

**Southwestern Willow Flycatcher (*Empidonax
traillii extimus*) Survey Results.**

U Bar Ranch

The Nature Conservancy

U.S. Forest Service

Cliff-Gila Valley, New Mexico – 2012

Alta Cabral Property

Redrock, New Mexico - 2012

**Roland Shook
Silver City, NM
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SUMMARY

A total of 272 resident Southwestern Willow Flycatchers, *Empidonax traillii extimus*, consisting of 129 pairs and occupying 143 territories, were detected in the Cliff-Gila Valley during the 2012 breeding season. This total is comprised of flycatchers detected on the private lands of the U Bar Ranch and historically censused adjacent private properties (242 adults consisting of 115 pairs and occupying 127 territories); the private lands of The Nature Conservancy (TNC) and adjacent private lands (four adults consisting of one pair and occupying three territories); the public lands of the Gila Bird Area and Fort West Ditch sites managed by the U.S. Forest Service (14 adults consisting of seven pairs and occupying seven territories); and a relatively newly censused area managed by the U Bar Ranch along Bill Evans Lake Road with an estimated population of 12 adults, consisting of six pairs and occupying six territories.

When comparing flycatcher populations in 2012 to those in 2011, the total flycatcher population in the Cliff-Gila Valley decreased by 42 resident adults (13%), 24 pairs (16%), and 17 territories (11%). On the private lands of the U Bar Ranch and adjacent private properties, this decrease consisted of 35 adults (13%), 20 pairs (15%), and 14 territories (10%); on lands managed by TNC and adjacent private lands, flycatchers decreased an estimated total of seven adults (64%), four pairs (80%) and three territories (50%); and on public lands of the Gila Bird Area and Fort West Ditch sites, managed by the U.S. Forest Service, there was an estimated decrease in flycatcher numbers of four adults (22%), two pairs (22%) and two territories (22%). Finally, on the area adjacent to Bill Evans Lake Road, managed by the U Bar Ranch, flycatchers increased a total of four adults (50%), two pairs (50%) and two territories (50%).

In 2012, Freeport-McMoRan Copper and Gold, Inc., purchase the Cabral Alta property along the Gila River west of the town of Redrock, Grant Co., NM. During the 2012 breeding season, a total of 78 resident Willow Flycatchers consisting of 36 pairs and occupying 42 territories were detected along the approximately 11 km of river.

Beginning in late 2010 and continuing through July 2012, below normal precipitation in southwestern New Mexico is thought to have impacted both the 2011 and 2012 breeding seasons resulting in decreased flycatcher populations.

INTRODUCTION

The Southwestern Willow Flycatcher is a subspecies of one of 10 North American members of the genus *Empidonax*. Owing to the morphological similarities among members of this genus, various species can be difficult to separate in the field except by song.

Evidence of declining populations in the West, and associated declines in their favored riparian habitat, led to the Southwestern Willow Flycatcher being listed in 1993, as a candidate species for the Federal Threatened and Endangered Species List, and elevated to Endangered species designation in 1995 (USFWS 1995). In conjunction with the Federal listing of this species, the New Mexico Department of Game and Fish listed *E. t. extimus* as a state Endangered species in New Mexico in 1996 (NMDGF 1996).

With the listing of this species as Federally Endangered, there was a need to gather sound biological data in order to manage this species effectively. As part of this effort a Southwestern Willow Flycatcher protocol was developed to determine actual breeding areas, potential breeding areas, and to standardized

surveys to provide consistent data collection, reporting, and interpretation (Sogge et al. 1997, Sogge et al. 2010).

Willow Flycatchers have been verified in New Mexico since 1886, with the collection of six specimens (Carnegie Museum of Natural History) by A.W. Anthony near the present town of Hachita, Grant County (Anthony 1892, Hubbard 1987). Both Unitt (1987) and Browning (1993) assign the subspecies *extimus* to the breeding populations of this species in New Mexico. It was not until 1959, that Hubbard (1987) confirmed breeding pairs of this species in the Redrock area, and since then, this species has been shown to be a regular summer breeder in the Redrock and Cliff-Gila areas (Hubbard 1971, Zimmerman 1970, Egbert 1981, and Montgomery et al. 1985).

Beginning in 1994, extensive, systematic, Southwestern Willow Flycatcher surveys were begun in riparian habitat along the Gila River in the Cliff-Gila Valley (Monzingo 1994, Parker and Hull 1994). Monzingo concentrated on public lands managed by the U.S. Forest Service located approximately 15 km downstream from Cliff, New Mexico in the Gila River Bird Habitat Management Unit (Gila Bird Area), and eight km upstream from Cliff at the Fort West Ditch site. Parker and Hull surveyed for flycatchers on private lands consisting of the U Bar Ranch and adjacent private properties approximately centered on the Highway 211 Bridge over the Gila River near the towns of Cliff and Gila. In 1994, Parker and Hull reported at least 64 pairs of Willow Flycatchers within the area they surveyed. Surveys conducted in 1999, on the same areas as delineated by Parker and Hull, found that the population of Willow Flycatchers had risen to 209 pairs (Stoleson and Finch 1999). The following year the population dropped by 43% to 121 pairs attributed to drought conditions (Stoleson and Finch 2000) and has since slowly increased until 176 pairs were detected in 2010 (Brodhead and Finch 2003, Brodhead 2004, 2005, 2006, Woodward 2007, Shook 2008b, 2009, 2010b). Since that time flycatcher numbers have decline to 135 pairs in 2011 (Shook 2011) and 115 pairs in 2012.

Lands along the Gila River in the Cliff-Gila Valley, in addition to those mentioned above, are also known to provide suitable habitat for Southwestern Willow Flycatchers. In the past, Willow Flycatcher surveys in all suitable habitats in the Cliff-Gila Gila Valley have been lacking, irregular, or incomplete. Owing primarily to management concerns and a desire to better understand the size and location of local flycatcher populations, an attempt was made during the 2009 to 2012 breeding seasons to survey for Willow Flycatchers in all habitats in the Cliff-Gila Valley that appeared suitable for this species. Consistent, periodic surveys for Willow Flycatchers in the Redrock area have been lacking.

The purpose of this paper is to report 2012 Willow Flycatcher survey results on data collected during the breeding season on lands surveyed with apparent suitable Willow Flycatcher habitat in the entire Cliff-Gila Valley, as well as, along the Gila River on the Cabral Alta property west of Redrock.

Reference to Willow Flycatcher or "flycatcher" in this paper refers to the Southwestern Willow Flycatcher.

OBJECTIVES OF THIS STUDY

Specifically the objectives of these surveys are to:

- Determine the number of flycatchers found on the various private and public properties in the Cliff-Gila Valley and the Cabral Alta property near Redrock during the 2012 breeding season,
- Determine the specific association between flycatcher populations and historical patches of flycatcher habitat on private lands consisting of the U Bar Ranch and other adjacent private

properties, on lands owned by The Nature Conservancy and adjacent private properties, and on public land managed by the U.S. Forest Service.

- Determine the specific association between flycatcher populations and apparent suitable habitat on the Cabral Alta property near Redrock.

METHODS

Study Sites: Southwestern Willow Flycatchers surveys were conducted according to the most recent USFWS accepted survey protocol (Sogge et al. 2010) on both private and public lands. The private lands consist of those owned by The Nature Conservancy and a few adjacent private properties hereafter referred to as TNC property. The private property of the U Bar Ranch and several adjacent private properties, hereafter called the U Bar Ranch, are the same as those originally surveyed by Parker and Hull in 1994 (Parker and Hull 1994) with the addition of riparian habitat along the Bill Evans Lake Road. The public land surveyed is managed by the U.S. Forest Service and consists of the Gila Bird Area, the Fort West Ditch site, and lands at the confluence of Mogollon Creek and the Gila River. All lands surveyed are found within the Cliff-Gila Valley, Grant Co., elevation 1320 m to 1427 m.

An additional area was surveyed in 2012, which consisted of the Cabral Alta property owned by Freeport McMoRan Copper and Gold Inc. which is found west of Redrock, Grant Co., elevation 1215m to 1204m.

The upper Cliff-Gila Valley from the Gauging Station above Mogollon Creek south to the pumping station near Bill Evans Lake, is characterized by a mosaic of irrigated and non-irrigated pastures supporting livestock, small to large patches of riparian vegetation found primarily along the river channel, and stringers of vegetation found primarily along the irrigation return ditches. Principle tree vegetation composed of many age classes consists of Fremont cottonwood (*Populus fremontii*), Box elder (*Acer negundo*), Arizona sycamore (*Platanus wrightii*), Arizona walnut (*Juglans major*), and Goodding willow (*Salix gooddingii*). To a lesser degree are found Velvet ash (*Fraxinus velutina*), Arizona alder (*Alnus oblongifolia*), New Mexico locust (*Robinia neomexicana*) and Russian olive (*Elaeagnus angustifolia*).

The Gila Bird Area, at the southern end of the Cliff-Gila Valley, consists of 405 hectares of which 280 are river floodplain supporting riparian plant communities of various ages, and the remainder is upland hillsides. The U. S. Forest Service, in order to preserve and restore prime riparian habitat, established the Gila Bird Area in 1970, limiting grazing and camping to upland areas and excluding off-road vehicles (Rea 1972).

From 1995 through 1999, the Forest Service created four floodplain wetlands and four upland terrace pits in the lower half of the Gila Bird Area. In addition to the primary goal of stream bank stabilization, these actions created temporary habitat for wildlife including the Southwestern Willow Flycatcher. Fences were constructed to control vehicular access to the river bottom and to create small pastures to facilitate livestock management (Boucher et al. 2003).

In the Gila Bird Area, Fremont Cottonwood (*Populus fremontii*), Goodding Willow (*Salix gooddingii*), and Arizona Sycamore (*Platanus wrightii*) are the dominant riparian tree species. Sub-canopy species include Boxelder (*Acer negundo*), Arizona Walnut (*Juglans major*), Velvet Ash (*Fraxinus velutina*), Arizona Alder (*Alnus oblongifolia*), Netleaf Hackberry (*Celtis reticulata*), and Texas Mulberry (*Morus microphylla*). Early successional patches are composed primarily of Seepwillow (*Baccharis glutinosa*). The eastern edge of the upper half of the Gila Bird Area includes a

dry, rocky hillside intersected by side canyons, supporting scattered Piñon Pines (*Pinus edulis*), Shrub Live Oak (*Quercus turbinella*), Gray Oak (*Quercus grisea*), Honey Mesquite (*Prosopis glandulosa*), Mimosa (*Mimosa biuncifera*), and One-Seeded Juniper (*Juniperus monosperma*).

Vegetation west of Redrock on the Cabral Alta property consists of elements of both the Chihuahuan and Sonoran deserts. Riparian vegetation is found both along the present river channel and also remnants of the former channel (Figures B 3 – B 5). Dominant riparian plants consist of Willow (*Salix spp.*), Fremont Cottonwood, and Seepwillow (*Baccharis spp.*). Upland vegetation is composed primarily of Mesquite (*Prosopis spp.*). The Cabral Alta property, with the exception of the riparian habitat, is primarily open country used for cattle grazing. Cattle were seen frequently roaming throughout the property during the 2012 surveys.

The Nature Conservancy (TNC)

Private property owned by The Nature Conservancy in the Cliff-Gila Valley is located both above and below the U Bar Ranch (Figures B1 and B2). TNC property was surveyed along the Gila River from approximately one km above Mogollon Creek south to the Lichty Center. In 2009 and once in 2011, surveys were conducted north to the Gauging Station above Mogollon Creek, but owing to lack of suitable habitat and the lack of flycatcher detection, surveys were reduced in 2010, 2011, and 2012. TNC property was also surveyed for approximately two km downstream from the Iron Bridge near Riverside, NM.

U.S. Forest Service

Public property, managed by the U.S. Forest Service, that was surveyed in 2012 (Figures B1 and B2) consist of the Gila Bird Area located approximately 15 km downstream from Cliff, and the Fort West Ditch site located approximately eight km upstream from Cliff. These areas are historically the same as those surveyed by Monzingo (1994). In addition, land managed by the U.S. Forest Service at the confluence of Mogollon Creek and the Gila River, approximately 12 km upstream from Cliff, (Figure B1) was surveyed.

U Bar Ranch

The areas surveyed on the U Bar Ranch are the same, with slight modifications, as those continually surveyed since 1994 (Figures B1 and B2) with the addition of riparian habitat along Bill Evans Lake Road. Owing to lack of suitable habitat, the habitat along Mangas Creek was not surveyed in 2012.

Cabral Alta Property

The Cabral Alta property (Figures B3 and B4), located approximately one to six km west of Redrock, was surveyed in 2012. The property includes approximately 11 km of riparian habitat along the Gila River. Comparing 2009 aerial photographs to the 1990 provisional topographic maps (Nichols Canyon and Redrock USGS Topographical Quadrangles (1:24,000)), it is apparent that the Gila River has substantially shifted its channel in the intervening 19 years (Appendix B 5).

Surveys: Surveys began within 15 minutes of sunrise and concluded at approximately 10 AM. The majority of surveys were conducted by two teams of two individuals each, which improved the accuracy of flycatcher detections and consistency of surveys across years. During the conduction of Willow Flycatcher surveys, data were also collected on the presence/absence of Common Black-Hawk

(*Buteogallus anthracinus*), Yellow-billed Cuckoo (*Coccyzus americanus*) and Brown-headed Cowbird (*Molothrus ater*).

Survey Periods: Three separated surveys were conducted on all patches as per the protocol instructions.

First Survey Period – May 15 to May 31: The purpose of this survey was to detect flycatchers during the period of highest singing rates and to become familiar with all aspects of the survey protocol. During this period a GPS coordinate was taken on all Willow Flycatchers detected. In subsequent survey periods only newly detected flycatchers were given a new GPS coordinate. These coordinates provided a valuable tool in returning at a later time to the location of previously detected flycatchers and determining their status.

Second Survey Period – June 1 to June 21: This period can represent a transition period between lingering migrants and residential breeding pairs. Any active Willow Flycatcher nests that were found during this or subsequent surveys were incidental to the survey. No attempt was made to monitor active nests.

Third Survey Period – June 22 to July 17: Flycatchers observed during this period are thought to be either resident breeders or non-breeding territorial floaters, and not migrants.

Breeding Status Determination: At each location where a Willow Flycatcher was detected, data were recorded in a field notebook as to whether that detection was based upon auditory clues, visual clues, or both. These data were then compiled and inferences about the breeding status of each flycatcher were made based upon the following criteria (from Sogge et al. 2010) arranged from information identifying migrating individuals to information verifying resident breeding pairs.

1. The detection of a “*fitz-bew*” vocalization without any other indications of a pair was delegated as a territorial male. If the bird was only present during the first survey periods it was most likely a migrant.
2. The detection of a “*fitz-bew*” call and/or a “*whitt*” call between nearby flycatchers indicates a possible pair. Repeated detections of the “*fitz-bew*” call and/or the “*whitt*” call on successive survey periods increases the probability that the vocalizing birds were a pair.
3. An observation of an “unchallenged” flycatcher in the immediate vicinity indicates a possible pair.
4. The detection of the interaction “twittering” call between nearby flycatchers indicates a possible pair.
5. Physical aggression against another flycatcher or another bird species indicates a possible pair.
6. Physical aggression against cowbirds suggests nest defense.
7. Observations of Willow Flycatcher copulating verifies attempted breeding.
8. Observations of flycatchers carrying nest material verifies a nesting attempt.
9. A flycatcher carrying food or fecal sacs verifies a nest with young.
10. Location of an active nest verifies breeding.
11. Observation of adult flycatchers feeding fledged young verifies successful breeding.

The most confident inferences concerning breeding status were made for a specific flycatcher based upon data from all three survey periods. If data were not available for a specific flycatcher from all three survey periods, inferences were made based upon the best data available. The incidental finding of a nest was interpreted as very strong evidence of breeding even if that pair was not detected during any survey period. Likewise, successive detections of two flycatchers in the immediate vicinity of each other that were “whitting,” “twittering,” and/or engaging in “unchallenged” interactions were interpreted as being a breeding pair even if they were not detected during the third census period. Owing to the size of the area surveyed, the number of flycatchers, and the density and height of the vegetation, it was not always possible to obtain all the data one would like, therefore these estimates of resident breeding pairs are based upon the best evidence available. The protocol (Sogge et al. 2010) reiterates the difficulty of determining exactly what is transpiring at any one time, “In some cases, regardless of the time and diligence of your efforts, it will be difficult to determine the actual breeding status of a territorial male. In these instances, use your best professional judgment...” Survey numbers, based upon the standard Southwestern Willow Flycatcher Protocol, often represent minimum numbers (conservative estimates) of flycatchers present, and therefore, should be recognized as approximate (Durst et al. 2008).

Documenting Presence of Cowbirds: All Brown-headed Cowbirds (*Molothrus ater*) detected vocally or visually during the course of this study were noted and assigned to a specific patch. Brown-headed Cowbirds were at no time considered plentiful. No Willow Flycatchers were seen feeding young cowbirds during the course of this study, however there was no attempt to monitor flycatcher nests. Bronzed Cowbirds (*Molothrus aeneus*) are known to occur during the summer in the Cliff-Gila Valley (Zimmerman per. comm.) but none were detected during 2012 flycatcher surveys.

Reporting Results: Appropriate information on each patch surveyed was submitted to the U.S. Fish and Wildlife Service and the New Mexico Department of Game and Fish using the most current forms. In addition, both agencies will also receive a copy of this report.

RESULTS

Durst et al. (2008) defines a “site” as a geographic location where one or more Willow Flycatchers establishes a territory, however, there is no standardized definition as to what constitutes a site. A “territory” is defined as an exclusive defended area within a breeding site. Because, the concept of territory is more similar among states and different investigators than site, it is a more robust unit to use for summaries and comparisons (Durst 2008). Therefore, the best unit of comparison from site to site and year to year, is the number of territories.

CLIFF – GILA VALLEY

The Nature Conservancy

In 2012, Willow Flycatchers were not detected for approximately three km below Mogollon Creek (Figure C 11). An unpaired, territorial flycatcher was detected below the headwaters of the Upper Gila Ditch on TNC property (Table A 3 and Figure C 34). Flycatchers were not detected on private lands adjacent to TNC property at the Fort West Ditch West site (Table A 3 and Figure C 6). When compared to the results of 2011, these numbers represented a decline of six resident adults, three pairs and three territories. Finally, three individuals composed of a pair and a territorial male occupied two territories on the TNC Iron Bridge West property located below the Iron Bridge near Riverside, NM (Table A 3 and Figures B 2, and C 9). These numbers represent a decline of 25% in resident adults, a 50% decline in resident pairs and no decline in territories when compared to 2011 flycatcher numbers (Table A 3). When the flycatcher numbers of all TNC sites were compared to the 2011 survey numbers, a decline of 64% in resident adults, 80% in resident pairs and 50% in resident territories was determined.

U.S. Forest Service

No flycatchers were detected on Forest Service property near the confluence of Mogollon Creek and the Gila River (Table A 3, Figures B 1, C 10 and C 11). It was estimated that six individuals, made up of three pairs and occupying three territories were located on the Fort West Ditch site in the upper Cliff-Gila Valley (Table A 3 and Figure C 5). These findings represent a decrease of 50% in the number of adults, a 50% decrease in the number of pairs, and a 50% decrease in the number of territories when compared to 2011 flycatcher data. At the southern end of the study area in the Gila Bird Area, eight flycatchers composed of four pairs and occupying four territories (Table A 3 and Figure C 7) were detected. These estimates represent an increase of 33% each in adults, pairs and territories when compared to 2011 estimations. Flycatcher numbers on all Forest Service sites decreased an average of 22% each for adults, pairs and territories.

Trespass cattle were observed on an irregular basis in the Gila Bird Area throughout the survey season.

U Bar Ranch

During the 2012 breeding season, 242 resident Willow Flycatchers were detected (Tables 1, A 1 and A 2 and Figures 1, C 1 – C 4, C 12 – C 32), composed of 115 pairs and occupying 127 territories. As seen in Tables A 1 and A 2, this is an decrease of 35 resident individuals, 20 pairs and 14 territories from 2011 estimates. While flycatcher numbers in most patches were relatively stable in 2012, the greatest numerical changes in the Northern patches occurred in Bennett (Table A 1), where numbers of adults, pairs and territories declined 44%, 49%, 40%, respectively. If all of the Northern patches were combined, the average decline in adults, pairs and territories was 6%, 8% and 4%, respectively. In the Southern patches, SW Stringer, Beaver Pond Stringer, and SE1 suffered some of the largest percentage declines. The percentage reduction in adults, pairs and territories was 50%, 50%, 50%; 71%, 71%, 71%; and 19%, 17%, 19%, respectively. If all the Southern patches were combined, the average decrease in adults, pairs and territories was 19%, 21%, and 15%, respectively.

Totals for Area Surveyed in Cliff-Gila Valley

Figure 2, Tables 2, A 1, A 2 and A 3 summarize the total number of flycatchers detected in 2012 in all habitats surveyed in the Cliff-Gila Valley. Both the Fort West Ditch and the Gila Bird Area were surveyed in 2007 and 2008 by the author (Shook 2008c), and therefore are included in “Total from Additional Patches” for those years (Table A 3). A grand total for the Cliff-Gila Valley (Table 1, A 2) of 272 adult flycatchers, 129 pairs, and 143 territories were detected during the 2012 season.

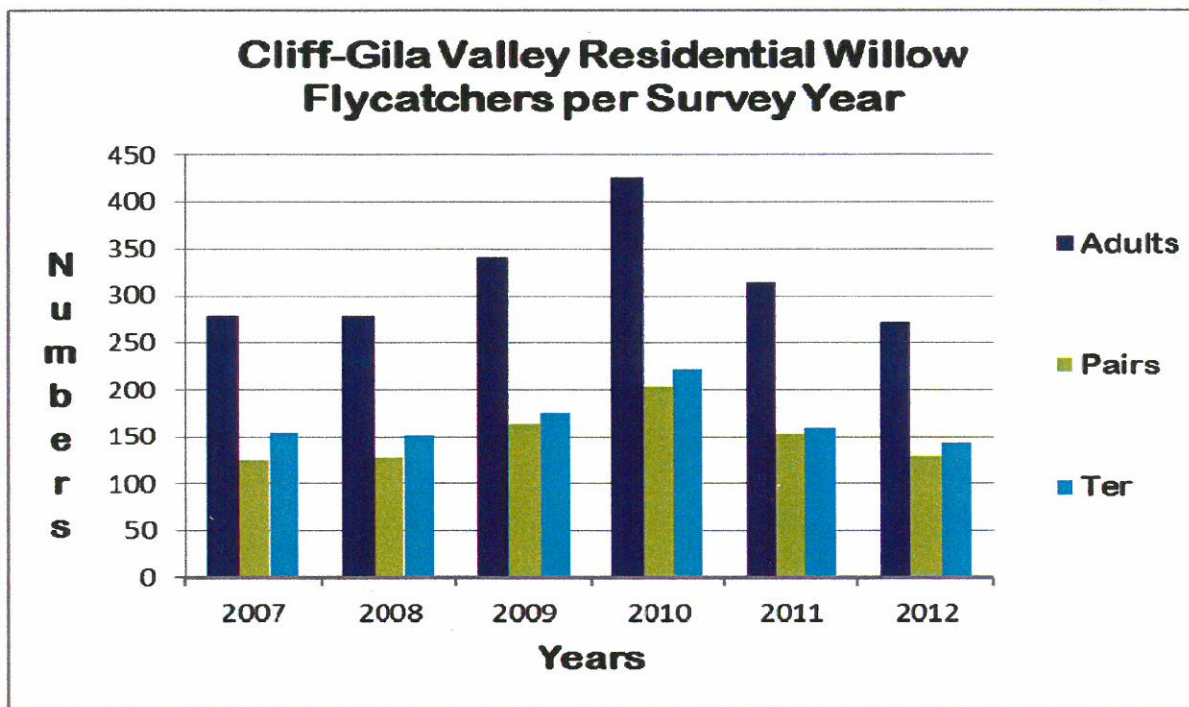


Figure 1. The number of resident adults, pairs and territories in the Cliff-Gila Valley plotted as a function of survey year. The summary data for surveys conducted 2007 to 2012 can be found below the graph in tabular form.

Woodward 2007			Shook 2008			Shook 2009			Shook 2010			Shook 2011			Shook 2012		
Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T
279	125	154	278	127	151	341	164	175	425	203	222	314	153	160	272	129	143

Table 1. A summary of total flycatcher detections in the Cliff-Gila Valley as a function of survey year (Ad = adults, P = pairs, T = territories).

These survey numbers, based upon the standard Southwestern Willow Flycatcher protocol, often represent minimum numbers (conservative estimates) of flycatchers present, and therefore, should be recognized as approximate (Durst et al. 2008).

Figure 1 shows a slow increase in the number of Willow Flycatcher territories from 2007 to 2010, and then a decrease in 2011 and 2012. In addition to flycatchers found on historically surveyed U Bar property and adjacent private lands, 12 adults, six pairs, and six territories were detected on the west side of the Bill Evans lake Road on property leased to the U Bar Ranch (Table A 3 and Figure C 4). This represents an increase of four adults, two pairs, and two territories from estimates obtained in 2011 (Table A 3). Owing to a lack of suitable habitat based upon 2011 surveys, Mangas Creek (Figure B 2) was not surveyed in 2012.

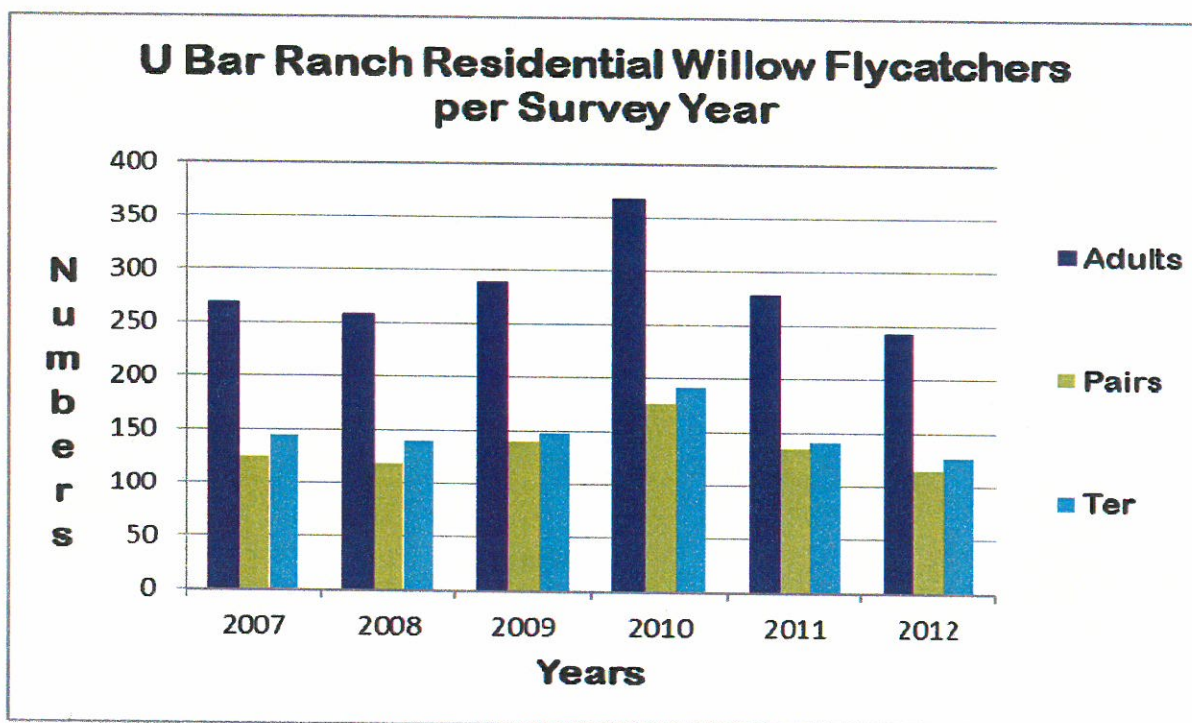


Figure 1. The number of resident adults, pairs and territories on the U Bar Ranch plotted as a function of survey year. The summary data for surveys conducted 2007 to 2012 can be found below the graph in tabular form.

Woodward 2007			Shook 2008			Shook 2009			Shook 2010			Shook 2011			Shook 2012		
Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T
269	125	144	258	118	140	289	139	148	368	176	192	277	135	141	242	115	127

Table 1. A summary of total flycatcher detections on the U Bar Ranch and adjacent private properties as a function of survey year (Ad = adults, P = pairs, T = territories).

Livestock: The U Bar Ranch is a working cattle ranch that grazes cattle in the irrigated and non-irrigated pastures that border the Gila River. Fencing precludes access by cattle to the river during the breeding season on the preponderance of suitable riparian habitats that are used by Willow Flycatchers. Of the 31 field-days spent surveying flycatchers in 2012, with the exception of a trespass mother cow and her calf, cattle were not seen on the U Bar Ranch upstream from the Highway 180 Bridge in the river corridor or in the various riparian patches adjacent to the river. Cattle were present in the river corridor adjacent to the Bill Evans Road (Figures C 3 and C 4) throughout much of the survey season.

Cattle were continually present during the breeding season on the Alta Cabral property west of Redrock.

Cowbirds: Brodhead et al. (2007) reported on factors influencing brood parasitism by Brown-head Cowbirds on Willow Flycatchers in two areas in the Cliff-Gila Valley: the Gila Bird Area and the U Bar Ranch. The total proportion of the 491 flycatcher nests monitored from 1997 to 2004, which were parasitized by cowbirds, was on average 20.2% with a range of 11.3% (1997) to 32.2% (1998). Brodhead et al. found that frequency of parasitism at their study sites was influenced by the condition of the nesting habitat and suitability of nest substrates, and that exclusion of livestock from riparian floodplains in the Southwest may have little or no effect in reducing parasitism.

Climatic considerations: In previous years, changes in the population size of Willow Flycatchers have been attributed to yearly climatic variation in the Cliff-Gila Valley. A 43% and 27% decrease in resident breeding pairs in 2000 and 2011, respectively, was attributed to drought conditions (Stoleson and Finch 2000, Shook 2011). Record precipitation and snow pack and the associated high river flow in early 2005, contributed to loss of suitable Willow Flycatcher habitat on the U Bar Ranch (Brodhead 2005). Temperature and precipitation are known to be variable in the arid Southwest, and their affect on flycatcher numbers can be difficult to predict. For example, when precipitation increased in 2006 to 2009 (Woodward 2007, Shook 2008b), there was not a corresponding increase in flycatcher numbers. Likewise, when precipitation decreased in 2009, flycatcher numbers did not decrease but instead increased. According to the National Weather Service Weather Forecast Office's Drought Summary, January to September 2011 was the driest period on record in New Mexico. The water year from October 2010 to September 2011, was the second driest on record, only 1956, was drier based upon 117 years of weather data collected in New Mexico (<http://www.srh.noaa.gov/abq/?n=drought>).

Following a period of exceptional drought from June through August 2011, precipitation conditions in southwestern New Mexico began to improve (http://drought.unl.edu/dm/DM_state.htm?NM,W) but failed to return to normal (Figures 2 and 3). From January to August 2012, the southern deserts averaged 61% of normal precipitation while the southwest mountains averaged 74% of normal (<http://www.srh.noaa.gov/abq/?n=drought>). Vegetative conditions in the Cliff-Gila Valley based upon antidotal evidence during 2012 field work in May, June and July, appeared no different than those seen the previous year.

Locations of resident Southwestern Willow Flycatchers in the Cliff-Gila Valley (Figures C 1 to C 34) detected during the 2012 survey period are overlaid on the appropriate USGS topographic quadrangles (1:24,000). In addition, locations of flycatchers are also plotted on 2009 aerial photos of the study area.

REDROCK

Cabral Alta Property

In 2012, Freeport-McMoRan Copper and Gold, Inc. purchased the Cabral Alta property along the Gila River near the town of Redrock, Grant Co., NM (Figures B 3 and B 4). During the 2012 breeding season, a total of 78 resident Willow Flycatchers consisting of 36 pairs and occupying 42 territories were detected along the approximately 11 km of riparian habitat bordering the Gila River (Tables A 4 and A 5, and Figures D 1 – D 18).

Property managed by the Bureau of Land Management (BLM), beginning approximately 2.5 km downstream from the western boundary of the Cabral Alta property and extending approximately another 12 km downstream to Cottonwood Canyon, was surveyed most recently for Willow Flycatchers in 2008. Surveyors detected a total of 107 Willow Flycatcher territories in this stretch of the Gila River (Debra Hill, per. comm.).

Yellow-billed Cuckoos were detected on the Alta Cabral property (A 7) but in lower frequency when compared to detections in the Cliff-Gila Valley (A 6). The Alta Cabral property also supports populations of breeding Common Black-Hawk, Zone-tailed Hawk (*Buteo albonotatus*), Gila Woodpecker, Bell's Vireo, and Abert's Towhee.

Locations of resident Southwestern Willow Flycatchers on the Alta Cabral property (Figures D 1 to D 18) detected during the 2012 survey period are overlaid on the appropriate USGS topographic quadrangles (1:24,000). In addition, locations of flycatchers are also plotted on 2009 aerial photos of the study area.

POPULATION CHANGES

Without a significant increase in data, it is difficult to definitively know the reason for changes in flycatcher numbers from year to year or from patch to patch. Possible explanations could involve:

1. Differences in observers from day to day or year to year,
2. Familiarity of the study area (Shook et al. 2003),
3. Successional changes in habitat,
4. Habitat disturbances caused by high water events (Brodhead 2005),
5. Habitat disturbances caused by livestock (see below),
6. Variation from year to year in census dates within a census period,
7. Differences in interpretation of data between survey periods or from year to year,
8. Changes in flycatcher population numbers both on wintering grounds and during the breeding season,
9. Yearly or seasonable changes in temperature and precipitation (see climatic considerations below),
10. Nest parasitism owing to Brown-headed Cowbirds (see below).

October 2011 - September 2012 Precipitation Totals (plotted) and Percent of Normal (contours)

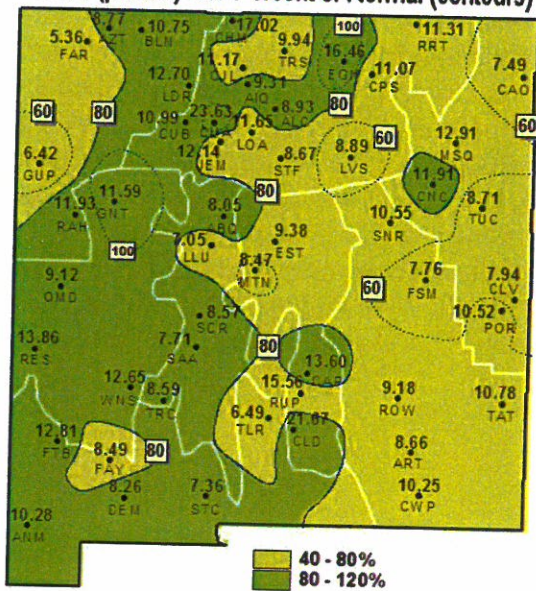


Figure 2

January - August 2012 Precipitation Totals (plotted) and Percent of Normal (contours)

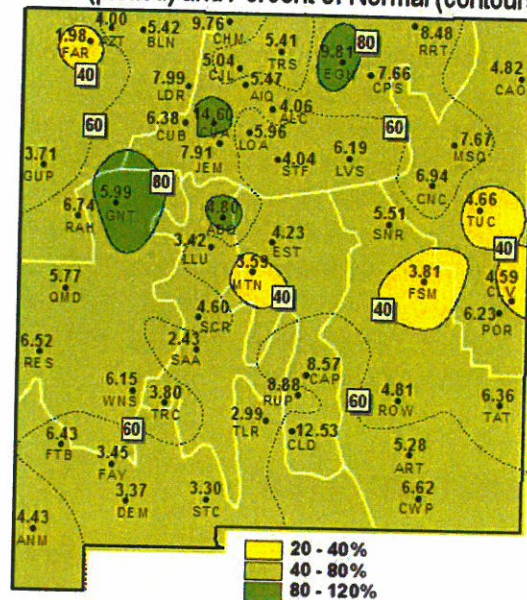


Figure 3

In general, climatic conditions in the Redrock area are hotter and drier than in the Cliff-Gila Valley.

Other species: Several avian species designated as Threatened by the New Mexico Department of Game and Fish (http://wildlife.state.nm.us/conservation/threatened_endangered_species/index.htm) breed in the Redrock area and the Cliff/Gila Valley including the U Bar Ranch, TNC, and properties managed by the Forest Service. These species include the Common Black-Hawk, Yellow-billed Cuckoo, Gila Woodpecker (*Melanerpes uropygialis*), Abert's Towhee (*Pipilo aberti*) and Bell's Vireo (*Vireo bellii*).

Data would suggest that the western subspecies *occidentalis* of the Yellow-billed Cuckoo is declining across the West owing to loss of suitable habitat. The U.S. Fish and Wildlife Service petitioned to list the western subspecies as Endangered (USFWS 2001), but the listing was precluded for higher priority listings. Yellow-billed Cuckoos were a common species in the study area during the 2012 season (Table A 6).

In 2012, eighteen active nests of Common Black-Hawks were monitored in the Cliff-Gila Valley. Eleven of these nests were on land managed by the U Bar Ranch, five were on TNC lands, and two were found in the Gila Bird Area, managed by the U.S. Forest Service.

Both Gila Woodpeckers and Abert's Towhees nest in riparian woods found in the Cliff-Gila Valley (Shook 2008a, 2010a). Bell's Vireo, a summer resident and breeder, is found breeding from the Gila Bird Area north to the Gauging Station above Mogollon Creek.

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APPENDIX A

Table A 1. Six year Survey Results for Historic Northern "U Bar" Patches.

Patch	Woodward 2007			Shook 2008			Shook 2009			Shook 2010			Shook 2011			Shook 2012			
	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	
NE 1	First Census	2	0	2	0	0	0	0	0	0	7	1	3	13	6	7	10	5	5
	Second Census	7	2	5	15	6	9	5	1	3	15	4	11	18	9	9	19	9	10
	Third Census	5	1	4	11	5	6	10	5	5	26	10	16	14	6	8	19	9	10
	Total	5	1	4	11	5	6	10	5	5	28	12	16	18	8	10	20	10	10
NE 2	First Census	3	1	2	1	0	1	4	0	4	5	1	4	9	4	5	15	7	8
	Second Census	3	1	2	2	1	1	9	3	6	5	2	3	11	5	5	16	8	8
	Third Census	2	1	1	2	1	1	9	3	6	10	5	5	12	5	5	15	7	8
	Total	2	1	1	2	1	1	9	3	6	10	5	5	14	7	7	16	8	8
NE 3	First Census	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1
	Second Census	2	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Third Census	1	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
NE 4	First Census	13	5	8	4	1	3	4	0	4	11	3	5	6	2	4	6	3	3
	Second Census	21	8	13	14	7	7	12	4	7	13	4	9	9	4	4	7	3	4
	Third Census	20	8	12	10	5	5	19	9	10	15	7	8	10	5	5	6	3	3
	Total	20	8	12	13	6	7	20	10	10	17	8	9	11	5	6	8	4	4
NE 5	First Census	2	0	2	0	0	0	0	0	0	0	0	0	6	3	3	6	1	5
	Second Census	1	0	1	7	2	5	0	0	0	4	2	2				9	3	6
	Third Census	1	0	1	0	0	0	0	0	0	2	1	1	3	1	2	8	3	5
	Total	1	0	1	4	2	2	0	0	0	2	1	1	5	2	3	12	5	7
NW String	First Census	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Second Census	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Third Census	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW 1	First Census	2	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Second Census	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Third Census	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NW 2	First Census	1	0	1	0	0	0	0	0	0	0	0	0	2	0	1	4	2	2
	Second Census	1	0	1	2	1	1	2	1	1	3	1	2	4	2	2	6	3	3
	Third Census	1	0	1	0	0	0	2	1	1	4	2	2	4	2	2	3	1	2
	Total	1	0	1	0	0	0	2	1	1	4	2	2	4	2	2	6	3	3
NW 3	First Census	2	0	2	3	1	2	2	1	1	0	0	0	0	0	0	0	0	0
	Second Census	0	0	0	0	0	0	2	1	1	2	1	1	0	0	0	0	0	0
	Third Census	0	0	0	0	0	0	6	3	3	3	1	2	0	0	0	4	2	2
	Total	0	0	0	0	0	0	6	3	3	3	1	2	0	0	0	4	2	2
NW 4	First Census	12	5	7	11	3	8	16	8	8	8	4	4	2	0	1	8	3	5
	Second Census	10	4	6	12	4	8	17	8	9	7	2	5	12	6	6	14	7	7
	Third Census	13	6	7	13	6	7	19	9	10	5	2	2	7	2	2	18	8	10
	Total	13	6	7	12	5	7	21	10	11	10	5	5	12	6	6	19	9	10
Bennett	First Census	94	44	50	79	29	50	69	33	37	70	34	36	29	13	16	31	14	17
	Second Census	78	39	39	71	32	39	78	35	39	79	35	39	58	28	28	32	13	19
	Third Census	94	46	48	72	32	40	70	30	30	70	29	30	52	22	25	32	14	18
	Total	98	48	50	82	37	45	98	49	49	90	44	46	70	35	35	39	18	21
NW 5	First Census										0	0	0	0	0	0	0	0	0
	Second Census										0	0	0	0	0	0	2	1	1
	Third Census										0	0	0	0	0	0	0	0	0
	Total										0	0	0	0	0	0	2	1	1
Total	141	64	77	126	57	69	166	81	85	164	78	86	134	65	69	126	60	66	
Key	A= Adults			P = Pairs			T = Territories												

Table A 2. Six Year Survey Results for the Historic Southern "U Bar" Patches

		Woodward 2007			Shook 2008			Shook 2009			Shook 2010			Shook 2011			Shook 2012		
		Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T
SW String	First Census	16	6	10	22	9	13	14	6	8	16	6	10	15	7	7	6	3	3
	Second Census	17	6	11	26	13	13	17	8	8	23	11	12	15	7	7	8	4	4
	Third Census	17	8	9	16	8	8	15	6	6	26	12	12	11	4	5	5	2	3
	Total	17	8	9	20	10	10	19	9	10	28	14	14	16	8	8	8	4	4
SW 1	First Census	6	3	3	10	5	5	3	1	2	7	3	4	4	2	2	5	2	3
	Second Census	10	4	6	10	5	5	6	3	3	5	1	4	6	3	3	6	3	3
	Third Census	8	4	4	10	5	5	8	4	4	6	3	3	7	3	3	10	5	5
	Total	9	4	5	10	5	5	8	4	4	6	3	3	8	4	4	10	5	5
SW 2	First Census	3	1	2	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0
	Second Census	3	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Third Census	2	1	1	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0
	Total	2	1	1	2	1	1	0	0	0	2	1	1	0	0	0	0	0	0
Beaver Pond Str	First Census	11	5	6	9	4	5	10	5	5	9	4	5	6	3	3	4	2	2
	Second Census	12	5	7	11	5	6	12	6	6	11	5	6	14	7	7	4	2	2
	Third Census	10	5	5	5	2	3	12	6	6	9	3	3	7	3	3	4	2	2
	Total	10	5	5	11	5	6	12	6	6	12	6	6	14	7	7	4	2	2
SW 3	First Census	6	3	3	6	3	3	4	2	2	1	0	1	2	1	1	2	1	1
	Second Census	7	3	4	6	3	3	5	2	3	3	1	1	4	2	2	2	1	1
	Third Census	8	4	4	6	3	3	3	1	2	4	2	2	6	3	3	4	2	2
	Total	8	4	4	8	4	4	6	2	4	4	2	2	6	3	3	4	2	2
SW 4	First Census	4	2	2	3	1	2	4	2	2	1	0	1	0	0	0	0	0	0
	Second Census	3	1	2	3	1	2	2	1	1	1	0	1	0	0	0	2	1	1
	Third Census	3	1	2	2	1	1	1	0	1	5	2	3	2	1	1	3	1	2
	Total	3	1	2	4	2	2	2	1	1	5	2	3	2	1	1	3	1	2
SE 0	First Census	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Second Census	0	0	0	0	0	0	4	2	2	0	0	0	2	0	2	0	0	0
	Third Census	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	4	2	2	0	0	0	0	0	0	0	0	0
SE 1	First Census	37	15	22	44	18	26	30	9	17	53	15	27	36	16	19	28	14	14
	Second Census	34	15	19	44	20	24	30	9	18	57	18	34	50	22	27	48	22	26
	Third Census	67	33	34	46	21	25	37	17	18	77	28	36	53	22	26	40	20	20
	Total	69	34	35	50	22	28	41	19	20	95	45	50	63	30	32	51	25	26
SE 2	First Census	4	1	3	0	0	0	0	0	0	4	2	2	2	1	1	3	1	2
	Second Census	5	1	4	12	6	6	4	2	2	9	4	4	4	2	2	4	2	2
	Third Census	2	0	2	1	0	1	5	2	3	8	4	4	3	1	1	4	2	2
	Total	2	0	2	7	3	4	7	3	4	10	5	5	4	2	2	4	2	2
SE 3	First Census	7	3	4	4	1	3	3	0	3	7	3	4	4	0	3	9	4	5
	Second Census	7	3	4	6	3	3	8	3	5	14	6	8	14	7	7	9	4	5
	Third Census	6	3	3	12	5	7	10	5	5	14	6	7	14	7	7	9	4	5
	Total	6	3	3	12	5	7	12	6	6	20	10	10	14	7	7	13	6	7
SE 4	First Census	1	0	1	11	3	8	9	3	6	6	1	4	3	0	3	4	1	3
	Second Census	1	0	1	11	5	6	12	4	7	14	5	9	14	6	8	18	8	10
	Third Census	2	1	1	8	4	4	10	5	5	19	8	11	11	5	5	15	6	9
	Total	2	1	1	8	4	4	12	6	6	22	10	12	16	8	8	19	8	11
Total from Southern Patches		128	61	67	132	61	71	123	58	63	204	98	106	143	70	72	116	55	61

A = Adults P = Pairs T = Territories

Total from Northern Patches	141	64	77	126	57	69	166	81	85	164	78	86	134	65	69	126	60	66
Grand Total for "U Bar"	269	125	144	258	118	140	289	139	148	368	176	192	277	135	141	242	115	127
Total from Additional Patches	10	NA	10	20	9	11	52	25	27	57	27	30	37	18	19	30	14	16

Grand Total for Cliff/Gila Valley	279	125	154	278	127	151	341	164	175	425	203	222	314	153	160	272	129	143
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Table A 3. Additional Patches Surveyed in 2012

Patch	Shook 2007			Shook 2008			Shook 2009			Shook 2010			Shook 2010			Shook 2010					
	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T	Ad	P	T			
Mogollon Creek - North -TNC	First Census						0	0	0	3	1	2	2	1	1	0	0	0			
	Second Census						0	0	0	2	1	1	0	0	0	0	0	0			
	Third Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Total						0	0	0	0	0	0	0	0	0	0	0	0			
Mogollon Creek - South -Forest Service -TNC	First Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Second Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Third Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Total						0	0	0	0	0	0	0	0	0	0	0	0			
TNC West -TNC	First Census						2	1	1	0	0	0	0	0	0	1	0	1			
	Second Census						6	3	3	2	1	1	0	0	0	1	0	1			
	Third Census						0	0	0	2	1	1	1	0	1	0	0	0			
	Total						4	2	2	2	1	1	1	0	1	1	0	1			
TNC - Lichty Center -TNC	First Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Second Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Third Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Total						0	0	0	0	0	0	0	0	0	0	0	0			
Fort West Ditch West -Private	First Census						0	0	0	2	1	1	2	1	1	0	0	0			
	Second Census						8	4	4	7	3	4	6	3	3	0	0	0			
	Third Census						4	2	2	9	4	4	6	3	3	0	0	0			
	Total						10	5	5	12	6	6	6	3	3	0	0	0			
Iron Bridge West -TNC	First Census						2	0	2	3	1	2	0	0	0	0	0	0			
	Second Census						7	2	5	3	0	2	4	2	2	3	1	2			
	Third Census						9	4	5	10	4	4	4	2	2	3	1	2			
	Total						9	4	5	12	6	6	4	2	2	3	1	2			
Iron Bridge East -TNC	First Census						0	0	0	1	0	0	0	0	0	0	0	0			
	Second Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Third Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Total						0	0	0	0	0	0	0	0	0	0	0	0			
Bill Evans Road West -Freeport-McMoRan	First Census						3	1	2	1	0	1	5	1	2	7	3	4			
	Second Census						2	0	0	6	2	4	6	3	3	7	3	4			
	Third Census						4	2	2	6	2	4	7	3	3	12	6	6			
	Total						4	2	2	6	2	4	8	4	4	12	6	6			
Bill Evans Road East -Freeport-McMoRan	First Census						0	0	0	2	1	1	0	0	0	0	0	0			
	Second Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Third Census						0	0	0	0	0	0	0	0	0	0	0	0			
	Total						0	0	0	0	0	0	0	0	0	0	0	0			
Mangas Creek -Freeport-McMoRan	First Census												0	0	0						
	Second Census												0	0	0						
	Third Census												0	0	0						
	Total												0	0	0						
Fort West Ditch -Forest Service	First Census			0	NA	0	4	0	4	3	0	3	3	1	2	4	0	4	8	4	4
	Second Census			5	NA	5	7	2	5	6	2	4	7	2	5	12	6	6	3	1	2
	Third Census			2	NA	2	8	4	4	7	3	4	9	4	5	11	5	6	6	3	3
	Total			5	NA	5	8	4	4	9	4	5	9	4	5	12	6	6	6	3	3
Gila Bird Area -Forest Service	First Census			1	NA	1	8	3	6	8	3	4	3	1	2	2	1	1	4	2	2
	Second Census			5	NA	5	16	8	8	16	8	8	13	6	7	3	1	2	8	4	4
	Third Census			1	NA	1	12	5	7	14	7	7	12	5	6	2	1	1	2	1	1
	Total			5	NA	5	12	5	7	16	8	8	16	8	8	6	3	3	8	4	4
Total	10	NA	10	20	9	11	52	25	27	57	27	30	37	18	19	30	14	16			

Key Ad = Adults P = Pairs T = Territories

A4. North Redrock Patches - 2012

Patch		Shook 2012		
		Ad	P	T
BCN1	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCN2	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCN3	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCN4	First Census	3	1	2
	Second Census	3	1	2
	Third Census	1	0	1
	Total	3	1	2
BCN5	First Census	6	3	3
	Second Census	4	2	2
	Third Census	0	0	0
	Total	4	2	2
BCN6	First Census	4	2	2
	Second Census	2	1	1
	Third Census	2	1	1
	Total	4	2	2
BCN7	First Census	11	5	6
	Second Census	15	5	9
	Third Census	18	6	10
	Total	19	9	10
BCN8	First Census	2	1	1
	Second Census	7	3	5
	Third Census	22	8	12
	Total	23	11	12
BCN9	First Census	5	2	3
	Second Census	2	1	1
	Third Census	0	0	0
	Total	2	1	1
Total		55	26	29

Ad = Adults
P = Pairs
T = Territories

Patch		Shook 2012		
		Ad	P	T
BCS1	First Census	3	1	2
	Second Census	2	1	1
	Third Census	6	3	3
	Total	6	3	3
BCS2	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCS3	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCS4	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCS5	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCS6	First Census	0	0	0
	Second Census	0	0	0
	Third Census	0	0	0
	Total	0	0	0
BCS7	First Census	18	7	11
	Second Census	13	6	7
	Third Census	10	5	5
	Total	16	7	9
BCS8	First Census	0	0	0
	Second Census	2	1	1
	Third Census	0	0	0
	Total	1	0	1
Total Southern Patches		23	10	13
Total Northern Patches		55	26	29
Grand Total Redrock		78	36	42

Key Ad = Adults
P = Pairs
T = Territories

Table A 6. 2012 Detections of Presence/Absence of Yellow-billed Cuckoos by Patch, Cliff-Gila Valley

Patch	Yellow-billed Cuckoo		
	Survey 1	Survey 2	Survey 3
SW String			
SW 1			X
SW 2			X
Beaver Pond Stringer		X	
SW 3			
SW 4		X	X
SE 0			
SE 1		X	X
SE 2			X
SE 3		X	
SE 4		X	X
NE 1			
NE 2			X
NE 3			
NE 4			
NE 5			
NW Stringer			
NW 1			
NW 2			
NW 3			X
NW 4			X
NW 5			X
Bennett		X	X
Bill Evans Road		X	X

Table A 6. 2011 Detections of Presence/Absence of Yellow-billed Cuckoos by Patch (Cont.). Cliff-Gila Valley

Patch	Yellow-billed Cuckoo		
	Survey 1	Survey 2	Survey 3
Bill Evans Rd			
Fort West Ditch		X	X
Fort West Ditch West			
Gila Bird Area	X	X	X
Mangas Creek			
Mogollon Creek North			
Mogollon Creek South			X
TNC - Lichty Center			
TNC West			
TNC - Iron Bridge		X	

Table A 7. 2012 Detections of Presence/Absence of Yellow-billed Cuckoos by Patch - Alta Cabral

Patch	Yellow-billed Cuckoo		
	Survey 1	Survey 2	Survey 3
BCN1			
BCN2			
BCN3			
BCN4			
BCN5			
BCN6			
BCN7			
BCN8		X	X
BCN9		X	X
BCN10			
BCS1			
BCS2			
BCS3			
BCS4			X
BCS5			
BCS6			
BCS7		X	
BCS8			

APPENDIX B

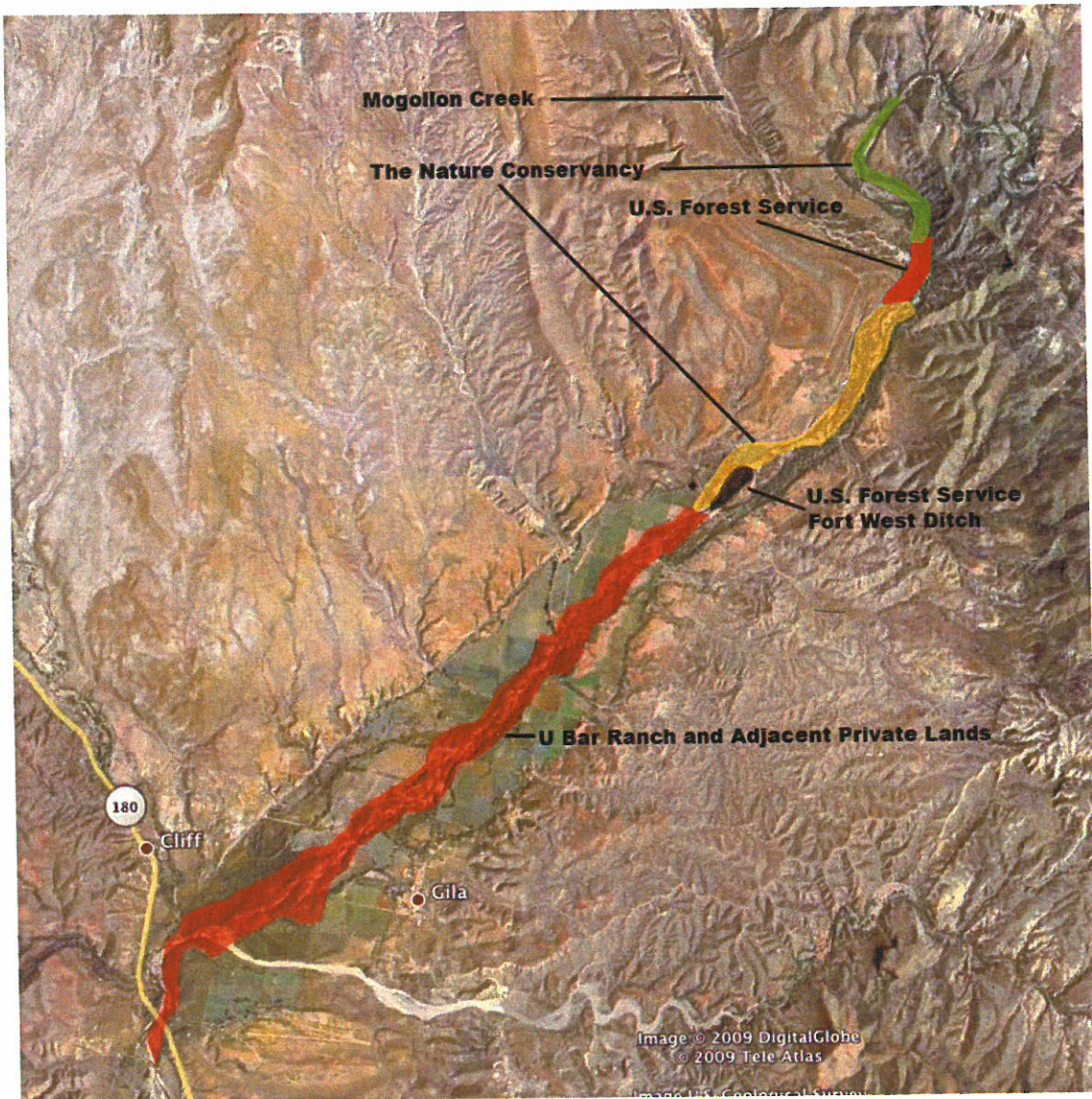


Figure B1. Image of the study area from the Highway 180 Bridge over the Gila River (in lower left-hand corner), north to the gauging station above Mogollon Creek (upper right-hand corner). Areas surveyed are labeled as to management authority or ownership. For the purposes of this image, the boundaries of the areas surveyed are only approximate. Detailed images of specific patches can be found in Appendix C.

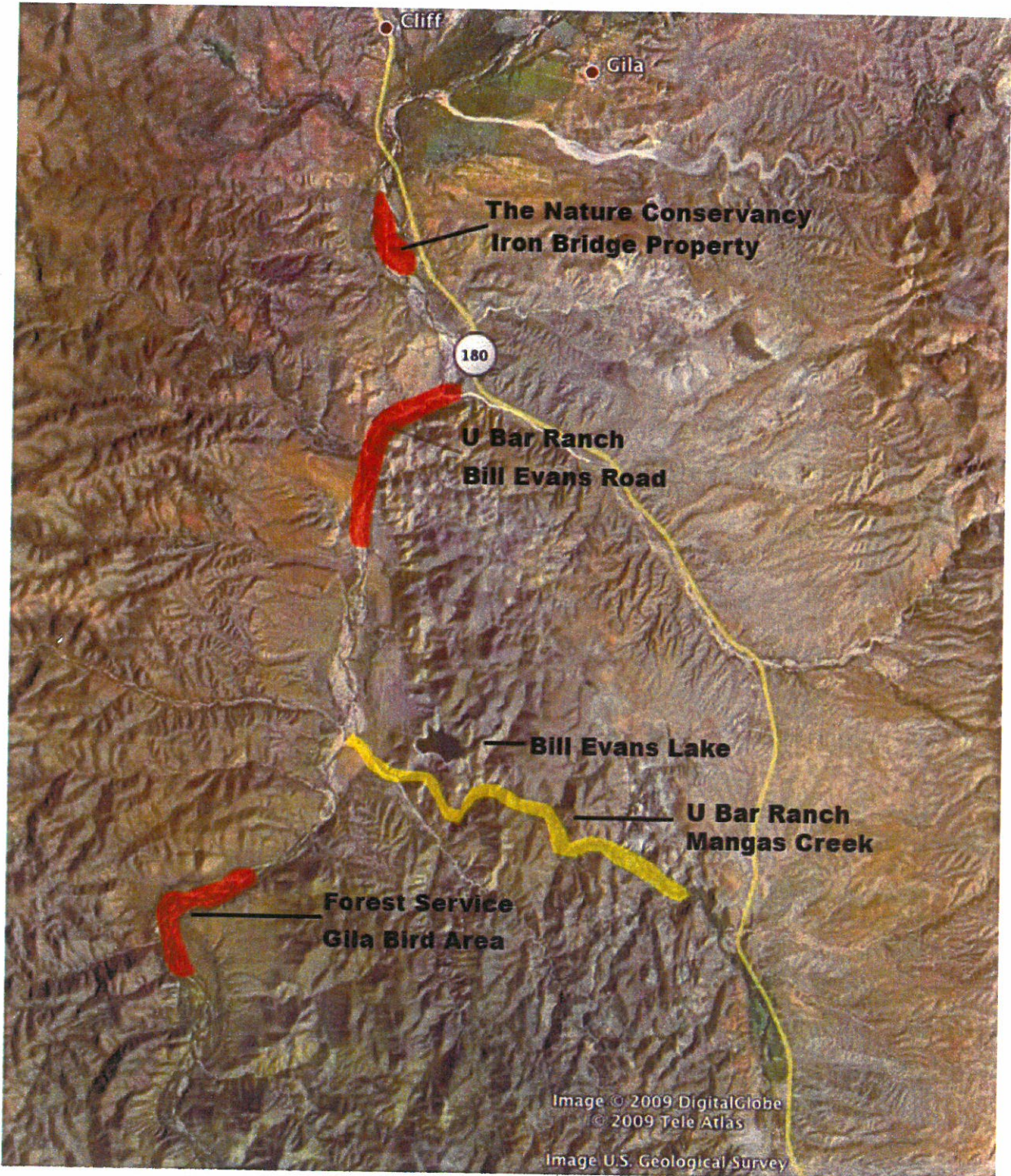


Figure B2. Image of the southern areas surveyed from Cliff (upper center), downstream to below the Gila Bird Area. General areas surveyed are labeled as to management authority or ownership. For the purposes of this image, the boundaries of the areas surveyed are only approximate. Detailed images of specific patches can be found in Appendix C.

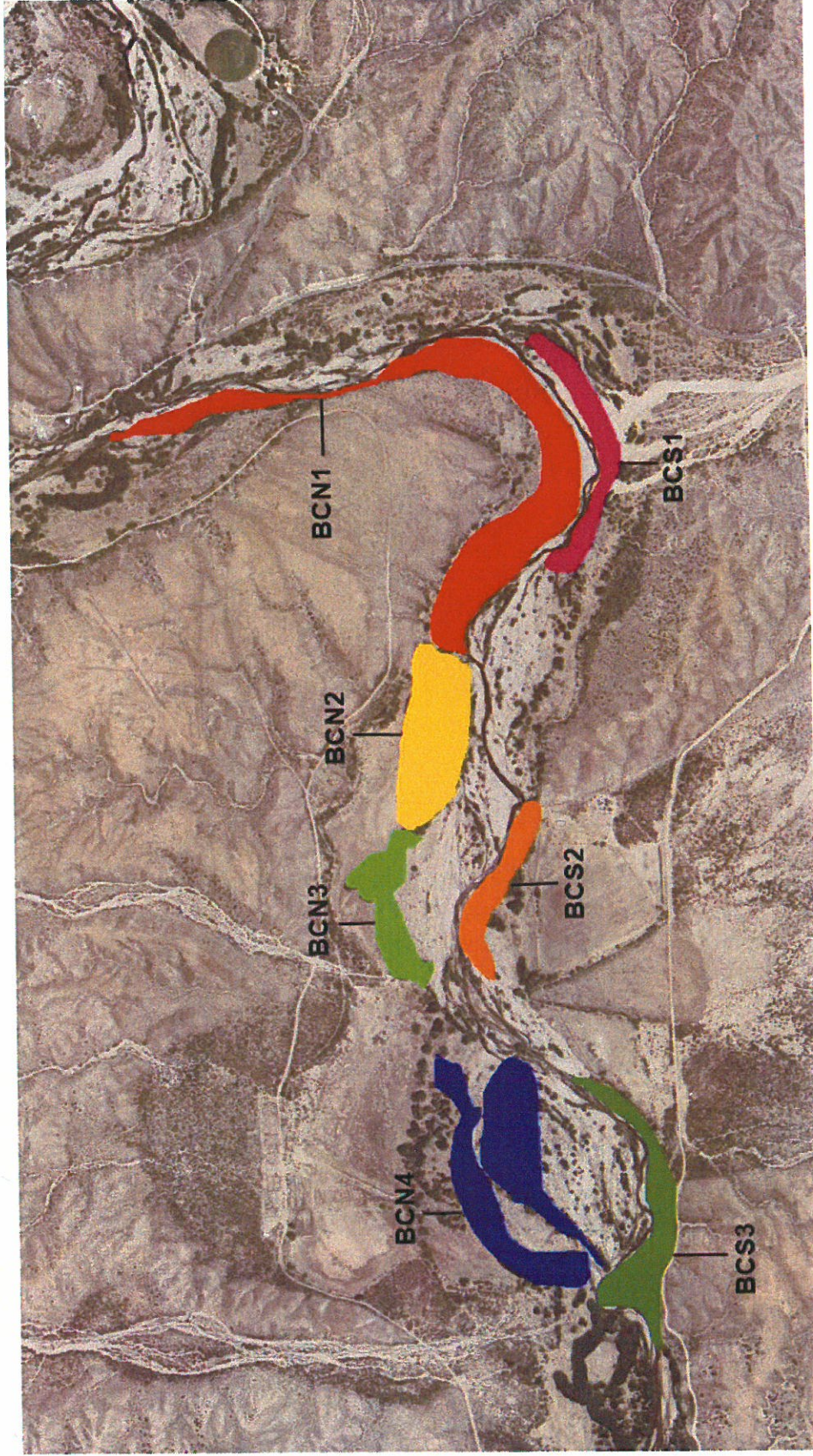


Figure B3. Image of the eastern part of the Alta Cabral study area. Patches that were surveyed are delineated and labeled. For the purposes of this image, the boundaries of the areas surveyed are only approximate. Detailed images of specific patches can be found in Appendix D. Aerial photo is from 2009.

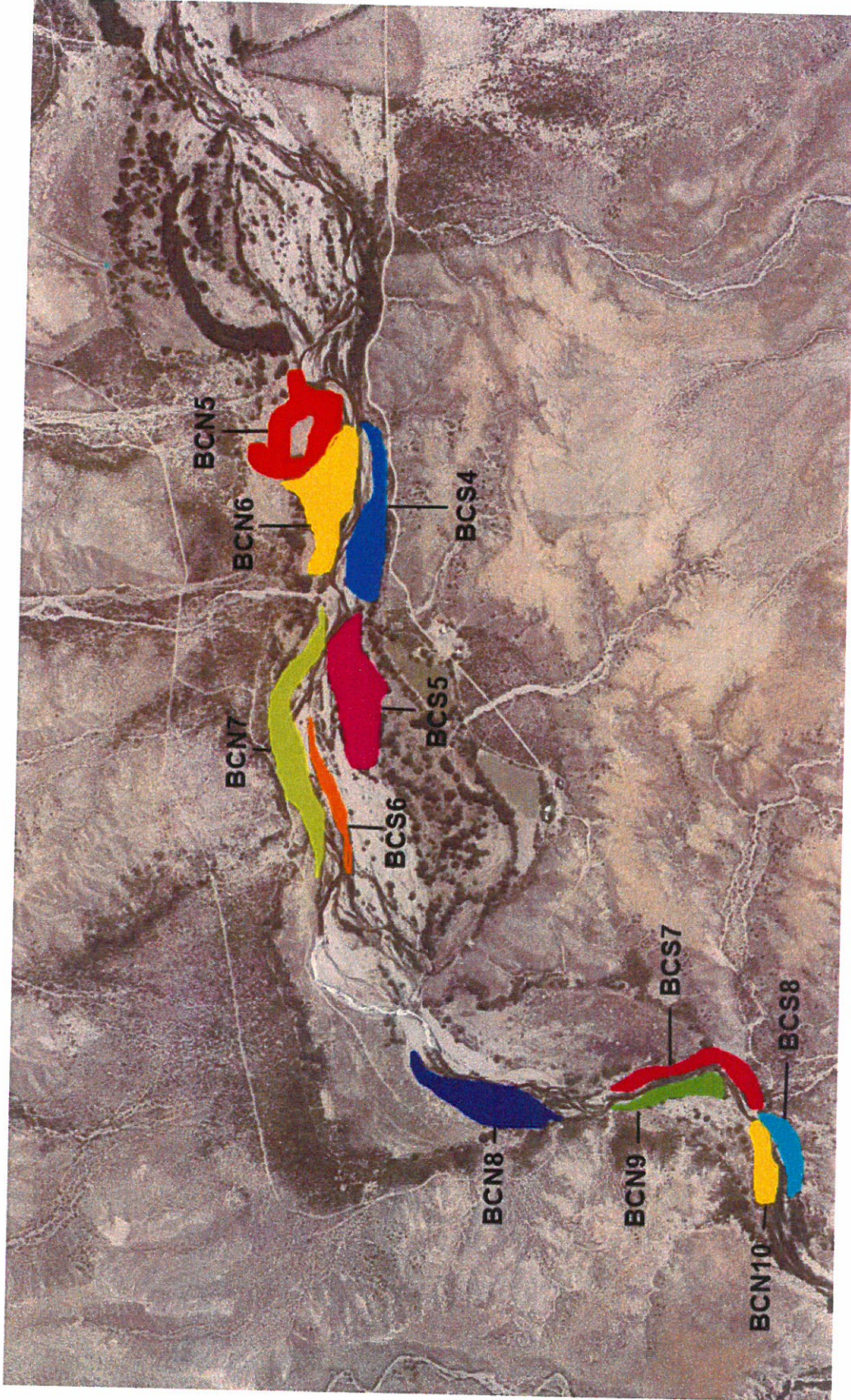


Figure B4. Image of the western part of the Alta Cabral study area. Patches that were surveyed are delineated and labeled. For the purposes of this image, the boundaries of the areas surveyed are only approximate. Detailed images of specific patches can be found in Appendix D. Aerial photo is from 2009.

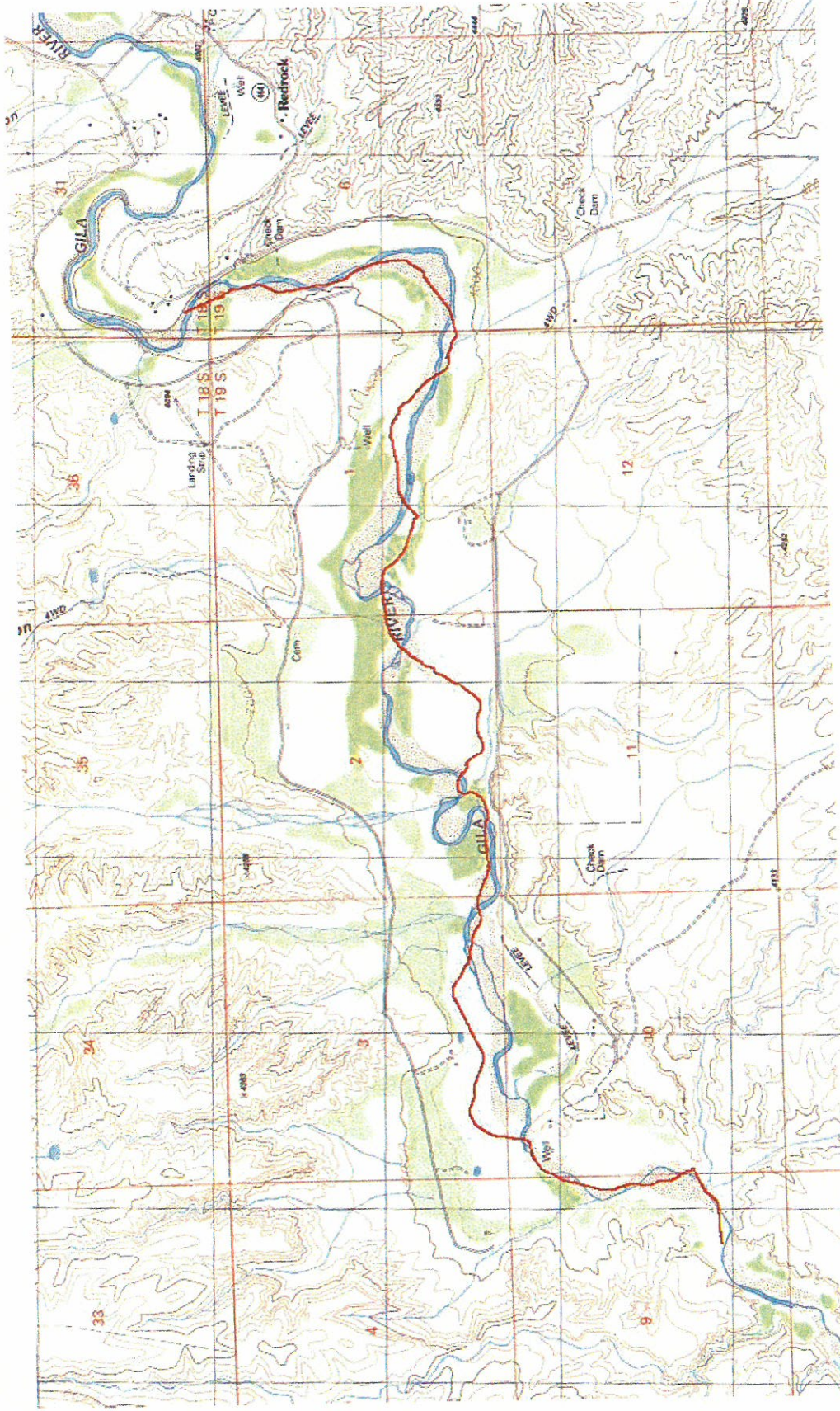


Figure B 5. The Alta Cabral study site with the 2009 course of the Gila River (drawn in red from aerial photographs) plotted on the 1990 Nichols Canyon and Redrock USGS Topographical Quadrangles (1:24,000).

APPENDIX C

Figure C 1. Beaver Pond Stringer. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

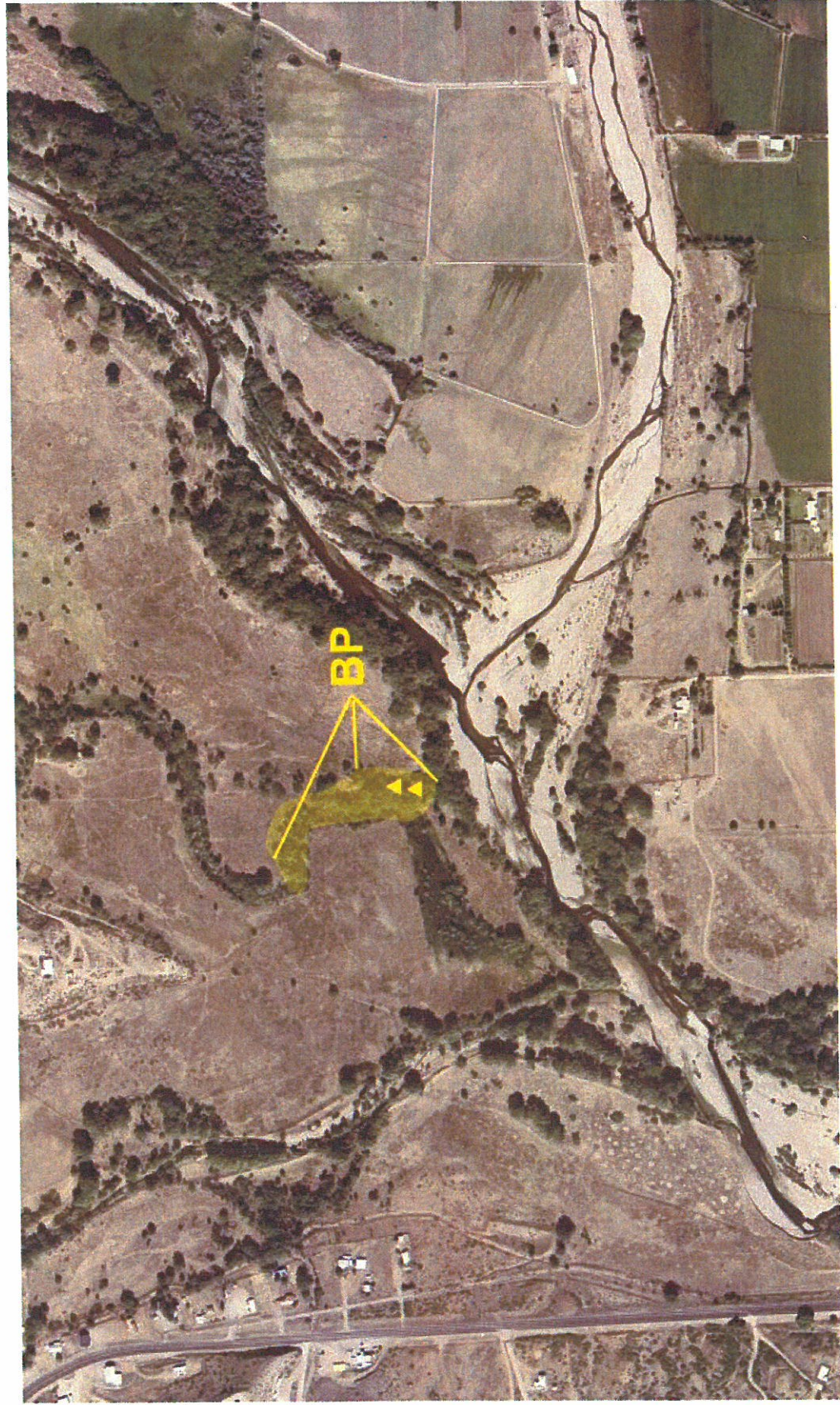


Figure C 1a. Beaver Pond Stringer Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

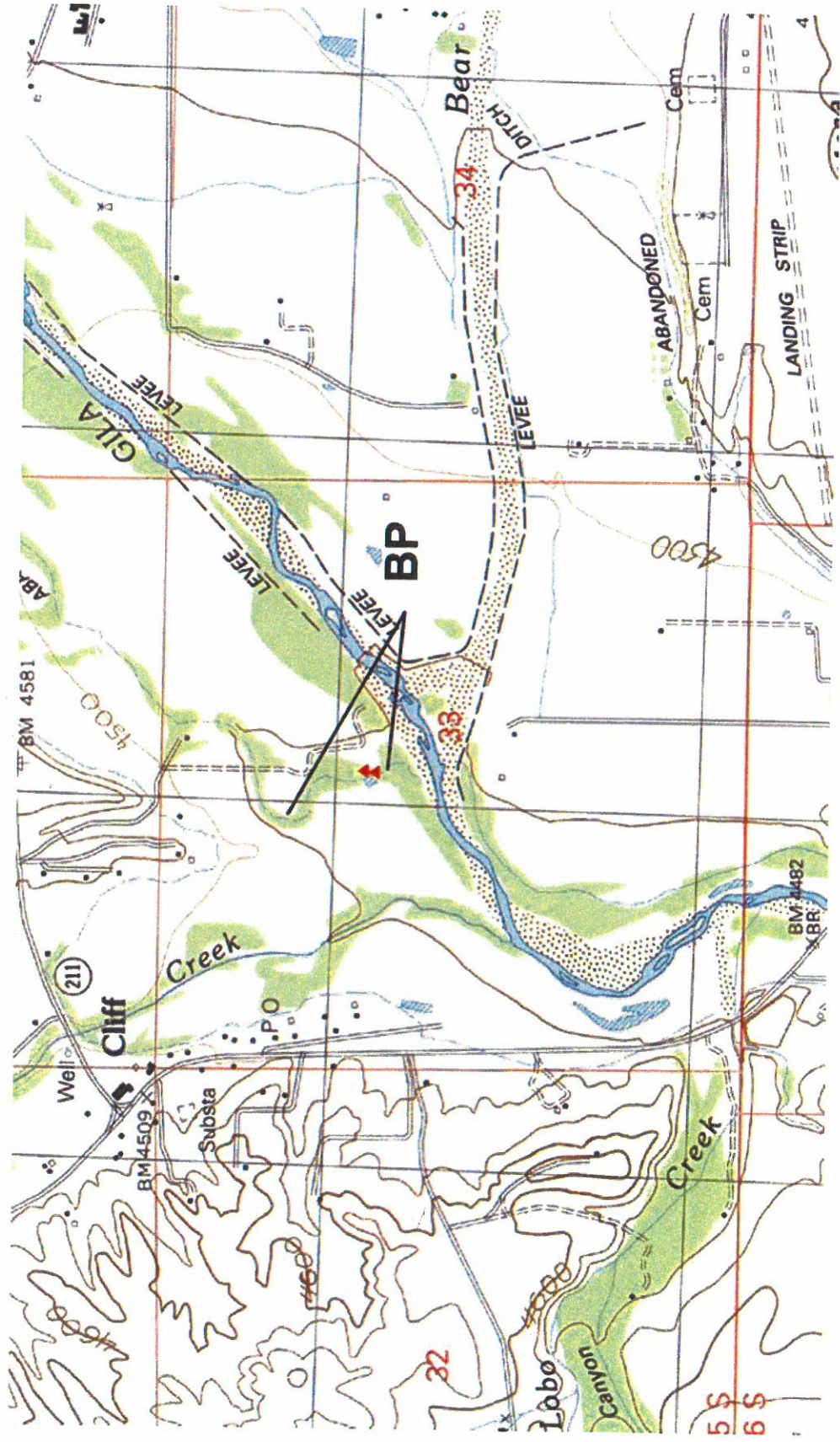


Figure C 2. Bennett. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon and Cliff USGS Topographical Quadrangle (1:24,000). Yellow diamonds represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

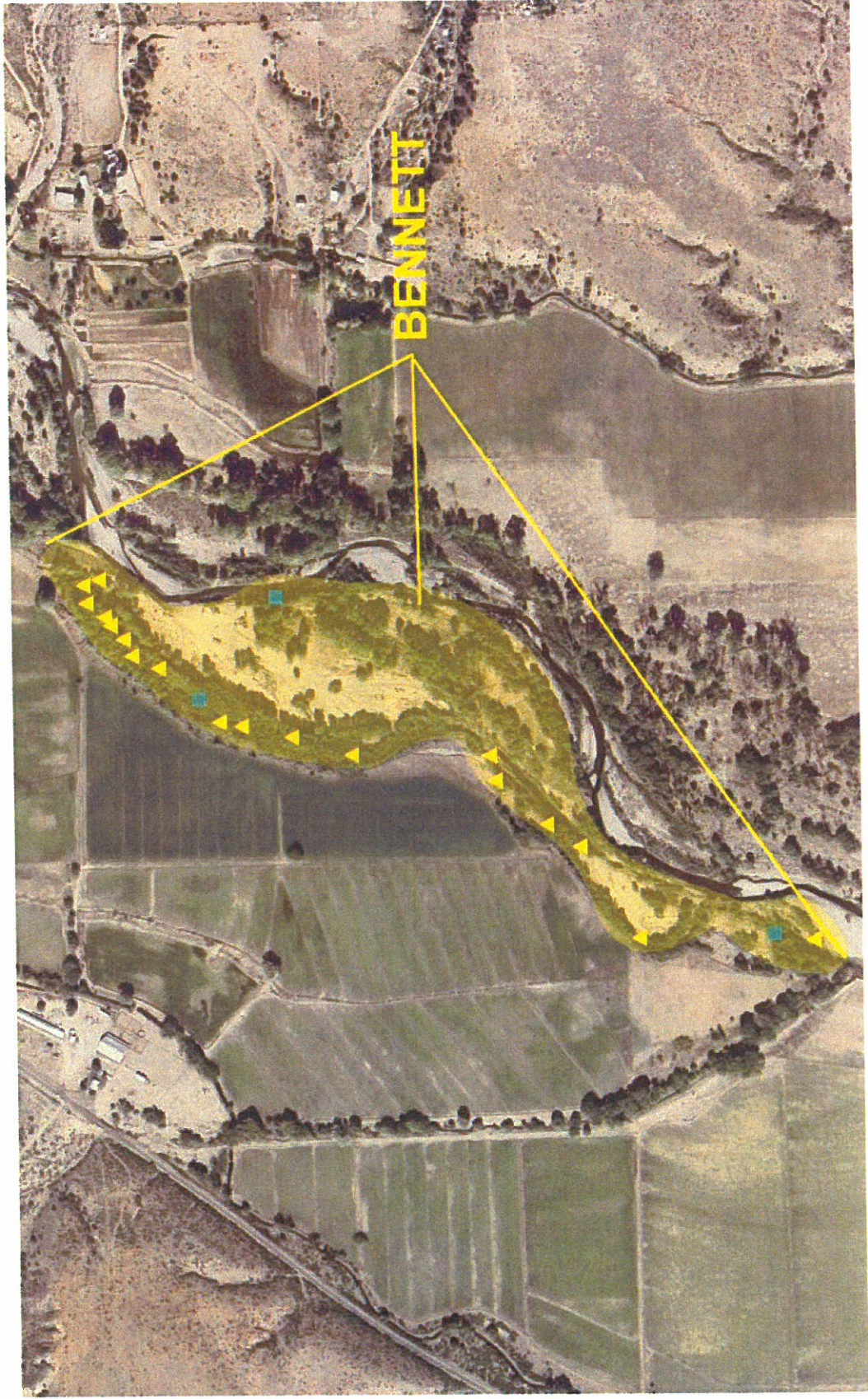


Figure C 3. Bill Evans Road East Upper. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow diamonds represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

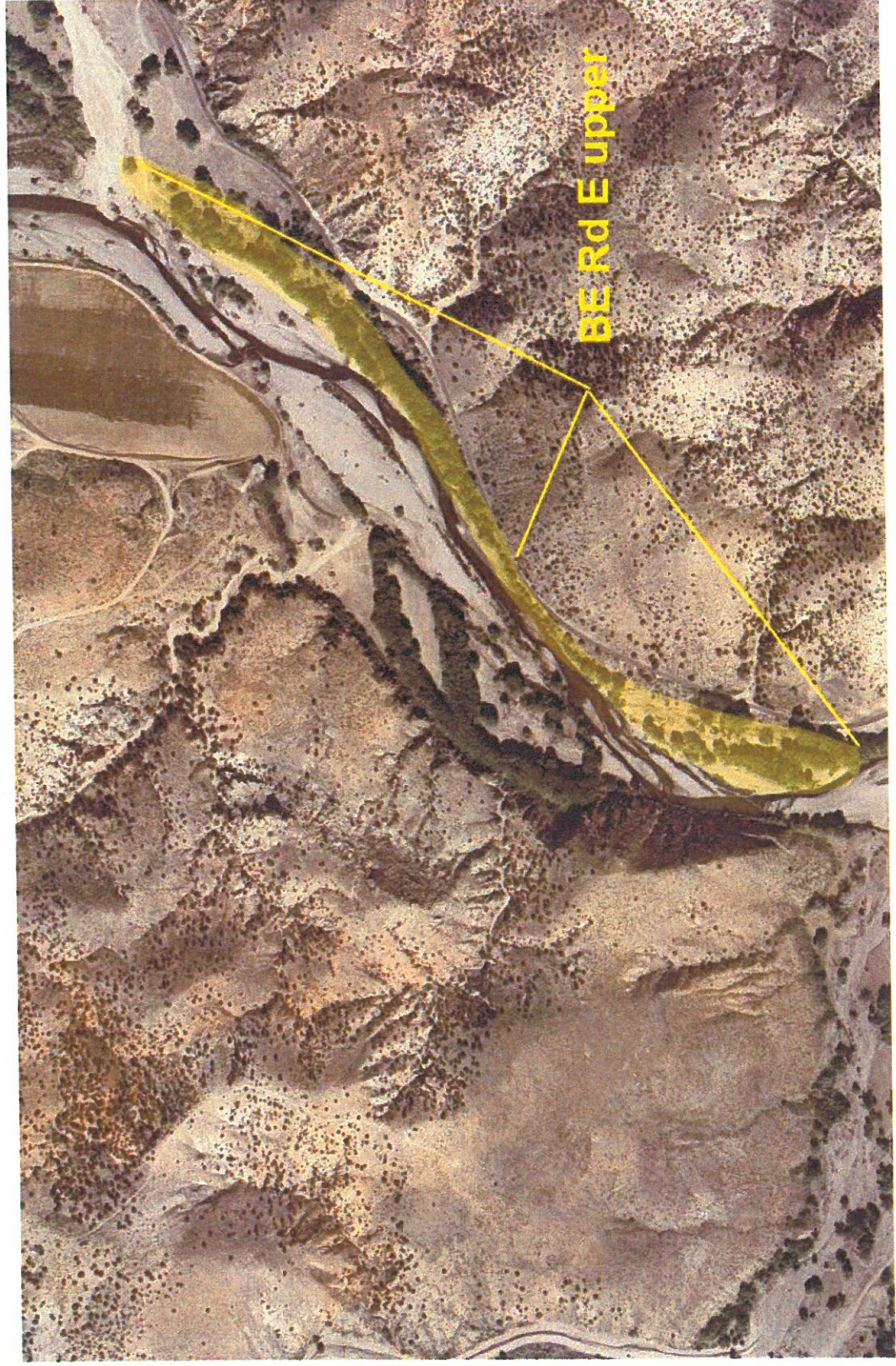


Figure C 3a. Bill Evans Road East upper Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

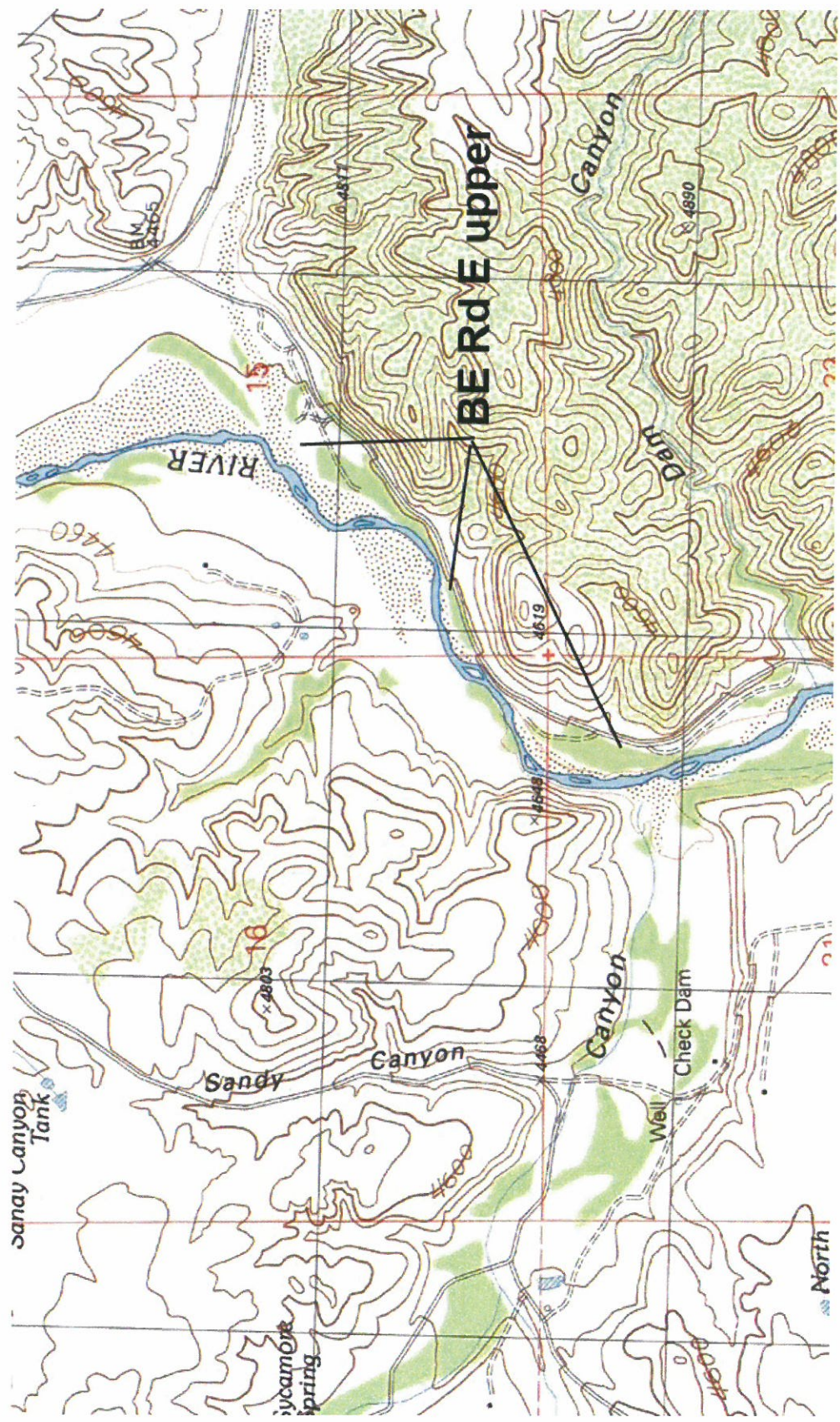


Figure C 3. Bill Evans Road East Lower. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 3a. Bill Evans Road East Lower Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

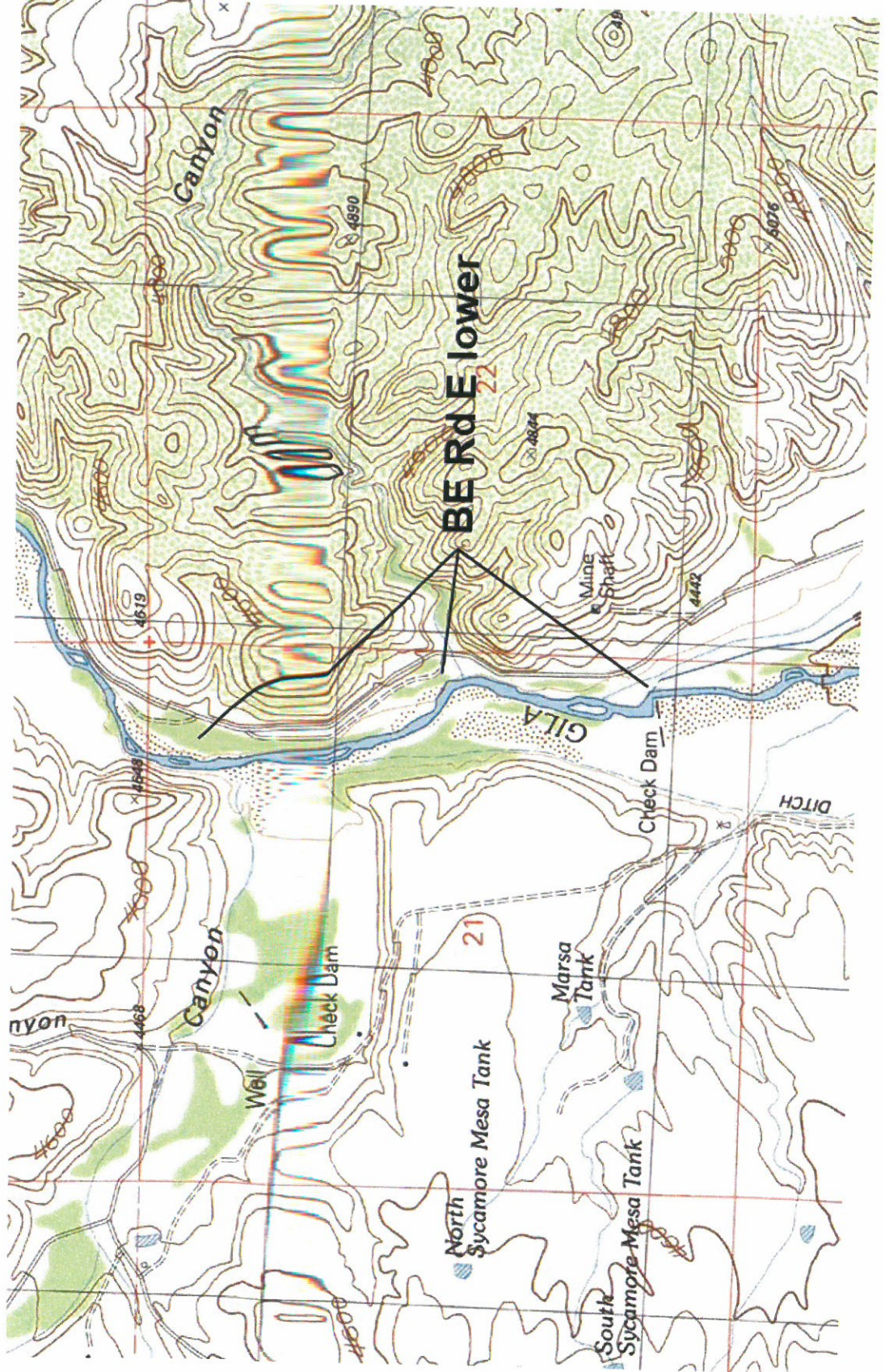


Figure C 4. Bill Evans Road West Upper. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow diamonds represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 4a. Bill Evans Road West Upper Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

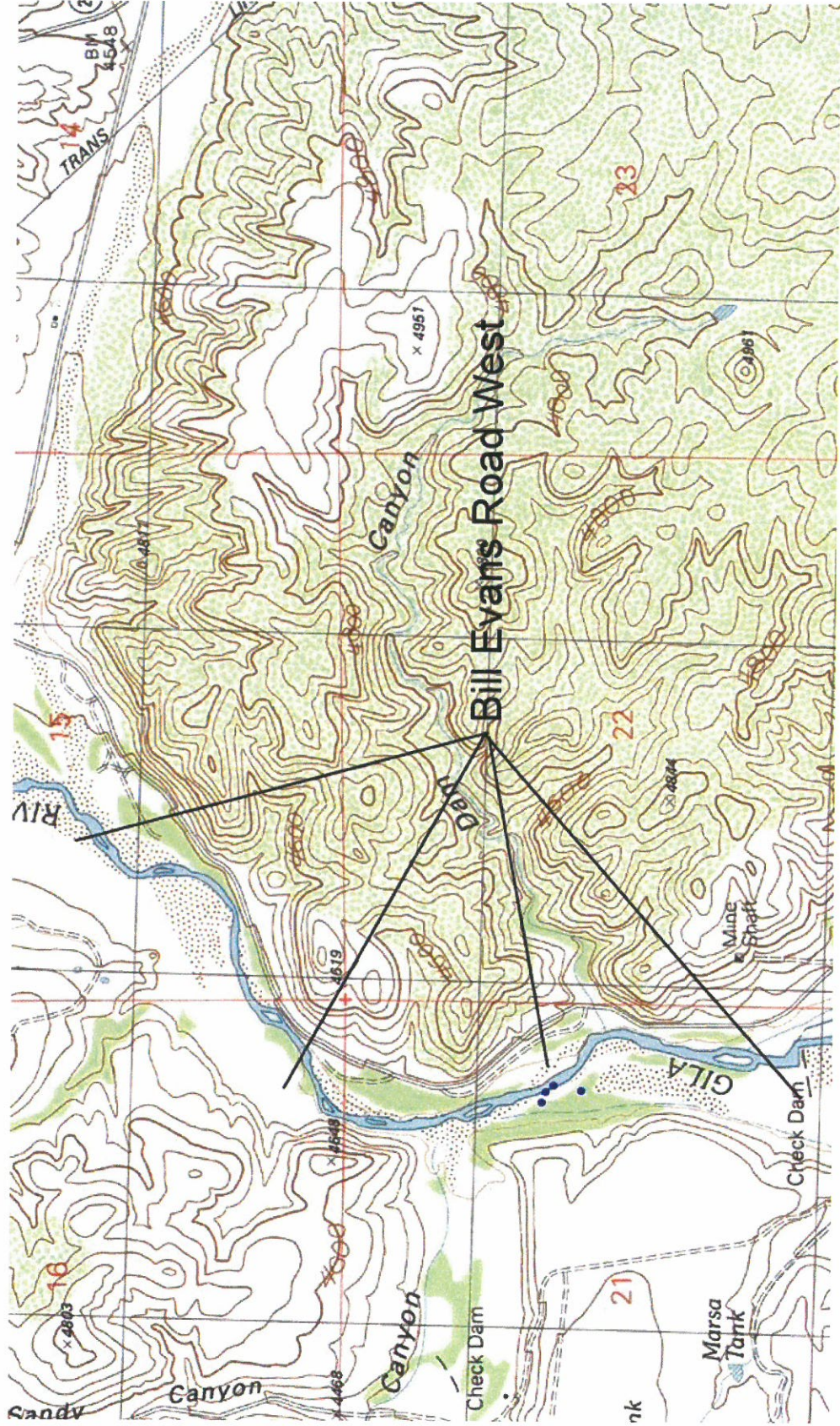


Figure C 4. Bill Evans Road West Lower. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

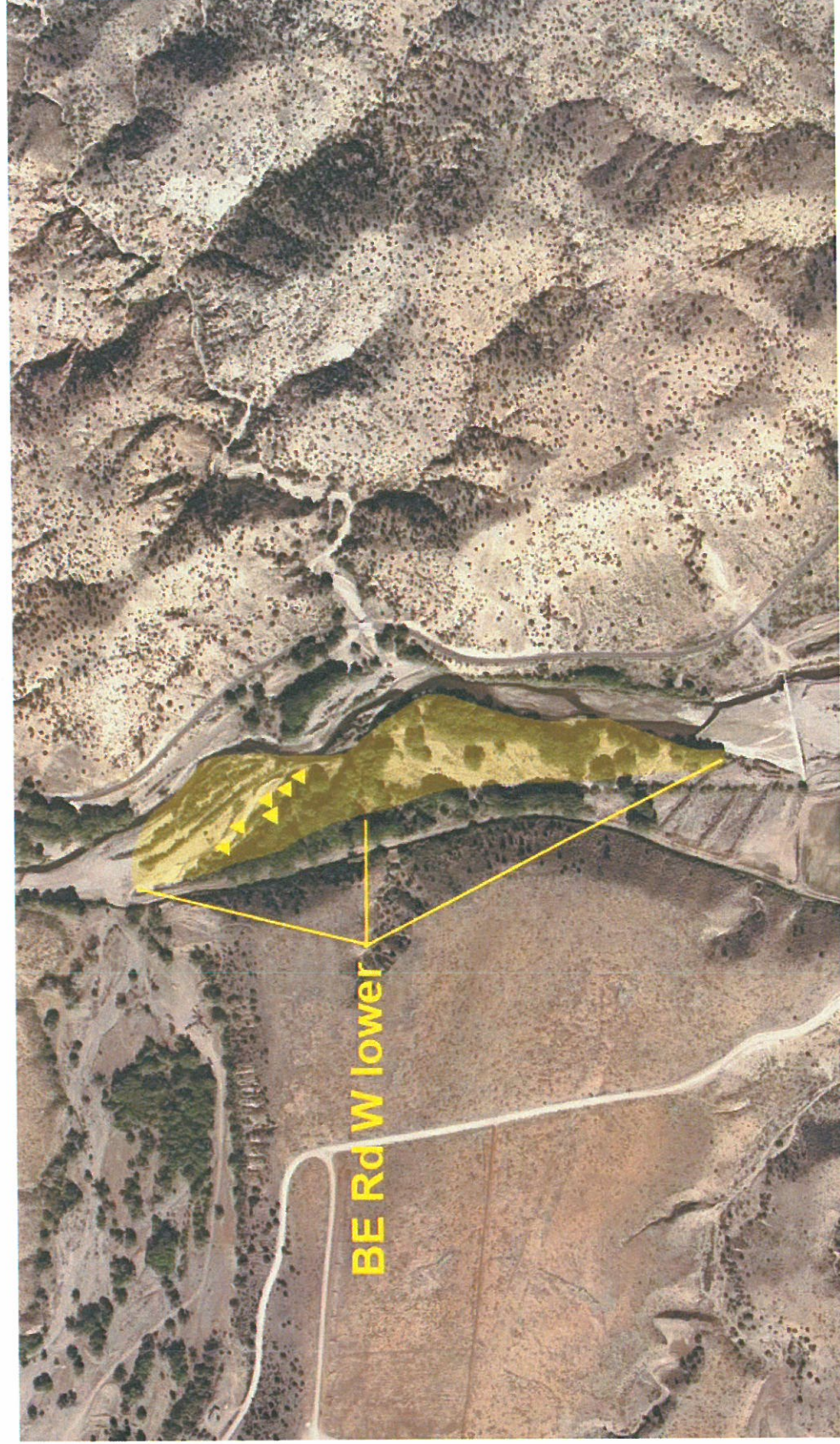


Figure C 5a. Fort West Ditch. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

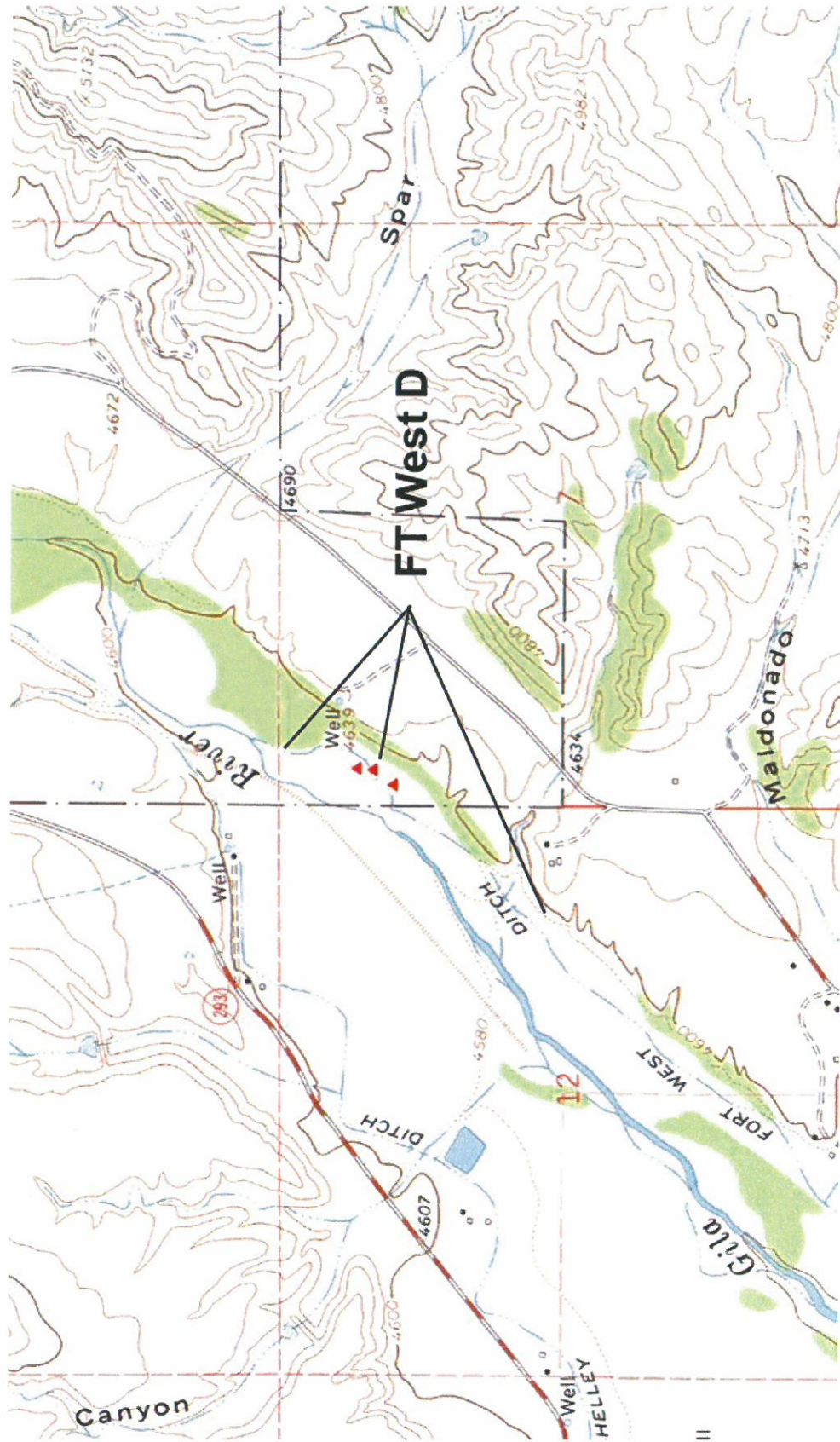


Figure C 6. Fort West Ditch West. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 6a. Fort West Ditch Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

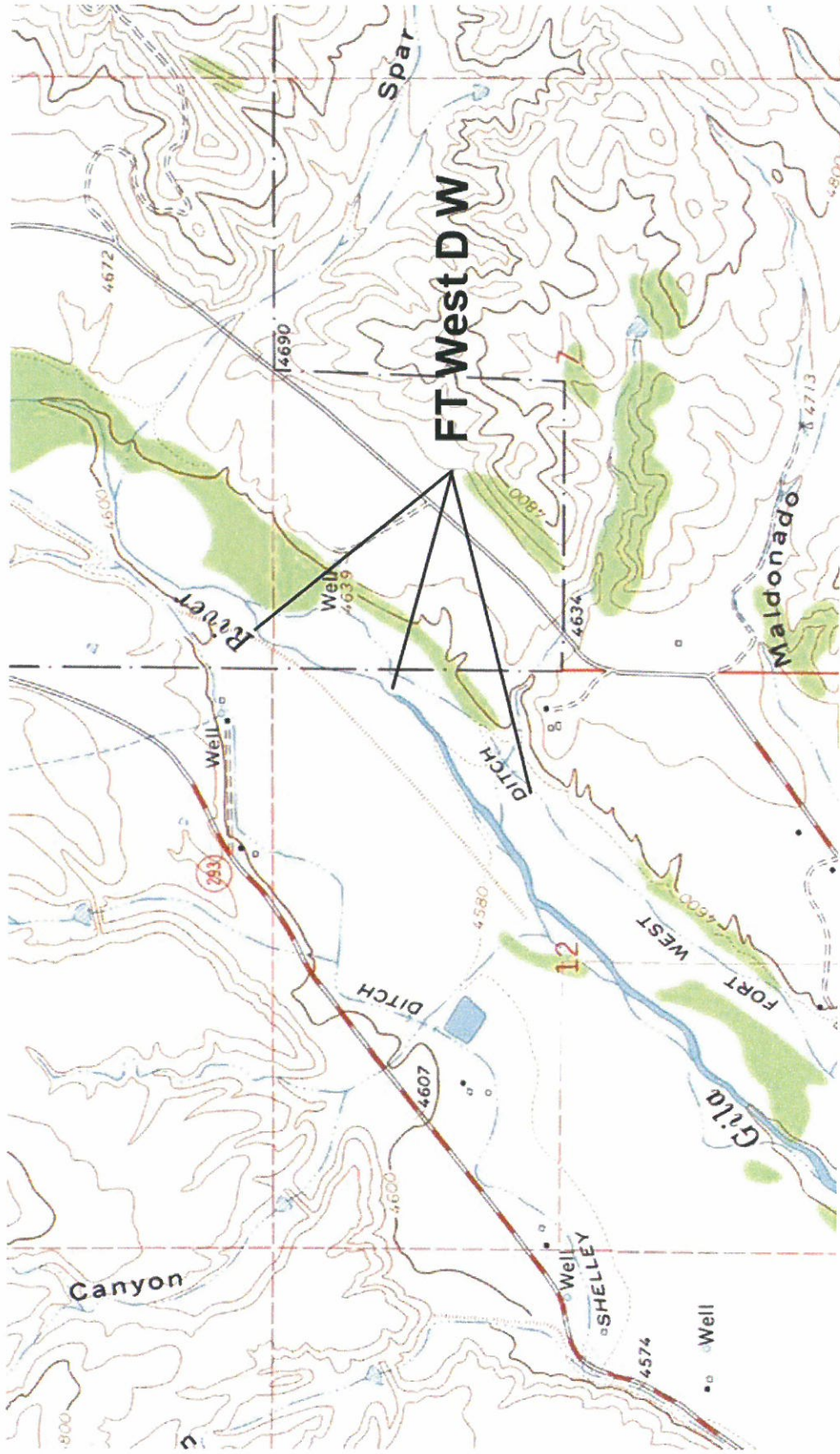


Figure C 7. Gila Bird Area. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Mangas Springs USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 8a. Iron Bridge East Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

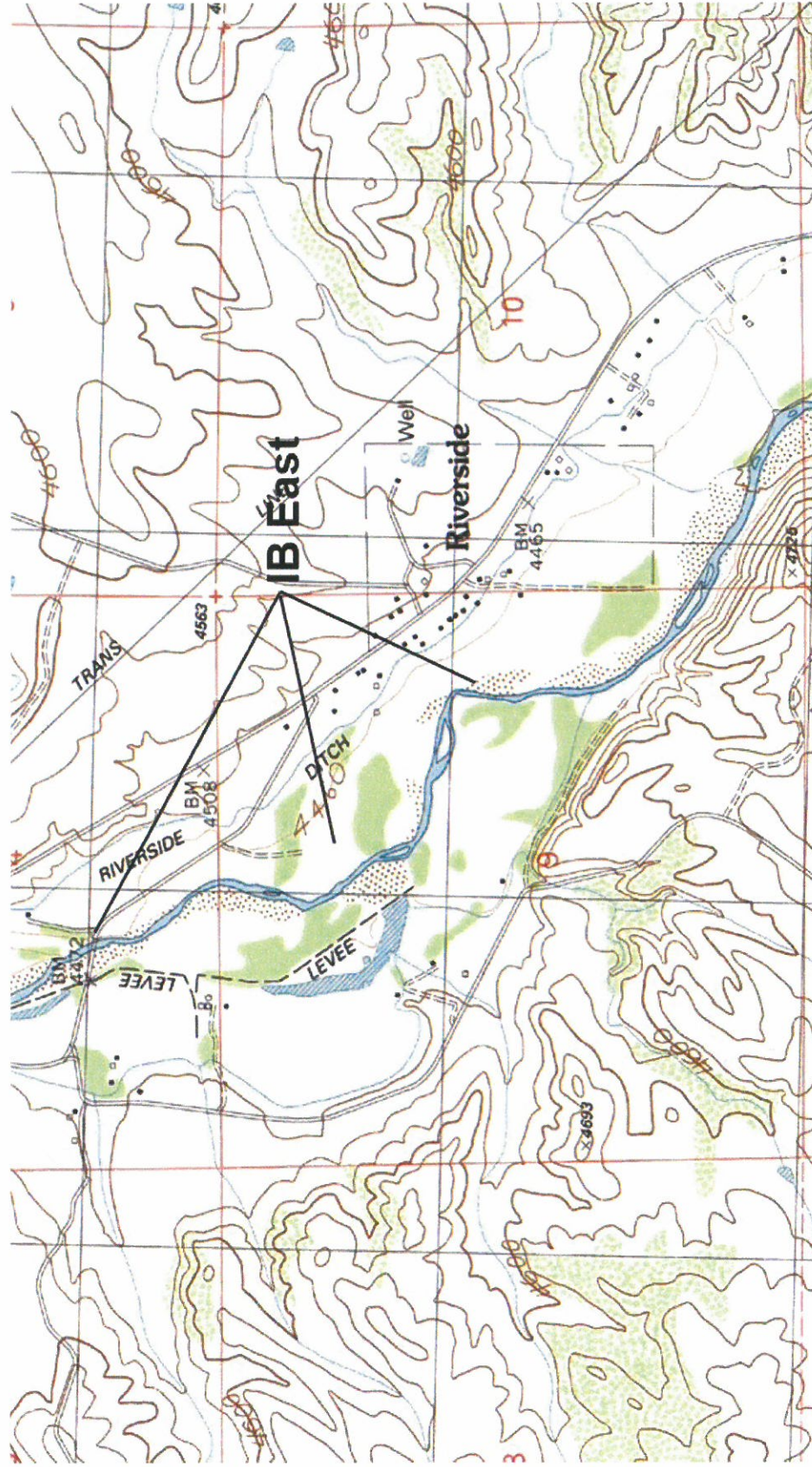


Figure C 9. Iron Bridge West Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 9a. Iron Bridge West Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

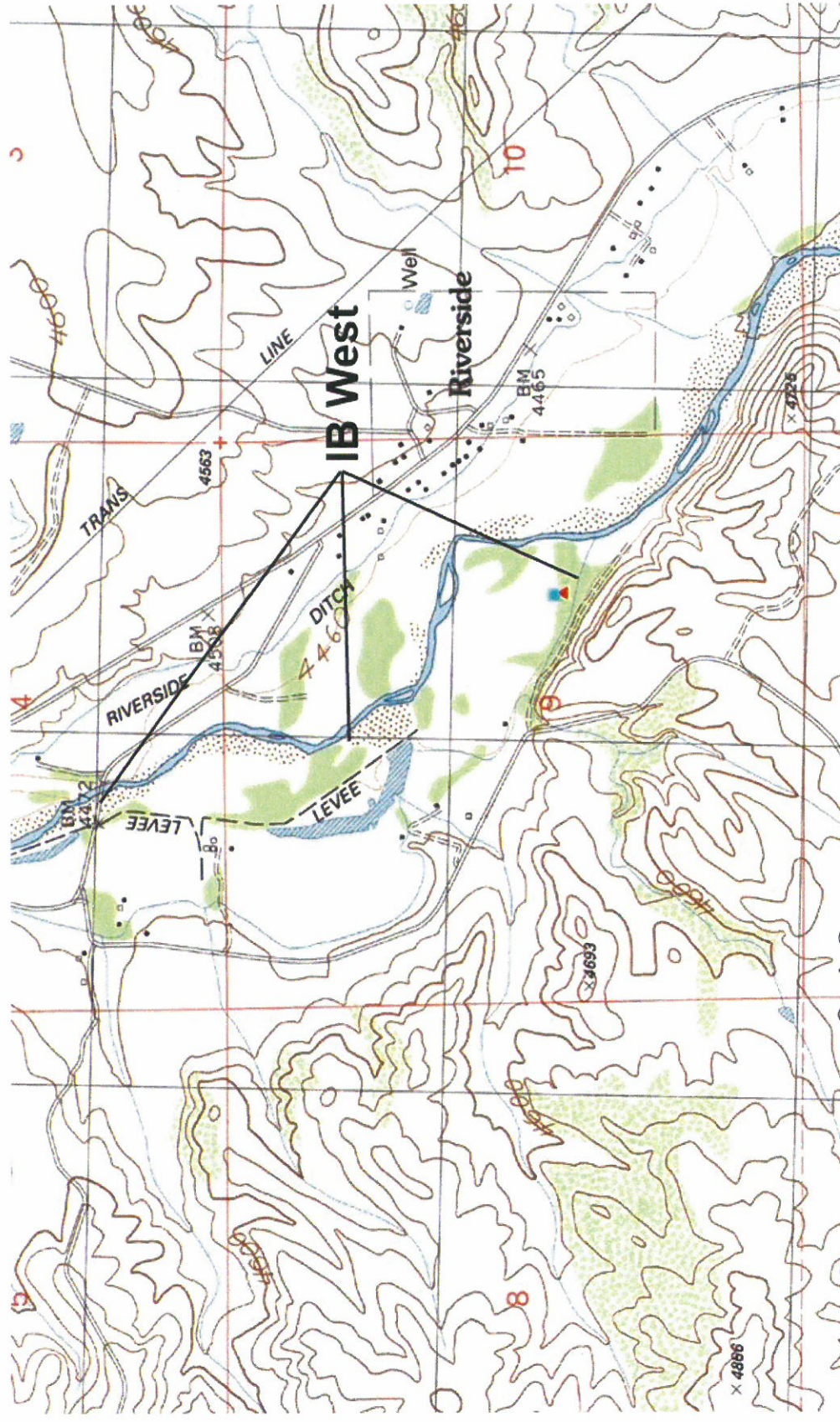


Figure C 10. Mogollon Creek – North. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 10a. Mogollon Creek – North Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

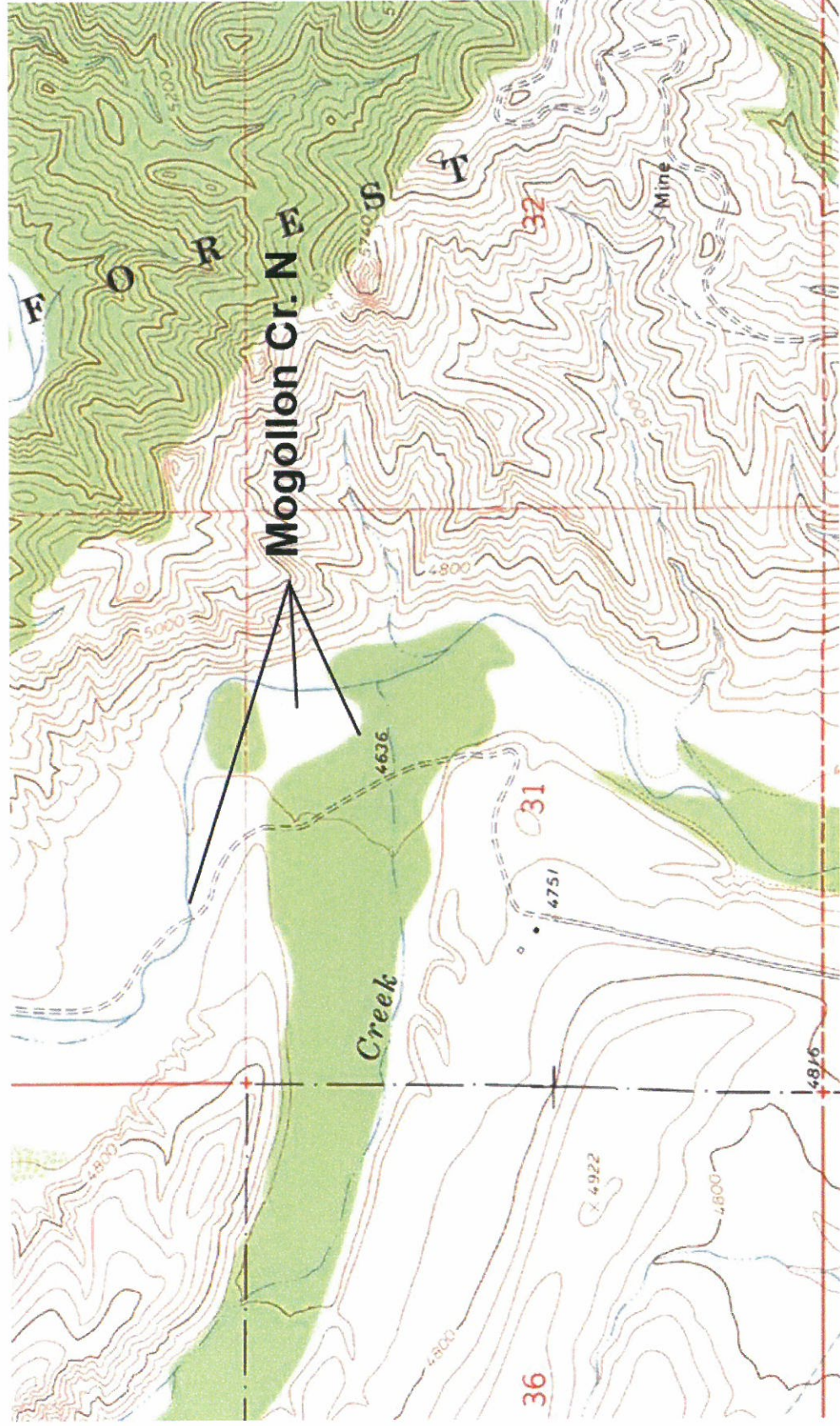


Figure C 11. Mogollon Creek – South Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 12. Northeast 1. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

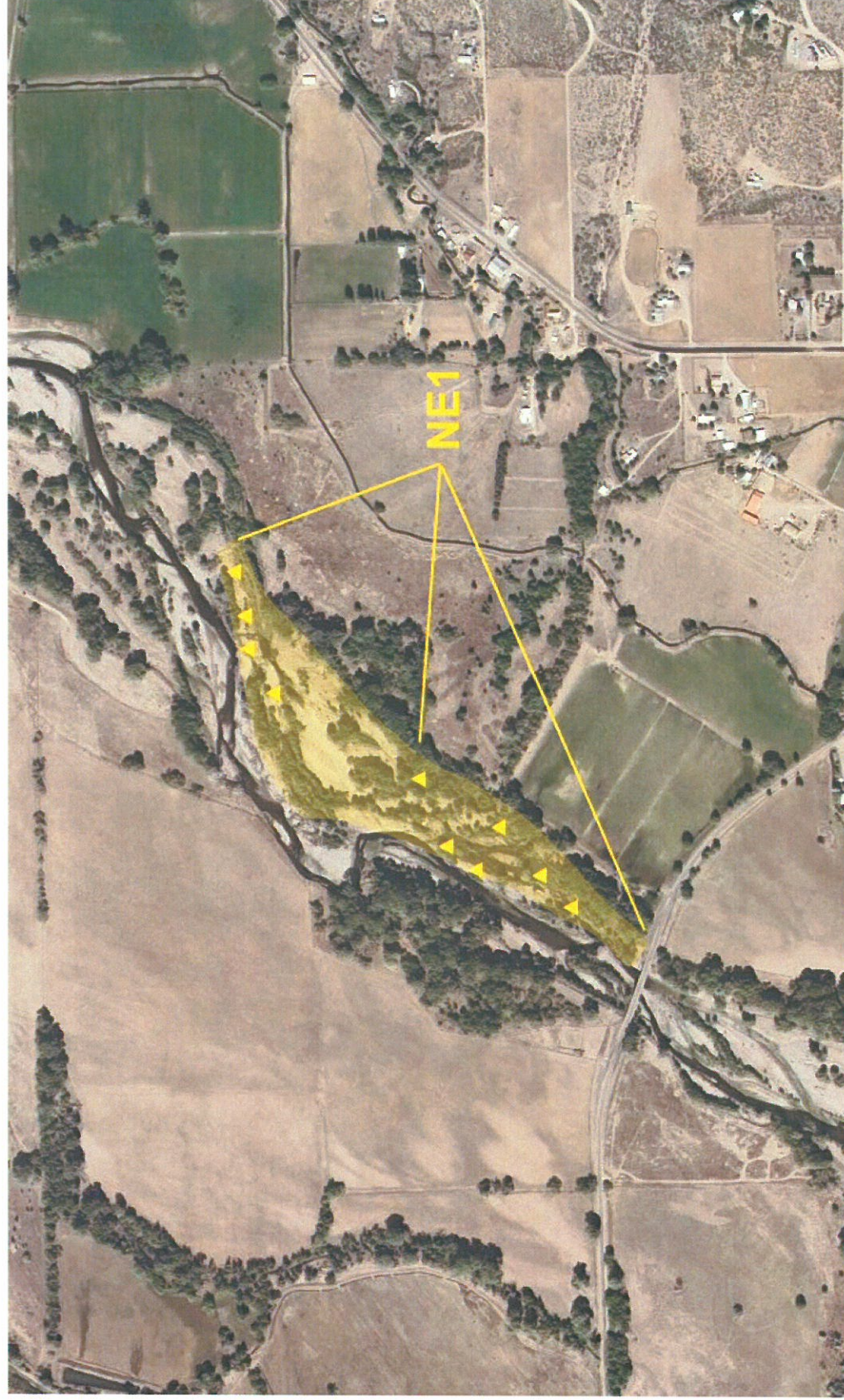


Figure C 12a. Northeast 1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

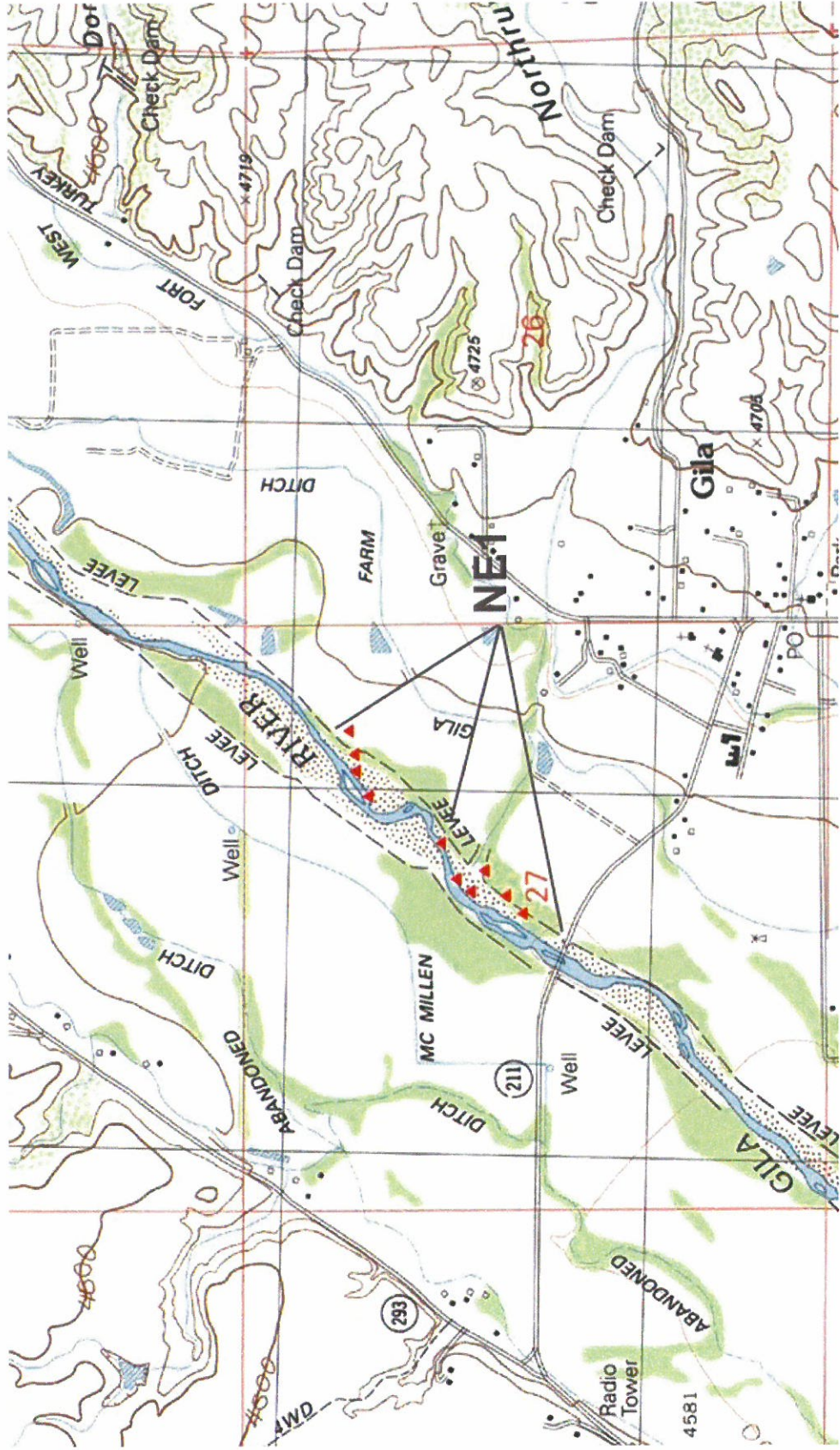


Figure C 13. Northeast 2. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

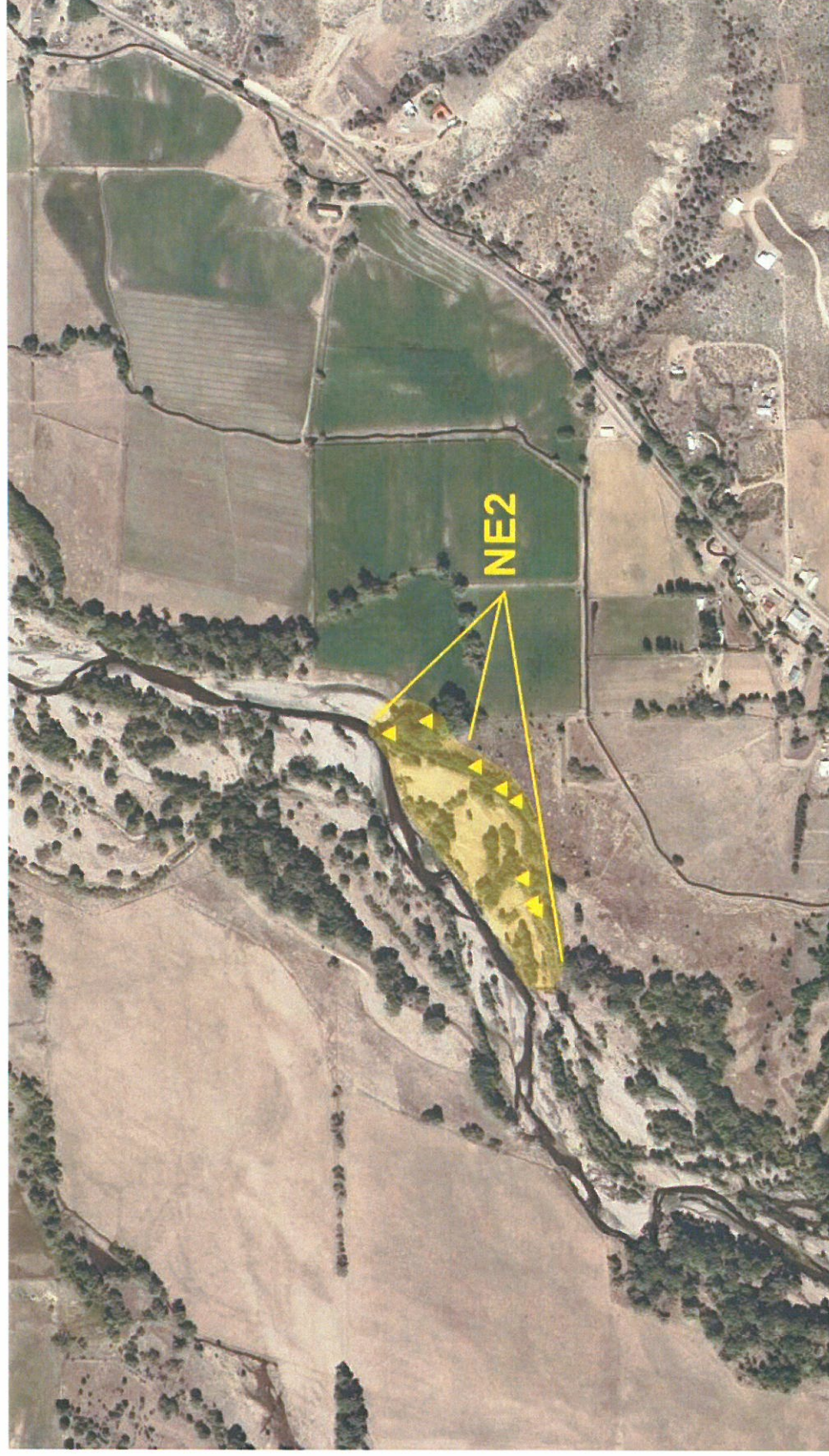


Figure C 13a. Northeast 2. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

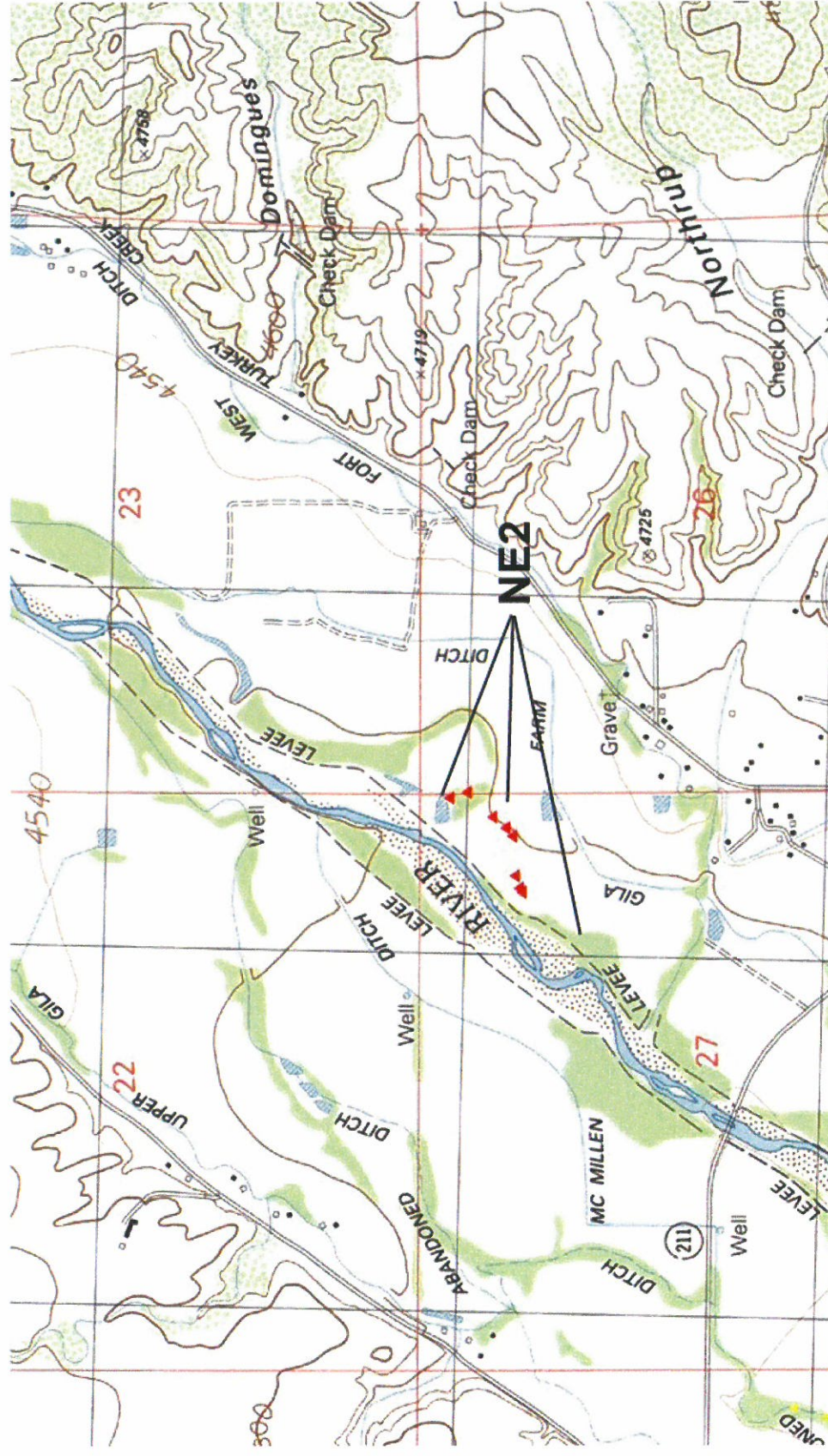


Figure C 14. Northeast 3. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

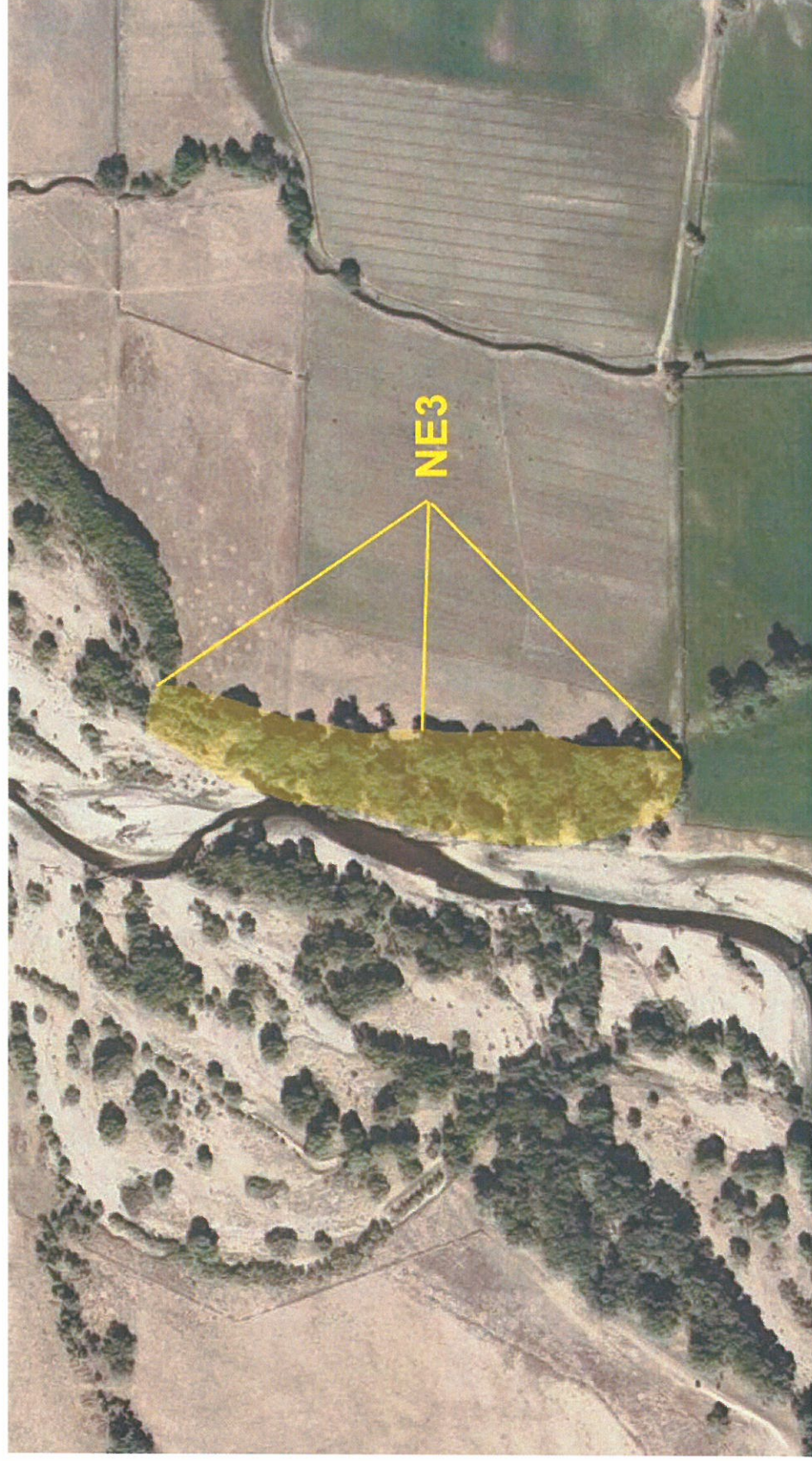


Figure C 14a. Northeast 3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

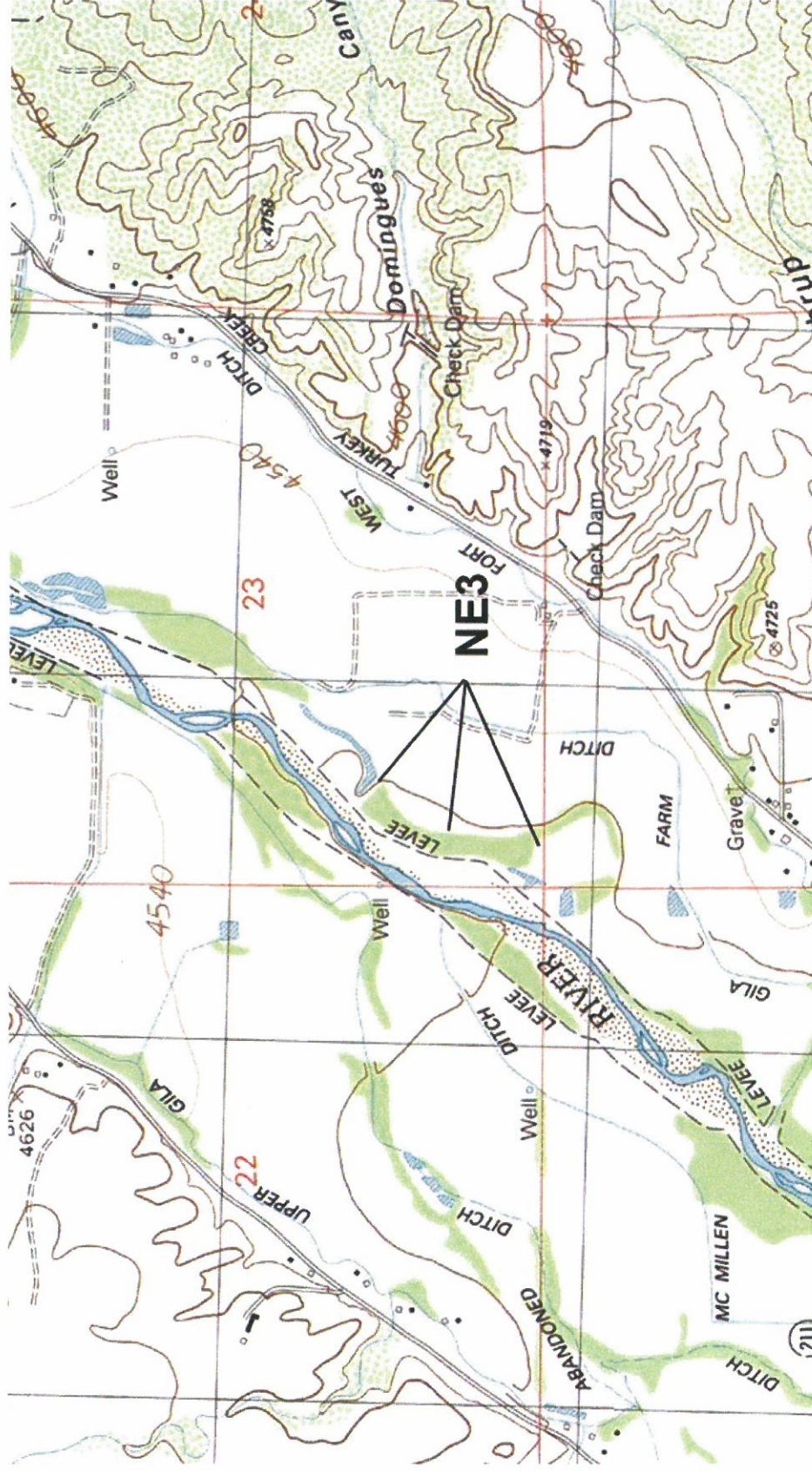


Figure C 15. Northeast 4. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

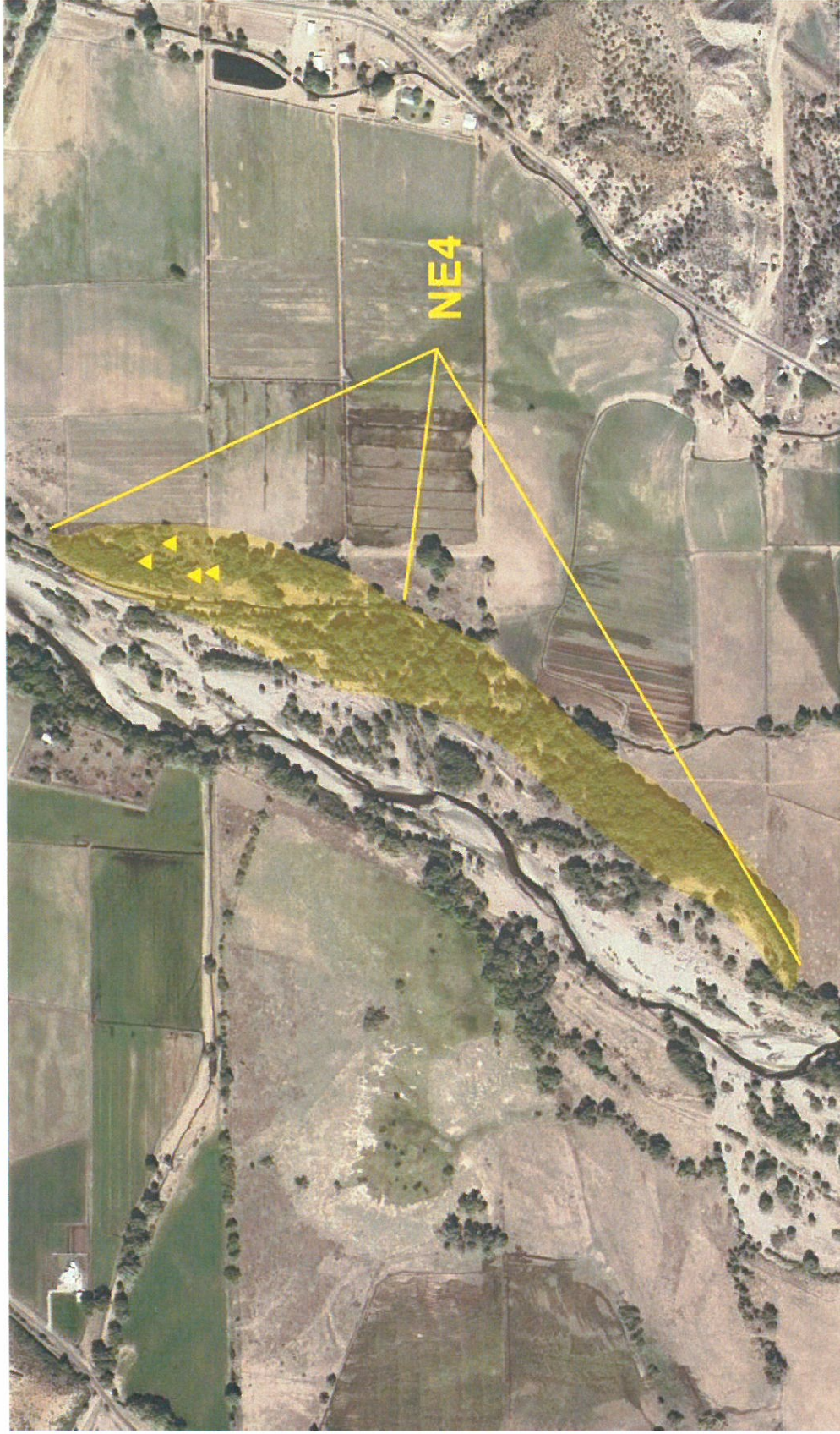


Figure C 15a. Northeast 4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

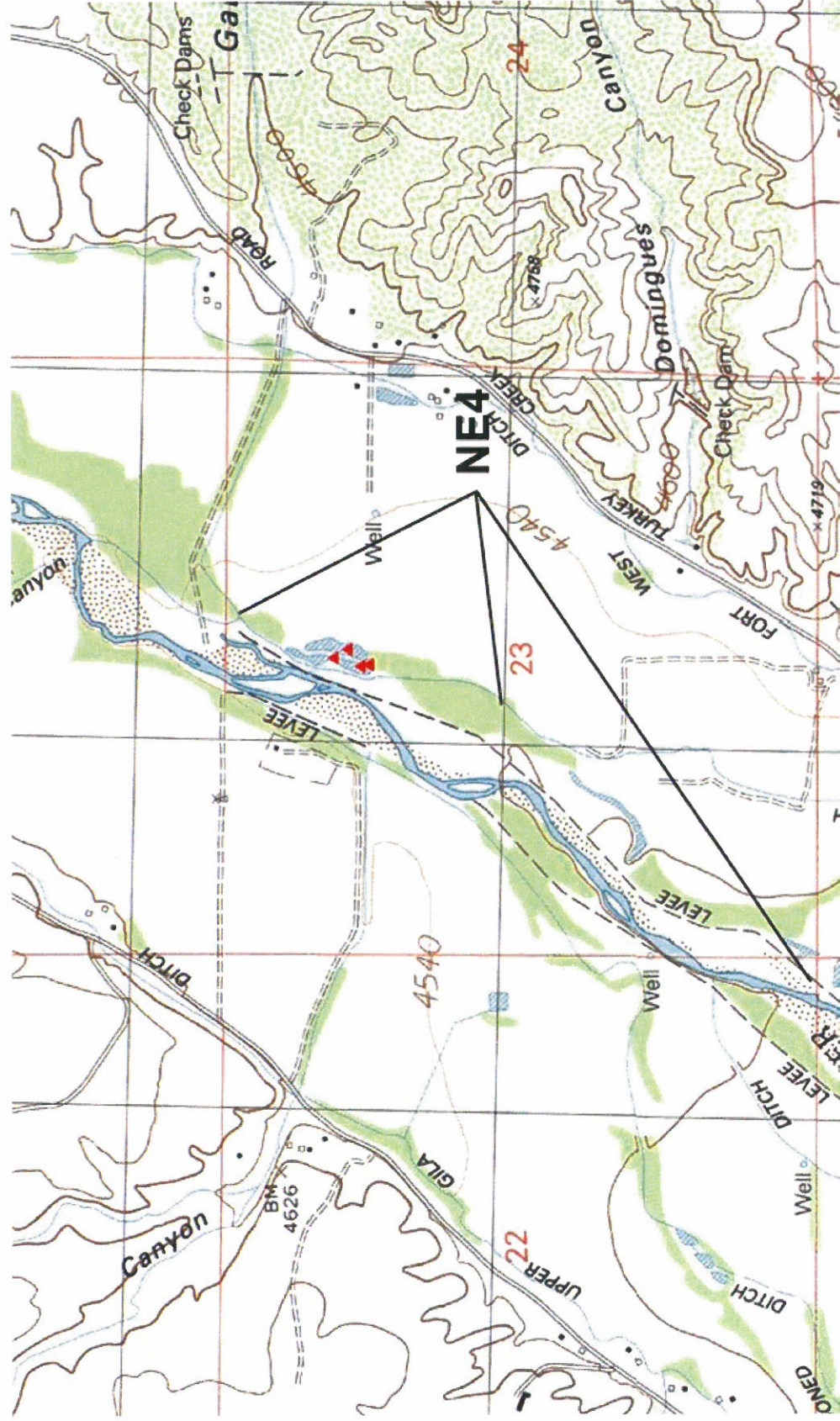


Figure C 16. Northeast 5. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon and Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 16a. Northeast 5. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon and Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

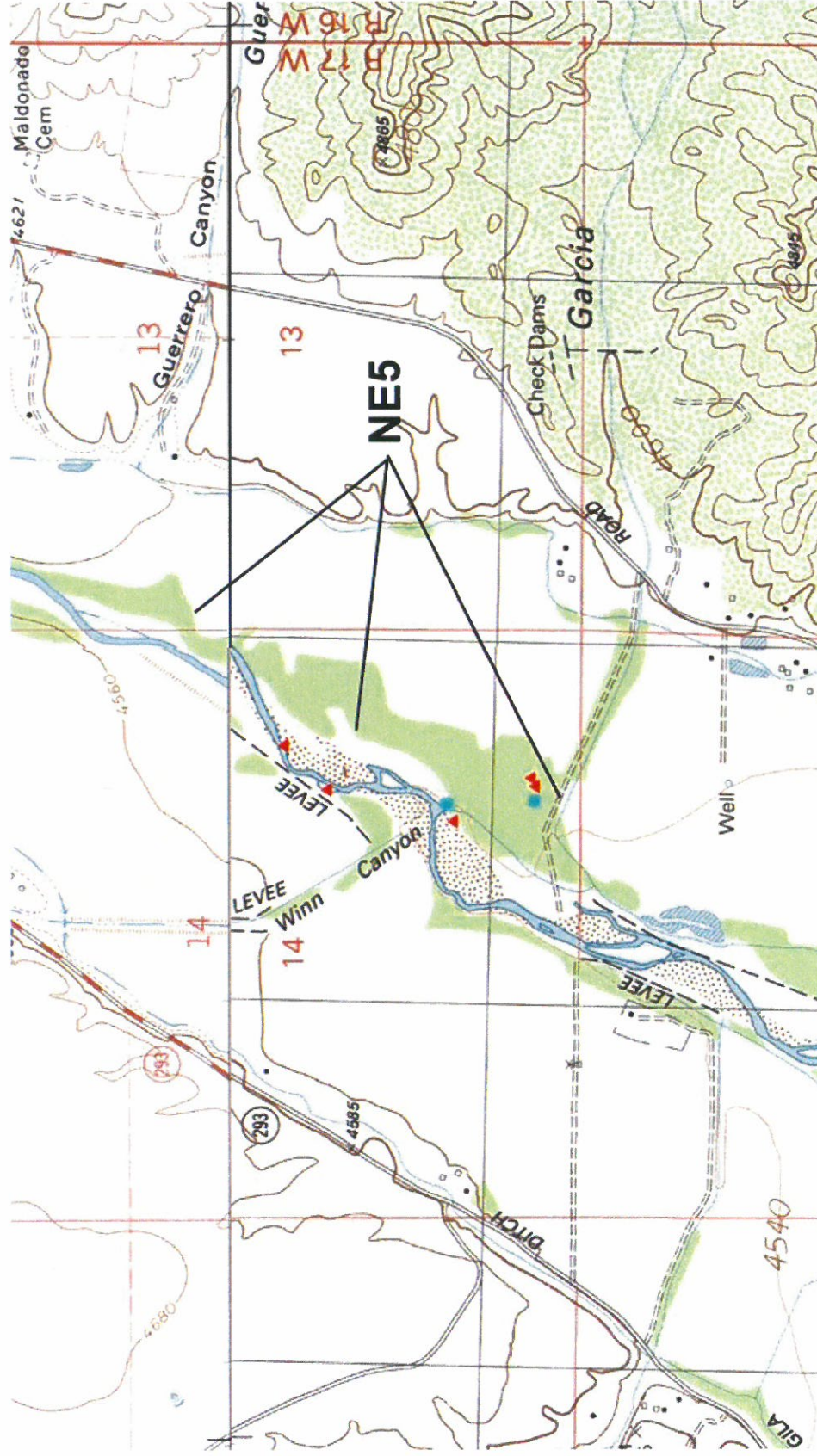


Figure C 17. Northwest 1. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

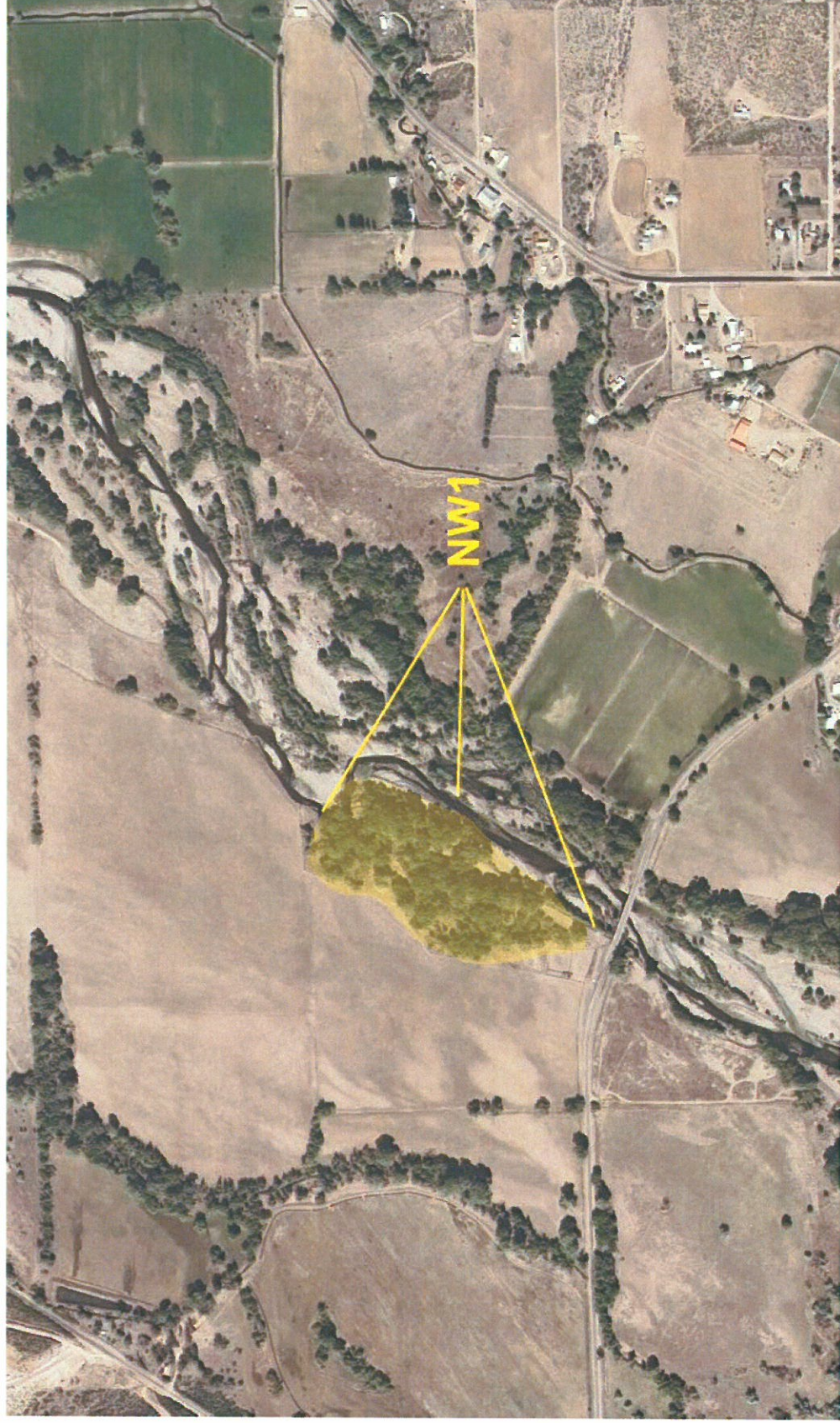


Figure C 17a. Northwest 1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

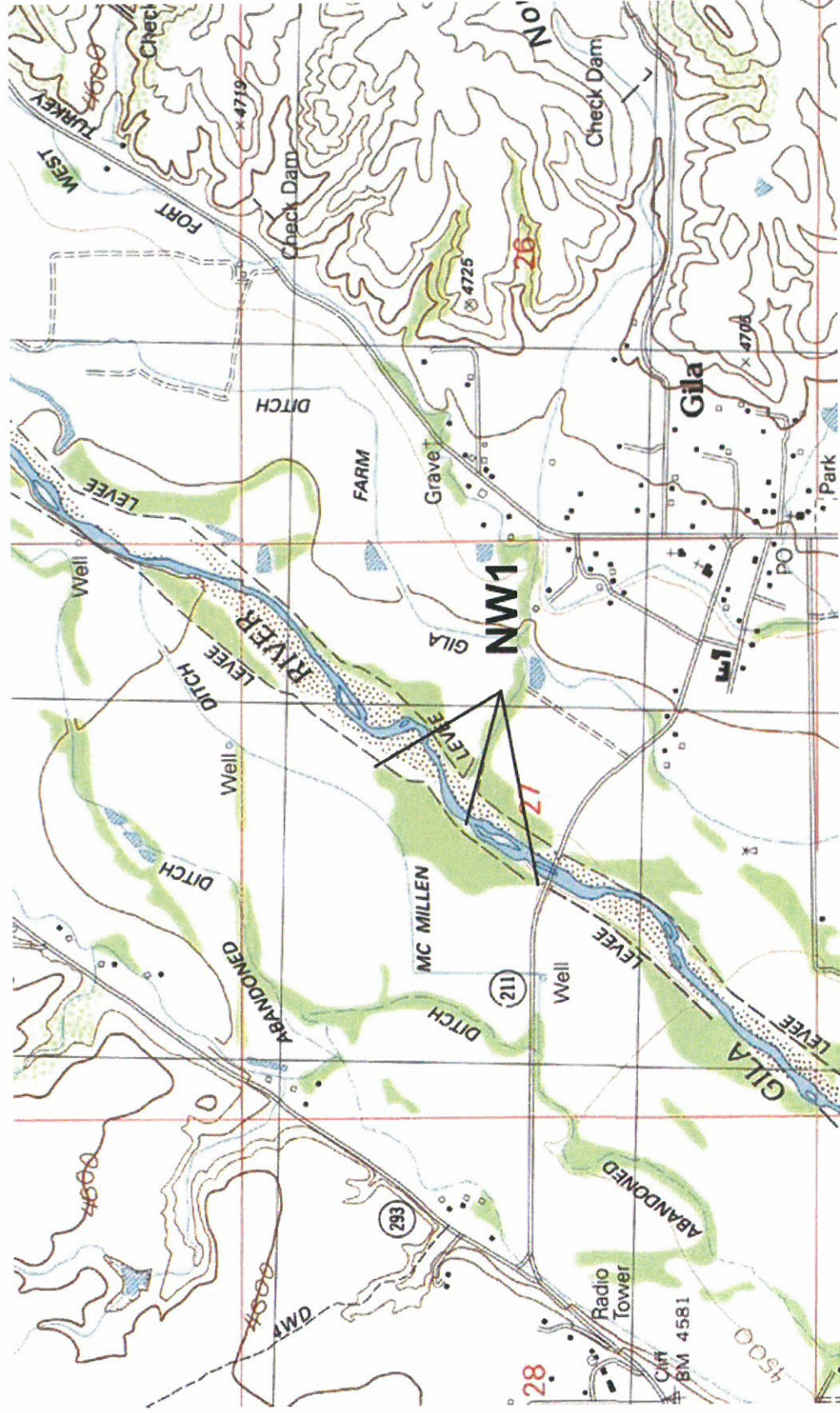


Figure C 18. Northwest 2. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

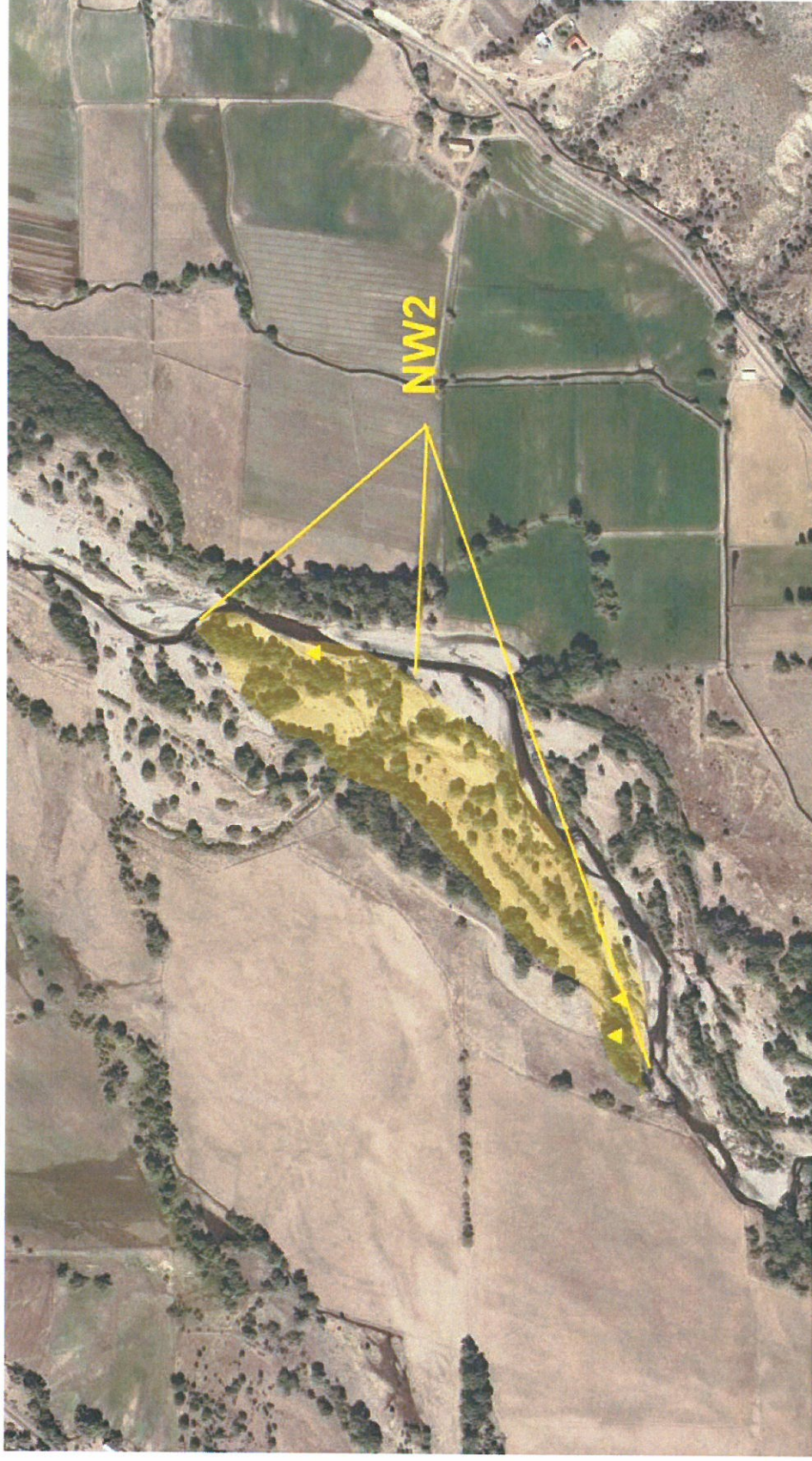


Figure C 18a. Northwest 2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

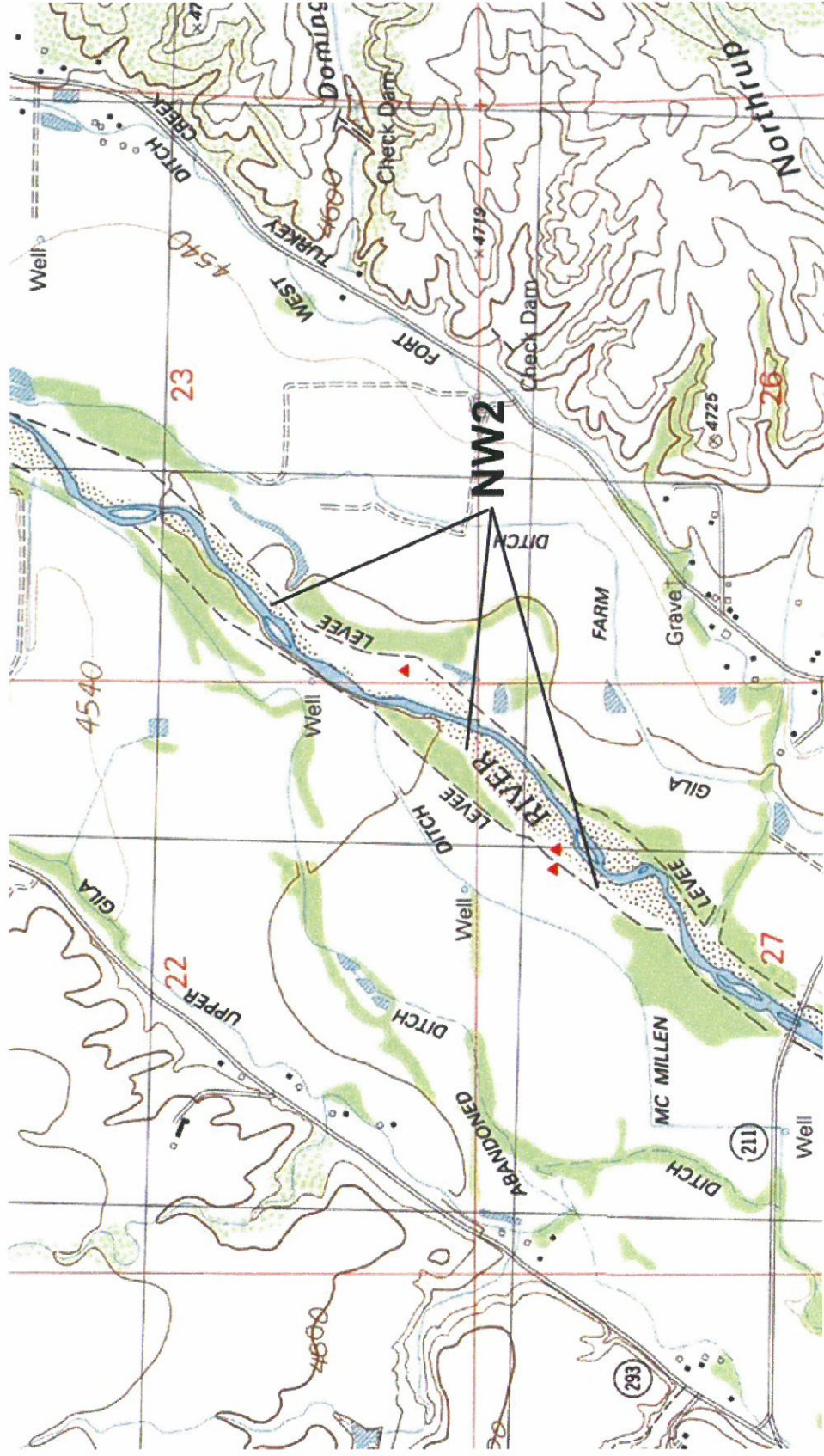


Figure C 19. Northwest 3. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

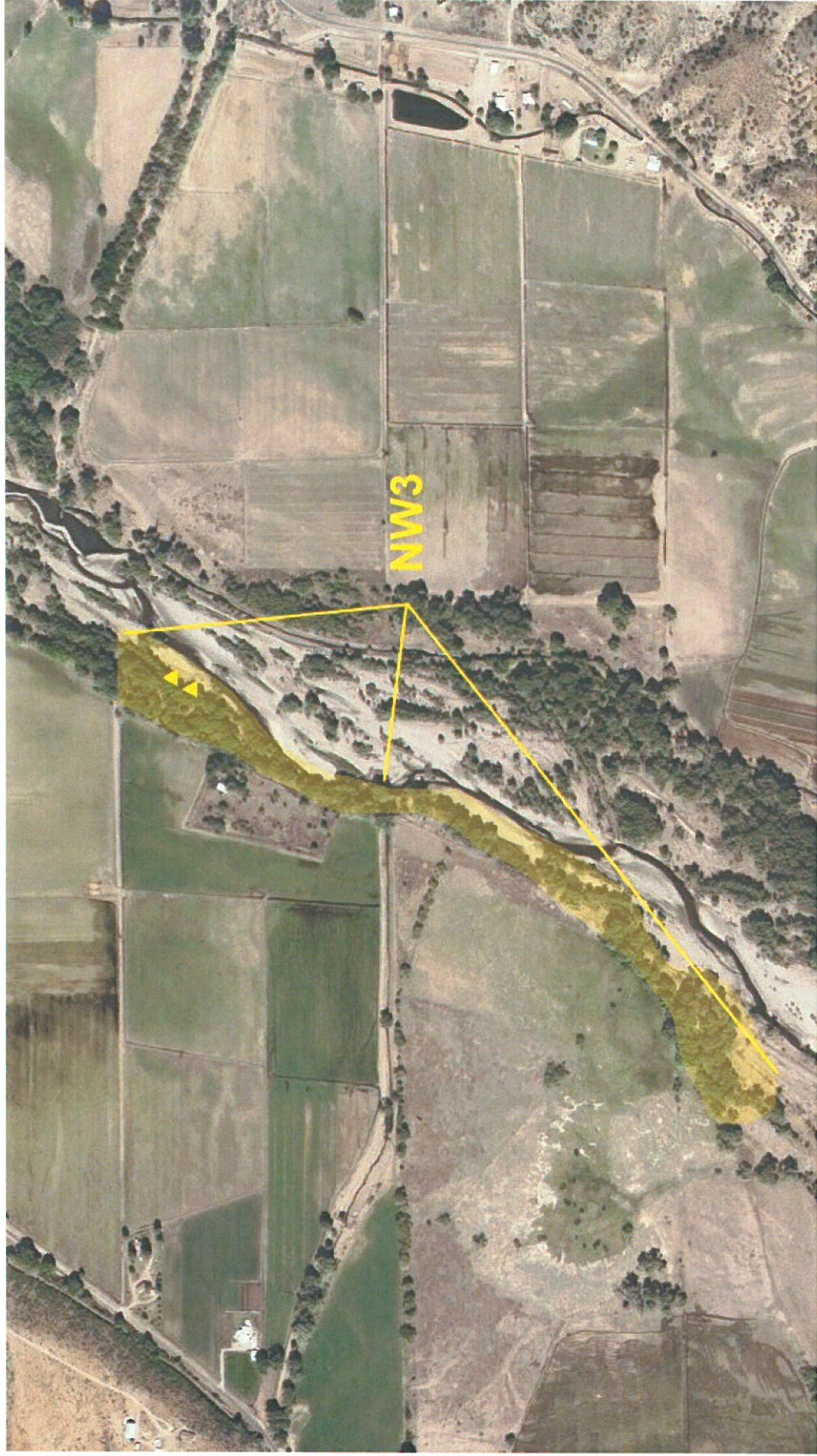


Figure C 19a. Northwest 3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

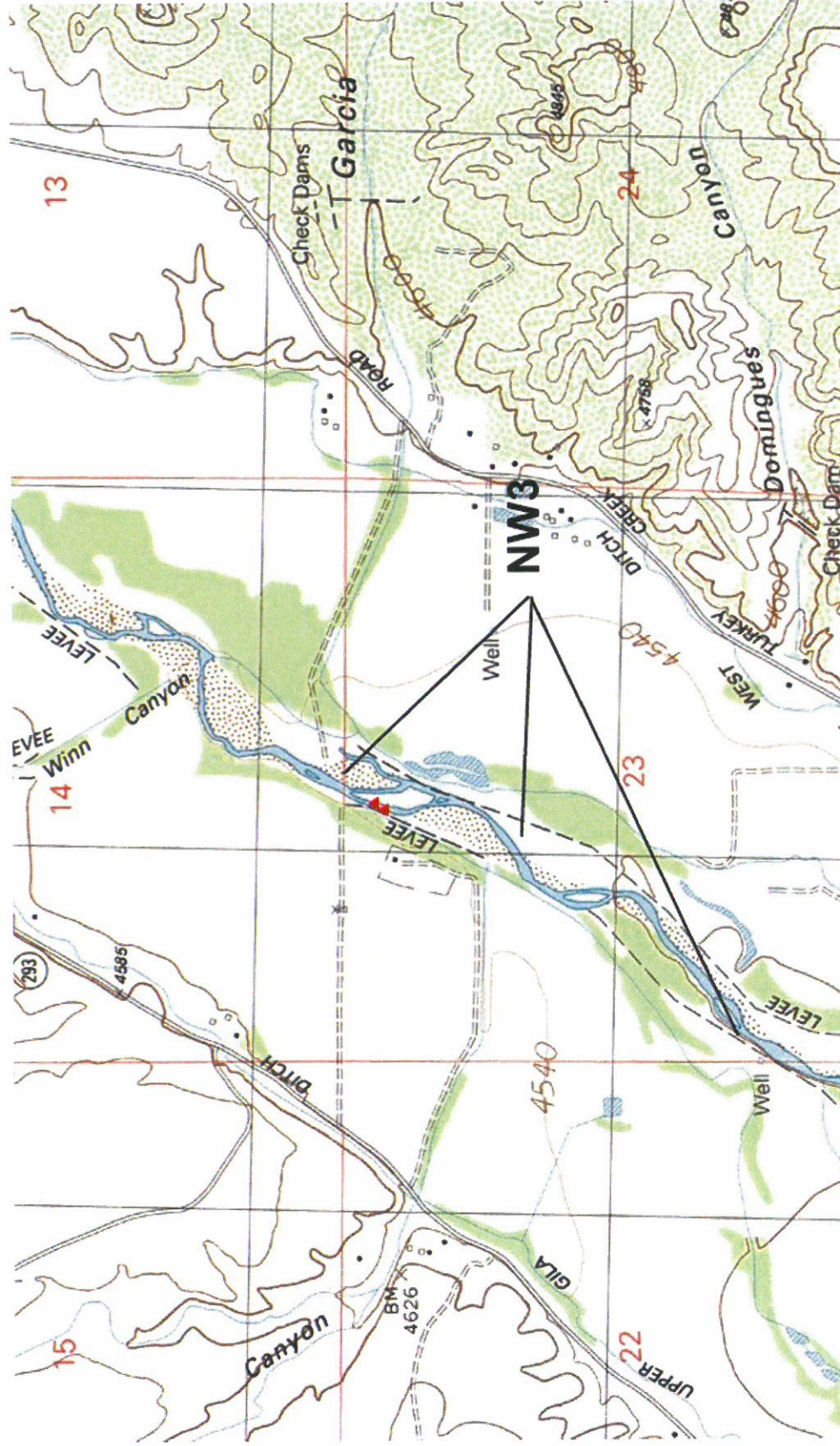


Figure C 20. Northwest 4. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

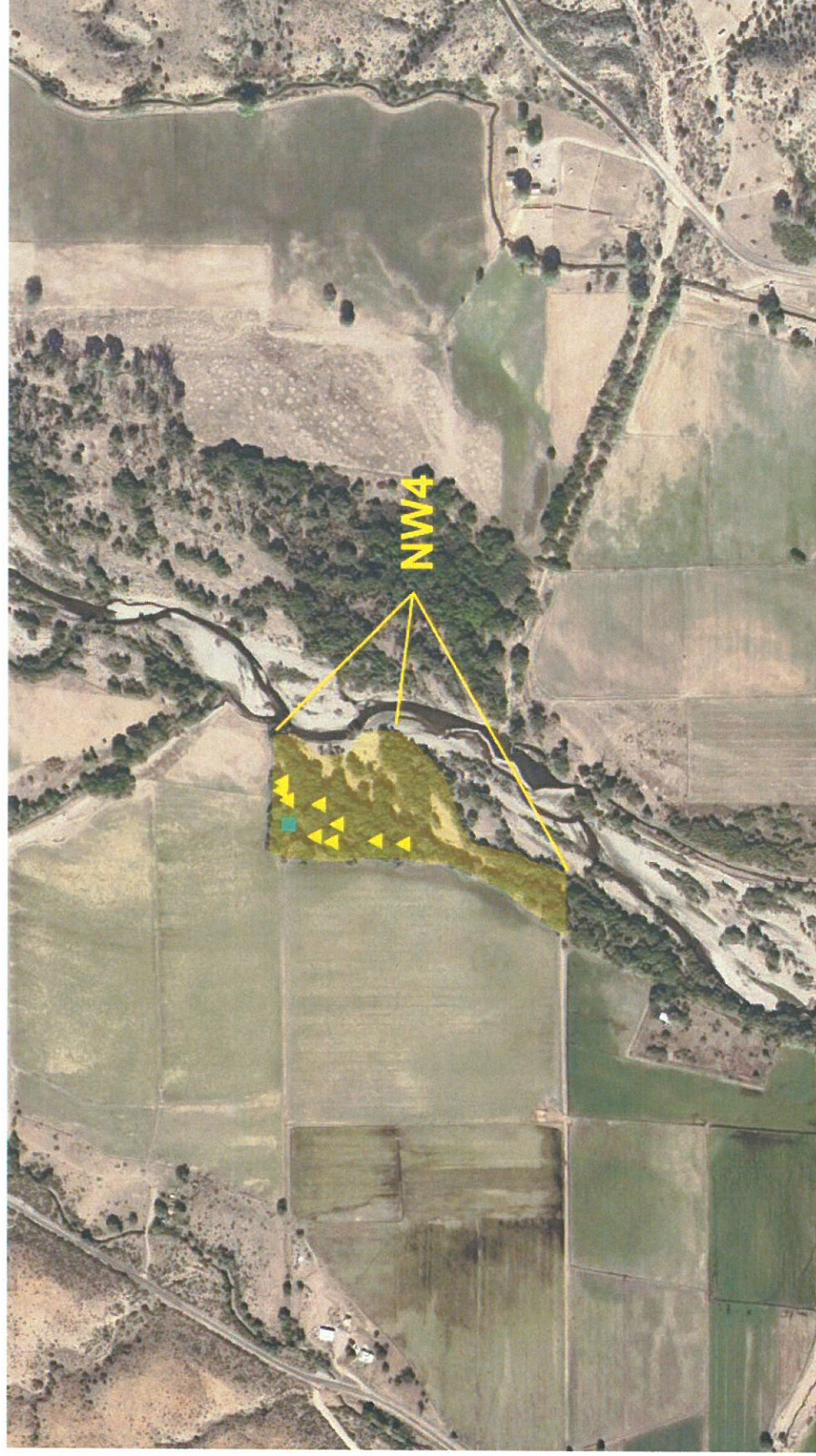


Figure C 20a. Northwest 4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

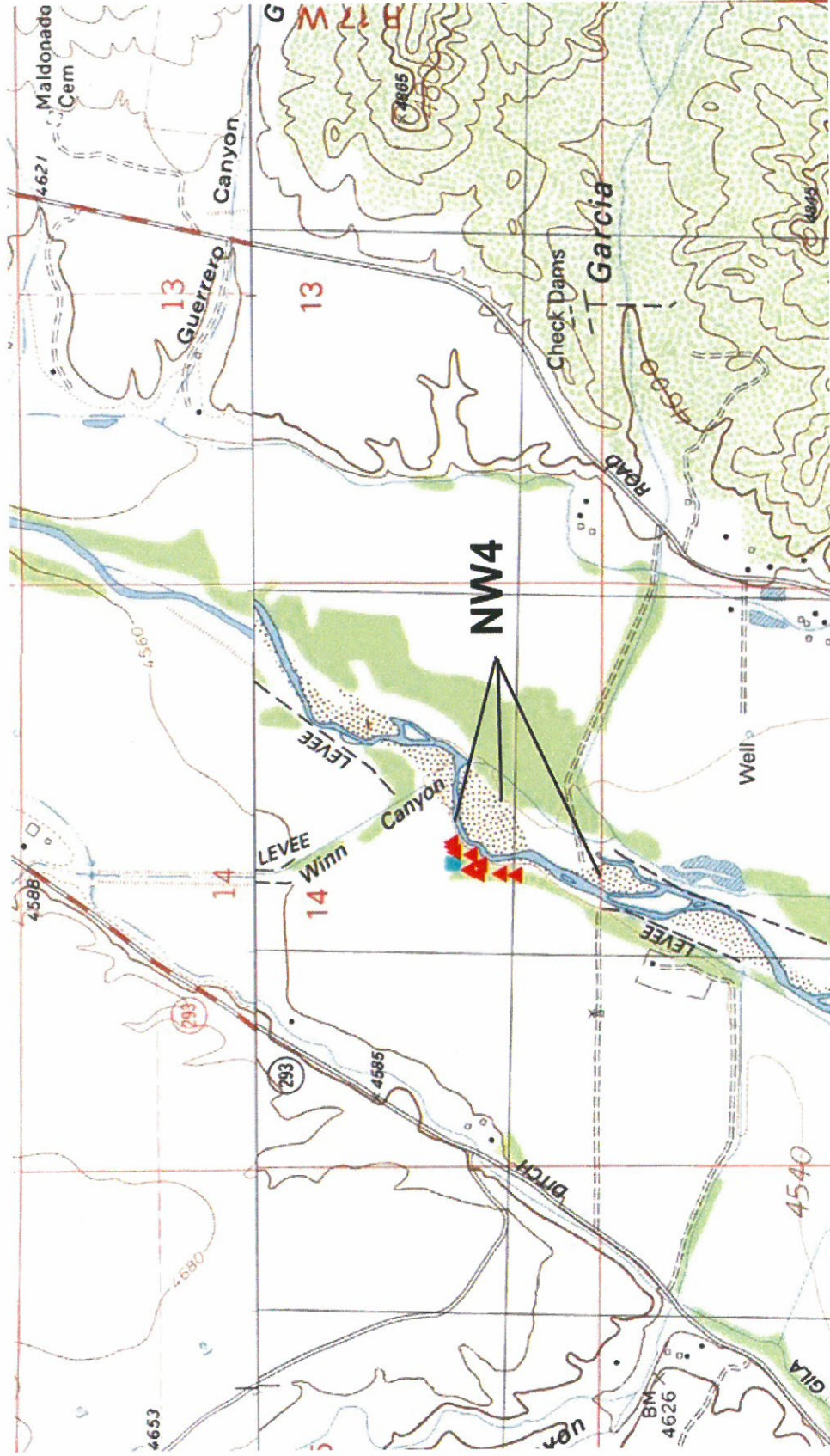


Figure C 21. Northwest 5. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 21a. Northwest 5 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

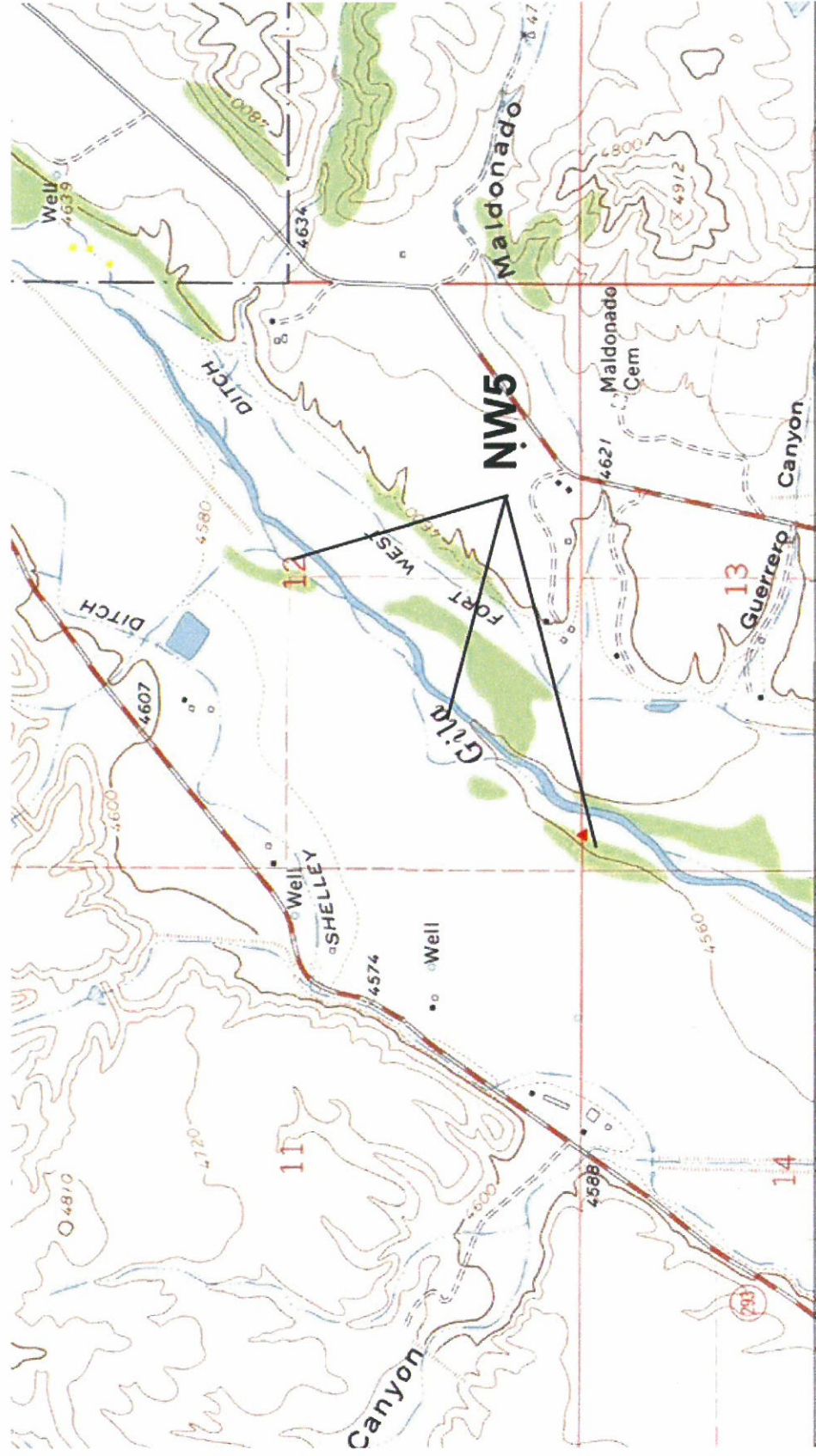


Figure C 22. Northwest Stringer. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 22a. Northwest Stringer Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

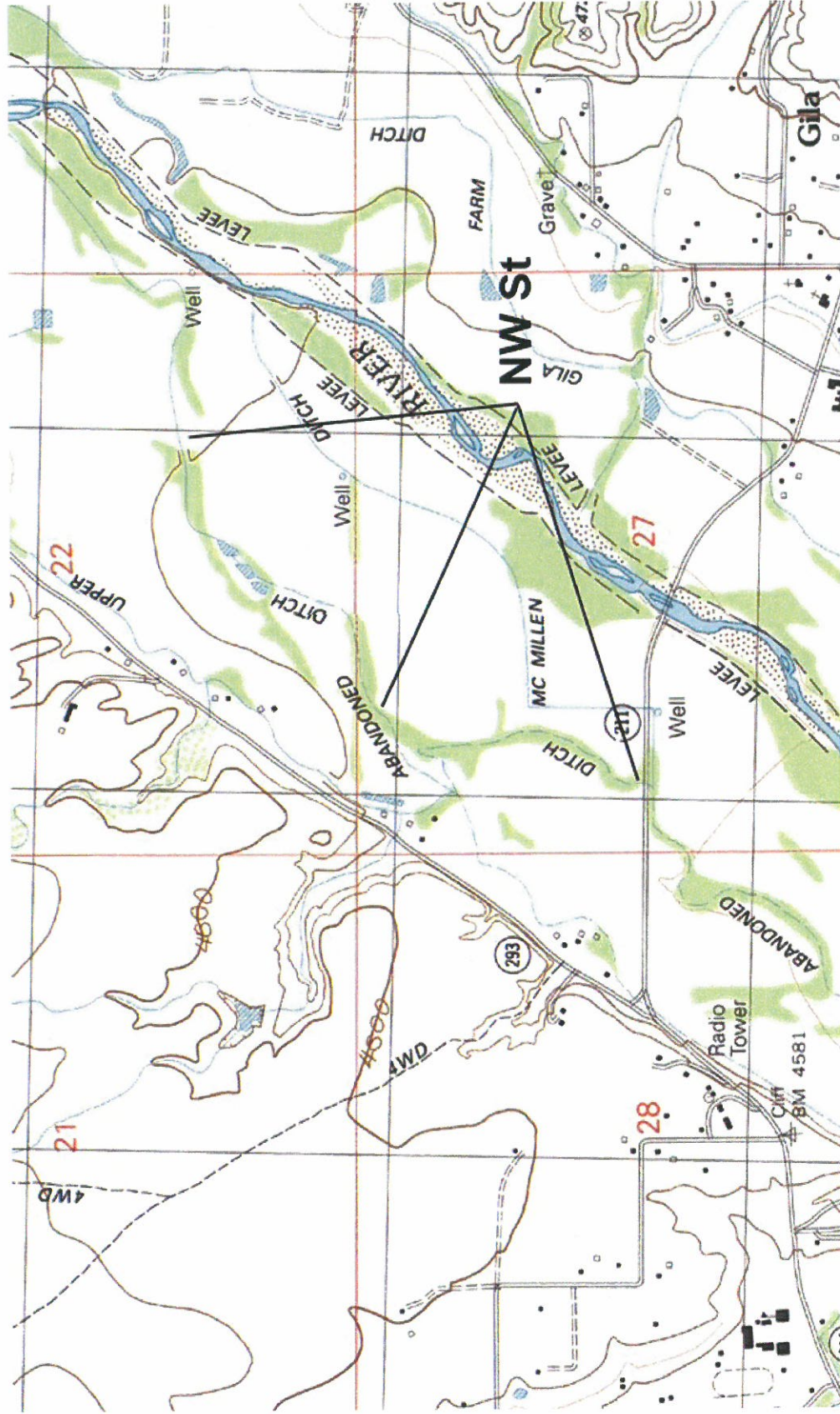


Figure C 23. Southeast 0. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

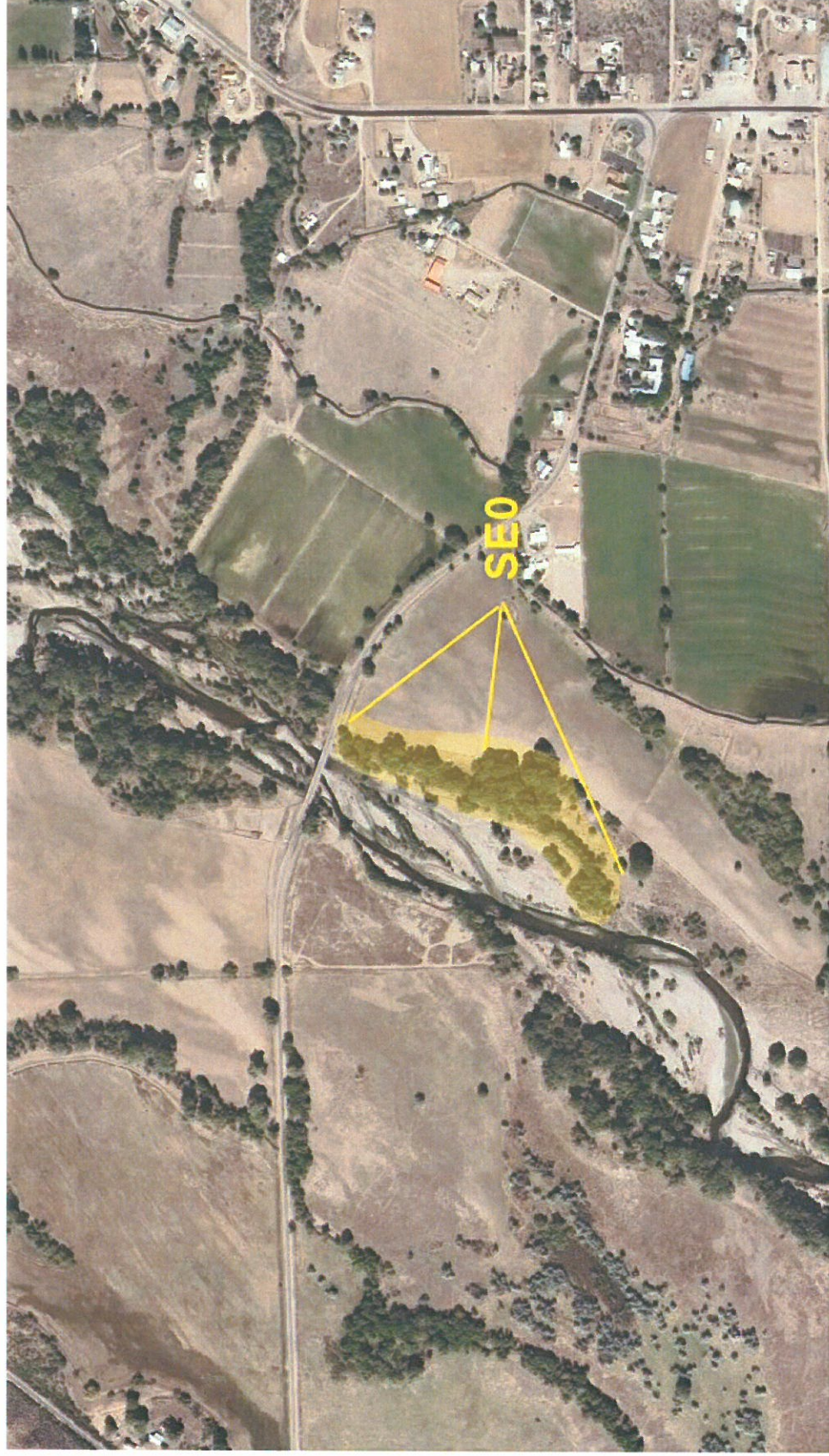


Figure C 23a. Southeast 0 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

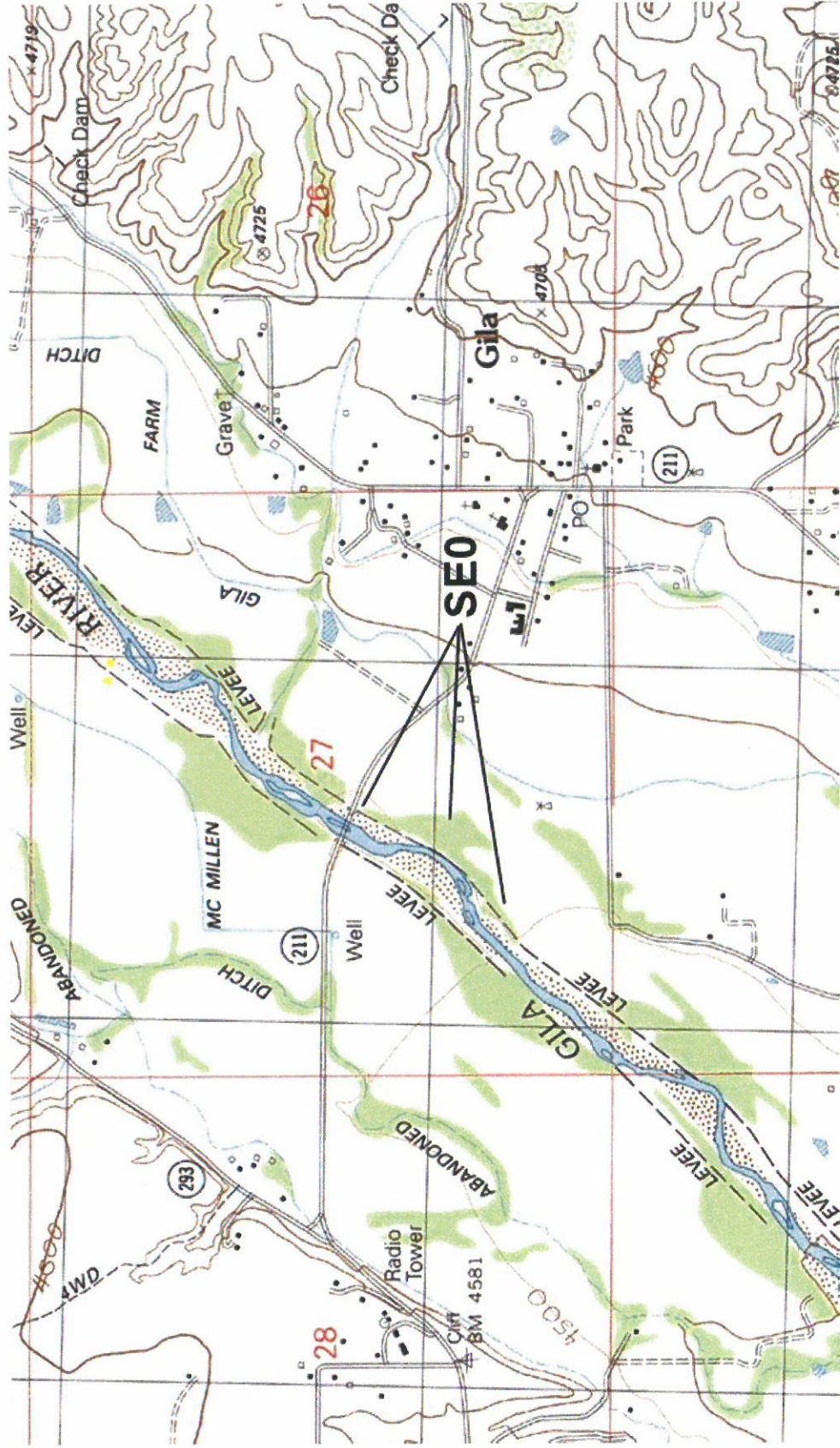


Figure C 24. Southeast 1. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

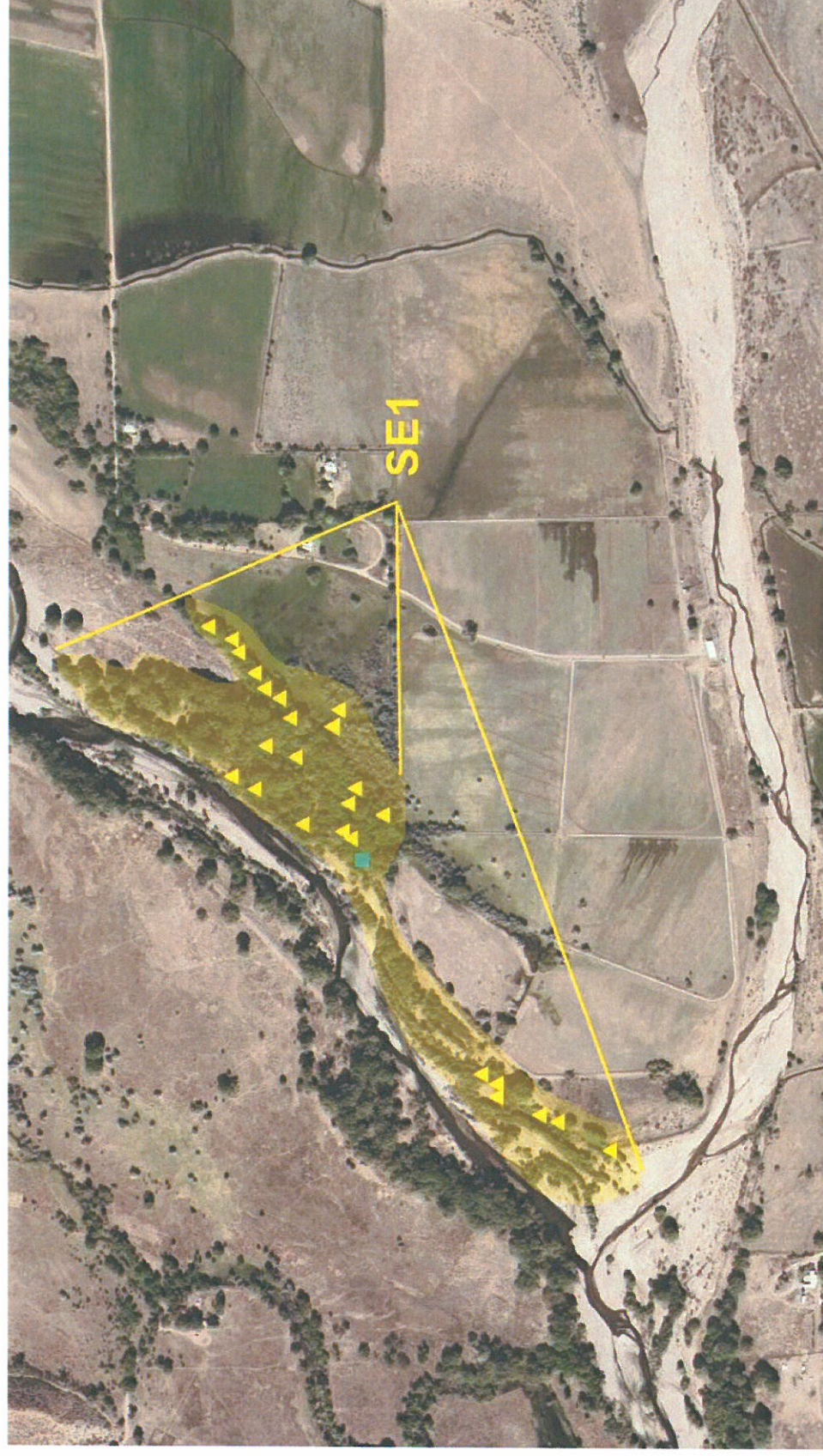


Figure C 24a. Southeast 1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

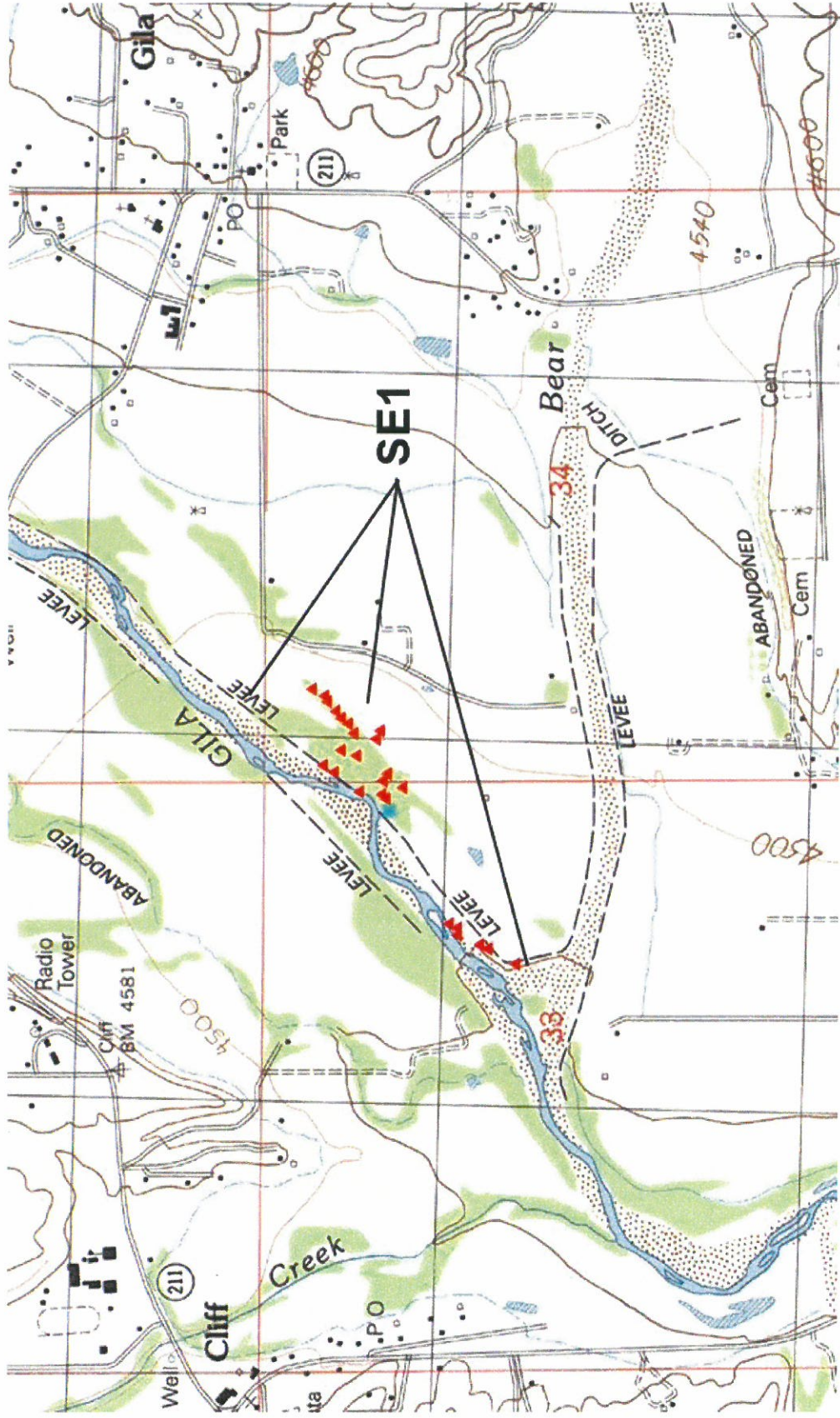


Figure C 25. Southeast 2. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 25a. Southeast 2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

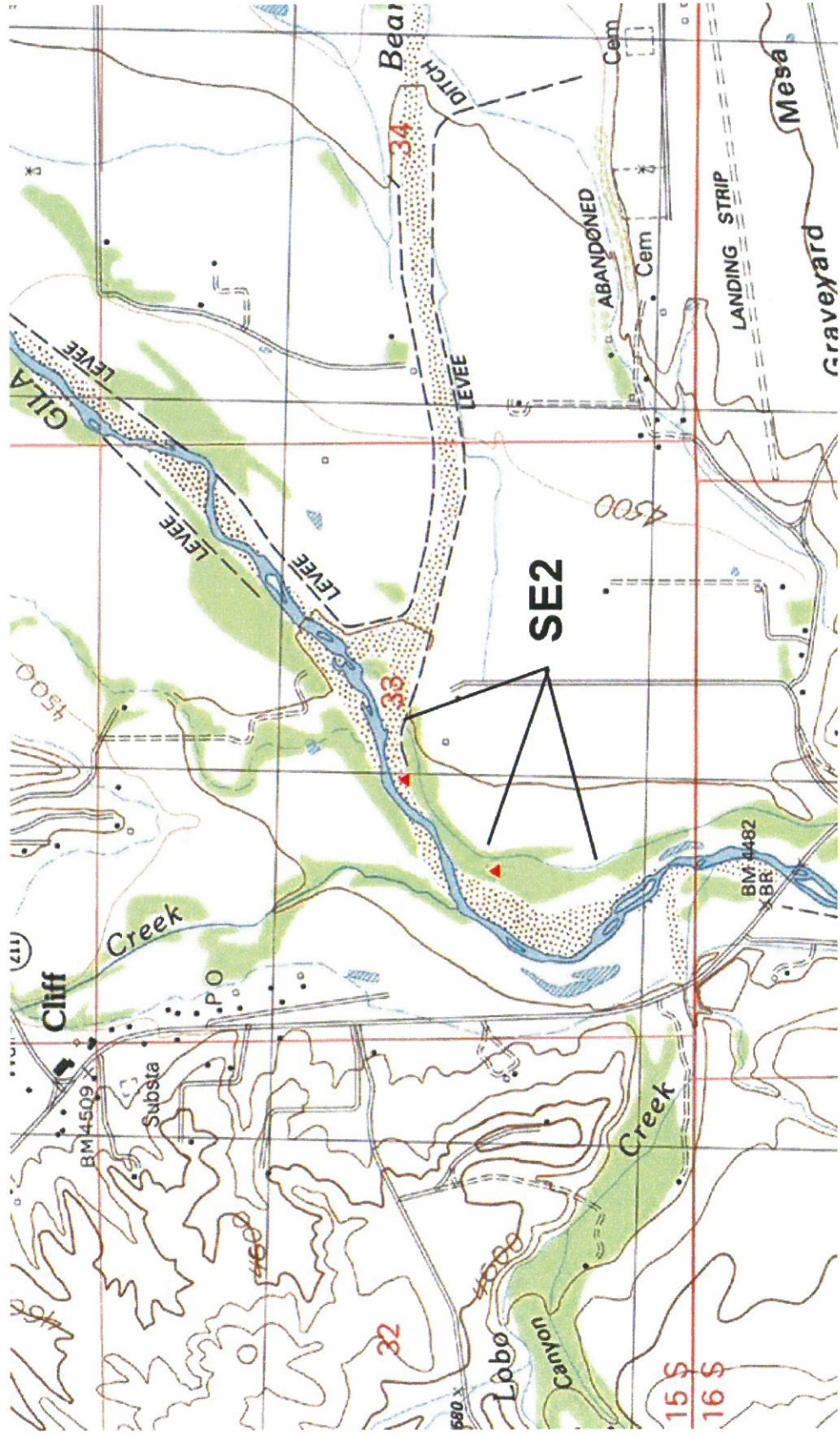


Figure C 26. Southeast 3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

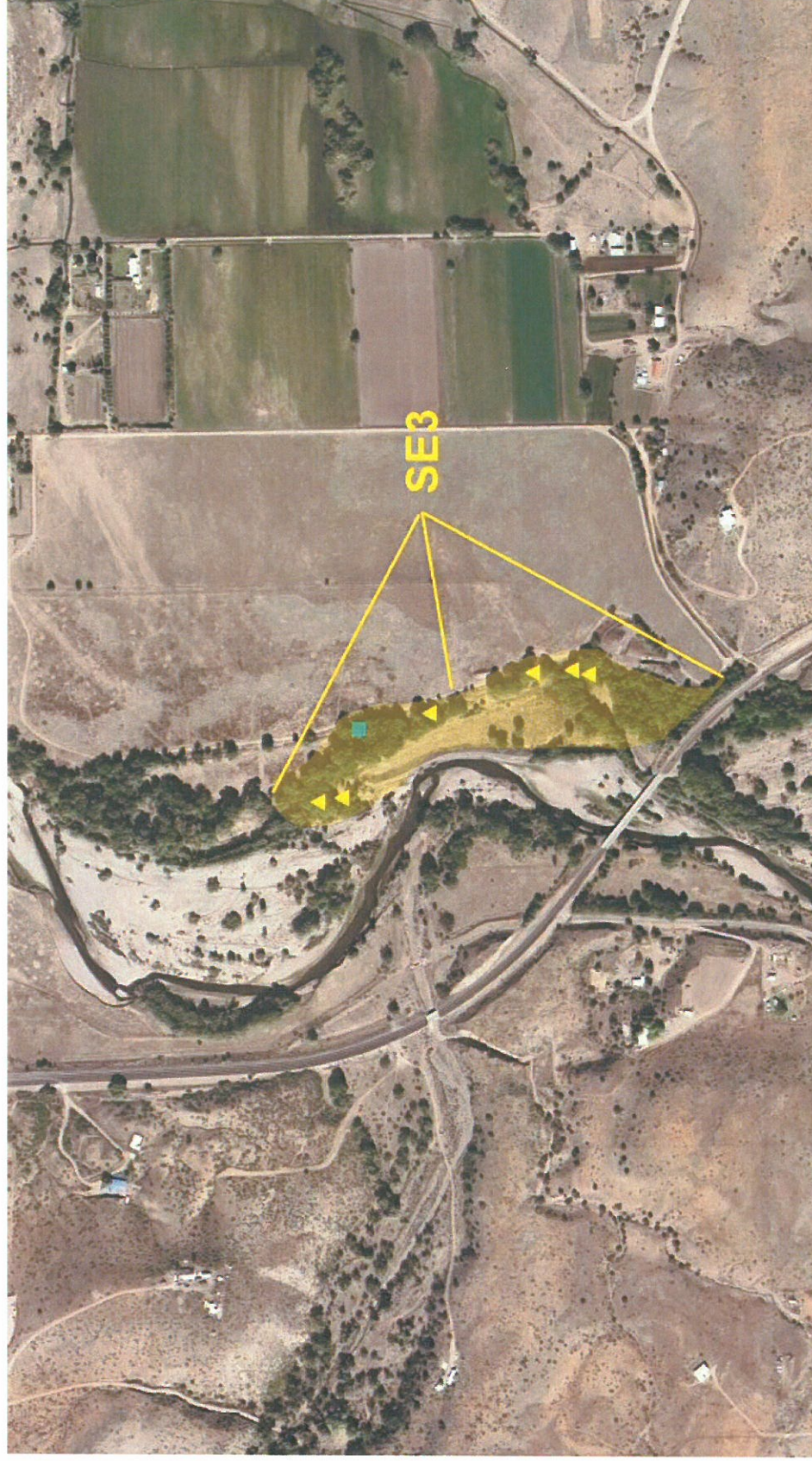


Figure C 26a. Southeast 3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

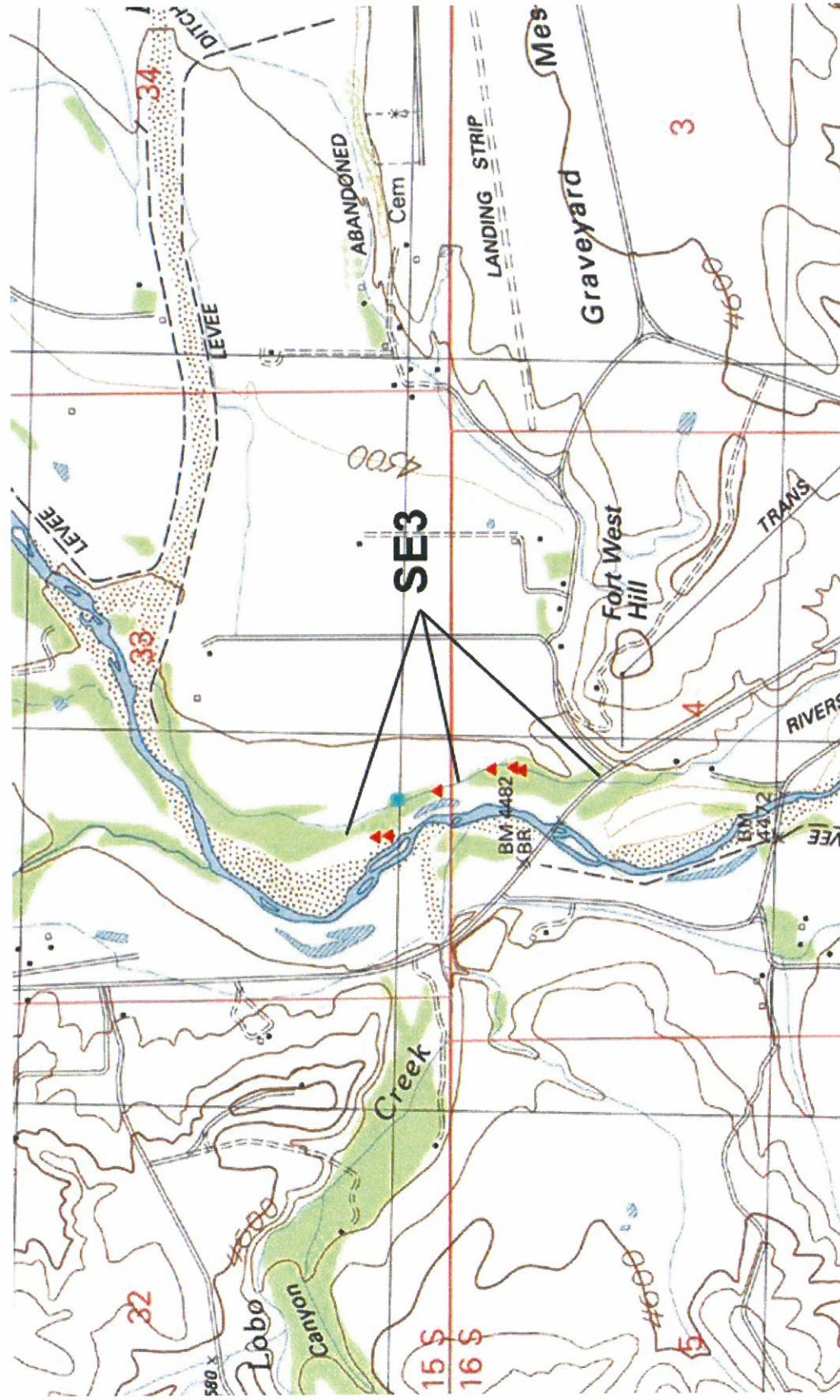


Figure C 27. Southeast 4. Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 28. Southwest 1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 28a. Southwest 1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

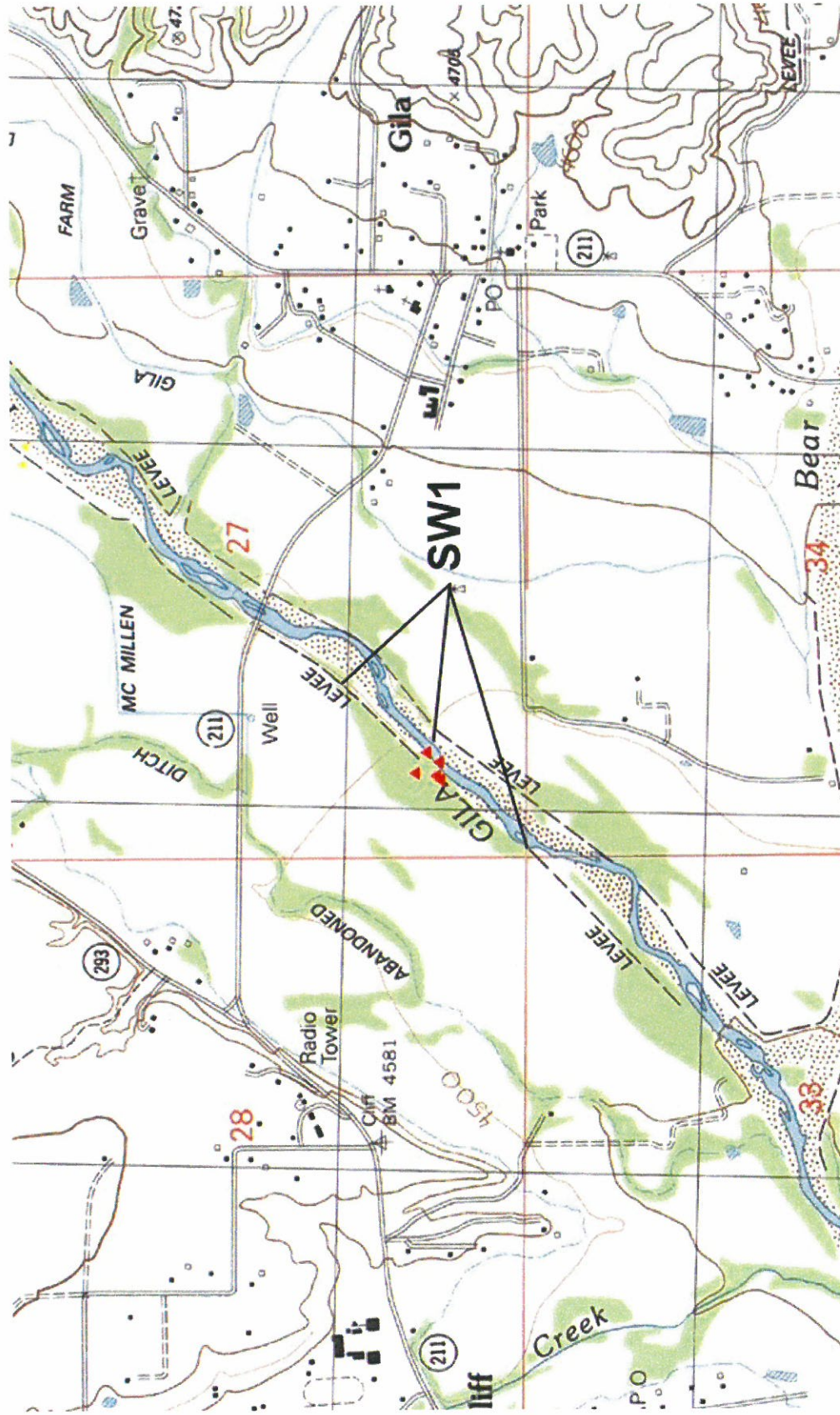


Figure C 29. Southwest 2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 29a. Southwest 2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

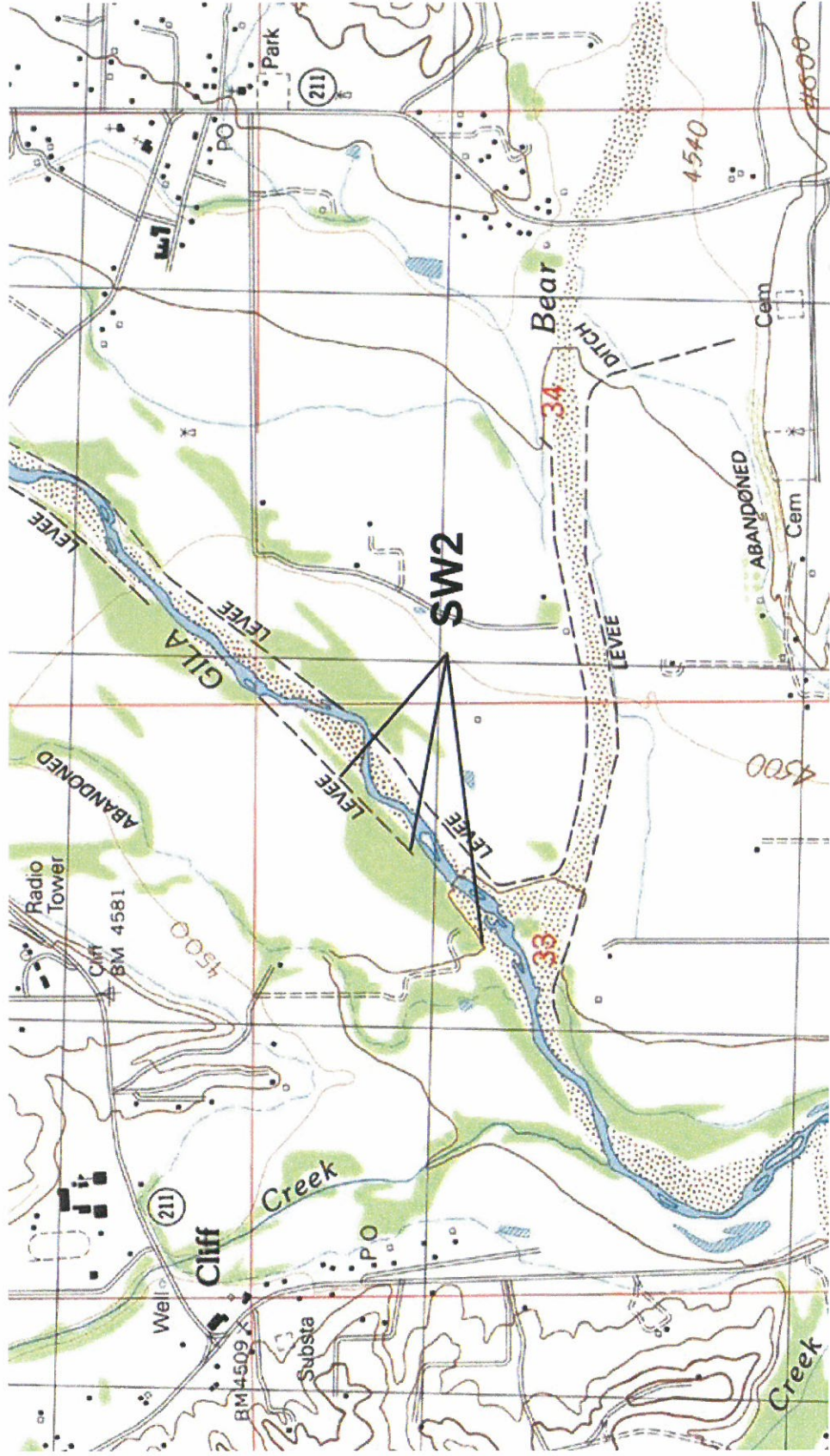


Figure C 30. Southwest 3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

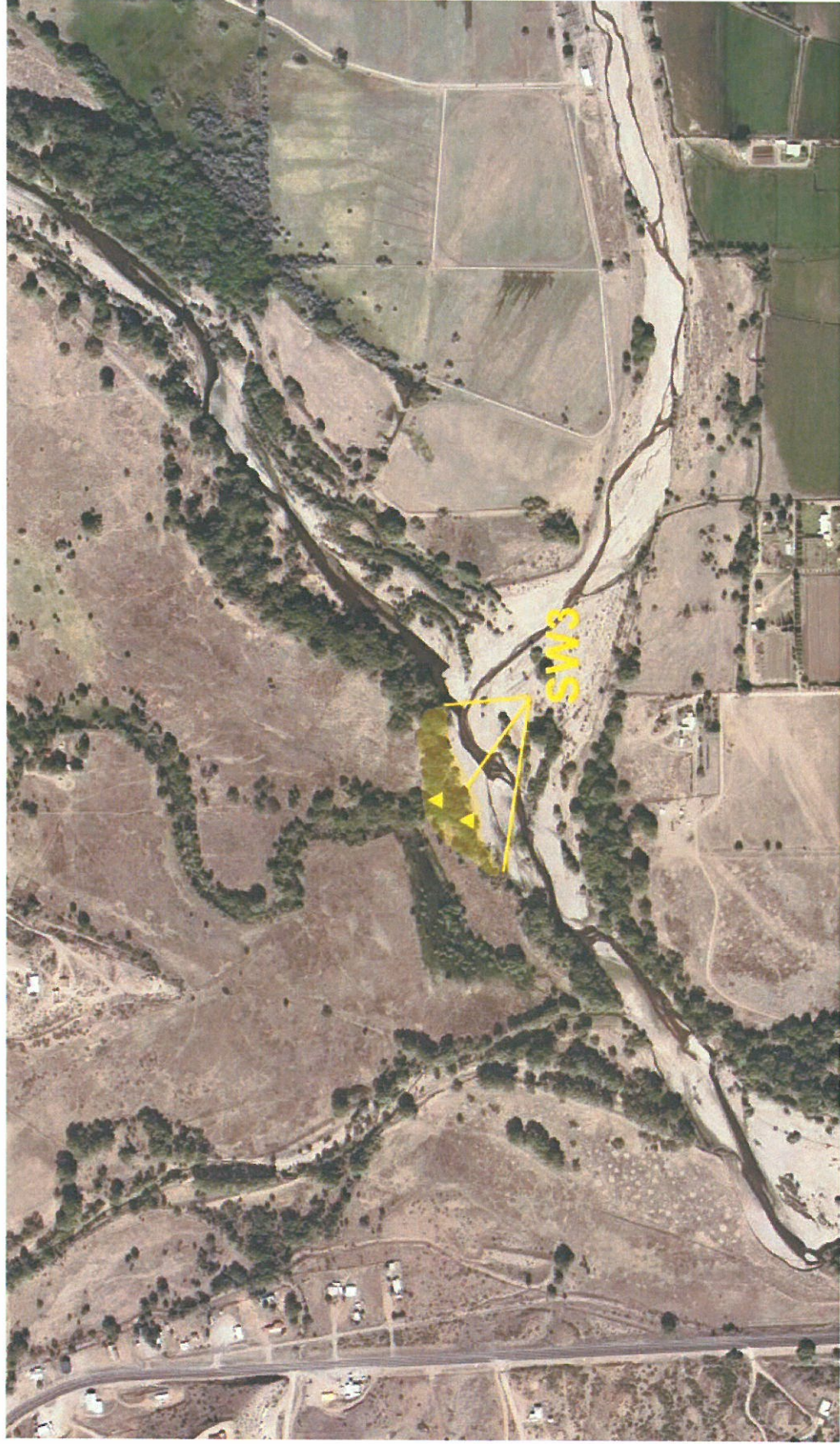


Figure C 31. Southwest 4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

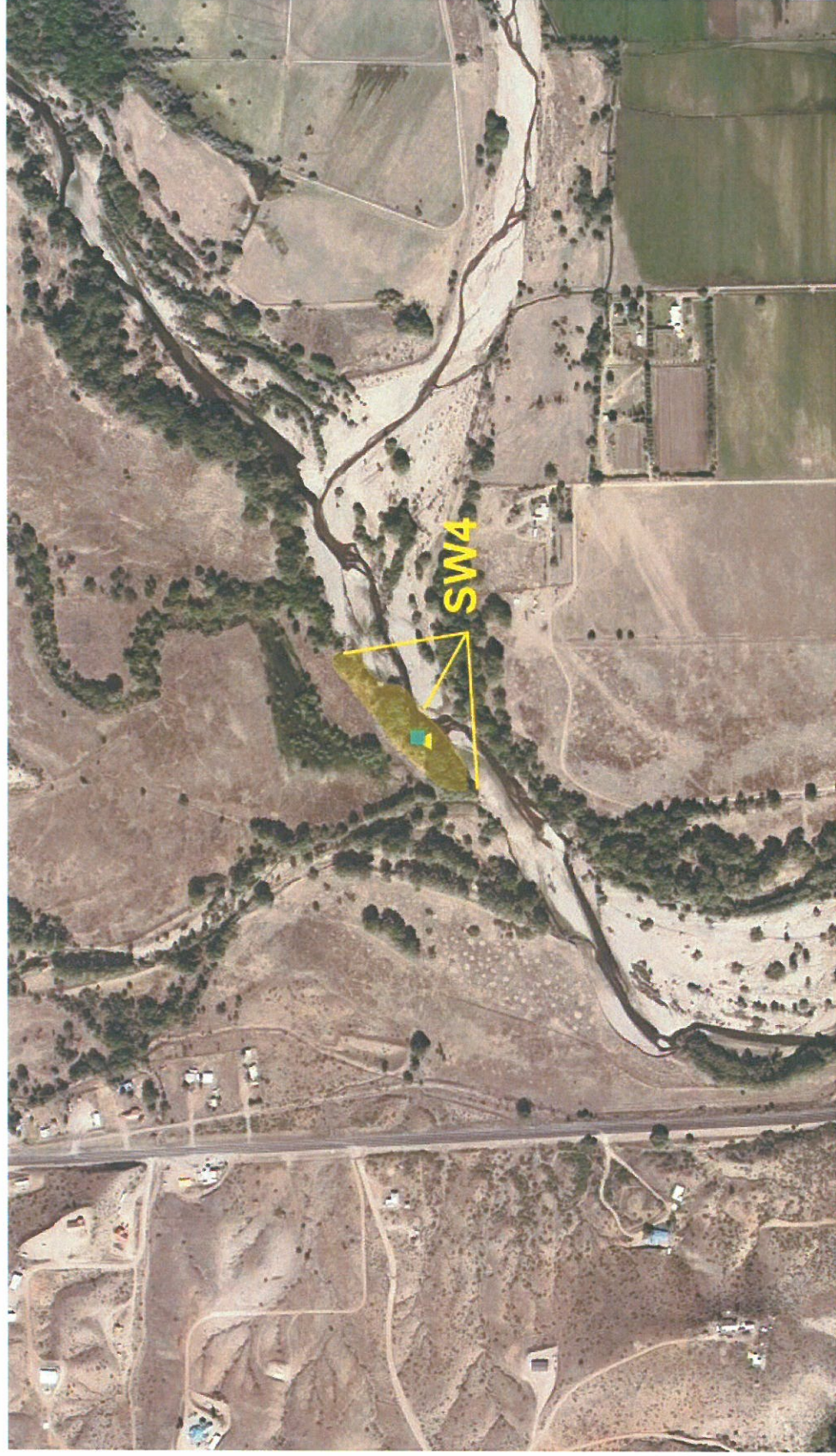


Figure C 31a. Southwest 4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

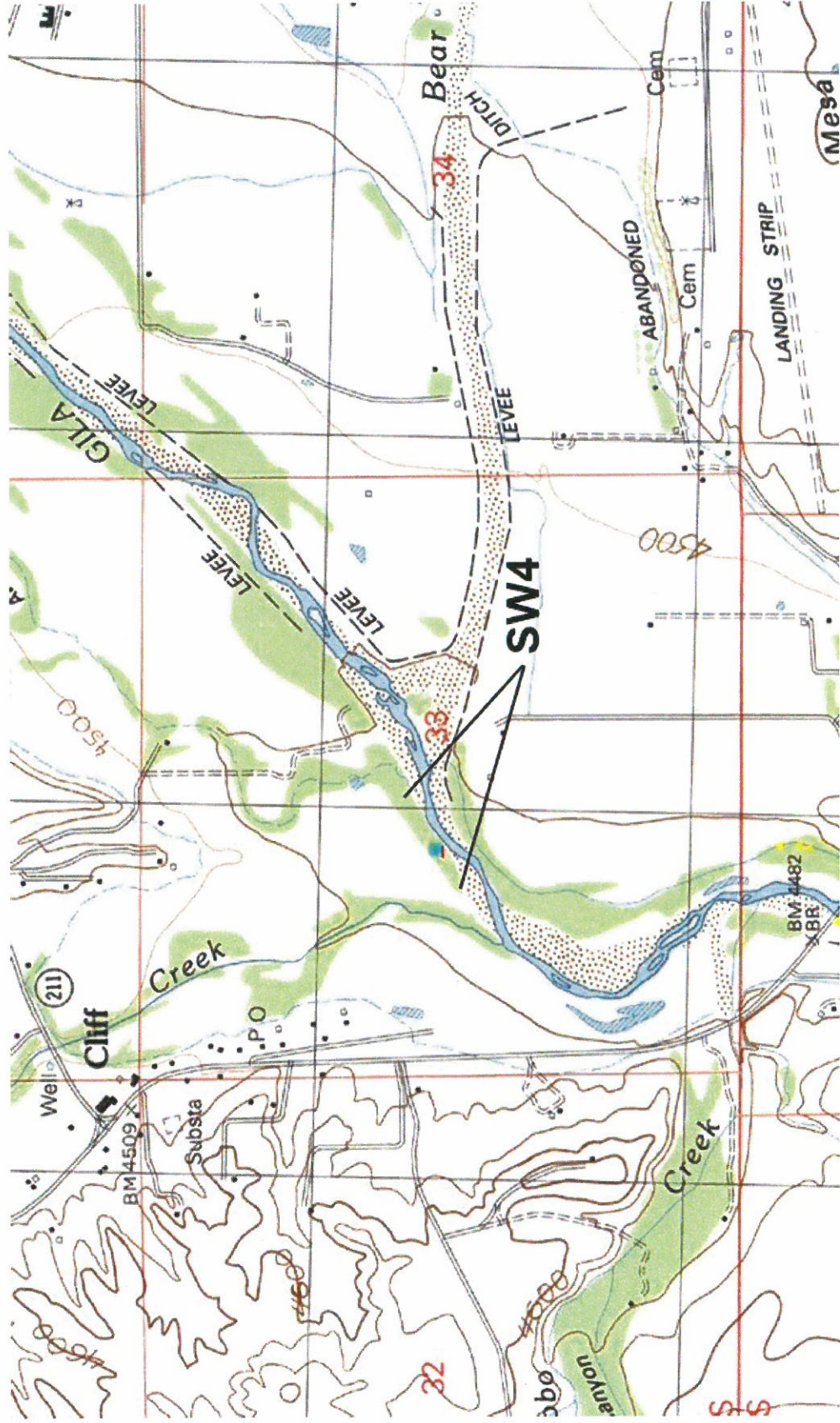


Figure C 32. Southwest Stringer Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 32a. Southwest Stringer Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Cliff USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

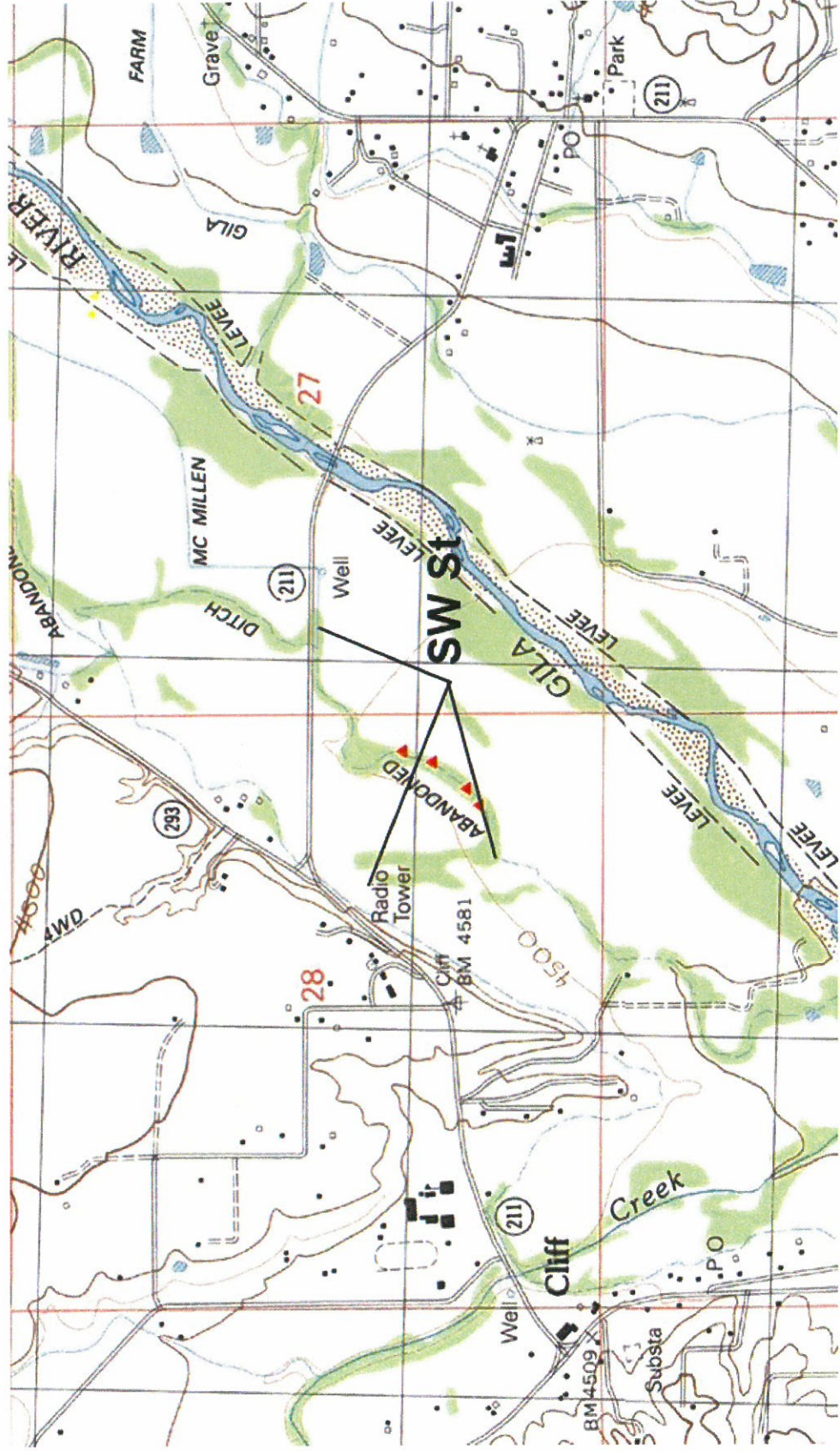


Figure C 33. The Nature Conservancy – Lichty Center Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 33a. The Nature Conservancy – Lichty Center Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

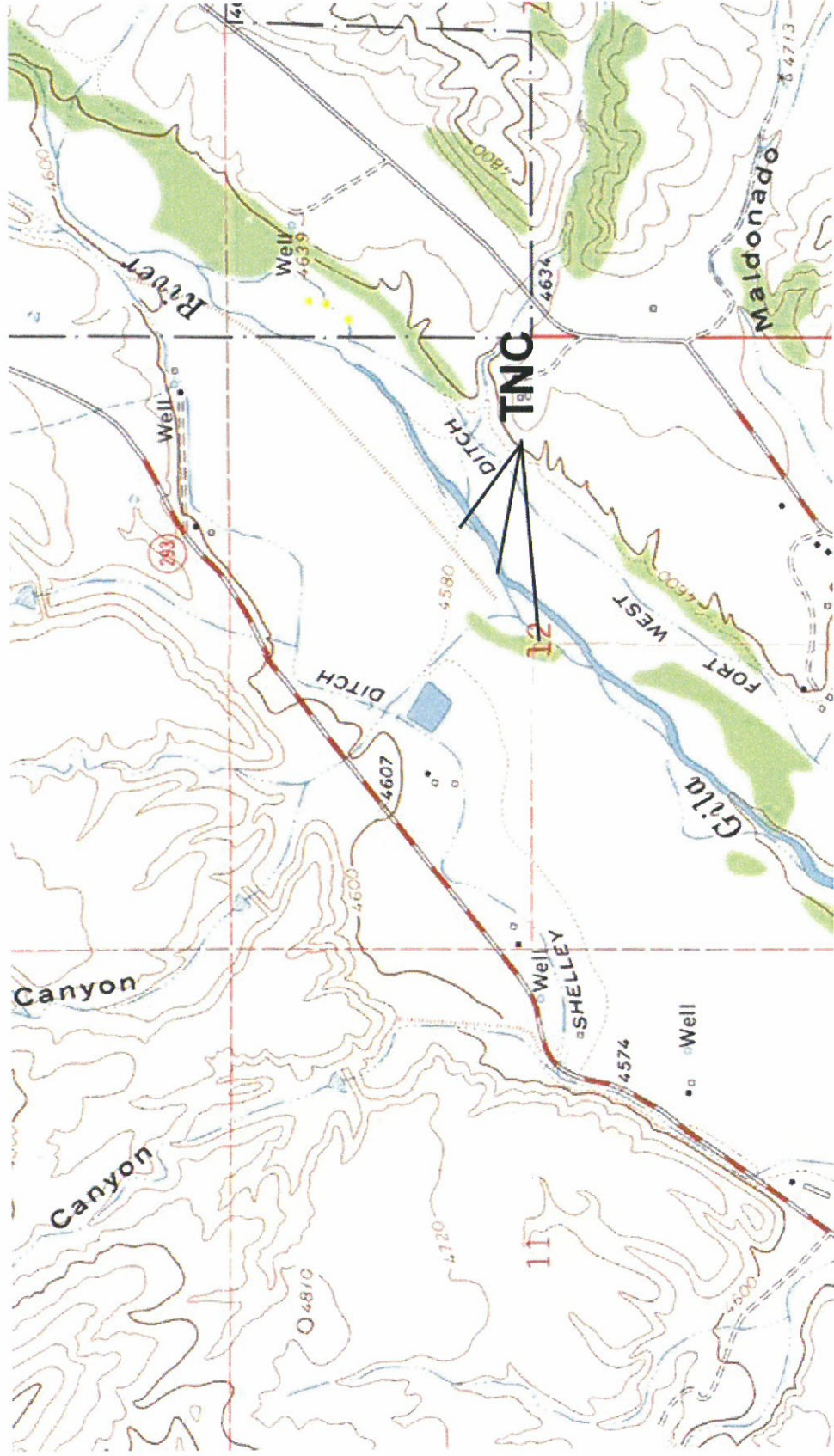
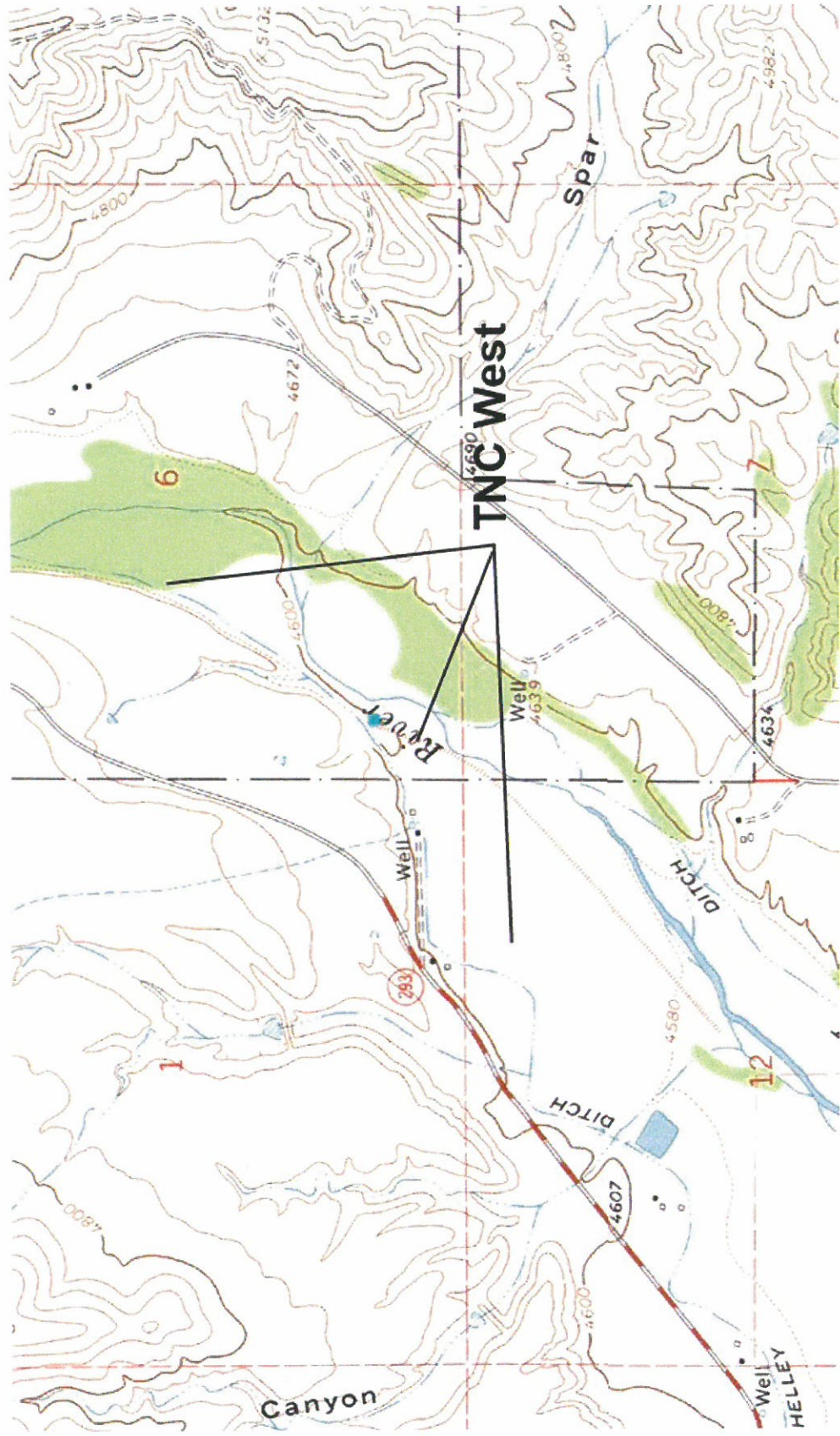


Figure C 34. The Nature Conservancy West Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure C 34a. The Nature Conservancy West Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Canteen Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.



APPENDIX D

Figure D1. BCN1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Redrock and Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

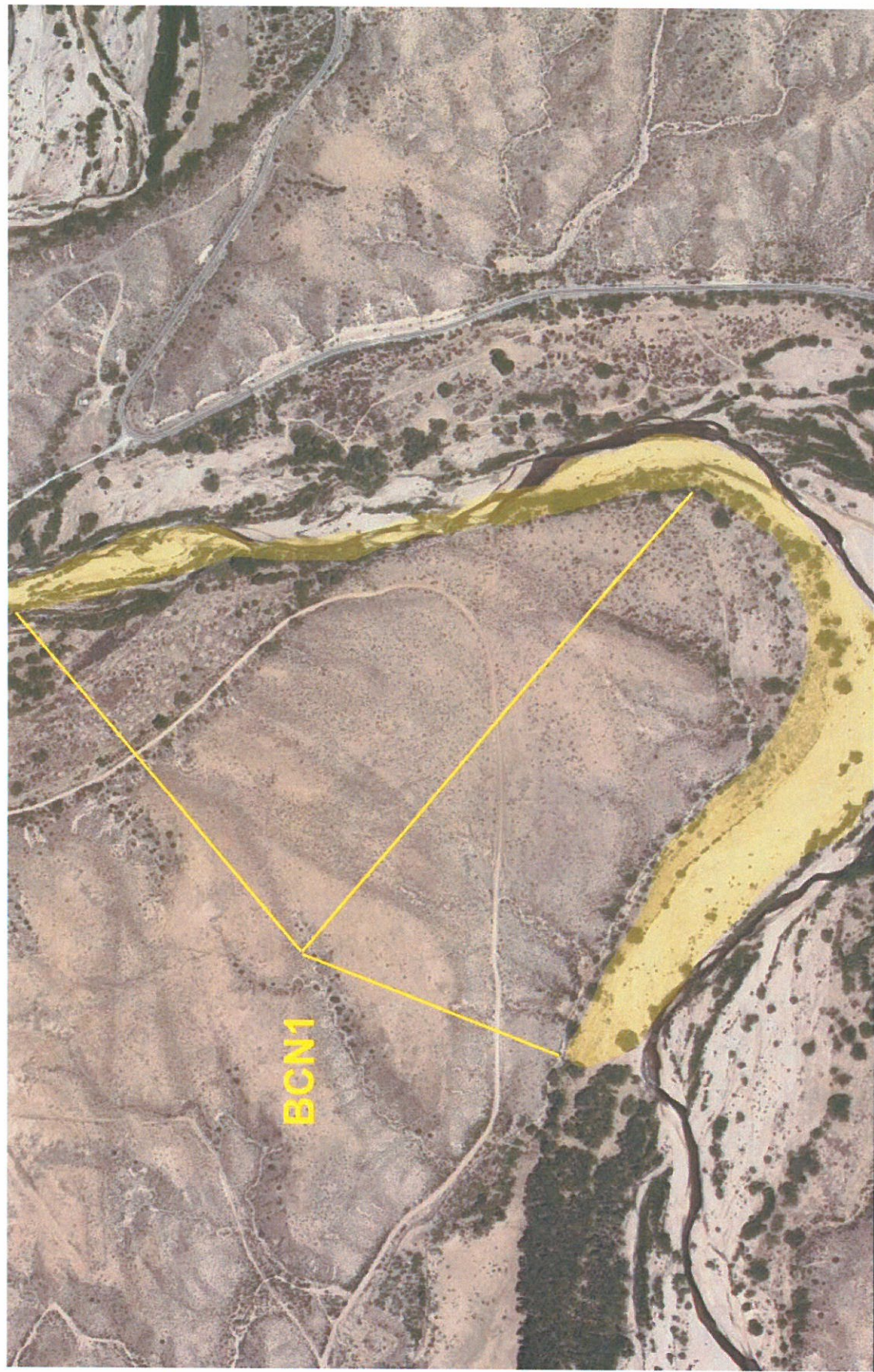


Figure D2. BCN2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D2a. BCN2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

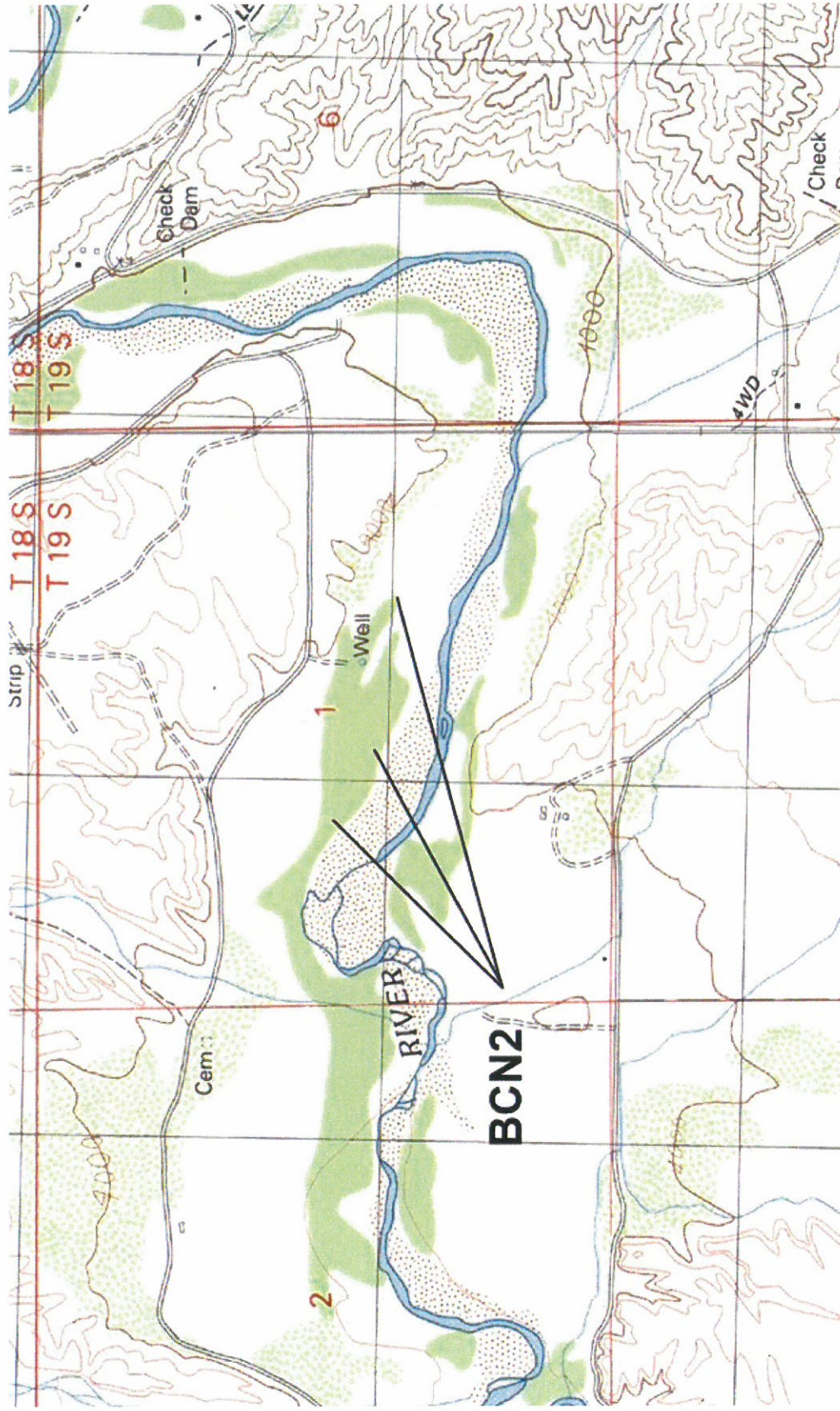


Figure D3. BCN3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D3a. BCN3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

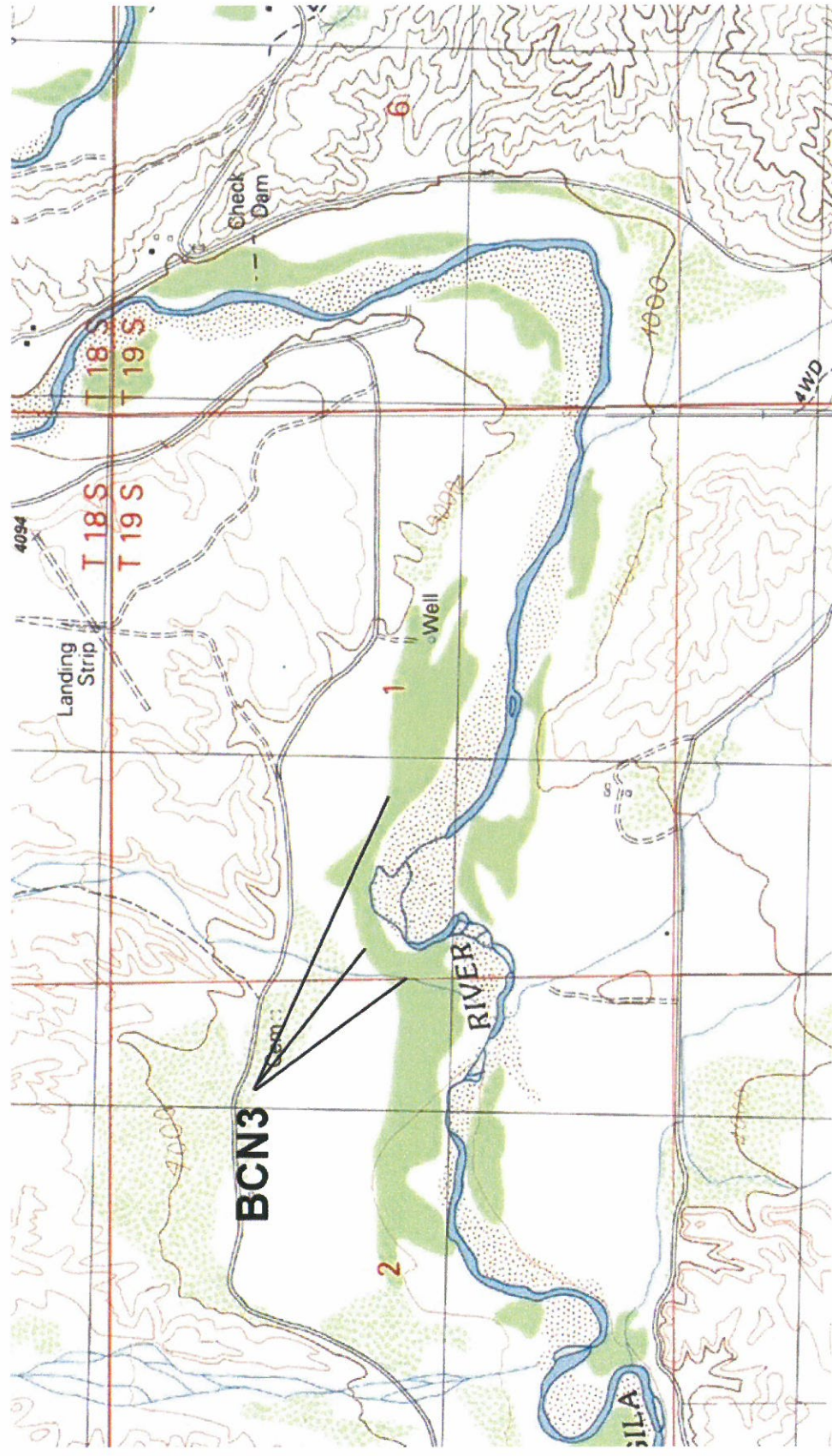


Figure D4. BCN4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D4a. BCN4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

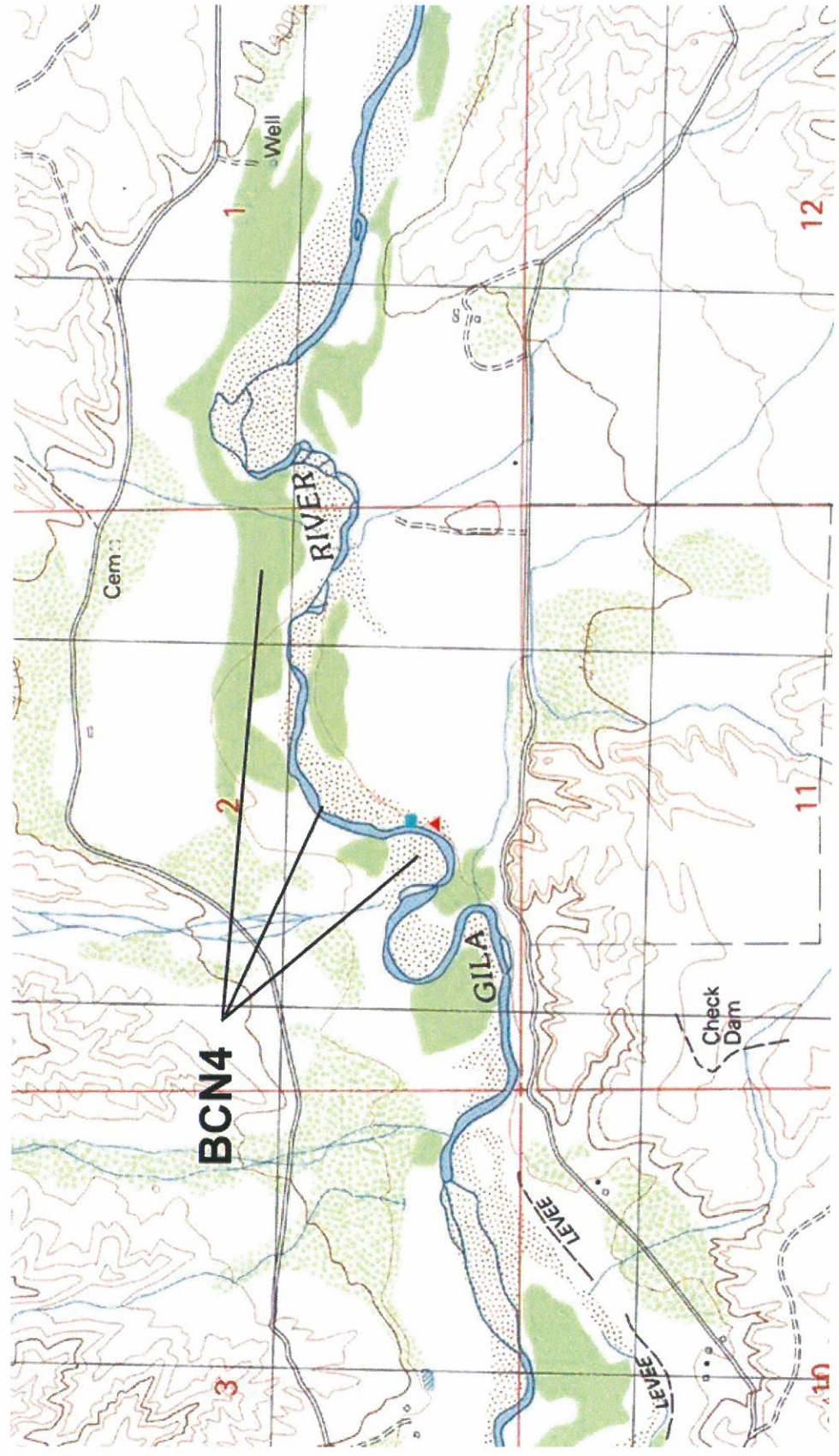


Figure D5. BCN5 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D5a. BCN5 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

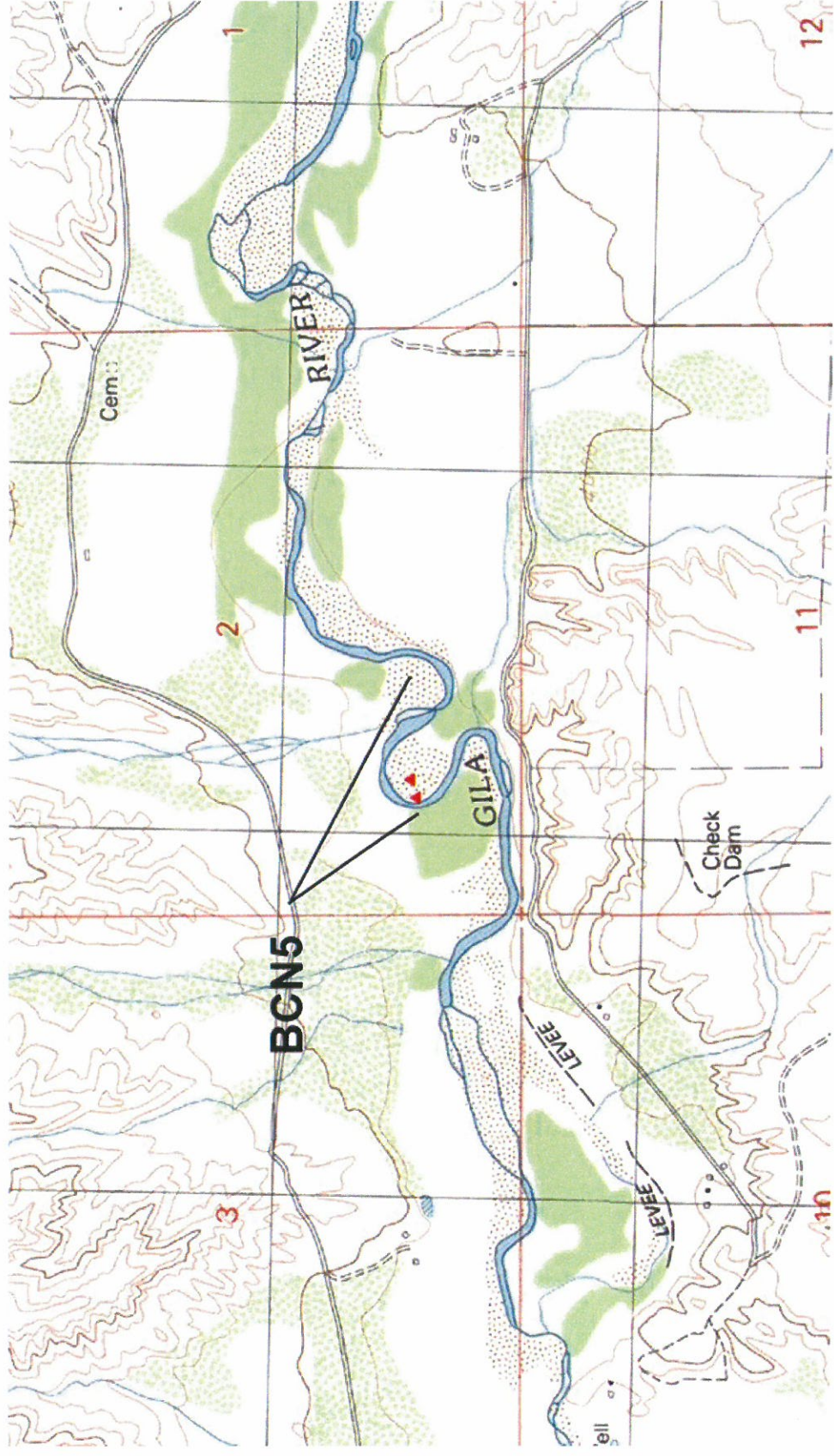


Figure D6. BCN6 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D6a. BCN6 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

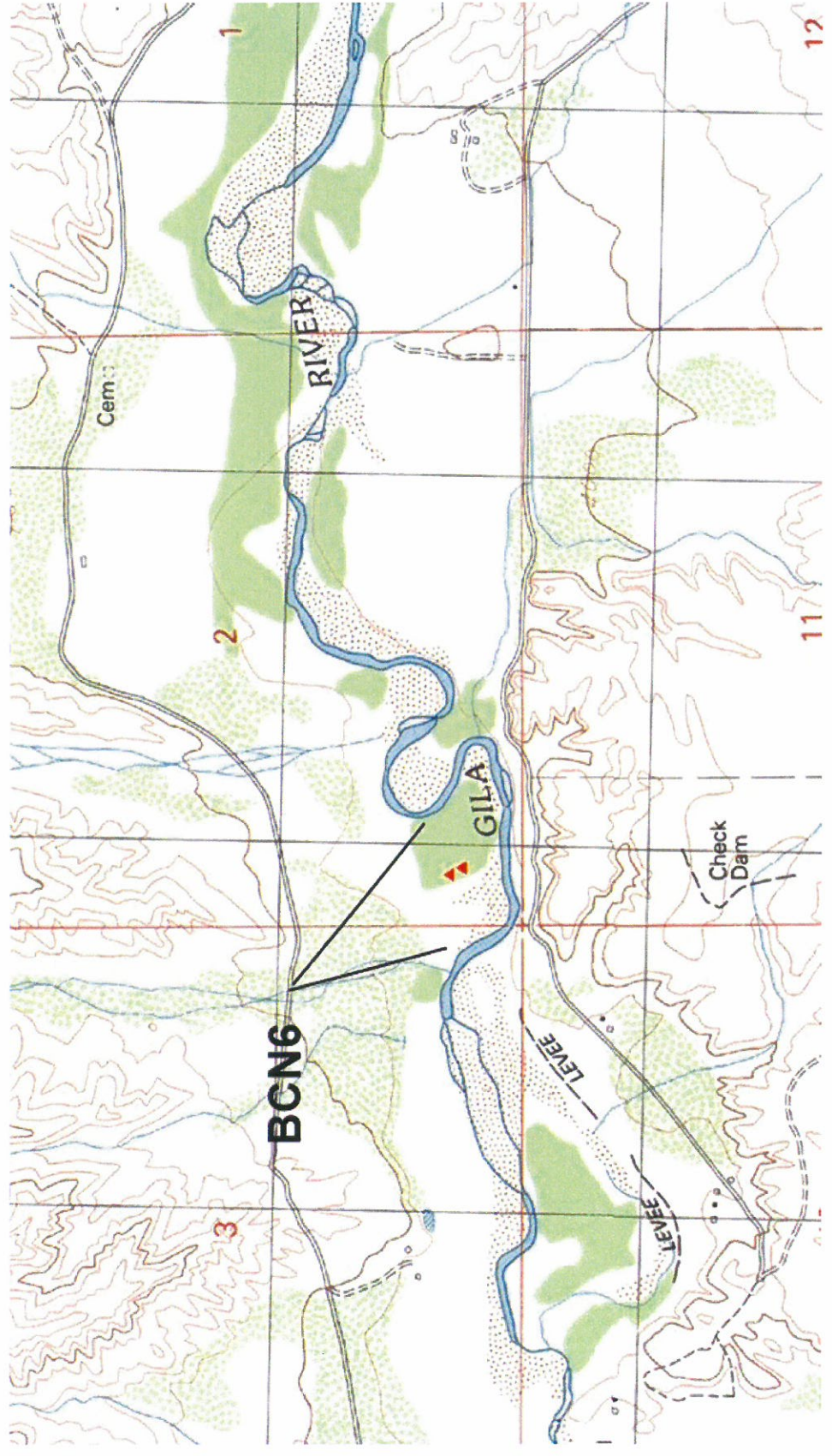


Figure D7. BCN7 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D7a. BCN7 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

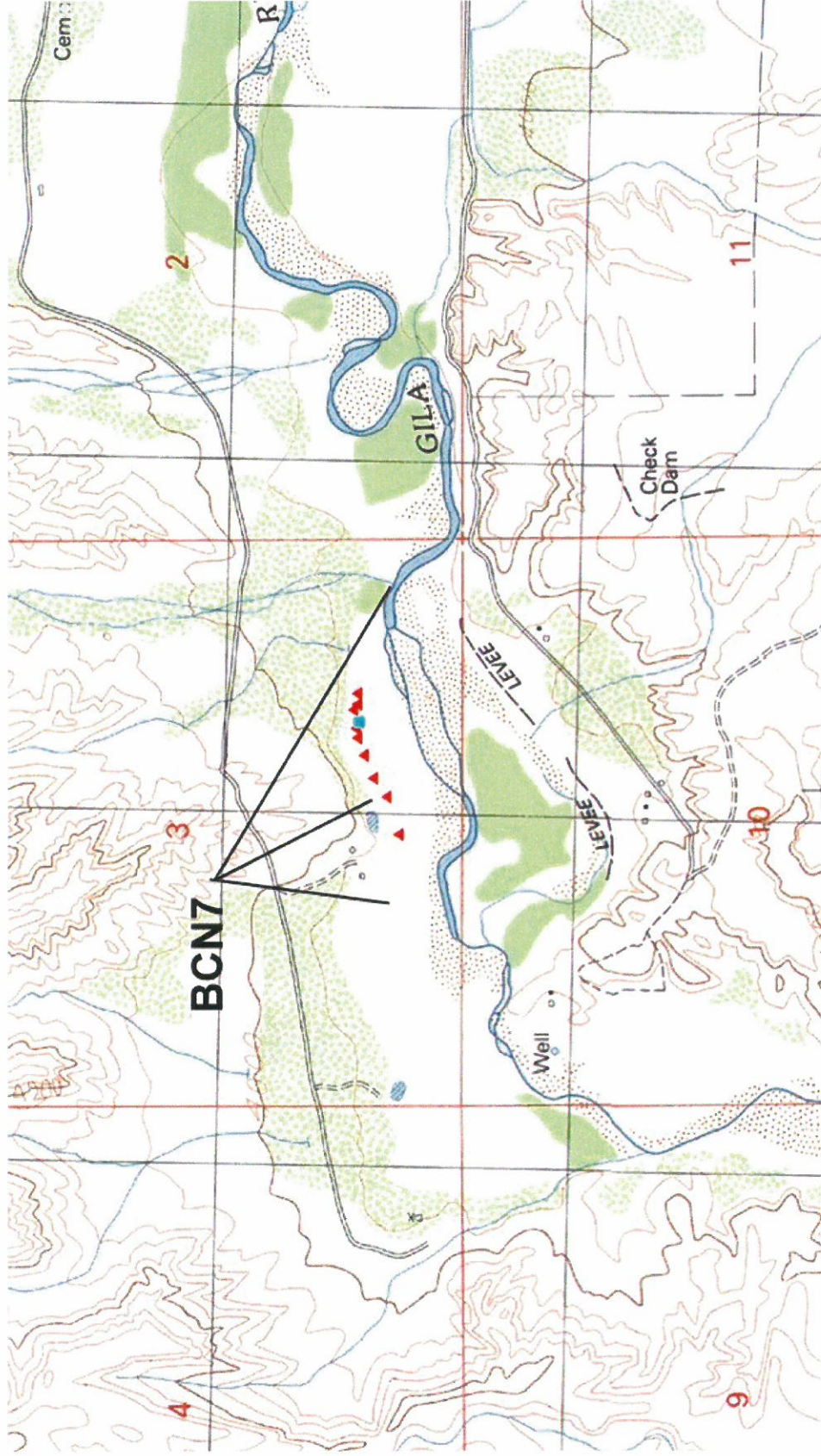


Figure D8. BCN8 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D8a. BCN8 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

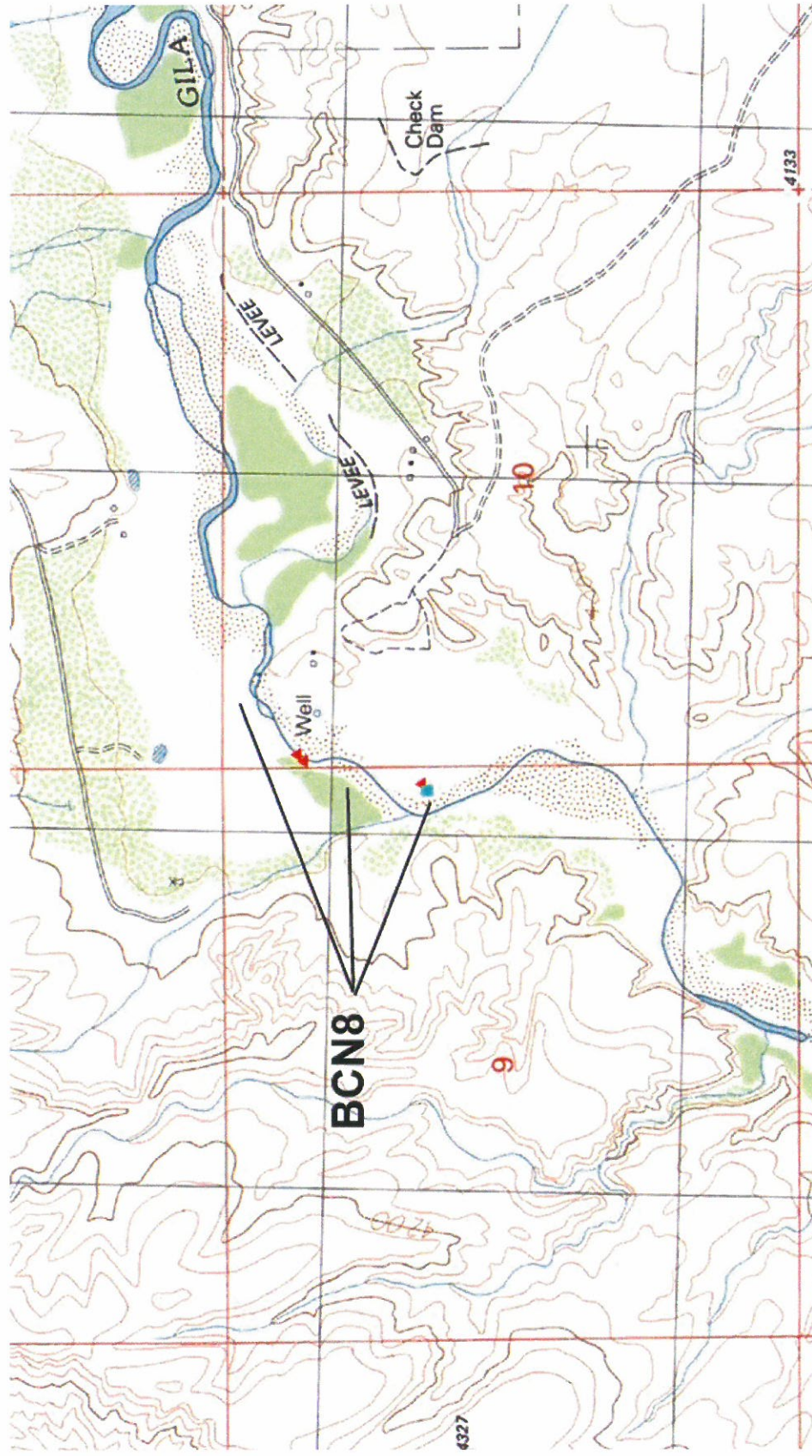


Figure D9. BCN9 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D9a. BCN9 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

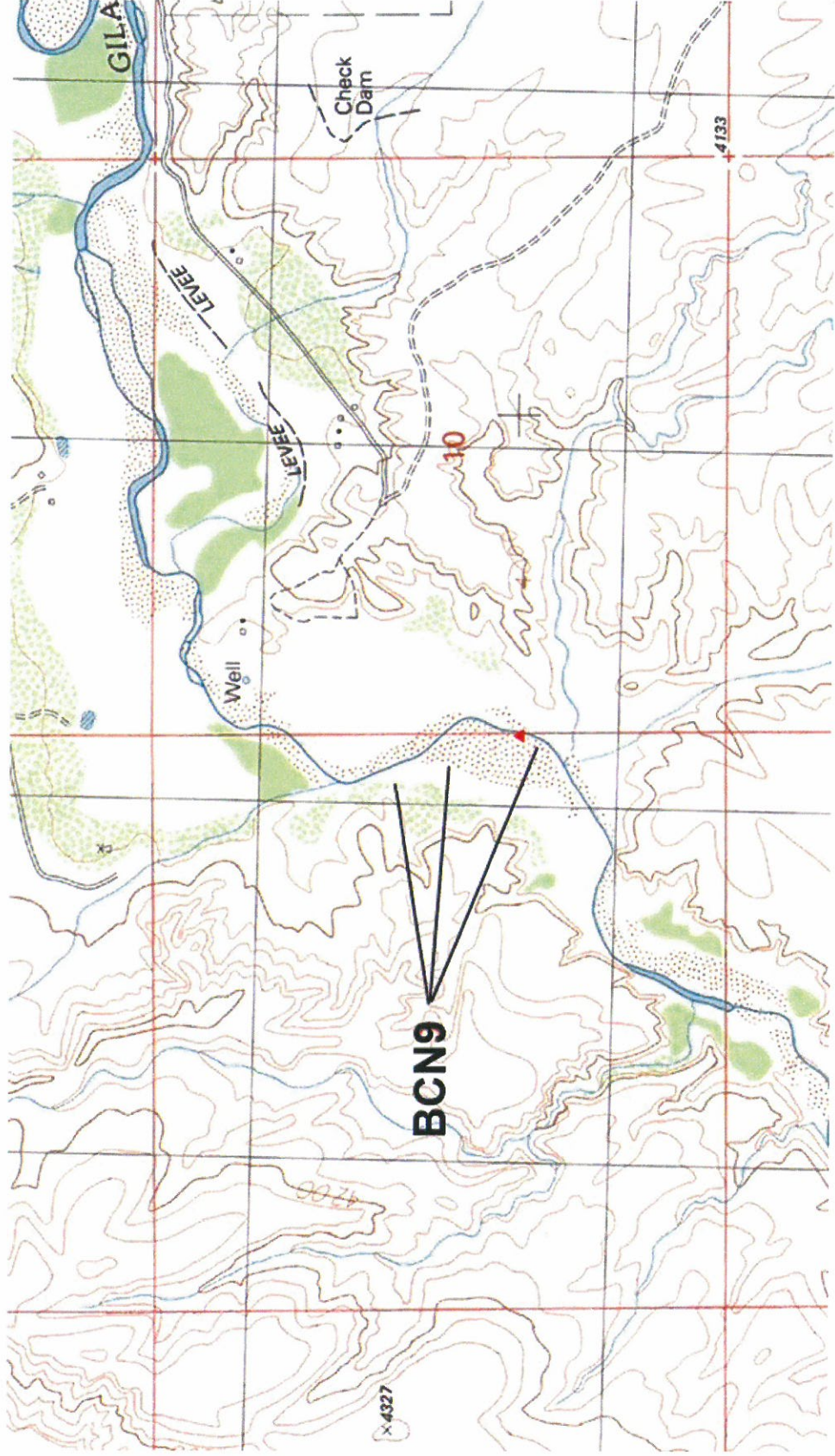


Figure D10. BCN10 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D10a. BCN10A Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon and Redrock USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

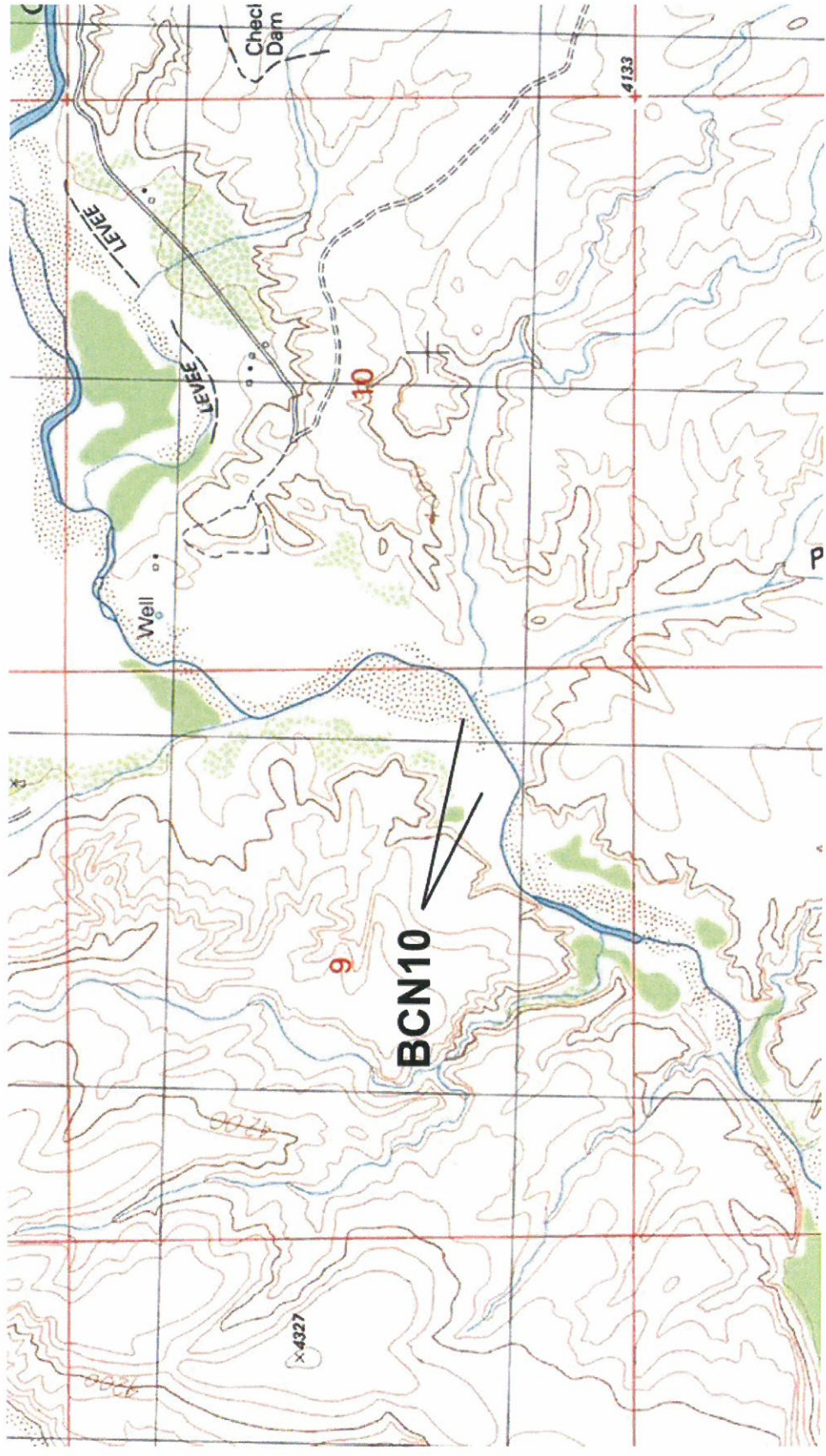


Figure D11. BCS1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon and Redrock USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D11a. BCS1 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon and Redrock USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

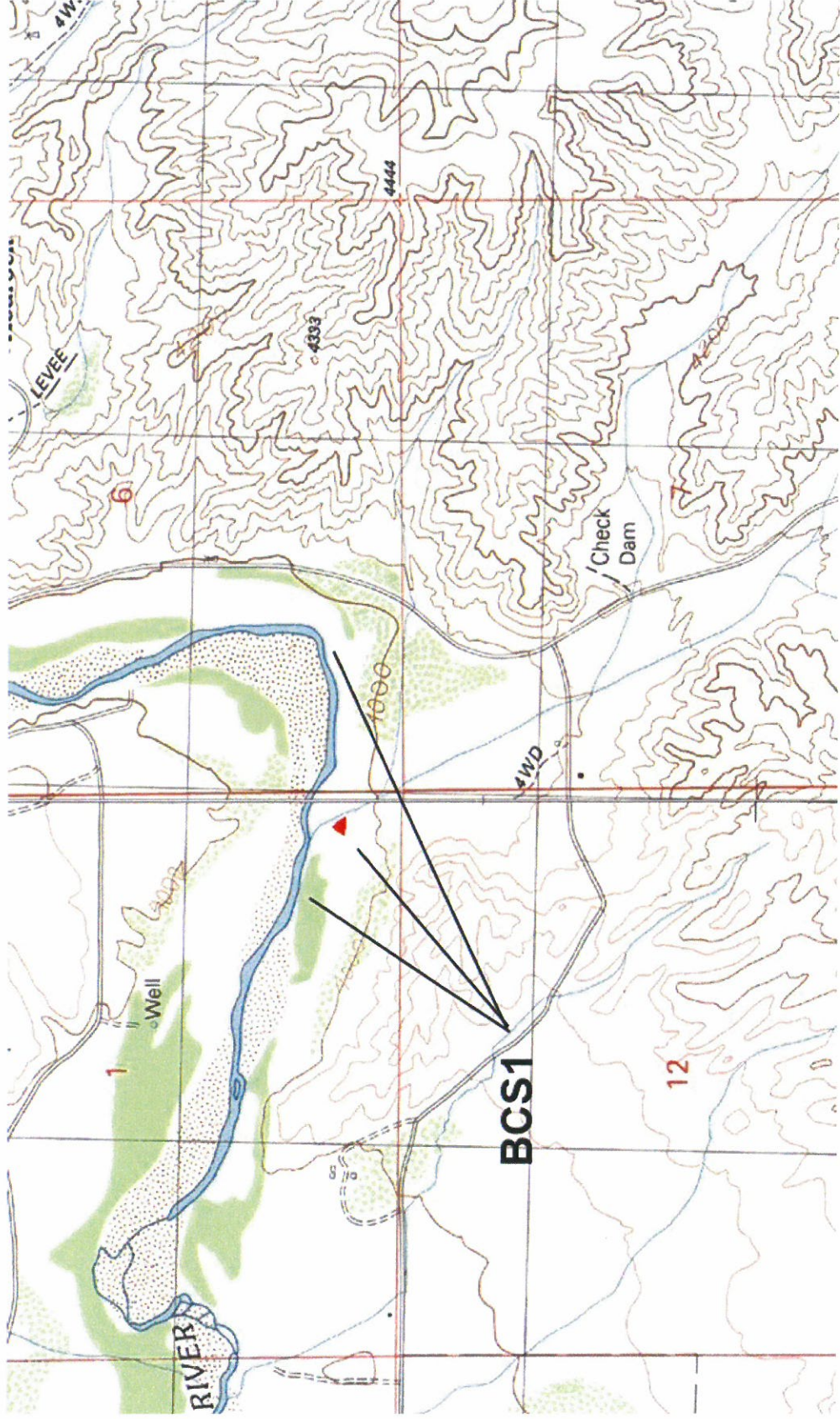


Figure D12. BCS2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

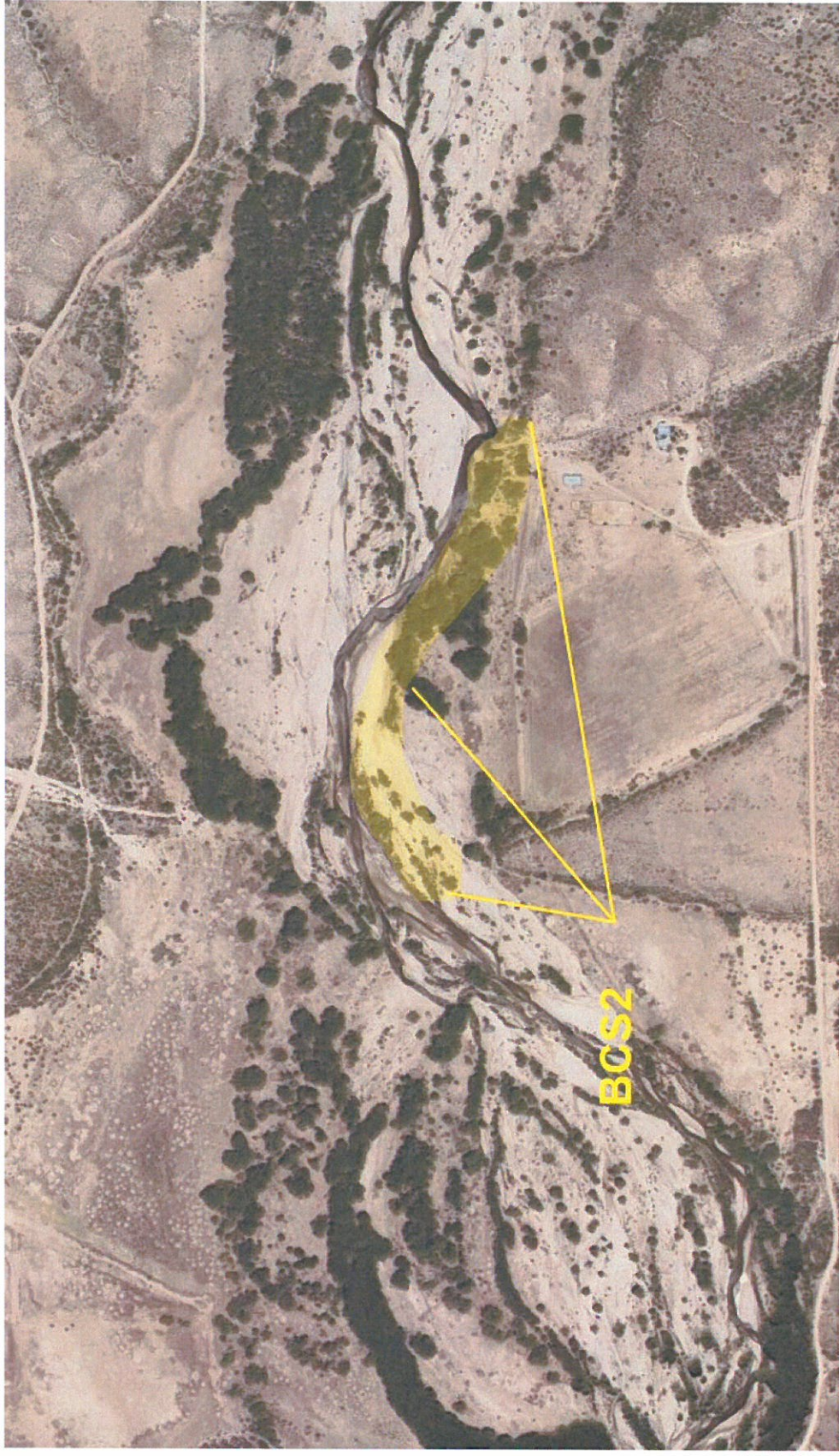


Figure D12a. BCS2 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

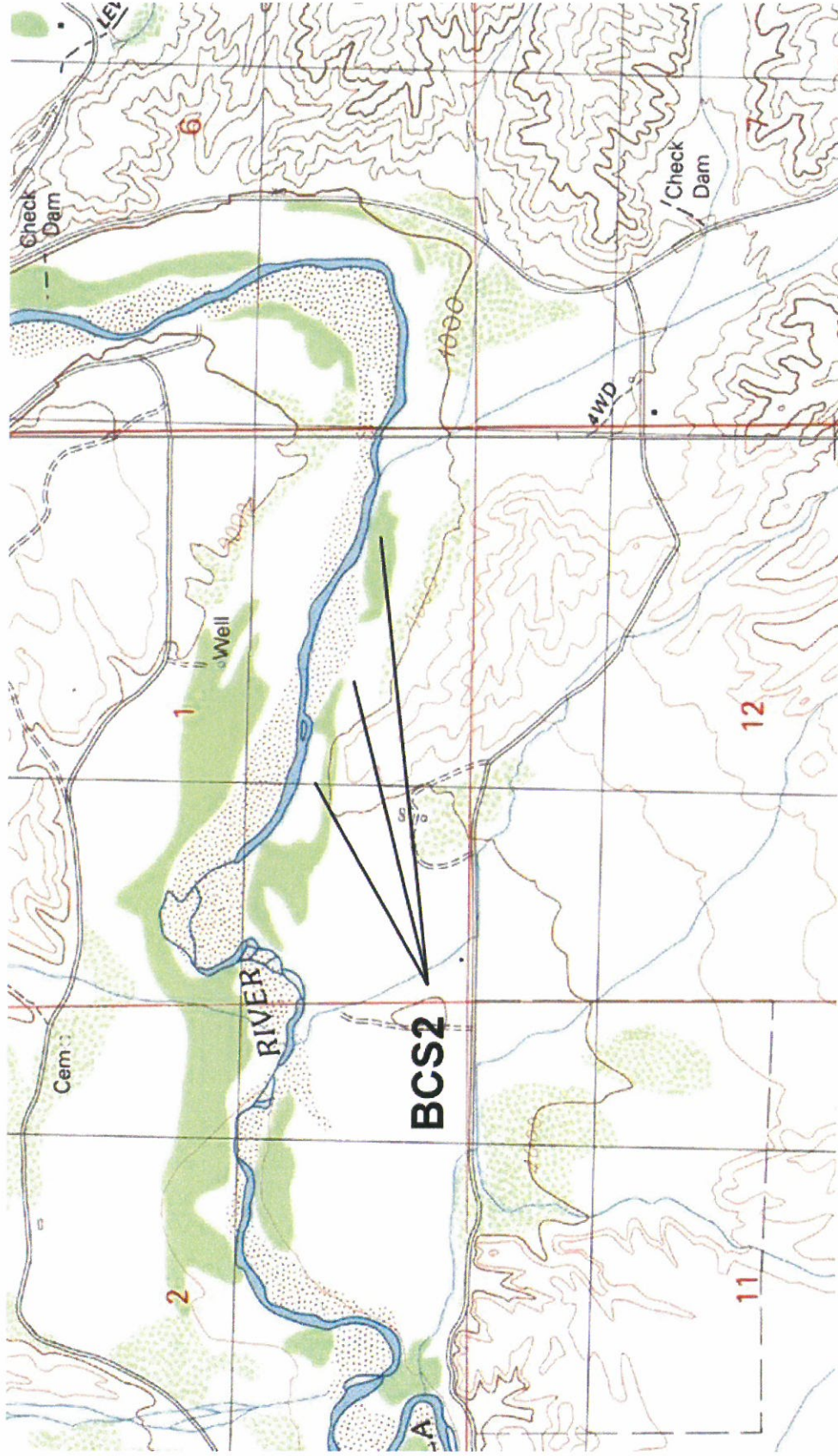


Figure D13. BCS3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D13a. BCS3 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

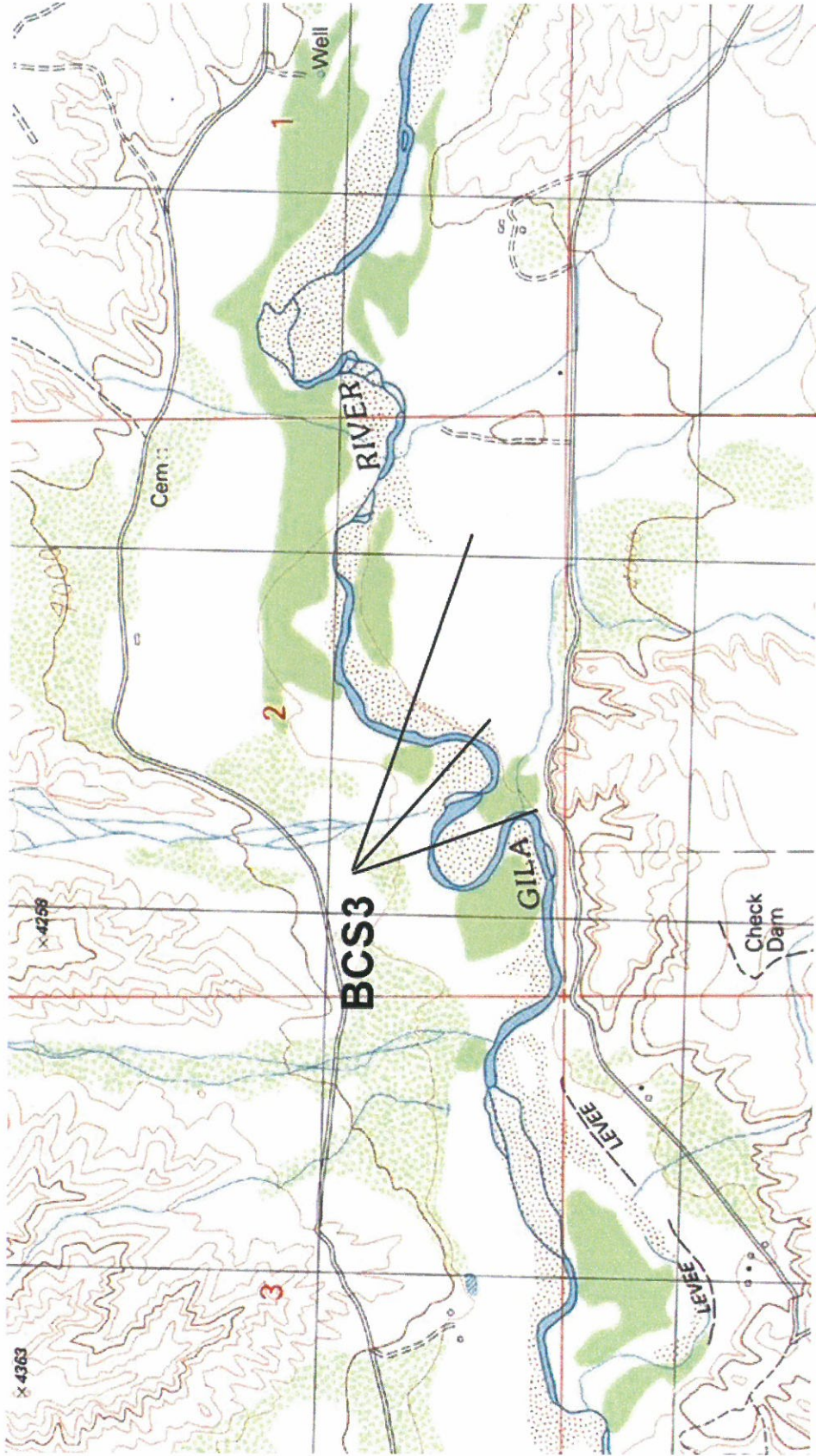


Figure D14. BCS4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D14a. BCS4 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

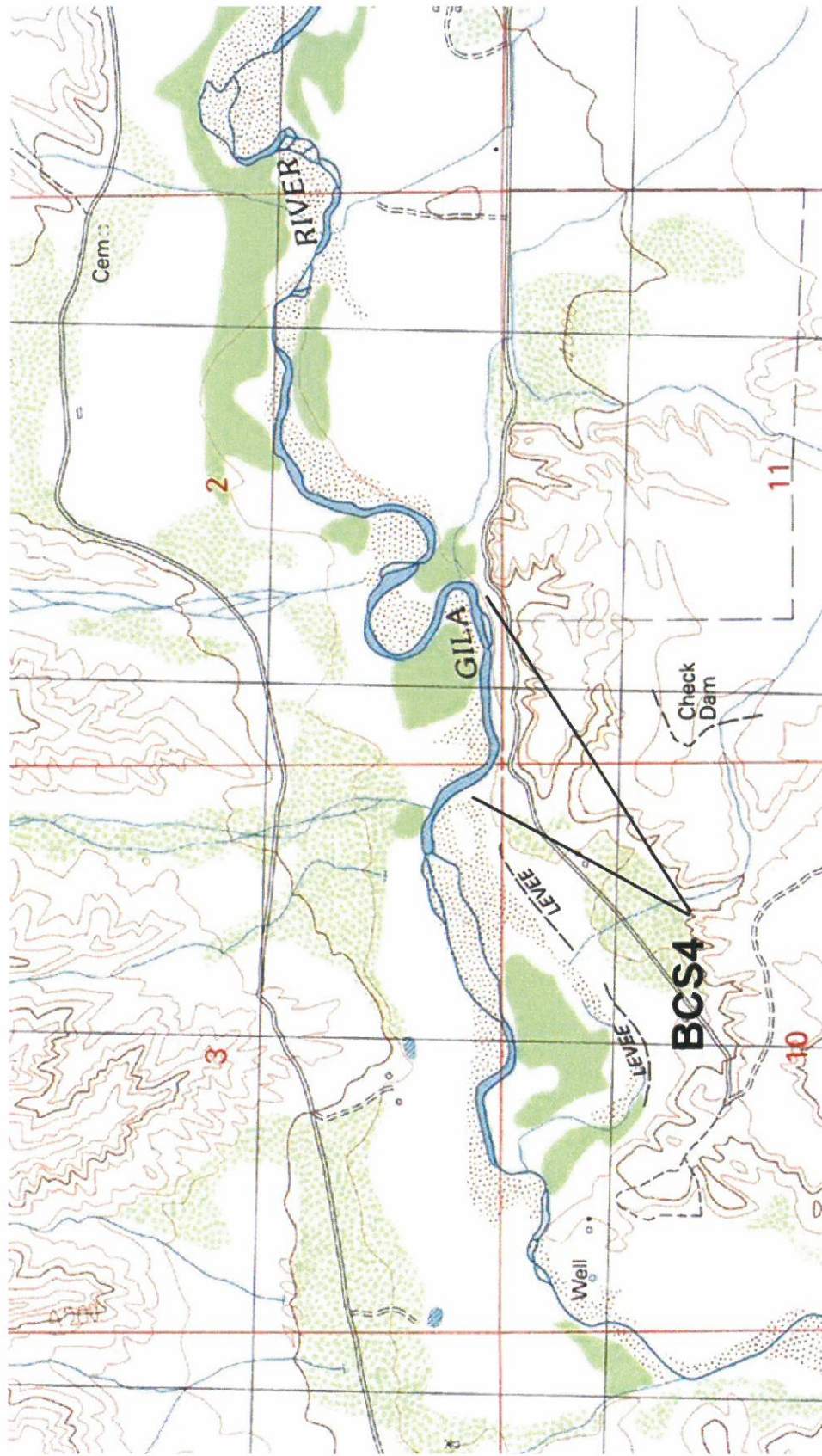


Figure D15. BCS5 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D15a. BCS5 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

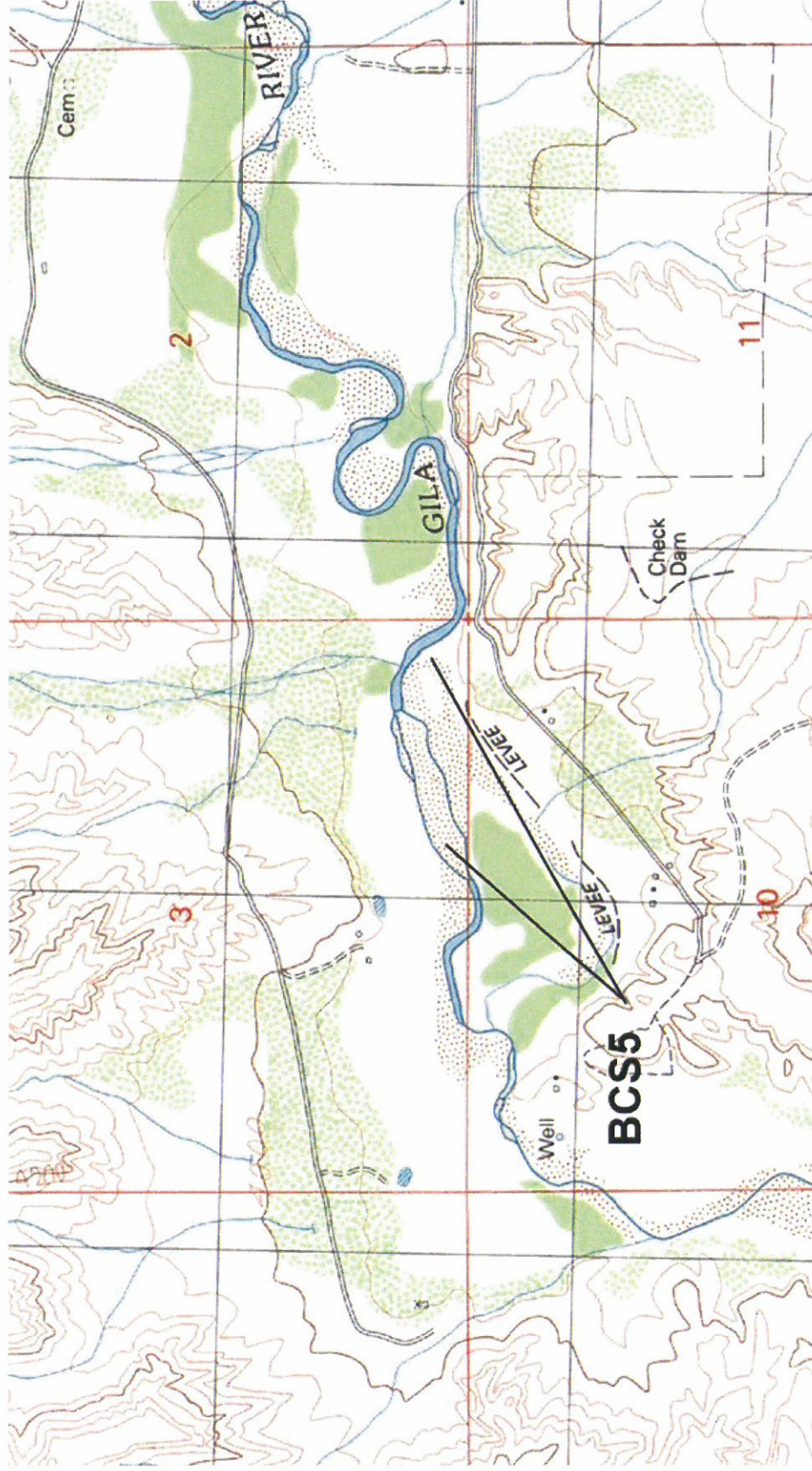


Figure D16. BCS6 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.

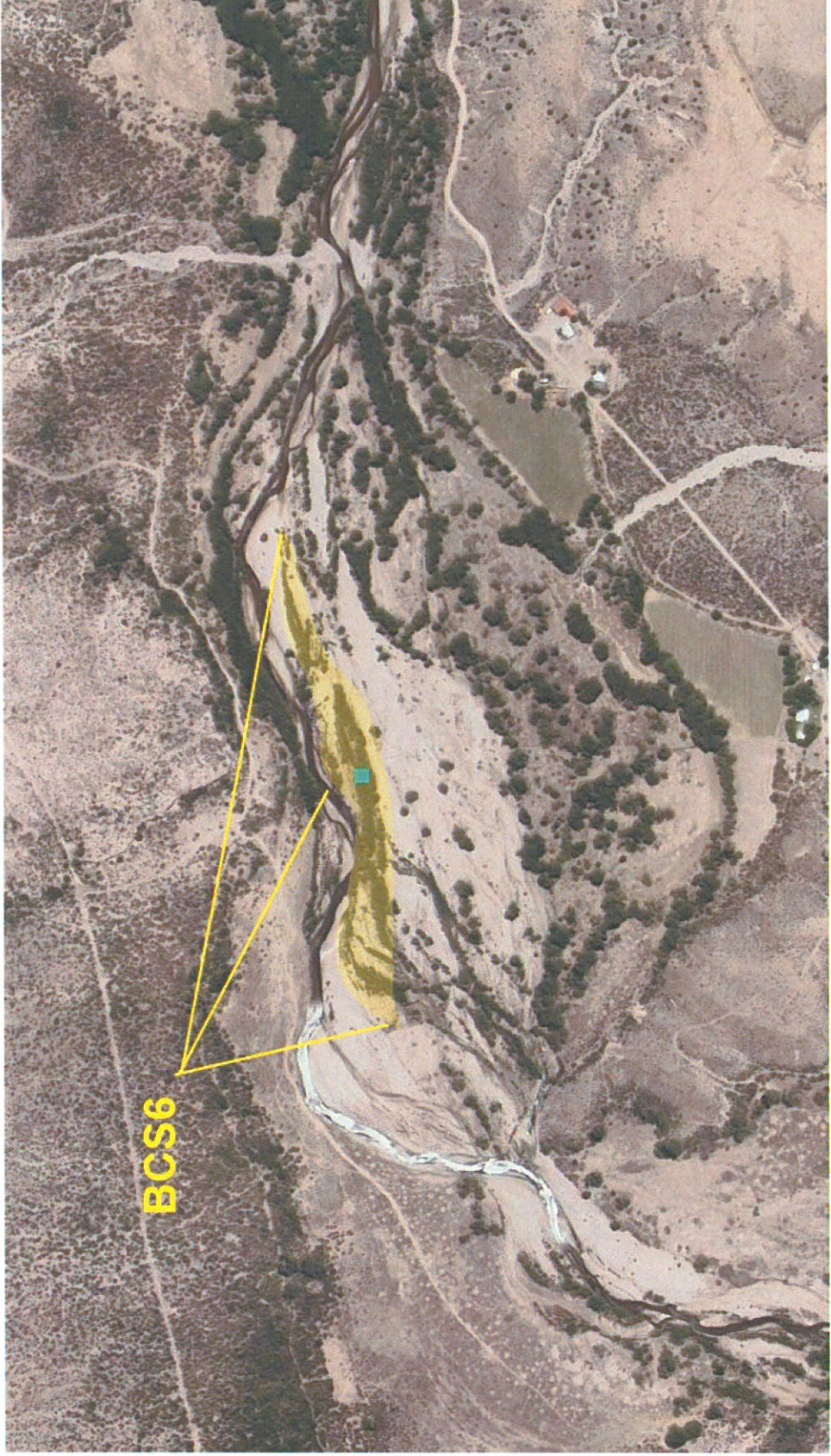


Figure D16a. BCS6 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

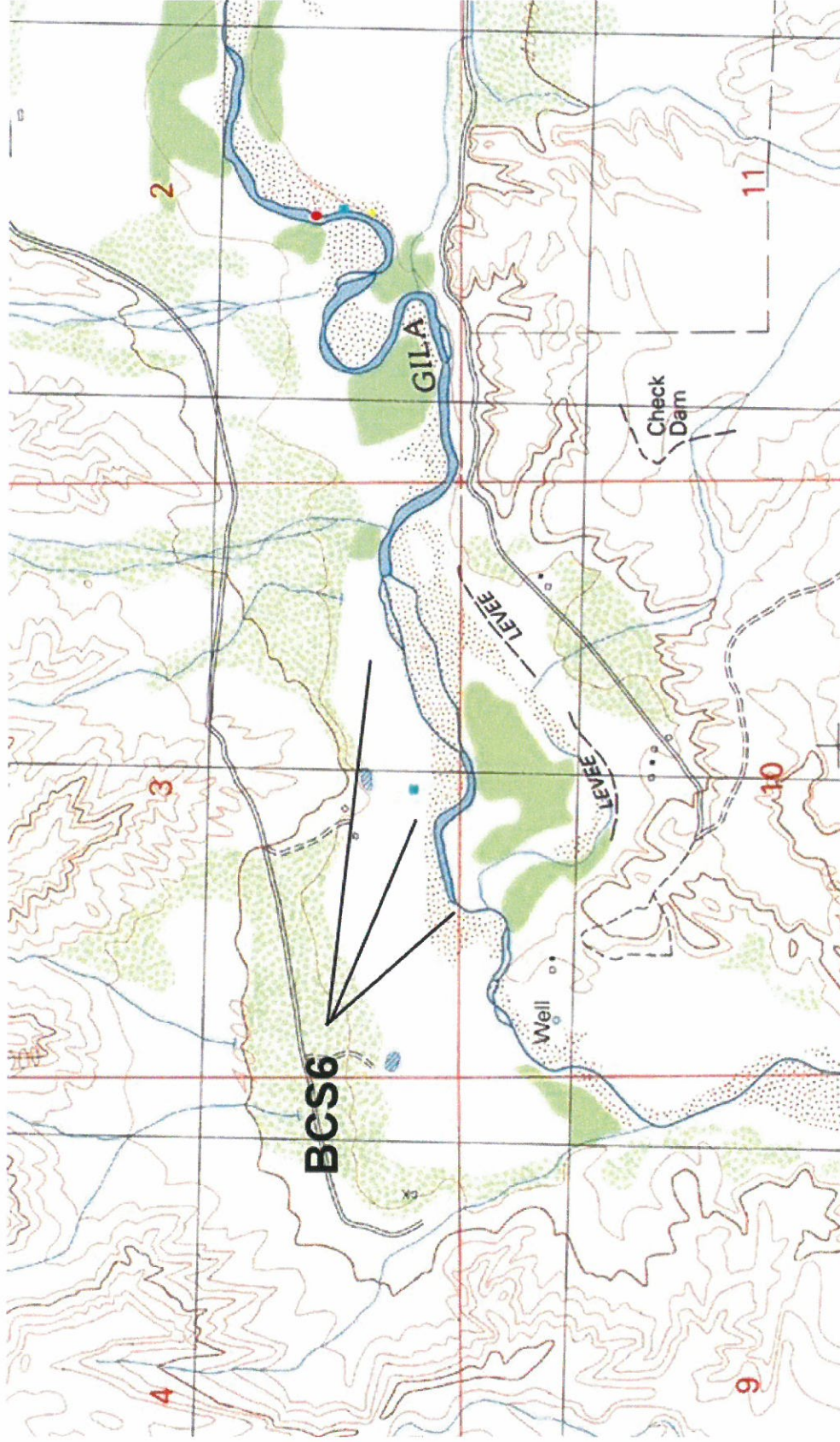


Figure D17. BCS7 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D17a. BCS7 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

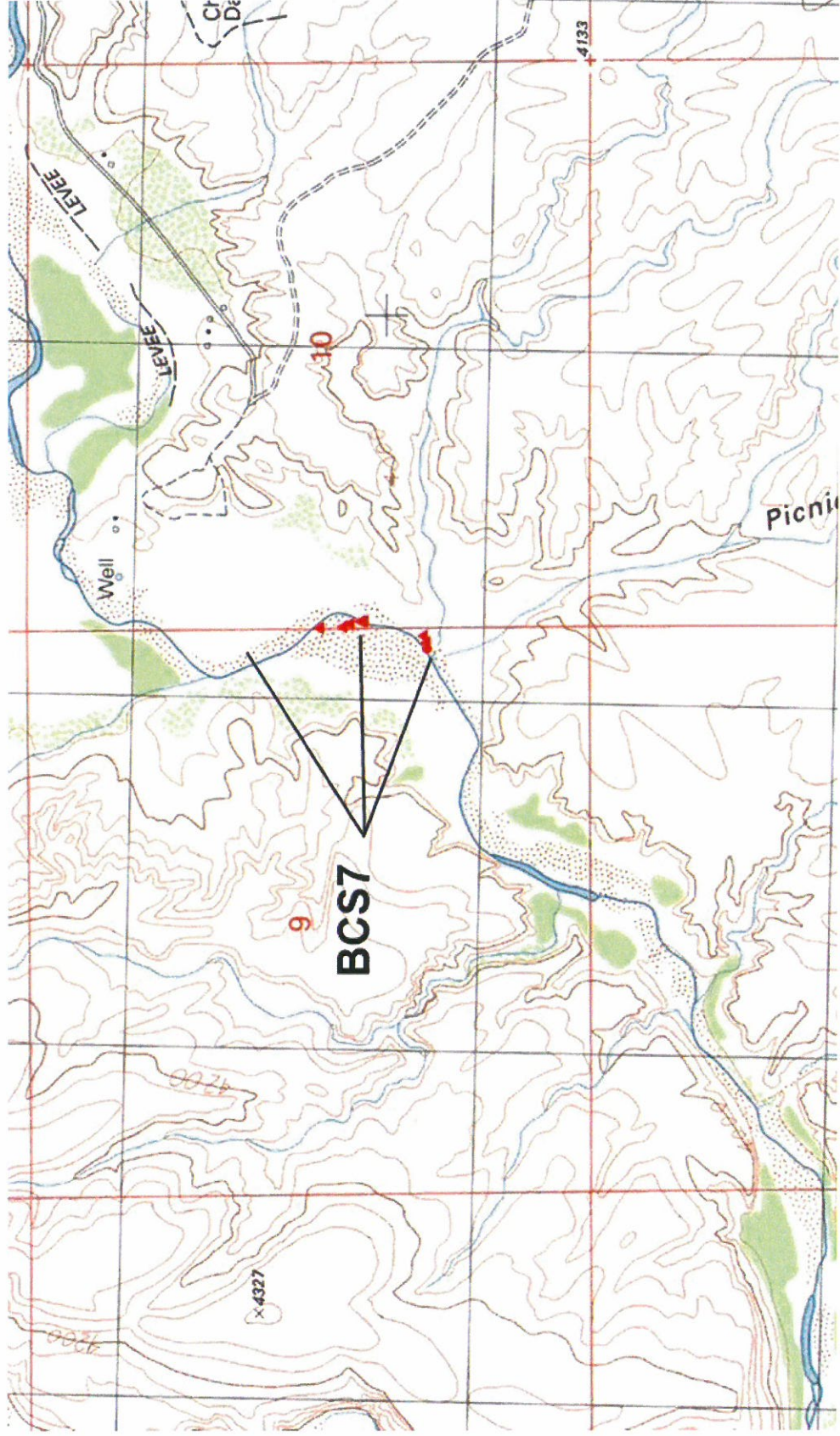


Figure D18. BCS8 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Yellow triangles represent territorial pairs, turquoise squares (when present) represent unpaired territorial birds. Aerial photograph dated 2009.



Figure D18a. BCS8 Resident Southwestern Willow Flycatcher territories detected during the 2012 breeding surveys overlaid on the Nichols Canyon USGS Topographical Quadrangle (1:24,000). Red triangles represent territorial pairs, turquoise squares (when present) represent an unpaired, territorial bird.

