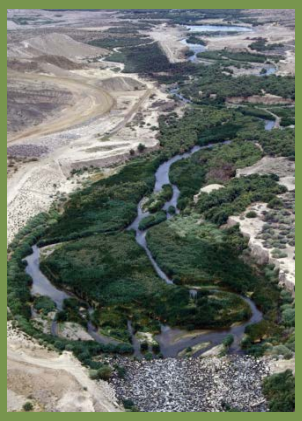

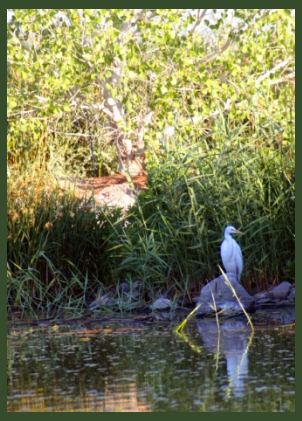

las vegas wash coordination committee

lvwash.org

Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 2016

November 2016

SOUTHERN NEVADA WATER AUTHORITY

Las Vegas Wash Coordination Committee

Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 2016

SOUTHERN NEVADA WATER AUTHORITY
Las Vegas Wash Project Coordination Team

Prepared for:

U.S. Fish and Wildlife Service
Southern Nevada Field Office

and

Las Vegas Wash Coordination Committee

Prepared by:

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November 2016

ABSTRACT

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). The surveys are conducted using the standard protocol (Sogge et al. 2010), and follow the five-survey protocol recommended for projects.

Surveys for 2016 began May 24 and were completed July 14. A total of three migrant willow flycatchers were detected, all during the first survey period. This is the lowest number of detections since 2010. The reduction in the number of migrants detected may be timing related. The surveys may have just missed the migrant wave; however, the decline may also be the result of habitat loss that has occurred over the past few years.

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, Signa Gundlach, 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. TE-148556-3 (expires May 24, 2018), Nicholas Rice under permit no. TE-64580A-1 (expires May 26, 2021) and Timothy Ricks under permit no. TE-67397A-1 (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, 2016

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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.

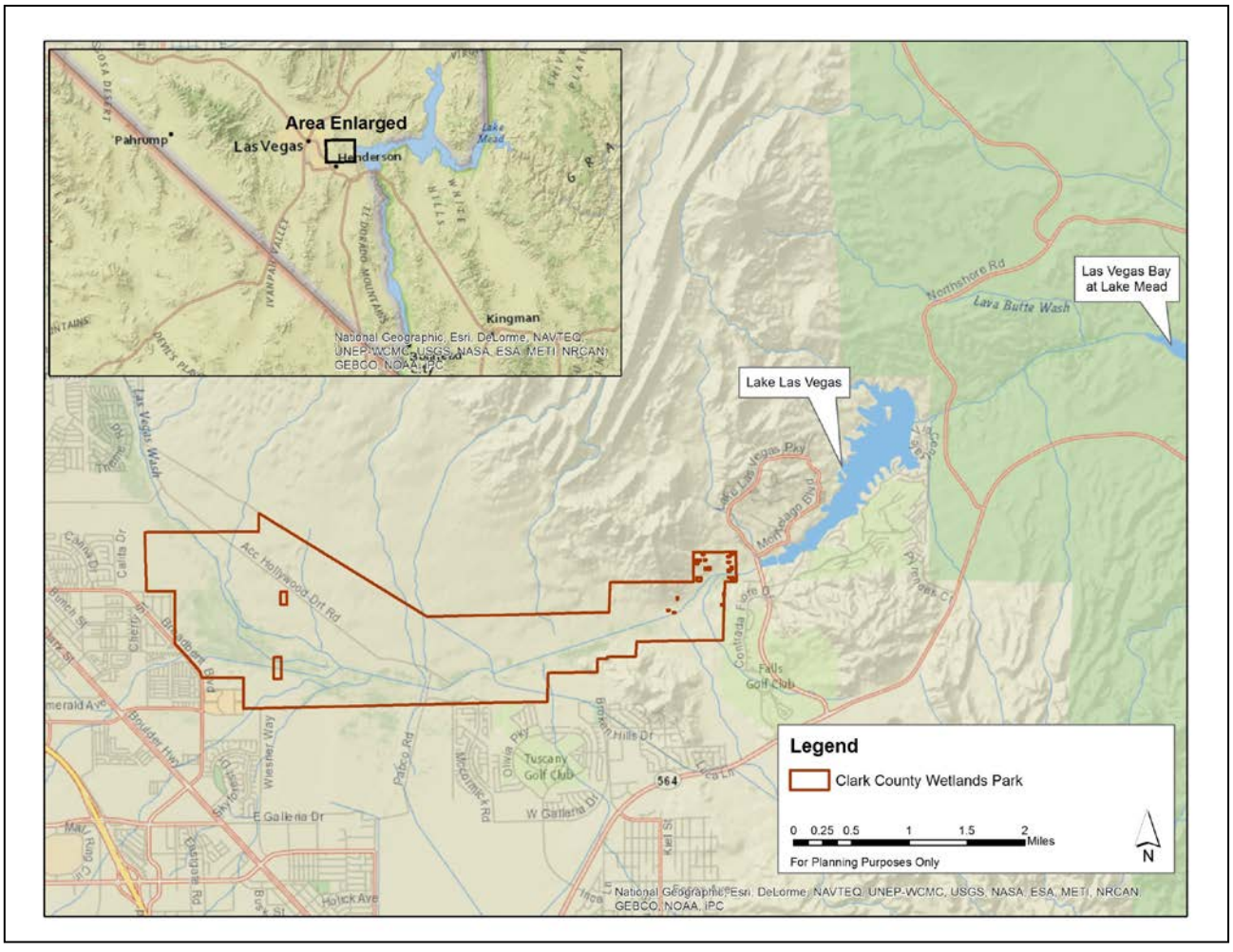

Figure 1. Las Vegas Wash location and general study area map.

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 2016, 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). This document reports the results from the 2016 surveys for southwestern willow flycatcher along the Wash.

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 2016, 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 about 22 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 2016, it covered 16 acres of habitat. Route 3 is located on the south bank of the Wash; in 2016, it began just above Calico Ridge Weir and continued upstream to Pabco Road Weir, covering 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 11 acres of habitat in 2016.

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 (e.g., adjacency to steep cliffs, etc.).

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 (TE-148556-3), Nicholas Rice (TE-64580A-1), or Timothy Ricks (TE-67397A-1). 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). During all but the first survey period (when this pattern was reversed), 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 8/9	June 15/16
Third (June 25-July 17)	June 29/30	July 13/14

Table 1. 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).

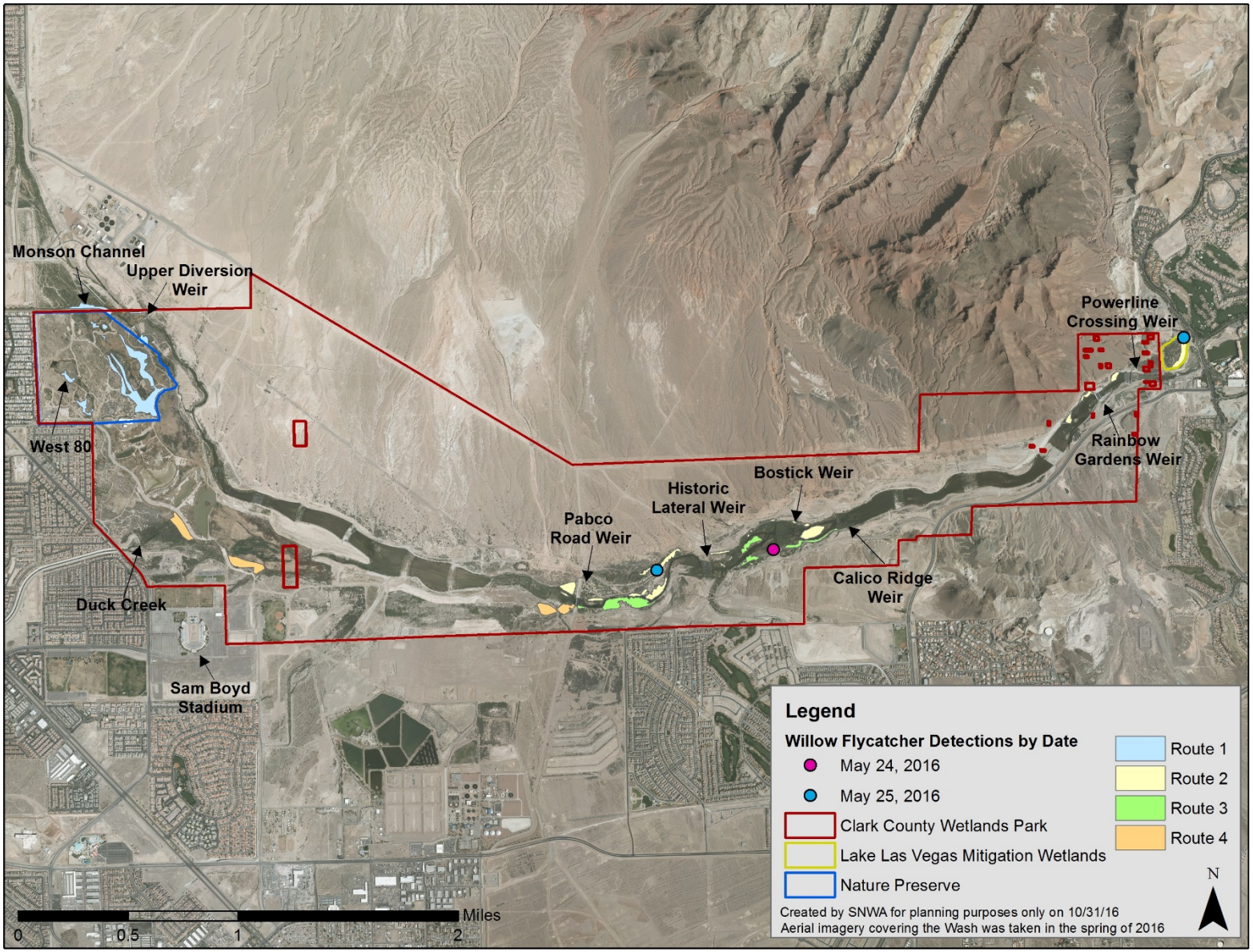

Figure 2. Survey routes and willow flycatcher detection locations.

3.0 RESULTS

3.1 Survey Results

A total of three migrant willow flycatchers were detected in 2016, all during the first survey period (Table 2). Survey datasheets are provided in Appendix A and GPS coordinates and additional detection information are provided in Appendix B.

Route	Survey Date	Status	Location (refer to Figure 2)
3	May 24, 2016	Migrant	Upstream Bostick South revegetation site
2	May 25, 2016	Migrant	S111 revegetation site
2	May 25, 2016	Migrant	Lake Las Vegas mitigation wetlands

Table 2. Willow flycatcher detections.

3.1.1 Route 1

No willow flycatchers were detected on this route.

3.1.2 Route 2

Two migrant willow flycatchers were detected on Route 2, both on May 25 (Figure 2; Table 2). One migrant was detected in a patch of mesquite (*Prosopis* spp.) with some tamarisk in the S111 revegetation site. The bird fitz-bewed a few times in response to the broadcast and then was silent; it was not seen. The other migrant was found in the Lake Las Vegas mitigation wetlands. The bird sang and twittered briefly in response to the recording and then fell silent; the flycatcher was visually observed but the legs were not seen so banding status could not be determined. The portion of the site where it was found included mesquite (from which the bird first responded and where it was seen) and Goodding willow.

3.1.3 Route 3

One migrant willow flycatcher was detected on Route 3, on May 24 (Figure 2; Table 2). It was identified in the Upstream Bostick South revegetation site. The bird responded during the broadcast and continued to fitz-bew and breet for a few minutes and then whitted for several more. It was first detected in a snag next to a large cottonwood that had fallen over. The sizeable hole left by its roots was filled with water and the area around it was damp. Vegetation, in general, was mixed, with riparian and upland trees and shrubs, and extensive common reed. The flycatcher was seen and had no bands.

3.1.4 Route 4

No willow flycatchers were detected on this route.

3.2 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 increase 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. As in 2015, the tamarisk experienced significant defoliation by the northern tamarisk beetle (*Diorhabda carinulata*) early in the season. The habitat quality of the area along Monson Channel (Figure 2), which had always been considered suboptimal for nesting, continued to be poor due to this defoliation, but a larger portion remained green than in 2015. The tamarisk adjacent to Vern's Pond was not surveyed as it was completely brown from the defoliation and was very dry.

Trees and shrubs in the few acres that burned in March of 2014 continued their regrowth and may be suitable to survey next year.

Habitat along the West 80 (Figure 2) was surveyed again in 2016. 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 did not appear as healthy in 2016 as they had in 2015.

A small native patch upstream of the Upper Diversion Weir (Figure 2), immediately adjacent to the Nature Preserve, was also surveyed.

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. As in 2015, habitat extent and quality declined. 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. This habitat is of fair to moderate quality. 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. Some habitat that had been cleared early in 2015 (in preparation for the since-delayed expansion of Historic Lateral Weir) regenerated to the extent that, although marginal, it was worth surveying.

There is now little potentially suitable nesting habitat downstream of Calico Ridge Weir (Figure 2). This habitat has been limited for several years now, but declined further as the two remaining patches of any real size were either cleared or dried out. The native riparian-dominated revegetation site above Rainbow Gardens Weir (Figure 2) was cleared in September of 2015 in an effort to improve hydrology around a U.S. Geological Survey gauge, and to further improve flood flow conveyance. This site had hosted several detections over the years. The Lake Las Vegas mitigation wetlands, located just east of the Wetlands Park (Figure 2), largely dried out over the course of the season, and the willows and cottonwoods showed significant signs of stress including die-off. The site did host a detection in 2016, but it occurred on the first survey of the season, when the site was wetter and the vegetation healthier. A stand of tamarisk downstream of Powerline Crossing Weir, surveyed through 2014, continued to be sparse and was not surveyed; no other stands remain.

3.2.3 Route 4

Along Route 4, habitat quality remained poor to fair, similar to 2015, but less habitat was surveyed due to access issues. 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). The Upstream Pabco South Upper Plateau site is dominated by mesquites and offers little to no understory. The riparian trees on the site showed signs of stress and may be dying off; if this continues, the site will not be surveyed in 2017. As in 2015, 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, although less of the stand to the north was accessible due to flooding.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Discussion

The number of migrant willow flycatchers detected on the Wash declined to just three in 2016. This is the lowest number of detections since 2010 (Table 3). This continued reduction in numbers relative to the 2011-2014 period could simply be timing related. Migrants can move through areas in waves. Waves of willow flycatcher migrants have been detected periodically over the years, with large numbers of detections occurring in a single survey, such as in 2011, 2012 and 2014 (Van Dooremolen 2011, 2012, 2014b). Surveys in 2016 may have just missed the wave. However, the continued decline in detections could also be related to the habitat loss that has occurred both within and adjacent to the study area in recent years (Van Dooremolen 2015).

Year	Migrants	Residents
1998	2	0
1999	0	0
2000	7	0
2001	0	0
2002	2	0
2003	2	0
2004	16	0
2005	0	0
2006	2	0
2007	0	1
2008	7	1*
2009	3	0
2010	1	0
2011	15	1
2012	13	0
2013	10	1*
2014	25	0
2015	6	0
2016	3	0

* bird on breeding territory for >30 days

Table 3. Summary of survey results, 1998-2016. Migrants (subspecies undetermined) were detected during the first and/or second survey period. Residents were detected during the third survey period and are considered to be of the endangered southwestern subspecies.

When southwestern willow flycatcher surveys first began in the study area 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 recent declines in native habitat and in willow flycatcher detections, this shift still appears to have positively impacted willow flycatcher occurrence. In the past eleven years, there have been no zero-detection survey years, two southwestern willow flycatchers established breeding territories in native-dominated sites, and

two other detections occurred that were concluded to be residents of the endangered subspecies (Table 3).

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 is under threat by the spread of tamarisk leaf beetles (*Diorhabda* spp.). The northern tamarisk beetle, a species of leaf beetle that first appeared at the Wash in 2012, caused widespread defoliation in both 2014 and 2015 (Van Dooremolen 2012, 2014b, 2015). Defoliation was less widespread in 2016, with some stands showing it extensively and others appearing to avoid it altogether. Given how little tamarisk remains on and adjacent to the Wash following clearing for weir construction and development, this defoliation has not had a significant impact on potentially suitable nesting habitat in the study area.

Although no territorial males have been observed in the study area since 2013, the Wash still has the potential to host breeding pairs. 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. However, as in previous years, it should be noted that the Wash also has the potential to become a population sink as brown-headed cowbirds are among the most common birds in the study area during the breeding season (Appendix C). The species is a known brood parasite of the southwestern willow flycatcher. While brown-headed cowbirds are no longer considered to be a significant threat, they can still impact flycatcher nest success, "especially at small and isolated breeding sites" (Sogge et al. 2010), such as the Wash would likely be.

4.2 Recommendations

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

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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 Observer(s): Nicholas Rice & Timothy Ricks	Date: 5/24/2016 Start: 4:28 Stop: 7:45 Total hrs: 3.3	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 2 Observer(s): Deborah Van Dooremolen, Jason Eckberg & Victoria Wuest	Date: 6/9/2016 Start: 4:25 Stop: 7:42 Total hrs: 3.3	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 3 Observer(s): Deborah Van Dooremolen, Jason Eckberg & Victoria Wuest	Date: 6/16/2016 Start: 4:28 Stop: 8:15 Total hrs: 3.8	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 4 Observer(s): Nicholos Rice & Victoria Wuest	Date: 6/30/2016 Start: 4:20 Stop: 7:30 Total hrs: 3.2	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 5 Observer(s): Timothy Ricks & Jason Eckberg	Date: 7/14/2016 Start: 4:25 Stop: 8:56 Total hrs: 4.5	0	0	0	N		# Birds	Sex	UTM E	UTM N
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: 18.1		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: **10/20/2016**

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 **10/20/2016**

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	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	5/25/2016						1		681956	3995797
	Start:						1		685810	3997499
Deborah Van Dooremolen & Timothy Ricks	4:35	2	0	0	N					
	Stop: 10:45									
	Total hrs: 6.2									
Survey # 2	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/8/2016									
	Start:									
Deborah Van Dooremolen & Nicholas Rice	4:23	0	0	0	N					
	Stop: 8:31									
	Total hrs: 4.1									
Survey # 3	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/15/2016									
	Start:									
Deborah Van Dooremolen & Timothy Ricks	4:28	0	0	0	N					
	Stop: 9:13									
	Total hrs: 4.8									
Survey # 4	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/29/2016									
	Start:									
Timoth Ricks & Nicholas Rice	4:28	0	0	0	N					
	Stop: 8:12									
	Total hrs: 3.7									
Survey # 5	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	7/13/2016									
	Start:									
Deborah Van Dooremolen & Timothy Ricks	4:45	0	0	0	N					
	Stop: 8:39									
	Total hrs: 3.9									
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: 22.7		Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No ____ **Unknown** X If yes, report color combination(s) in the comments section on back of form and report to USFWS.				
		0	0	0	0					

Reporting Individual: **Deborah Van Dooremolen** Date Report Completed: **10/20/2016**

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 **10/20/2016**

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):	5/24/2016						1		682807	3995948
Deborah Van Dooremolen & Jason Eckberg	Start: 4:48	1	0	0	N					
	Stop: 7:44									
	Total hrs: 2.9									
Survey # 2	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/9/2016									
Nicholas Rice & Timothy Ricks	Start: 4:30	0	0	0	N					
	Stop: 8:32									
	Total hrs: 4.0									
Survey # 3	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/16/2016									
Nicholas Rice & Timothy Ricks	Start: 4:23	0	0	0	N					
	Stop: 7:24									
	Total hrs: 3.0									
Survey # 4	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	6/30/2016									
Timothy Ricks & Jason Eckberg	Start: 4:26	0	0	0	N					
	Stop: 7:22									
	Total hrs: 2.9									
Survey # 5	Date:						# Birds	Sex	UTM E	UTM N
Observer(s):	7/14/2016									
Deborah Van Dooremolen, Victoria Wuest & Signa Gundlach	Start: 4:49	0	0	0	N					
	Stop: 7:40									
	Total hrs: 2.9									
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: 15.7		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: **10/20/2016**

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 **10/20/2016**

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 Observer(s): Deborah Van Dooremolen & Jason Eckberg; Timothy Ricks & Nicholas Rice	Date: 5/24/2016 Start: 8:03; 8:38 Stop: 8:25; 9:21 Total hrs: 1.1	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 2 Observer(s): Nicholas Rice & Timothy Ricks	Date: 6/9/2016 Start: 7:45 Stop: 8:42 Total hrs: 1.0	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 3 Observer(s): Nicholas Rice & Timothy Ricks	Date: 6/16/2016 Start: 7:37 Stop: 8:59 Total hrs: 1.4	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 4 Observer(s): Nicholas Rice & Victoria Wuest; Timothy Ricks & Jason Eckberg;	Date: 6/30/2016 Start: 7:35; 7:46 Stop: 8:02; 8:13 Total hrs: 0.9	0	0	0	N		# Birds	Sex	UTM E	UTM N
Survey # 5 Observer(s): Deborah Van Dooremolen, Victoria Wuest & Signa Gundlach	Date: 7/14/2016 Start: 7:45 Stop: 8:52 Total hrs: 1.1	0	0	0	N		# Birds	Sex	UTM E	UTM N
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: 5.5		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: **10/20/2016**

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 4** Date report Completed **10/20/2016**

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

Appendix B

GPS Coordinates for Willow Flycatcher Detections

Species	Location	Habitat*	Date	Easting**	Northing	Comments
Willow Flycatcher	Upstream Bostick South revegetation site	native	20160524	682807	3995948	In snag
Willow Flycatcher	S111 revegetation site	native	20160525	681956	3995797	In mesquite
Willow Flycatcher	Lake Las Vegas mitigation wetlands	native	20160525	685810	3997499	In mesquite

*The presence of common reed was ignored for determination of native/non-native habitat

**Datum - NAD83

Appendix C

List of All Bird Species Detected during Surveys
with Presumed Status and Relative Abundance

The following table includes all bird species identified in the study area during the 2016 southwestern willow flycatcher surveys. Presumed status comes from field observations. Relative abundance categories are modified after Phillips et al. (1964); abundance of a given species is based on field observations. Species names and taxonomic order follow the American Ornithologists' Union's *Check-list of North American Birds* (AOU 1998) and subsequent revisions. Adapted from Appendix A in SWCA (2009b).

Common Name	Scientific Name	Presumed Status	Relative Abundance
Canada goose	*Branta canadensis*	R	R
Mallard	*Anas platyrhynchos*	R	C
Lesser scaup	*Aythya affinis*	M	R
Gambel's quail	*Callipepla gambelii*	R	C
Pied-billed grebe	*Podilymbus podiceps*	R	R
Eared grebe	*Podiceps nigricollis*	R	C
Clark's grebe	*Aechmophorus clarkii*	R	R
Eurasian collared-dove	*Streptopelia decaocto*	R	U
White-winged dove	*Zenaida asiatica*	R	U
Mourning dove	*Zenaida macroura*	R	FC
Greater roadrunner	*Geococcyx californianus*	R	FC
Lesser nighthawk	*Chordeiles acutipennis*	R	U
White-throated swift	*Aeronautes saxatalis*	R	R
Black-chinned hummingbird	*Archilochus alexandri*	R	FC
Anna's hummingbird	*Calypte anna*	R	FC
Costa's hummingbird	*Calypte costae*	R	FC
Common gallinule	*Gallinula galeata*	R	FC
American coot	*Fulica americana*	R	U
Black-necked stilt	*Himantopus mexicanus*	R	R
Killdeer	*Charadrius vociferous*	R	R
Spotted sandpiper	*Actitis macularius*	R	U
Caspian tern	*Hydroprogne caspia*	M	R
Double-crested cormorant	*Phalacrocorax auritus*	R	U
Least bittern	*Ixobrychus exilis*	R	R
Great blue heron	*Ardea herodias*	R	U
Great egret	*Ardea alba*	R	U
Snowy egret	*Egretta thula*	R	U
Green heron	*Butorides virescens*	R	FC
Black-crowned night-heron	*Nycticorax nycticorax*	R	U
White-faced ibis	*Plegadis chihi*	M	R

Common Name	Scientific Name	Presumed Status	Relative Abundance
Turkey vulture	*Cathartes aura*	R	R
Northern harrier	*Circus cyaneus*	R	R
Sharp-shinned hawk	*Accipiter striatus*	R	U
Cooper's hawk	*Accipiter cooperii*	R	U
Barn owl	*Tyto alba*	R	R
Ladder-backed woodpecker	*Picoides scalaris*	R	U
Western wood-pewee	*Contopus sordidulus*	M	FC
Willow flycatcher	*Empidonax traillii*	M	R
Black phoebe	*Sayornis nigricans*	R	U
Say's phoebe	*Sayornis saya*	R	U
Western kingbird	*Tyrannus verticalis*	R	R
Loggerhead shrike	*Lanius ludovicianus*	R	R
Bell's vireo	*Vireo bellii*	R	R
Common raven	*Corvus corax*	R	R
Northern rough-winged swallow	*Stelgidopteryx serripennis*	R	C
Cliff swallow	*Petrochelidon pyrrhonota*	R	FC
Verdin	*Auriparus flaviceps*	R	C
Marsh wren	*Cistothorus palustris*	R	C
Bewick's wren	*Thryomanes bewickii*	R	C
Black-tailed gnatcatcher	*Polioptila melanura*	R	C
Crissal thrasher	*Toxostoma crissale*	R	FC
Northern mockingbird	*Mimus polyglottos*	R	R
Cedar waxwing	*Bombycilla cedrorum*	M	R
House finch	*Haemorhous mexicanus*	R	FC
Lesser goldfinch	*Spinus psaltria*	R	R
Lucy's warbler	*Oreothlypis luciae*	R	FC
Common yellowthroat	*Geothlypis trichas*	R	C
Yellow warbler	*Setophaga petechia*	R	C
Wilson's warbler	*Cardellina pusilla*	M	U
Yellow-breasted chat	*Icteria virens*	R	C
Abert's towhee	*Melozone aberti*	R	C
Song sparrow	*Melospiza melodia*	R	C
Western tanager	*Piranga ludoviciana*	M	R
Blue grosbeak	*Passerina caerulea*	R	C
Lazuli bunting	*Passerina amoena*	M	R
Indigo bunting	*Passerina cyanea*	R	U

Common Name	Scientific Name	Presumed Status	Relative Abundance
Red-winged blackbird	*Agelaius phoeniceus*	R	C
Great-tailed grackle	*Quiscalus mexicanus*	R	C
Brown-headed cowbird	*Molothrus ater*	R	C
Hooded oriole	*Icterus cucullatus*	R	R
Bullock's oriole	*Icterus bullockii*	R	R

Presumed Status

Resident (R)	Species is present in the area throughout the summer nesting season.
Migrant (M)	Species passes through the area during migration.

Relative Abundance

Abundant (A)	Species is easily detected in large numbers (>50) on a daily basis.
Common (C)	Species is easily detected on a daily basis, but not in large numbers (5–50).
Fairly Common (FC)	Species regularly detected in small numbers (2–4) on a daily basis.
Uncommon (U)	Species regularly detected in very small numbers, although not necessarily every day.
Rare (R)	Species detected irregularly in very small numbers.