2007 Survey for Yuma Clapper Rails and Southwestern Willow Flycatchers Along Las Vegas Wash, Clark County, Nevada

Prepared for

Southern Nevada Water Authority

Prepared by

SWCA Environmental Consultants

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2007 SURVEY FOR YUMA CLAPPER RAILS AND SOUTHWESTERN WILLOW FLYCATCHERS ALONG LAS VEGAS WASH, CLARK COUNTY, NEVADA

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EXECUTIVE SUMMARY

Systematic surveys for Yuma clapper rails (*Rallus longirostris yumanensis*) were conducted within potentially suitable habitat along the Las Vegas Wash (Wash) in Clark County, Nevada, from April through May 2007. The survey techniques included playback recordings of the Yuma clapper rail in accordance with standardized survey protocol (McKinstry 1995). No clapper rails were detected.

Systematic surveys for southwestern willow flycatchers (*Empidonax traillii extimus*) were conducted along the Wash from May through July 2007. The survey techniques included playback recordings of the southwestern willow flycatcher in accordance with standardized survey protocol (Sogge et al. 1997). One willow flycatcher was detected during the third survey period, which is the latest a willow flycatcher has been detected in the Clark County Wetlands Park (Park) in systematic surveys dating back to 1998. Although detected only once, it was determined to be a resident southwestern willow flycatcher per the protocol (Sogge et al. 1997), and is the first confirmed detection of the federally endangered subspecies along the Wash.

While no official surveys were conducted for the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), special care was taken to listen for the species and evaluate potentially suitable habitat while conducting southwestern willow flycatcher surveys. No individuals were detected.

Previous survey reports (SWCA 2002, 2003, 2004, 2007) have identified both increases and losses of potential Yuma clapper rail habitat. Generally, construction of erosion control structures has continued to increase the quantity of emergent wetland habitat within the boundaries of the Park. However, some marsh areas have become increasingly channelized, reducing the habitat quality within these areas. Additionally, emergent marsh habitat along the lower C-1 Channel in which a Yuma clapper rail was detected in 2006 was destroyed by construction of a concrete- and riprap-lined flood control channel prior to the 2007 breeding season. Presently, the Wash still provides only marginal habitat for nesting Yuma clapper rails.

Previous survey reports (SWCA 1999–2007) have identified losses of potentially suitable southwestern willow flycatcher habitat. Habitat losses continued into 2007 and were primarily associated with wildfire, ongoing construction of erosion control and bank stabilization structures, and large-scale revegetation efforts in the survey area. Such events, while the cause of additional tamarisk losses, will likely lead to long-term improvements in potentially suitable southwestern willow flycatcher habitat, as well as potentially suitable clapper rail and western yellow-billed cuckoo habitats. Cottonwood and willow plantings continue to mature, thus improving riparian habitat structure and suitability for cuckoos and flycatchers.

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1.0 INTRODUCTION

This study was undertaken to further examine the breeding status of the federally endangered Yuma clapper rail (*Rallus longirostris yumanensis*) and southwestern willow flycatcher (*Empidonax traillii extimus*) along Las Vegas Wash (Wash) in Clark County, Nevada. In 1997, as part of the environmental permitting process associated with the proposed development of the Clark County Wetlands Park (Park), through which the Wash flows, it was recognized that potentially suitable southwestern willow flycatcher habitat existed along the channel, which could be affected by the installation of erosion control structures and development of other Park facilities. At that time, agency biologists recommended that a systematic survey be undertaken to determine whether or not these species breed within the Park boundary. Initial surveys for the southwestern willow flycatcher were conducted in 1998 (SWCA 1998), and follow-up surveys have been conducted every year, beginning in 1999 (SWCA 1999, 2000, 2001, 2002, 2003, 2004, 2006, 2007). Systematic surveys for the Yuma clapper rail and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) were initiated in 2000 and undertaken by the San Bernardino County Museum. The Yuma clapper rail and yellow-billed cuckoo surveys were repeated by the San Bernardino County Museum in 2001 (McKernan and Braden 2001, 2002), and then by SWCA in 2002, 2003, and 2004 (SWCA 2002, 2003, 2004). The Yuma clapper rail surveys were also done in 2006 by SWCA (SWCA 2007).

The results of the 2007 survey for the southwestern willow flycatcher and Yuma clapper rail are presented in this report. Western yellow-billed cuckoo surveys were not conducted in 2007. However, any incidental detections of this species were recorded, as were changes in their potential habitat since 2006.

The purpose of this report is twofold:

1. Document the results of the 2007 surveys with respect to the distribution and abundance of Yuma clapper rails and southwestern willow flycatchers in the Wash.
2. Qualitatively estimate the utility of existing and future potential habitat to nesting Yuma clapper rails and southwestern willow flycatchers and, to a lesser degree, western yellow-billed cuckoos.

2.0 STUDY AREA

The general study area for this survey consists of an approximately 405-ha (1,000-acre) portion of the Wash dominated by tamarisk (*Tamarix ramosissima*; Bureau of Reclamation 1988) and contained primarily within the boundaries of the Park (Figure 1). This area is spread along an 11-km (7-mile) reach of the Wash, and includes portions of the City of Henderson as well as private, county, and Bureau of Reclamation lands. The study area was defined in 1998 in consultation with Clark County, the Bureau of Reclamation, the Southern Nevada Water Authority (SNWA), and the U.S. Fish and Wildlife Service (USFWS). It includes areas that have been and will continue to be revegetated with native species, as well as areas that have been and will continue to be affected by construction of erosion and grade control structures, roads, trails, and other facilities associated with the Park development.

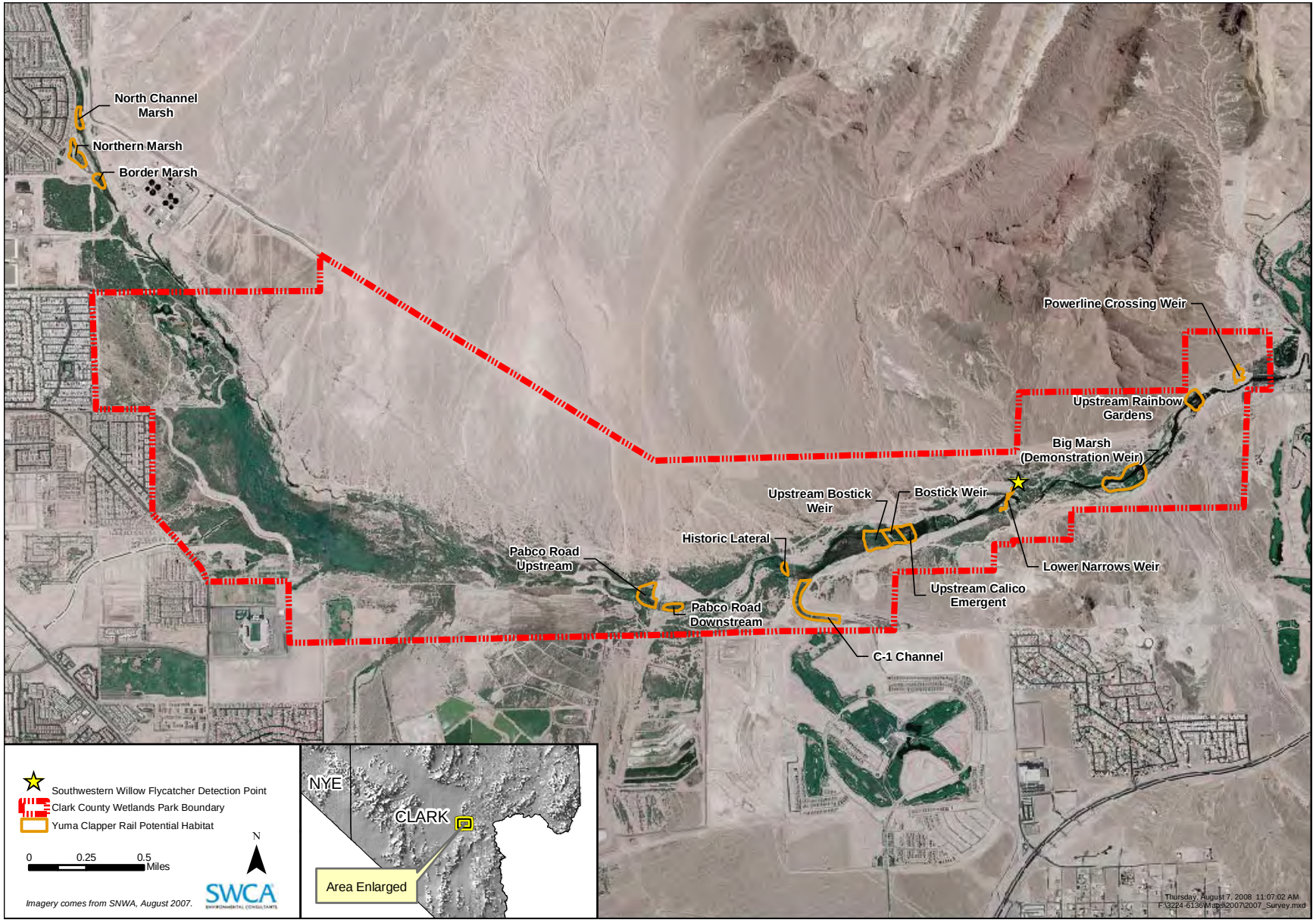

Figure 1. Southwestern willow flycatcher detection and Yuma clapper rail survey sites, 2007.

3.0 METHODS

3.1 YUMA CLAPPER RAIL

Yuma clapper rail habitat tends to consist primarily of freshwater or brackish marshlands and riparian areas (Grinnell and Miller 1944). The species generally requires a wet substrate such as mud flats, sandbars, and drainage bottoms that are densely vegetated with herbs or woody vegetation at least 40 cm (15.8 inches) in mean canopy height. The presence of ponds and/or flowing water is also critical for Yuma clapper rails. According to Todd (1986), "Large unbroken stands of vegetation in wet situations without emergent soils do not seem to be optimum habitat." The species apparently distributes its territories along the land-water interface where standing water in the marsh gives way to gently sloping saturated soil (usually not steeply sloping). In large, deep-water marshes, rail territories may extend 50 m (164 feet) or more from shore when dead, decadent, and lodged or floating vegetation from the previous year provides an above-water substrate for foraging and nesting (Todd 1986).

Yuma clapper rails primarily occupy marshes dominated by cattail (*Typha* spp.), bulrush (*Schoenoplectus* spp.), and/or common reed (*Phragmites australis*) in all seasons, although they reach their greatest densities in cattail-bulrush marshes of moderate foliage density (Anderson and Ohmart 1985). As such, these habitats were targeted during the 2007 clapper rail surveys in the Wash. They include isolated patches of emergent marsh habitat in the active floodplain of the Wash.

The presence/absence of Yuma clapper rails was determined by conducting three surveys during the early breeding season (March 15 to May 30) from 30 minutes before sunrise to no later than 09:00 hours (McKinstry 1995; Harlow 2000). The actual survey dates were March 20, April 10, and May 15. The survey technique employed taped calls played along established transect routes by observers on foot.

3.2 SOUTHWESTERN WILLOW FLYCATCHER

Within the general study area, southwestern willow flycatcher survey efforts focused on areas containing tamarisk and other species such as Fremont cottonwood *(Populus fremontii)* and Goodding willow *(Salix gooddingii)* that have the proper structure to be potentially suitable for use by southwestern willow flycatchers. For the purposes of the study, potentially suitable habitat was defined as dense woody riparian vegetation greater than 3.0 m (9.8 feet) in height with more than 75% canopy cover. Areas dominated by desert scrub vegetation and other upland habitats known to be unsuitable for southwestern willow flycatchers were not surveyed as part of this effort.

Surveys for southwestern willow flycatchers were conducted from May through July 2007, using playback of a recorded southwestern willow flycatcher song and call notes (*fitz-bew* and *britt*) according to the standard protocol described by Sogge et al. (1997). The five-visit protocol described in Braden and McKernan (1998) and currently mandated by the U.S. Fish and Wildlife Service (USFWS) was used. Trained observers conducted five surveys of the study area in the three established survey periods: one survey each in the May 15–31 and June 1–21 periods, and three surveys in the June 22 through July 17 period. Surveys in 2007 were conducted through the

following date ranges: May 15–16, June 14–15, June 26–27, July 3–4, and July 10–11. On the first day of each survey, observers covered the north bank of the Wash, and on the second day they covered the south bank.

Surveys were initiated approximately 30 minutes before sunrise and were terminated by 10:00 a.m. (Pacific Daylight Time). Observers played the tape recordings at approximately 20 to 30–m (65 to 98–foot) intervals in potential nesting habitat. Excluded from the surveys were extensive areas of dense cattail, common reed, and quailbush (*Atriplex lentiformis*); stands of recently burned tamarisk; and large areas of tamarisk that exhibited low stature and less than 75% canopy cover Survey routes primarily followed the edges of dense riparian patches and were designed to permit efficient and effective coverage of as large an area as feasible. Survey routes also attempted to follow the water's edge. This was not always possible, especially in the portion of the Park downstream of the Pabco Road Weir, where the steep, eroded, and high (approximately 10 to 15–m, or 30 to 50–foot) banks of the Wash prevent access to the water's edge in some places. Surveys were conducted in this area by walking the "rim" of the Wash and broadcasting the taped song and call notes to the habitat below. Special care was taken to avoid double-counting individuals. If a willow flycatcher was detected calling from roughly the same location on consecutive days, it was counted as a single individual. Likewise, if a willow flycatcher responded from approximately the same location when the tape was played at adjacent calling stations, it was counted as a single individual.

It should be noted that construction activities, while removing potentially suitable habitat in some locations, have also provided access to the active floodplain and improved the ability to survey these areas. Vegetation clearing has also allowed biologists to survey areas that formerly had been inaccessible due to impenetrable stands of tamarisk, quailbush, or a combination thereof.

3.3 Western Yellow-billed Cuckoo

No systematic surveys were done for western yellow-billed cuckoos in 2007. However, special care was taken to listen and look for this species while surveying for southwestern willow flycatchers. Additionally, qualitative observations of the habitat conditions for western yellow-billed cuckoo were recorded.

4.0 Results and Discussion

4.1 Yuma Clapper Rail

4.1.1 Results

No Yuma clapper rails were detected during the 2007 surveys. However, the lack of response to playback of a taped call should not be considered conclusive evidence that there are no Yuma clapper rails present in the area. Most rails do not respond to taped calls. Even at the peak of the early nesting season, only 40% of Yuma clapper rail individuals may respond (Conway et al. 1993).

Emergent marsh habitat near the mouth of the C-1 Channel (Figure 1), the area in which a Yuma clapper rail was detected in 2006, was destroyed prior to the 2007 breeding season. The channel had been reconstructed and lined with concrete and riprap so that at the time of the 2007 Yuma clapper rail surveys no rail habitat remained.

Information on the status of Yuma clapper rails along the Wash prior to 1998 is limited; however, Alcorn (1988:126) reports that eight clapper rails were observed in the Las Vegas Sewage disposal (now known as the City of Las Vegas Water Pollution Control Facility) drainage ditch on September 6, 1959, and a single clapper rail was detected in the same location on September 19, 1959. This ditch drains into the Wash approximately 2.5 km (1.5 miles) upstream of the Park boundary. No other historical records of clapper rail detections have been found. The 1998 southwestern willow flycatcher surveys resulted in Yuma clapper rail detections on May 28 and June 18, just upstream of the Pabco Road Weir (SWCA 1998). One Yuma clapper rail was detected during the 2005 southwestern willow flycatcher surveys. The Yuma clapper rail was detected May 23, 2005, at 09:23 hours (SWCA 2006). The call was emanating from the area referred to as the Big Marsh. One Yuma clapper rail was detected during the 2006 surveys. Aaron Miller with San Bernardino County Museum visually detected a Yuma clapper rail on June 4, 2006, at 07:00 hours in the C-1 Channel. This detection was confirmed June 7 at 08:10, when a Yuma clapper rail responded to a tape playback (SWCA 2007). These have been the only Yuma clapper rail detections made within the boundaries of the Park despite the systematic surveys for this species carried out in 2000 and 2001 by the San Bernardino County Museum (McKernan and Braden 2001, 2002) and in 2002, 2003, 2004, and 2006 by SWCA (SWCA 2002, 2003, 2004, 2007).

4.1.2 Observations on Suitability of Existing and Potential Future Habitat

Our qualitative observations of habitat conditions in spring and summer 2007 indicate that there is less potential Yuma clapper rail habitat present in the Wash than there was in 2006. Of the potentially suitable rail habitat present in 2006, the emergent marsh located near the mouth of the C-1 Channel appeared to be among the best. As described above, the vegetation in this area was cleared and replaced with a concrete- and riprap-lined channel prior to the 2007 survey.

Although the construction of erosion control structures typically increases the quantity of potential Yuma clapper rail habitat as emergent marsh vegetation becomes established in pools upstream of the structures, it contributed no noticeable change in the amount of potential habitat present from the 2006 to the 2007 field season. Construction of the Powerline Crossing Weir had been completed just prior to the 2007 surveys (Figure 1), but emergent marsh vegetation had not yet had sufficient time to become established in the resulting impoundment.

As described previously (SWCA 2007), the Big Marsh area has become channelized, and inter-channel islands of emergent marsh have become relatively dry and dominated by common reed (as opposed to the wetter bulrush- or cattail-dominated stands). As a result, the quality of rail habitat within this area is relatively low. Channelization of the Big Marsh area occurred because of a shift in the elevation of the Demonstration Weir, a temporary erosion control structure just downstream of the marsh. Unlike the other weirs on the Wash, this structure was constructed as a

temporary, unconfined rock riprap structure and was not engineered to withstand heavy flood waters. Consequently, portions of the temporary structure slumped when large flood flows shifted the rock riprap in the winter of 2005. The Wash then incised the marsh as it cut its way down to the new elevation. This lowered the water table in the impoundment and facilitated the transition of the cattail marsh habitat to a reed-dominated community.

Channelization of emergent wetland habitats resulting from floods is proving to be a continuing challenge, limiting the extent and longevity of potentially suitable Yuma clapper rail habitat. As these areas become dryer and increasingly dominated by common reed, their habitat value for rails declines. Yet, channelization should not be as problematic in the future as stabilization activities along the Wash progress. With continued construction of erosion control structures and growth of emergent marsh vegetation upstream of the weirs, we anticipate that some potential Yuma clapper rail habitat will continue to become established in different stretches of the Wash. Presently, though, the Wash still provides only marginal habitat for nesting Yuma clapper rails due to the small patch sizes (less than 3.50 ha [8.75 acres]) and the continued channelization of the area.

Eleven distinct sites, eight within and three just upstream of the Park, were surveyed as potential Yuma clapper rail habitat in 2007 (Figure 1). Some of the areas surveyed were different than those surveyed in 2006 because the Wash and the potential Yuma clapper rail habitat have changed.

1. North Channel Marsh – This site is located in the Wash channel approximately 1.4 km (0.85 miles) north of the Park's western boundary and is composed of a small stand of cattail-dominated emergent marsh in the middle of the channel. The future quality of this site is uncertain. People living in the surrounding neighborhood have been observed throwing trash into the Wash in the area.
2. Northern Marsh – This site is located downstream of the Northern Channel Marsh, just to the west of the main channel. It is approximately 1.2 km (0.75 miles) upstream of the Park boundary. It has a relatively large stand of cattail-dominated emergent marsh. The future quality of this site is also uncertain.
3. Border Marsh – This site is located in the Wash just north and approximately 1 km (0.6 miles) upstream of the Park border. It has a decent-sized stand of emergent marsh dominated by cattails. As with the above sites, the future quality of this site is uncertain.
4. Pabco Road Upstream – The Pabco Road Weir impoundment has created the potential for the development of future Yuma clapper rail habitat. The habitat here, which is made up of cattail, bulrush, and common reed, is currently rather patchy. The habitat quality of this area has generally continued to improve over the past several years, although some potential habitat on the north side of the Wash did dry up in 2007.
5. Pabco Road Downstream – This area is just downstream of the Pabco Road Weir. The habitat is made up primarily of cattail and common reed, and the patch size is relatively small.
6. Historic Lateral Weir – This site has filled in with cattail and common reed, and wading birds, ducks, and red-winged blackbirds are common in the area. However, the potential Yuma clapper rail habitat is small in size and structure.

7. Upstream Bostick Weir – This area has become one of the largest patches of potentially suitable clapper rail habitat in the Wash. Small islands in the middle of the Wash and the borders of the impoundment are covered with thick emergent marsh that is potentially suitable for clapper rails. As an indicator of the habitat quality, other secretive marsh bird species, including least bittern and Virginia rail, have been detected at this site.
8. Bostick Weir – This site covers the emergent marsh habitat spread along the face of the Bostick Weir, and is dominated by common reed and cattail with some bulrush.
9. Upstream Calico Emergent – This site is located in the Calico Ridge Weir impoundment, at the toe of Bostick Weir. The emergent marsh habitat is composed of patches of bulrush, cattail, and common reed. As with the Upstream Bostick site, other secretive marsh birds have been detected using the site, indicating good habitat potential.
10. Big Marsh (Demonstration Weir) – In 2004, this area appeared to contain the best quantity and quality of potential Yuma clapper rail habitat along the Wash. During the 2005 southwestern willow flycatcher surveys, a Yuma clapper rail was heard at this site. However, since the winter of 2005–2006, the site has become channelized and dominated by common reed, reducing the habitat quality for clapper rails. However, this site is still fairly active with wading and water birds.
11. Upstream Rainbow Gardens – Just upstream of the Rainbow Gardens Weir, emergent marsh with potential for rail habitat has begun to fill in. It is still a small patch but may continue to grow.

4.2 SOUTHWESTERN WILLOW FLYCATCHER

4.2.1 RESULTS

One willow flycatcher was detected singing (*fitz-bew*) during the 2007 surveys. It was detected at 08:10 on June 26, responding to a playback recording. The individual was located on a large tamarisk-dominated point bar extending from the south bank of the Wash, roughly 2.5 km (1.5 miles) upstream of the Park's eastern border and just upstream of the future Lower Narrows Weir site (Figure 1). The bird was located in a small patch composed predominantly of tamarisk, but with some Goodding willow, bordering the water. Surveyors returned to the detection site just before 10:30 hours on the same morning and replayed the recording, but the willow flycatcher was not detected again. Surveys on the two subsequent dates failed to detect any willow flycatchers at or near the detection location.

The timing of this willow flycatcher detection is significant. According to Sogge et al. (1997), any willow flycatcher detected June 22 or later "should no longer be passing through the southwest; therefore, any flycatchers that you detect are probably resident breeders or nonbreeding floaters" (meaning that they are southwestern willow flycatchers). The “passing through” refers to other subspecies of willow flycatcher that migrate through the region to more northerly breeding grounds and are not federally endangered. The southwestern willow flycatcher is the only subspecies that nests in the southwest. As the subspecies are vocally inseparable, the methods for distinguishing the southwestern subspecies from the others are timing of detection (i.e., after June 21) or conclusive signs of breeding activity (e.g., observing the bird carrying nesting material). Therefore, as the willow flycatcher was detected on June 26, it is being considered a resident southwestern willow flycatcher. This determination is also

supported by the southwestern willow flycatcher coordinator for the Bureau of Reclamation's Lower Colorado Regional Office, Theresa Olson (personal communication). This determination is significant because it marks the first documented southwestern willow flycatcher to ever be detected within Park boundaries. Because this southwestern willow flycatcher was not detected during the last two surveys, the nest-searching protocol of Martin and Geupel (1993) was not initiated, and nest-monitoring activities were deemed unnecessary.

The 2007 southwestern willow flycatcher survey represents the tenth annual systematic survey for this species in Park boundaries. During the 1998 survey, two willow flycatchers were detected in the first survey period at a point approximately 2.4 km (1.5 miles) downstream of the Pabco Road Weir. It was later concluded that these individuals were migrants due to the fact that they were detected only in the first of the three survey periods. Seven willow flycatchers were detected during the 2000 surveys. However, because no nesting behavior or activity was observed, and no willow flycatchers were detected on the third and final survey despite special care taken to search for the previously detected birds, all seven willow flycatchers detected were considered migrants. Two willow flycatchers were detected during the 2002, 2003, and 2006 surveys, with one of the 2006 detections occurring prior to the official survey season. Again, these individuals were later concluded to be migrants. In 2004, 16 willow flycatchers were detected during the first survey period (May 18–19), and it was speculated that the surveys had coincided with a migratory wave. Because no willow flycatchers were detected in the last four surveys, all 16 individuals were later concluded to be migrants. In 1999, 2001, and 2005, no willow flycatchers were detected.

For reference, there were three years where the number of detections was greater than the number of individuals presumed to have been detected, as determined by the criteria specified in Section 3.2. In 1998 and 2004, two flycatchers were detected calling from the same location on two consecutive days and were thus presumed to be the same individual. In 2002, a flycatcher was detected calling from roughly the same location at adjacent calling stations.

4.2.2 Observations on Suitability of Existing and Potential Future Habitat

Our qualitative observations of habitat conditions in spring and summer of 2007 indicate that fire, the construction of weirs, and clearing of tamarisk associated with restoring native plant communities in the interval between the 2006 and 2007 survey periods have continued to substantially reduce the amount of potentially suitable southwestern willow flycatcher nesting habitat along the Wash. A 200-acre wildfire occurred along the Wash on March 13, 2007. The burn consumed nearly all of the common reed community between Sam Boyd Stadium and the Nature Preserve. There was some potential southwestern willow flycatcher habitat composed of tamarisk within the burned area, but the vast majority of the fire took place in common reed. The many areas that were burned between the 2001 and 2002 field seasons, eliminating nearly one-third of the potential southwestern willow flycatcher nesting habitat in the northeastern portion of the study area, are beginning to gain suitable habitat structure but have still not regenerated to the point of being suitable willow flycatcher habitat. Unlike recent years, the majority of the weir construction and ground clearing conducted between the 2006 and 2007 field seasons occurred upstream in the upper

third of the Wash. However, ground clearing also occurred just downstream of the Pabco Road Weir, where 16 acres of tamarisk were cleared from the north bank for a new revegetation site.

Although overall potentially suitable nesting habitat declined due to the continued clearing of tamarisk, there were increases in native-dominated potentially suitable habitat due to SNWA's ongoing aggressive revegetation program. The biggest increase has occurred downstream of Pabco Road Weir, where several islands and the borders of the active stream channel(s) have grown thick with willows. This habitat has the potential to be very dynamic. Channel locations could change in the floodplain due to flood scouring, erosion, and sedimentation. Also, large areas of willow habitat could be destroyed in a large flood. In addition, Goodding willows have grown along the face of the Bostick Weir in places where they interfere with the weir's ability to evenly disperse flood flows. In locations such as these (where woody, inflexible vegetation negatively impacts the integrity of channel bed and bank facilities along the Wash), the trees will have to be removed.

Lateral erosion, although likely still occurring in portions of the active floodplain, has been minimized by the construction of erosion control structures, and was not observed to have had a major effect on southwestern willow flycatcher habitat in the last year. While lateral erosion will, in the short term, likely continue to result in the incremental loss of existing riparian habitat, the associated widening of the floodplain is beginning to create more braided channels, and in time will create abandoned meander loops and isolated floodplain depressions. The creation of these habitat elements should eventually increase the extent of moist-soil and standing shallow-water habitats that are useful to southwestern willow flycatchers. It should be noted that development of this habitat tends to occur at the expense of the marginal southwestern willow flycatcher habitat associated with relict floodplains and old alluvial terraces located high above the active floodplain.

While lateral erosion of the floodplain can help create substrate conditions favorable to the development of southwestern willow flycatcher habitat, this process is tempered by catastrophic flooding and vertical erosion (i.e., headcutting). To the extent that the existing erosion control structures dissipate floodwater energy (which, in turn, counters headcutting and lateral scour), future conditions should be more favorable for the development of suitable southwestern willow flycatcher habitat along the downstream reach of the Wash.

Another aspect of southwestern willow flycatcher habitat suitability, somewhat independent of vegetative structure, involves factors associated with other members of the Wash's avian community. True colonization of the study area by the southwestern willow flycatcher would eventually require successful reproduction. Breeding within the study area may prove difficult for southwestern willow flycatchers due to their susceptibility to brood parasitism by the brown-headed cowbird (*Molothrus ater)*, which has been shown to significantly reduce flycatcher nesting success (Brown 1994; Sogge et al. 1997; USFWS 1995). All 10 southwestern willow flycatcher survey years have shown cowbirds to be one of the most common (if not the most common) birds found in the study area, with more than 50 seen on a daily basis (see Appendix A). In addition, the somewhat fragmented habitat, which is presently becoming more fragmented due to ongoing construction, fires, and other activities, makes potential southwestern willow flycatcher nests more susceptible to this type of parasitism than they would be in habitats with more contiguous canopy coverage.

4.2.3 10-YEAR WILLOW FLYCATCHER SURVEY REVIEW

The 2007 southwestern willow flycatcher survey represents the tenth annual systematic survey for this species within Park boundaries. During this time, the Wash has undergone large changes in terms of human encroachment, changing habitat (largely due to SNWA's native revegetation program), and weir construction. This section of the report focuses on the willow flycatcher data that has been collected during this time span. Analyses focus on the number of individuals presumed to have been detected during the 10-year period. For individuals that were detected on two consecutive days, the date of the first detection was used.

4.2.3.1 WILLOW FLYCATCHERS DETECTED BY YEAR

During the last 10 years, 32 willow flycatchers have been detected along the Wash, only one of which was determined to be a southwestern willow flycatcher. The other 31 were concluded to be migrants. The yearly distribution of these birds over the last 10 years is shown in Figure 2.

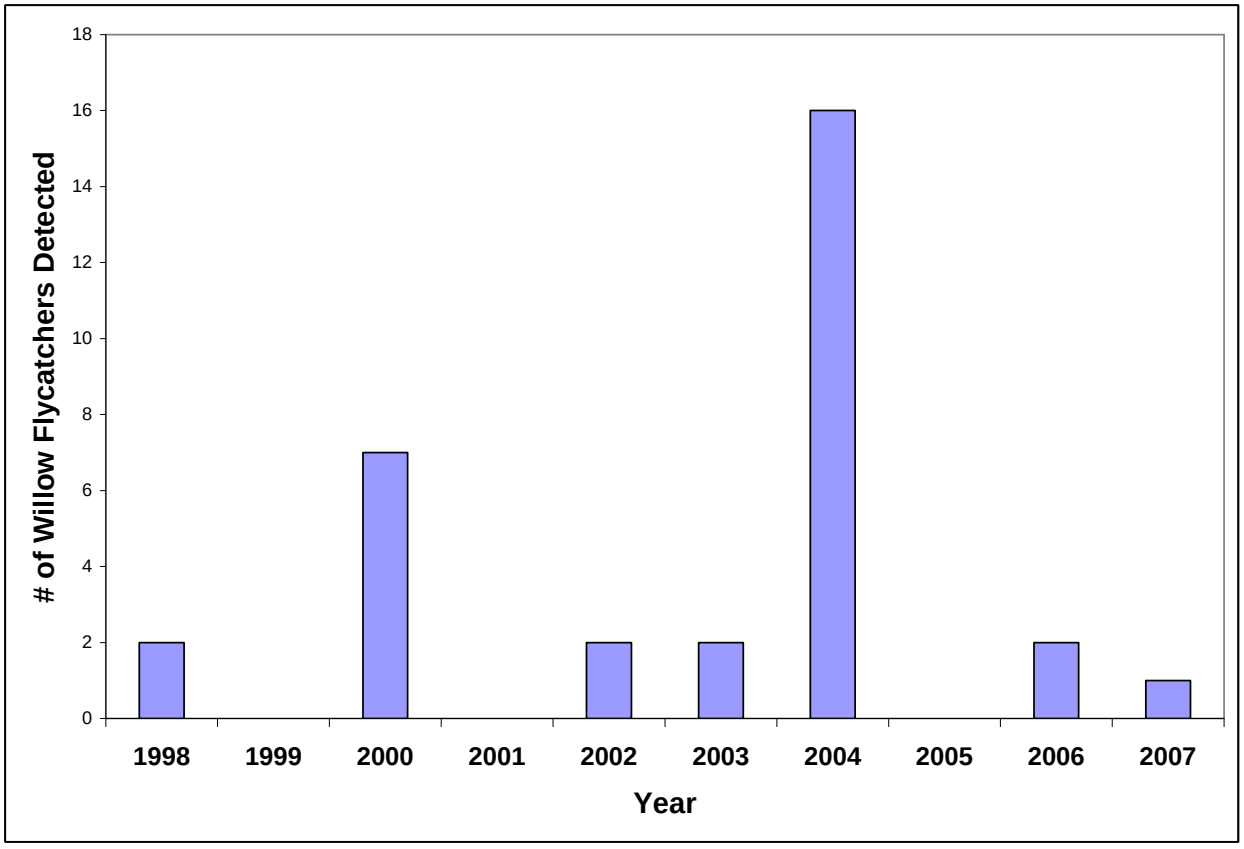

Figure 2. Willow flycatchers detected by year.

The surveys that were completed during the first survey period of 2004 were speculated to have coincided with a willow flycatcher migratory wave. Whether or not this migratory wave is a yearly event along the Wash is unknown. It is possible this was an unusual phenomenon on the Wash. The overall differences in the number of willow flycatchers detected each year may have

more to do with random chance of when the surveys occurred relative to the timing of migration, rather than the number of willow flycatcher using the Wash as a temporary layover per year. However, this remains unclear.

4.2.3.2 WILLOW FLYCATCHERS DETECTED BY DATE

Over the past 10 years, 18 of the 32 willow flycatchers detected (or 56.3%) were detected during the first six days of the first southwestern willow flycatcher survey period (May 15–20; Figure 3). Twenty-one individuals (or 65.6%) were detected during May (including the single pre-survey season detection). Of the remaining 11 (34.4%), 10 (31.3%) were detected before June 15. Only one willow flycatcher (3.1%) was detected after June 15. This individual was detected on June 26, late enough in the season to be considered a resident rather than migrant willow flycatcher (Sogge et al. 1997). As such, it was the first documented resident southwestern willow flycatcher detected along the Wash. The following two surveys failed to detect this individual again, and although it could still be considered a resident, it was determined not to be breeding in the area.

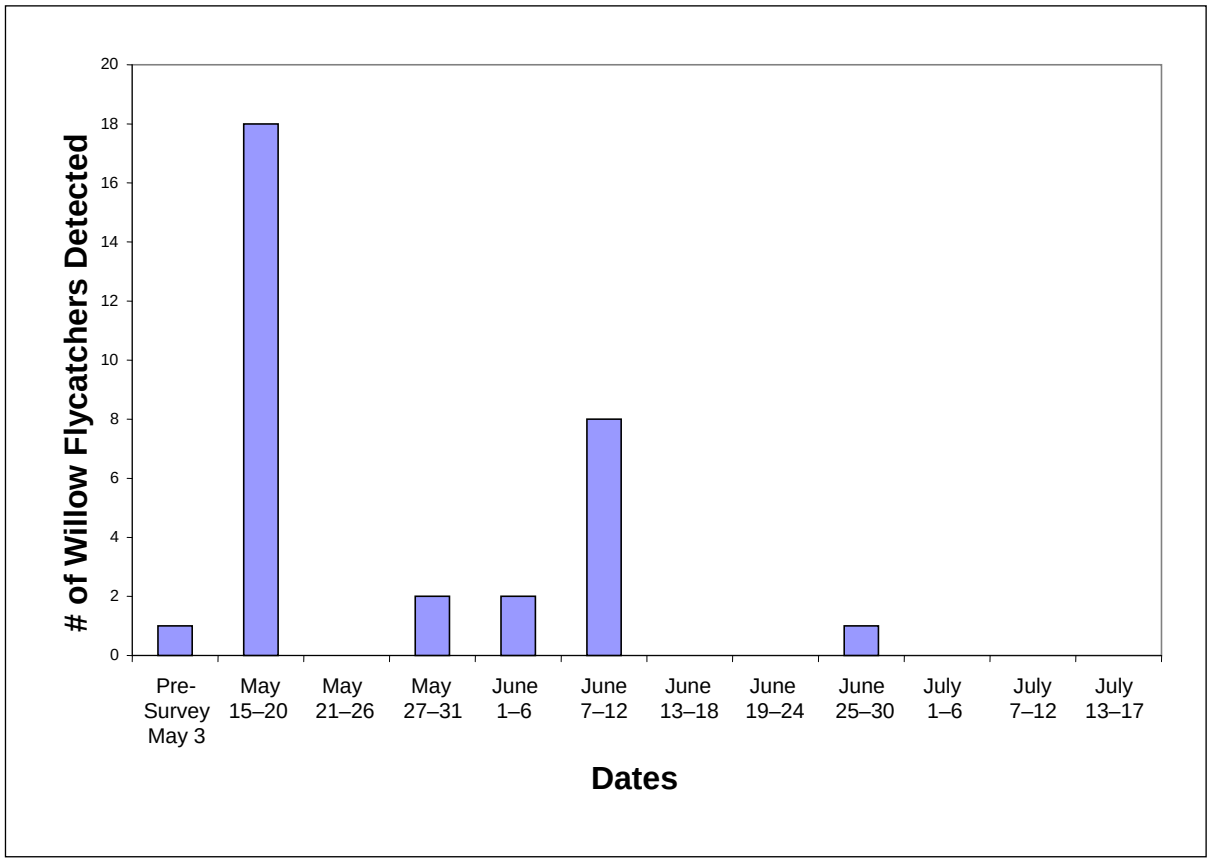

Figure 3. Willow flycatchers detected by date; grouped in 5- and 6-day periods.

4.2.3.3 WILLOW FLYCATCHERS DETECTED BY SURVEY PERIOD

As can be surmised from the dates given in Section 4.2.3.2, the vast majority of willow flycatchers, 20 (or 62.5%), were detected in the first survey period, May 15–31 (Figure 4). Ten (or 31.3%) were detected during the second survey period, June 1–21. The last three surveys

took place in the third survey period, June 22–July 17. Only one individual was detected during the third survey period, and it was detected during the first survey of that period. No willow flycatchers were detected during the fourth or fifth surveys. It should be noted that although the survey protocol was altered in 2001 to add one week to the third survey period and an additional two surveys to the end of the survey window, the first two survey periods were not altered.

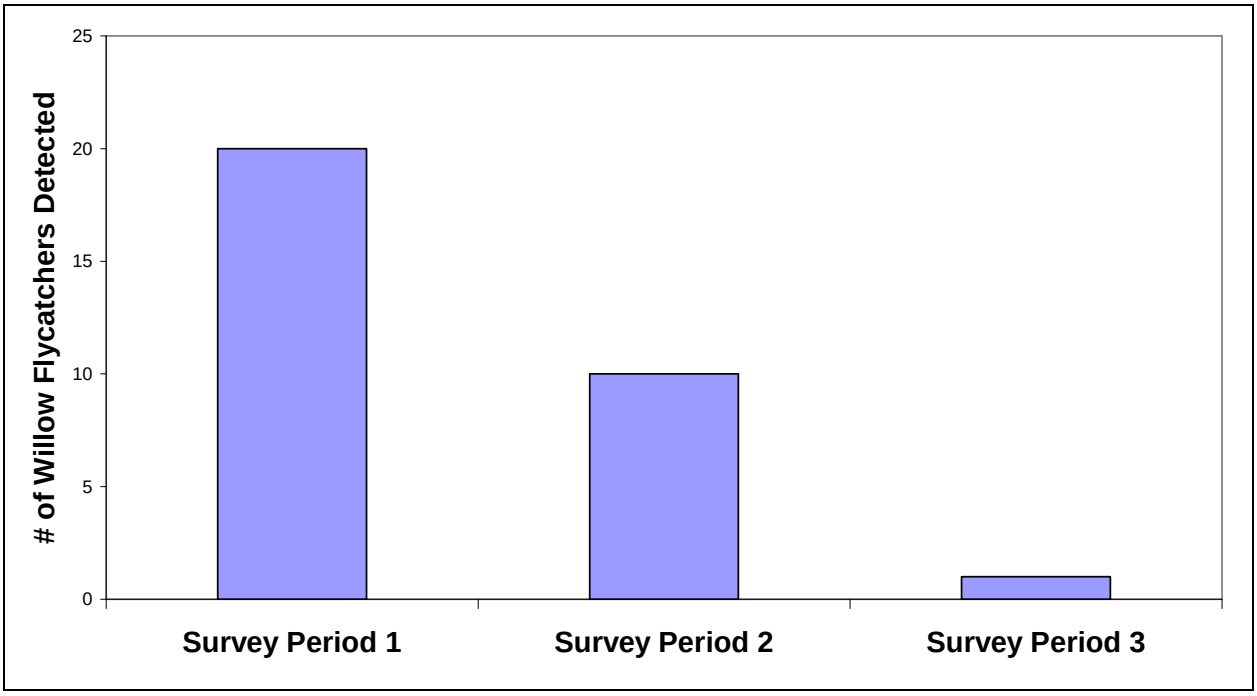

Figure 4. Willow flycatchers detected by survey period.

4.2.3.4 Spatial Locations of Willow Flycatchers Detected

Willow flycatcher detections over the last 10 years have occurred predominantly in thick tamarisk and occasionally in cottonwood groves. Figure 5 shows the locations of all willow flycatchers detected over the past 10 years. Certain locations have been used by willow flycatchers in multiple years, leading to the conclusion that some areas are more agreeable to migrating willow flycatchers than others. Based on this, there are four "hot spot" areas described below:

Hot Spot 1 – Five migrating willow flycatchers have been detected in this area; one each in 2000, 2004, and 2006, and two in 2002. This is a unique area—although it is located roughly 0.65 km (0.4 miles) from the Wash, it has an almost constant source of water in the form of run-off from Sam Boyd Stadium, Duck Creek, and the Clark County Nature Preserve. Habitat in the area is characterized by a relatively large stand of tamarisk with some standing water beneath the trees.

Hot Spot 2 – Two migrating willow flycatchers have been detected in this area; one in 2000 and the other in 2004. Like Hot Spot 1, this area is located off the main channel and is dominated by tamarisk. It is fed by a different water source that eventually flows into the main channel.

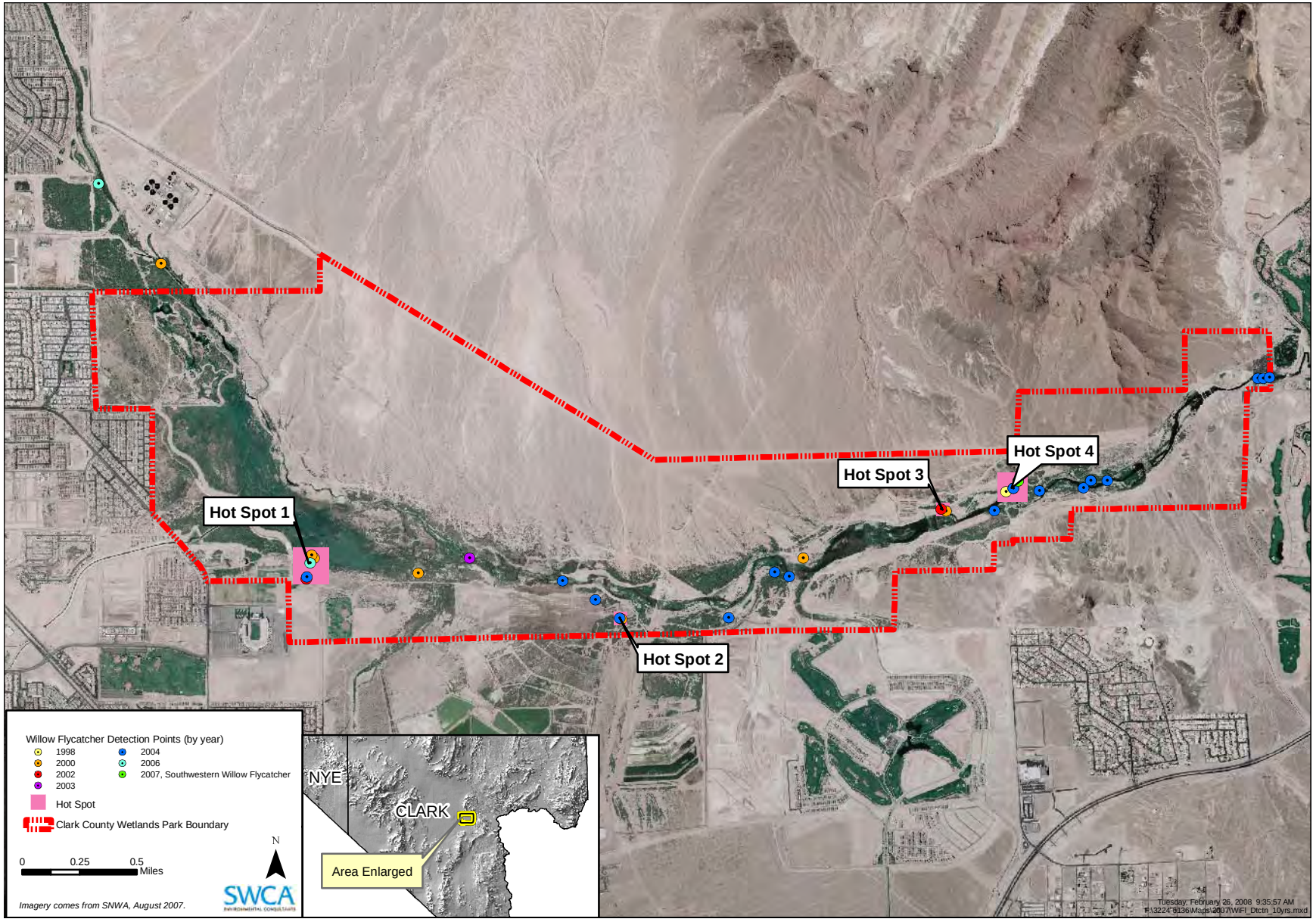

Figure 5. Locations of willow flycatcher detections, 1998–2007.

Hot Spot 3 – Two migrating willow flycatchers have been detected in this area; one in 2000 and the other in 2002. Unlike Hot Spot 1 and 2, Hot Spot 3 is associated with the main channel of the Wash. There is a large thick stand of tamarisk in this area.

Hot Spot 4 – Three migrating willow flycatchers have been detected in this area; one each in 1998, 2004, and 2007. Like Hot Spot 3, this area is associated with the main channel and a large, thick stand of tamarisk.

4.2.3.5 10-YEAR WILLOW FLYCATCHER SURVEY REVIEW DISCUSSION

The 10-year data set does give insight into the use of the Wash by migrating willow flycatchers. The data indicate that the majority of the migrating willow flycatchers are using the Wash as a stopover as they pass through the area in May and early June. This timing of use correlates with the first two survey periods. The June 26, 2007 detection of a willow flycatcher was the first ever made in the third survey period, and thus the first that could be called a southwestern willow flycatcher in 10 years of surveys. Although the individual was not detected again in the subsequent surveys, it can still be considered a resident per the survey protocol (Sogge et al. 1997), which states that all migrants should have moved through the area by June 22.

Areas of the Wash termed "hot spots" appear to be more favorable to migrating willow flycatchers. Two of these areas are not on the main channel of the Wash but are associated with different water sources that eventually flow into the main channel of the Wash. The other hotspots were located in large patches of dense tamarisk associated with the main channel.

4.3 WESTERN YELLOW-BILLED CUCKOO

No migrant or resident western yellow-billed cuckoos were detected during the 2007 southwestern willow flycatcher surveys. Information on the status of the western yellow-billed cuckoo along the Wash prior to 1998 is lacking. In 1998, a western yellow-billed cuckoo was detected within what is now the Nature Preserve area (SWCA 1998). The 2000 and 2001 surveys (McKernan and Braden 2001, 2002) were the first systematic surveys for this species within Park boundaries. No migrant or resident western yellow-billed cuckoos were detected during either of these surveys. SWCA continued the systematic surveys in 2002, 2003, and 2004, but no migrant or resident western yellow-billed cuckoos were detected in these years either (SWCA 2002, 2003, 2004).

Potentially suitable cuckoo habitat has continued to improve since the 2004 season. Some of the cottonwoods established between Pabco Road Weir and the Historic Lateral Weir have grown to sizes that may be sufficient to support cuckoos. Beyond this particular area, however, potentially suitable western yellow-billed cuckoo habitat along the Wash still appears to be of marginal quality at best. Although the cuckoo is known to use tamarisk in Arizona and New Mexico (Howe 1986; Corman and Magill 2000), the patch size and stature of the tamarisk presently in the Park appear suboptimal. In addition, some of the best potential western yellow-billed cuckoo habitat, located in the southeast portion of the Wash, was destroyed by wildfire between the 2001 and 2002 surveys, and has not yet regenerated. The Park has good potential for developing suitable cuckoo habitat in the future, provided that revegetation efforts for cottonwood and willow continue to be successful.

4.4 DISCUSSION

The detection of a Yuma clapper rail in the 2005 and 2006 survey seasons suggests that if colonization by Yuma clapper rails has not taken place already, it has the potential to occur in the near future. The amount of Yuma clapper rail habitat along the Wash decreased between the breeding seasons of 2006 and 2007 as a result of the loss of habitat along the C-1 Channel; however, the groundwork was laid to potentially increase the amount of Yuma clapper rail habitat along the Wash in the near future. The recently installed erosion control structures have created and will continue to create microhabitats favorable to Yuma clapper rails, possibly providing impetus for this species to colonize the area. Also, as continued weir construction occurs, channelization of wetland habitats should decrease. This, along with active wetland revegetation efforts, should continue to increase the quality and extent of potential Yuma clapper rail habitat in the Wash.

June 26 is the latest date that a willow flycatcher has been detected in the Wash, and it is the only time that a willow flycatcher has been detected during the third survey window. The survey protocol states that a willow flycatcher detected in the third survey period can be called a resident southwestern willow flycatcher, as all migrants should have arrived on their breeding grounds by that time (Sogge et al. 1997). Because the bird was detected only once during the survey season, however, it is not likely that it was actually nesting in the Wash. However, the area in which the bird was detected does offer potentially suitable nesting habitat. The site of the actual detection has relatively patchy cover, but there are also dense stands of tamarisk more than an acre in size with minor Goodding willow located on the point bar. Additionally, there is intermittent saturated soil and standing water at the detection site and in the adjacent stands, an important feature of southwestern willow flycatcher nest sites. As a result of the late season detection and the potentially suitable nature of the habitat, special attention should be taken in surveying this area in 2008.

In 10 consecutive years of intensive, systematic surveys for southwestern willow flycatchers along the Wash, no nesting southwestern willow flycatchers have been detected, indicating an extremely low probability that the species is a regular breeding resident. However, there are four compelling reasons to suggest that colonization of the Wash by southwestern willow flycatchers may occur in the near future.

First, the 1998, 2000, 2002, 2003, 2004, 2006, and 2007 surveys detected willow flycatchers in the study area. Although these detections could represent part of a normal willow flycatcher migration pattern, it may be that willow flycatchers are adjusting their migratory route to take advantage of the riparian habitat in the Wash. This would increase the possibility of the Wash being colonized by a migrant, wandering, or dispersing pair of southwestern willow flycatchers. The 2007 detection of the first individual that could be called a resident southwestern willow flycatcher is particularly significant, further indicating that the Wash is possibly being considered for nesting.

Second, the erosion control structures that are presently being installed will make the habitat more favorable to southwestern willow flycatchers, possibly providing further impetus for this species to stay in the area and nest.

Third, successful riparian revegetation projects are occurring along the Wash.

Fourth, there are three known active southwestern willow flycatcher nesting areas in close proximity to the Wash: Mesquite, Nevada, approximately 81 km (50 miles) northeast of Las Vegas; Pahranagat, Nevada, approximately 122 km (75 miles) north-northeast of Las Vegas; and Mormon Mesa on the Virgin River, approximately 97 km (60 miles) east of Las Vegas. In the summer of 2007, there were 27 total southwestern willow flycatchers and 14 active nests in Mesquite. There were 29 total southwestern willow flycatchers and 12 active nests in Pahranagat, and 30 southwestern willow flycatchers and 11 active nests in Mormon Mesa. Individuals from these populations could potentially colonize the Wash.

The western yellow-billed cuckoo does not seem likely to colonize the Wash in the near future. Although there was a single western yellow-billed cuckoo detection in 1998 during the southwestern willow flycatcher surveys, existing habitat is currently sparse and small in stature compared to optimal cuckoo nesting habitat. Much of the Wash's best potential cuckoo habitat was destroyed by wildfire in 2002. However, enhancements being made at the Wash will eventually result in long-term cuckoo habitat improvements, as native cottonwoods and willows become established and mature. Thus, the likelihood that western yellow-billed cuckoos will colonize the area will increase over time but currently the habitat for such colonization does not exist. SWCA recommends that cuckoo surveys resume in three to five years, after cottonwood- and Goodding willow–dominated riparian habitats have had a chance to fill in.

LITERATURE CITED

Alcorn, J. R. 1988. *The Birds of Nevada*. Fallon, Nevada: Fairview West Publishing.

Anderson, B. W., and R. D. Ohmart. 1985. Habitat use by clapper rails in the lower Colorado River valley. *Condor* 87:116–126.

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

Braden, G. T., and R. L. McKernan. 1998. Observations on nest cycles, vocalization rates, the probability of detection, and survey protocols for the southwestern willow flycatcher (*Empidonax traillii extimus*). Final Report to the U.S. Bureau of Reclamation, Lower Colorado River Office, Boulder City, Nevada.

Brown, B. T. 1994. Rates of brood-parasitism by brown-headed cowbirds on riparian passerines in Arizona. *Journal of Field Ornithology* 65:160–168.

Bureau of Reclamation. 1988. Plant-soil-water relationships in Las Vegas Wash. Special Report, Division of Planning, Environmental and Reports Branch, Bureau of Reclamation, Lower Colorado Region, Boulder City, Nevada, 44.

Conway, C. J., W. R. Eddleman, S. H. Anderson, and L. R. Hanebury. 1993. Seasonal changes in Yuma clapper rail vocalization rate and habitat use. *Journal of Wildlife Management* 57:282–290.

Corman, T. E., and R. T. Magill. 2000. Western yellow-billed cuckoo in Arizona: 1998 and 1999 survey report. Technical Report 150. Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix.

Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. Pacific Coast Avifauna No. 27, Cooper Ornithological Club. Berkeley, California, 608.

Harlow, D. L. 2000. Yuma Clapper Rail Survey Protocol. Unpublished memo from the U.S. Fish and Wildlife Service. Phoenix, Arizona.

Howe, W. H. 1986. Status of the yellow-billed cuckoo (*Coccyzus americanus*) in New Mexico. Contract No. 516.6-75-09. Unpublished Report to the New Mexico Department of Game and Fish, Santa Fe.

Martin, T. E., and G. R. Geupel. 1993. Protocols for nesting monitoring plots: Locating nests, monitoring success, and measuring vegetation. *Journal of Field Ornithology* 64:507–519.

McKernan, R. L., and G. T. Braden. 2001. The status of Yuma clapper rail and yellow-billed cuckoo along portions of Virgin River, Muddy River, and Las Vegas Wash, Southern Nevada, 2000. Final Report to the U.S. Fish and Wildlife Service and Southern Nevada Water Authority, Las Vegas, prepared by San Bernardino County Museum, Redlands, California.

McKernan, R. L., and G. T. Braden. 2002. The status of Yuma clapper rail and yellow-billed cuckoo along portions of Virgin River, Muddy River, and Las Vegas Wash, Southern

Nevada, 2001. Final Report to the U.S. Fish and Wildlife Service and Southern Nevada Water Authority, Las Vegas, prepared by San Bernardino County Museum, Redlands, California.

McKinstry, R. 1995. Revised instructions for Yuma clapper rail surveys. Unpublished Memorandum, U.S. Fish and Wildlife Service, Phoenix, Arizona, 3.

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

Ryser, F. A., Jr. 1985. Birds of the Great Basin: A natural history. University of Nevada Press, Reno, 604.

Sogge, M. K., R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A southwestern willow flycatcher natural history summary and survey protocol. Technical Report NPS/NAUCPRS/NRTR-97/12, Colorado Plateau Research Station, Northern Arizona University, Flagstaff.

SWCA. 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. 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.

Todd, R. L. 1986. A saltwater marsh hen in Arizona: A history of the Yuma clapper rail (*Rallus longirostris yumanensis*). Completion Report, Federal Aid Project W-95-R, Arizona Game and Fish Department, Phoenix.

U.S. Fish and Wildlife Service (USFWS). 1995. Final rule determining endangered status for the southwestern willow flycatcher. *Federal Register* 60(38): 10694-10714, Monday, February 27, 1995.

APPENDIX A: ANNOTATED CHECKLIST OF BIRD SPECIES DETECTED ALONG LAS VEGAS WASH, APRIL THROUGH JULY 2007

This annotated checklist identifies the bird species that were detected along the Las Vegas Wash in Clark County Wetlands Park, Nevada, during surveys for Yuma clapper rails and southwestern willow flycatchers from mid March through early July 2007. Presumed status is from Ryser (1985), Alcorn (1988), and/or our field observations. Relative abundance categories are modified after Phillips et al. (1964); abundance of a given species is based on our field observations. Common names and phylogenetic order conform to ornithological standards established by the American Ornithologists' Union (AOU 1998) and subsequent revisions.

Common Name	Scientific Name	Presumed Status	Relative Abundance
Canada goose	*Branta canadensis*	M	R
Wood duck	*Aix sponsa*	R	U
American wigeon	*Anas americana*	R	U
Mallard	*Anas platyrhynchos*	R	FC
Cinnamon teal	*Anas cyanoptera*	R	R
Common merganser	*Mergus merganser*	M	R
Gambel's quail	*Callipepla gambelii*	R	C
Pied-billed grebe	*Podilymbus podiceps*	R	R
Eared grebe	*Podiceps nigricollis*	R	R
Western grebe	*Aechmophorus occidentalis*	R	R
Double-crested cormorant	*Phalacrocorax auritus*	R	U
Great blue heron	*Ardea herodias*	R	FC
Great egret	*Ardea alba*	R	U
Snowy egret	*Egretta thula*	M	FC
Green heron	*Butorides virescens*	R	FC
Black-crowned night heron	*Nycticorax nycticorax*	R	FC
White-faced ibis	*Plegadis chihi*	M	U
Turkey vulture	*Cathartes aura*	R	R
Osprey	*Pandion haliaetus*	M	R
Northern harrier	*Circus cyaneus*	R	R
Cooper's hawk	*Accipiter cooperii*	R	R
American kestrel	*Falco sparverius*	R	R
Peregrine falcon	*Falco peregrinus*	R	R
Virginia rail	*Rallus limicola*	R	R
Common moorhen	*Gallinula chloropus*	R	U
American coot	*Fulica americana*	R	C

Common Name	Scientific Name	Presumed Status	Relative Abundance
Killdeer	*Charadrius vociferus*	R	FC
American avocet	*Recurvirostra americana*	R	R
Spotted sandpiper	*Actitis macularia*	R	FC
Rock pigeon	*Columba livia*	R	R
White-winged dove	*Zenaida asiatica*	R	C
Mourning dove	*Zenaida macroura*	R	A
Greater roadrunner	*Geococcyx californianus*	R	U
Great horned owl	*Bubo virginianus*	R	R
Lesser nighthawk	*Chordeiles acutipennis*	R	FC
White-throated swift	*Aeronautes saxatalis*	R	FC
Black-chinned hummingbird	*Archilochus alexandri*	R	C
Broad-tailed hummingbird	*Selasphorus platycercus*	R	R
Belted kingfisher	*Megaceryle alcyon*	R	U
Western wood-pewee	*Contopus sordidulus*	R	R
Willow flycatcher	*Empidonax traillii*	M	R
Black phoebe	*Sayornis nigricans*	R	FC
Say's phoebe	*Sayornis saya*	R	U
Ash-throated flycatcher	*Myiarchus cinerascens*	R	FC
Western kingbird	*Tyrannus verticalis*	R	U
Loggerhead shrike	*Lanius ludovicianus*	R	R
Bell's vireo	*Vireo bellii*	R	R
Yellow-throated vireo	*Vireo flavifrons*	A	N/A
Warbling vireo	*Vireo gilvus*	M	R
Common raven	*Corvus corax*	R	U
Violet-green swallow	*Tachycineta thalassina*	R	FC
Northern rough-winged swallow	*Stelgidopteryx serripennis*	R	A
Cliff swallow	*Petrochelidon pyrrhonota*	R	R
Verdin	*Auriparus flaviceps*	R	C
Rock wren	*Salpinctes obsoletus*	R	R
Bewick's wren	*Thryomanes bewickii*	R	A
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
Bendire's thrasher	*Toxostoma bendirei*	R	U
American pipit	*Anthus rubescens*	M	FC

Common Name	Scientific Name	Presumed Status	Relative Abundance
Lucy's warbler	*Vermivora luciae*	R	C
Yellow warbler	*Dendroica petechia*	R	FC
Common yellowthroat	*Geothlypis trichas*	R	C
Wilson's warbler	*Wilsonia pulsilla*	M	U
Yellow-breasted chat	*Icteria virens*	R	C
Western tanager	*Piranga ludoviciana*	M	U
Abert's towhee	*Pipilo aberti*	R	C
Song sparrow	*Melospiza melodia*	R	C
White-crowned sparrow	*Zonotrichia leucophrys*	M	R
Rose-breasted grosbeak	*Pheucticus leudovicianus*	R	U
Blue grosbeak	Guiraca caerulea	R	C
Bobolink	*Dolichonyx oryzivorus*	M	R
Lazuli bunting	*Passerina amoena*	R	U
Indigo bunting	*Passerina cyanea*	R	U
Bobolink	*Dolichonyx oryzivorus*	M	R
Red-winged blackbird	*Agelaius phoeniceus*	R	C
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	R	FC
Great-tailed grackle	*Quiscalus mexicanus*	R	C
Bullock's oriole	*Icterus bullockii*	M	R
Brown-headed cowbird	*Molothrus ater*	R	A
House finch	*Carpodacus mexicanus*	R	U

Presumed Status

Resident (R)	Species apparently inhabits the area throughout the spring and summer nesting season, probably nesting.
Migrant (M)	Species apparently passes through the area during migration, probably not nesting.
Unknown (U)	Presumed status is in question due to insufficient information for evaluation of status.
Accidental (A)	Species is far (usually >200 miles) from its normal nesting, migration, or wintering range, and is not expected to be seen again.

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.
N/A	Not applicable.

APPENDIX B: SWCA PERSONNEL CONDUCTING THE 2007 STUDY

Project Scientist .....R. Spencer Martin, M.E.M.
Project Manager/Field Coordinator .....Thomas Sharp, M.S.
Field Ornithologist..... Robert Wilson, M.S.
Field Ornithologist..... Amanda Christensen, B.S.
Field Ornithologist.....Audrey McCulley, B.S.
Field Ornithologist.....Justin Streit, B.S.