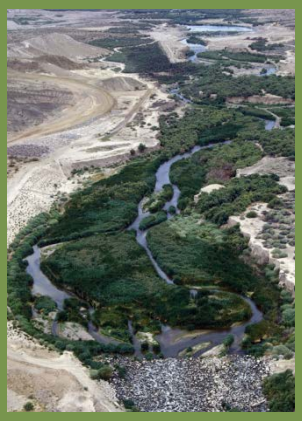

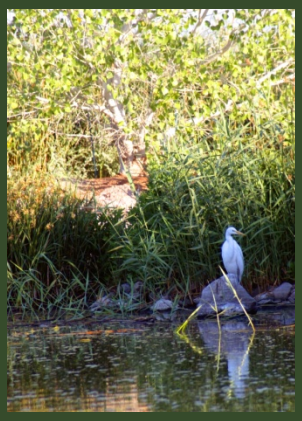

las vegas wash coordination committee

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Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 2013

January 2014

SOUTHERN NEVADA WATER AUTHORITY

Las Vegas Wash Coordination Committee

Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 2013

SOUTHERN NEVADA WATER AUTHORITY
Las Vegas Wash Project Coordination Team

Prepared for:

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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 Southern Nevada Water Authority staff have performed the surveys since (Van Dooremolen 2010, 2011, 2012). The surveys are conducted using the standard protocol (Sogge et al. 2010), and follow the five-survey protocol recommended for projects.

Surveys for 2013 began May 21 and were completed July 3. A total of 10 migrant willow flycatchers were detected: 2 during the first survey, 2 during the second survey, and 6 during the third survey. A resident southwestern willow flycatcher was also found in the study area. It established a breeding territory in a stand of willow and cottonwood in the Wetlands Park Nature Preserve (Nature Preserve). The resident bird was detected on the second through fifth surveys. Field crews were unable to confirm the presence of a mate. The bird was banded by a permitted bander from SWCA Environmental Consultants on June 18, 2013, and it represents the second known southwestern willow flycatcher to defend a breeding territory in the study area (the first was in 2008).

Overall habitat quality and extent were impacted by the removal of marginal quality habitat from survey routes. Approximately 35 fewer acres, the vast majority of which were poor quality, were surveyed in 2013 compared to 2012. The areas of marginal habitat still surveyed have had detections within the past few seasons. When looking at areas of moderate to high quality habitat, quality and extent were similar to 2012. The Nature Preserve provided the highest quality potentially suitable nesting habitat (as evidenced by the resident on territory) and native-dominated revegetation sites along the Wash on Routes 2 and 3 continued to offer moderate quality potential nesting habitat.

When surveys first began in 1998, potentially suitable nesting habitat was dominated by salt cedar (*Tamarix ramosissima*) and the hydrology was poor. It is now dominated by native riparian species, due to revegetation and hydrological changes associated with the stabilization project. Van Dooremolen (2011, 2012) argued that this shift to native habitat may increase the likelihood of the species nesting in the project area given the loss of salt cedar-dominated nesting habitat caused by the arrival of the tamarisk leaf beetle (*Diorhabda* sp.) in the watershed. This position is further supported by the second known southwestern willow flycatcher defending a territory in the study area.

Annual surveys for southwestern willow flycatchers should continue in order to avoid effects to the species and comply with informal Section 7 consultation measures.

ACKNOWLEDGEMENTS

I thank the Bureau of Reclamation for providing partial funding to the Southern Nevada Water Authority for this project under assistance agreement number R09AP30017. I also extend my thanks to Seth Shanahan, Nicholas Rice, Timothy Ricks, and Carol Lane for assisting with surveys. Finally, I thank the Las Vegas Wash Coordination Committee for their continued support for wildlife monitoring research and the implementation of the Las Vegas Wash Comprehensive Adaptive Management Plan and Las Vegas Wash Wildlife Management Plan. These activities have been conducted by Deborah Van Dooremolen under permit no. TE-148556-2 (expires February 16, 2015), Nicholas Rice under permit no. TE-64580A-0 (expires August 31, 2015), Timothy Ricks under permit no. TE-67397A-0 (expires August 30, 2015) and Seth Shanahan under permit no. TE-231424-1 (expires April 4, 2016) as issued by the U.S. Fish and Wildlife Service, Sacramento, California.

Southwestern Willow Flycatcher Surveys along the Las Vegas Wash, Clark County, Nevada, 2013

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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.

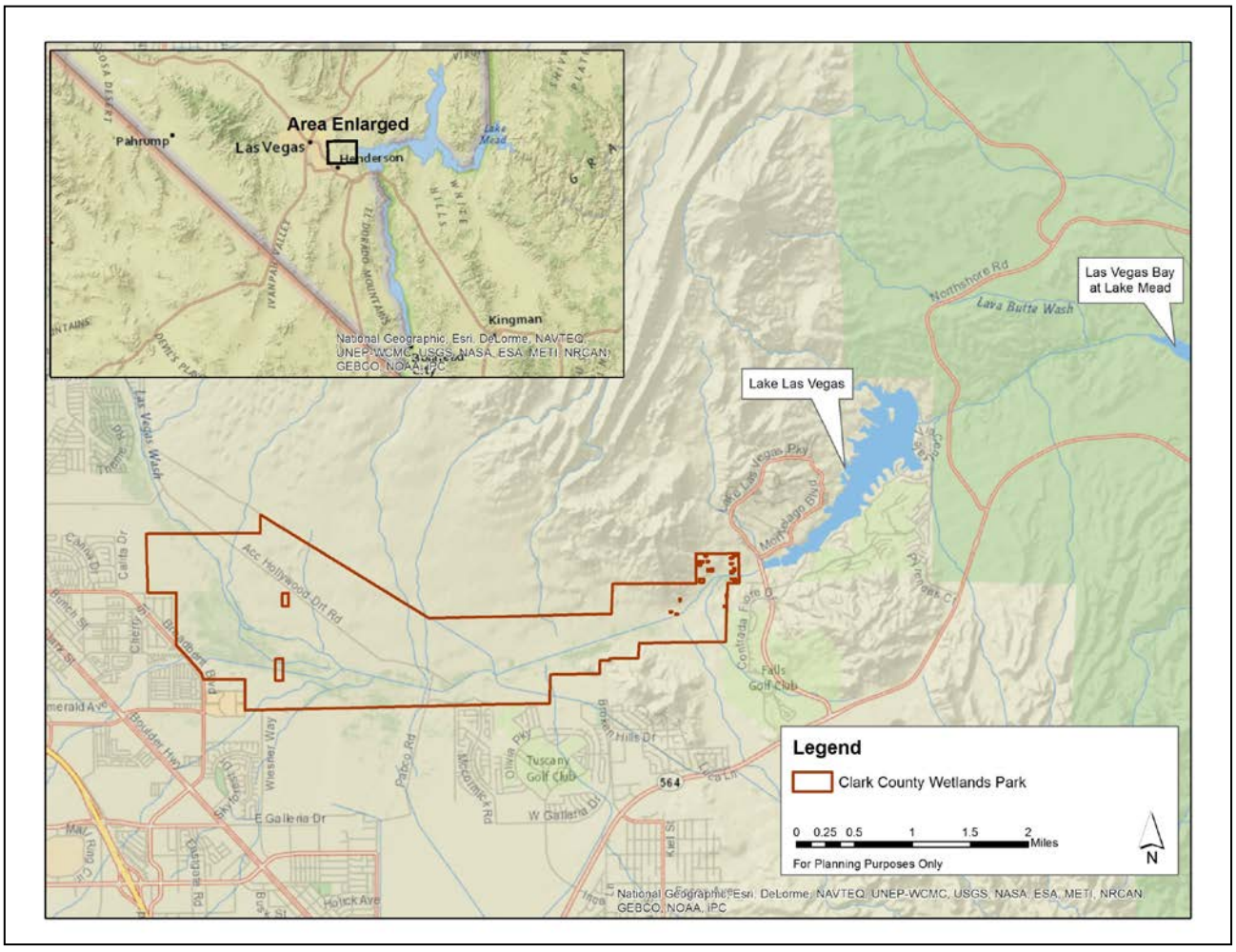

Figure 1. Las Vegas Wash location and general study area map.

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 22 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 2013, 16 permanent weirs were in place.

Weir construction impacts habitat in 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 salt cedar (*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 salt cedar and planting riparian and wetland vegetation within the study area as it develops park facilities.

The southwestern willow flycatcher (*Empidonax trailli 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 salt cedar 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 SNWA staff have performed the surveys since (Van Dooremolen 2010, 2011, 2012). This document reports the results from the 2013 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 seven-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*). Salt cedar 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 2013, Route 1 began in the Wetlands Park Nature Preserve (Nature Preserve). The portion of Monson Channel bordering the preserve was included. The route ended downstream on the north bank with the remaining habitat between the DU Wetlands No. 1 and Duck Creek Confluence weirs. Surveys on the portion upstream of the Wetlands Park boundary were discontinued due to poor habitat quality. The route covered 28 acres. The Nature Preserve includes constructed wetland ponds and small streams lined with mostly native riparian vegetation. The vegetation between DU Wetlands No. 1 and Duck Creek Confluence weirs is dominated by salt cedar. 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 2013, it covered 24 acres of habitat. Route 3 is located on the south bank of the Wash, and begins at the eastern boundary of the Wetlands Park and continues upstream to Pabco Road Weir, covering 20 acres of habitat in 2013. 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 begins just above Pabco Road Weir. It includes the remaining habitat upstream along the Wash and the Duck Creek drainage and covered 25 acres in 2013. Although the route begins in a riparian revegetation site, the majority covers areas that have not undergone stabilization or revegetation and are dominated by salt cedar.

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 completed by 10:30 a.m (see Appendix A for temperature and weather). 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. Routes 1 and 4 were surveyed contiguously in a single morning (beginning with Route 4 and ending with Route 1), while Routes 2 and 3 each required a full morning. Each team was composed of a minimum of one of the following permitted individuals: Deborah Van Dooremolen (TE-148556-2), Nicholas Rice (TE-64580A-0), Timothy Ricks (TE-67397A-0), and Seth Shanahan (TE-231424-1). We followed the five-survey protocol for projects (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 the first and second periods, Route 2 was surveyed on the first day, and Routes 1, 3 and 4 were surveyed on the second day. In the third period, this order was reversed.

Survey Period	1st Survey	2nd Survey
First (May 15-31)	May 21/22	n/a
Second (June 1-24)	June 5/6	June 12/13
Third (June 25-July 17)	June 25/26	July 1/3

Table 1. Southwestern willow flycatcher survey dates for the study area.

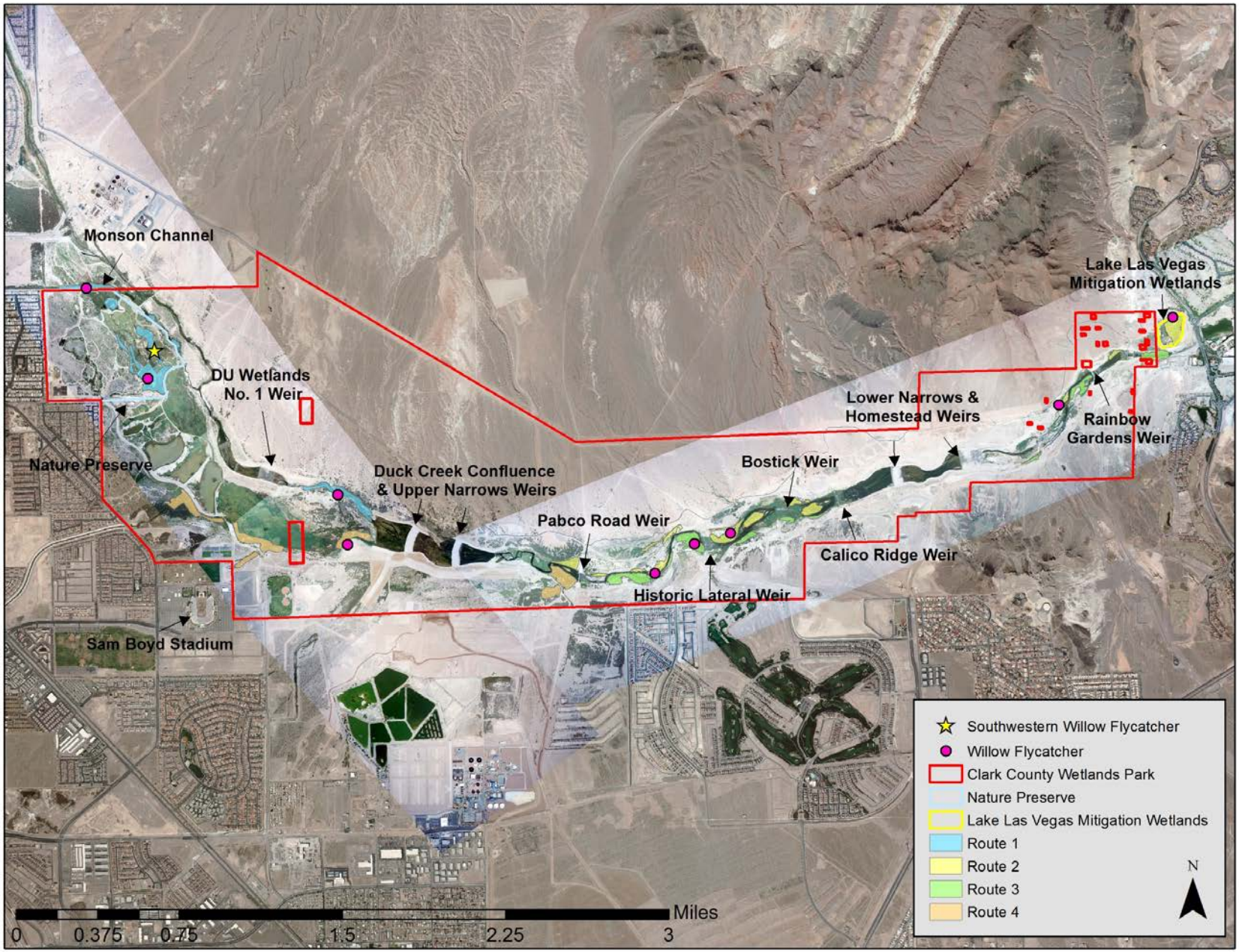

Figure 2. 2013 survey routes and willow flycatcher detection locations. Aerial imagery covering the Wash was taken on June 14, 2013.

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 during that time can be considered residents, and thus of the southwestern subspecies (Sogge et al. 2010).

3.0 RESULTS

3.1 Survey Results

We detected 10 migrant willow flycatchers in 2013: 2 during the first survey, 2 during the second survey, and 6 during the third survey (Table 2). A resident willow flycatcher (and thus of the endangered southwestern subspecies) was also found in the study area (Table 2). It established a breeding territory in a stand of willow and cottonwood in the Wetlands Park Nature Preserve. The resident bird was detected on the second through fifth surveys. A breakdown of the detections by route follows. The banding status of birds is provided where known. GPS coordinates for all detected individuals are provided in Appendix B.

Route	Survey Date	Status	Location (refer to Figure 2)
1	May 22, 2013	Migrant	Nature Preserve - Vern's Pond
3	May 22, 2013	Migrant	Upstream Historic Lateral South revegetation site
4	June 6, 2013	Migrant	On Duck Creek, ~0.2 miles upstream of Wash confluence
1	June 6, 13, 25 and July 1, 2013	Resident	Nature Preserve - cottonwood/willow patch on feeder channel southeast of middle ponds
1	June 6, 2013	Migrant	~0.3 miles downstream of DU Wetlands No. 1 Weir
2	June 12, 2013	Migrant	Upstream Historic Lateral South Bank Wetland revegetation site
2	June 12, 2013	Migrant	Upstream Bostick South revegetation site
2	June 12, 2013	Migrant	~0.2 miles upstream of Rainbow Gardens Weir, may be using both north and south banks including revegetation site
2	June 12, 2013	Migrant	Lake Las Vegas mitigation wetlands
1	June 13, 2013	Migrant	On Monson Channel, ~0.2 miles upstream of Wash confluence
1	June 13, 2013	Migrant	Nature Preserve - Vern's Pond

Table 2. 2013 willow flycatcher detections.

3.1.1 Route 1

Four migrant willow flycatchers and one resident southwestern willow flycatcher were detected on this route (Figure 2; Table 2). Of the migrants, two were detected at the same location on Vern's Pond within the Nature Preserve, one each on May 22 and June 13. Although field staff thought for a time that these could represent a single individual and thus perhaps a resident bird on territory, follow up visits detected no further activity at the site. Another migrant (un-banded) was discovered on June 6 in a patch of salt cedar on the north bank of the Wash, approximately 0.3 miles downstream from the DU Wetlands No. 1 Weir. The fourth migrant was found in

sparse salt cedar along the Monson Channel on June 13, approximately 0.2 miles upstream of the Wash confluence.

The resident southwestern willow flycatcher was first detected in the Nature Preserve on June 6 in a stand of cottonwood and Goodding willow, with an understory of sandbar willow with some willow baccharis (*B. salicina*). The bird flew in and responded first with twitters and then with fitz-bews, singing for several minutes. The field crew moved approximately 250 feet away before broadcasting into the same patch, but the bird flew in again and sang from several different perches for the next 15 minutes. The bird was detected on all subsequent surveys, spontaneously singing (i.e., no broadcast required) in his territory. The bird was un-banded and occupied an approximately 1.5-acre portion of the total 2.5-acre patch.

Anne Pellegrini, a permitted bander with SWCA Environmental Consultants, target-netted and banded the bird on June 18. The bird was found to be an after hatch-year male. Despite several hours of quiet observation, field staff were unable to confirm the presence of a female, although on a few occasions one was thought to be present. We concluded that the bird was unpaired. He became very quiet in July and was last detected on July 10 in a follow-up visit after official surveys had ended for the season. The bird represented only the second record of a male defending a breeding territory on the Wash (the first was in 2008).

3.1.2 Route 2

Four migrant willow flycatchers were detected on Route 2. All detections occurred on June 12 (Figure 2, Table 2). One migrant was detected from the Upstream Historic Lateral North revegetation site. The bird was on the opposite bank, in the Upstream Historic Lateral South Bank Wetland revegetation site, and responded with breets from a small patch of willows. After several minutes and a few broadcasts in the area, the bird responded with a few fitz-bews and then fell silent. The next willow flycatcher was discovered from a passive revegetation site located on the north bank just downstream of Historic Lateral Weir. It responded to the broadcast immediately, but quietly, with a few soft fitz-bews and whits. The bird responded from native vegetation in the Upstream Bostick South revegetation site, on the opposite bank. Another migrant was found in a mix of salt cedar and natives approximately 0.2 miles upstream of Rainbow Gardens Weir, possibly utilizing both banks (and thus the Upstream Rainbow Gardens South revegetation site). It responded soon after the broadcast with fitz-bews and twitters and sang for about three minutes before going quiet. The fourth migrant was found in the Lake Las Vegas Mitigation Wetlands. The field crew picked up the bird whitting at the second calling station within the site, but it did not fitz-bew until the final station and then only a few times, responding from a small patch of sandbar willow. Two other birds whitted but never fitz-bewed so could not be confirmed as willow flycatchers.

3.1.3 Route 3

A migrant willow flycatcher was found in sandbar willows in the Upstream Historic Lateral South revegetation site on May 22 (Figure 2, Table 2). The bird fitz-bewed for more than ten minutes in response to the broadcast, but was not detected again.

3.1.4 Route 4

A migrant willow flycatcher (un-banded) was detected along Duck Creek on June 6 in a sparse stringer of salt cedar with a common reed understory, approximately 0.2 miles upstream of the Wash confluence (Figure 2; Table 2). The patch burned a few years ago and growth is still scrubby at best. The bird fitz-bewed during the broadcast and then for a few minutes after before falling silent.

3.2 Observations on Habitat Quality

3.2.1 Route 1

The presence of the second known resident southwestern willow flycatcher on territory confirms that the Nature Preserve offers the highest quality potentially suitable nesting habitat both along this route and within the entire study area. 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 was generally thinner. The areas between the DU Wetlands No. 1 and Duck Creek Confluence weirs and along Monson Channel (Figure 2) consist of thin stringers of salt cedar. Between the weirs, the Wash channel is incised, separating the Wash from the trees by approximately ten feet, so that the ground in the stands is dry. Surveys continued along these marginal stretches because they yield willow flycatcher detections, including two birds this year. More than 20 acres of marginal quality habitat were removed from the route in 2013. No detections had occurred in the removed areas for more than five years, if at all.

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 quality and extent were similar to 2012. The potentially suitable habitat along these routes is dominated by natives since most of the reach has undergone stabilization and revegetation; little salt cedar remains. The majority of the current habitat is found in the approximately 1.5-mile reach from Pabco Road Weir to Calico Ridge Weir (Figure 2). The habitat is of moderate quality, although patch sizes are small (typically 1-5 acres). The patches 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. Downstream of Calico Ridge Weir, habitat is limited and the quality is largely marginal, although the Upstream Rainbow Gardens South revegetation site continues to improve. The furthest downstream point surveyed was the Lake Las Vegas mitigation wetlands (Figure 2), part of Route 2. Habitat quality began to decline here in 2010 with substantial die-off of Goodding willow, resulting in stands of dead trees. While improvement was noted in 2012, the site had declined somewhat again in 2013.

Approximately nine acres of marginal quality habitat were removed from Route 2, the majority of which was upstream of Pabco Road Weir, including a dry patch of salt cedar and a patch with a few scattered native trees, neither of which had ever yielded detections. Just two acres of marginal quality habitat were removed from Route 3, due in part to flood impacts from storms in August and September of 2012.

3.2.3 Route 4

Habitat along Route 4 was of mixed quality. The route begins with the only native-dominated habitat on the route. In 2008, this site (the Upstream Pabco South Lower Plateau revegetation site), located just upstream of Pabco Road Weir (Figure 2), played host to the first known southwestern willow flycatcher breeding territory on the Wash. (The bird was unsuccessful in attracting a mate and departed after 34 days, but was banded beforehand.) At that time, the site consisted of a stand of large cottonwoods mixed with Goodding willows. Patches of sandbar willow occurred on the periphery as did dense common reed. The site flooded periodically, leaving saturated soils and depressions filled with water in the understory. In the intervening years, the site has changed. To improve floodwater conveyance in early 2009, the cottonwoods and willows were thinned. Cover still has not returned to its pre-thinning state, although it has improved. The site was dry in 2013. A second revegetation site (Upstream Pabco South Upper Plateau) exists just to the south but is dominated by mesquites and offers little to no understory.

The remainder of the habitat along Route 4, occurs in the Duck Creek drainage and is dominated by salt cedar of marginal quality. Flows are largely channelized or are isolated at the edge of the stands so that all but the trees bordering the water are dry, with no surface water or saturated soil in the stand interior. Also, some stands that were burned as recently as a few years prior to surveys have not yet returned to their full stature. The salt cedar stand just northeast of Sam Boyd Stadium (Figure 2) that had hosted several detections in earlier years (SWCA 2008) was wet again this year, but once again no birds were detected. Three acres of poor quality habitat in the Duck Creek drainage were removed from the route, due to access issues and a lack of detections.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Discussion

Willow flycatcher use of the Wash continues to be largely limited to migration (Table 3). However, for just the second time in more than 15 survey seasons, a bird was found defending a breeding territory in the study area (resident detections in 2007 and 2011 were single detections occurring after June 24; Table 3). The detections of territorial males in the past five years provide strong evidence that the Wash has the potential to host breeding pairs. Established nesting colonies occur within just 40 miles of the study area at Overton, Nevada (McCleod and Pellegrini 2013), and the Wash's 2008 resident southwestern willow flycatcher was re-sighted at Overton in 2009 (McCleod and Koronkiewicz 2010) showing the potential for birds to move to different sites from season to season. Overall habitat quality and extent were impacted by the removal of marginal quality habitat from survey routes. Approximately 35 fewer acres, the vast majority of which were poor quality, were surveyed in 2013 compared to 2012. The areas of marginal habitat still surveyed have had detections within the past few seasons, including in 2013. When looking at areas of moderate to high quality habitat, quality and extent were similar to 2012. The Nature Preserve provided the highest quality potential nesting habitat (as evidenced by the resident on territory) and native-dominated revegetation sites along the Wash on Routes 2 and 3 continued to offer moderate quality potential nesting habitat.

When southwestern willow flycatcher surveys first began in 1998, potentially suitable nesting habitat was dominated by salt cedar and the hydrology was poor. It is now dominated by native riparian species, due to revegetation and hydrological changes associated with the stabilization project. This shift appears to have positively impacted willow flycatcher occurrence in the project area. We have gone eight years without a zero-detection survey (Table 3), witnessed two southwestern willow flycatchers establish breeding territories in the study area in native-dominated sites, and had two other years with detections we could conclude to be residents of the endangered subspecies.

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*
*bird on breeding territory for >30 days		

Table 3. Summary of survey results, 1998-2013. 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.

In the 2011 and 2012 survey reports, Van Dooremolen (2011, 2012) argued that this shift to native habitat could increase the likelihood of the species nesting in the project area in coming years given the loss of salt cedar-dominated nesting habitat caused by the arrival of the tamarisk leaf beetle (*Diorhabda* sp.) in the lower Colorado River watershed. This position is further supported by the second known southwestern willow flycatcher defending a territory in the study area.

As in previous years, it should be noted that although the Wash has the potential to host breeding pairs, it could 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, recent detections of residents and the close proximity of established breeding colonies, annual surveys for southwestern willow flycatchers should continue in order to avoid effects to the species and comply with informal Section 7 consultation measures.

5.0 LITERATURE CITED

American Ornithologists' Union (AOU). 1998. Check-list of North American birds. Seventh Edition. American Ornithologists' Union, Washington, D.C. 829 pp.

McCleod, M.A. and T.J. Koronkiewicz. 2010. Southwestern willow flycatcher surveys, demography, and ecology along the lower Colorado River and tributaries, 2009. Annual report submitted to Bureau of Reclamation, Boulder City, NV, by SWCA Environmental Consultants, Flagstaff, AZ. 165 pp.

McCleod, M.A. and A.R. Pellegrini. 2013. Southwestern willow flycatcher surveys, demography, and ecology along the lower Colorado River and tributaries, 2012. Annual report submitted to Bureau of Reclamation, Boulder City, NV, by SWCA Environmental Consultants, Flagstaff, AZ. 92 pp.

Phillips, A.R., J. Marshall, and G. Monson. 1964. *The Birds of Arizona*. University of Arizona Press, Tucson. 212 pp.

Sogge, M.K., Ahlers, Darrell, and Sferra, S.J., 2010. A natural history summary and survey protocol for the southwestern willow flycatcher: U.S. Geological Survey Techniques and Methods 2A-10, 38 pp.

Southwest Wetlands Consortium. 1998. A survey for southwestern willow flycatchers along Las Vegas Wash, Clark County Wetlands Park, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Clark County Department of Parks and Recreation, Las Vegas.

SWCA. 1999. Survey for southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2000. Survey for southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2001. Survey for southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2002. Survey for Yuma clapper rails, yellow-billed cuckoos and southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2003. Survey for Yuma clapper rails, yellow-billed cuckoos and southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2005. [2004] Survey for Yuma clapper rails, yellow-billed cuckoos and southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2006. Survey for southwestern willow flycatchers in 2005 along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2007. 2006 survey for Yuma clapper rails and southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2008. 2007 survey for Yuma clapper rails and southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2009a. 2008 survey for southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

SWCA. 2009b. 2009 survey for southwestern willow flycatchers along Las Vegas Wash, Clark County, Nevada. Prepared by SWCA Environmental Consultants, Salt Lake City. Final report prepared for the Southern Nevada Water Authority, Las Vegas.

Van Dooremolen, D. 2010. Southwestern willow flycatcher surveys along Las Vegas Wash, Clark County, Nevada, 2010. Prepared by the Southern Nevada Water Authority, Las Vegas, NV. Prepared for the U.S. Fish and Wildlife Service and the Las Vegas Wash Coordination Committee. http://www.lvwash.org/assets/pdf/resources_ecoresearch_flycatcher10.pdf

Van Dooremolen, D. 2011. Southwestern willow flycatcher surveys along Las Vegas Wash, Clark County, Nevada, 2011. Prepared by the Southern Nevada Water Authority, Las Vegas, NV. Prepared for the U.S. Fish and Wildlife Service and the Las Vegas Wash Coordination Committee. http://www.lvwash.org/assets/pdf/resources_wildlife_flycatcher_2011.pdf

Van Dooremolen, D. 2012. Southwestern willow flycatcher surveys along Las Vegas Wash, Clark County, Nevada, 2012. Prepared by the Southern Nevada Water Authority, Las Vegas, NV. Prepared for the U.S. Fish and Wildlife Service and the Las Vegas Wash Coordination Committee. http://www.lvwash.org/assets/pdf/resources_wildlife_flycatcher_2012.pdf

Appendix A

Survey Temperature and Weather

Date	Route #	Temperature (Start/Finish) - Fahrenheit	Weather (Start/Finish)
5/21/2013	2	64/77	Clear, calm/overcast, calm
5/22/2013	4 & 1	75/85	Clear, breezy/clear, breezy
	3	78/82	Clear, light wind/clear, light wind
6/5/2013	2	68/84	Clear, calm/clear, calm
6/6/2013	4 & 1	73/100	Clear, calm/clear, calm
	3	80/95	Clear, calm/clear, calm
6/12/2013	2	75/95	Overcast, calm/clear, calm
6/13/2013	4 & 1	78/95	Clear, calm/clear, breezy
	3	80/90	Clear, light wind/clear, light wind
6/25/2013	4 & 1	77/90	Clear, light wind/clear, calm
	3	73/81	Clear, light wind/clear, calm
6/26/2013	2	77/82	Clear, calm/clear, calm
7/1/2013	4 & 1	95/98	Clear, calm/clear, light wind
	3	87/99	Partly cloudy, muggy, calm/partly cloudy, muggy, light wind
7/3/2013	2	77/88	Partly cloudy, calm/partly cloudy, muggy, calm

Appendix B

GPS Coordinates for 2013 Willow Flycatcher Detections

Species	Location	Habitat	Date	Easting*	Northing	Comments
Willow Flycatcher	Nature Preserve - Vern's Pond	native	20130522	678170	3997035	Bird ~7m to NW
Willow Flycatcher	Upstream Historic Lateral South revegetation site	native	20130522	682217	3995815	Bird ~15m to NE
Willow Flycatcher	On Duck Creek, ~0.2 miles upstream of Wash confluence	salt cedar	20130606	679650	3995808	Bird ~20m to NW
Southwestern Willow Flycatcher	Nature Preserve - cottonwood/willow patch on feeder channel southeast of middle ponds	native	20130606	678219	3997245	Bird ~10m to SW
Willow Flycatcher	On north bank, ~0.3 miles downstream of DU Wetlands No. 1 Weir	salt cedar	20130606	679578	3996176	Bird ~20m to N
Willow Flycatcher	Across from Upstream Historic Lateral North in Upstream Historic Lateral South Bank Wetland revegetation site	native	20130612	681928	3995596	Bird ~20m to SE
Willow Flycatcher	Across Wash from Downstream Historic Lateral North passive site in Upstream Bostick South revegetation site	native	20130612	682485	3995892	Bird ~65m to SE
Willow Flycatcher	~0.2 miles upstream of Rainbow Gardens Weir, may be using both north and south banks, including Upstream Rainbow Gardens South revegetation site	mix	20130612	684915	3996841	Bird ~40+m to NE
Willow Flycatcher	Lake Las Vegas mitigation wetlands	native	20130612	685761	3997490	Bird ~7m to S
Willow Flycatcher	Nature Preserve - Vern's Pond	native	20130613	678170	3997035	Bird ~7m to NW
Willow Flycatcher	On Monson Channel, ~0.2 miles upstream of Wash confluence	salt cedar	20130613	677716	3997704	Bird ~20m to NE

*Datum – WGS84

Appendix C

List of All Bird Species Detected during 2013 Surveys
with Presumed Status and Relative Abundance

The following table includes all bird species identified in the study area during the 2013 southwestern willow flycatcher surveys. Presumed status comes from our field observations. Relative abundance categories are modified after Phillips et al. (1964); abundance of a given species is based on our 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	U
Mallard	*Anas platyrhynchos*	R	FC
Cinnamon teal	*Anas cyanoptera*	R	U
Northern pintail	*Anas acuta*	M	R
Ruddy duck	*Oxyura jamaicensis*	R	R
Gambel's quail	*Callipepla gambelii*	R	C
Pied-billed grebe	*Podilymbus podiceps*	R	R
Eared grebe	*Podiceps nigricollis*	R	U
Western grebe	*Aechmophorus occidentalis*	R	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	U
Turkey vulture	*Cathartes aura*	R	R
Sharp-shinned hawk	*Accipiter striatus*	M	R
Cooper's hawk	*Accipiter cooperii*	R	U
Red-tailed hawk	*Buteo jamaicensis*	R	R
American kestrel	*Falco sparverius*	R	U
Virginia rail	*Rallus limicola*	R	R
Common gallinule	*Gallinula galeata*	R	U
American coot	*Fulica americana*	R	FC
Killdeer	*Charadrius vociferous*	R	U
Black-necked stilt	*Himantopus mexicanus*	R	FC
American avocet	*Recurvirostra americana*	R	FC
Spotted sandpiper	*Actitis macularius*	R	U
Wilson's phalarope	*Phalaropus tricolor*	M	R

Common Name	Scientific Name	Presumed Status	Relative Abundance
White-winged dove	*Zenaida asiatica*	R	U
Mourning dove	*Zenaida macroura*	R	FC
Greater roadrunner	*Geococcyx californianus*	R	U
Barn owl	*Tyto alba*	R	R
Lesser nighthawk	*Chordeiles acutipennis*	R	U
White-throated swift	*Aeronautes saxatalis*	R	R
Black-chinned hummingbird	*Archilochus alexandri*	R	U
Anna's hummingbird	*Calypte anna*	R	U
Costa's hummingbird	*Calypte costae*	R	U
Western wood-pewee	*Contopus sordidulus*	M	U
Willow flycatcher	*Empidonax traillii*	M/R	U
Black phoebe	*Sayornis nigricans*	R	FC
Say's phoebe	*Sayornis saya*	R	FC
Ash-throated flycatcher	*Myiarchus cinerascens*	R	R
Western kingbird	*Tyrannus verticalis*	R	U
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
Canyon wren	*Catherpes mexicanus*	R	U
Bewick's wren	*Thryomanes bewickii*	R	C
Marsh wren	*Cistothorus palustris*	R	C
Blue-gray gnatcatcher	*Polioptila caerulea*	R	U
Black-tailed gnatcatcher	*Polioptila melanura*	R	C
Northern mockingbird	*Mimus polyglottos*	R	U
Crissal thrasher	*Toxostoma crissale*	R	FC
Phainopepla	*Phainopepla nitens*	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
Summer tanager	*Piranga rubra*	R	R

Common Name	Scientific Name	Presumed Status	Relative Abundance
Western tanager	*Piranga ludoviciana*	M	R
Blue grosbeak	*Passerina caerulea*	R	C
Lazuli bunting	*Passerina amoena*	M	R
Indigo bunting	*Passerina cyanea*	R	U
Red-winged blackbird	*Agelaius phoeniceus*	R	C
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	R	R
Great-tailed grackle	*Quiscalus mexicanus*	R	C
Brown-headed cowbird	*Molothrus ater*	R	C
Bullock's oriole	*Icterus bullockii*	R	R
House finch	*Haemorhous mexicanus*	R	FC

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.