WCFO Field Report

From: Christian Edwards and Erik Woodhouse
Date: May 14, 2025
Subject: Southwestern Willow Flycatcher Monitoring, May-August 2025

INTRODUCTION

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*; hereafter flycatcher) is an obligate riparian bird that occurs patchily along rivers and streams throughout much of the southwestern U.S. from April through September. Females build small open-cup nests, which are typically placed in the fork of small-diameter vertical branches, 2-7 m above the ground. Successful flycatchers typically produce a single clutch per year but will occasionally produce a second clutch following a successful nest. Unsuccessful flycatchers will re-nest multiple times following nest failure. The flycatcher was federally listed as endangered in 1995 due to declining populations caused primarily by the loss and modification of breeding habitat (USFWS 1995). The current flycatcher population consists of approximately 1,000 known pairs, and an estimated population size of 1,200 pairs (USFWS 2002). Typically, three to 11 pairs breed along the Virgin River in St George, Utah (Day 2003, Edwards et al. 2019).

Breeding habitat is characterized by a mosaic of relatively dense tree and shrub growth, typically in association with surface water or saturated soil, interspersed with more open areas, open water, or shorter, sparser vegetation along rivers, streams, or other wetlands. Plant species composition, vegetation height and density, and patch size vary greatly, but most occupied sites typically consist of dense vegetation in the interior of the patch and within 3-4 m of the ground (Sogge and Marshall 2000, USFWS 2002). Flycatchers historically nested primarily in willows (e.g., *Salix exigua*, *S. gooddingii*), buttonbush (*Cephalanthus occidentalis*), and seepwillow (*Baccharis salicifolia*), but now also nest in thickets dominated by tamarisk (e.g., *Tamarix ramosissima*) and Russian olive (*Elaeagnus angustifolia*). Because habitat loss and degradation are the main factors contributing to the decline of the species, the Southwestern Willow Flycatcher recovery plan emphasizes the increase and improvement of breeding habitat through restoration of native breeding habitat and the management of exotic vegetation (USFWS 2002).

The Utah Division of Wildlife Resources (UDWR) continued long-term population monitoring in 2025 by conducting presence-absence surveys at known and potential breeding sites, including restoration project sites, along the Virgin River and its tributaries (i.e., St George study area). In 2025, in coordination with the Virgin River Program, UDWR also continued monitoring breeding productivity for an eighteenth consecutive year. Associated with nest monitoring, UDWR collected habitat data at successful and unsuccessful nest sites within occupied habitat patches. Toward the goal of recovering the St George flycatcher population, UDWR will use these data to refine ongoing riparian habitat restoration activities to benefit flycatchers specifically. All data were collected by UDWR personnel Christian N. Edwards and Erik T. Woodhouse.

METHODS

Population Size and Distribution
Presence-absence surveys were conducted at historic breeding sites, previously occupied breeding sites, potential breeding sites, and currently occupied sites along the Virgin River in St George, Washington Co., Utah (Table 1). Surveys were also conducted on the Santa Clara River (near the Virgin River confluence) and Sand Wash (a tributary of the Santa Clara River). Standardized Southwestern Willow Flycatcher survey protocol (Sogge et al. 2010) were used, conducting one

survey during each of three survey periods (15-31 May, 1-24 June, and 24 June-17 July) at currently occupied breeding sites. At potential breeding sites, one survey was conducted during the first survey period and two surveys during each of the latter two survey periods. Prior to attempting surveys, aerial imagery was used to delineate survey areas and to identify survey routes providing adequate coverage of the area. Routes were walked during surveys, stopping every 20-30 m. At each stop, the observer first looked and listened for flycatchers for 1-2 min, after which, if a flycatcher was not detected, a 20 sec recording of a flycatcher song was broadcasted, and the observer then again looked and listened for responding flycatchers. Total number of adult flycatchers was recorded. Recording was not broadcasted during surveys conducted at currently occupied breeding sites.

Reproductive Success
All active flycatcher nests located throughout the 2025 breeding season were monitored following standard methods (Martin et al. 1997, Rourke et al. 1999). Nests were located primarily by observing adult behavior and systematically searching vegetation. Nests were generally checked every three to four days, however, frequency was increased to every one to two days in anticipation of nest stage transitions. Nests were monitored from a distance when possible but were approached and closely observed to check nest contents and thus determine nest stage transition dates, clutch size, hatching success, and nest fate.

Breeding Habitat and Nest Site Characteristics
During the 2008-2017 breeding seasons, most commonly in mid-late August, following flycatcher departure from breeding territories, vegetation characteristics associated with active nests were recorded (Edwards et al. 2019). Standard methods (Martin et al. 1997) were used to quantify canopy cover, canopy height, foliage height density, and shrub-sapling stem density within a 5 m radius plot, and tree density within an 11.3-m radius plot centered on nest sites (use plots) and randomly selected sites (nonuse plots). Additionally, distance to habitat edge, distance to nearest water, and other nest site characteristics (e.g., nest height) were recorded. These data were not collected during 2025; however, the vegetation data were used for comparison and discussion in this report. In 2025, dominant species (e.g., native or exotic) within a 5-m radius of active nests was recorded.

Banding and Re-sighting
Toward the goal of understanding flycatcher demography, SWCA Environmental Consultants (Flagstaff, Arizona; hereafter SWCA) maintains a long-term banding program throughout much of the Lower Colorado River Recovery Unit, including the St George study area (McLeod and Koronkiewicz 2009). Re-sighting color-banded flycatchers returning or dispersing to breeding sites along the Virgin River was attempted throughout the 2025 breeding season.

RESULTS AND DISCUSSION

Population Size and Distribution
Thirteen flycatcher territories, distributed among three breeding sites (Figure 1) in the St George study area, were observed in 2025. Sites and number of territories included Riverside Restoration (n=6), Brinton Pond (n=5), and Sand Wash (n=2) (Figure 2). Unpaired males which maintained territories throughout the breeding season were observed at Riverside Restoration (n=1), Brinton Pond (n=1), and Sand Wash (n=2). A total of nine female flycatchers were observed at two breeding sites (Riverside Restoration (n=5), Brinton Pond (n=4)), during 2025 (Figure 3), equaling the second highest number of breeding females observed in the St George study area since 2018. Although commonly observed in the St George study area, no males were observed in polygynous relationships with multiple females during the 2025 breeding season.

The number of flycatcher territories in 2025 (n=13) was the highest number of territories since 2014 (n=13) and continued a dramatic increase from historic low numbers (n=7) observed in 2022 and 2023. In 2025, the number of breeding females (n=9) decreased from 2024 (n=11); however, 2025 continued to reverse a declining trend observed since the historic high in 2018 (n=16) (Figure 4). The number of females in 2025 was also slightly above the average number of breeding females (n=8.8) observed in the St George study area.

On May 9, 2023 (prior to the arrival of flycatchers), a human caused fire burned approximately 80.0 % of nesting habitat at Seegmiller Marsh (a preferred nesting site for flycatchers since the early 2000s) and no territorial males or breeding females have been observed at this site post-fire (2023-2025). Data collected from the 2023-2025 breeding seasons suggest that displaced flycatchers from Seegmiller Marsh have successfully established occupancy in other sites along the Virgin River (e.g., Riverside Restoration and Brinton Pond) and in Sand Wash. In 2024, breeding flycatcher pairs (n=2) were observed for the first time on record at Sand Wash. Although no females were observed in 2025, territorial males (n=2) occupied Sand Wash for a second consecutive year. At the Riverside Restoration site, the number of territorial males increased from four to five in 2024 and from five to six in 2025. Additionally, the number of breeding females increased from three in 2023 to five in both 2024 and 2025 (Figure 4). This represents the fifth consecutive year of documented flycatcher breeding at the Riverside Restoration site. This is especially noteworthy because this was a previously unoccupied site dominated by tamarisk and Russian olive. Between 2011 and 2013, extensive habitat restoration work was conducted by UDWR personnel and partners. Enhancement work included selectively removing tamarisk trees, replanting willow stems, and redirecting water flow into the habitat.

From 2014 to 2022, between three and nine female flycatchers were observed at Seegmiller Marsh during each breeding season. Additionally, over the same nine years, 50.0 % of all breeding females along the Virgin River were located at Seegmiller Marsh. These data suggest, prior to the 2023 wildfire, that Seegmiller Marsh was both a preferred nesting site for flycatchers and a population stronghold for flycatchers in the St George study area. However, in both 2022 and 2023, four of the seven territorial males (57.1%) were located at the Riverside Restoration site. These data suggest that flycatchers breeding along the Virgin River exhibit site fidelity (e.g., Seegmiller Marsh), however, they will occupy additional sites as suitable breeding habitat patches becomes available (e.g., Riverside Restoration). Our data also suggest that the population size of flycatchers in the St George study area remains relatively low and stable but is variable both spatially and temporally.

In 2021, a human caused fire was ignited at Brinton Pond and burned approximately six acres of riparian habitat. A small portion of large trees and understory was lost due to the fire and subsequent clearing of debris. However, the one nesting flycatcher pair remained and resumed nesting activity. In 2022, a pair of flycatchers returned to Brinton Pond and remained for the duration of the nesting season. In 2023, between mid-March and mid-June, high flow events on the Virgin River, coupled with an extended spring runoff, resulted in the loss of approx. 0.5 acres of potential nesting habitat at Brinton Pond. Despite these habitat-alternating disturbances (e.g., fire, flood) flycatchers returned in 2023 and 2024, producing successful nests during both breeding seasons. Additionally, in 2025, Brinton Pond experienced a third consecutive year of increased numbers of breeding flycatchers.

The cause(s) of the historic low number of breeding female flycatchers from 2020-2023 is currently unknown. While much of the western U.S., including St George, Utah has experienced several years of extreme drought, the off-channel wetland habitats have remained relatively stable

and unaltered due to irrigation return flow and municipal runoff. And although climate change remains a serious threat to all ecosystems, including the Virgin River drainage and riparian habitat, resiliency in breeding flycatchers in the St George study area has been observed as they utilize off-channel wetland areas for nesting. Following the 2023 breeding season, it was assumed that flycatcher numbers would rebound as monitoring and habitat restoration efforts continue. Flycatcher numbers in the St George study area did rebound in both 2024 and 2025, including an increase in breeding range along the Virgin River in 2024 (e.g., Above Quail Creek Diversion). It is assumed that flycatcher numbers will continue to be variable over space and time.

Reproductive Success

A total of 12 active nests (i.e., with confirmed flycatcher eggs or nestlings) were located and monitored in 2025 (Table 2, Figure 5). Two additional flycatcher nests that were partially constructed and abandoned by the female prior to confirmation of egg-laying (i.e., inactive) were located. Eight of the nine females had successful nests producing a total of 16 fledglings (Table 2, Figure 5), this represents the second highest number of fledglings since 2019. Of the successful nests, four were first nest attempts, two were re-nest attempts following depredation, and two were re-nest attempts following a first nest that was inactive. One female re-nested twice (following two depredation events) and successfully fledged three young on her third nesting attempt. This female also used the same nest (in the same location) for her second and third nesting attempts. Additionally, one female at the Riverside Restoration site laid her eggs in a nest that was built and successfully fledged young in 2024. No females attempted a double-brood following a successful nest.

No unsuccessful nest attempts failed due to cowbird brood parasitism (Figure 6). However, brood parasitism of flycatcher nests by cowbirds represents an important factor contributing to reduced nest success, productivity, and fecundity, both range-wide and along the Virgin River in St George, Utah. Cowbird control programs, intended to reduce the numbers of breeding adult cowbirds via trapping and euthanasia, have proven to be effective tools in the management of endangered bird species, including flycatchers (Whitfield et al. 1999, Kus and Whitfield 2005). In 2013 a pilot study was initiated to investigate the effectiveness of cowbird control in the St George study area. Over eight years of management (2013-2020) the data confirmed that trapping and removing adult cowbirds can increase the nesting success and overall productivity of breeding riparian bird species (e.g., flycatchers; Edwards et al. 2019). Cowbird trapping efforts did not occur during the 2021 breeding season and high brood parasitism rates (62.5%) and nest failures caused by cowbirds (80.0%) were observed. Cowbird management practices recommenced during the 2022 and 2023 breeding seasons, resulting in the decreased parasitism rates of 33.3% and 0.0%, respectively. In 2025, trapping efforts were conducted, however, three of 12 (25.0%) flycatcher nests were parasitized. However, UDWR personnel were able to access two parasitized flycatcher nests and replace the viable cowbird egg with an infertile or “dead” cowbird egg. Both nests subsequently were successful and fledged a total of three flycatcher young.

All four unsuccessful nest attempts (100.0%) failed due to predation (Figure 6). The cause of nest failure due to predation increased from the 2024 breeding season and remained higher than the average for the St George study area (67.2%). Each failed nest was depredated during the nestling stage with considerable structural damage to three of the four nests. Although not confirmed, it is possible that two nests were moved by the female flycatcher and the nest material was used for her re-nest attempt in a new location. The nest with minimal damage was immediately used again by the female and eventually successfully fledged flycatcher young. No predation events were observed and the predator(s) remain largely unknown. However, at Seegmiller Mash in 2022, a video recording captured footage of a Greater Roadrunner (*Geococcyx californianus*) removing a

12-13 day old flycatcher nestling from a nest. Additionally, a video camera recording of an active flycatcher nest at Y-Drain Marsh in 2015 captured footage of an adult Cooper's Hawk (*Accipiter cooperii*) perching next to and observing a flycatcher nest containing eggs only. The hawk left the nest unharmed but we assume that both the Cooper's Hawk and Greater Roadrunner remain potential and confirmed nest predators, especially if there are nestlings present. Additional nest predators that do not cause damage to nest structure during predation events remain unknown in the St George study area.

In 2025, average daily survival rate (DSR) for a flycatcher nest was 98.7% and there was a 68.0% probability of a flycatcher nest surviving to fledge at least one young flycatcher (Mayfield survival probability). In 2025, apparent nest success (active nests which successfully fledged at least one young flycatcher) was 66.6% (Figure 7). The average apparent nest success for flycatchers along the Virgin River in St George, Utah is 48.1 % (UDWR unpublished data). In 2025, both nesting success rates (Mayfield and apparent) were the second highest observed since 2017 and continued a three-year span of nesting success rates exceeding the average.

Nest Site Characteristics and Breeding Habitat
In 2025, flycatchers built four of 12 nests (33.3%) in tamarisk, six nests (50.0%) in Coyote willow, and two (16.7%) in Velvet ash (*Fraxinus velutina)*. This represents a third consecutive year of relatively high willow use as a nest substrate in the St George study area (Figure 8). The total number of nests found in tamarisk trees has not drastically changed during this study; however, the use of willow as a nest substrate has been inconsistent with significant changes between years. The number of nests placed in willow increased dramatically between the 2009 and 2010-2012 breeding seasons and was followed by a dramatic decrease in 2013; a continued decline was observed between 2014 and 2016. And between 2016 and 2020 (five consecutive breeding seasons), no flycatcher nests were built in willow substrates (Figure 8).

Proportionately (e.g., percentage of total nests), the use of tamarisk as a nest substrate has drastically changed over 18 years of monitoring (Figure 8). During the 2008 breeding season 90.0% of flycatcher nests were placed in tamarisk trees. However, a steady decrease was observed over the next four years (as birds moved to native dominated (i.e., willow) habitat, see below) and by 2012, <50.0 % were located in tamarisk. In 2013, a shift was observed as flycatchers began to select tamarisk over willow as a nest substrate (Figure 8). The trend continued throughout the 2014-2022 breeding seasons (as birds moved back to non-native dominated (i.e., tamarisk) habitat, Figure 9) during which 98 of 116 total active nests (84.5%) were placed in tamarisk trees. It is assumed that the decrease in tamarisk use observed in 2023 is due, in part, to the absence of flycatchers at the recently burned Seegmiller Marsh breeding site, which is tamarisk-dominated habitat. It is also assumed that willow use as a nest substrate remained relatively high in 2024 and 2025 due to flycatchers occupying several native dominated sites (e.g., Riverside Restoration, Brinton Pond, Sand Wash).

The decrease in willow use as a nest substrate observed in 2013 is likely a result of concealment from predators and parasites (i.e., cowbirds) which tamarisk provide because they are structurally more complex and collect more debris than willow. It is assumed that flycatchers select tamarisk over willow substrates to decrease the risk of nest failure from predation and increase overall nesting productivity. The years of greatest nesting success ($\geq$70.0% apparent nest success) occurred during the 2008, 2013, and 2017 breeding seasons which coincide with high tamarisk use ($\geq$90.0%) by nesting flycatchers. In 2009, beetle-induced tamarisk defoliation occurred during peak flycatcher breeding and negatively affected hatching success by exposing active nests to predators and extreme abiotic conditions (e.g., nest success in 2009 was 13.0%, compared to 70.0% in 2008). An increased use of willow substrates by flycatchers was observed from 2010 to

2012, during which time tamarisk defoliation occurred after peak flycatcher breeding. Between 2013 and 2017, tamarisk defoliation continued to occur after peak breeding season and flycatchers were observed returning to tamarisk substrates to build their nests.

Additionally, flycatchers have exhibited three major shifts in the use of specific breeding sites within the St George study area between 2008 and 2020, likely due to tamarisk defoliation events by tamarisk leaf beetles. The most dramatic shift occurred between 2009 and 2010 where flycatchers essentially vacated sites dominated by non-native vegetation (i.e., tamarisk) and moved to sites dominated by large native (i.e., willow) vegetation (Figure 9). In 2014, flycatchers initiated a shift back to tamarisk dominated habitats due to timing of defoliation events occurring after flycatcher critical breeding stages (Figure 9). This shift continued through the 2019 breeding season. However, a minimal increase in the use of native-dominated breeding habitat was observed in 2020 due to the continued presence of flycatchers at Brinton Pond, which is dominated by both young and old growth willow, ash, and Fremont cottonwood (*Populus fremontii*). In addition to Brinton Pond, the appearance and persistence of nesting flycatchers in the Riverside Restoration site from 2021 to 2025, which contains large stands of native trees, has contributed to the steady increase in flycatcher use of native-dominated habitat over the past six years (Figure 9). As mentioned previously, this trend continued in 2025 when 91.7% flycatcher nests were located within native-dominated habitats.

During 2018 and 2019, peak beetle-induced defoliation occurred at breeding sites during the first two weeks of July and negatively affected flycatcher reproductive success for the first time since 2009. During 2020-2022 breeding seasons, tamarisk browning and defoliation occurred in late July at Seegmiller Marsh and defoliation did not negatively affect flycatcher reproductive success. In 2025, tamarisk browning and defoliation was not observed at breeding sites along the Virgin River until mid-August, after the completion of nesting for the majority of riparian birds (e.g., flycatchers).

The data suggest first, that in the absence of defoliation by the tamarisk leaf beetle during peak flycatcher breeding season, female flycatchers prefer to nest in tamarisk trees which provide better concealment for nests from predators. Second, that cowbird brood parasitism is a major threat to successful flycatcher nesting along the Virgin River in St George, Utah. Third, although tamarisk dominated habitats are suitable for and often preferred by nesting flycatchers, habitat enhancement projects which restore native vegetation can be successful in expanding suitable breeding habitat for flycatchers. Fourth, beetle-induced tamarisk defoliation varies both spatially and temporally along the Virgin River and remains a threat to the overall nesting success of flycatchers. Fifth, to combat the effects of climate change and global warming, flycatchers in the St George study area are occupying native-dominated breeding sites which provide overall cooler ambient temperatures and lower relative humidity.

Banding and Re-sighting
No flycatchers were banded or re-sighted in the St George study area in 2025.

LITERATURE CITED

Edwards, C.N., E.T. Woodhouse, R.C. Dobbs, and R.A. Fridell. 2019. Status, Reproductive Success, and Habitat Use of the Southwestern Willow Flycatcher on the Virgin River, Utah. 2008-2017. Utah Division of Wildlife Resources Publication Number 19-19. 69 pp.

Kus, B.E. and M.J. Whitfield. 2005. Parasitism, productivity, and population growth: response of Least Bell's Vireos (*Vireo bellii pusillus*) and Southwestern Willow Flycatchers (*Empidonax traillii extimus*) to cowbird (*Molothrus* spp.) control. Ornithological Monographs 57: 16-27.

Martin, T.E., C. Paine, C.J. Conway, W.M. Hochachka, P. Allen, and W. Jenkins. 1997. Breeding Biology Research and Monitoring Database (BBIRD) field protocol. Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, Montana.

McLeod, M.A. and T.J. Koronkiewicz. 2009. Southwestern Willow Flycatcher surveys, demography, and ecology along the lower Colorado River and tributaries, 2008. Annual report submitted to U.S. Bureau of Reclamation, Boulder City, NV by SWCA Environmental Consultants, Flagstaff, Arizona.

Rourke, J.W., T.D. McCarthey, R.F. Davidson, and A.M. Santaniello. 1999. Southwestern Willow Flycatcher nest monitoring protocol. Nongame and Endangered Wildlife Program Technical Report 144. Arizona Game and Fish Department, Phoenix, Arizona.

Sogge, M.K., D. Ahlers, and S.J. Sferra. 2010. A natural history summary and survey protocol for the southwestern willow flycatcher. U.S. Geological Survey Techniques and Methods 2A-10.

U.S. Fish and Wildlife Service [USFWS]. 1995. Final rule determining endangered status for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). Federal Register 60: 10694-10715.

U.S. Fish and Wildlife Service [USFWS]. 2002. Southwestern Willow Flycatcher recovery plan. Albuquerque, NM.

Whitfield, M.J., K.M. Enos, and S.P. Rowe. 1999. Is Brown-headed Cowbird trapping effective for managing populations of the endangered Southwestern Willow Flycatcher? Studies in Avian Biology 18: 260-266.

Table 1. Presence-absence survey sites (2008-2025) for Southwestern Willow Flycatchers in the St George study area, Washington Co., Utah. (WFD = Washington Fields Diversion, QCD = Quail Creek Diversion).

Site	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Riverside Marsh*	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x	x oc	x oc	x oc	x oc	x	x oc	x	x
Riverside East*	-	x oc	x oc	x oc	x oc	x oc	x	x	x	x	x	x	x	x	x	x	x	x
River Rd Bridge*	x oc	x oc	x oc	x	x	x	x	x	-	-	x	x	x	x	x	-	-	-
Seegmiller Marsh*	x oc	x oc	x oc	x oc	x oc	x	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x	x	x
Schmutz Drain+	-	x	x	x	x	x	x oc	x	x	x	x	x	x	x	x	x	x	-
Y-Drain Marsh*	-	-	-	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x	x	x	x	x	x
Snipe Pond*	-	x	x oc	x oc	x oc	x oc	x oc	x oc	x	x	x	x	x	x	x	x	x	x
Riverside Restoration	-	-	-	-	-	x	x	x	x	x	x	x	x oc	x oc	x oc	x oc	x oc	x oc
Below WFD^	-	-	x	x	x	-	-	-	-	-	-	-	-	-	x	-	-	-
Brinton Pond	-	-	-	x	-	-	-	-	-	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc	x oc
Above WFD+	-	-	-	-	-	-	-	-	x	x oc	X	x	x	x	x	x	-	-
Above QCD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- oc	x
Santa Clara Confluence^	-	-	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x	x
Cottonwood Cove Park^	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x	-
Sand Wash	-	-	-	-	-	-	x	x	x	x	x	x	x	x	-	x	x oc	x oc

x = Survey conducted.
oc = Occupied by breeding flycatcher(s).
* Historic breeding site. + Previously occupied. ^ Potential breeding site.

Table 2. Number of active nests, nests parasitized by Brown-headed Cowbirds, failed nests, successful nests, and total fledglings produced by Southwestern Willow Flycatchers at breeding sites in 2025 in the St George study area, Washington Co., Utah.

Site	Active nests[1]	Parasitized nests	Failed nests	Successful nests[2]	Total fledglings
Riverside Restoration	6	2	2	4	9
Brinton Pond	6	1	2	4	7
Sand Wash	0	-	-	-	-
All sites combined	**12**	**3**	**4**	**8**	**16**

[1] Nests with confirmed Southwestern Willow Flycatcher eggs or nestlings.
[2] Nests producing ≥ 1 fledgling.

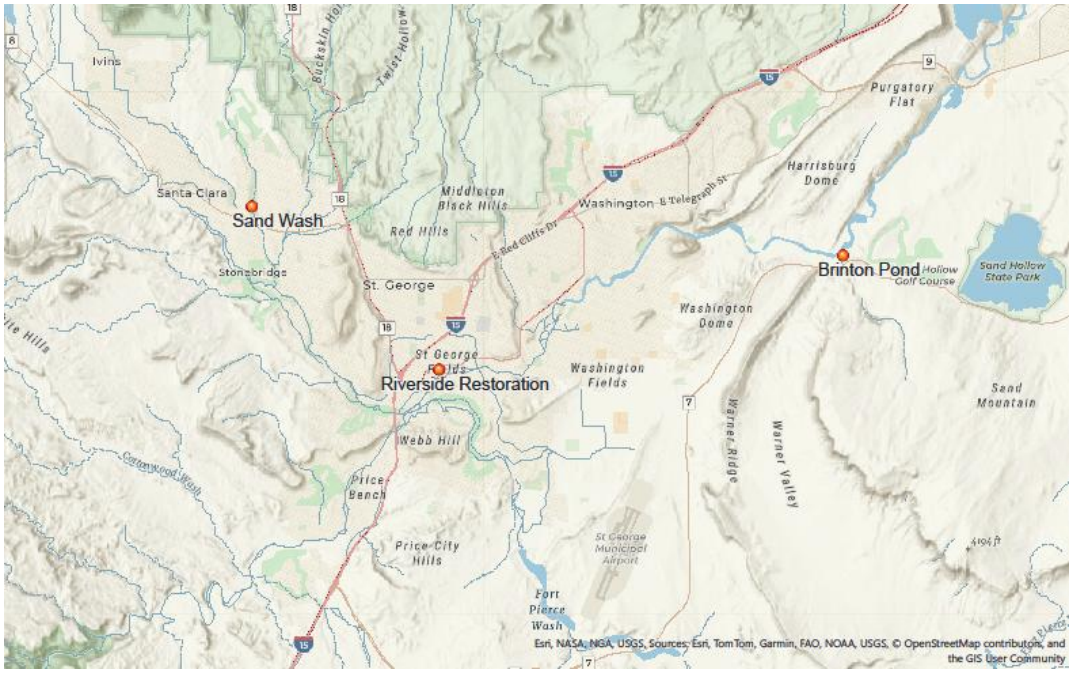

Figure 1. Southwestern Willow Flycatcher occupied breeding sites along the Virgin River and Sand Wash in the St George study area, Washington Co., Utah in 2025. Note: Sand Wash was occupied with territorial males (n=2) throughout the breeding season, however, no females were detected.

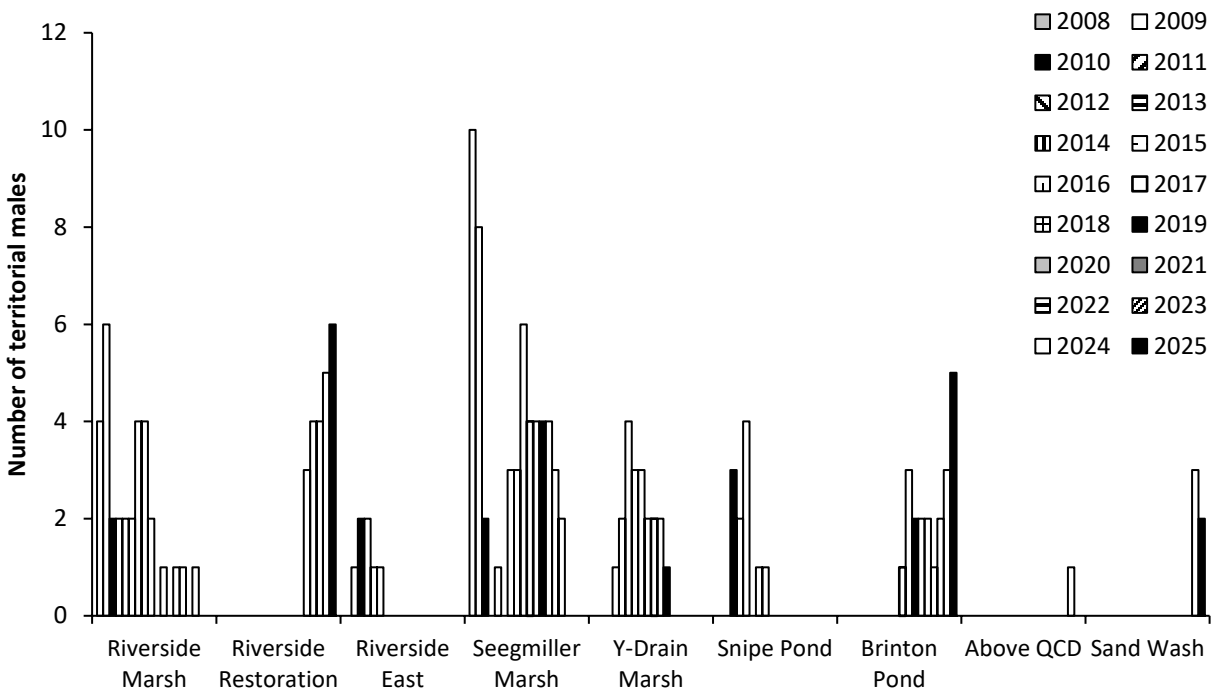

Figure 2. Number of Southwestern Willow Flycatcher territories (males exhibiting territorial behavior beyond 31 May) among years (2008-2025) at nine breeding sites in the St George study area, Washington Co., Utah.

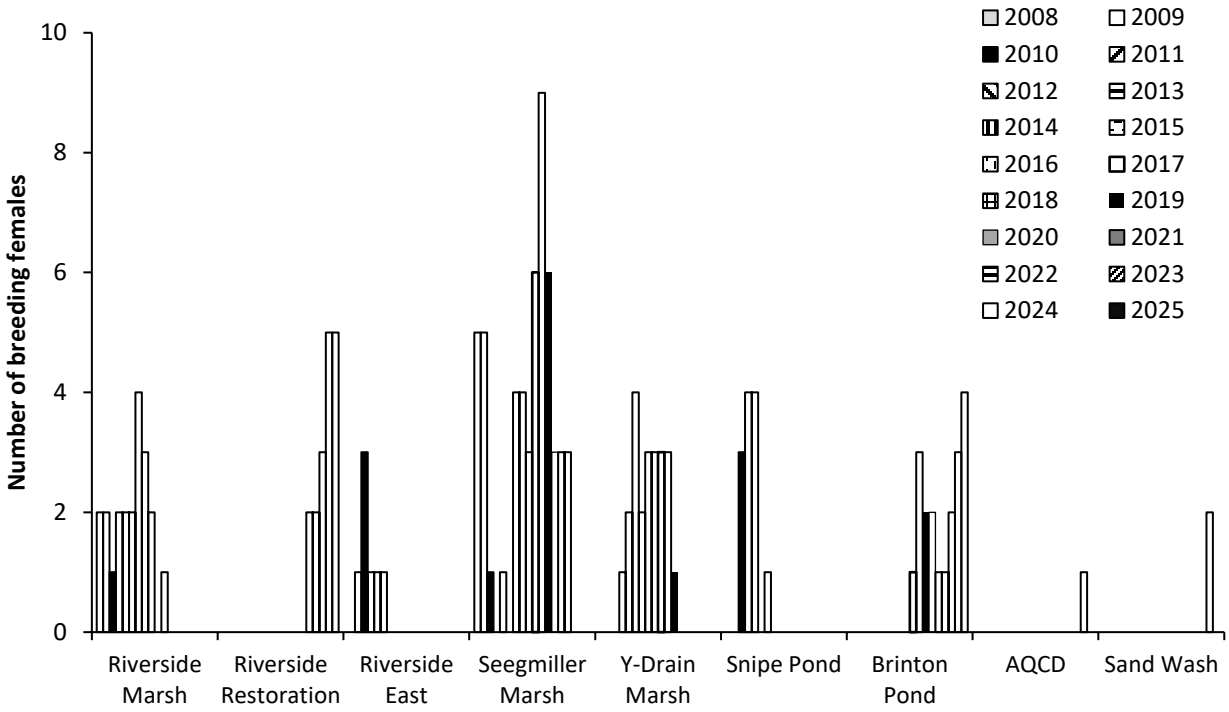

Figure 3. Number of confirmed Southwestern Willow Flycatcher breeding pairs among years (2008-2025) at nine breeding sites in the St George study area, Washington Co., Utah.

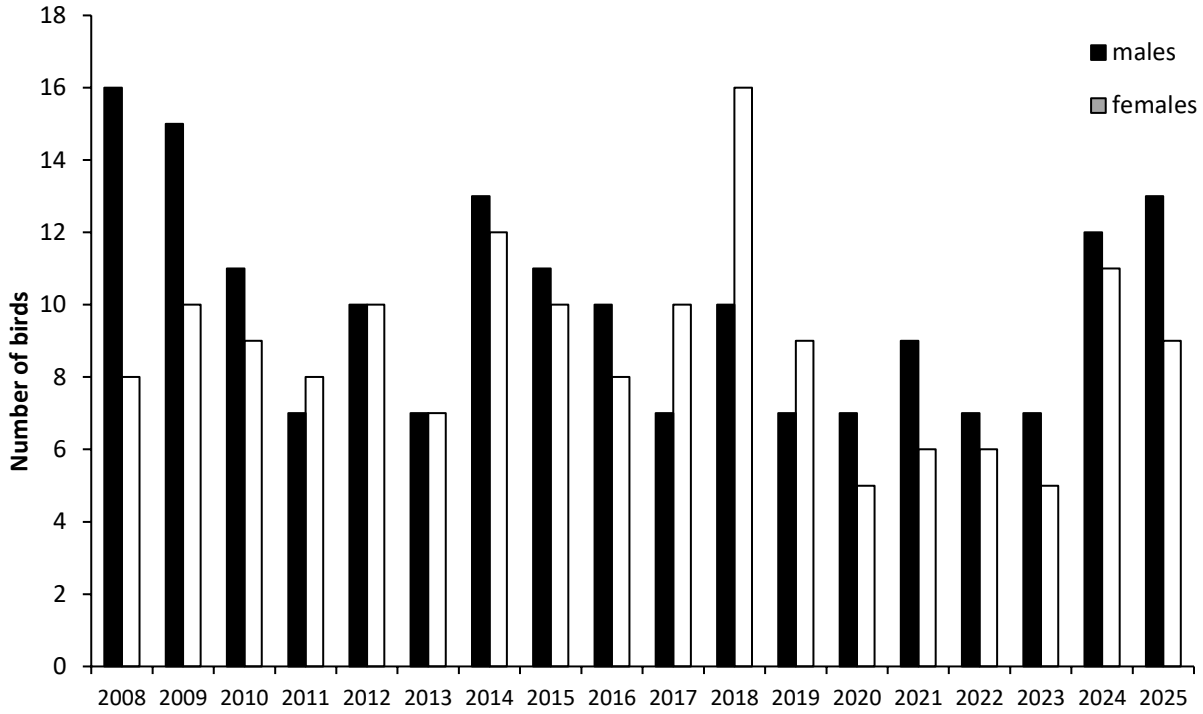

Figure 4. Number of breeding male and female Southwestern Willow Flycatchers observed in the St George study area, Washington Co., Utah, 2008-2025.

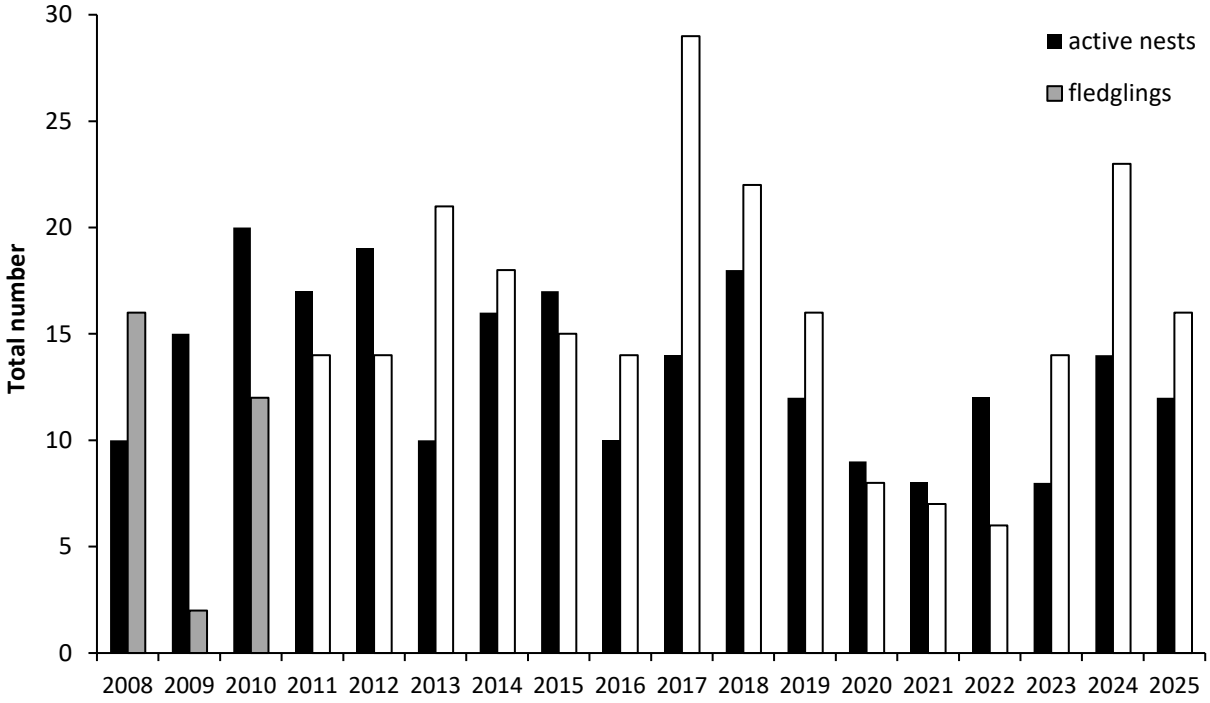

Figure 5. Number of Southwestern Willow Flycatcher active nests and fledglings observed in the St George study area, Washington Co., Utah, 2008-2025.

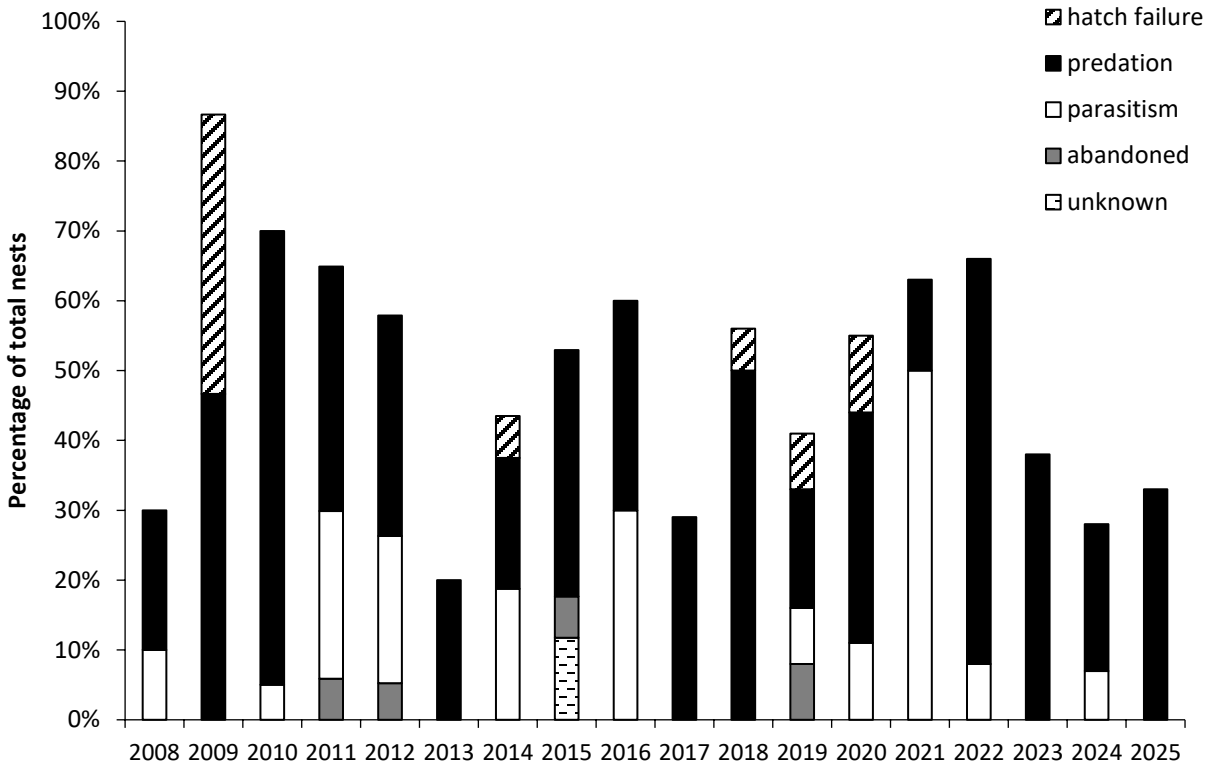

Figure 6. Cause of nest failure of Southwestern Willow Flycatcher nests in the St George study area, Washington Co., Utah, 2008-2025.

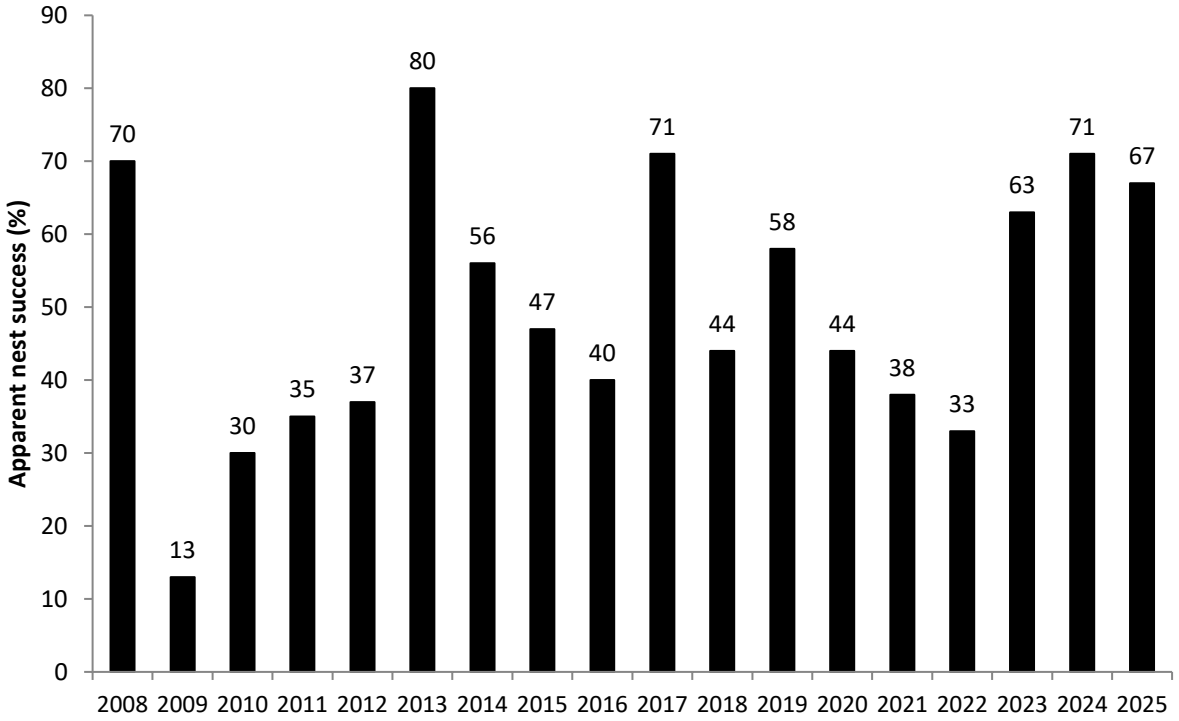

Figure 7. Apparent nest success of active Southwestern Willow Flycatcher nests in the St George study area, Washington Co., Utah, 2008-2025.

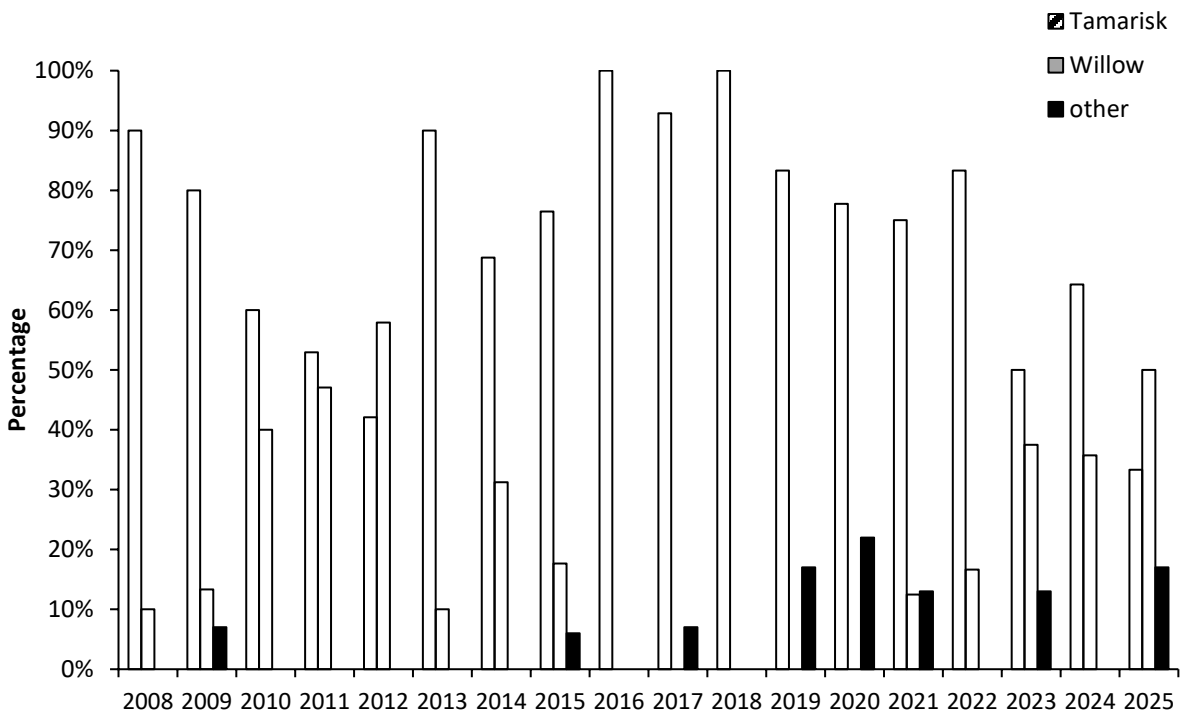

Figure 8. Proportion of Southwestern Willow Flycatcher nests placed in tamarisk, coyote willow, or other substrates from 2008-2025 in the St George study area, Washington Co., Utah. Species included in "other" substrates are Russian olive (*Elaeagnus angustifolia*), Seepwillow (*Baccharis salicifolia)*, Fremont cottonwood (*Populus fremontii*), and Velvet ash (*Fraxinus velutina*).

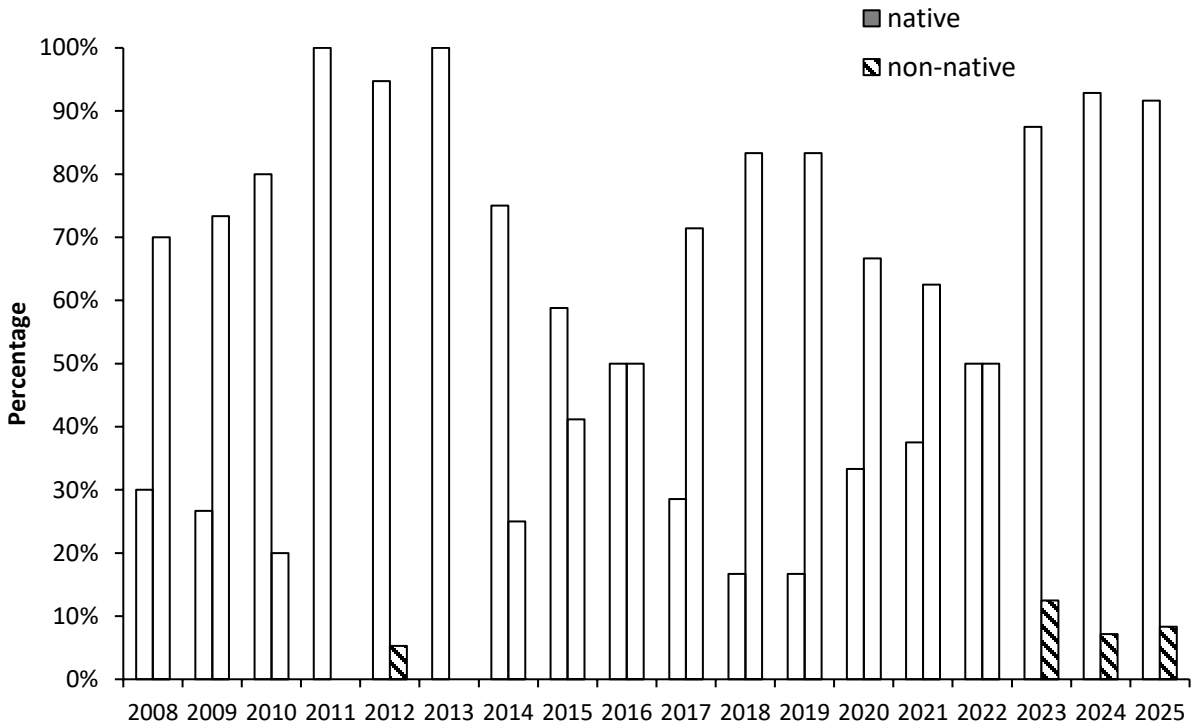

Figure 9. Proportion of Southwestern Willow Flycatcher territories in native (i.e., willow) and non-native (i.e., tamarisk) dominated habitat from 2008-2025 in the St George study area, Washington Co., Utah.