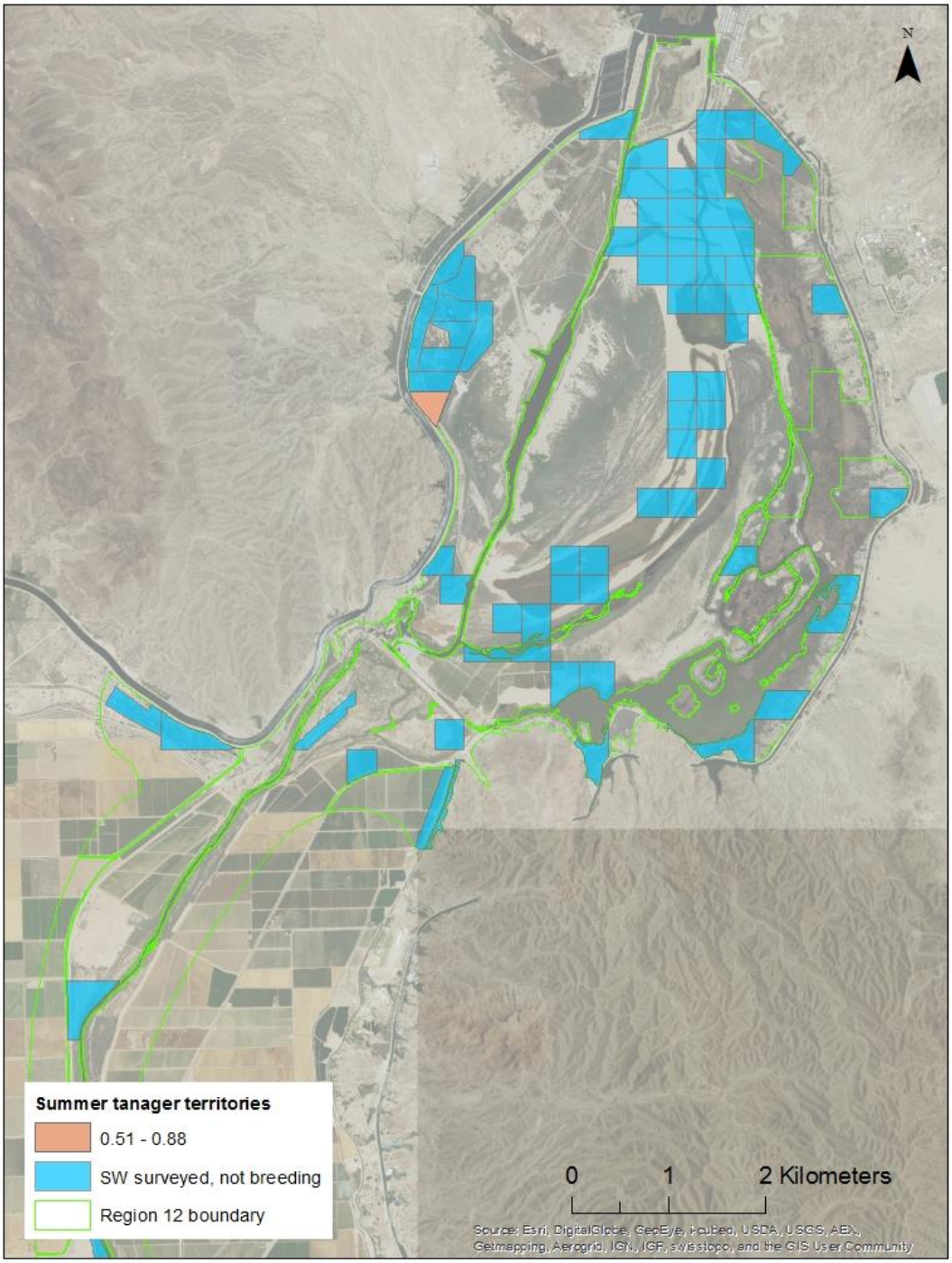

Figure 4-94.—Average number of summer tanager territories found in Region 12, Imperial/Laguna Dam sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

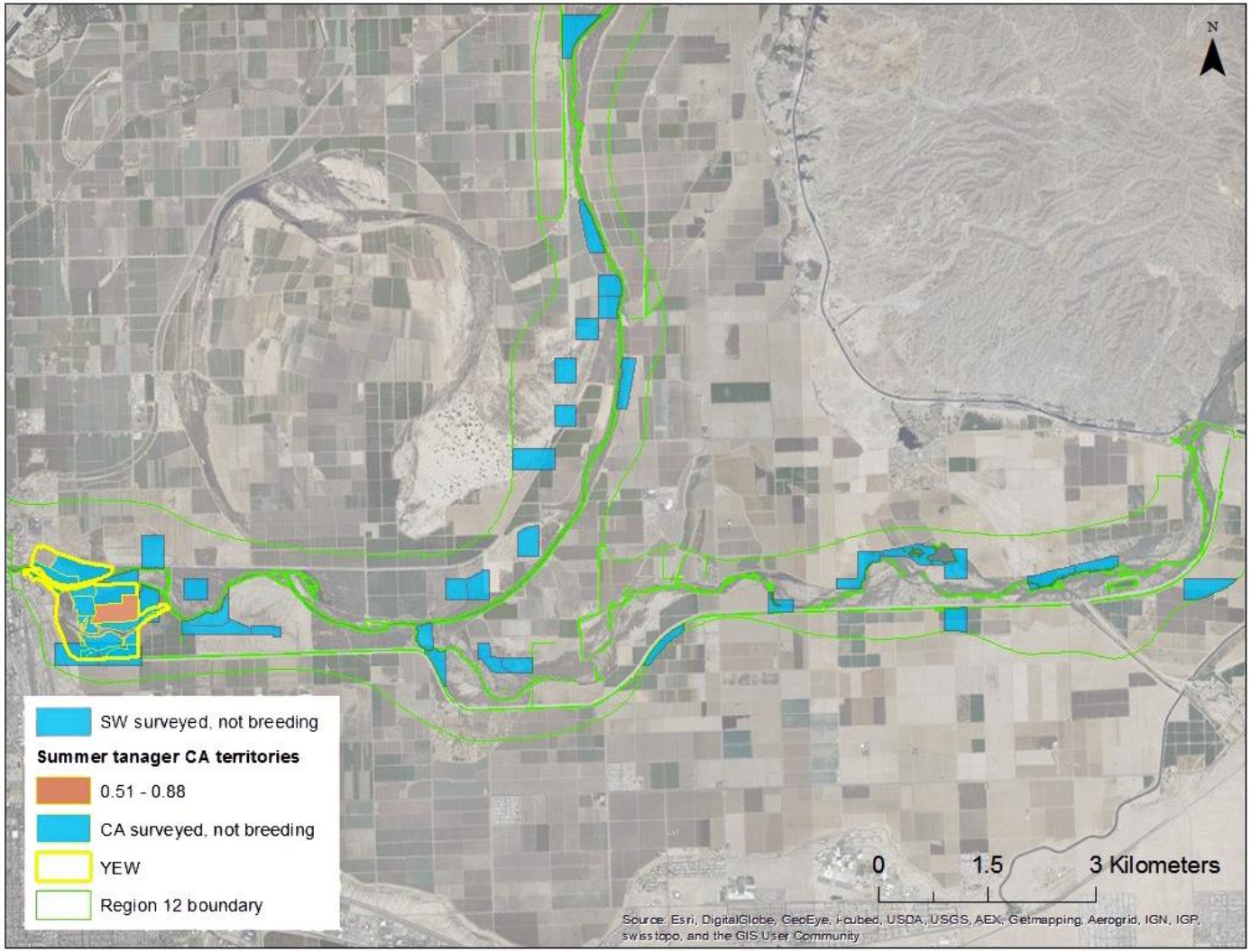

Figure 4-95.—Average number of summer tanager territories found in Region 12, Yuma/Gila River, Arizona, sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area CRIT 9 coverage.

Figure 4-96.—Minimum convex polygons of summer tanager territories at YEW.

Vermilion Flycatcher

Observed Habitat Use in the Project Area

- Vermilion flycatchers are most often found in open, park-like mesquite woodlands that are either irrigated or close to a surface water source.

- The area along the Bill Williams River where vermilion flycatchers are currently found consists of a fairly narrow cottonwood-willow river corridor flanked by large mesquites and surrounded by old, overgrown Bermuda grass (*Cyndodon dactylon*) fields with scattered mesquites and other shrubs.

- Quail Hollow and La Paz County Park are typical of most sites used by this species along the Colorado River: parks with fairly large trees (mesquite, cottonwood and/or Athel tamarisk) for nesting among plentiful open space for foraging, and these sites are watered with sprinklers.

- In conservation areas and CRIT 9, most vermilion flycatchers were found in open areas at the edge of cottonwood, willow, or mesquite plantings. Nests were usually in large mesquites or in low branches of cottonwood or willow trees.

- Habitat factors that may be important to this species include moist soil, a grassy understory, and open strips or patches with a few large trees. Vermilion flycatchers appear to be particularly associated with mature mesquite trees.

Phenology in the Project Area

- Vermilion flycatchers are slightly more widespread in the study area in winter than during the breeding season, and the overlap between wintering and breeding individuals is unknown (Rosenberg et al. 1991).

- Nests are fairly easily found and observed.

- For vermilion flycatchers, we calculated a range of incubation initiation date of March 25 to June 9. The peak of incubation initiation was in late April. This is consistent with previously published nesting phenology in the region (Grinnell 1914; Rosenberg et al. 1991; Corman and Wise-Gervais 2005; Ellison et al. 2009).

- We observed one nest almost daily that contained nestlings 17 days old when it was destroyed; these nestlings were older than the typical vermilion flycatcher nestling period reported by Ellison et al. (2009).

- There is little information on the fledgling period of this species. Based on extended observations of particular pairs over several weeks, we observed dependent young remaining with parents at least 20 days after fledging.

- Dependent young were observed still being fed while adults began a second brood; in one case, copulation was observed (April), and in another case, incubation had begun with dependent young remaining (May).

Surveying This Species

- In general, this species is easy to detect when present. Adults perch in the open, nests are fairly easy to find, and the male's distinctive song is given often.

- Migrating vermilion flycatchers are not likely to occur during the riparian bird survey season because breeding begins just before the survey period.

- One potential complication for surveys is that the phainopepla (*Phainopepla nitens*) has a poorly known vocalization that sounds very similar to the song of the vermilion flycatcher. Several briefly heard detections of vermilion flycatchers along the Bill Williams River were later suspected to have been calling phainopeplas. See http://www.xeno-canto.org/161374 for an excellent recording of this call.

Status and Distribution in 2011–2015

- Grinnell (1914) found vermilion flycatchers to be uncommon to fairly common, but locally distributed, with small numbers around the towns of Needles and Ehrenberg, larger numbers at the Cibola NWR and upstream of Laguna Dam, and the largest numbers downstream of Laguna Dam, where human activity, agriculture, and flooding had created open, mesic habitat types.

- With overall small numbers of vermilion flycatcher territories encountered during our 5-year project in 2011–15, annual population size estimates varied from 0 to 432, and the SE was high. However, we feel that our 5-year population size estimate of 112 (SE = 100) pairs throughout the study area is reasonable based on our observations of the distribution of nesting vermilion flycatchers and appropriate habitat.

- From 2011 to 2015, we documented a range of 0 to 2.75 vermilion flycatcher territories system-wide and from 1.75 to 4.75 territories in conservation areas and CRIT 9.

- In both system-wide and conservation area and CRIT 9 area search surveys, the vermilion flycatchers we found were distributed between the Bill Williams River National Wildlife Refuge and the PVER (figures 4-104 and 4-106 to 4-109).

- The greatest density of vermilion flycatchers found was at CRIT 9, where this species was present every year (figures 4-106 and 4-107).

- Other locations with small numbers of breeding vermilion flycatchers included Esquerra Ranch on the upper Bill Williams River National Wildlife Refuge; Quail Hollow and La Paz County Park, both in the Parker Strip; and the PVER (figures 4-104, 4-108, and 4-109).

- The system-wide random plot selection method used in 2011–15 does not tend to include nesting areas for this species (parks, golf courses, recreational vehicle parks, and similar locations are underrepresented in our plots layer), which are more widespread than system-wide area search surveys indicate. This species is known to occur locally in small numbers throughout the main stem of the Colorado River.

- CRIT 9 and the PVER are located in Region 9, where no system-wide plots were surveyed, because of access issues. If Region 9 system-wide plots were surveyed, additional vermilion flycatchers might have been documented.

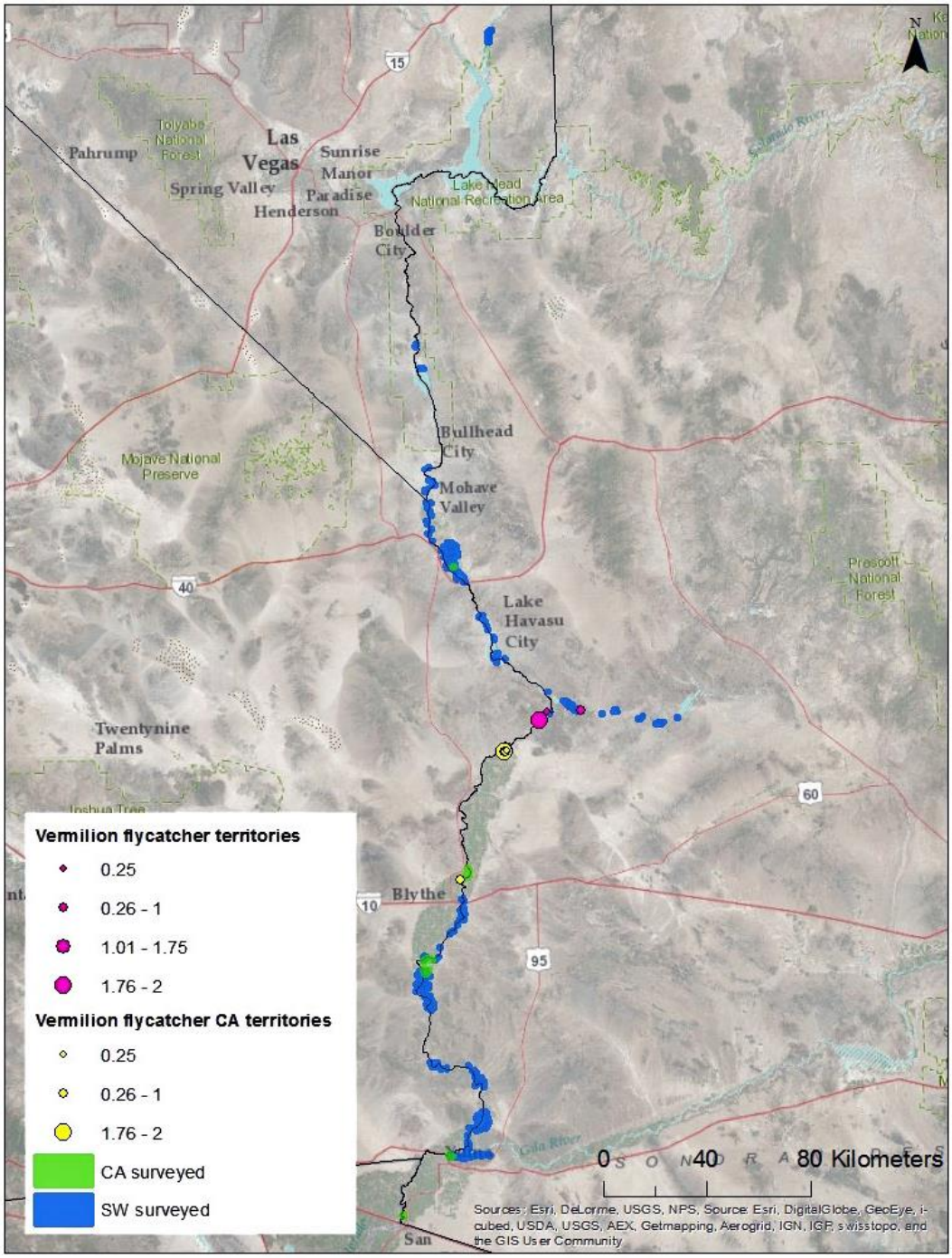

Figure 4-97.—Average number of vermilion flycatcher territories found throughout the LCR MSCP project area in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

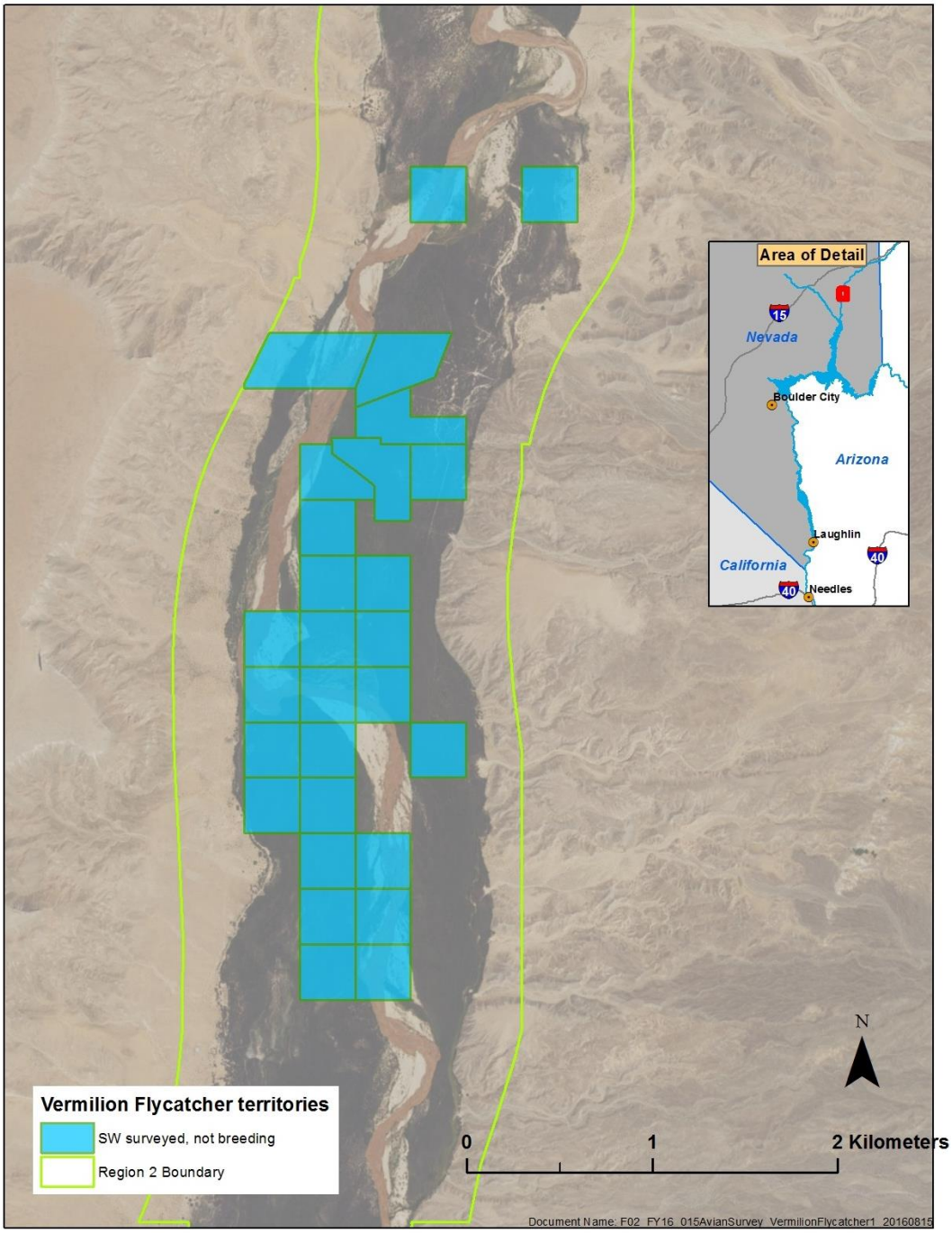

Figure 4-98.—Average number of vermilion flycatcher territories found in Region 2, Virgin River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

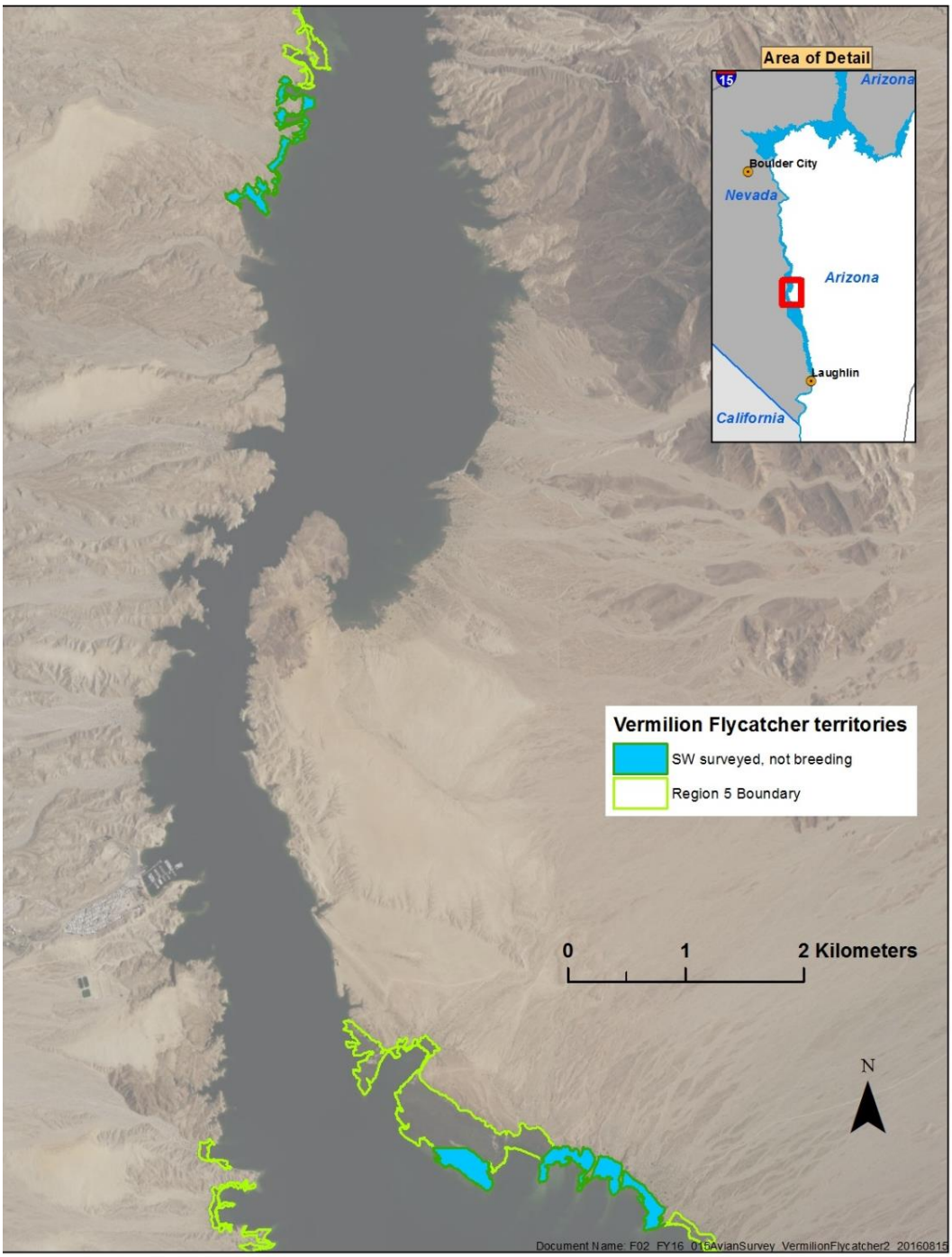

Figure 4-99.—Average number of vermilion flycatcher territories found in Region 5, Lake Mohave sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

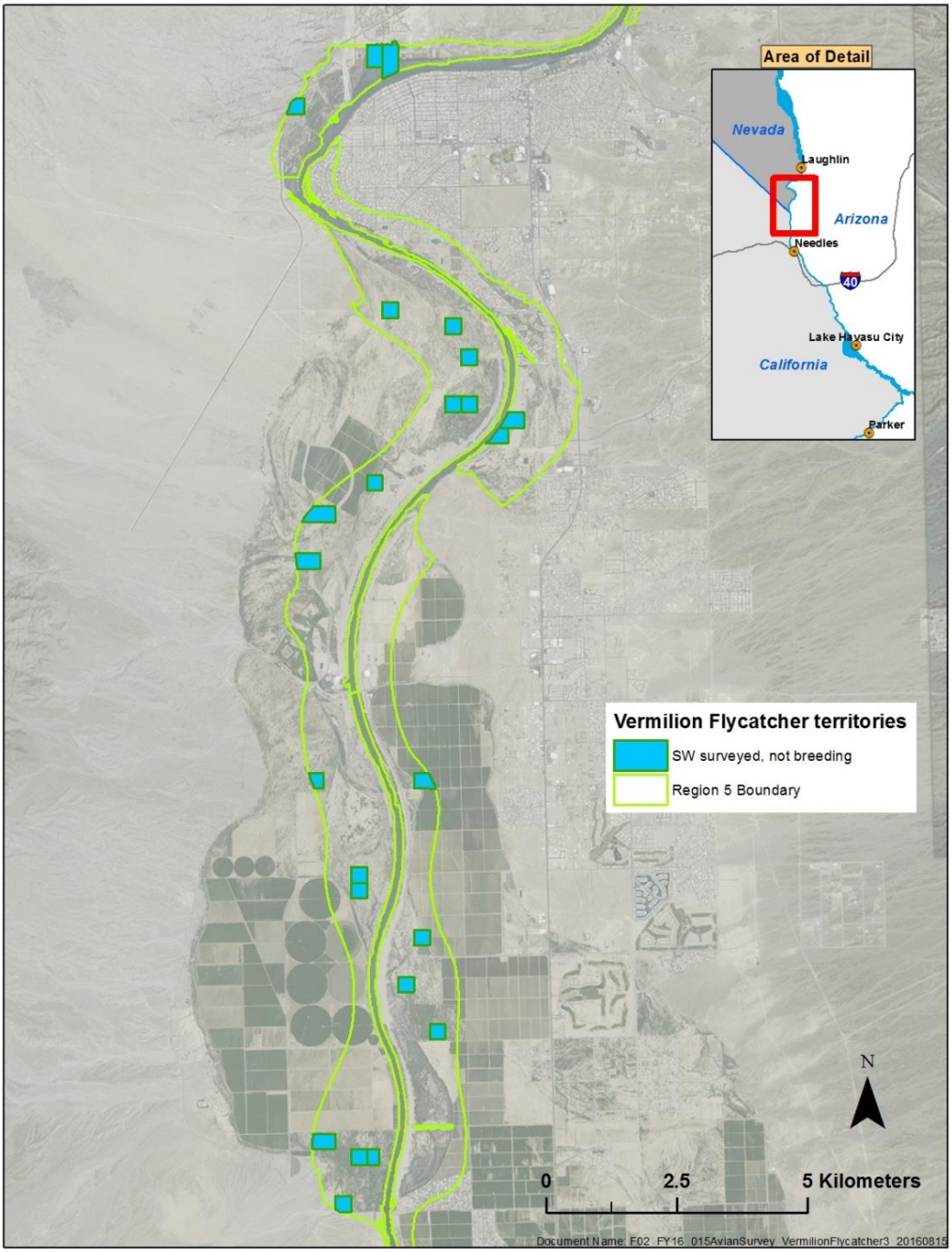

Figure 4-100.—Average number of vermilion flycatcher territories found in Region 5, Mohave Valley sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

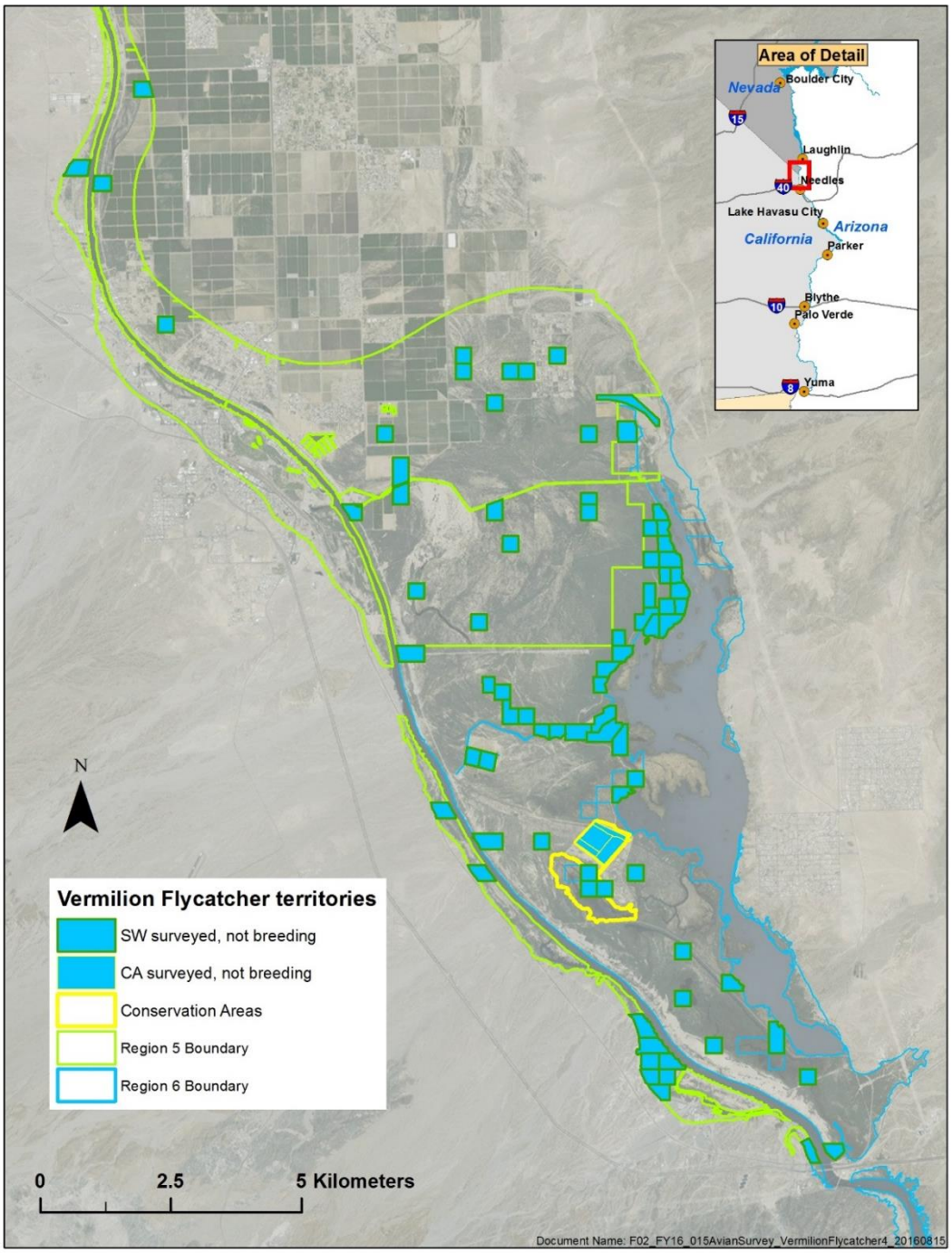

Figure 4-101.—Average number of vermilion flycatcher territories found in Regions 5 and 6, Topock Marsh sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

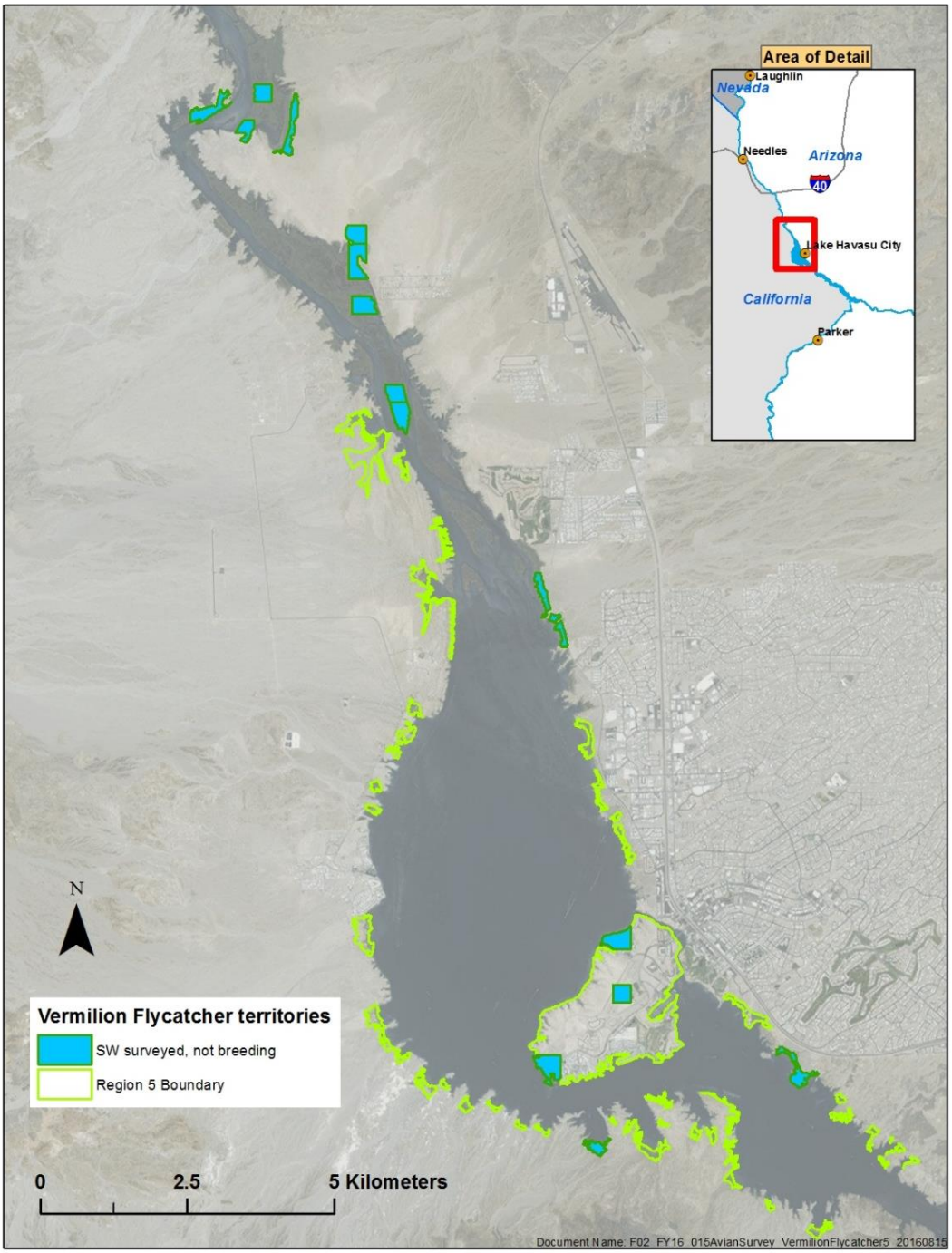

Figure 4-102.—Average number of vermilion flycatcher territories found in Region 5, Topock Gorge and Lake Havasu sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

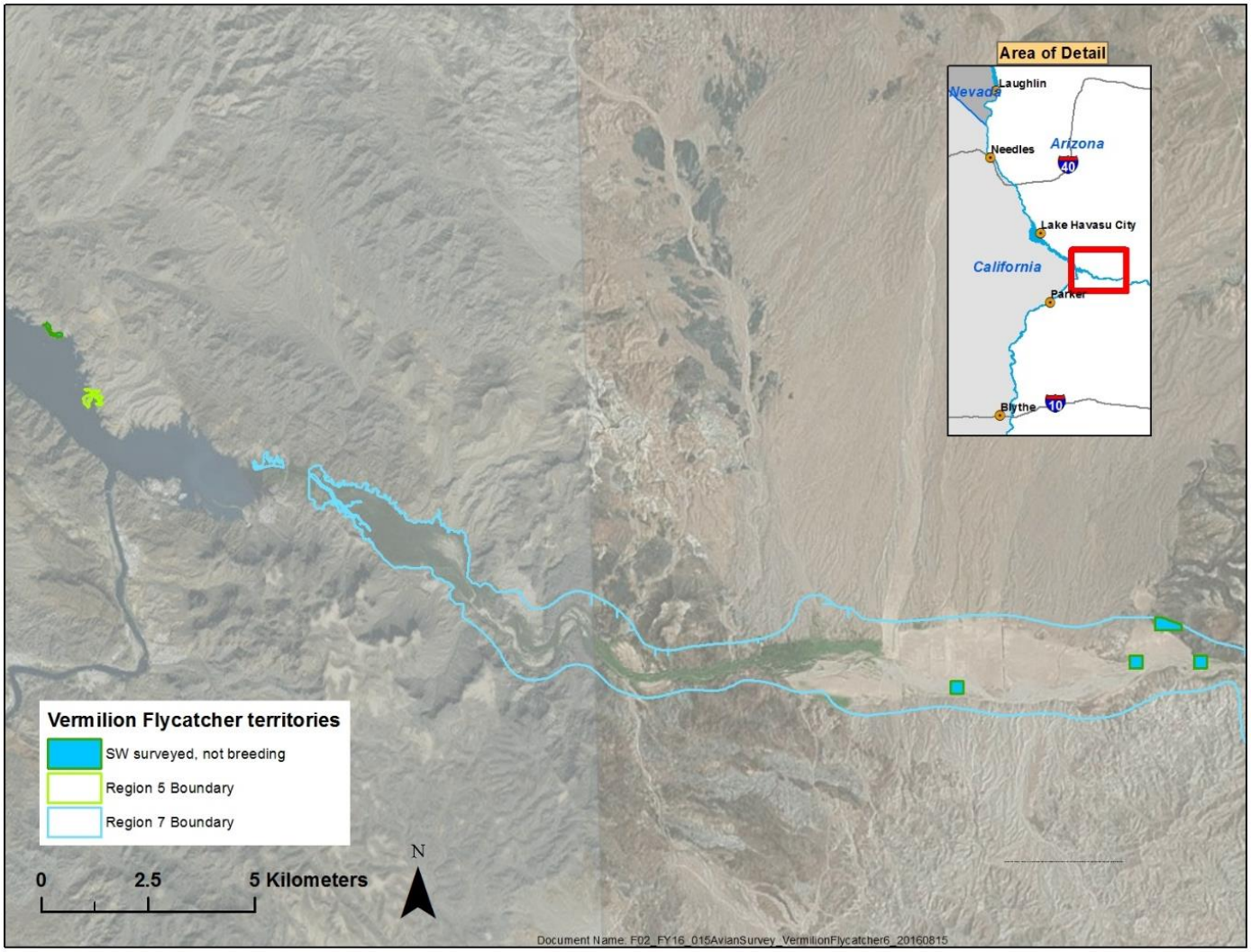

Figure 4-103.—Average number of vermilion flycatcher territories found in Regions 5 and 7, Bill Williams Delta sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

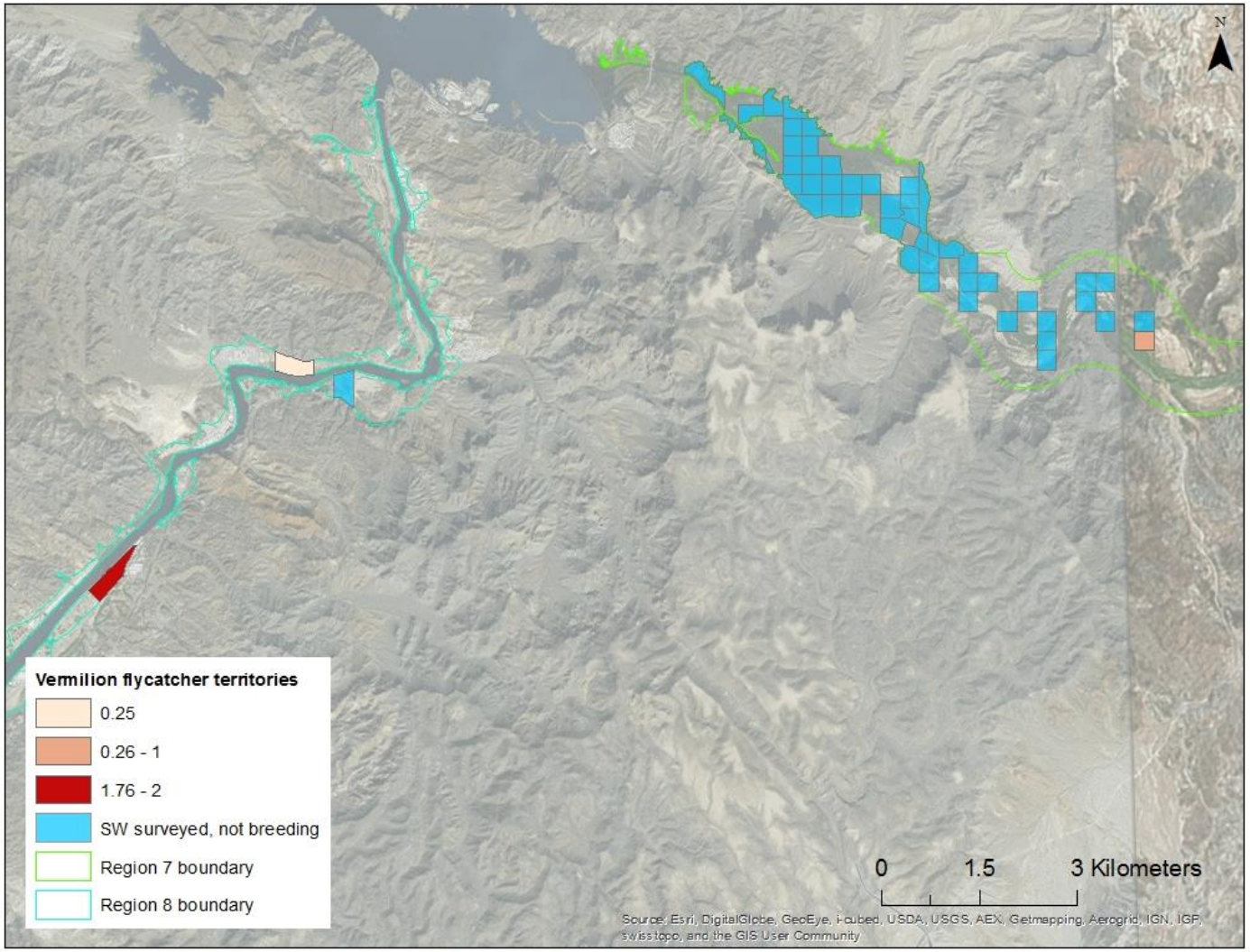

Figure 4-104.—Average number of vermilion flycatcher territories found in Regions 7 and 8, lower Bill Williams River and Parker Strip sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

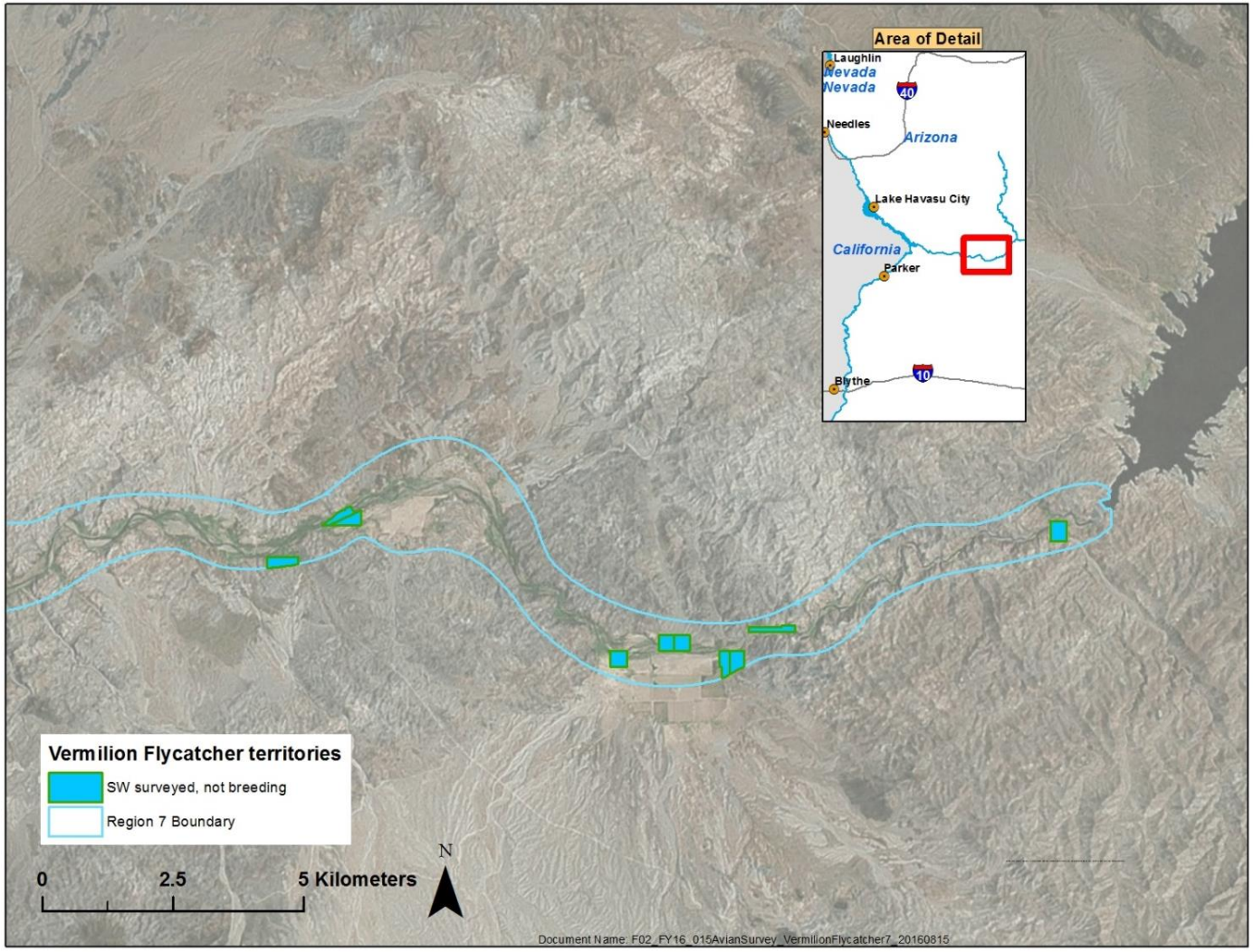

Figure 4-105.—Average number of vermilion flycatcher territories found in Region 7, upper Bill Williams River and Parker Strip sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

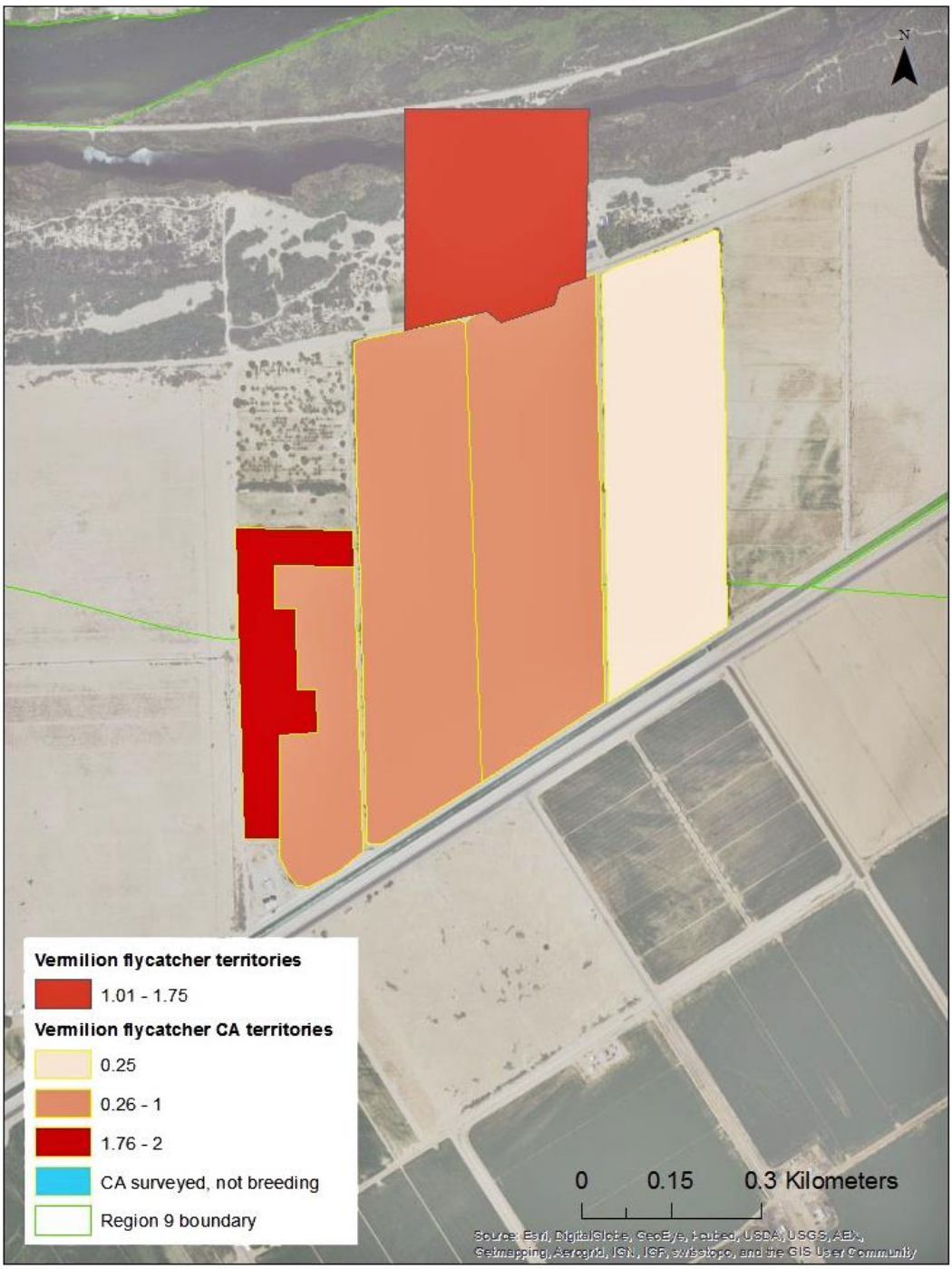

Figure 4-106.—Average number of vermilion flycatcher territories found in CRIT 9, in 2011–15.

CA = surveyed as part of conservation area and CRIT 9 coverage.

Figure 4-107.—Minimum convex polygons of vermilion flycatcher territories at CRIT 9, in 2011–15.

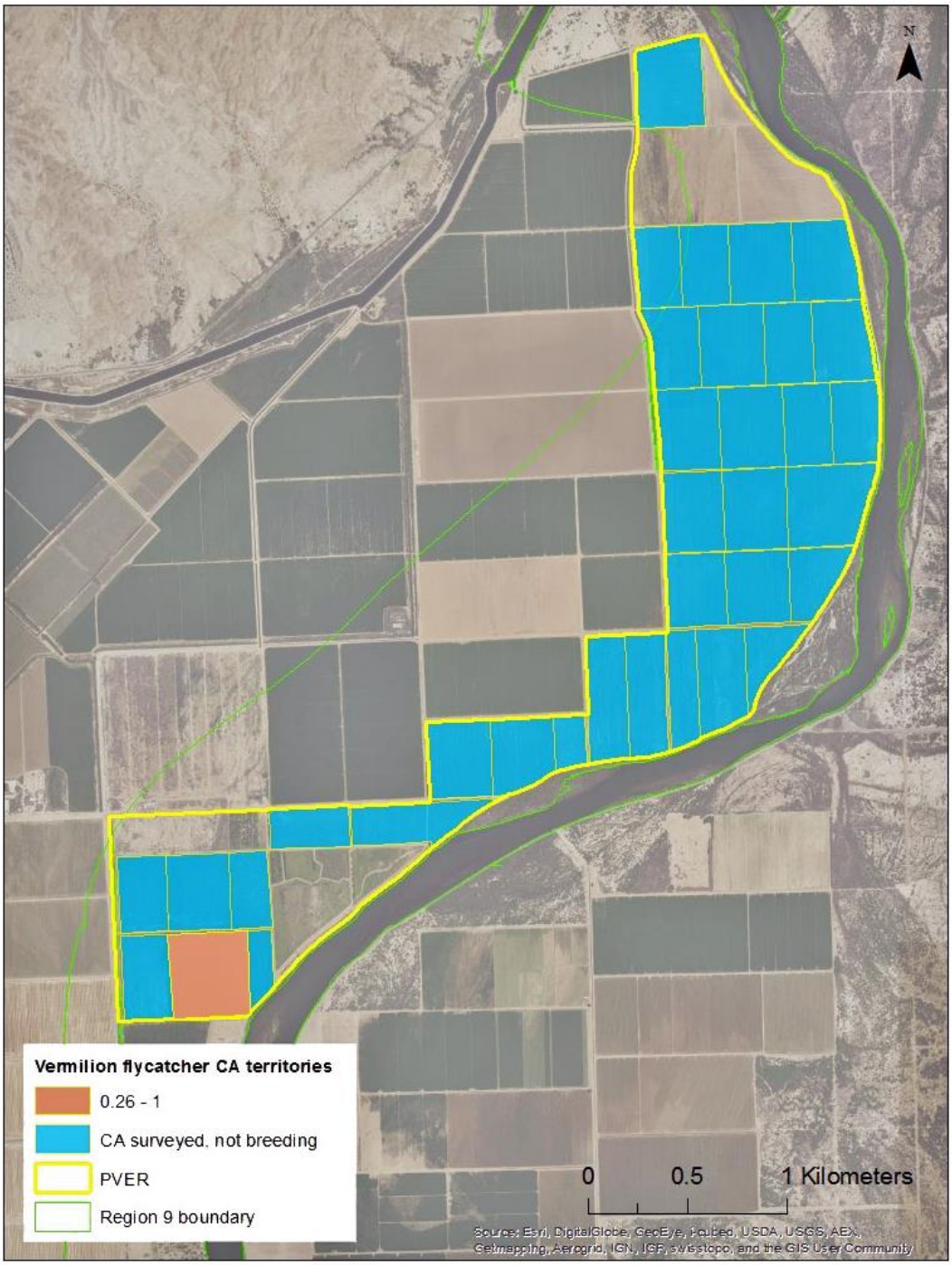

Figure 4-108.—Average number of vermilion flycatcher territories found in Region 9, PVER sites, in 2011–15.
CA = surveyed as part of conservation area and CRIT 9 coverage.

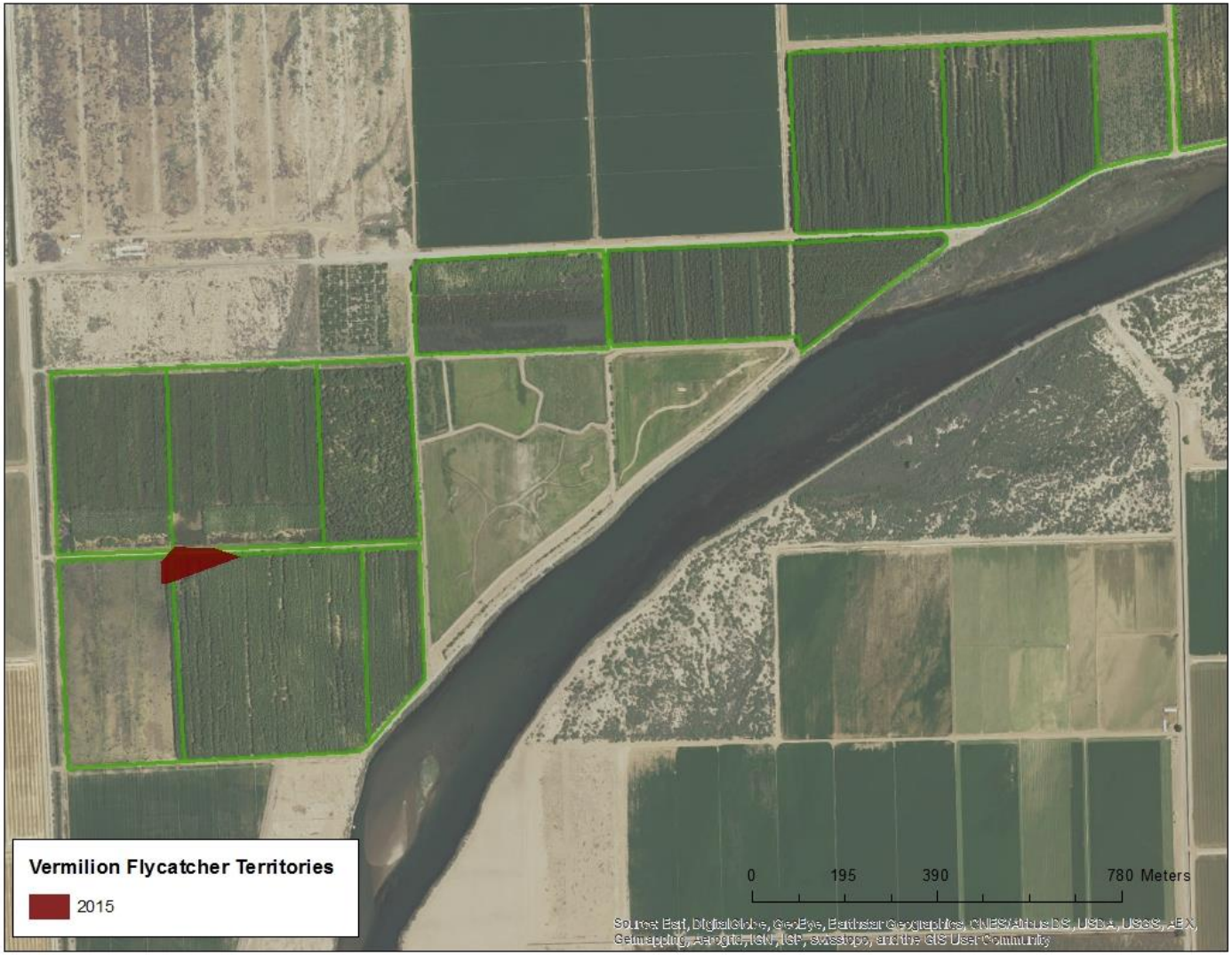

Figure 4-109.—Minimum convex polygons of vermilion flycatcher territories at the PVER.

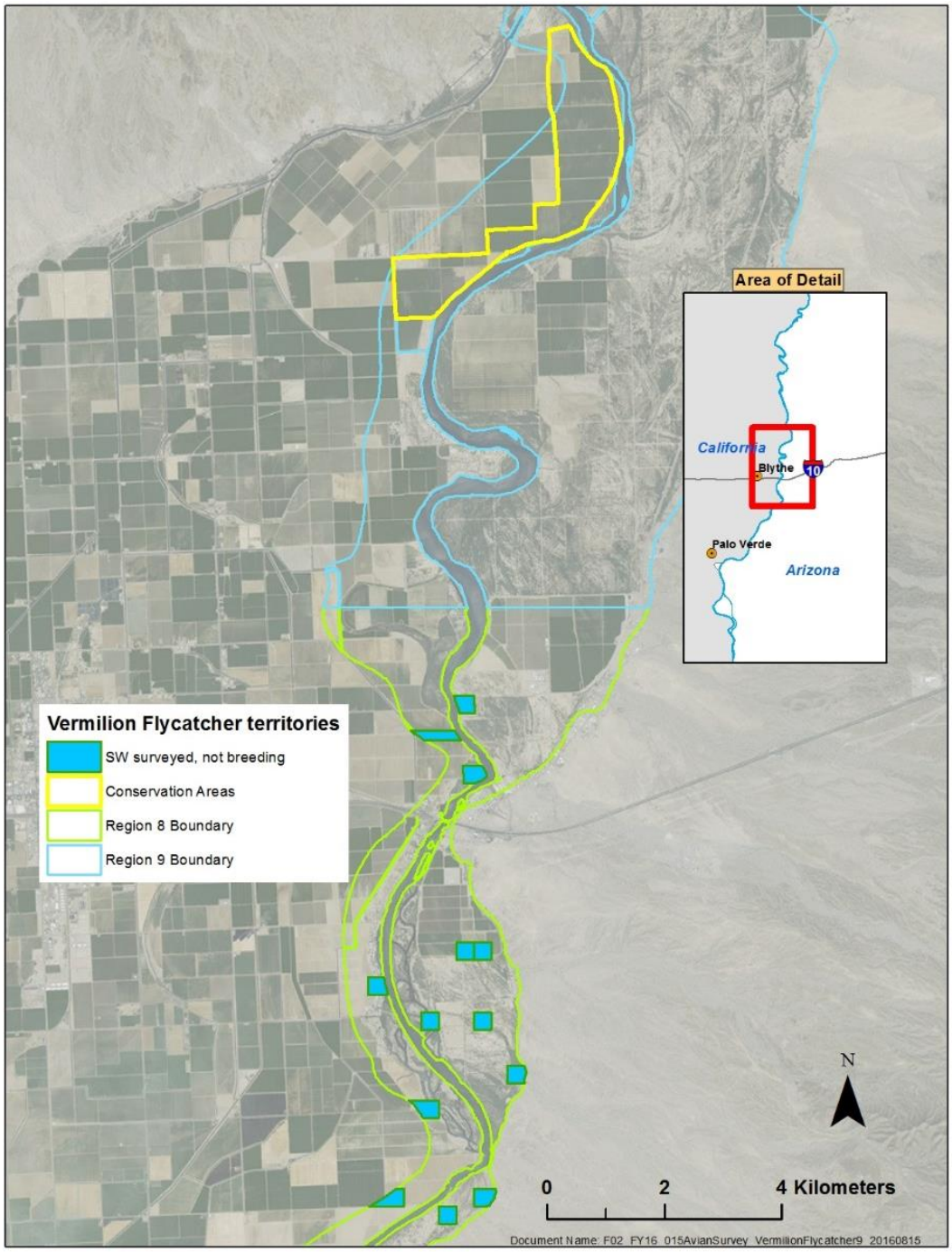

Figure 4-110.—Average number of vermilion flycatcher territories found in Region 8, Blythe sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

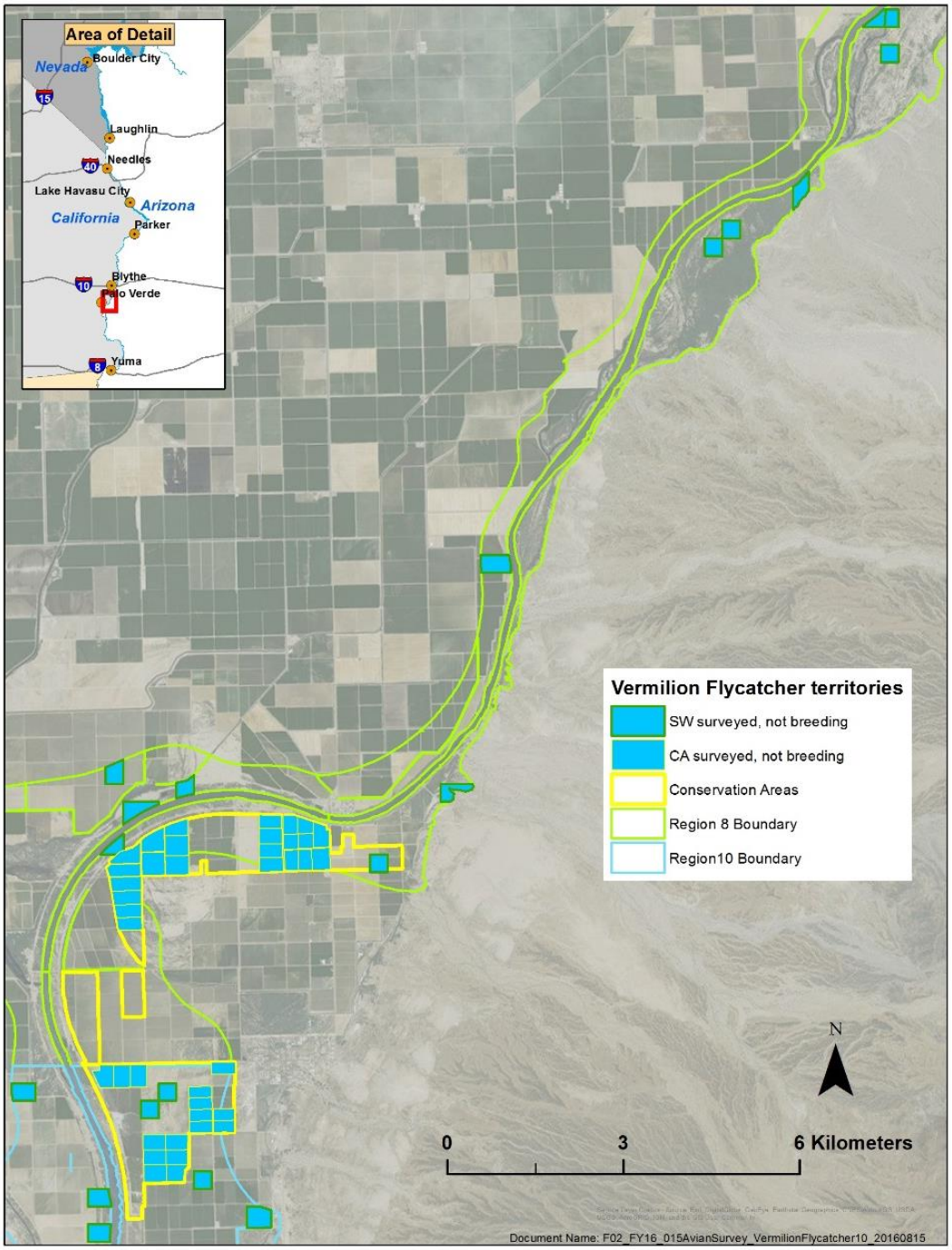

Figure 4-111.—Average number of vermilion flycatcher territories found in Regions 8 and 10, Palo Verde, Cibola Valley, and Cibola NWR sites, in 2011–15. SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

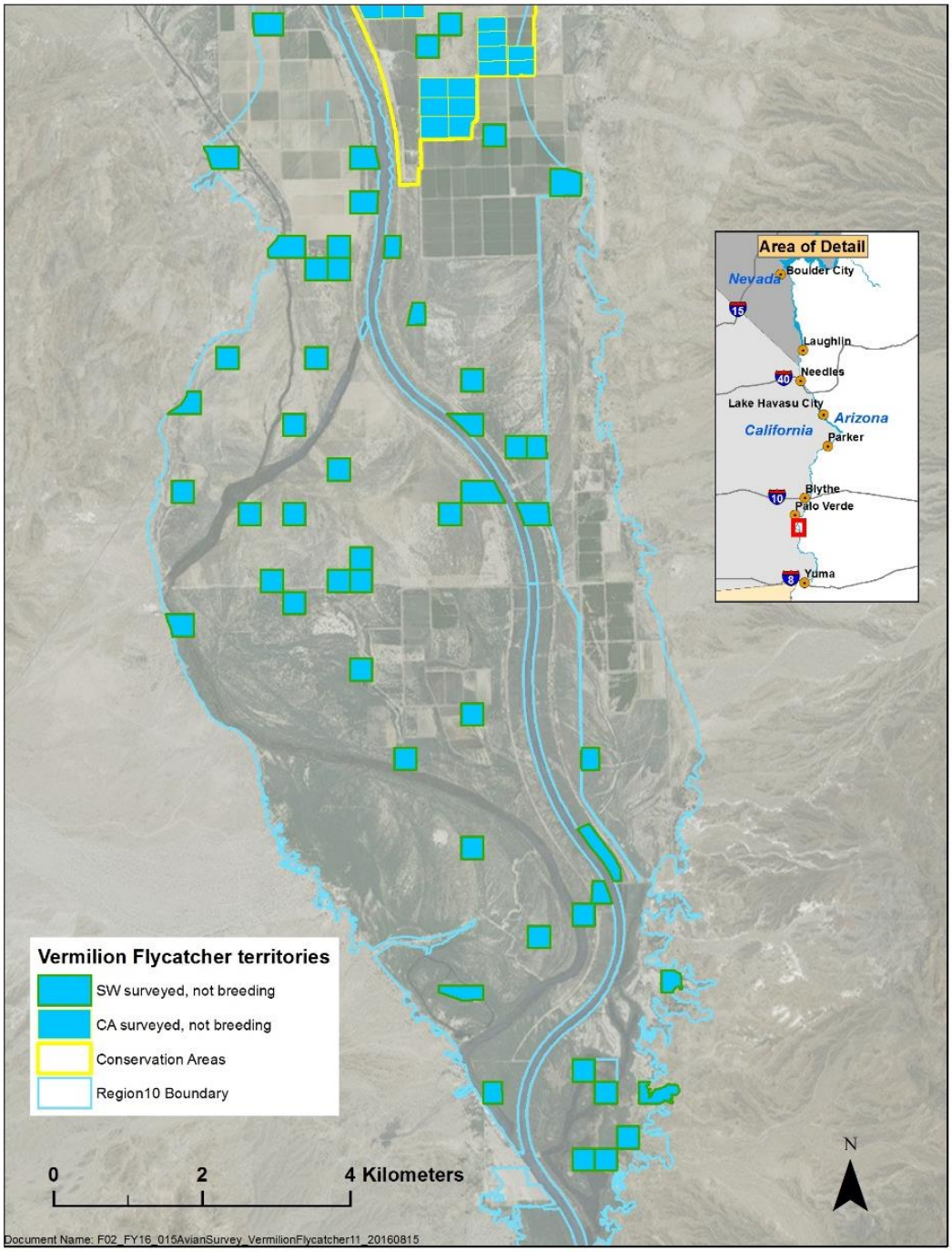

Figure 4-1129.—Average number of vermilion flycatcher territories found in Region 10, Cibola NWR sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

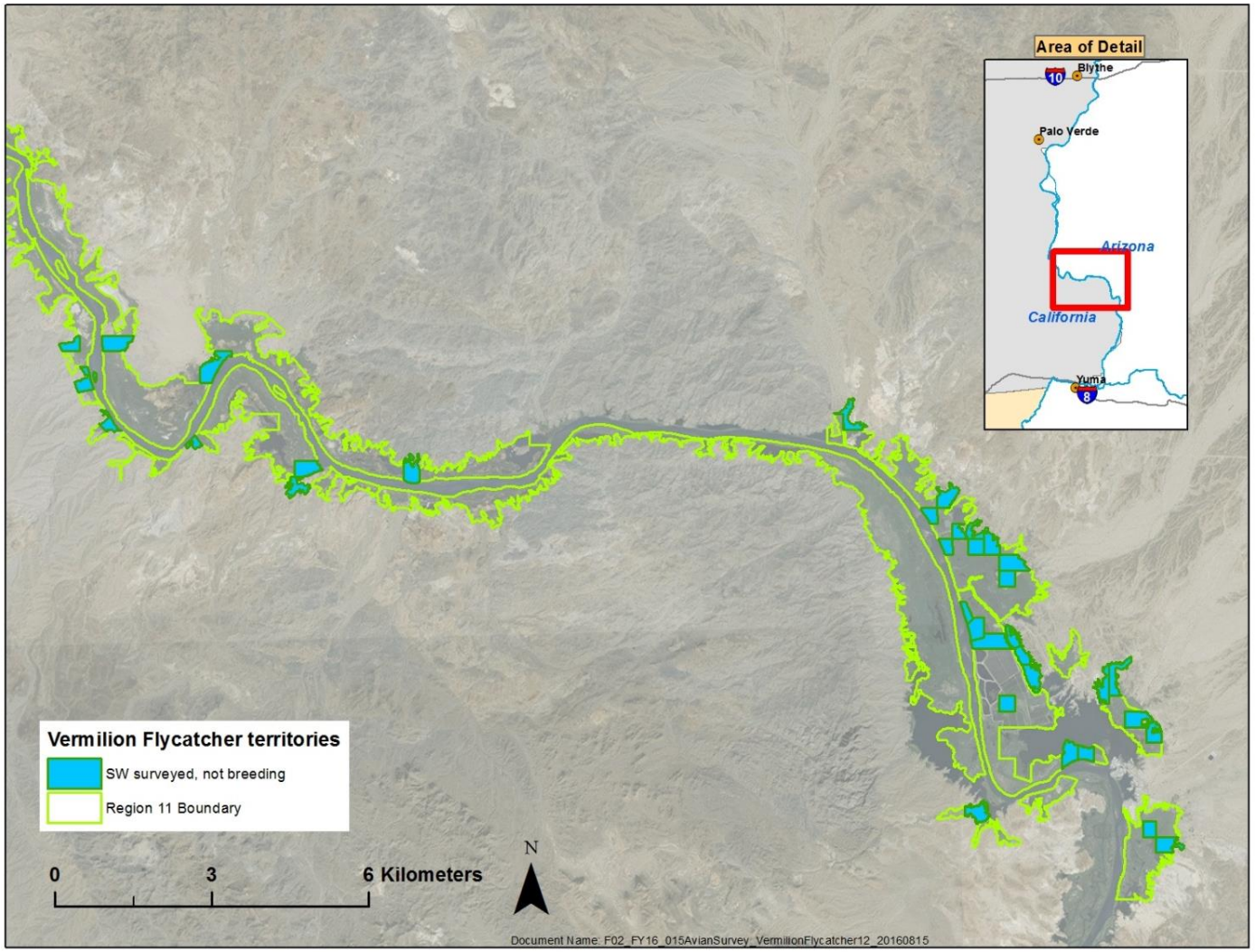

Figure 4-113.—Average number of vermilion flycatcher territories found in Region 11, Imperial National Wildlife Refuge sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

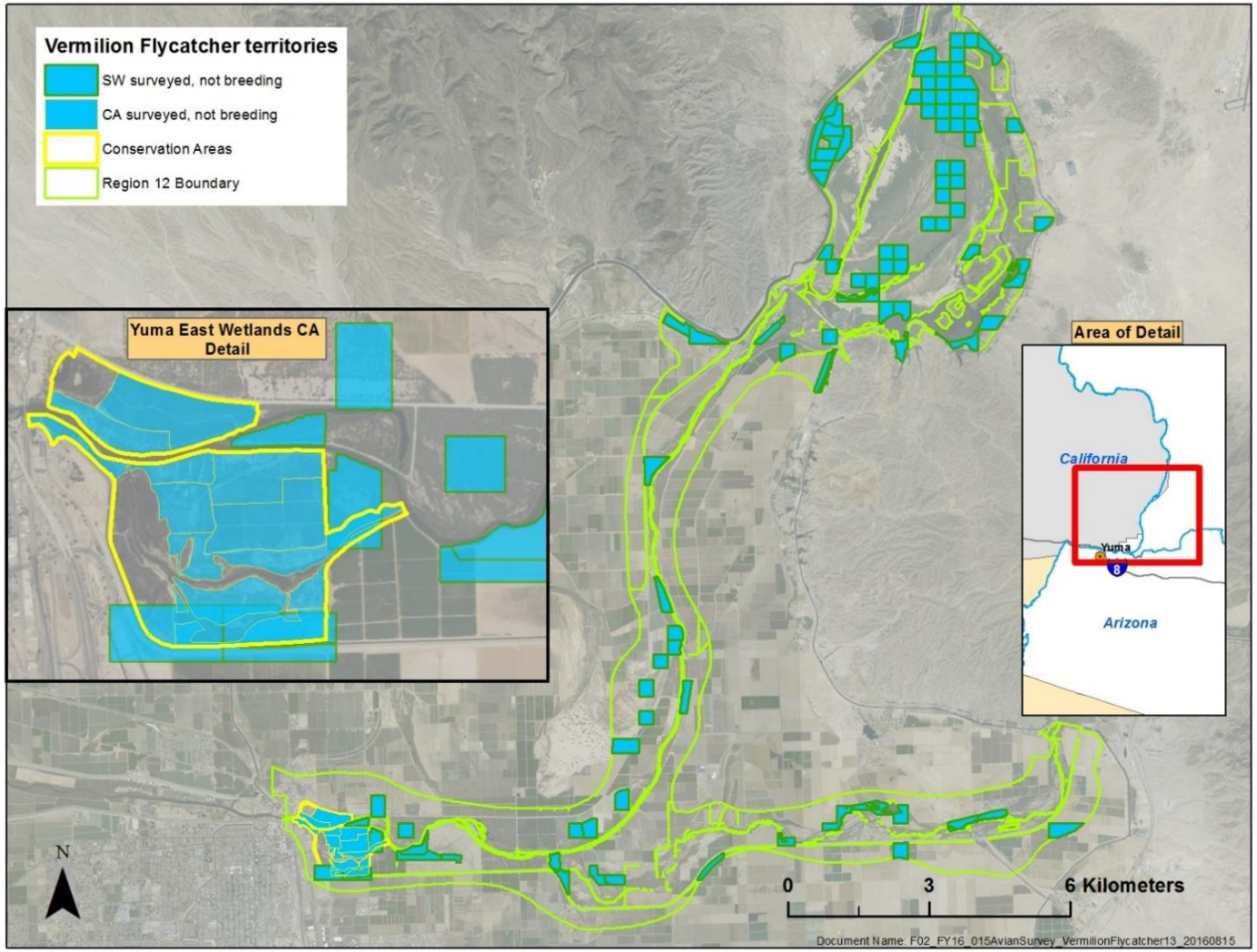

Figure 4-114.—Average number of vermilion flycatcher territories found in Region 12, Imperial/Laguna and Yuma/Gila River, Arizona, sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

Gilded Flicker

Observed Habitat Use in the Project Area

- Habitat in the extremely limited areas where we found this species was characterized by fairly narrow, open, braided active river channels with perennial flow, and adjacent upland slopes with plentiful saguaro cactus.

- All confirmed nest sites of 2011–15 were in saguaro cavities near the riparian zone (upland areas were not surveyed), and family groups were observed foraging in the riparian areas. Historically, the species also nested in cavities of old cottonwoods and, presumably, other overstory riparian trees. It is currently unclear why riparian trees nearby were not used for nesting.

- Suitable saguaros and large cottonwoods for nesting are likely the most important habitat features for gilded flickers.

- They may forage in a wide variety of habitat types, and during this project, they were most often observed foraging in riparian areas.

Phenology in the Project Area

- We were not able to record any phenology information on gilded flickers, as we did not observe any confirmed breeding behavior beyond an independent fledgling.

Surveying This Species

- This project identified little new information on best survey practices for this species based on their very limited distribution and our limited data from these areas. Generally, northern flickers, which are the only species that they could be confused with during nesting season, have moved out of the project area by the end of April. Therefore, any flicker observed between mid-April and the end of September should be thoroughly examined for the possibility of being a gilded flicker.

- This project did not employ call-playback methods on gilded flickers, which are effective with other species, and does not provide information on how it would improve detection ratios. This species is not particularly cryptic based on our observations, but should survey records increase in project area, new inventory methods may better document distribution and habitat use.

Status and Distribution in 2011–2015

- Grinnell (1914) found gilded flickers only in a saguaro forest in the vicinity of Laguna Dam, where they were fairly common. He surmises that the species was formerly more widespread, with specimens from Fort Mohave taken in 1861, as well as probable flicker cavities found above Picacho and near Yuma, Arizona. Grinnell did not explore the Bill Williams River, where we documented the species in our area search surveys.

- We found gilded flickers on plots only between Lincoln Ranch and Alamo Dam (figure 4-121). In all cases, we suspected breeding in upland saguaros and use of the Bill Williams River riparian areas for foraging.

- The system-wide population size estimate for 2011–15 was 22 (SE = 15) pairs of gilded flickers; however, extremely small sample sizes make these estimates prone to error. We estimate fewer than 10 pairs of gilded flickers to be breeding on the Bill Williams River below Alamo Dam, all above Planet Ranch, and we did not find the species breeding on the main stem of the Colorado River.

- Others have reported recent gilded flicker sightings along the main stem of the Colorado River (see also Bureau of Reclamation [2012]) for a thorough compilation of these, including the following highlights:

    - A pair was at McIntyre Park south of Blythe, Arizona, in April 2012, and the female was seen into late May. A nest was suspected but never confirmed (eBird 2015)

    - A male was seen in Yuma (Yuma West Wetlands) on April 22, 2012 (Harter and Vander Pluym 2012)

    - Non-breeding individuals have been recorded between October and February in recent years, including at Topock Marsh, Lake Havasu, and Parker Dam (eBird 2015)

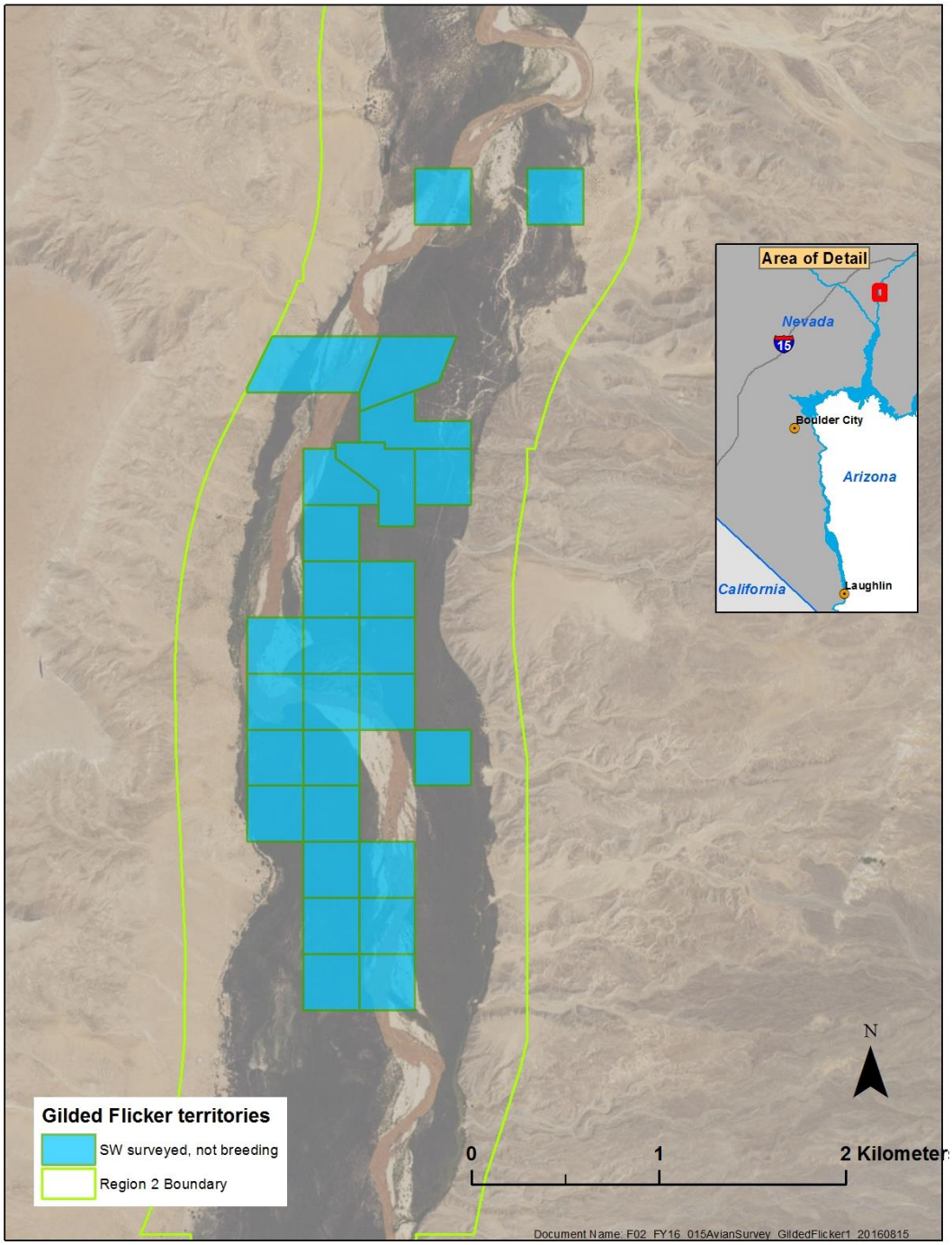

Figure 4-115.—Average number of gilded flicker territories found in Region 2, Virgin River sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

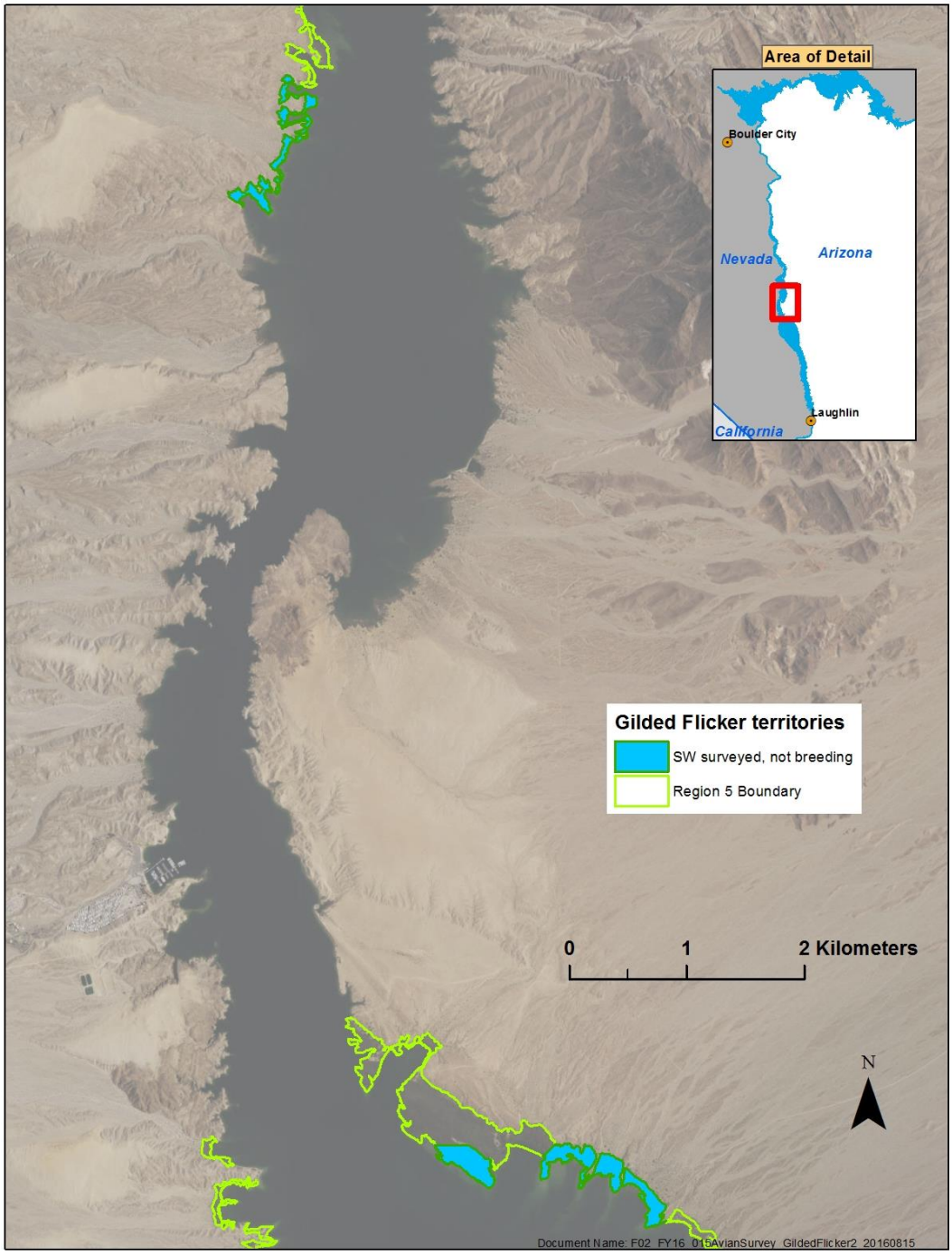

Figure 4-116.—Average number of gilded flicker territories found in Region 5, Lake Mohave sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

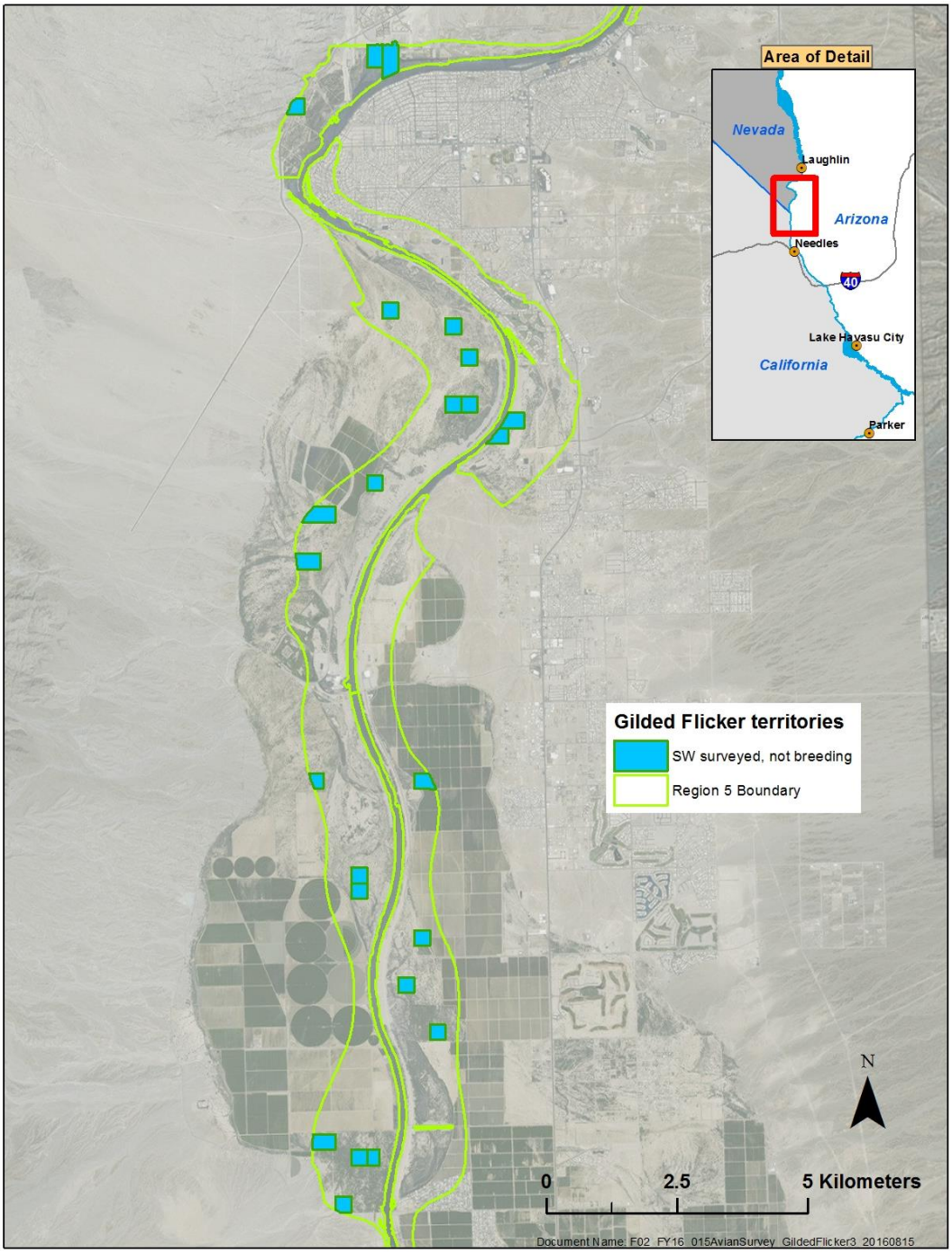

Figure 4-117.—Average number of gilded flicker territories found in Region 5, Mohave Valley sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

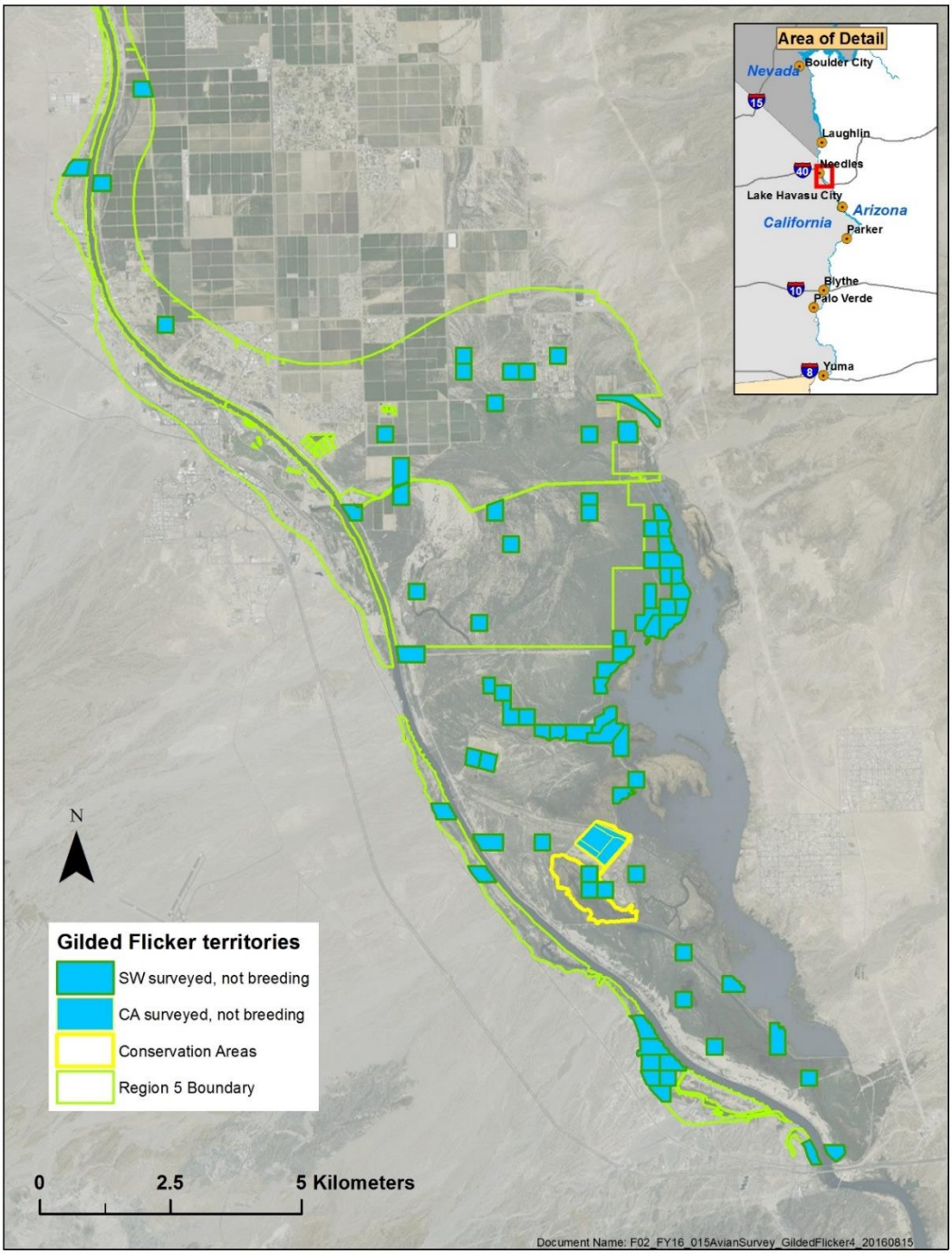

Figure 4-118.—Average number of gilded flicker territories found in Regions 5 and 6, Topock Marsh sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

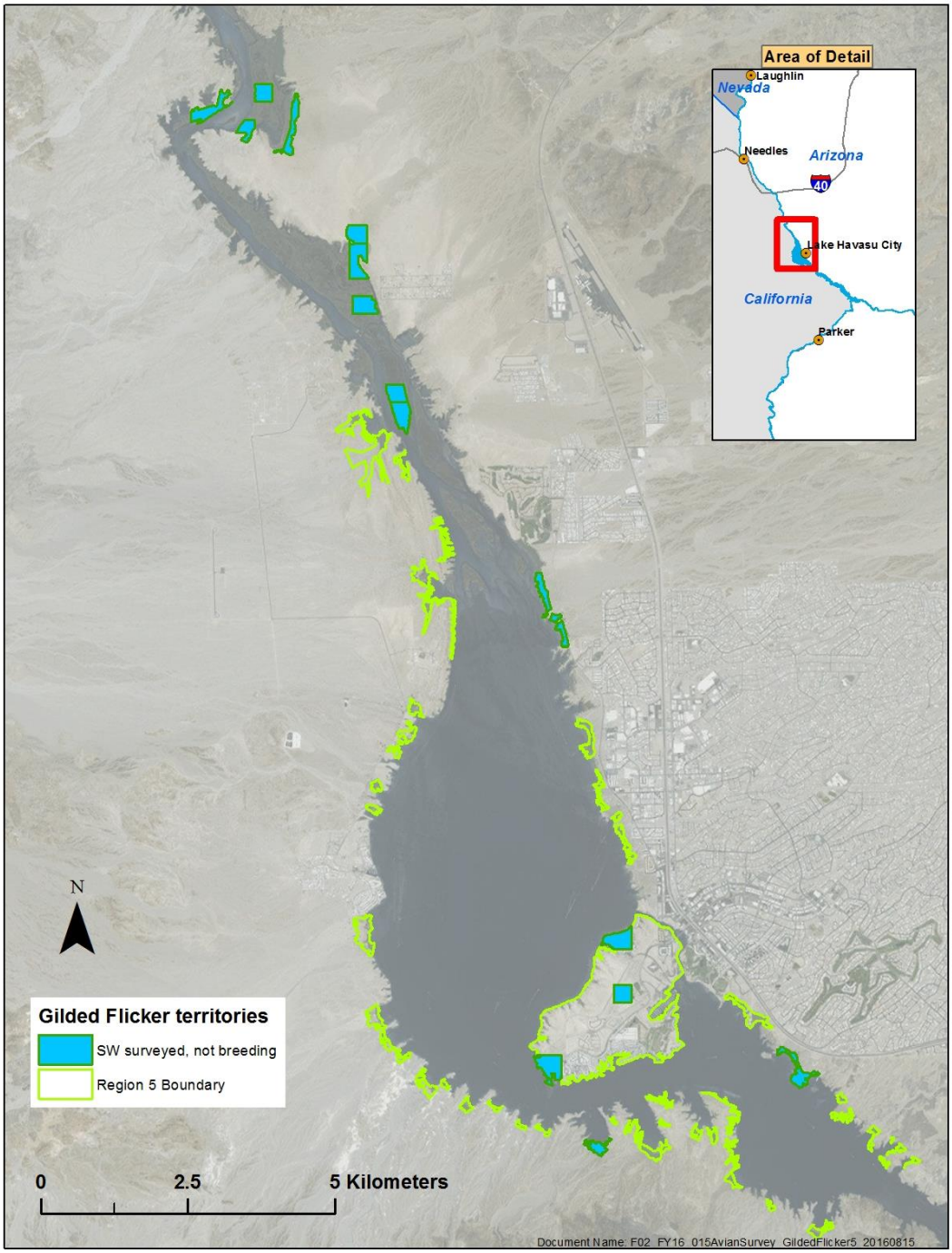

Figure 4-119.—Average number of gilded flicker territories found in Region 5, Lake Havasu sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

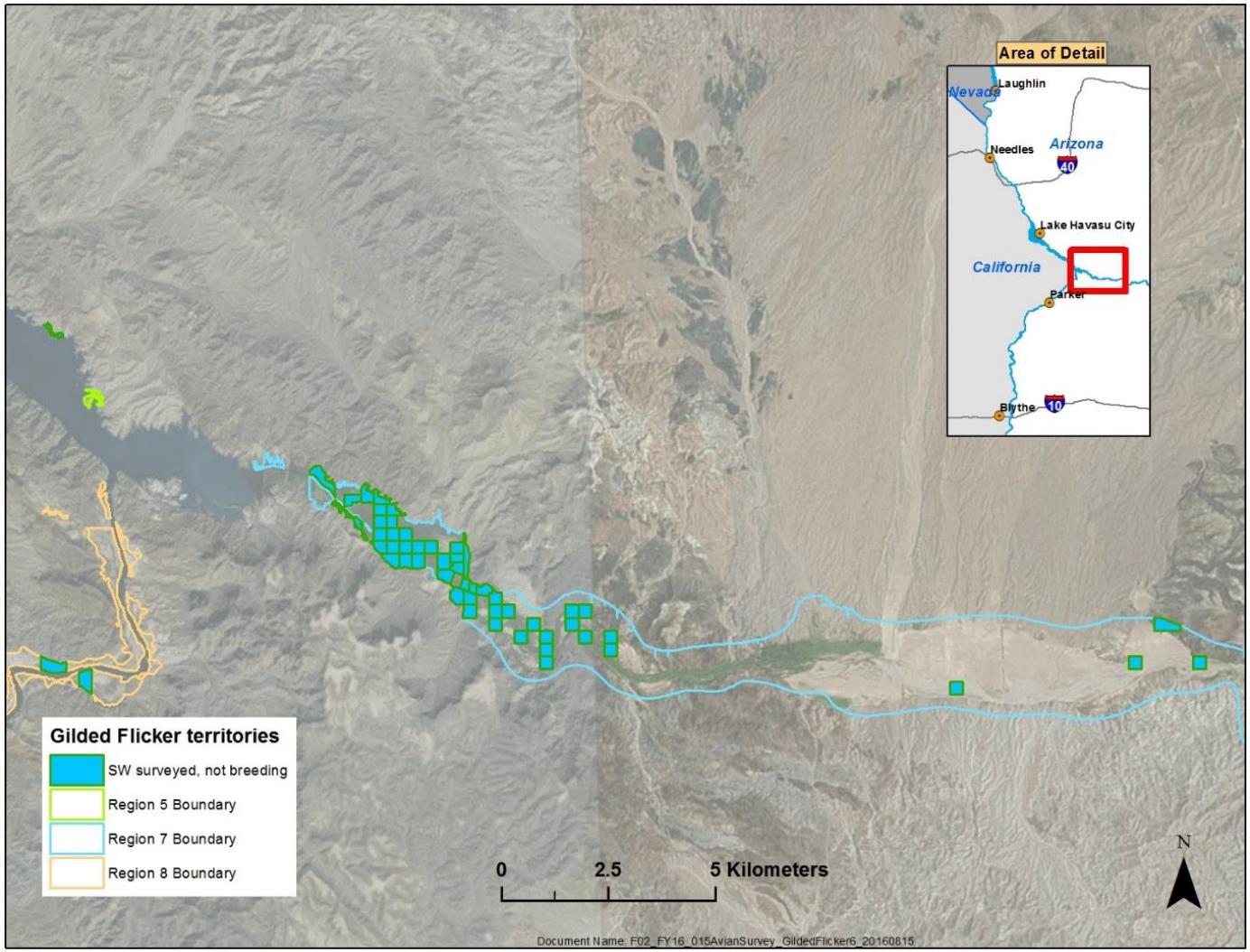

Figure 4-120.—Average number of gilded flicker territories found in Regions 5, 7, and 8, Bill Williams Delta, lower Bill Williams River, and Parker Strip sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

Figure 4-121.—Average number of gilded flicker territories found in Region 7, upper Bill Williams River sites, in 2011–15.

SW = surveyed as part of system-wide coverage.

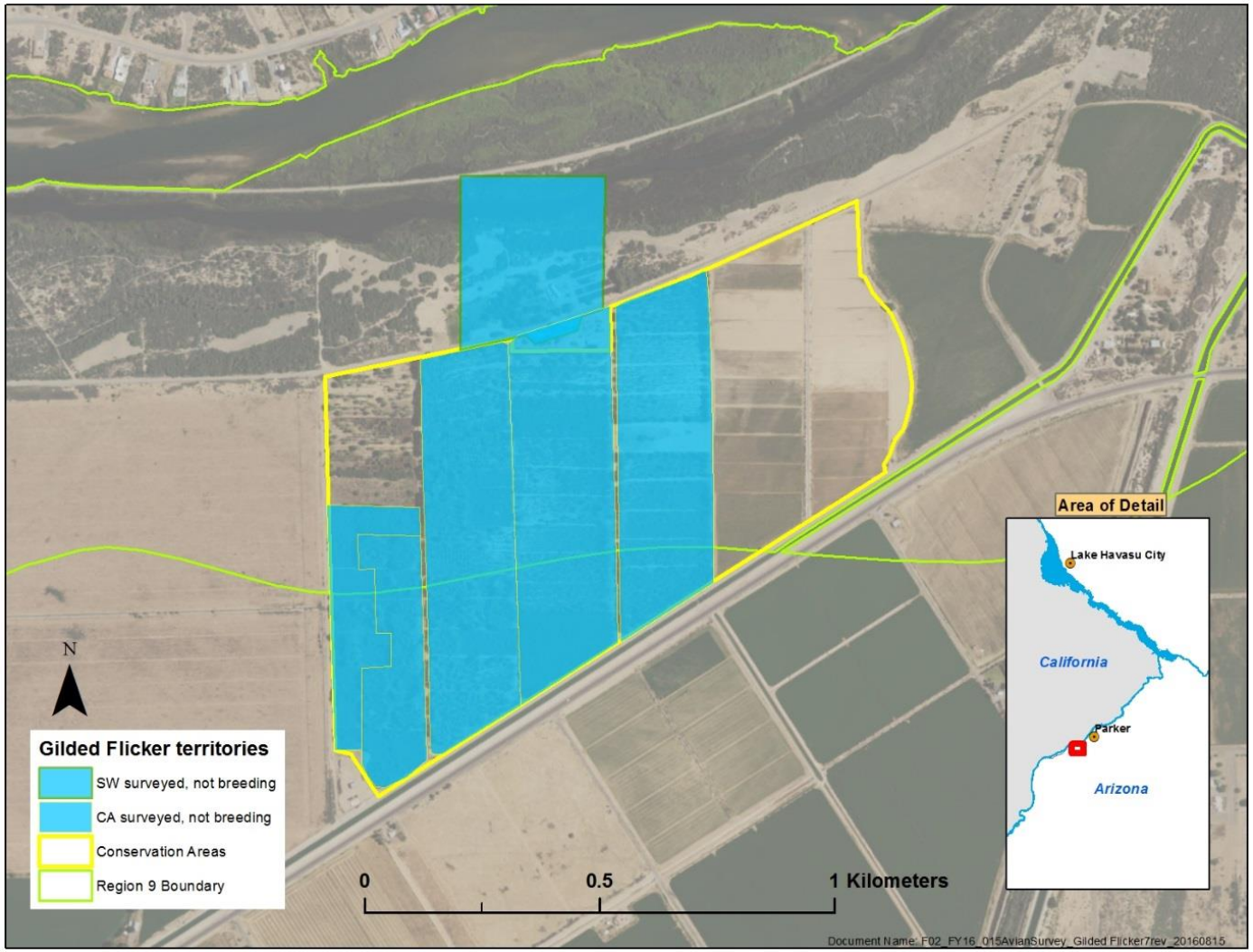

Figure 4-122.—Average number of gilded flicker territories found in CRIT 9, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

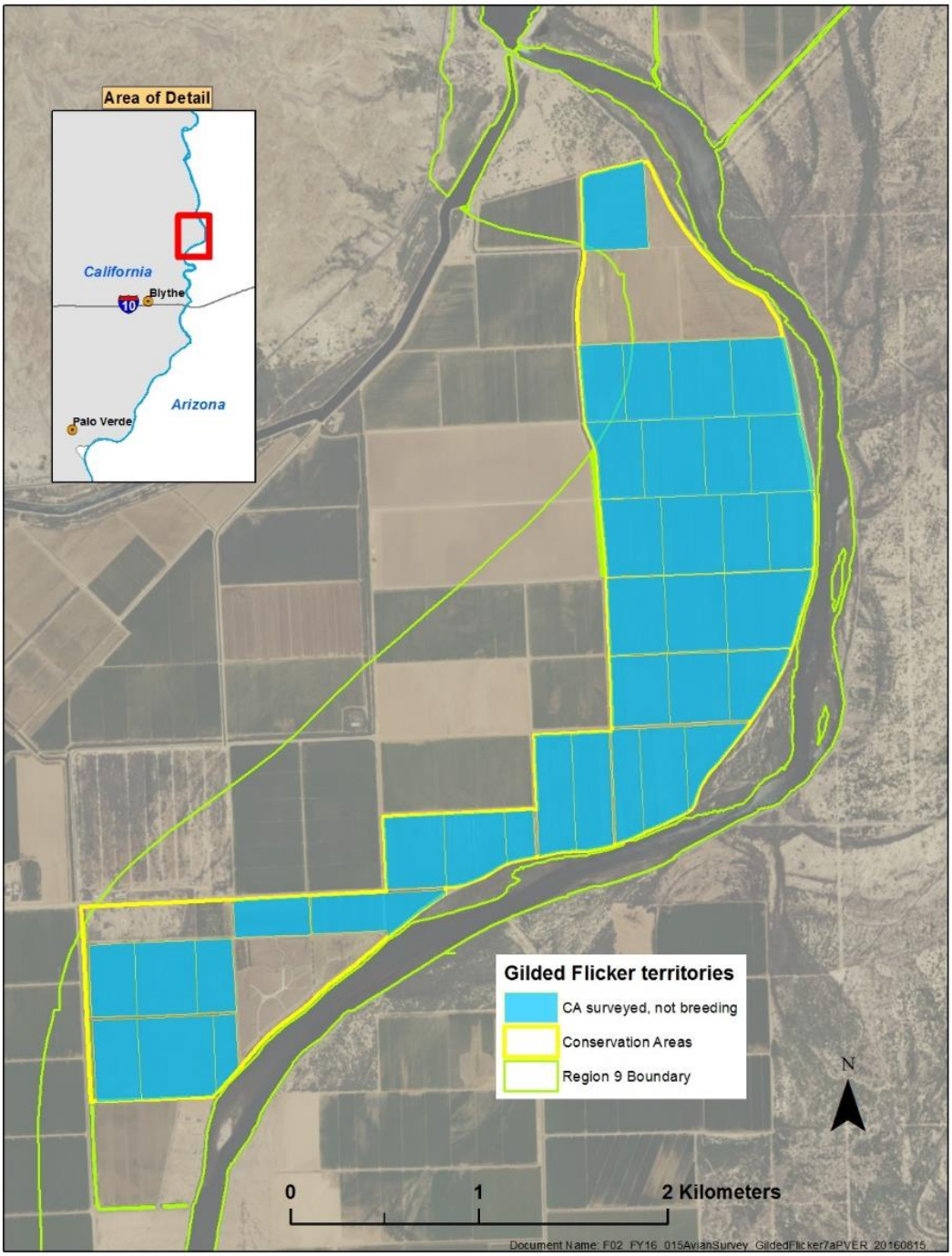

Figure 4-123.—Average number of gilded flicker territories found in Region 9, PVER sites, in 2011–15.
CA = surveyed as part of conservation area and CRIT 9 coverage.

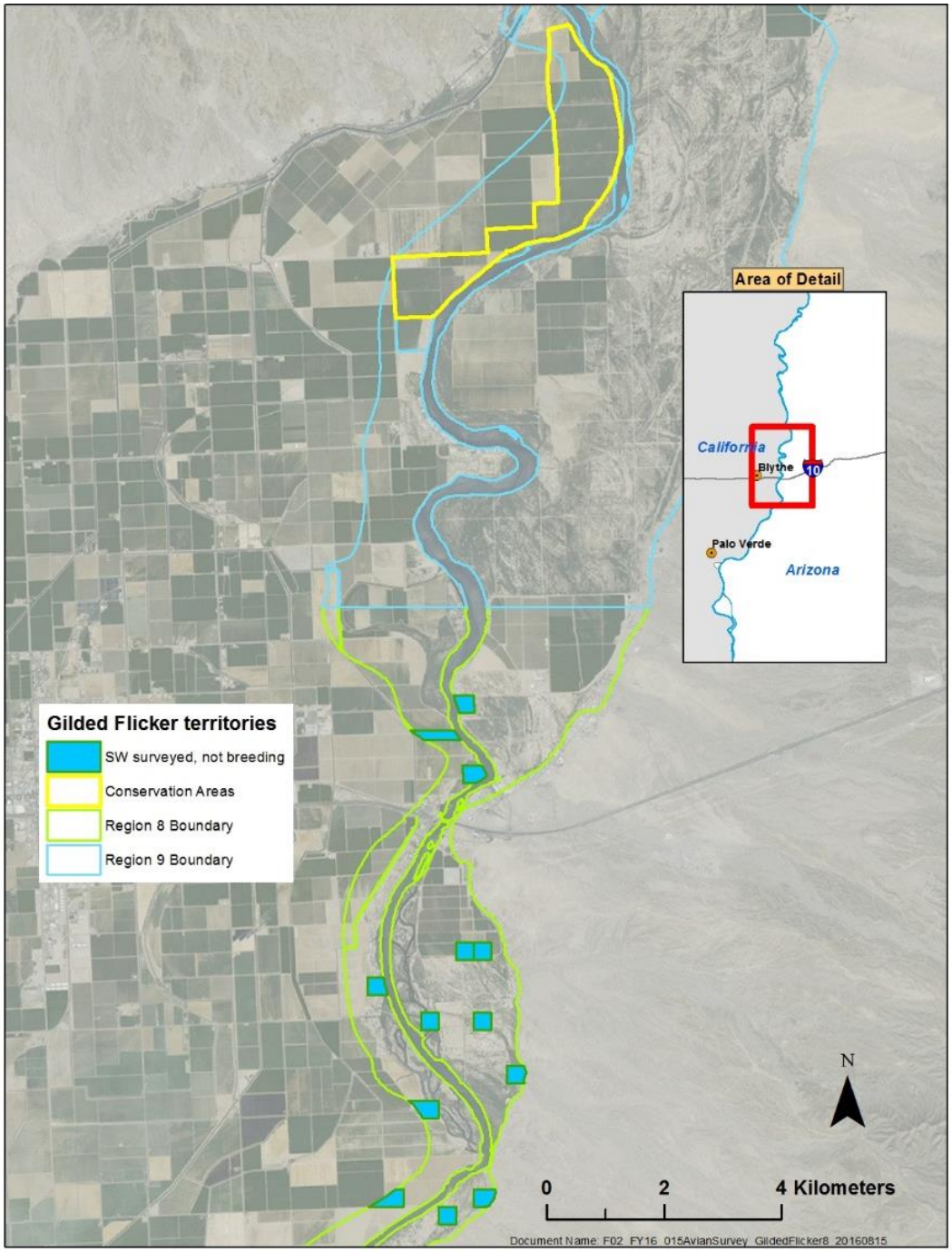

Figure 4-124.—Average number of gilded flicker territories found in Region 8, Blythe sites, in 2011–15.
SW = surveyed as part of system-wide coverage.

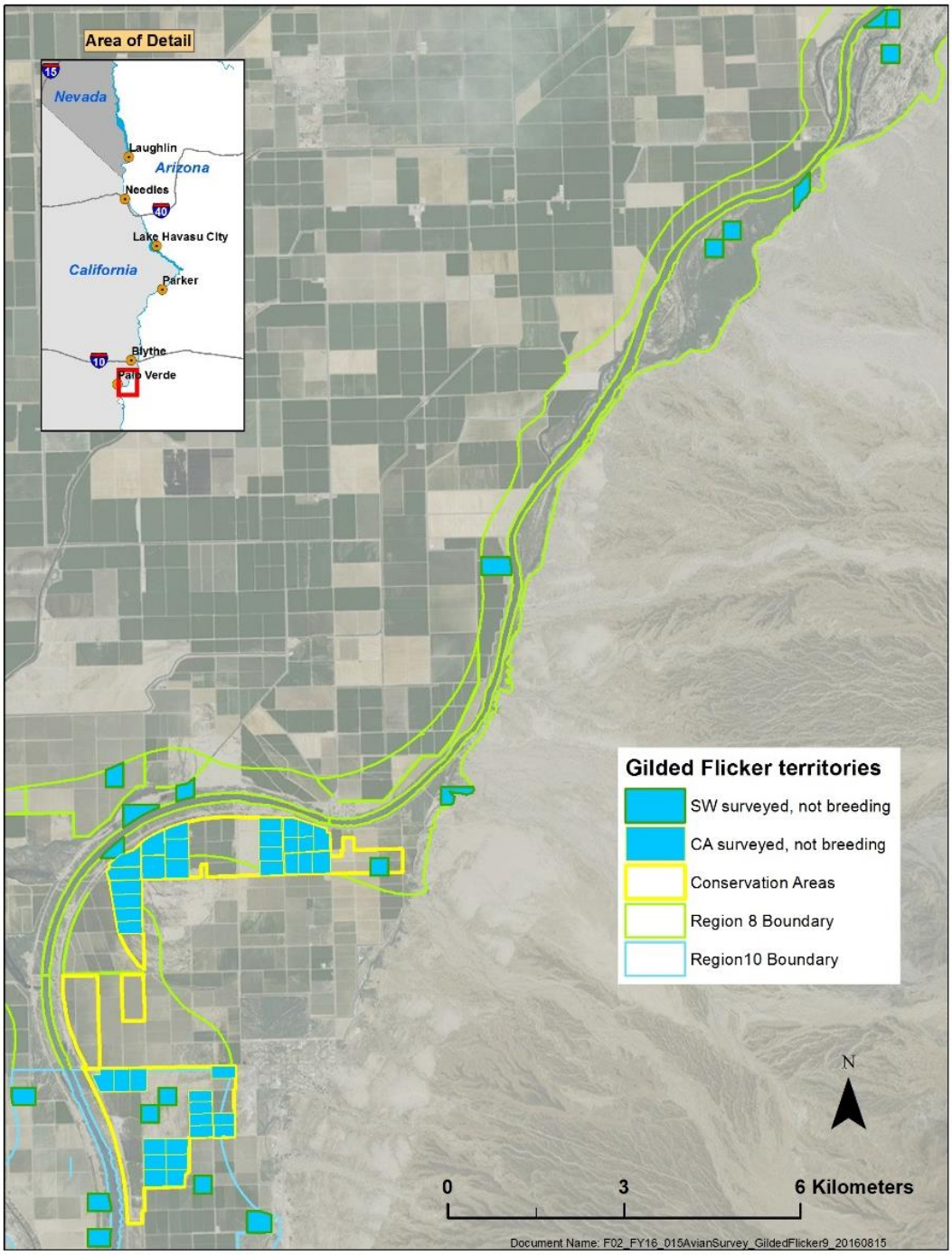

Figure 4-125.—Average number of gilded flicker territories found in Regions 8 and 10, Palo Verde, Cibola Valley, and Cibola NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

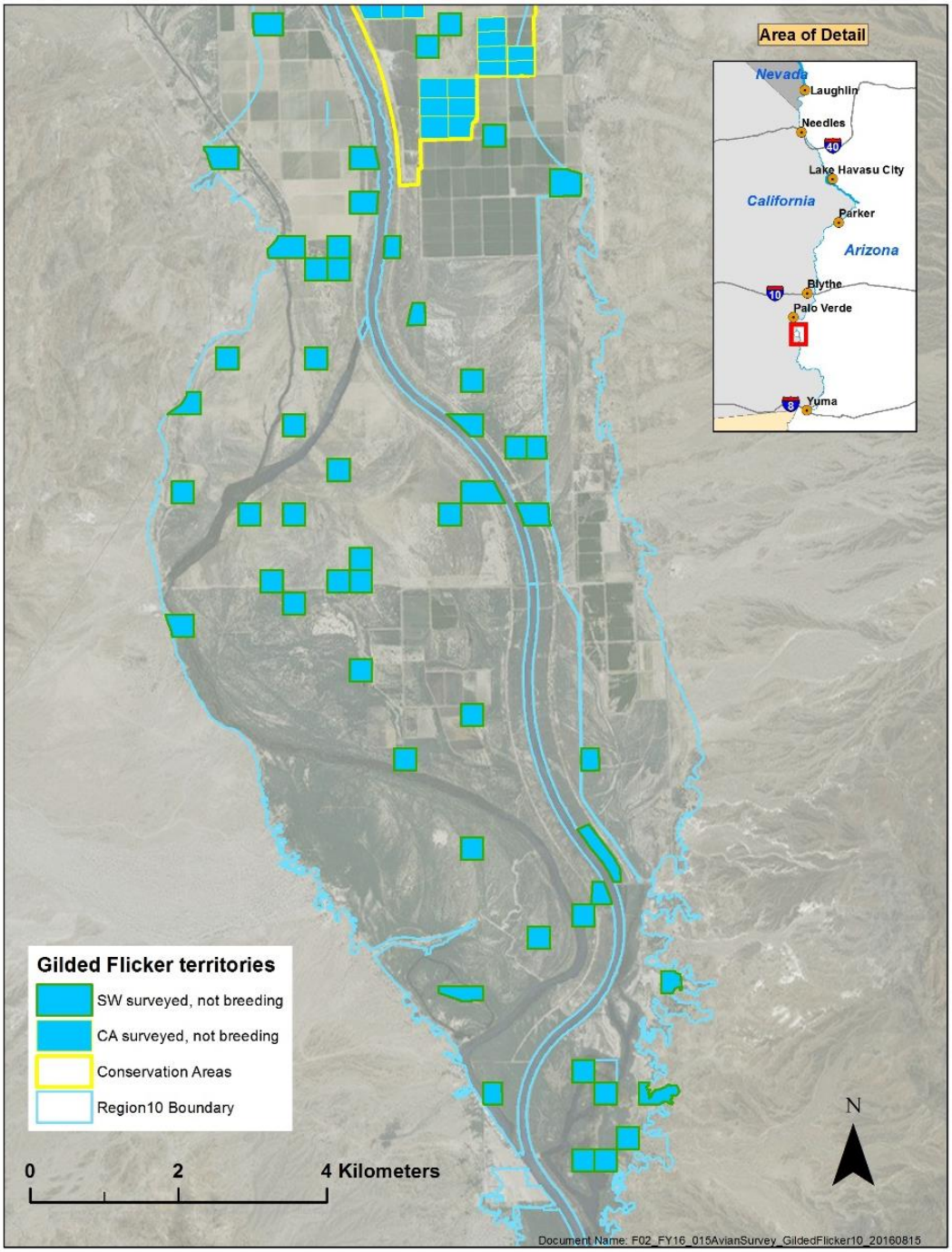

Figure 4-126.—Average number of gilded flicker territories found in Region 10, Cibola NWR sites, in 2011–15.
SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

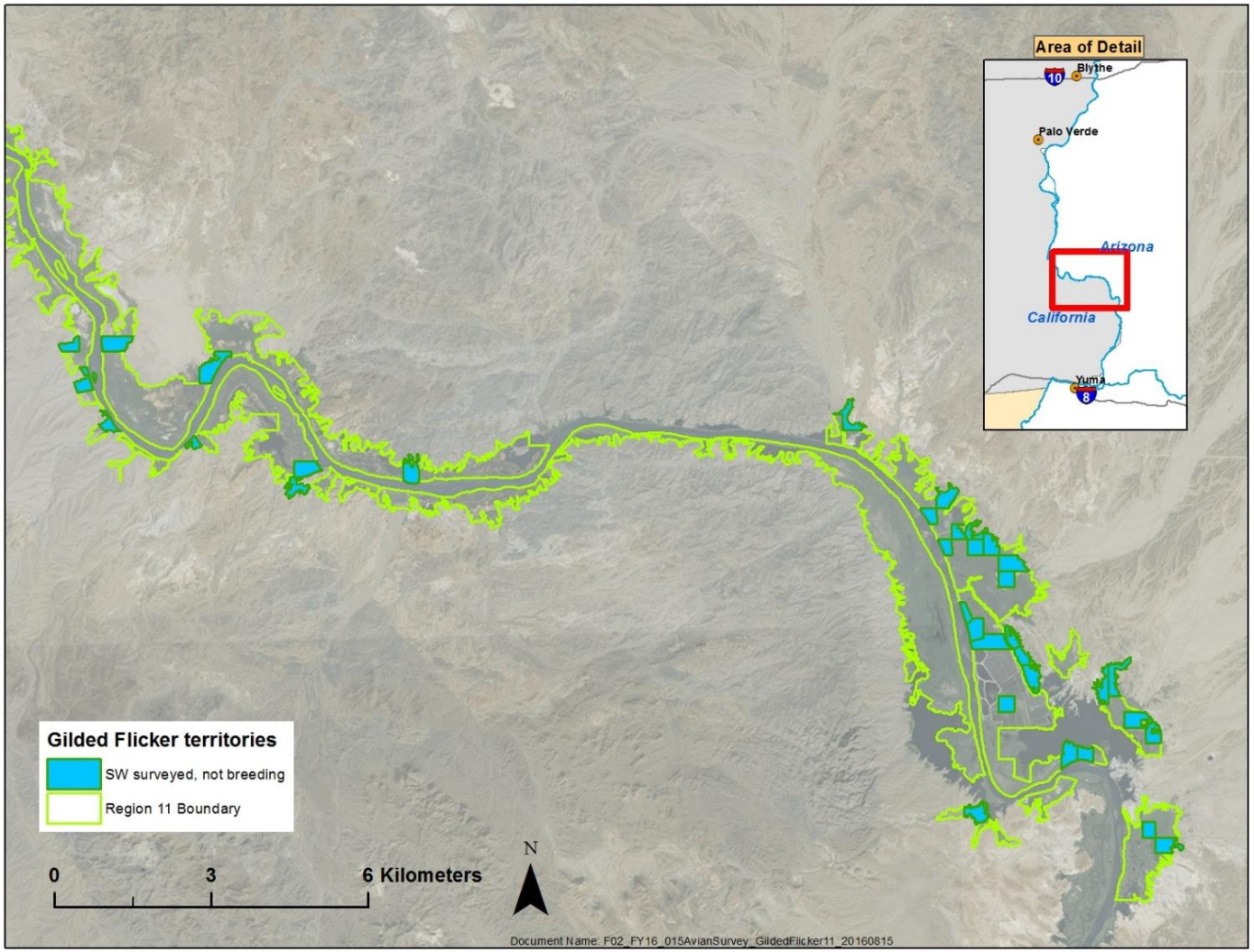

Figure 4-127.—Average number of gilded flicker territories found in Region 11, Imperial NWR sites, in 2011–15.

SW = surveyed as part of system-wide coverage.

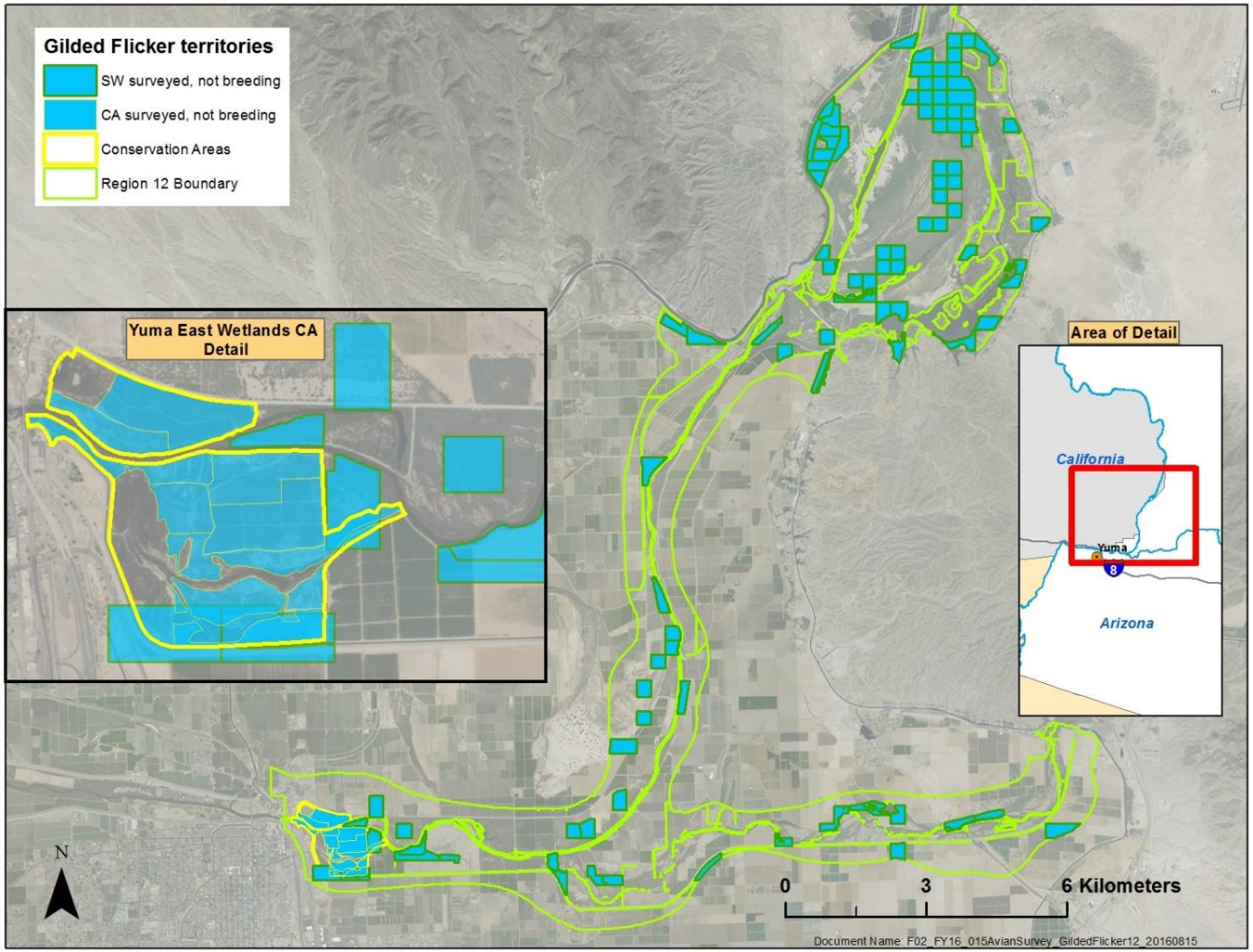

Figure 4-128.—Average number of gilded flicker territories found in Region 12, Imperial/Laguna and Yuma/Gila River, Arizona, sites, in 2011–15.

SW = surveyed as part of system-wide coverage, and CA = surveyed as part of conservation area and CRIT 9 coverage.

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ATTACHMENT 5

2011–2015 Population Estimates

Total population size estimates across all habitat strata and regions reported in this report are based on revised annual estimates. Annual estimates for individual region and stratum were reported in the 2011, 2012, 2013, 2014, and 2015 annual reports (Great Basin Bird Observatory 2012, 2013, 2014a, 2014b, 2015). Errors in calculations were found after these annual reports were published and posted to the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Web site. The corrected population estimates for individual habitat stratum and regions for 2011–15 are presented in this attachment. The previously published annual reports have not been revised.

The following applies to system-wide summary totals and associated standard error for each habitat stratum for all regions (all) and summary totals for all regions and all habitat strata (all). The total population estimate and associated standard error for the combined habitat strata and/or combined regions is not equal to the sum of individual habitat stratum or individual region estimates because the sampling plots are not all the same size. Habitat stratum and region estimates are based on density, or the total number of territories divided by the total area of sampled plots. Because plot area varies, the population total over habitat strata and regions must be calculated by summing the total birds and plot area over habitat strata and regions, calculating territories per unit area from these sums, and then multiplying that by the total area over all habitat strata and regions.

The following applies to conservation area summary totals and associated standard error for each conservation area and for all conservation areas. The total population estimate and associated standard error for the combined habitat strata for each conservation area (all habitats) and all conservation area totals (all) is not equal to individual habitat stratum or individual conservation area estimates. Habitat stratum and conservation area estimates are based on density, or the total number of territories divided by the total area of sampled plots. Because plot area varies, the population total over habitat strata and conservation areas must be calculated by summing the total birds and plot area over habitat strata and conservation areas, calculating territories per unit area from these sums, and then multiplying that by the total area over all habitat strata and conservation areas.

2011 POPULATION ESTIMATES

Table 5-1.—Estimated number of territories with standard error (SE) in 2011; LCR MSCP covered focal species, system-wide (Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2011.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
6	Tall woody	37.7	48.6	0.0	0.0	0.0	0.0	15.1	19.4	0.0	0.0	0.0	0.0
7	Tall woody	399.5	102.9	148.1	47.0	50.5	14.3	41.1	15.8	0.0	0.0	1.2	1.2
8	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
10	Tall woody	7.2	1.0	0.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
11	Tall woody	9.0	12.6	0.0	0.0	0.0	0.0	2.3	3.2	0.0	0.0	0.0	0.0
12	Tall woody	11.1	8.2	27.8	29.0	30.6	13.4	0.0	0.0	0.0	0.0	0.0	0.0
All	**Tall woody**	497.7	132.8	191.4	64.7	90.5	23.5	60.0	24.4	0.0	0.0	1.3	1.3
4+5	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Low woody	527.7	539.4	970.9	849.9	84.4	53.4	63.3	42.2	0.0	0.0	0.0	0.0
8	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Low woody	16.9	16.5	338.4	198.6	16.9	15.0	67.7	68.8	0.0	0.0	0.0	0.0
12	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Low woody**	463.0	430.4	1165.1	769.6	88.6	46.1	122.5	78.7	0.0	0.0	0.0	0.0

Table 5-1.—Estimated number of territories with standard error (SE) in 2011; LCR MSCP covered focal species, system-wide (Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2011.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	200.3	118.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	Herbaceous	0.0	0.0	0.0	0.0	9.7	9.4	0.0	0.0	0.0	0.0	0.0	0.0
All	**Herbaceous**	181.6	109.5	0.0	0.0	11.4	11.5	0.0	0.0	0.0	0.0	0.0	0.0
4+5	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	0.0	0.0	209.5	95.3	29.9	32.7	29.9	32.7	0.0	0.0	0.0	0.0
8	Unsuitable	0.0	0.0	0.0	0.0	118.6	110.3	0.0	0.0	316.3	294.0	0.0	0.0
10	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	0.0	0.0	200.6	81.9	194.8	166.0	28.7	29.3	443.0	435.3	0.0	0.0
Total	**All**	**1,083.8**	**483.7**	**1,564.6**	**811.4**	**371.2**	**175.8**	**206.7**	**91.0**	**432.1**	**431.3**	**1.1**	**1.1**

[1] Scientific names of the species are listed in attachment 3.

Table 5-2.—Estimated number of territories with SE in 2011; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2011.)

		Common yellow-throat[1]		Abert's towhee[1]		Black-tailed gnatcatcher[1]		Verdin[1]		Lucy's warbler[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	-	-	-	-	-	-	-	-	-	-
6	Tall woody	82.9	99.4	52.8	38.1	113.1	130.7	37.7	33.6	3.8	2.8
7	Tall woody	350.2	89.6	163.3	47.4	34.1	19.6	61.1	24.2	255.0	65.0
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	25.1	3.3	10.7	1.4	9.0	1.2	10.7	1.4	5.4	0.7
11	Tall woody	416.2	311.8	58.8	28.5	45.2	27.3	9.0	12.6	0.0	0.0
12	Tall woody	348.6	111.3	156.9	42.9	183.3	44.3	358.3	85.7	11.1	11.6
All	**Tall woody**	1,270.4	304.1	471.8	98.3	400.1	125.8	528.7	120.2	300.0	75.8
4+5	Low woody	88.5	90.2	2,282.2	461.1	1,946.1	540.4	937.6	338.0	2,455.6	500.6
6	Low woody	68.2	73.5	460.5	133.0	528.8	155.8	0.0	0.0	614.1	352.1
7	Low woody	696.5	376.9	422.1	110.7	527.7	330.1	147.7	146.1	1,160.9	460.3
8	Low woody	882.3	687.9	992.6	249.1	1,323.5	1,177.0	1,249.9	1,095.5	0.0	0.0
10	Low woody	469.4	483.6	1,095.4	297.3	695.5	366.4	330.3	166.1	712.8	506.6
11	Low woody	1,996.5	1,018.9	676.8	348.3	1,032.1	289.1	727.5	207.5	135.4	137.6
12	Low woody	213.0	128.8	343.1	122.2	603.5	302.6	591.6	319.7	0.0	0.0
All	**Low woody**	4,231.3	1,360.0	6,106.7	1,034.3	6,458.9	1,465.8	3,811.5	1,079.6	4,920.3	1,076.0

Table 5-2.—Estimated number of territories with SE in 2011; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2011.)

		Common yellow-throat[1]		Abert's towhee[1]		Black-tailed gnatcatcher[1]		Verdin[1]		Lucy's warbler[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	410.5	163.4	5.0	5.2	40.1	36.9	0.0	0.0	10.0	9.2
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	454.6	60.6	0.0	0.0	50.5	6.7	50.5	6.7	0.0	0.0
12	Herbaceous	242.5	158.0	58.2	8.1	48.5	47.1	29.1	28.3	0.0	0.0
All	**Herbaceous**	1,134.1	269.8	73.0	11.4	146.3	66.9	87.2	35.8	9.1	8.8
4+5	Unsuitable	1,536.6	1,357.1	981.7	454.6	1,067.1	507.1	341.5	367.9	170.7	184.0
6	Unsuitable	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	59.8	65.5	299.2	67.5	179.5	110.0	269.3	248.2	149.6	66.5
8	Unsuitable	0.0	0.0	474.4	135.8	0.0	0.0	158.1	147.0	474.4	441.0
10	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Unsuitable	205.7	27.4	135.0	18.0	25.7	3.4	115.7	15.4	12.9	1.7
12	Unsuitable	2,624.8	349.6	843.7	112.4	937.4	124.9	937.4	124.9	0.0	0.0
All	**Unsuitable**	3,875.3	1,400.0	2,706.3	577.2	1,950.4	572.8	1,704.9	503.7	979.0	675.7
Total	**All**	**10,322.8**	**2,284.9**	**9,419.2**	**1,473.1**	**9,051.6**	**1,775.8**	**6,138.3**	**1,354.1**	**6,300.4**	**1,359.3**

[1] Scientific names of the species are listed in attachment 3.

Table 5-3.—Estimated number of territories with SE in 2011; second 5 of the 10 most abundant territorial species, system-wide

(Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2011.)

		Song sparrow[1]		Yellow-breasted chat[1]		Lesser nighthawk[1]		Marsh wren[1]		Phainopepla[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	-	-	-	-	-	-	-	-	-	-
6	Tall woody	33.9	43.7	15.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0
7	Tall woody	1,104.5	284.3	679.2	154.9	4.7	4.8	4.7	4.7	54.1	30.1
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	10.7	1.4	25.1	3.3	0.0	0.0	10.7	1.4	0.0	0.0
11	Tall woody	434.3	266.0	124.4	128.7	0.0	0.0	58.8	36.8	0.0	0.0
12	Tall woody	205.6	102.5	68.1	42.8	116.7	40.4	61.1	43.6	0.0	0.0
All	**Tall woody**	1,875.7	422.7	979.1	229.6	136.6	50.1	145.3	72.2	58.5	33.3
4+5	Low woody	0.0	0.0	70.8	72.9	141.5	97.7	0.0	0.0	70.8	72.1
6	Low woody	0.0	0.0	68.2	73.5	272.9	152.2	17.1	18.4	0.0	0.0
7	Low woody	1,371.9	691.1	1,245.3	596.1	0.0	0.0	0.0	0.0	1,941.8	1,699.8
8	Low woody	220.6	244.7	0.0	0.0	294.1	267.1	0.0	0.0	0.0	0.0
10	Low woody	260.8	249.3	278.2	286.6	782.4	281.5	226.0	213.6	504.2	486.2
11	Low woody	1,150.5	662.8	1,184.4	1,136.6	676.8	496.6	473.7	397.9	0.0	0.0
12	Low woody	23.7	23.5	0.0	0.0	757.3	287.7	213.0	171.7	0.0	0.0
All	**Low woody**	2,808.8	969.2	2,693.9	1,326.2	3,066.0	836.7	986.3	514.6	2,236.5	1,569.6

Table 5-3.—Estimated number of territories with SE in 2011; second 5 of the 10 most abundant territorial species, system-wide

(Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2011.)

		Song sparrow[1]		Yellow-breasted chat[1]		Lesser nighthawk[1]		Marsh wren[1]		Phainopepla[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	420.5	155.8	140.2	53.7	5.0	4.6	781.0	201.9	0.0	0.0
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	101.0	13.5	50.5	6.7	0.0	0.0	50.5	6.7	0.0	0.0
12	Herbaceous	9.7	10.1	0.0	0.0	9.7	9.4	329.7	325.9	0.0	0.0
All	**Herbaceous**	498.7	154.6	180.1	51.3	16.0	12.2	1,149.4	428.6	0.0	0.0
4+5	Unsuitable	1,365.9	1,206.3	0.0	0.0	170.7	184.0	682.9	603.1	85.4	92.0
6	Unsuitable	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	448.9	261.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Unsuitable	0.0	0.0	0.0	0.0	79.1	86.0	0.0	0.0	0.0	0.0
10	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Unsuitable	154.2	20.5	218.5	29.1	77.1	10.3	77.1	10.3	0.0	0.0
12	Unsuitable	375.0	49.9	375.0	49.9	375.0	49.9	749.9	99.9	0.0	0.0
All	**Unsuitable**	2,171.5	241.7	573.8	81.3	669.4	229.3	1,335.5	612.8	77.8	79.7
Total	**All**	**7,124.6**	**1,788.7**	**4,363.8**	**1,447.9**	**3,949.6**	**959.8**	**3,529.5**	**972.4**	**2,433.7**	**1,625.9**

[1] Scientific names of the species are listed in attachment 3.

Table 5-4.—Estimated number of territories with SE in 2011; LCR MSCP covered focal species, conservation areas and Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09 (CRIT 9)

(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2011.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Tall woody	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.4
'Ahakhav Tribal Preserve CRIT 9	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	0.0	0.0	0.0	0.0	0.0	0.0	3.8	1.9
Beal Lake Conservation Area	Tall woody	8.6	4.3	13.0	6.5	2.3	1.1	0.0	0.0
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	8.6	4.3	13.0	6.5	2.3	1.1	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	7.0	3.5	2.1	1.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	7.0	3.5	2.1	1.0	0.0	0.0	0.0	0.0

Table 5-4.—Estimated number of territories with SE in 2011; LCR MSCP covered focal species, conservation areas and Colorado River Indian Tribes' 'Ahakhav Tribal Preserve habitat creation area 09 (CRIT 9)

(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2011.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	6.0	3.0	0.0	0.0	2.6	1.3	0.0	0.0
Cibola Valley Conservation Area	Low woody	5.2	2.6	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	11.2	5.6	0.0	0.0	2.6	1.3	0.0	0.0
Palo Verde Ecological Reserve	Tall woody	8.3	4.1	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	**All habitats**	8.3	4.1	0.0	0.0	0.0	0.0	0.0	0.0
Habitat total	Tall woody	29.8	14.9	15.0	7.5	4.9	2.4	2.8	1.4
Habitat total	Low woody	5.2	2.6	0.0	0.0	0.0	0.0	1.0	0.5
Total	**All**	**35.0**	**17.4**	**15.0**	**7.5**	**4.9**	**2.4**	**3.8**	**1.9**

[1] Scientific names of the species are listed in attachment 3.

Table 5-5.—Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the first 5 of the 10 most abundant territorial species breeding in these areas

(Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2011.)

		Abert's towhee[1]		Blue grosbeak[1]		Common yellowthroat[1]		Song sparrow[1]		Western kingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Tall woody	11.4	5.7	1.0	0.5	0.0	0.0	0.0	0.0	2.3	1.2
'Ahakhav Tribal Preserve CRIT 9	Low woody	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	12.5	6.2	1.0	0.5	0.0	0.0	0.0	0.0	3.4	1.7
Beal Lake Conservation Area	Tall woody	20.9	10.4	3.1	1.6	8.8	4.4	0.3	0.1	0.0	0.0
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	20.9	10.4	3.1	1.6	8.8	4.4	0.3	0.1	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	20.0	10.0	14.5	7.2	15.0	7.5	10.9	5.4	16.1	8.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	2.3	1.2	4.7	2.3	0.0	0.0	0.0	0.0	0.5	0.3
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	22.3	11.1	19.2	9.6	15.0	7.5	10.9	5.4	16.6	8.3

Table 5-5.—Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the first 5 of the 10 most abundant territorial species breeding in these areas

(Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2011.)

		Abert's towhee[1]		Blue grosbeak[1]		Common yellowthroat[1]		Song sparrow[1]		Western kingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	28.5	14.2	25.7	12.8	2.1	1.0	13.5	6.7	7.3	3.6
Cibola Valley Conservation Area	Low woody	16.1	8.0	10.1	5.0	8.3	4.1	1.0	0.5	4.7	2.3
Cibola Valley Conservation Area	**All habitats**	44.6	22.2	35.8	17.8	10.4	5.2	14.5	7.2	11.9	5.9
Palo Verde Ecological Reserve	Tall woody	18.4	9.2	21.3	10.6	28.8	14.3	22.1	11.0	4.9	2.5
Palo Verde Ecological Reserve	Low woody	1.6	0.8	8.3	4.1	23.6	11.8	0.0	0.0	3.1	1.6
Palo Verde Ecological Reserve	**All habitats**	20.0	10.0	29.6	14.7	52.4	26.1	22.1	11.0	8.0	4.0
Habitat total	Tall woody	99.3	49.5	65.6	32.7	54.8	27.3	46.7	23.3	30.6	15.3
Habitat total	Low woody	21.0	10.5	23.1	11.5	31.9	15.9	1.0	0.5	9.3	4.7
Total	**All**	**120.3**	**59.9**	**88.7**	**44.2**	**86.7**	**43.2**	**47.7**	**23.8**	**40.0**	**19.9**

[1] Scientific names of the species are listed in attachment 3.

Table 5-6.—Estimated number of territories with SE in 2011; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2011.)

		Bullock's oriole[1]		Black-tailed gnatcatcher[1]		Anna's hummingbird[1]		Verdin[1]		Lucy's warbler[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Tall woody	5.2	2.6	1.6	0.8	7.3	3.6	1.3	0.6	0.0	0.0
'Ahakhav Tribal Preserve CRIT 9	Low woody	0.5	0.3	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	5.7	2.8	1.6	0.8	7.8	3.9	1.3	0.6	0.0	0.0
Beal Lake Conservation Area	Tall woody	3.0	1.5	19.2	9.6	5.4	2.7	13.2	6.6	9.9	4.9
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	3.0	1.5	19.2	9.6	5.4	2.7	13.2	6.6	9.9	4.9
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	12.5	6.2	3.1	1.6	7.8	3.9	5.2	2.6	5.2	2.6
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	12.5	6.2	3.1	1.6	7.8	3.9	5.2	2.6	5.2	2.6

Table 5-6.—Estimated number of territories with SE in 2011; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2011.)

		Bullock's oriole[1]		Black-tailed gnatcatcher[1]		Anna's hummingbird[1]		Verdin[1]		Lucy's warbler[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	10.4	5.2	0.3	0.1	1.6	0.8	0.8	0.4	0.0	0.0
Cibola Valley Conservation Area	Low woody	1.0	0.5	3.6	1.8	0.0	0.0	0.0	0.0	4.2	2.1
Cibola Valley Conservation Area	**All habitats**	11.4	5.7	3.9	1.9	1.6	0.8	0.8	0.4	4.2	2.1
Palo Verde Ecological Reserve	Tall woody	5.4	2.7	0.0	0.0	2.9	1.4	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Low woody	0.3	0.1	0.0	0.0	0.0	0.0	1.3	0.6	1.6	0.8
Palo Verde Ecological Reserve	**All habitats**	5.7	2.8	0.0	0.0	2.9	1.4	1.3	0.6	1.6	0.8
Habitat total	Tall woody	36.4	18.1	24.1	12.0	24.9	12.4	20.4	10.2	15.0	7.5
Habitat total	Low woody	1.8	0.9	3.6	1.8	0.5	0.3	1.3	0.6	5.7	2.8
Total	**All**	**38.2**	**19.1**	**27.8**	**13.8**	**25.4**	**12.7**	**21.7**	**10.8**	**20.8**	**10.3**

[1] Scientific names of the species are listed in attachment 3.

2012 POPULATION SIZE ESTIMATES

Table 5-7.—Estimated number of territories with SE in 2012; LCR MSCP covered focal species, system-wide
(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2012.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	49.5	35.9	49.5	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Tall woody	25.0	24.0	0.0	0.0	12.5	6.7	0.0	0.0	0.0	0.0	0.0	0.0
7	Tall woody	414.1	128.4	118.3	47.6	48.9	16.4	77.2	15.2	0.0	0.0	0.0	0.0
8	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
10	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
11	Tall woody	8.5	5.0	1.4	1.6	4.2	1.1	9.9	2.8	0.0	0.0	0.0	0.0
12	Tall woody	0.0	0.0	2.1	2.1	12.4	8.1	0.0	0.0	0.0	0.0	0.0	0.0
All	**Tall woody**	501.6	143.5	186.5	50.6	77.4	19.5	86.1	14.6	0.0	0.0	0.0	0.0
4+5	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Low woody	668.3	323.1	613.8	345.1	259.1	68.8	136.4	68.9	0.0	0.0	0.0	0.0
8	Low woody	0.0	0.0	0.0	0.0	31.7	32.3	0.0	0.0	0.0	0.0	0.0	0.0
10	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Low woody	0.0	0.0	18.0	19.4	107.8	51.7	35.9	34.0	0.0	0.0	0.0	0.0
12	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Low woody**	676.9	351.9	640.4	348.9	406.7	102.7	175.5	81.4	0.0	0.0	0.0	0.0

Table 5-7.—Estimated number of territories with SE in 2012; LCR MSCP covered focal species, system-wide

(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2012.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	0.0	0.0	35.8	35.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	0.0	0.0	0.0	0.0	7.4	5.2	14.8	10.3	0.0	0.0	0.0	0.0
12	Herbaceous	0.0	0.0	3.9	3.8	7.8	8.2	0.0	0.0	0.0	0.0	0.0	0.0
All	**Herbaceous**	0.0	0.0	35.3	32.4	16.1	10.1	17.2	15.0	0.0	0.0	0.0	0.0
4+5	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	120.8	124.7	785.4	403.1	120.8	58.1	60.4	62.3	0.0	0.0	30.2	28.4
8	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	103.6	104.8	673.6	317.5	103.6	45.1	51.8	52.4	0.0	0.0	25.9	25.8
Total	**All**	**1,225.7**	**400.7**	**1,528.8**	**500.0**	**590.7**	**123.8**	**319.8**	**103.4**	**0.0**	**0.0**	**26.9**	**27.0**

[1] Scientific names of the species are listed in attachment 3.

Table 5-8.—Estimated number of territories with SE in 2012; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2012.)

		Common yellow-throat[1]		Song sparrow[1]		Abert's towhee[1]		Lucy's warbler[1]		Black-tailed gnatcatcher[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	94.1	46.8	118.8	19.9	0.0	0.0	73.0	26.0	29.7	7.5
6	Tall woody	175.2	64.7	100.1	43.7	43.8	28.6	29.2	27.4	56.3	23.1
7	Tall woody	468.1	99.7	1,782.3	409.0	133.7	20.7	136.3	53.1	30.9	15.2
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	-	-	-	-	-	-	-	-	-	-
11	Tall woody	161.0	68.1	90.4	86.9	26.8	14.9	5.7	6.4	19.8	8.4
12	Tall woody	466.7	120.8	223.0	99.2	105.3	22.0	16.5	10.8	103.2	21.1
All	**Tall woody**	1,437.3	248.1	2,318.2	489.4	314.3	55.7	285.8	71.8	258.7	46.6
4+5	Low woody	1,931.3	2,144.7	724.3	804.3	2,776.3	727.4	3,500.6	985.4	1,569.2	786.2
6	Low woody	335.5	214.7	383.4	344.0	559.1	127.1	686.9	274.3	559.1	237.8
7	Low woody	2,673.2	897.1	7,160.5	2,105.2	791.1	170.3	1,527.6	434.3	600.1	278.8
8	Low woody	95.0	67.6	0.0	0.0	759.8	214.7	838.9	332.8	997.2	170.3
10	Low woody	824.4	603.0	412.2	289.2	2,839.6	877.5	3,206.0	1,585.8	2,931.2	1,089.2
11	Low woody	3,252.2	1,253.5	3,431.9	1,928.8	592.9	190.1	664.8	170.1	521.1	109.7
12	Low woody	912.3	278.5	815.3	543.2	562.9	303.6	465.9	312.9	485.3	313.8
All	**Low woody**	10,097.9	2,838.5	13,279.5	3,671.4	8,429.2	1,445.9	10,319.2	2,117.1	7,342.2	1,558.0

Table 5-8.—Estimated number of territories with SE in 2012; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2012.)

		Common yellow-throat[1]		Song sparrow[1]		Abert's towhee[1]		Lucy's warbler[1]		Black-tailed gnatcatcher[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	1,262.3	355.9	286.5	51.0	53.7	31.7	89.5	21.3	80.6	56.3
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	709.4	266.3	206.9	144.3	22.2	15.5	14.8	10.3	7.4	5.2
12	Herbaceous	246.8	48.1	74.4	78.0	27.4	6.0	0.0	0.0	39.2	14.9
All	**Herbaceous**	2,173.9	515.1	564.4	194.1	99.2	32.5	96.1	20.2	116.8	53.5
4+5	Unsuitable	0.0	0.0	0.0	0.0	953.9	116.6	529.9	64.8	847.9	103.6
6	Unsuitable	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	332.3	211.0	1,057.3	688.5	694.8	331.6	815.6	260.2	634.4	187.3
8	Unsuitable	567.0	69.3	0.0	0.0	1,417.5	173.2	0.0	0.0	567.0	69.3
10	Unsuitable	845.0	591.4	65.0	68.8	0.0	0.0	0.0	0.0	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	1,157.9	455.3	396.1	158.1	335.2	333.2	0.0	0.0	121.9	121.2
All	**Unsuitable**	2,842.2	860.1	1,376.0	608.6	3,540.7	616.2	1,403.5	256.0	2,329.0	344.6
Total	**All**	**16,155.8**	**3,269.5**	**17,047.1**	**3,884.3**	**12,301.1**	**1,856.2**	**11,898.2**	**2,218.3**	**9,944.3**	**1,747.7**

[1] Scientific names of the species are listed in attachment 3.

Table 5-9.—Estimated number of territories with SE in 2012; second 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2012.)

		Verdin[1]		Marsh wren[1]		Yellow-breasted chat[1]		Black-chinned hummingbird[1]		Ash-throated flycatcher[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	32.2	19.0	5.0	5.5	29.7	13.8	0.0	0.0	8.7	2.5
6	Tall woody	29.2	18.8	8.3	9.0	79.3	52.5	16.7	18.8	14.6	9.4
7	Tall woody	66.9	26.8	0.0	0.0	1008.2	274.0	38.6	26.4	46.3	16.3
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	-	-	-	-	-	-	-	-	-	-
11	Tall woody	48.0	27.1	25.4	9.2	19.8	22.1	1.4	1.6	4.2	2.5
12	Tall woody	221.0	46.2	47.5	28.3	33.0	18.6	66.1	13.6	35.1	8.7
All	**Tall woody**	426.8	83.1	95.7	38.1	1,146.1	294.6	124.1	37.1	112.7	23.7
4+5	Low woody	1,388.2	413.1	0.0	0.0	482.8	536.2	241.4	268.1	362.1	180.6
6	Low woody	111.8	81.0	607.1	495.5	383.4	265.5	63.9	68.6	159.8	51.8
7	Low woody	913.8	410.8	54.6	55.2	2,509.6	1,204.8	300.1	210.4	422.8	154.5
8	Low woody	348.2	183.6	0.0	0.0	0.0	0.0	126.6	79.7	269.1	155.5
10	Low woody	916.0	584.8	0.0	0.0	274.8	174.1	687.0	424.4	641.2	248.9
11	Low woody	844.5	204.3	1,724.9	909.0	1,329.6	633.2	305.5	115.8	269.5	124.7
12	Low woody	1,106.5	565.0	0.0	0.0	77.6	48.3	252.3	148.6	155.3	87.8
All	**Low woody**	5,622.0	1,186.2	2,629.2	1,208.7	5,165.5	1,651.0	1,936.3	596.6	2,238.3	471.4

Table 5-9.—Estimated number of territories with SE in 2012; second 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2012.)

		Verdin[1]		Marsh wren[1]		Yellow-breasted chat[1]		Black-chinned hummingbird[1]		Ash-throated flycatcher[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	0.0	0.0	716.2	461.6	53.7	53.9	0.0	0.0	17.9	18.2
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	22.2	15.5	1,241.5	1,050.3	103.5	72.2	22.2	15.5	14.8	10.3
12	Herbaceous	43.1	11.3	250.7	119.2	19.6	20.5	7.8	8.2	0.0	0.0
All	**Herbaceous**	66.8	21.4	2,317.1	1,191.9	186.6	109.9	33.3	22.9	33.0	20.7
4+5	Unsuitable	635.9	77.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Unsuitable	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	815.6	142.8	0.0	0.0	362.5	249.1	60.4	62.4	513.5	129.7
8	Unsuitable	1,559.3	190.5	0.0	0.0	0.0	0.0	1,134.0	138.6	0.0	0.0
10	Unsuitable	0.0	0.0	1,251.3	845.9	48.8	51.6	0.0	0.0	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	700.9	696.7	0.0	0.0	182.8	181.7	182.8	181.7	91.4	90.9
All	**Unsuitable**	3,728.9	846.5	1,244.6	748.2	546.1	286.1	1,306.8	251.3	533.8	139.1
Total	**All**	**9,824.3**	**1,695.3**	**6,105.2**	**1,775.1**	**6,833.9**	**1,741.4**	**3,395.8**	**705.8**	**2,876.7**	**523.1**

[1] Scientific names of the species are listed in attachment 3.

Table 5-10.—Estimated number of territories with SE in 2012; LCR MSCP covered focal species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2012.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
‘Ahakhav Tribal Preserve CRIT 9	Tall woody	0.0	0.0	0.0	0.0	1.0	0.1	3.2	0.5
‘Ahakhav Tribal Preserve CRIT 9	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.3
‘Ahakhav Tribal Preserve CRIT 9	**All habitats**	0.0	0.0	0.0	0.0	1.0	0.1	5.1	0.8
Beal Lake Conservation Area	Tall woody	12.4	2.4	19.5	3.6	1.3	0.8	0.0	0.0
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	12.4	2.4	19.5	3.6	1.3	0.8	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	3.9	0.6	1.3	0.2	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	3.9	0.6	1.3	0.2	0.0	0.0	0.0	0.0

Table 5-10.—Estimated number of territories with SE in 2012; LCR MSCP covered focal species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2012.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	3.9	0.6	0.0	0.0	1.9	0.3	0.0	0.0
Cibola Valley Conservation Area	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	3.9	0.6	0.0	0.0	1.9	0.3	0.0	0.0
Palo Verde Ecological Reserve	Tall woody	5.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	**All habitats**	5.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Habitat total	Tall woody	29.6	5.5	28.4	6.5	4.6	1.4	3.1	0.5
Habitat total	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.3
Total	**All**	**30.3**	**5.7**	**29.1**	**6.8**	**4.7**	**1.5**	**5.1**	**0.8**

[1] Scientific names of the species are listed in attachment 3.

Table 5-11.—Estimated number of territories with SE in 2012; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the first 5 of the 10 most abundant territorial species breeding these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2012.)

		Abert's towhee[1]		Blue grosbeak[1]		Common yellowthroat[1]		Western kingbird[1]		Song sparrow[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Tall woody	8.4	1.3	0.0	0.0	0.0	0.0	2.3	0.3	0.0	0.0
'Ahakhav Tribal Preserve CRIT 9	Low woody	1.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	10.3	1.6	0.0	0.0	0.0	0.0	2.3	0.3	0.0	0.0
Beal Lake Conservation Area	Tall woody	17.7	3.5	0.0	0.0	12.8	2.4	0.0	0.0	0.0	0.0
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	17.7	3.5	0.0	0.0	12.8	2.4	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	43.1	6.5	16.4	2.5	13.8	2.1	24.8	3.7	16.4	2.5
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	6.4	1.0	11.9	1.8	0.0	0.0	1.9	0.3	1.6	0.2
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	49.5	7.5	28.3	4.3	13.8	2.1	26.7	4.0	18.0	2.7

Table 5-11.—Estimated number of territories with SE in 2012; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the first 5 of the 10 most abundant territorial species breeding these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2012.)

		Abert's towhee[1]		Blue grosbeak[1]		Common yellowthroat[1]		Western kingbird[1]		Song sparrow[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	41.5	6.3	19.6	3.0	1.6	0.2	28.3	4.3	5.1	0.8
Cibola Valley Conservation Area	Low woody	37.3	5.6	16.7	2.5	6.8	1.0	1.9	0.3	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	78.8	11.9	36.4	5.5	8.4	1.3	30.2	4.6	5.1	0.8
Palo Verde Ecological Reserve	Tall woody	32.2	4.8	58.9	8.9	47.0	7.1	29.9	4.5	45.0	6.8
Palo Verde Ecological Reserve	Low woody	10.1	3.1	16.5	3.3	41.0	8.0	5.5	1.4	5.9	2.6
Palo Verde Ecological Reserve	**All habitats**	42.6	7.1	75.9	11.7	87.6	14.2	35.8	5.6	51.6	8.4
Habitat total	Tall woody	144.8	22.1	91.1	13.8	77.8	11.8	81.8	12.4	63.9	9.7
Habitat total	Low woody	56.4	9.1	45.2	7.1	46.6	9.0	9.3	1.8	7.4	2.5
Total	**All**	**202.4**	**31.0**	**136.6**	**20.7**	**124.5**	**19.6**	**92.6**	**14.0**	**72.5**	**11.2**

[1] Scientific names of the species are listed in attachment 3.

Table 5-12.—Estimated number of territories with SE in 2012; second 5 of the 10 most abundant territorial species; conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2012.)

		Bullock's oriole[1]		Verdin[1]		Black-tailed gnatcatcher[1]		Anna's hummingbird[1]		Black-chinned hummingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Tall woody	5.5	0.8	4.5	0.7	1.3	0.2	13.2	2.0	0.6	0.1
'Ahakhav Tribal Preserve CRIT 9	Low woody	0.6	0.1	1.6	0.2	0.6	0.1	0.6	0.1	0.0	0.0
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	6.1	0.9	6.1	0.9	1.9	0.3	13.8	2.1	0.6	0.1
Beal Lake Conservation Area	Tall woody	2.7	1.7	5.3	3.4	13.7	4.6	7.1	1.2	0.0	0.0
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	2.7	1.7	5.3	3.4	13.7	4.6	7.1	1.2	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	17.1	2.6	15.4	2.3	6.1	0.9	8.7	1.3	3.2	0.5
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	0.0	0.0	1.3	0.2	0.0	0.0	0.6	0.1	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	17.1	2.6	16.7	2.5	6.1	0.9	9.3	1.4	3.2	0.5

Table 5-12.—Estimated number of territories with SE in 2012; second 5 of the 10 most abundant territorial species; conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2012.)

		Bullock's oriole[1]		Verdin[1]		Black-tailed gnatcatcher[1]		Anna's hummingbird[1]		Black-chinned hummingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	13.8	2.1	3.5	0.5	3.2	0.5	2.6	0.4	10.9	1.6
Cibola Valley Conservation Area	Low woody	1.6	0.2	8.4	1.3	14.8	2.2	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	15.4	2.3	11.9	1.8	18.0	2.7	2.6	0.4	10.9	1.6
Palo Verde Ecological Reserve	Tall woody	13.5	2.0	1.3	0.2	1.3	0.2	1.3	0.2	11.9	1.8
Palo Verde Ecological Reserve	Low woody	2.1	0.9	0.0	0.0	3.4	1.7	0.0	0.0	1.7	0.7
Palo Verde Ecological Reserve	**All habitats**	15.8	2.6	1.3	0.2	4.6	1.7	1.3	0.2	13.8	2.2
Habitat total	Tall woody	51.6	8.0	31.2	6.8	30.6	8.4	34.6	5.2	25.6	3.9
Habitat total	Low woody	4.3	1.0	11.5	1.8	19.0	3.4	1.3	0.2	1.6	0.6
Total	**All**	**56.9**	**8.9**	**42.9**	**8.2**	**49.6**	**10.5**	**36.6**	**5.5**	**27.8**	**4.3**

[1] Scientific names of the species are listed in attachment 3.

2013 POPULATION SIZE ESTIMATES

Table 5-13.—Estimated number of territories with SE in 2013; LCR MSCP covered focal species, system-wide
(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2013.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	152.5	56.6	65.5	17.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Tall woody	19.7	12.0	2.5	2.3	4.9	5.4	6.2	3.6	0.0	0.0	0.0	0.0
7	Tall woody	531.6	163.3	66.0	51.3	35.6	10.0	44.0	15.8	0.0	0.0	0.0	0.0
8	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
10	Tall woody	0.0	0.0	0.0	0.0	3.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
11	Tall woody	0.0	0.0	0.0	0.0	1.9	0.3	5.6	0.8	0.0	0.0	0.0	0.0
12	Tall woody	0.0	0.0	4.9	5.0	14.8	9.2	0.0	0.0	0.0	0.0	0.0	0.0
All	**Tall woody**	587.2	159.1	112.0	51.7	56.8	15.5	54.1	15.5	0.0	0.0	0.0	0.0
4+5	Low woody	0.0	0.0	0.0	0.0	53.3	54.1	0.0	0.0	0.0	0.0	0.0	0.0
6	Low woody	63.6	60.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Low woody	856.1	557.1	1,102.4	573.5	82.1	34.9	140.7	72.2	46.9	47.5	11.7	11.6
8	Low woody	0	0	0	0	0	0	0	0	0	0	0	0
10	Low woody	0	0	0	0	0	0	0	0	0	0	0	0
11	Low woody	0	0	0	0	79.4	83.8	0	0	0	0	0	0
12	Low woody	0	0	0	0	0	0	0	0	0	0	0	0
All	**Low woody**	906.2	542.7	1,073.4	553.2	200.0	96.0	137.0	70.9	45.7	46.1	11.4	11.5
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-13.—Estimated number of territories with SE in 2013; LCR MSCP covered focal species, system-wide

(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2013.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
6	Herbaceous	0.0	0.0	8.6	7.8	4.3	3.9	0.0	0.0	0.0	0.0	0.0	0.0
7	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	Herbaceous	0.0	0.0	0.0	0.0	6.2	1.6	0.0	0.0	0.0	0.0	0.0	0.0
All	**Herbaceous**	0.0	0.0	9.7	9.3	11.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
4+5	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Unsuitable	0.0	0.0	0.0	0.0	194.8	197.4	0.0	0.0	0.0	0.0	0.0	0.0
10	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	0.0	0.0	0.0	0.0	144.4	145.8	0.0	0.0	0.0	0.0	0.0	0.0
Total	**All**	**1,534.4**	**576.1**	**1,180.5**	**546.5**	**416.6**	**182.0**	**193.6**	**73.2**	**44.5**	**44.9**	**11.1**	**11.2**

[1] Scientific names of the species are listed in attachment 3.

Table 5-14.—Estimated number of territories with SE in 2013; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2013.)

		Common yellow-throat[1]		Song sparrow[1]		Black-tailed gnatcatcher[1]		Verdin[1]		Lucy's warbler[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	53.8	32.1	96.9	23.9	29.6	13.0	21.5	10.0	59.2	14.3
6	Tall woody	40.7	27.4	32.1	35.4	24.7	12.8	30.9	5.8	37.0	13.6
7	Tall woody	672.1	144.2	2,046.7	553.8	38.9	21.6	66.0	37.2	181.1	57.7
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	36.3	4.9	43.5	5.8	3.2	0.4	14.5	1.9	0.0	0.0
11	Tall woody	22.5	3.0	16.8	2.3	0.0	0.0	0.0	0.0	5.6	0.8
12	Tall woody	140.8	50.8	111.2	58.7	58.1	18.2	164.3	47.6	4.9	5.0
All	**Tall woody**	868.1	166.2	2,021.4	512.2	143.4	34.6	278.5	61.5	258.2	59.8
4+5	Low woody	266.3	253.2	492.6	339.6	1,198.2	311.3	692.3	326.9	2,556.2	528.5
6	Low woody	1,255.8	593.3	1,335.2	1,190.4	604.0	510.4	429.2	437.8	985.5	358.6
7	Low woody	1,196.2	347.5	3,236.8	724.3	375.3	135.7	539.5	202.0	1,524.6	347.1
8	Low woody	0.0	0.0	0.0	0.0	608.5	81.7	243.4	32.7	0.0	0.0
10	Low woody	821.3	777.5	547.6	466.9	612.0	427.6	306.0	236.7	209.4	151.0
11	Low woody	4,260.3	3,161.2	2,090.5	1,357.8	582.2	233.8	979.1	308.8	105.8	111.8
12	Low woody	861.4	115.6	459.4	61.7	172.3	23.1	689.1	92.5	0.0	0.0
All	**Low woody**	8,208.3	2,751.2	7,976.5	2,152.3	4,107.2	955.6	3,848.5	851.2	5,482.7	974.4

Table 5-14.—Estimated number of territories with SE in 2013; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2013.)

		Common yellow-throat[1]		Song sparrow[1]		Black-tailed gnatcatcher[1]		Verdin[1]		Lucy's warbler[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	522.0	113.1	138.0	65.9	69.0	53.2	86.3	32.4	90.6	27.6
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	--	-	-	-	-
11	Herbaceous	201.7	27.1	50.4	6.8	63.0	8.5	63.0	8.5	0.0	0.0
12	Herbaceous	172.8	77.8	29.3	21.9	23.1	11.6	57.1	19.2	0.0	0.0
All	**Herbaceous**	930.7	175.4	227.4	76.3	154.1	63.4	207.2	45.5	102.2	31.0
4+5	Unsuitable	806.2	541.8	681.1	427.1	945.2	267.9	597.7	164.7	111.2	53.1
6	Unsuitable	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	0.0	0.0	0.0	0.0	166.4	22.3	0.0	0.0	0.0	0.0
8	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	64.9	65.2	0.0	0.0
10	Unsuitable	0.0	0.0	0.0	0.0	495.2	302.7	297.1	269.3	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	371.1	49.8	185.6	24.9	0.0	0.0	417.5	56.0	0.0	0.0
All	**Unsuitable**	1,519.2	696.1	1,097.9	537.4	1,765.4	505.3	1,660.6	389.9	135.3	64.7
Total	**All**	**11,497.3**	**2,960.0**	**11,374.3**	**2,474.9**	**6,122.6**	**1,204.1**	**5,970.1**	**1,086.0**	**5,874.8**	**1,009.8**

[1] Scientific names of the species are listed in attachment 3.

Table 5-15.—Estimated number of territories with SE in 2013; second 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2013.)

		Yellow-breasted chat[1]		Abert's towhee[1]		Marsh wren[1]		Bewick's wren[1]		Lesser nighthawk[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	53.8	11.1	33.2	9.7	0.0	0.0	0.0	0.0	0.0	0.0
6	Tall woody	46.9	25.1	33.3	4.9	0.0	0.0	12.3	13.6	0.0	0.0
7	Tall woody	1,212.1	234.9	98.2	25.5	0.0	0.0	419.8	101.0	0.0	0.0
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	15.3	2.1	11.3	1.5	0.0	0.0	0.0	0.0	0.0	0.0
11	Tall woody	3.7	0.5	1.9	0.3	7.5	1.0	0.0	0.0	0.0	0.0
12	Tall woody	46.9	30.0	92.6	22.1	0.0	0.0	0.0	0.0	22.2	9.9
All	**Tall woody**	1,190.5	227.4	251.6	42.0	12.0	1.7	370.1	88.9	20.1	8.9
4+5	Low woody	53.3	54.1	732.3	137.1	0.0	0.0	0.0	0.0	79.9	54.3
6	Low woody	1,160.4	641.4	365.6	150.1	0.0	0.0	381.5	311.2	159.0	168.9
7	Low woody	2,075.8	731.5	375.3	136.6	0.0	0.0	1,372.1	487.7	0.0	0.0
8	Low woody	0.0	0.0	1,156.2	155.2	0.0	0.0	0.0	0.0	243.4	32.7
10	Low woody	161.0	160.4	676.4	252.8	3,671.9	3,784.4	0.0	0.0	322.1	222.3
11	Low woody	952.6	572.6	688.0	107.4	873.2	922.3	0.0	0.0	344.0	322.2
12	Low woody	0.0	0.0	229.7	30.8	0.0	0.0	0.0	0.0	402.0	54.0
All	**Low woody**	4,350.4	1,225.8	4,090.9	639.4	4,269.3	3,683.5	1,771.7	600.7	1,550.2	441.9

Table 5-15.—Estimated number of territories with SE in 2013; second 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2013.)

		Yellow-breasted chat[1]		Abert's towhee[1]		Marsh wren[1]		Bewick's wren[1]		Lesser nighthawk[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	86.3	19.9	43.1	9.4	163.9	96.3	8.6	7.8	0.0	0.0
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	163.9	22.0	37.8	5.1	252.1	33.8	0.0	0.0	25.2	3.4
12	Herbaceous	1.5	1.5	29.3	10.6	216.1	161.5	0.0	0.0	13.9	2.2
All	**Herbaceous**	237.2	37.3	109.7	20.0	612.1	190.9	9.7	9.3	35.1	5.7
4+5	Unsuitable	0.0	0.0	528.2	124.5	55.6	53.4	0.0	0.0	27.8	27.3
6	Unsuitable	-	-	-	-	-	-	-	-	-	-
7	Unsuitable	0.0	0.0	249.6	33.5	0.0	0.0	0.0	0.0	0.0	0.0
8	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Unsuitable	0.0	0.0	371.4	191.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	0.0	0.0	0.0	0.0	463.8	62.3	0.0	0.0	46.4	6.2
All	**Unsuitable**	0.0	0.0	1,216.3	289.9	740.5	115.2	0.0	0.0	101.1	35.7
Total	**All**	**5,811.7**	**1,320.0**	**5,620.2**	**851.6**	**5,577.7**	**3,621.5**	**2,147.2**	**613.9**	**1,673.0**	**439.0**

[1] Scientific names of the species are listed in attachment 3.

Table 5-16.—Estimated number of territories with SE in 2013; LCR MSCP covered focal species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP focal species breeding these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2013.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
‘Ahakhav Tribal Preserve CRIT 9	Tall woody	0.7	0.3	0.0	0.0	1.8	0.7	0.2	0.1
‘Ahakhav Tribal Preserve CRIT 9	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.4
‘Ahakhav Tribal Preserve CRIT 9	**All habitats**	0.7	0.3	0.0	0.0	1.8	0.7	1.2	0.4
Beal Lake Conservation Area	Tall woody	13.4	5.0	11.5	4.3	1.2	0.4	0.0	0.0
Beal Lake Conservation Area	Low	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	13.4	5.0	11.5	4.3	1.2	0.4	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	0.0	0.0	0.7	0.3	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	0.0	0.0	0.7	0.3	0.0	0.0	0.0	0.0

Table 5-16.—Estimated number of territories with SE in 2013; LCR MSCP covered focal species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP focal species breeding these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2013.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Tall woody	1.3	0.5	0.0	0.0	0.5	0.2	0.0	0.0
Palo Verde Ecological Reserve	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	**All habitats**	1.3	0.5	0.0	0.0	0.5	0.2	0.0	0.0
Habitat total	Tall woody	15.4	5.8	12.2	4.6	3.5	1.3	0.2	0.1
Habitat total	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.4
Total	**All**	**15.4**	**5.8**	**12.2**	**4.6**	**3.5**	**1.3**	**1.2**	**0.4**

[1] Scientific names of the species are listed in attachment 3.

Table 5-17.—Estimated number of territories with SE in 2013; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area for the first 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2013.)

		Common yellowthroat[1]		Abert's towhee[1]		Blue grosbeak[1]		Song sparrow[1]		Western kingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Tall woody	0.0	0.0	7.2	2.7	0.0	0.0	0.0	0.0	2.2	0.8
'Ahakhav Tribal Preserve CRIT 9	Low woody	0.0	0.0	1.0	0.4	0.0	0.0	0.0	0.0	1.3	0.5
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	0.0	0.0	8.2	3.1	0.0	0.0	0.0	0.0	3.5	1.3
Beal Lake Conservation Area	Tall woody	3.0	1.1	8.3	3.1	2.5	0.9	0.3	0.1	0.0	0.0
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	3.0	1.1	8.3	3.1	2.5	0.9	0.3	0.1	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	2.0	0.8	16.2	6.1	7.0	2.6	0.7	0.3	11.2	4.2
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	1.0	0.4	7.3	2.8	3.0	1.1	18.0	6.8	0.5	0.2
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	3.0	1.1	23.5	8.9	10.0	3.8	18.7	7.0	11.7	4.4

Table 5-17.—Estimated number of territories with SE in 2013; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area for the first 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2013.)

		Common yellowthroat[1]		Abert's towhee[1]		Blue grosbeak[1]		Song sparrow[1]		Western kingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	0.0	0.0	11.5	4.3	4.7	1.8	0.0	0.0	8.7	3.3
Cibola Valley Conservation Area	Low woody	0.0	0.0	13.2	5.0	3.3	1.3	0.0	0.0	1.0	0.4
Cibola Valley Conservation Area	**All habitats**	0.0	0.0	24.7	9.3	8.0	3.0	0.0	0.0	9.7	3.6
Palo Verde Ecological Reserve	Tall woody	16.0	6.0	10.9	4.1	14.9	5.6	13.7	5.2	4.7	1.8
Palo Verde Ecological Reserve	Low woody	68.3	25.7	2.3	0.9	10.2	3.8	7.7	2.9	1.3	0.5
Palo Verde Ecological Reserve	**All habitats**	84.3	31.7	13.2	5.0	25.0	9.4	21.4	8.0	6.0	2.3
Habitat total	Tall woody	21.0	7.9	54.1	20.3	29.1	10.9	14.7	5.5	26.7	10.0
Habitat total	Low woody	69.3	26.1	23.9	9.0	16.5	6.2	25.7	9.7	4.2	1.6
Total	**All**	**90.3**	**34.0**	**78.0**	**29.3**	**45.6**	**17.1**	**40.4**	**15.2**	**30.9**	**11.6**

[1] Scientific names of the species are listed in attachment 3.

Table 5-18.—Estimated number of territories with SE in 2013; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2013.)

		Black-tailed gnatcatcher[1]		Verdin[1]		Yellow-breasted chat[1]		Bullock's oriole[1]		Black-chinned hummingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Tall woody	1.2	0.4	2.5	0.9	0.0	0.0	1.5	0.6	0.2	0.1
'Ahakhav Tribal Preserve CRIT 9	Low woody	0.7	0.3	1.8	0.7	0.0	0.0	0.3	0.1	0.0	0.0
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	1.8	0.7	4.3	1.6	0.0	0.0	1.8	0.7	0.2	0.1
Beal Lake Conservation Area	Tall woody	12.4	4.6	8.0	3.0	17.2	6.5	4.2	1.6	1.7	0.6
Beal Lake Conservation Area	Low woody	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	**All habitats**	12.4	4.6	8.0	3.0	17.2	6.5	4.2	1.6	1.7	0.6
Cibola National Wildlife Refuge Unit #1 Conservation Area	Tall woody	1.5	0.6	5.8	2.2	1.3	0.5	5.0	1.9	3.2	1.2
Cibola National Wildlife Refuge Unit #1 Conservation Area	Low woody	0.0	0.0	1.3	0.5	6.7	2.5	1.0	0.4	0.7	0.3
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	1.5	0.6	7.2	2.7	8.0	3.0	6.0	2.3	3.8	1.4

Table 5-18.—Estimated number of territories with SE in 2013; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2013.)

		Black-tailed gnatcatcher[1]		Verdin[1]		Yellow-breasted chat[1]		Bullock's oriole[1]		Black-chinned hummingbird[1]	
Conservation area	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Tall woody	0.3	0.1	1.0	0.4	0.0	0.0	8.5	3.2	2.2	0.8
Cibola Valley Conservation Area	Low woody	12.5	4.7	7.7	2.9	0.0	0.0	0.3	0.1	0.3	0.1
Cibola Valley Conservation Area	**All habitats**	12.9	4.8	8.7	3.3	0.0	0.0	8.9	3.3	2.5	0.9
Palo Verde Ecological Reserve	Tall woody	0.0	0.0	0.0	0.0	1.2	0.4	3.8	1.4	7.5	2.8
Palo Verde Ecological Reserve	Low woody	0.0	0.0	0.2	0.1	0.0	0.0	0.8	0.3	1.0	0.4
Palo Verde Ecological Reserve	**All habitats**	0.0	0.0	0.2	0.1	1.2	0.4	4.7	1.8	8.5	3.2
Habitat total	Tall woody	15.4	5.8	17.4	6.5	19.7	7.4	23.0	8.7	14.7	5.5
Habitat total	Low woody	13.2	5.0	11.0	4.1	6.7	2.5	2.5	0.9	2.0	0.8
Total	**All**	**28.6**	**10.7**	**28.4**	**10.7**	**26.4**	**9.9**	**25.6**	**9.6**	**16.7**	**6.3**

[1] Scientific names of the species are listed in attachment 3.

2014 POPULATION SIZE ESTIMATES

Table 5-19.—Estimated number of territories with SE in 2014; LCR MSCP covered focal species, system-wide
(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2014.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	142.9	85.9	90.8	20.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Tall woody	126.6	85.9	0.0	0.0	20.5	8.5	9.1	7.8	0.0	0.0	0.0	0.0
7	Tall woody	671.0	211.9	147.6	52.1	42.2	13.8	43.9	12.9	0.0	0.0	1.8	1.8
8	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
10	Tall woody	0.0	0.0	0.0	0.0	3.6	3.2	1.8	1.6	0.0	0.0	0.0	0.0
11	Tall woody	42.2	47.5	0.0	0.0	8.4	3.8	0.0	0.0	0.0	0.0	0.0	0.0
12	Tall woody	0.0	0.0	56.4	56.0	22.5	15.2	0.0	0.0	0.0	0.0	0.0	0.0
All	**Tall woody**	978.5	302.2	268.0	89.8	102.3	29.6	56.9	18.1	0.0	0.0	1.7	1.8
4+5	Low woody	0.0	0.0	353.6	355.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Low woody	-	-	-	-	-	-	-	-	-	-	-	-
7	Low woody	1,941.4	1,767.2	283.1	61.3	202.2	46.7	242.7	143.6	0.0	0.0	0.0	0.0
8	Low woody	0.0	0.0	0.0	0.0	22.6	21.1	0.0	0.0	11.3	10.5	0.0	0.0
10	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	Low woody	0.0	0.0	91.0	101.1	22.7	21.6	0.0	0.0	0.0	0.0	0.0	0.0
12	Low woody	0.0	0.0	0.0	0.0	74.5	30.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Low woody**	2,470.9	2,489.2	855.1	447.8	385.3	103.0	308.9	211.8	14.2	14.4	0.0	0.0

Table 5-19.—Estimated number of territories with SE in 2014; LCR MSCP covered focal species, system-wide

(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2014.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	0.0	0.0	40.0	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
12	Herbaceous	0.0	0.0	0.0	0.0	2.4	2.5	0.0	0.0	0.0	0.0	0.0	0.0
All	**Herbaceous**	0	0.0	66.8	56.6	3.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0
4+5	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Unsuitable	0.0	0.0	0.0	0.0	77.1	16.6	0.0	0.0	0.0	0.0	0.0	0.0
8	Unsuitable	0.0	0.0	0.0	0.0	76.0	85.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Unsuitable	144.0	147.3	0.0	0.0	36.0	36.8	36.0	36.8	0.0	0.0	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	140.4	143.7	0.0	0.0	220.1	97.5	35.1	35.9	0.0	0.0	0.0	0.0
Total	**All**	**3,658.8**	**2,553.1**	**1,186.0**	**485.2**	**722.1**	**190.7**	**403.8**	**221.7**	**14.0**	**14.3**	**1.9**	**1.9**

[1] Scientific names of the species are listed in attachment 3.

Table 5-20.—Estimated number of territories with SE in 2014; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2014.)

		Common yellow-throat[1]		Song sparrow[1]		Lucy's warbler[1]		Black-tailed gnatcatcher[1]		Yellow-breasted chat[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	77.2	44.8	146.8	58.2	46.3	12.0	25.1	21.4	75.3	16.7
6	Tall woody	201.8	92.3	224.6	108.3	92.4	37.7	17.1	9.9	139.1	80.7
7	Tall woody	558.6	194.6	1,554.6	471.4	400.5	133.7	52.7	36.1	1,150.6	309.1
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	83.2	52.7	102.1	43.4	13.4	15.7	22.5	18.4	33.4	29.1
11	Tall woody	377.9	238.3	325.1	186.2	0.0	0.0	42.2	31.1	67.6	43.4
12	Tall woody	165.3	143.0	120.2	116.2	7.5	7.3	255.5	97.5	229.2	161.0
All	**Tall woody**	1,539.1	484.3	2,519.6	677.7	571.0	164.9	403.0	129.4	1,688.9	438.9
4+5	Low woody	0.0	0.0	0.0	0.0	5,060.5	2,329.4	2,607.6	753.0	243.1	244.6
6	Low woody	-	-	-	-	-	-	-	-	-	-
7	Low woody	3,720.9	3,387.0	6,633.0	6,037.8	3,963.6	2,521.6	647.1	421.8	3,154.7	2,402.7
8	Low woody	135.5	139.4	0.0	0.0	271.0	111.7	925.8	283.5	90.3	94.5
10	Low woody	322.5	203.0	37.9	38.8	512.2	314.1	1,574.7	524.2	19.0	19.4
11	Low woody	9,255.4	4,549.2	6,435.6	3,068.2	0.0	0.0	1,273.5	319.1	1,478.1	425.2
12	Low woody	372.4	262.1	297.9	201.8	397.2	404.7	794.4	434.9	0.0	0.0
All	**Low woody**	15,764.2	6,601.5	15,825.0	9,245.0	12,007.6	4,900.9	8,835.4	2,163.4	6,039.0	3,568.1

Table 5-20.—Estimated number of territories with SE in 2014; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2014.)

		Common yellow-throat[1]		Song sparrow[1]		Lucy's warbler[1]		Black-tailed gnatcatcher[1]		Yellow-breasted chat[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	1,326.1	340.2	852.9	378.3	293.2	112.8	119.9	43.3	393.2	178.4
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	-	-	-	-		-	-	-	-	-
12	Herbaceous	618.2	279.1	144.9	132.6	0.0	0.0	41.1	27.8	0.0	0.0
All	**Herbaceous**	3,110.9	845.2	1,634.8	658.5	489.8	172.0	259.9	89.1	656.8	306.8
4+5	Unsuitable	236.6	230.6	0.0	0.0	749.4	413.0	1,262.1	510.4	0.0	0.0
6	Unsuitable	1,299.2	278.9	853.2	183.2	19.4	4.2	0.0	0.0	135.7	29.1
7	Unsuitable	5,397.4	1,158.6	3,238.4	695.2	1,310.8	281.4	771.1	165.5	1,233.7	264.8
8	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	228.0	255.0	0.0	0.0
10	Unsuitable	2,376.4	1,992.9	810.1	623.9	0.0	0.0	0.0	0.0	288.1	212.9
11	Unsuitable	-	-	-	-	-	-	-	-	-	-
-	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	11,605.7	3,146.9	6,293.1	1,489.9	2,655.9	683.6	2,564.9	746.9	2,204.5	519.6
Total	**All**	**31,425.0**	**9,006.1**	**26,040.3**	**10,236.2**	**15,573.2**	**5,362.3**	**11,998.2**	**2,821.5**	**10,555.1**	**4,022.2**

[1] Scientific names of the species are listed in attachment 3.

Table 5-21.—Estimated number of territories with SE in 2014; second 5 of the 10 most abundant territorial species, system-wide

(Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2014.)

		Verdin[1]		Abert's towhee[1]		Marsh wren[1]		Bewick's wren[1]		Black-chinned hummingbird[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Tall woody	29.0	27.0	15.4	7.5	0.0	0.0	11.6	7.0	0.0	0.0
6	Tall woody	22.8	12.9	35.3	14.7	0.0	0.0	58.2	27.7	3.4	3.1
7	Tall woody	184.4	58.6	156.3	41.8	0.0	0.0	628.9	188.7	65.0	34.9
8	Tall woody	-	-	-	-	-	-	-	-	-	-
10	Tall woody	42.5	26.6	20.0	6.4	32.8	8.1	0.0	0.0	2.4	2.1
11	Tall woody	57.0	39.6	31.7	19.3	160.5	115.1	0.0	0.0	33.8	38.0
12	Tall woody	450.8	173.9	120.2	51.4	0.0	0.0	0,0	0.0	109.0	70.6
All	**Tall woody**	763.0	226.9	381.1	98.4	217.3	144.4	697.6	200.1	207.9	91.2
4+5	Low woody	88.4	69.5	1,127.0	370.3	0.0	0.0	0.0	0.0	22.1	22.7
6	Low woody	-	-	-	-	-	-	-	-	-	
7	Low woody	1,011.1	463.1	930.2	392.2	0.0	0.0	2,264.9	1,141.6	647.1	589.1
8	Low woody	892.0	278.1	666.1	207.8	0.0	0.0	0.0	0.0	338.7	171.4
10	Low woody	417.4	217.3	872.7	254.3	113.8	116.4	0.0	0.0	0.0	0.0
11	Low woody	1,409.9	424.7	363.8	126.0	1,205.2	865.8	0.0	0.0	295.6	244.7
12	Low woody	1,017.8	536.1	918.5	451.3	0.0	0.0	0.0	0.0	372.4	308.0
All	**Low woody**	5,532.2	1,508.4	5,566.2	1,418.2	1,444.8	1,076.0	2,882.7	1,718.0	1,970.9	997.0

Table 5-21.—Estimated number of territories with SE in 2014; second 5 of the 10 most abundant territorial species, system-wide

(Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2014.)

		Verdin[1]		Abert's towhee[1]		Marsh wren[1]		Bewick's wren[1]		Black-chinned hummingbird[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
4+5	Herbaceous	-	-	-	-	-	-	-	-	-	-
6	Herbaceous	80.0	35.8	93.3	26.9	746.3	423.5	0.0	0.0	33.3	18.3
7	Herbaceous	-	-	-	-	-	-	-	-	-	-
8	Herbaceous	-	-	-	-	-	-	-	-	-	-
10	Herbaceous	-	-	-	-	-	-	-	-	-	-
11	Herbaceous	-	-	-	-	-	-	-	-	-	-
12	Herbaceous	67.6	31.8	38.6	21.5	953.9	422.4	0.0	0.0	2.4	2.5
All	**Herbaceous**	231.5	79.6	211.8	62.2	2,628.8	946.5	0.0	0.0	59.2	32.8
4+5	Unsuitable	1,143.8	462.1	907.1	422.6	0.0	0.0	0.0	0.0	276.1	166.3
6	Unsuitable	0.0	0.0	19.4	4.2	0	0.0	19.4	4.2	77.6	16.7
7	Unsuitable	771.1	165.5	308.4	66.2	0.0	0.0	1,079.5	231.7	0.0	0.0
8	Unsuitable	0.0	0.0	228.0	255.0	0.0	0.0	0.0	0.0	911.9	1,020.1
10	Unsuitable	54.0	55.2	36.0	22.2	2,376.4	1,915.0	0.0	0.0	0.0	0.0
11	Unsuitable	-	-	-	-	-	-	-	-	-	-
12	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	2,285.5	624.0	1,598.9	570.6	2,316.0	1,868.3	1,592.5	346.9	1,208.0	946.5
Total	**All**	**8,821.4**	**2,159.2**	**7,714.9**	**1,889.1**	**5,914.2**	**2,585.5**	**5,254.1**	**1,953.4**	**3,461.9**	**1,499.7**

[1] Scientific names of the species are listed in attachment 3.

Table 5-22.—Estimated number of territories with SE in 2014; LCR MSCP covered focal species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2014.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
‘Ahakhav Tribal Preserve CRIT 9	Cottonwood-willow	0.0	0.0	0.0	0.0	2.4	0.5	2.4	0.5
‘Ahakhav Tribal Preserve CRIT 9	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.5
‘Ahakhav Tribal Preserve CRIT 9	Mixed	-	-	-	-	-	-	-	-
‘Ahakhav Tribal Preserve CRIT 9	**All habitats**	0.0	0.0	0.0	0.0	2.4	0.5	4.8	0.9
Beal Lake Conservation Area	Cottonwood-willow	10.4	2.0	15.6	3.1	2.8	0.6	0.0	0.0
Beal Lake Conservation Area	Mesquite	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	Mixed	1.6	0.3	5.2	1.0	0.0	0.0	0.0	0.0
Beal Lake Conservation Area	**All habitats**	12.0	2.4	20.8	4.1	2.8	0.6	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Cottonwood-willow	1.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mesquite	-	-	-	-	-	-	-	-
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mixed	0.0	0.0	8.1	3.2	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	1.8	0.7	8.0	3.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	Cottonwood-willow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	Mixed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 5-22.—Estimated number of territories with SE in 2014; LCR MSCP covered focal species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2014.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Palo Verde Ecological Reserve	Cottonwood-willow	9.2	2.5	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Mixed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	**All habitats**	9.2	2.5	0.0	0.0	0.0	0.0	0.0	0.0
Yuma East Wetlands	Cottonwood-willow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yuma East Wetlands	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yuma East Wetlands	Mixed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yuma East Wetlands	**All habitats**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Habitat total	CW	22.0	4.7	15.9	3.2	5.3	1.1	2.5	0.5
Habitat total	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.5
Habitat total	Mixed	1.6	0.3	13.1	3.7	0.0	0.0	0.0	0.0
Total	**All**	**23.5**	**5.0**	**29.2**	**6.3**	**5.3**	**1.0**	**4.9**	**1.0**

[1] Scientific names of the species are listed in attachment 3.
[2] Cottonwood-willow (*Populus fremontii-Salix* spp.) and mesquite (*Prosopis* spp.).

Table 5-23.—Estimated number of territories with SE in 2014; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for the first 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2014.)

		Abert's towhee[1]		Verdin[1]		Common yellow-throat[1]		Blue grosbeak[1]		Black-tailed gnatcatcher[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
'Ahakhav Tribal Preserve CRIT 9	Cottonwood-willow	12.4	2.4	8.4	1.7	0.0	0.0	5.6	1.1	1.6	0.3
'Ahakhav Tribal Preserve CRIT 9	Mesquite	1.6	0.3	3.2	0.6	0.0	0.0	0.8	0.2	0.0	0.0
'Ahakhav Tribal Preserve CRIT 9	Mixed	-	-	-	-	-	-	-	-	-	-
'Ahakhav Tribal Preserve CRIT 9	**All habitats**	14.0	2.8	11.6	2.3	0.0	0.0	6.4	1.3	1.6	0.3
Beal Lake Conservation Area	Cottonwood-willow	15.6	3.1	15.2	3.0	0.0	0.0	1.6	0.3	20.8	4.1
Beal Lake Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	Mixed	2.0	0.4	5.6	1.1	2.0	0.4	0.8	0.2	5.2	1.0
Beal Lake Conservation Area	**All habitats**	17.6	3.5	20.8	4.1	2.0	0.4	2.4	0.5	26.0	5.1
Cibola National Wildlife Refuge Unit #1 Conservation Area	Cottonwood-willow	30.2	6.5	15.3	4.3	0.9	0.4	23.0	4.7	3.2	1.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mixed	27.3	7.0	41.9	11.0	5.6	2.6	13.6	2.8	11.6	3.7
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	57.3	12.3	56.7	13.3	6.4	2.7	36.6	7.4	14.6	4.2
Cibola Valley Conservation Area	Cottonwood-willow	29.3	5.9	13.7	3.4	0.0	0.0	24.7	5.9	4.6	1.7
Cibola Valley Conservation Area	Mesquite	53.6	10.7	60.9	12.4	0.0	0.0	13.5	3.1	56.3	11.3
Cibola Valley Conservation Area	Mixed	6.4	1.3	6.0	1.2	0.0	0.0	3.6	0.7	2.4	0.5
Cibola Valley Conservation Area	**All habitats**	89.3	17.7	80.6	16.3	0/0	0.0	41.8	9.0	63.3	12.8

Table 5-23.—Estimated number of territories with SE in 2014; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for the first 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2014.)

		Abert's towhee[1]		Verdin[1]		Common yellow-throat[1]		Blue grosbeak[1]		Black-tailed gnatcatcher[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Palo Verde Ecological Reserve	Cottonwood-willow	52.9	11.2	10.1	2.8	108.1	24.5	68.5	14.5	0.0	0.0
Palo Verde Ecological Reserve	Mesquite	8.8	1.7	4.0	0.8	28.0	5.5	8.8	1.7	3.2	0.6
Palo Verde Ecological Reserve	Mixed	29.5	6.4	0.0	0.0	103.5	21.5	44.6	9.4	4.8	1.4
Palo Verde Ecological Reserve	**All habitats**	91.1	18.6	14.1	3.4	239.5	49.2	122.0	24.8	7.9	1.9
Yuma East Wetlands	Cottonwood-willow	12.3	4.4	30.6	14.7	6.4	5.3	11.8	4.0	9.1	5.2
Yuma East Wetlands	Mesquite	9.2	1.8	34.0	6.7	0.8	0.2	0.0	0.0	10.4	2.0
Yuma East Wetlands	Mixed	20.4	4.0	50.4	9.9	2.0	0.4	2.0	0.4	8.0	1.6
Yuma East Wetlands	**All habitats**	41.8	9.3	114.2	27.6	9.6	5.1	14.6	3.4	27.5	7.5
Habitat total	CW	157.9	31.8	99.1	22.0	120.4	27.6	140.3	28.5	41.1	9.1
Habitat total	Mesquite	73.1	14.5	102.2	20.3	29.3	5.8	23.2	4.8	69.7	13.9
Habitat total	Mixed	85.2	17.5	102.8	21.3	113.9	23.7	64.8	13.2	31.7	7.0
Total	**All**	**316.5**	**62.9**	**305.2**	**61.5**	**264.8**	**54.6**	**228.4**	**45.6**	**142.7**	**28.8**

[1] Scientific names of the species are listed in attachment 3.
[2] Cottonwood-willow (*Populus fremontii-Salix* spp.) and mesquite (*Prosopis* spp.).

Table 5-24.—Estimated number of territories with SE in 2014; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2014.)

		Song sparrow[1]		Western kingbird[1]		Black-chinned hummingbird[1]		Bullock's oriole[1]		Anna's hummingbird[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
‘Ahakhav Tribal Preserve CRIT 9	Cottonwood-willow	0.0	0.0	7.6	1.5	9.6	1.9	7.2	1.4	8.8	1.7
‘Ahakhav Tribal Preserve CRIT 9	Mesquite	0.0	0.0	2.0	0.4	0.0	0.0	1.6	0.3	0.0	0.0
‘Ahakhav Tribal Preserve CRIT 9	Mixed	-	-	-	-	-	-	-	-	-	-
‘Ahakhav Tribal Preserve CRIT 9	**All habitats**	0.0	0.0	9.6	1.9	9.6	1.9	8.8	1.7	8.8	1.7
Beal Lake Conservation Area	Cottonwood-willow	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.5	0.0	0.0
Beal Lake Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	Mixed	7.6	1.5	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0
Beal Lake Conservation Area	**All habitats**	7.6	1.5	0.0	0.0	0.4	0.1	2.4	0.5	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Cottonwood-willow	21.6	6.9	17.6	4.1	4.1	1.1	11.3	2.7	0.9	0.4
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mixed	26.2	8.0	13.6	4.1	6.1	2.2	9.6	2.6	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	47.7	12.5	31.1	7.2	10.1	2.7	20.8	4.7	0.9	0.4

Table 5-24.—Estimated number of territories with SE in 2014; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2014.)

		Song sparrow[1]		Western kingbird[1]		Black-chinned hummingbird[1]		Bullock's oriole[1]		Anna's hummingbird[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Cibola Valley Conservation Area	Cottonwood-willow	0.0	0.0	29.3	6.7	14.6	3.6	18.3	4.0	0.0	0.0
Cibola Valley Conservation Area	Mesquite	0.0	0.0	5.4	1.3	2.3	0.6	2.3	0.6	0.0	0.0
Cibola Valley Conservation Area	Mixed	0.0	0.0	8.0	1.6	1.6	0.3	2.4	0.5	0.8	0.2
Cibola Valley Conservation Area	**All habitats**	0.0	0.0	42.7	9.1	18.5	4.2	22.9	4.8	0.8	0.2
Palo Verde Ecological Reserve	Cottonwood-willow	16.6	5.2	17.0	4.3	29.4	6.5	25.8	5.7	3.7	1.6
Palo Verde Ecological Reserve	Mesquite	8.0	1.6	1.6	0.3	6.4	1.3	0.8	0.2	0.0	0.0
Palo Verde Ecological Reserve	Mixed	29.0	6.9	3.9	0.9	4.8	1.2	13.4	3.0	0.0	0.0
Palo Verde Ecological Reserve	**All habitats**	53.5	11.9	22.5	5.2	40.5	8.5	40.0	8.4	3.7	1.6
Yuma East Wetlands	Cottonwood-willow	0.0	0.0	0.0	0.0	13.9	7.4	0.0	0.0	23.6	5.8
Yuma East Wetlands	Mesquite	3.2	0.6	0.0	0.0	1.6	0.3	0.0	0.0	12.4	2.4
Yuma East Wetlands	Mixed	13.2	2.6	1.6	0.3	4.0	0.8	0.0	0.0	18.4	3.6
Yuma East Wetlands	**All habitats**	**15.8**	**3.4**	**1.5**	**0.3**	**20.4**	**6.9**	**0.0**	**0.0**	**55.1**	**11.1**
Habitat total	CW	39.6	10.6	72.7	15.2	75.0	16.2	66.4	13.6	40.7	8.3
Habitat total	Mesquite	11.4	2.2	9.0	1.9	10.4	2.1	4.7	1.0	12.6	2.5
Habitat total	Mixed	75.8	16.7	26.9	6.0	16.7	3.8	25.4	5.5	19.1	3.8
Total	**All**	**128.0**	**27.4**	**108.6**	**22.1**	**101.8**	**21.1**	**96.4**	**19.4**	**72.4**	**14.4**

[1] Scientific names of the species are listed in attachment 3.
[2] Cottonwood-willow (*Populus-fremontii-Salix* spp.) and mesquite (*Prosopis* spp.).

2015 POPULATION SIZE ESTIMATES

Table 5-25.—Estimated number of territories with SE in 2015; LCR MSCP covered focal species, system-wide

(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2015.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
5.0	Tall woody	197.7	35.1	90.1	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	Tall woody	7.3	9.3	43.9	31.6	1.8	2.1	0.0	0.0	0.0	0.0	0.0	0.0
7.0	Tall woody	458.2	173.3	69.5	23.5	64.8	16.1	25.3	6.6	0.0	0.0	0.0	0.0
8.0	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
10.0	Tall woody	-	-	-	-	-	-	-	-	-	-	-	-
11.0	Tall woody	6.1	6.6	0.0	0.0	8.8	3.1	5.3	2.5	0.0	0.0	0.0	0.0
12.0	Tall woody	0.0	0.0	5.0	5.2	16.7	9.5	6.7	7.0	0.0	0.0	0.0	0.0
All	**Tall woody**	748.6	211.0	245.7	62.2	94.6	23.2	38.3	11.5	0.0	0.0	0.0	0.0
5.0	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	47.6	46.0	0.0	0.0	0.0	0.0
7.0	Low woody	695.1	456.1	753.0	289.7	289.6	71.0	101.4	48.1	0.0	0.0	57.9	58.4
8.0	Low woody	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	Low woody	0.0	0.0	0.0	0.0	163.9	99.4	0.0	0.0	0.0	0.0	0.0	0.0
11.0	Low woody	0.0	0.0	14.2	14.3	85.2	43.2	0.0	0.0	0.0	0.0	0.0	0.0
12.0	Low woody	0.0	0.0	0.0	0.0	79.4	39.3	0.0	0.0	0.0	0.0	0.0	0.0
All	**Low woody**	760.5	486.8	836.7	304.2	644.4	165.9	152.9	68.7	0.0	0.0	63.4	64.3

Table 5-25.—Estimated number of territories with SE in 2015; LCR MSCP covered focal species, system-wide

(Population estimates are reported by region-habitat stratum combinations for six LCR MSCP covered focal species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2015.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Gila woodpecker[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gilded flicker[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
5.0	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
6.0	Herbaceous	16.7	17.6	43.5	45.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.0	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
8.0	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
10.0	Herbaceous	-	-	-	-	-	-	-	-	-	-	-	-
11.0	Herbaceous	5.9	5.4	0.0	0.0	2.9	3.1	5.9	5.4	0.0	0.0	0.0	0.0
12.0	Herbaceous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Herbaceous**	22.3	17.9	42.4	43.8	3.0	3.1	5.9	5.8	0.0	0.0	0.0	0.0
5.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
7.0	Unsuitable	-	-	-	-	-	-	-	-	-	-	-	-
8.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**All**	**1,720.9**	**629.3**	**1,263.4**	**379.6**	**828.8**	**199.4**	**221.1**	**81.6**	**0.0**	**0.0**	**70.6**	**71.7**

[1] Scientific names of the species are listed in attachment 3.

Table 5-26.—Estimated number of territories with SE in 2015; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2015.)

		Common yellowthroat[1]		Song sparrow[1]		Lucy's warbler[1]		Black-tailed gnatcatcher[1]		Yellow-breasted chat[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
5.0	Tall woody	103.8	18.4	52.9	9.4	45.0	8.0	35.2	6.3	78.3	13.9
6.0	Tall woody	71.4	90.3	51.3	64.8	64.1	26.9	98.9	45.5	38.4	34.5
7.0	Tall woody	526.1	162.9	1431.4	351.4	530.8	115.4	17.4	8.2	954.3	235.9
8.0	Tall woody	-	-	-	-	-	-	-	-	-	-
10.0	Tall woody	-	-	-	-	-	-	-	-	-	-
11.0	Tall woody	171.7	94.1	106.0	65.1	3.5	3.8	31.5	11.3	51.7	32.9
12.0	Tall woody	123.6	77.6	85.2	60.9	6.7	6.8	150.3	65.8	51.8	36.5
All	**Tall woody**	1,070.3	289.1	1,800.2	444.7	688.6	146.6	357.5	103.3	1,236.2	296.2
5.0	Low woody	1,919.0	1,759.6	648.7	636.7	5,513.7	2,561.5	2,756.9	715.9	351.4	220.8
6.0	Low woody	2,568.3	1,077.4	1,712.2	704.3	1,783.6	673.0	642.1	172.1	1,165.3	526.6
7.0	Low woody	1,679.8	882.0	2,461.7	1,330.7	1,636.3	562.3	521.3	166.6	1,636.3	1,046.5
8.0	Low woody	840.8	465.8	145.0	94.7	347.9	233.4	1,072.7	231.4	174.0	105.3
10.0	Low woody	1,857.0	1,981.7	436.9	466.3	1,147.0	1,136.6	2,621.7	909.0	1,802.4	1,539.3
11.0	Low woody	4,813.8	1,493.9	4,501.4	2,642.4	610.6	615.5	738.4	251.6	1,320.6	688.3
12.0	Low woody	510.7	236.1	794.4	518.1	102.1	97.7	646.9	211.3	181.6	120.3
All	**Low woody**	13,622.4	4013.7	10,390.9	3,390.7	11,290.6	3,476.5	8,992.2	1,898.9	6,515.7	2,292.4

Table 5-26.—Estimated number of territories with SE in 2015; first 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the first 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2015.)

		Common yellowthroat[1]		Song sparrow[1]		Lucy's warbler[1]		Black-tailed gnatcatcher[1]		Yellow-breasted chat[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
5.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
6.0	Herbaceous	1,164.3	260.9	588.8	244.0	100.4	69.8	30.1	31.7	113.8	70.9
7.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
8.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
10.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
11.0	Herbaceous	591.3	142.6	225.4	110.8	0.0	0.0	84.9	45.2	64.4	43.3
12.0	Herbaceous	54.1	9.6	39.4	7.0	0.0	0.0	0.0	0.0	0.0	0.0
All	**Herbaceous**	1,791.9	367.8	844.0	286.1	97.9	67.8	115.5	55.1	176.3	85.7
5.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	Unsuitable	-	-	-	-	-	-	-	-	-	-
7.0	Unsuitable	-	-	-	-	-	-	-	-	-	-
8.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	208.6	218.4	0.0	0.0
11.0	Unsuitable	88.3	15.7	255.1	45.3	127.6	22.7	39.3	7.0	39.3	7.0
12.0	Unsuitable	0.0	0.0	0.0	0.0	0.0	0.0	48.3	51.0	0.0	0.0
All	**Unsuitable**	98.8	17.8	285.3	51.3	142.6	25.7	439.4	357.0	43.9	7.9
Total	**All**	**1,8730.5**	**4,891.7**	**14,913.8**	**4,156.1**	**13,604.1**	**3,980.6**	**10,936.6**	**2,290.3**	**8,916.8**	**2,711.9**

[1] Scientific names of the species are listed in attachment 3.

Table 5-27.—Estimated number of territories with SE in 2015; second 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2015.)

		Abert's towhee[1]		Verdin[1]		Horned lark[1]		Marsh wren[1]		Phainopepla[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
5.0	Tall woody	31.3	5.6	21.5	3.8	0.0	0.0	0.0	0.0	0.0	0.0
6.0	Tall woody	38.4	15.1	47.6	22.5	0.0	0.0	0.0	0.0	1.8	2.3
7.0	Tall woody	126.4	31.7	105.9	28.6	0.0	0.0	0.0	0.0	9.5	9.8
8.0	Tall woody	-	-	-	-	-	-	-	-	-	-
10.0	Tall woody	-	-	-	-	-	-	-	-	-	-
11.0	Tall woody	37.7	15.4	6.1	4.9	0.0	0.0	3.5	3.8	0.0	0.0
12.0	Tall woody	126.9	42.4	152.0	55.7	43.4	24.0	0.0	0.0	0.0	0.0
All	**Tall woody**	379.9	82.1	345.4	84.9	42.0	22.9	3.9	4.0	11.8	10.4
5.0	Low woody	1,729.8	517.2	1,027.1	423.5	0.0	0.0	0.0	0.0	0.0	0.0
6.0	Low woody	737.2	196.1	237.8	129.1	0.0	0.0	0.0	0.0	0.0	0.0
7.0	Low woody	622.7	197.4	448.9	147.0	0.0	0.0	57.9	58.4	115.8	96.2
8.0	Low woody	739.3	196.2	405.9	254.6	0.0	0.0	58.0	59.4	174.0	173.6
10.0	Low woody	1,420.1	264.3	1,474.7	1,167.4	0.0	0.0	1,310.8	1,398.9	2,512.4	2,489.8
11.0	Low woody	667.4	323.2	326.6	135.9	0.0	0.0	624.8	650.8	0.0	0.0
12.0	Low woody	374.5	93.5	136.2	95.6	0.0	0.0	0.0	0.0	0.0	0.0
All	**Low woody**	6,246.9	1,259.8	4,052.7	1,436.4	0.0	0.0	1,970.2	1,476.8	2,761.9	2,517.8

Table 5-27.—Estimated number of territories with SE in 2015; second 5 of the 10 most abundant territorial species, system-wide (Population estimates are reported by region-habitat stratum combinations for the second 5 of the 10 most abundant territorial species breeding in system-wide areas. Regions 4 and 5 are combined because of changes in the 2010 plots layer. Dashes indicate that no plots were surveyed in that region-habitat stratum combination during 2015.)

		Abert's towhee[1]		Verdin[1]		Horned lark[1]		Marsh wren[1]		Phainopepla[1]	
Region	**Habitat**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
5.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
6.0	Herbaceous	46.8	36.9	43.5	27.1	0.0	0.0	501.9	230.9	0.0	0.0
7.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
8.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
10.0	Herbaceous	-	-	-	-	-	-	-	-	-	-
11.0	Herbaceous	41.0	15.3	5.9	6.2	0.0	0.0	1,027.4	299.0	2.9	3.1
12.0	Herbaceous	24.6	4.4	0.0	0.0	0.0	0.0	305.2	54.2	0.0	0.0
All	**Herbaceous**	112.9	42.3	48.4	28.4	0.0	0.0	1,850.1	479.5	3.0	3.1
5.0	Unsuitable	0.0	0.0	0.0	0.0	2,578.1	458.2	0.0	0.0	0.0	0.0
6.0	Unsuitable	-	-	-	-	-	-	-	-	-	-
7.0	Unsuitable	-	-	-	-	-	-	-	-	-	-
8.0	Unsuitable	59.0	55.7	88.5	83.6	1,651.8	981.9	0.0	0.0	0.0	0.0
10.0	Unsuitable	208.6	47.6	0.0	0.0	463.6	113.5	0.0	0.0	0.0	0.0
11.0	Unsuitable	39.3	7.0	39.3	7.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	Unsuitable	48.3	51.0	48.3	51.0	48.3	51.0	0.0	0.0	0.0	0.0
All	**Unsuitable**	517.7	134.1	215.9	131.4	5,971.6	1,631.5	0.0	0.0	0.0	0.0
Total	**All**	**7,963.3**	**1,572.9**	**5,147.2**	**1,670.7**	**4,996.7**	**1,320.9**	**4,529.7**	**1,858.4**	**3,095.7**	**2,814.3**

[1] Scientific names of the species are listed in attachment 3.

Table 5-28.—Estimated number of territories with SE in 2015; LCR MSCP covered focal species, conservation areas and CRIT 9
(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2015.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gila woodpecker[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
CRIT 09 'Ahakhav Preserve	Cottonwood-willow	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.6	0.4	0.3
CRIT 09 'Ahakhav Preserve	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	3.9	1.3	0.0	0.0
CRIT 09 'Ahakhav Preserve	Mixed	-	-	-	-	-	-	-	-	-	-
CRIT 09 'Ahakhav Preserve	**All habitats**	0.0	0.0	0.0	0.0	0.0	0.0	5.9	2.0	0.4	0.3
Beal Lake Conservation Area	Cottonwood-willow	21.9	7.0	16.5	5.3	6.5	2.1	0.0	0.0	0.0	0.0
Beal Lake Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	Mixed	0.3	0.1	6.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0
Beal Lake Conservation Area	**All habitats**	22.9	7.3	23.1	7.4	6.7	2.1	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Cottonwood-willow	3.9	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mixed	0.0	0.0	7.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	3.5	1.8	10.2	4.7	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	Cottonwood-willow	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	Mixed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0

Table 5-28.—Estimated number of territories with SE in 2015; LCR MSCP covered focal species, conservation areas and CRIT 9

(Population estimates are reported by habitat stratum and conservation area and CRIT 9 for six LCR MSCP covered focal species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2015.)

		Sonoran yellow warbler[1]		Arizona Bell's vireo[1]		Summer tanager[1]		Vermilion flycatcher[1]		Gila woodpecker[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Hunters Hole Conservation Area	Cottonwood-willow	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hunters Hole Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Hunters Hole Conservation Area	Mixed	-	-	-	-	-	-	-	-	-	-
Hunters Hole Conservation Area	**All habitats**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Cottonwood-willow	6.4	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2
Palo Verde Ecological Reserve	Mesquite	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Mixed	3.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	**All habitats**	10.1	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2
Yuma East Wetlands	Cottonwood-willow	1.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yuma East Wetlands	Mesquite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1
Yuma East Wetlands	Mixed	0.0	0.0	0.0	0.0	1.3	0.6	0.0	0.0	0.0	0.0
Yuma East Wetlands	**All habitats**	1.2	0.9	0.0	0.0	1.2	0.7	0.0	0.0	0.3	0.1
Habitat total	Cottonwood-willow	37.7	12.5	20.0	6.4	8.2	2.7	2.0	0.7	0.8	0.4
Habitat total	Mesquite	0.6	0.2	0.0	0.0	0.0	0.0	4.0	1.3	0.3	0.1
Habitat total	Mixed	3.4	1.9	14.0	5.1	1.3	0.8	0.0	0.0	0.0	0.0
Total	**All**	**41.0**	**13.6**	**34.0**	**11.2**	**9.4**	**3.1**	**6.1**	**2.0**	**1.1**	**0.4**

[1] Scientific names of the species are listed in attachment 3.

[2] Cottonwood-willow (*Populus fremontii-Salix* spp.) and mesquite (*Populus* spp.).

Table 5-29.—Estimated number of territories with SE in 2015; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for the first 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2015.)

		Blue grosbeak[1]		Abert's towhee[1]		Common yellowthroat[1]		Verdin[1]		Black-tailed gnatcatcher[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
CRIT 09 'Ahakhav Preserve	Cottonwood-willow	2.3	1.3	17.2	6.1	0.0	0.0	13.4	4.4	7.3	2.3
CRIT 09 'Ahakhav Preserve	Mesquite	2.0	0.6	1.4	0.4	0.0	0.0	2.0	0.6	2.5	0.8
CRIT 09 'Ahakhav Preserve	Mixed	-	-	-	-	-	-	-	-	-	-
CRIT 09 'Ahakhav Preserve	**All habitats**	4.3	1.7	18.6	6.5	0.0	0.0	15.4	5.0	9.8	3.2
Beal Lake Conservation Area	Cottonwood-willow	0.5	0.2	9.0	2.9	0.0	0.0	4.5	1.4	11.0	3.5
Beal Lake Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	Mixed	0.8	0.3	3.4	1.1	0.8	0.3	4.8	1.5	9.8	3.1
Beal Lake Conservation Area	**All habitats**	1.3	0.4	12.3	3.9	0.8	0.2	9.0	2.9	20.3	6.5
Cibola National Wildlife Refuge Unit #1 Conservation Area	Cottonwood-willow	49.2	16.1	35.9	13.1	24.9	10.0	11.1	4.8	1.1	0.6
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mixed	22.8	7.5	21.0	6.9	4.7	2.3	19.6	7.1	1.4	0.8
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	76.2	24.7	61.8	20.7	29.0	11.0	37.4	13.1	3.0	1.4
Cibola Valley Conservation Area	Cottonwood-willow	23.7	7.8	21.3	7.1	1.4	0.8	10.7	3.8	0.0	0.0
Cibola Valley Conservation Area	Mesquite	18.7	6.5	47.3	15.5	0.0	0.0	40.9	13.7	57.2	19.1
Cibola Valley Conservation Area	Mixed	3.6	1.2	5.9	1.9	0.0	0.0	3.9	1.3	1.7	0.5
Cibola Valley Conservation Area	**All habitats**	46.3	15.1	74.1	24.0	1.4	0.8	54.9	18.1	57.7	19.2

Table 5-29.—Estimated number of territories with SE in 2015; first 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for the first 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2015.)

		Blue grosbeak[1]		Abert's towhee[1]		Common yellowthroat[1]		Verdin[1]		Black-tailed gnatcatcher[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Hunters Hole	Cottonwood-willow	1.1	0.4	2.0	0.6	1.1	0.4	4.5	1.4	0.0	0.0
Hunters Hole	Mesquite	-	-	-	-	-	-	-	-	-	-
Hunters Hole	Mixed	-	-	-	-	-	-	-	-	-	-
Hunters Hole	**All habitats**	1.1	0.4	2.0	0.6	1.1	0.4	4.5	1.4	0.0	0.0
Palo Verde Ecological Reserve	Cottonwood-willow	99.1	32.1	37.9	12.8	92.0	34.4	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Mesquite	17.4	5.6	13.2	4.2	17.1	5.5	3.9	1.3	2.2	0.7
Palo Verde Ecological Reserve	Mixed	55.7	18.4	24.7	8.3	102.0	38.1	3.5	1.5	5.1	2.7
Palo Verde Ecological Reserve	**All habitats**	172.0	55.5	75.6	24.7	209.4	71.8	7.3	2.5	7.2	3.1
Yuma East Wetlands	Cottonwood-willow	5.8	2.1	13.8	4.4	6.2	2.2	31.9	10.8	7.3	2.5
Yuma East Wetlands	Mesquite	0.0	0.0	9.0	2.9	1.7	0.5	20.2	6.5	10.1	3.2
Yuma East Wetlands	Mixed	4.7	1.6	15.1	5.6	0.0	0.0	33.2	10.8	9.5	4.5
Yuma East Wetlands	**All habitats**	10.9	3.9	38.0	12.4	8.5	2.8	85.8	27.6	26.6	9.2
Habitat total	Cottonwood-willow	180.6	58.2	138.0	44.7	129.2	46.0	83.5	27.0	30.9	9.9
Habitat total	Mesquite	38.2	12.5	70.7	22.9	19.1	6.1	67.0	21.8	71.7	23.5
Habitat total	Mixed	87.6	28.5	69.9	22.7	107.7	39.5	64.7	21.4	27.7	9.4
Total	**All**	**306.5**	**98.5**	**280.3**	**90.1**	**257.3**	**86.8**	**217.8**	**70.2**	**132.9**	**43.0**

[1] Scientific names of the species are listed in attachment 3.
[2] Cottonwood-willow (*Populus fremontii-Salix* spp.) and mesquite (*Populus* spp.).

Table 5-30.—Estimated number of territories with SE in 2015; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2015.)

		Black-chinned hummingbird[1]		Song sparrow[1]		Western kingbird[1]		Bullock's oriole[1]		Yellow-breasted chat[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
CRIT 09 'Ahakhav Preserve	Cottonwood-willow	1.1	0.6	0.0	0.0	4.6	1.6	4.2	2.1	0.0	0.0
CRIT 09 'Ahakhav Preserve	Mesquite	0.0	0.0	0.0	0.0	1.4	0.4	1.1	0.4	0.0	0.0
CRIT 09 'Ahakhav Preserve	Mixed	-	-	-	-	-	-	-	-	-	-
CRIT 09 'Ahakhav Preserve	**All habitats**	1.1	0.6	0.0	0.0	6.0	2.1	5.4	2.4	0.0	0.0
Beal Lake Conservation Area	Cottonwood-willow	3.5	1.1	0.0	0.0	0.0	0.0	5.5	1.8	19.9	6.4
Beal Lake Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Beal Lake Conservation Area	Mixed	0.6	0.2	0.0	0.0	0.0	0.0	0.6	0.2	3.9	1.3
Beal Lake Conservation Area	**All habitats**	4.1	1.3	0.0	0.0	0.0	0.0	6.2	2.0	24.2	7.7
Cibola National Wildlife Refuge Unit #1 Conservation Area	Cottonwood-willow	12.7	5.1	21.6	11.4	23.8	8.6	10.5	4.2	6.6	3.5
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mesquite	-	-	-	-	-	-	-	-	-	-
Cibola National Wildlife Refuge Unit #1 Conservation Area	Mixed	9.8	4.3	6.5	3.4	11.2	4.2	7.2	2.8	10.1	4.3
Cibola National Wildlife Refuge Unit #1 Conservation Area	**All habitats**	25.1	9.4	28.5	12.8	37.1	12.7	19.6	7.0	20.2	8.1
Cibola Valley Conservation Area	Cottonwood-willow	12.0	4.1	0.0	0.0	31.3	11.5	19.6	6.7	0.0	0.0
Cibola Valley Conservation Area	Mesquite	2.8	1.3	0.0	0.0	3.6	1.6	4.0	1.6	7.9	4.9
Cibola Valley Conservation Area	Mixed	1.7	0.5	0.0	0.0	4.5	1.4	2.5	0.8	0.0	0.0
Cibola Valley Conservation Area	**All habitats**	16.8	5.6	0.0	0.0	40.2	14.2	26.6	9.0	7.8	4.8

Table 5-30.—Estimated number of territories with SE in 2015; second 5 of the 10 most abundant territorial species, conservation areas and CRIT 9 (Population estimates are reported by habitat stratum and conservation area for the second 5 of the 10 most abundant territorial species breeding in these areas. Dashes indicate that no plots were surveyed in that habitat stratum-conservation area and CRIT 9 combination during 2015.)

		Black-chinned hummingbird[1]		Song sparrow[1]		Western kingbird[1]		Bullock's oriole[1]		Yellow-breasted chat[1]	
Conservation area	**Habitat[2]**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**	**Population size**	**SE**
Hunters Hole	Cottonwood-willow	0.0	0.0	0.0	0.0	1.1	0.4	0.0	0.0	0.0	0.0
Hunters Hole	Mesquite	-	-	-	-	-	-	-	-	-	-
Hunters Hole	Mixed	-	-	-	-	-	-	-	-	-	-
Hunters Hole	**All habitats**	0.0	0.0	0.0	0.0	1.1	0.4	0.0	0.0	0.0	0.0
Palo Verde Ecological Reserve	Cottonwood-willow	44.0	16.1	29.0	10.4	9.7	3.8	27.2	9.2	15.7	5.7
Palo Verde Ecological Reserve	Mesquite	6.7	2.2	18.2	5.8	3.1	1.0	0.3	0.1	4.2	1.3
Palo Verde Ecological Reserve	Mixed	7.8	3.5	45.1	17.3	1.6	0.9	10.2	3.4	23.5	10.2
Palo Verde Ecological Reserve	**All habitats**	59.0	20.7	91.3	31.0	14.4	5.2	37.8	12.5	43.0	15.4
Yuma East Wetlands	Cottonwood-willow	12.0	3.9	0.7	0.6	0.4	0.3	0.0	0.0	0.0	0.0
Yuma East Wetlands	Mesquite	2.8	0.9	0.3	0.1	0.3	0.1	0.0	0.0	0.0	0.0
Yuma East Wetlands	Mixed	5.6	2.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0
Yuma East Wetlands	**All habitats**	21.2	7.1	1.5	0.8	1.1	0.6	0.0	0.0	0.0	0.0
Habitat total	Cottonwood-willow	91.0	30.6	47.5	17.2	67.6	22.9	69.9	23.0	46.1	15.2
Habitat total	Mesquite	12.5	4.1	18.9	6.0	8.4	2.9	5.4	2.0	12.1	5.6
Habitat total	Mixed	25.4	9.0	52.0	19.4	17.6	6.1	20.5	6.8	37.6	14.2
Total	**All**	**128.0**	**42.2**	**119.7**	**40.4**	**92.9**	**30.8**	**95.0**	**30.9**	**96.5**	**32.2**

[1] Scientific names of the species are listed in attachment 3.
[2] Cottonwood-willow (*Populus fremontii-Salix* spp.) and mesquite (*Populus* spp.).

Table 5-31.—Estimated number of territories with SE in 2011; pre-development monitoring, Laguna Division Conservation Area

(Population estimates are listed by the low woody and unsuitable habitat stratums. The future conservation area did not contain any tall woody or herbaceous habitat stratums. LCR MSCP covered focal species are in bold.)

Species[1]	Low woody population size	Low woody SE	Unsuitable population size	Unsuitable SE	Total	Total SE
Abert's towhee	91.0	8.4	3.0	2.1	94.0	8.6
American coot	11.2	3.1	0.0	0.0	11.2	3.1
Anna's hummingbird	9.6	2.1	0.0	0.0	9.6	2.1
Arizona Bell's vireo	**0.4**	**0.2**	**0.0**	**0.0**	**0.4**	**0.2**
Ash-throated flycatcher	29.1	3.9	2.5	0.9	31.6	4.0
Bewick's wren	3.2	1.4	0.0	0.0	3.2	1.4
Black phoebe	1.2	0.7	0.0	0.0	1.2	0.7
Black-chinned hummingbird	10.4	3.0	0.0	0.0	10.4	3.0
Black-necked stilt	1.6	1.0	0.0	0.0	1.6	1.0
Black-tailed gnatcatcher	114.2	7.9	5.0	0.7	119.2	7.9
Blue grosbeak	21.2	3.0	5.0	2.5	26.2	3.9
Bullock's oriole	0.8	0.3	0.0	0.0	0.8	0.3
California black rail	**0.4**	**0.2**	**0.0**	**0.0**	**0.4**	**0.2**
Common ground-dove	1.6	1.0	0.0	0.0	1.6	1.0
Common yellowthroat	95.0	16.1	0.0	0.0	95.0	16.1
Crissal thrasher	22.4	2.6	1.0	0.7	23.4	2.7
Green heron	0.8	0.5	0.0	0.0	0.8	0.5

Table 5-31.—Estimated number of territories with SE in 2011; pre-development monitoring, Laguna Division Conservation Area

(Population estimates are listed by the low woody and unsuitable habitat stratums. The future conservation area did not contain any tall woody or herbaceous habitat stratums. LCR MSCP covered focal species are in bold.)

Species[1]	Low woody population size	Low woody SE	Unsuitable population size	Unsuitable SE	Total	Total SE
Indigo bunting	2.8	1.3	0.0	0.0	2.8	1.3
Killdeer	2.4	1.1	0.	0.0	2.4	1.1
Ladder-backed woodpecker	14.5	2.0	0.0	0.0	14.5	2.0
Lesser nighthawk	80.7	8.0	5.5	0.4	86.2	8.0
Loggerhead shrike	0.8	0.5	0.0	0.0	0.8	0.5
Lucy's warbler	22.0	5.2	0.0	0.0	22.0	5.2
Marsh wren	36.3	10.9	0.0	0.0	36.3	10.9
Phainopepla	1.6	1.0	0.0	0.0	1.6	1.0
Pied-billed grebe	4.0	2.0	0.0	0.0	4.0	2.0
Say's phoebe	1.6	1.0	0.0	0.0	1.6	1.0
Song sparrow	37.9	11.6	0.0	0.0	37.9	11.6
Verdin	88.6	9.3	4.0	1.4	92.6	9.4
Virginia rail	3.2	1.4	0.0	0.0	3.2	1.4
Western kingbird	1.6	1.0	0.0	0.0	1.6	1.0
Yellow-breasted chat	46.7	9.6	0.0	0.0	46.7	9.6
Yuma clapper rail	1.6	1.0	0.0	0.0	1.6	1.0

[1] Scientific names of the species are listed in attachment 3.

Table 5-32.—Estimated number of territories with SE in 2015; pre-development monitoring, Laguna Division Conservation Area

(Population estimates are listed by low woody and unsuitable habitat stratums. The future conservation area did not contain any tall woody or herbaceous habitat stratums. LCR MSCP covered focal species are in bold.)

Species[1]	Low woody population size	Unsuitable population size	Total
Abert's towhee	13.8	2.8	16.5
American kestrel	0.0	0.3	0.3
Anna's hummingbird	0.5	0.0	0.5
Ash-throated flycatcher	3.0	0.8	3.8
Black-chinned hummingbird	3.0	4.0	7.0
Black-tailed gnatcatcher	23.0	8.5	31.5
Blue grosbeak	2.0	0.0	2.0
Common yellowthroat	0.8	0.0	0.8
Crissal thrasher	1.8	0.8	2.5
Ladder-backed woodpecker	1.0	0.0	1.0
Lesser nighthawk	1.8	0.0	1.8
Lucy's warbler	26.8	9.5	36.3
Northern rough-winged swallow	1.0	0.0	1.0
Verdin	3.5	1.8	5.3
Yellow-breasted chat	5.0	0.0	5.0

[1] Scientific names of the species are listed in attachment 3.

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