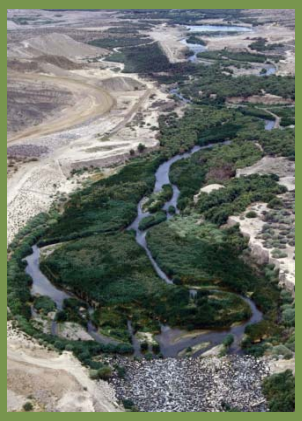

las vegas wash coordination committee

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Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 1998-2017

January 2018

SOUTHERN NEVADA WATER AUTHORITY

Las Vegas Wash Coordination Committee

Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 1998-2017

SOUTHERN NEVADA WATER AUTHORITY
Las Vegas Wash Project Coordination Team

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EXECUTIVE SUMMARY

The Las Vegas Wash Coordination Committee (LVWCC), a 29-member stakeholder group, is working to stabilize and enhance the Las Vegas Wash (Wash), the channel that drains flows from the Las Vegas Valley to Lake Mead at Las Vegas Bay. The Wash also flows through the 2,900-acre Clark County Wetlands Park (Wetlands Park). As a result of informal Section 7 consultation with the U.S. Fish and Wildlife Service, the Southern Nevada Water Authority, the lead agency of the LVWCC, began annual surveys to determine the occurrence of the southwestern willow flycatcher (*Empidonax traillii extimus*) within the Wetlands Park. These surveys were conducted by permitted consultants from 1998 through 2009 (Southwest Wetlands Consortium 1998; SWCA 1999, 2000, 2001, 2002, 2003, 2005, 2006, 2007, 2008, 2009a, 2009b). Permitted staff from the Las Vegas Wash Project Coordination Team, the implementation arm of the LVWCC, have performed the surveys since (Van Dooremolen 2010, 2011, 2012, 2014a, 2014b, 2015, 2016). The surveys are conducted using the standard protocol (Sogge et al. 2010), and follow the five-survey protocol recommended for projects.

Surveys for 2017 began May 24 and were completed July 13; two migrant willow flycatchers were detected, both during the first survey period. This is the lowest number of detections since 2010 and represents the third consecutive year of declines. The reduction in the number of migrants detected may be related to survey timing but is likely due at least in part to habitat losses that have occurred both within and adjacent to the study area in recent years.

20 years of surveys have shown that the Wash is most used by migrating willow flycatchers but occasionally offers habitat to resident birds trying to breed. Of the 120 individuals detected from 1998 through 2017, 116 (96.7%) were migrants. Just four were considered residents, only two of which established territories, and neither was confirmed to pair or nest. When surveys first began, potentially suitable nesting habitat was dominated by tamarisk and the hydrology was poor. It is now dominated by native riparian species. This change has positively impacted willow flycatcher occurrence. The number detected nearly tripled in the 2008-2017 period when compared to the first 10 years of surveys, rising from 32 to 88 individuals. Likewise, two southwestern willow flycatchers established breeding territories in native-dominated sites. Seven sites, six native-dominated and one tamarisk-dominated, accounted for the majority of willow flycatchers identified in the past 10 years. As of 2017, only a few of these areas still had at least moderate quality potentially suitable nesting habitat.

While southwestern willow flycatchers nest in both tamarisk and native-dominated riparian habitats if the conditions are right, tamarisk-dominated habitat in the Colorado River watershed has been impacted by the spread of tamarisk leaf beetles (*Diorhabda* spp.). The northern tamarisk beetle (*D. carinulata*) has caused defoliation in the study area since 2014. However, given how little tamarisk remains, the beetle has not had a significant impact on potentially suitable nesting habitat along the Wash. If beetle-caused habitat impacts continue in the Colorado River watershed, the Wash's status as native-dominated may increase its potential to host nesting birds, especially if gains can be made in habitat following the completion of the final erosion control structures.

Annual surveys for southwestern willow flycatchers should continue in order to comply with informal Section 7 consultation measures.

ACKNOWLEDGEMENTS

I thank Nicholas Rice, Timothy Ricks, Jason Eckberg, David Syzdek, and Victoria Wuest for assisting with surveys. I also extend my thanks to the Las Vegas Wash Coordination Committee for their continued support for wildlife monitoring and the implementation of the Las Vegas Wash Comprehensive Adaptive Management Plan and the Las Vegas Wash Wildlife Management Plan. These activities have been conducted by Deborah Van Dooremolen under permit no. TE148556-3 (expires May 24, 2018), Nicholas Rice under permit no. TE64580A-2 (expires May 26, 2021) and Timothy Ricks under permit no. TE67397A-2 (expires May 30, 2021) as issued by the U.S. Fish and Wildlife Service, Sacramento, California.

Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 1998-2017

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1.0 BACKGROUND

The Las Vegas Wash (Wash) is the primary drainage channel for the Las Vegas Valley carrying highly treated wastewater, urban runoff, shallow groundwater, and storm runoff into Lake Mead at Las Vegas Bay (Figure 1). Although originally an ephemeral stream, the Wash began supporting perennial flows in the 1950s when the discharge of treated wastewater into the channel was initiated. At first these perennial flows created a lush wetland along the channel. However, the volume of flows in the Wash continued to increase with the increasing urban population, and erosion from the increased flow and from storm events began to drain the wetlands and carry thousands of tons of sediment to Lake Mead. By the late 1990s, headcutting had deeply incised the channel and reduced the wetlands by approximately 90% from their peak extent, leaving less than 200 acres.

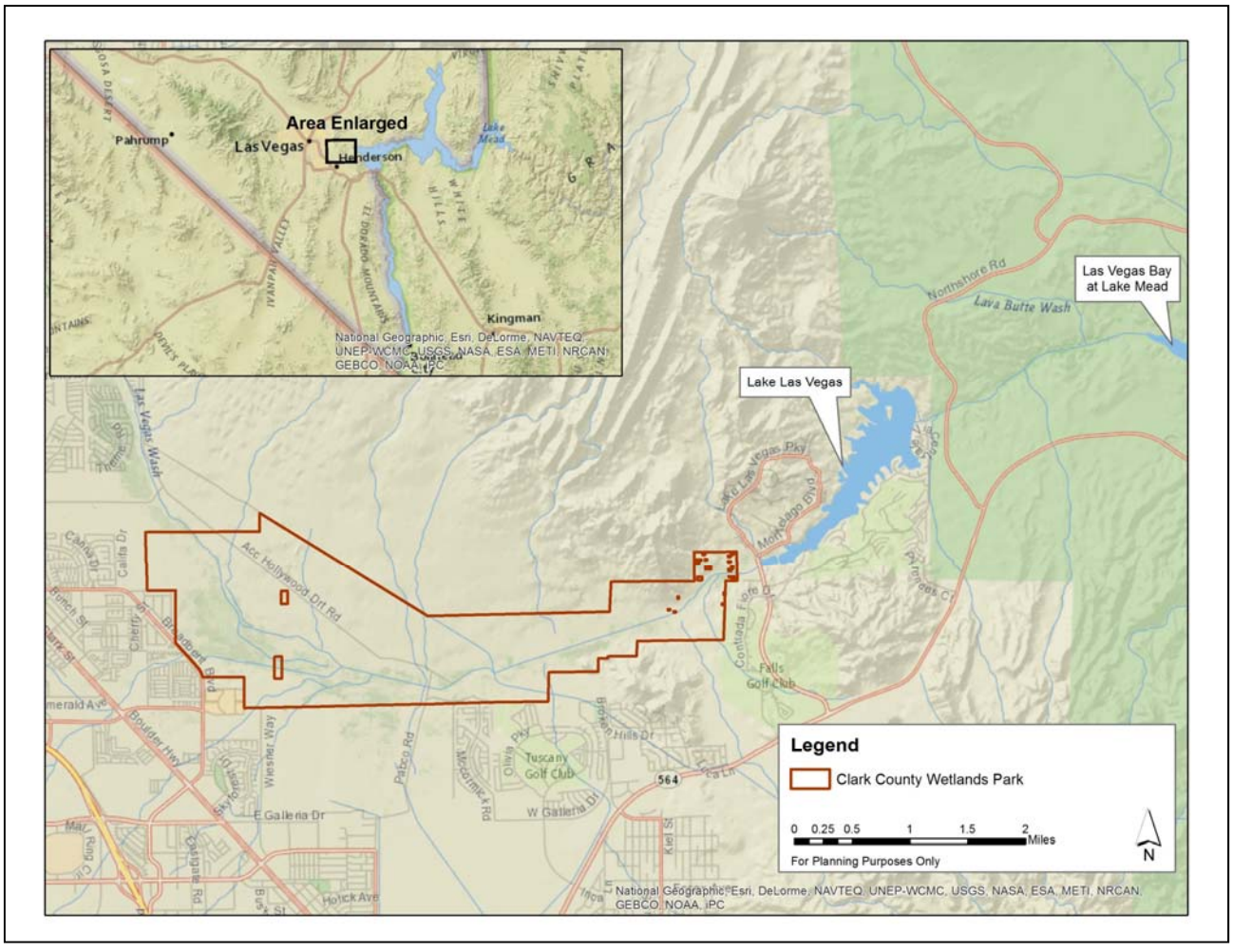

Figure 1. Las Vegas Wash location and general study area map.

In 1998, the Las Vegas Wash Coordination Committee (LVWCC), a now 29-member community stakeholder group, was created to address the degradation of the Wash. The group developed and is implementing the Las Vegas Wash Comprehensive Adaptive Management Plan to stabilize the Wash and restore its ecological functions. Stabilization and enhancement activities, which include the construction of 21 erosion control structures (weirs) and extensive revegetation, will help deter

further erosion and reduce the amount of sediment being deposited in Lake Mead. As of May 2017, 19 permanent weirs were in place.

Weir construction impacts habitat at the Wash. Vegetation must be cleared from each site to allow for vehicle access and for the footprint of the weir itself. Especially in the early years of the project, much of the vegetation present at each site was non-native tamarisk (*Tamarix ramosissima*). Once construction is over, a variety of wetland, riparian, and upland revegetation occurs. The weirs create more favorable conditions for riparian and wetland vegetation along the Wash, so the short-term habitat loss created by construction generally leads to long-term gains. The Wash flows through the 2,900-acre Clark County Wetlands Park (Wetlands Park), and Clark County is also removing tamarisk and planting riparian and wetland vegetation within the study area as it develops park facilities.

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a small songbird that breeds in riparian habitat in the Southwest, and is a federally endangered subspecies of the willow flycatcher. It historically preferred dense willow (*Salix* spp.) habitat throughout its range, but as this habitat declined in the twentieth century, the southwestern willow flycatcher adapted to the non-native tamarisk that had largely replaced its preferred habitat.

As a result of informal Section 7 consultation with the U.S. Fish and Wildlife Service on the proposed development of the park and associated erosion control structures, the Southern Nevada Water Authority (SNWA), the lead agency of the LVWCC, began annual surveys to determine the occurrence of the southwestern willow flycatcher within the Wetlands Park. SNWA contracted with permitted consultants to conduct these surveys from 1998 through 2009 (Southwest Wetlands Consortium 1998; SWCA 1999, 2000, 2001, 2002, 2003, 2005, 2006, 2007, 2008, 2009a, 2009b). Permitted staff from the Las Vegas Wash Project Coordination Team (the implementation arm of the LVWCC) have performed the surveys since (Van Dooremolen 2010, 2011, 2012, 2014a, 2014b, 2015, 2016). This document reports the results from the 2017 surveys for southwestern willow flycatcher along the Wash and provides a review of the 20 years of data collected to date.

2.0 METHODS

2.1 Study Area

The general study area consists of the Wetlands Park and an approximately six-mile reach of the Wash contained within its boundaries. Select areas located immediately adjacent to the park's boundaries are also included if permission to survey is obtained from the landowner. Only potentially suitable nesting habitat is surveyed. For the purposes of this study, potentially suitable nesting habitat is defined as areas with dense to moderately dense riparian vegetation, either bordering or containing surface water or saturated soils. Riparian vegetation in the study area consists of both native and non-native species. Native species primarily include Goodding willow (*S. gooddingii*), sandbar willow (a.k.a. coyote willow; *S. exigua*), cottonwood (*Populus fremontii*), and seep willow (*Baccharis salicifolia*). Tamarisk is the dominant non-native species.

Four survey routes were established to cover all potentially suitable habitat within the Wash (Figure 2). The routes are adjusted each year to accommodate changes in habitat and access due to construction and other factors. In 2017, Route 1 encompassed the Wetlands Park Nature

Preserve (Nature Preserve). A portion of Monson Channel bordering the preserve was also included, as was a small patch upstream of Upper Diversion Weir. The route covered 20 acres. The Nature Preserve includes constructed wetland ponds and small streams lined with mostly native riparian vegetation. Vegetation on Monson Channel is dominated by tamarisk. Route 2 is located on the north bank of the Wash, and begins upstream of Pabco Road Weir and continues downstream to the Lake Las Vegas mitigation wetlands. In 2017, it covered 15 acres of habitat. Route 3 is located on the south bank of the Wash; in 2017, it began just above Calico Ridge Weir and continued upstream to Pabco Road Weir, covering about 10 acres of habitat. Both Routes 2 and 3 are located in the largely stabilized portion of the Wash, where several weirs have been constructed and significant revegetation has occurred. Route 4 is also on the south bank and includes two revegetation sites just above Pabco Road Weir and two patches of tamarisk north and northeast of Sam Boyd Stadium; it covered approximately 10 acres of habitat in 2017.

2.2 Survey Protocol

Surveys were conducted using the standard protocol developed by Sogge et al. (2010). Surveys began in the hour before sunrise and were typically completed by 10:30 a.m. (Appendix A). Call-playback was used to elicit responses from any nearby willow flycatchers. Surveyors broadcast the species' song (fitz-bew) and calls with MP3 players attached to portable speakers. They walked through potentially suitable nesting habitat broadcasting the vocalizations approximately every 100-130 feet following a period of silent listening. Vocalizations were broadcast for approximately 20 seconds at each stop, followed by 1-2 minutes of listening for a response. Broadcasts were conducted from inside habitat patches where possible, but occasionally had to occur from the habitat edge due to concerns regarding safe access.

Each route was surveyed by a team of 2-3 people. Each team was composed of a minimum of one of the following permitted individuals: Deborah Van Dooremolen (TE148556-3), Nicholas Rice (TE64580A-2), or Timothy Ricks (TE67397A-2). The five-survey protocol for projects was used (Sogge et al. 2010), which includes one survey in the first survey period, two surveys in the second survey period and two surveys in the third survey period (Table 1). Route 2 was surveyed on the first day, and Routes 1, 3 and 4 were surveyed on the second day. Route 4 was either completed consecutively with Route 1 or Route 3 or was split between them, with the crew completing surveys for Route 3 covering the two revegetation sites and the crew performing surveys for Route 1 surveying the patches of tamarisk. The route is still reported separately for consistency with prior years.

Survey Period	1st Survey	2nd Survey
First (May 15-31)	May 24/25	n/a
Second (June 1-24)	June 7/8	June 14/15
Third (June 25-July 17)	June 28/29	July 12/13

Table 1. 2017 southwestern willow flycatcher survey dates.

The southwestern subspecies is the only willow flycatcher that nests in southern Nevada. However, other non-listed subspecies of the willow flycatcher may pass through the area during migration, and the different subspecies are virtually indistinguishable in the field. Birds discovered during the first and second survey periods may simply be migrating through and cannot be determined to be of the federally endangered subspecies. The third survey period (June 25-July 17) begins after the known migration period, so any willow flycatchers detected then can be considered residents, and thus of the southwestern subspecies (Sogge et al. 2010).

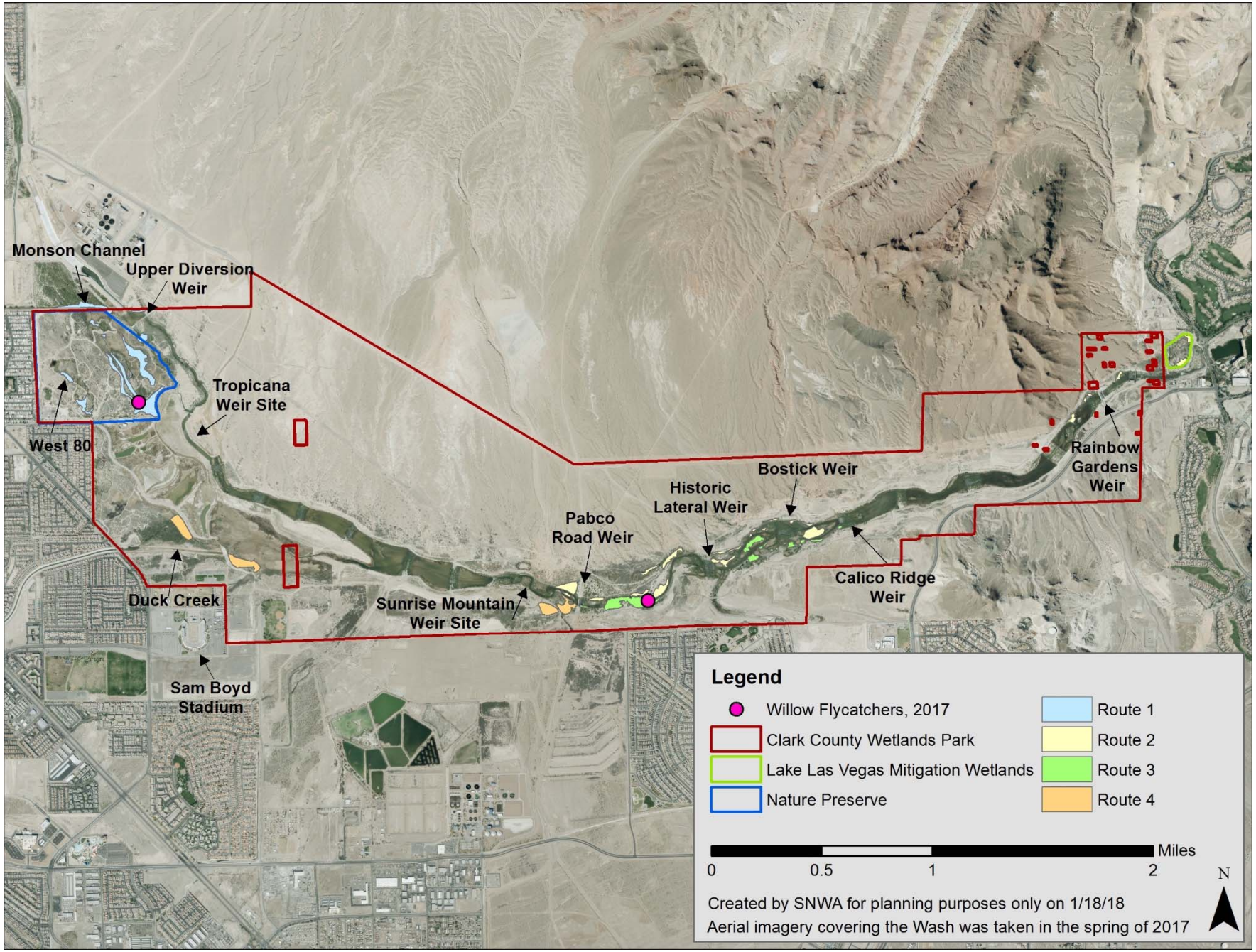

Figure 2. Survey routes and 2017 willow flycatcher detection locations.

3.0 RESULTS

3.1 2017 Survey Results

A total of two migrant willow flycatchers were detected in 2017, both during the first survey period. Survey datasheets are provided in Appendix A and include GPS coordinates for the detections.

3.1.1 Route 1

One migrant willow flycatcher was detected on May 25 (Figure 2). The bird fitz-bewed twice in response to the broadcast, then was silent for a few minutes. It fitz-bewed once more and then was quiet; it was not seen. The bird responded from a patch with Goodding and sandbar willows and cottonwoods at the inflow to Vern's Pond.

3.1.2 Route 2

No willow flycatchers were detected on this route.

3.1.3 Route 3

One migrant willow flycatcher was detected on May 25 (Figure 2). The bird was whitting when the field crew arrived at the location, likely in response to a previous broadcast. The crew waited several minutes to broadcast to allow helicopters to pass overhead. When the call playback was finally conducted, the bird fitz-bewed once in response from across the Wash. It fitz-bewed once more several minutes later; it was not seen. The flycatcher was first heard whitting in the Upstream Historic Lateral North/South revegetation site, which is where the broadcast occurred. Habitat where the bird was detected was dominated by Goodding willows with baccharis, sandbar willow and some tamarisk in the understory along the bank.

3.1.4 Route 4

No willow flycatchers were detected on this route.

3.2 2017 Observations on Habitat Quality

3.2.1 Route 1

Overall, potentially suitable nesting habitat remained of moderate quality in the Nature Preserve, with some portions of the site improving and some declining in habitat quality, and there was a slight decrease in the amount of habitat surveyed. The site has dense sandbar willow, other shrubs and emergents in the understory, and Goodding willow and cottonwood above. The densest and widest patches occur along the small channels that feed water to a series of constructed wetland ponds. The density and width of the habitat ringing the ponds themselves is generally thinner. A few areas of tamarisk still remain, including one small stand adjacent to the lower pond (Vern's Pond) and a thin stringer along the northern border of the Nature Preserve, along Monson Channel. This tamarisk experienced varying levels of defoliation by the northern tamarisk beetle (*Diorhabda carinulata*). The habitat quality of the area along Monson Channel (Figure 2), which has always been considered suboptimal for nesting, continued to be poor in part due to this defoliation, but a substantial portion did remain green throughout the season. The tamarisk adjacent to Vern's Pond was not surveyed as it was brown and dry from the defoliation.

Riparian trees and shrubs in the few acres that burned in March of 2014 continued their regrowth, recovering to be of fair to moderate habitat quality.

Habitat in the West 80 (Figure 2) was surveyed again in 2017. While the West 80 has been developed for several years now, the riparian zone along the feeder channels and ponds is generally much thinner than that in older portions of the Nature Preserve and the trees have not appeared as healthy in the past few years as they did in 2015 when first surveyed.

A small native patch upstream of the Upper Diversion Weir (Figure 2), immediately adjacent to the Nature Preserve, was also surveyed. It shrank in size from 2016 due to weir maintenance activities and was only surveyed due to its adjacency to the Nature Preserve.

3.2.2 Routes 2 and 3

Routes 2 and 3 have similar habitat, as the two routes are on opposite sides of the Wash channel. Habitat extent declined slightly; quality was similar to 2016 overall (generally fair to moderate) but there were localized changes. The majority of the current potentially suitable nesting habitat is found in the approximately 1.5-mile reach from Pabco Road Weir to Calico Ridge Weir (Figure 2) and is dominated by natives since the reach has undergone stabilization and revegetation. Patch sizes are small (typically 1-5 acres or smaller) and consist of sandbar and Goodding willow, cottonwood, and some seep willow. In wetter areas, common reed (*Phragmites australis*) and cattails (*Typha domingensis*) form the understory. Habitat that had been cleared early in 2015 (in preparation for the then-delayed expansion of Historic Lateral Weir) regenerated further and was of moderate quality. This habitat has since been cleared again and construction is now underway.

There is little potentially suitable nesting habitat downstream of Calico Ridge Weir (Figure 2). This habitat has been limited for several years now. What little remained declined further in 2016 as the two remaining patches of any real size were either cleared or dried out. These patches did not recover in 2017. The large sandbar above Rainbow Gardens Weir that contained a native riparian-dominated revegetation site (Figure 2) was removed in September 2015 in an effort to improve flow around a U.S. Geological Survey gage and flood flow conveyance through the area. The sandbar has reformed and marsh has reestablished, but while riparian vegetation has volunteered on the site, it is still sparse and immature. The Lake Las Vegas mitigation wetlands, located just east of the Wetlands Park (Figure 2), largely dried out over the course of the 2016 season, and the willows and cottonwoods showed significant signs of stress. In 2017, the amount of potentially suitable habitat declined again and was of marginal quality as the site dried even further, and riparian trees showed substantial die-off. What little habitat remained was surveyed, but barring recovery, the mitigation wetlands may not be surveyed in 2018.

3.2.3 Route 4

Along Route 4, habitat quality was largely poor, similar to recent years. The Upstream Pabco South revegetation site, just upstream of the Pabco Road Weir (Figure 2), is small and isolated following the loss of the Lower Plateau site early in 2015 (Van Dooremolen 2015), but does have a stand of sandbar willow (there is also a small stand of tamarisk adjacent to the site). Although Lower Plateau continued to rebound into the monitoring season, it was cleared again in October 2017 as construction of the long-awaited Sunrise Mountain Weir commenced (Figure 2). The Upstream Pabco South Upper Plateau site is dominated by mesquites and offers little to no

understory. The riparian trees on the site showed further signs of stress and die-off, continuing a trend noted the prior year, but the site was still surveyed. As a result of the construction of the weir and the declining habitat suitability, the Pabco area sites will likely not be surveyed in 2018. The two stands of tamarisk in the Duck Creek drainage (to the north and northeast of Sam Boyd Stadium [Figure 2]) were green and wet enough throughout the season to merit surveying.

3.3 20-Year Review: 1998-2017

2017 was the 20th year of surveys for southwestern willow flycatcher in the study area. A review of the data from 1998 through 2017 is provided below. The analyses in this section mimic and update portions of the analyses presented in the 2007 survey report (SWCA 2008) covering the 10-year period from 1998 through 2007 and include a review of the number of willow flycatchers detected by year, detections by survey period, migratory waves, habitat and spatial locations of detected individuals.

3.3.1 Willow Flycatchers Detected by Year

In 20 years of surveys, a total of 120 willow flycatchers were detected along the Wash; 116 (96.7%) were concluded to be migrants, leaving just four (3.3%) that were determined to be residents, and thus could be stated to be of the endangered southwestern subspecies (Figure 3). Even this might be overstated. Two of the four simply had a detection date on or after June 25, in the third survey period. As mentioned in Section 2.2, the protocol states that this is after the known migration period and so birds present can be considered resident. Neither of these two birds exhibited strong territorial behavior and each was only detected once, so it is possible that they were late migrants heading to their breeding grounds or early migrants returning from them. This leaves just two birds that irrefutably established territories at the Wash, one in 2008 and the other in 2013. Both birds were present for more than 30 days and sang constantly. Each was banded by permitted staff from the SWCA Flagstaff office, in partnership with the Bureau of Reclamation, and found to be an after hatch year male. Neither was confirmed to pair or nest.

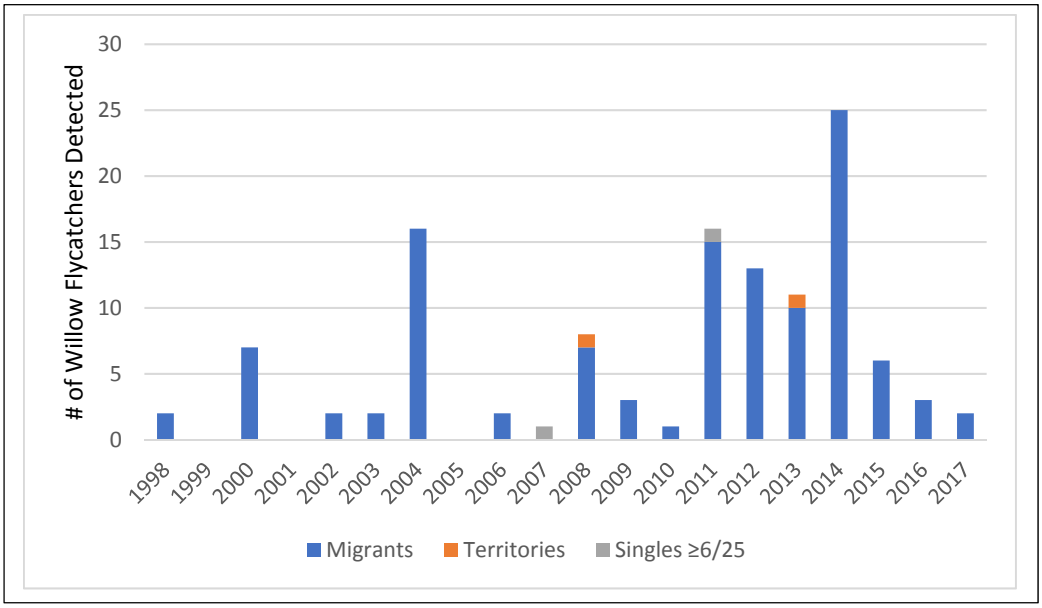

Figure 3. The number of willow flycatchers detected annually, 1998-2017. Birds on territory and single detections in the third survey period (≥ June 25) were assumed to be resident and thus confirmed to be of the endangered southwestern subspecies.

Just 32 willow flycatchers were detected during the first 10 years of surveys (Figure 3). Field crews identified nearly three times that number in the last 10 years, detecting 88, or 73.3% of all willow flycatchers reported in the 20-year period. In addition, both territorial flycatchers were identified in the latter 10 years, while each 10-year stretch contained a single, late season detection that was concluded to be a resident. The first 10-year period contained three years in which there were no detections; in the 2008-2017 period, field crews detected at least one willow flycatcher every year (Figure 3).

When averaged over the 20-year period, six flycatchers were detected each year. In the first 10-year period, all but two years had detections that were well below average. Although detections were substantially higher in the second 10-year period, they were not consistent from one year to the next. The period from 2011 through 2014 had substantially higher than average detections, averaging more than 16 birds per year, then detections declined to six in 2015 and were well below average in the last two years (Figure 3).

3.3.2 Willow Flycatcher Detections by Survey Period

While 120 individuals were detected at the Wash in the 20-year period, the number of willow flycatcher detections was slightly higher, at 131, as some of the individuals, both migrants and residents, were detected on more than one date. Breaking these detections down by survey period, 80 (61.1%) were identified in the first period, 45 (34.4%) were identified in the second and just five (3.8%) were identified in the third. The remaining detection was made during surveys for other species on May 3, 2006.

In the first 10 years of surveys, a larger majority, 66.7%, of the detections were made in the first period versus 58.9% for the most recent 10 years. Conversely, a smaller proportion of the detections in the 1998-2007 surveys were made in the second period, just 27.8%, versus 36.8% in the 2008-2017 surveys. This is likely due primarily to a change in the survey protocol. Prior to 2010, there was just a single survey in the second period (then June 1-21) and three surveys in the third period (then June 22-July 17). Since the Wash is used more by migrant willow flycatchers (Figure 3), the change to two surveys in the second period (now June 1-24) and two in the third (now June 25-July 17) resulted in more opportunities to detect willow flycatchers when they are still migrating through the area. The reduction from three to two surveys in the third period did not negatively impact detections; in the 1998-2007 surveys, just 2.8% of detections occurred in the third period, while in the 2008-2017 surveys, it was 4.2%, further substantiating the conclusion that the Wash has been more of a migration stopover habitat than breeding habitat for willow flycatchers.

3.3.3 Migratory Waves

Migrants can move through areas in waves, with larger numbers of detections occurring in a single survey. Over the 20-year period, field crews encountered possible migratory waves of willow flycatchers on six separate instances, with four occurring in the first survey period and two in the second. 2000 was the first of these, with six migrants detected over June 8-9. The second occurred in 2004, when field crews identified 16 flycatchers over May 18-19. In 2008, another migratory wave was captured with six individuals detected on May 22. In 2011, crews identified 13 willow flycatchers over May 23-24, while in 2012, they detected 11 on June 6. Finally, in 2014, biologists found 21 flycatchers over May 21-22. (Note: Although detections were well above average in

2013, they were more evenly distributed across the first three surveys, so did not seem to reflect a "wave" of willow flycatchers moving through the area.)

3.3.4 Habitat

Potentially suitable nesting habitat declined in extent nearly every year after 1998. When surveys first began, this habitat was dominated by tamarisk and the declines were due to flooding, fire or both. Then, in the early 2000s, tamarisk removal for weir construction and revegetation began to play an important role in the reduction of habitat. Fires still periodically reduced habitat, but as more weirs were constructed, flooding impacts became more rare, unless the habitat was flooded by a new weir's impoundment. As the years progressed, more weirs were completed, riparian revegetation matured and potentially suitable habitat transitioned from tamarisk to native-dominated. Hydrology improved. Reductions in habitat began affecting native as well as tamarisk-dominated areas as weir maintenance was needed, impacting both passively and actively revegetated sites. The northern tamarisk beetle, first documented in the study area in 2012, began widescale defoliation of remaining tamarisk in 2014, although by this time, the majority of potentially suitable nesting habitat was native-dominated. In early 2015, larger, higher quality areas of native riparian habitat (and marginally suitable tamarisk) were cleared for the final erosion control projects planned for the Wash, and weir maintenance again removed native habitat in 2016.

Now, at the end of the 20-year period, very little tamarisk remains, but the native riparian habitat is somewhat fragmented while the final weirs are being built. However, plans are currently being developed for the planting of at least a dozen acres of riparian habitat at the Tropicana Weir (Figure 2), which is forecast to be completed by mid-2018, while Sunrise Mountain Weir and the expansion of Historic Lateral Weir should be completed by mid-2019 and allow for additional opportunities to increase native cottonwood-willow habitat again.

3.3.5 Spatial Locations of Detected Individuals

Given the significant changes in habitat in the study area between the first 10 years of surveys and the second, this review separates the analysis into the same timeframes. In their 2007 survey report, SWCA (2008) conducted a spatial analysis of data for the 32 willow flycatchers detected in the first 10 years (Figure 4). They stated that most were detected in tamarisk, with just a few found in native riparian habitat. They identified four "hot spots," or areas with multiple detections over the years, conjecturing that these locations offered more desirable habitat for migrating willow flycatchers (Figure 4). All four were dominated by tamarisk. Of these, only Hot Spot 1 remains, and it has been degraded by years of beetle defoliation and a general drying of the hydrology. Hot Spot 2 also dried out over the years and was cleared in early 2015 and again in late 2017, and Hot Spots 3 and 4 were substantially modified by weir construction.

In the 2009 survey report, SWCA (2009b) revisited their spatial analysis, already documenting significant changes to the above hot spots. They identified three new present/future hot spots, all of which were native-dominated: the Upstream Pabco South Lower Plateau revegetation site (which hosted the 2008 resident), the island in the Calico Ridge Weir impoundment and the Lake Las Vegas mitigation wetlands. Of these, the Pabco site was thinned in early 2009 and then cleared in preparation for Sunrise Mountain Weir construction in early 2015 and again in late 2017. The only detections made at the site were the 2008 resident and a migrant in 2011 (Figure 5). The other sites will be discussed with the review of the past 10 years of detection data below.

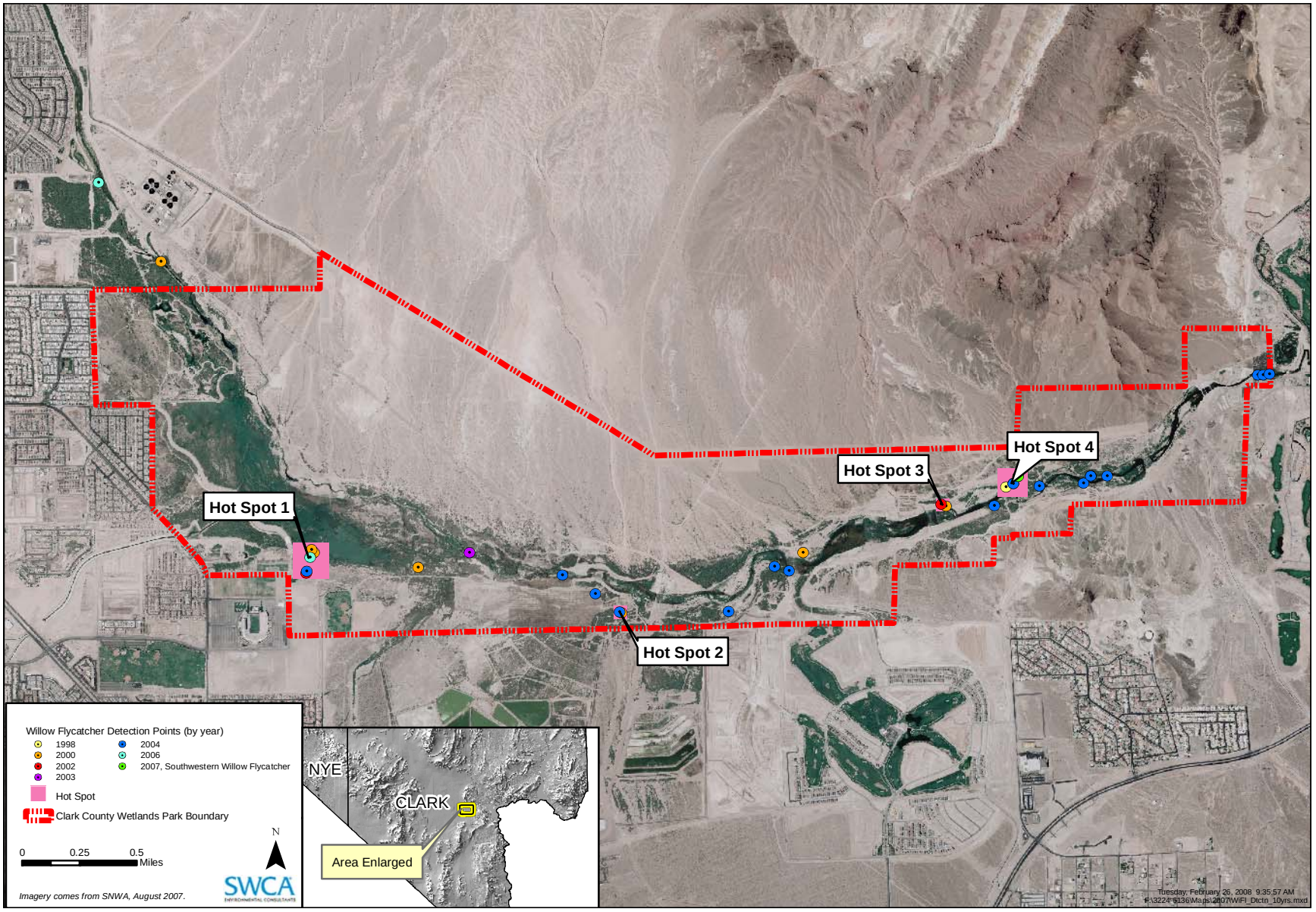

Figure 4. Locations of willow flycatchers detected in 1998-2007. Taken from SWCA (2008).

Figure 5 shows locations for the 88 willow flycatchers detected from 2008 through 2017. The figure gives an indication of the changes that have occurred in the period, with some detections shown on what is now bare ground or open water. Unlike the period from 1998 through 2007, in the last 10 years, the majority of detections were in native habitat. Seven areas, six native and one tamarisk-dominated, were notable for the relatively high numbers detected there and could be termed hot spots (using SWCA's [2008, 2009b] terminology) for the 10-year period (Figure 5). However, not all are likely to continue as such.

The Nature Preserve hosted seven willow flycatchers from 2012 through 2017 (surveys began at the site in 2009), including the 2013 resident and a migrant in 2017 (Figure 5). The site is described in detail in Section 3.2.1, and is likely to continue to be important for willow flycatcher detections in the study area in the future.

The reach of the Wash from just upstream of Pabco Road Weir downstream to Calico Ridge Weir yielded more than 60% of the 88 willow flycatchers detected in the 10-year period, with 52 migrants and the 2008 and 2011 residents (Figure 5). Looking at this reach more closely, three areas encompassing portions of both actively and passively revegetated sites were responsible for most of these detections: an ~6-acre area between Pabco Road and Historic Lateral weirs, an ~12-acre area below Historic Lateral Weir, and the island (proposed as a hot spot by SWCA [2009b]) and adjacent banks below Bostick Weir that cover an ~4-acre area in the impoundment of Calico Ridge Weir.

- The ~6-acre area between Pabco Road and Historic Lateral weirs hosted 13 migrants from 2008 through 2017, yielding detections nearly every year (Figure 5). The area has probably the best quality potentially suitable nesting habitat currently available on the Wash, with dense Goodding willows, some backwater, and a mixture of riparian shrubs in the (relatively sparse) understory, and it is basically still intact, with only minor impacts from the expansion of the Historic Lateral Weir currently underway. While it has not hosted resident southwestern willow flycatchers, the area was the site of a probable yellow-billed cuckoo breeding territory in 2017.
- The ~12-acre area below Historic Lateral Weir hosted 15 migrants from 2011 through 2014 (Figure 5). This area dramatically improved in just a few short years as stabilization work in 2010 increased wetness along the north bank and cottonwoods, willows and other vegetation volunteered across the site. Beaver activity then ponded flows, inundating stands of trees. However, this north bank site, equal to approximately half of the acreage and the highest quality habitat in the area, was cleared first in early 2015 and then again in late 2017 for the expansion of Historic Lateral Weir. There have been no detections since. The area still has some habitat so may be used by migrants in the future, but suitability for nesting has been significantly reduced.
- The ~4-acre area of the island and adjacent banks in the Calico Ridge Weir impoundment hosted seven migrants and one resident from 2008 through 2014 (Figure 5). The island is dense with Goodding willows, but has little understory except common reed and is generally dry in the interior. The banks have stringers of riparian vegetation with cottonwood, and Goodding and sandbar willows. A channel was cleared through the northern third of the island in early 2016 to improve flood flow conveyance. As it brought more water into the site, this may have actually improved habitat suitability, but since a line of willows was cleared in the process, the overall impact on habitat quality may have

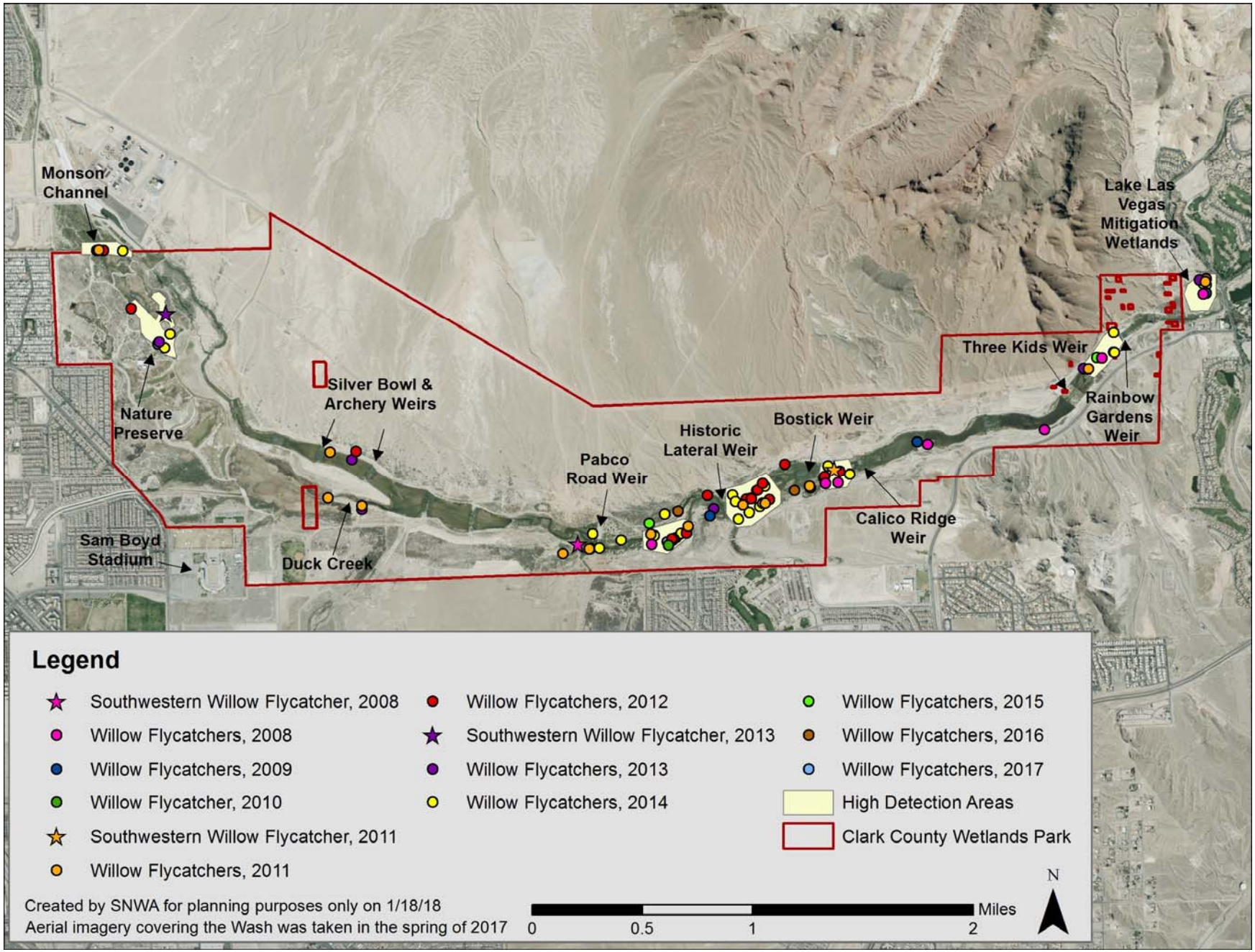

Figure 5. Locations of willow flycatchers detected in 2008-2017.

been neutral or negative. The high number of migrants and a detection of a resident validate the area's status as a hot spot (SWCA 2009b), but given the lack of a shrubby understory and wetness in the stands, it is not ideal for nesting southwestern willow flycatchers. However, it should continue to offer migration stopover habitat.

Continuing downstream, field crews detected seven migrants along the Wash between Three Kids and Rainbow Gardens weirs. Detections occurred in 2008, 2011, 2013, 2014 and 2015 (Figure 5). Impacts to the habitat began in 2014 with the onset of construction of the Three Kids Weir. They continued with the removal of the large vegetated sandbar in the impoundment of Rainbow Gardens Weir. This left very little habitat, only about an acre, in the area. What remains is on the north bank and is a mix of tamarisk and native riparian trees. It is doubtable this site will host many willow flycatcher detections in the future unless it is allowed to reestablish, which is not likely.

The final native-dominated site with noteworthy detections is the Lake Las Vegas mitigation wetlands, proposed by SWCA (2009b) as a hot spot. Surveys first began there in 2008, and biologists detected seven migrants through 2016 (Figure 5). The site first showed signs of degraded hydrology and die-off of riparian vegetation in 2010. It slowly recovered over the years but then in 2016 again showed signs of altered hydrology and riparian tree mortality, which worsened in 2017. While the number of willow flycatchers detected confirms the site's status as a hot spot, it is unknown whether use will continue in the future if the site does not begin to recover again.

Of habitat that was dominated by tamarisk through the 10-year period, only the Monson Channel hosted multiple detections, with crews encountering a migrant every year from 2011 through 2014. As stated in Section 3.2.1, the habitat quality is poor for nesting and may have been impacted for migrants as well, following beetle defoliation in recent years. Hot Spot 1, although surveyed at least in part nearly every year in the period, did not yield any detections. Other sites where crews detected migrants such as Duck Creek and the Wash between Silver Bowl and Archery weirs (Figure 5), were cleared during weir construction, with some flooded by impounded flows once construction was complete.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Discussion

The number of migrant willow flycatchers detected on the Wash declined to just two in 2017. This is the lowest number of detections since 2010 (Figure 3) and is well below the 20-year average. It also represents a third consecutive year of declines. As stated in Van Dooremolen (2015, 2016), this continued reduction in numbers relative to the 2011-2014 period may be timing related. SWCA (2009b) stated that fluctuations in numbers from one year to the next may be due in part to the timing of surveys relative to the timing of migration. Three of the four years in the 2011-2014 period detected migratory waves of willow flycatchers, resulting in detections that were substantially higher than any other period in the 20 years. Surveys in recent years may have missed these waves. However, it remains unknown whether such waves are an annual occurrence or are more rare and related to climatic events or other forces (SWCA 2009b).

While survey timing may play an important role in the number of willow flycatchers detected in any given year, the continued decline noted from 2015 onward is likely due at least in part to habitat losses that have occurred both within and adjacent to the study area in recent years (Van Dooremolen 2015, 2016).

20 years of surveys have shown that the Wash is most used by migrating willow flycatchers but occasionally offers habitat to resident birds trying to breed. Of the 120 individuals detected from 1998 through 2017, 116 (96.7%) were migrants. Just four were considered residents, only two of which established territories, and neither was confirmed to pair or nest.

When southwestern willow flycatcher surveys first began in 1998, potentially suitable nesting habitat was dominated by tamarisk and the hydrology was poor. It is now dominated by native riparian species, due to the tamarisk removal, revegetation and hydrological changes associated with the stabilization project. Despite continued declines in habitat extent and recent declines in detections, this change has positively impacted willow flycatcher occurrence. The number of willow flycatchers detected nearly tripled in the 2008-2017 period when compared to the first 10 years of surveys, rising from 32 to 88 individuals. Likewise, there were no zero-detection survey years in the latter 10 years, two southwestern willow flycatchers established breeding territories in native-dominated sites, and one other detection occurred in a native site that was concluded to be a resident of the endangered subspecies (Figures 3 and 5). Looking ahead to the future, completion of the final weir projects should provide opportunities to reverse the trend of declining habitat and increase the extent and quality of native riparian habitat available along the Wash.

SWCA (2008) identified four hot spots (areas with multiple detections) following spatial analysis of the first 10 years of detection data (Figure 4). They revised and updated this analysis in 2009 (SWCA 2009b). Upon review of the 2008-2017 data, seven areas, six native-dominated and one tamarisk-dominated, accounted for the majority of willow flycatchers identified in the past 10 years (Figure 5). As of 2017, only a few of these areas still had at least moderate quality potentially suitable nesting habitat.

While southwestern willow flycatchers nest in both tamarisk and native-dominated riparian habitats if the conditions are right, tamarisk-dominated habitat in the Colorado River watershed has been impacted by the spread of tamarisk leaf beetles (*Diorhabda* spp.). The northern tamarisk beetle caused widespread defoliation in the study area in both 2014 and 2015 (Van Dooremolen 2014b, 2015). Defoliation was less widespread in 2016 and 2017, with some stands showing it extensively and others appearing to largely avoid it. However, given how little tamarisk remains, the beetle has not had a significant impact on potentially suitable nesting habitat along the Wash. If beetle-caused habitat impacts continue in the Colorado River watershed, the Wash's status as native-dominated may increase its potential to host nesting birds, especially if gains can be made in habitat in upcoming years. Nesting colonies occur within just 40 miles, at Overton, Nevada (McCleod and Pellegrini 2014), and the Wash's 2008 resident southwestern willow flycatcher was re-sighted there in 2009 (McCleod and Koronkiewicz 2010), showing the potential for birds to move to different sites from season to season.

4.2 Recommendations

Given the continued detections of migrants, past detections of residents and the close proximity of established breeding colonies, annual surveys for southwestern willow flycatchers should continue in order to determine the occurrence of the species within the study area and comply with informal Section 7 consultation measures.

5.0 LITERATURE CITED

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Appendix A

Survey Datasheets

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **Las Vegas Wash, Route 1** State: **NV** County: **Clark**

USGS Quad Name: Elevation: **496** (meters)

Creek, River, or Lake Name: **Las Vegas Wash**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** **X** ***No*** ____

Survey Coordinates: Start: E **678148** N **3997000** UTM Datum: **NAD83** (See instructions)

Stop: E **677734** N **3997012** UTM Zone: **11N**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	5/25/2017						1		678163	3997019
Timothy Ricks & David Syzdek	Start: 4:15	1	0	0	N					
	Stop: 8:59									
	Total hrs: 4.7									
Survey # 2	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/8/2017									
Deborah Van Dooremolen, Jason Eckberg & Victoria Wuest	Start: 4:28	0	0	0	N					
	Stop: 8:12									
	Total hrs: 3.7									
Survey # 3	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/15/2017									
Nicholos Rice, Victoria Wuest & Jess Lillie	Start: 4:10	0	0	0	N					
	Stop: 7:00									
	Total hrs: 2.8									
Survey # 4	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/29/2017									
Timothy Ricks & Victoria Wuest	Start: 4:25	0	0	0	N					
	Stop: 7:33									
	Total hrs: 3.1									
Survey # 5	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	7/13/2017									
Deborah Van Dooremolen & Nicholas Rice	Start: 4:28	0	0	0	N					
	Stop: 7:05									
	Total hrs: 2.6									
Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 16.9		Total Adult Residents: 0	Total Pairs: 0	Total Territories: 0	Total Nests: 0	Were any WIFLs color-banded? Yes ____ No ____ **Unknown** If yes, report color combination(s) in the comments section on back of form and report to USFWS.				

Reporting Individual: **Deborah Van Dooremolen** Date Report Completed: **11/15/2017**

US Fish & Wildlife Service Permit #: **TE148556-3** State Wildlife Agency Permit #: **n/a**

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Deborah Van Dooremolen** Phone # **702-822-3370**

Affiliation **Southern Nevada Water Authority** E-mail debbie.vandooremolen@snwa.com

Site Name **Las Vegas Wash, Route 1** Date report Completed **11/15/2017**

Was this site surveyed in a previous year? Yes__X__ No____ Unknown____

Did you verify that this site name is consistent with that used in previous yrs? Yes **x** No _____ Not Applicable _____

If name is different, what name(s) was used in the past? _____

If site was surveyed last year, did you survey the same general area this year? Yes **x** No _____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes **x** No _____ If no, summarize below.

Management Authority for Survey Area: Federal **x** Municipal/County **x** State _____ Tribal _____ Private _____

Name of Management Entity or Owner (e.g., Tonto National Forest) **Bureau of Reclamation and Clark County**

Length of area surveyed: **1.0** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

x Native broadleaf plants (entirely or almost entirely, > 90% native)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

_____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.

Salix spp. (gooddingii & exigua), Populus fremontii

Average height of canopy (Do not include a range): **6** (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;

2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;

3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

*Total time surveyed includes time spent surveying portions or all of Route 4 as the routes or portions thereof were run consecutively and the field crew did not enter separate start and stop times.

**Estimate

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **Las Vegas Wash, Route 2** State: **NV** County: **Clark**

USGS Quad Name: Elevation: **467** (meters)

Creek, River, or Lake Name: **Las Vegas Wash**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** **X** ***No*** ____

Survey Coordinates: Start: E **681269** N **3995676** UTM Datum: **NAD83** (See instructions)

Stop: E **685809** N **3997363** UTM Zone: **11N**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s): Deborah Van Dooremolen & Timothy Ricks	Date: 5/24/2017 Start: 4:40 Stop: 10:12 Total hrs: 5.5	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 2 Observer(s): Deborah Van Dooremolen, Nicholas Rice & Timothy Ricks	Date: 6/7/2017 Start: 4:38 Stop: 8:41 Total hrs: 4.1	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 3 Observer(s): Timothy Ricks & Nicholas Rice	Date: 6/14/2017 Start: 4:23 Stop: 7:45 Total hrs: 3.4	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 4 Observer(s): Deborah Van Dooremolen, Nicholas Rice & Victoria Wuest	Date: 6/28/2017 Start: 4:27 Stop: 8:18 Total hrs: 3.9	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 5 Observer(s): Deborah Van Dooremolen, Nicholas Rice & Timothy Ricks	Date: 7/12/2017 Start: 4:36 Stop: 8:24 Total hrs: 3.8	0	0	0	N		# Birds	Sex	UTM E	UTM N

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No ____ **Unknown** X
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.
Total survey hrs: 20.7					

Reporting Individual: **Deborah Van Dooremolen** Date Report Completed: **11/15/2017**

US Fish & Wildlife Service Permit #: **TE148556-3** State Wildlife Agency Permit #: **n/a**

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Deborah Van Dooremolen** Phone # **702-822-3370**

Affiliation **Southern Nevada Water Authority** E-mail debbie.vandooremolen@snwa.com

Site Name **Las Vegas Wash, Route 2** Date report Completed **11/15/2017**

Was this site surveyed in a previous year? Yes__X__ No____ Unknown____

Did you verify that this site name is consistent with that used in previous yrs? Yes **x** No _____ Not Applicable _____

If name is different, what name(s) was used in the past? _____

If site was surveyed last year, did you survey the same general area this year? Yes **x** No _____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes **x** No _____ If no, summarize below.

Management Authority for Survey Area: Federal **x** Municipal/County **x** State _____ Tribal _____ Private _____

Name of Management Entity or Owner (e.g., Tonto National Forest) **Bureau of Reclamation and Clark County**

Length of area surveyed: **5.0** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

x Native broadleaf plants (entirely or almost entirely, > 90% native)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

_____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.

Salix spp. (gooddingii & exigua), Populus spp.

Average height of canopy (Do not include a range): **6** (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **Las Vegas Wash, Route 3** State: **NV** County: **Clark**

USGS Quad Name: Elevation: **440** (meters)

Creek, River, or Lake Name: **Las Vegas Wash**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** **X** ***No*** ____

Survey Coordinates: Start: E **683265** **N** **3996087** UTM Datum: **NAD83** (See instructions)

Stop: E **681377** N **3995526** UTM Zone: **11N**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	5/25/2017						1		681877	3995572
Deborah Van Dooremolen, Jason Eckberg & Victoria Wuest	Start: 4:37	1	0	0	N					
	Stop: 8:10									
	Total hrs: 3.6									
Survey # 2	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/8/2017									
Nicholas Rice & Timothy Ricks	Start: 4:23	0	0	0	N					
	Stop: 7:10									
	Total hrs: 2.8									
Survey # 3	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/15/2017									
Timothy Ricks & Jason Eckberg	Start: 4:30	0	0	0	N					
	Stop: 7:16									
	Total hrs: 2.8									
Survey # 4	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/29/2017									
Deborah Van Dooremolen & Nicholas Rice	Start: 4:30	0	0	0	N					
	Stop: 6:25									
	Total hrs: 1.9									
Survey # 5	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	7/13/2017									
Timothy Ricks, Jason Eckberg & Victoria Wuest	Start: 4:33	0	0	0	N					
	Stop: 7:33									
	Total hrs: 3.0									
Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 14.1		Total Adult Residents: 0	Total Pairs: 0	Total Territories: 0	Total Nests: 0	Were any WIFLs color-banded? Yes ____ No X **Unknown** ____ If yes, report color combination(s) in the comments section on back of form and report to USFWS.				

Reporting Individual: **Deborah Van Dooremolen** Date Report Completed: **11/15/2017**

US Fish & Wildlife Service Permit #: **TE148556-3** State Wildlife Agency Permit #: **n/a**

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Deborah Van Dooremolen** Phone # **702-822-3370**

Affiliation **Southern Nevada Water Authority** E-mail debbie.vandooremolen@snwa.com

Site Name **Las Vegas Wash, Route 3** Date report Completed **11/15/2017**

Was this site surveyed in a previous year? Yes__X__ No____ Unknown____

Did you verify that this site name is consistent with that used in previous yrs? Yes **x** No _____ Not Applicable _____

If name is different, what name(s) was used in the past? _____

If site was surveyed last year, did you survey the same general area this year? Yes **x** No _____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes **x** No _____ If no, summarize below.

Management Authority for Survey Area: Federal **x** Municipal/County **x** State _____ Tribal _____ Private _____

Name of Management Entity or Owner (e.g., Tonto National Forest) **Bureau of Reclamation and Clark County**

Length of area surveyed: **2** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

x Native broadleaf plants (entirely or almost entirely, > 90% native)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

_____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.

Salix spp. (gooddingii & exigua), Populus fremontii

Average height of canopy (Do not include a range): **6** (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

*Estimate

**Total time surveyed includes time spent surveying portions or all of Route 4 as the routes or portions thereof were run consecutively and the field crew did not enter separate start and stop times.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **Las Vegas Wash, Route 4** State: **NV** County: **Clark**

USGS Quad Name: Elevation: **472** (meters)

Creek, River, or Lake Name: **Las Vegas Wash**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** **X** ***No*** ____

Survey Coordinates: Start: E **681347** N **3995528** UTM Datum: **NAD83** (See instructions)

Stop: E **678359** N **3996190** UTM Zone: **11N**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date: 5/25/2017	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): Deborah Van Dooremolen, Jason Eckberg & Victoria Wuest	Start: 8:17									
	Stop: 9:49									
	Total hrs: 1.5									
Survey # 2	Date: 6/8/2017	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): Nicholas Rice & Timothy Ricks	Start: 7:28									
	Stop: 8:36									
	Total hrs: 1.1									
Survey # 3	Date: 6/15/2017	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): Timothy Ricks & Jason Eckberg	Start: 7:21; 7:05									
Nicholas Rice, Victoria Wuest & Jess Lillie	Stop: 7:40; 7:30									
	Total hrs: 0.7									
Survey # 4	Date: 6/29/2017	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): Deborah Van Dooremolen & Nicholas Rice	Start: 6:32									
	Stop: 7:42									
	Total hrs: 1.2									
Survey # 5	Date: 7/13/2017	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): Timothy Ricks, Jason Eckberg & Victoria Wuest	Start: 7:50; 7:24									
Deborah Van Dooremolen & Nicholas Rice	Stop: 8:04; 7:53									
	Total hrs: 0.7									
Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 5.2		Total Adult Residents: 0	Total Pairs: 0	Total Territories: 0	Total Nests: 0	Were any WIFLs color-banded? Yes ____ No ____ **Unknown** If yes, report color combination(s) in the comments section on back of form and report to USFWS.				

Reporting Individual: **Deborah Van Dooremolen** Date Report Completed: **11/15/2017**

US Fish & Wildlife Service Permit #: **TE148556-3** State Wildlife Agency Permit #: **n/a**

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Reporting Individual **Deborah Van Dooremolen** Phone # **702-822-3370**

Affiliation **Southern Nevada Water Authority** E-mail debbie.vandooremolen@snwa.com

Site Name **Las Vegas Wash, Route 4** Date report Completed **11/15/2017**

Was this site surveyed in a previous year? Yes__X__ No____ Unknown____

Did you verify that this site name is consistent with that used in previous yrs? Yes **x** No _____ Not Applicable _____

If name is different, what name(s) was used in the past? _____

If site was surveyed last year, did you survey the same general area this year? Yes **x** No _____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes **x** No _____ If no, summarize below.

Management Authority for Survey Area: Federal **x** Municipal/County **x** State _____ Tribal _____ Private _____

Name of Management Entity or Owner (e.g., Tonto National Forest) **Bureau of Reclamation and Clark County**

Length of area surveyed: **3.0** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

_____ Native broadleaf plants (entirely or almost entirely, > 90% native)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

x Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.

Tamarix ramosissima., Salix exigua, Prosopis spp.

Average height of canopy (Do not include a range): **4** (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;

2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;

3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

*Total time surveyed includes time spent surveying Route 1 and/or Route 3 as the routes or portions thereof were run consecutively and the field crew did not enter separate start and stop times. When split between both Routes 1 and 3, names and times are separated by a semi-colon.

**Estimate

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary