



**SURVEY FOR
YUMA CLAPPER RAILS,
YELLOW-BILLED CUCKOOS, AND
SOUTHWESTERN WILLOW FLYCATCHERS
ALONG LAS VEGAS WASH,
CLARK COUNTY, NEVADA**

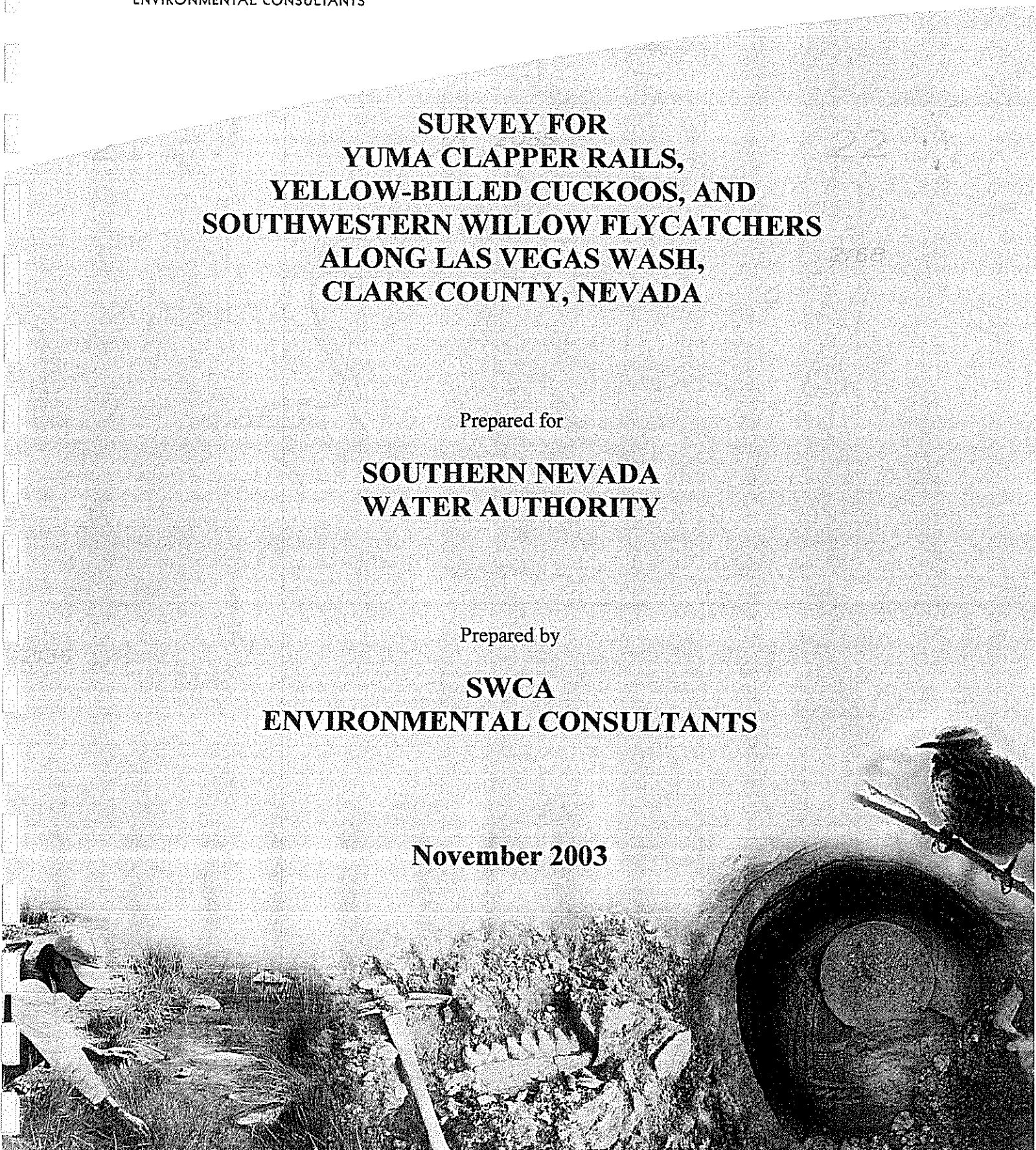
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**SOUTHERN NEVADA
WATER AUTHORITY**

Prepared by

**SWCA
ENVIRONMENTAL CONSULTANTS**

November 2003



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EXECUTIVE SUMMARY

Systematic surveys for the presence of Yuma clapper rails (*Rallus longirostris yumanensis*), yellow-billed cuckoos (*Coccyzus americanus occidentalis*) and southwestern willow flycatchers (*Empidonax traillii extimus*) were conducted along Las Vegas Wash in Clark County, Nevada, between March and August 2003. The survey techniques used playback recordings of each species in accordance with its standardized survey protocol. No clapper rails or cuckoos were detected, however, two migrant willow flycatchers were observed during the surveys.

Previous survey reports (SWCA 1999, 2000, 2001, 2002) have identified losses of potentially suitable flycatcher habitat due to lateral erosion within the active floodplain of Las Vegas Wash. Habitat losses have continued into 2003 with impacts primarily associated with construction in the area. However, the ongoing construction of bank stabilization structures and erosion control weirs, and the continued development of the Nature Center, while causing additional, incremental losses of tamarisk, are likely to lead to long-term improvements in potentially suitable clapper rail, cuckoo and flycatcher habitat. Indeed, for rails, these improvements have already led to habitat improvements as evidenced by the increasing acreages of cattail marsh habitat. Such improvements are most pronounced in areas in which the construction of erosion control structures has resulted in the creation of emergent marsh. For cuckoos and flycatchers, habitat improvements are likely to be most pronounced in areas that have been revegetated with native cottonwoods and willows.

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1.0 INTRODUCTION

This study was undertaken in order to further examine the breeding status of the federally endangered Yuma clapper rail (*Rallus longirostris yumanensis*), the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*; a candidate for federal listing), and the federally endangered 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), it was recognized that potentially suitable Yuma clapper rail, western yellow-billed cuckoo and southwestern willow flycatcher habitat existed along the Wash and could be affected by the installation of erosion control structures and 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 were conducted in 1999 (SWCA 1999), 2000 (SWCA 2000), 2001 (SWCA 2001) and 2002 (SWCA 2002). Systematic surveys for the Yuma clapper rail and yellow-billed cuckoo were initiated in 2000 and undertaken by San Bernardino County Museum. These surveys were repeated in 2001 (McKernan and Braden 2001, 2002a) and 2002 (SWCA 2002). The results of the 2003 survey effort for all three species are presented in this report.

The purpose of this report is twofold:

- 1) Document the results of the 2003 surveys with respect to the distribution and abundance of Yuma clapper rails, yellow-billed cuckoos and southwestern willow flycatchers in Las Vegas Wash, and
- 2) Qualitatively estimate the utility of existing and future potential habitat to nesting Yuma clapper rails, yellow-billed cuckoos and southwestern willow flycatchers.

2.0 STUDY AREA

The general study area for this survey consisted of an approximately 405-hectare (1000 acre) portion of the Wash, dominated by tamarisk (*Tamarix* spp.; Bureau of Reclamation 1988) and contained within the boundaries of the Park (Figure 1). This area is spread along an 11-kilometer (7 mile) reach of the Wash and includes portions of the City of Henderson, as well as private, county, Bureau of Land Management, and Bureau of Reclamation lands. The study area was defined in consultation with Clark County, the Bureau of Reclamation, the Southern Nevada Water Authority, and the U.S. Fish and Wildlife Service. It includes areas that could be affected by future construction of, and have been affected by past construction of, erosion and grade control structures and other activities associated with the development of the Park.

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 centimeters (15.8 inches) in mean canopy height. The presence of ponds and/or flowing water is also critical for the presence of Yuma clapper rails. "Large unbroken stands of vegetation in wet situations without emergent soils do not seem to be optimum habitat" (Todd 1986). 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 meters (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 1986:43).

Yuma clapper rails primarily occupy marshes dominated by cattail (*Typha* spp.), bulrush (*Scirpus* spp.), and/or reed (*Phragmites australis*) in all seasons, although they reach their greatest densities in cattail-bulrush marshes of moderate foliage density (Anderson and Ohmart 1985). Therefore these habitats were targeted during both the 2002 and 2003 clapper rail surveys in the Wash. These areas include the large *Phragmites* marsh downstream of the old D-14 Dike (Clark County Wetlands Park Nature Center), the slough area in which SWCA detected a clapper rail in 1998, and other isolated patches of emergent marsh habitat occurring in the active floodplain of the Wash downstream of Pabco Road.

The presence/absence of Yuma clapper rails was determined by conducting three censuses during the early breeding season (March 15 to May 15) from 30 minutes before sunrise to no later than 09:00 hours (McKinstry 1995; Harlow 2000). The actual dates of the surveys were April 3, April 24, and May 14. The census technique employed taped calls played along established transect routes by observers on foot.

3.2 Yellow-billed Cuckoo

Western yellow-billed cuckoos are obligate riparian nesters, meaning they are restricted to more mesic habitat along rivers, streams, and other wetlands (Johnson et al. 1987). In California, nesting generally occurs in cottonwood-willow habitats below 1400 meters (4350 feet) in elevation (Laymon 1998), although apparently breeding pairs have been located as high as 1782 meters (5850 feet; Corman and Magill 2000). Other habitats used include mixed native associations (cottonwood, willow, ash, mesquite, sycamore, walnut), mixed native and introduced associations (any of the previous species with less than 75% tamarisk), mesquite bosque, associations with more than 75% tamarisk, and even fruit orchards adjacent to rivers (i.e., artificial riparian habitat) (Laymon and Halterman 1989; Corman and Magill 2000). Cottonwood-willow habitats appear to be "...greatly preferred..." in California (Laymon and Halterman 1989), and other habitats such as mesquite may be occupied only after cottonwood-willow habitats are fully occupied. However, no empirical data exists to demonstrate preference for greater productivity in any particular habitat.

Patch size is also an important landscape feature associated with cuckoo nesting habitat. A significant trend correlates increased habitat occupancy with increased patch size: specifically, sites exhibiting both suitable habitat and a patch size of greater than 80 hectares (200 acres) were occupied 100% of the time in California away from the Colorado River. Nevertheless, sites as small as 4 hectares (10 acres) have been observed to be occupied on the lower Colorado River (Laymon and Halterman 1989).

Tamarisk has been identified as unsuitable nesting habitat for yellow-billed cuckoos in California and only marginally suitable along the Colorado River; yet, it is widely used in Arizona and New Mexico (Howe 1986, Corman and Magill 2000). For instance, Howe (1986) has attributed a substantial increase in the abundance and distribution of cuckoos along the Pecos River to the establishment of tamarisk. Reasons for different geographic use patterns of tamarisk are unclear but may be related to elevation, ambient temperature, or other environmental factors.

Canopy cover near a given nest also appears to be an important feature of habitat quality; canopy cover was significantly less and its standard deviation increased with increasing distance from the nest (Laymon 1998). The distance to water from cuckoo nests averaged 310 meters (1015 feet) along the South Fork Kern River in California with an overall range of 0 to 1500 meters (0 to 4920 feet). Distance to water averaged 41 meters (135 feet) along the Bill Williams River in Arizona with a range of 0 to 175 meters (0 to 575 feet) (Laymon 1998). Relatively high humidity near the nest has been suggested as an important habitat characteristic (Hamilton and Hamilton 1965; Laymon 1998), although no empirical data demonstrates that it is a requirement. In California, cuckoos appear to prefer dense cottonwood/willow stands (Rosenberg et al. 1991; Halterman 1991). In the desert Southwest, mesquite and tamarisk may be used as well (Hunter et al. 1987). Rosenberg et al. (1991) suggest that perhaps the extreme southwestern mid-summer temperatures, which could kill unprotected eggs, may influence the selection of nest sites, with more heavily shaded, understory habitats and woody riparian habitats containing standing water being preferred in this region.

A survey and monitoring protocol for the cuckoo in California was developed by Laymon (1998) and has been adopted by the Arizona Game and Fish Department (Corman and Magill 2000). This protocol was also accepted for use during a statewide survey of cuckoos in California (Halterman et al. 2000). The established protocol requires the use of playback recordings of cuckoo contact calls (*kowlp*) to elicit responses. Surveys occur between dawn and noon and never at temperatures above 100 degrees Fahrenheit. According to the protocol, surveys should not be conducted on rainy days or at times when winds exceed 11.3 kilometers/hours (7 miles/hour). Calling stations are located no more than 200 meters (656 feet) apart, and a high-quality, dual-speaker tape recorder capable of clearly projecting crisp calls out to a distance of at least 100 meters (328 feet) is used. The recorded call is played about 10 times at each calling station, with 30-60 second pauses between calls. Three surveys of the study area were conducted between June 15 and August 10 with surveys separated by 10-14 days. In the 2003 study, surveys along the Wash were carried out July 17, July 29 and August 8.

3.3 Southwestern Willow Flycatcher

Within the general study area, willow flycatcher survey efforts focused on areas containing tamarisk and other species such as Fremont cottonwood (*Populus fremontii*) and Goodding's

willow (*Salix gooddingii*), which have the proper structure to be potentially suitable for use by willow flycatchers. This was defined as dense woody riparian vegetation greater than three meters (9.8 feet) in height with greater than 75 percent canopy cover. Areas dominated by desert scrub vegetation and other upland habitats known to be unsuitable for willow flycatchers were not surveyed as part of this effort.

Surveys for southwestern willow flycatchers were conducted between May and July 2002 using a tape-recorded playback of 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 also used. The year 2003 was the third time that the five-visit protocol was required. 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 within the June 22-July 17 period. Surveys were conducted on the following dates: May 15-16, June 3-4, June 24-25, July 9-10 and July 15-16.

Surveys were initiated approximately 30 minutes before sunrise and were terminated by 10:00 hours (Pacific Daylight Time). Observers played tape recordings of flycatcher song at approximately 20-30 meter (65 - 98 feet) intervals in potential flycatcher nesting habitat. Excluded from the surveys were extensive areas of dense cattail (*Typha* spp.), common reed, quailbush (*Atriplex lentiformis*), stands of recently burned tamarisk, and large areas of tamarisk that exhibited low stature and less than 75 percent canopy cover. Survey routes (Figure 1) 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 followed the water's edge where possible; this was not always possible in the portion of the Park downstream of Pabco Road, where the steep, eroded, and high (ca. 10-15 meters, 30-50 feet) 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 taped flycatcher song and call notes to the habitat below. It should be noted that ongoing construction activities, while removing potentially suitable habitat in some locations, have also provided access to the active floodplain and improved our ability to survey these areas. In other areas, vegetation clearing has also allowed us to survey areas that had formerly been inaccessible due to impenetrable stands of tamarisk and/or quailbush.

4.0 RESULTS AND DISCUSSION

4.1 Yuma Clapper Rail

4.1.1 Results

No migrant or resident Yuma clapper rails were detected during the 2003 surveys. Information on the status of Yuma clapper rails along the Wash prior to 1998 is lacking. The 1998 willow flycatcher surveys resulted in Yuma clapper rail detections on May 28 and June 18, just upstream of Pabco Road (SWCA 1998). No clapper rails have been detected within the boundaries of the Park since this time, despite the systematic surveys for this species that were carried out in 2000 and 2001 by San Bernardino County Museum (McKernan and Braden 2001, 2002a) and those carried out by SWCA in 2002 (SWCA 2002).

Although no clapper rails were detected, it must be stated that most rails do not respond to taped calls, and even at the peak of the early nesting season only 40% of *Rallus longirostris yumanensis* individuals may respond (Conway et al. 1993). They exhibit a relatively wide variety of calls, the most typical year-round call being the "clatter" which apparently serves in communication and territorial defense (Todd 1986). They vocalize during the nesting, migration, and wintering seasons, during the day and at night; *Rallus longirostris yumanensis* may call all night long during the early breeding season (Todd 1986:70, 107).

4.1.2 Observations on Suitability of Existing and Potential Future Habitat

Our qualitative observations of habitat conditions in spring 2003 indicate that the construction of erosion control structures has continued to increase both the quantity and quality of potential Yuma clapper rail habitat within the boundaries of the Park. With continued construction of erosion control structures and growth of emergent marsh vegetation, we anticipate that the potential Yuma clapper rail habitat will continue to increase in both extent and quality, depending on the frequency and extent of large runoff events. As in 2002 there are only seven sites that warranted intensive surveys (see Figure 2), and most of these sites are likely marginal for nesting Yuma clapper rails due to the small patch sizes (less than 2 hectares, 5 acres). However, additional sites may warrant attention in the near future. The site names given below have been developed solely for Yuma clapper rail surveys and associated reports. They are not official place names and serve only as convenient references in discussing these survey areas.

- 1) Big Marsh - This is the best habitat in terms of both quality and quantity within the Park. It is dominated by cattail, bulrush, and reed. This site has become more channelized since 2002, perhaps slightly reducing the habitat quality for clapper rails. This site is still very active with wading and water birds.
- 2) Barrel - This site is just upstream of Big Marsh. It has small patches of *Phragmites* but does not compare to Big Marsh in terms of quality or quantity. This site has not increased in quality since 2002.
- 3) Pabco Road - The Pabco Road erosion control structure has created the potential for the development of future Yuma clapper rail habitat. The habitat here, which is made up of cattail, bulrush and reed, is patchy and small in stature but has improved since 2002.
- 4) Old Slough - This is the site where two clapper rail detections were made in 1998. This site is not very promising, and has not changed since 2002. It does not have the emergent vegetation with which the clapper rail is associated, and it is surrounded with tamarisk.
- 5) Northwest Observation - This site, at the far north end of the Nature Center, has improved since the 2002 field season and appears to have the potential to continue this trend. Cattail and common reed have become established, and the site is more active with wading birds than in previous years.
- 6) Nature Center Ponds - This site has filled in with cattail and reeds and the potential for providing clapper rail habitat has improved since 2002. However, due to its overall design, it will probably always remain somewhat patchy and fragmented and therefore has limited potential.
- 7) Sora South - The developing vegetation has created potential clapper rail habitat in this area that has slightly improved since the 2002 field season. For the second year in a row,

a sora was observed while doing intensive surveys in this area. This site has the potential to become suitable clapper rail habitat in the future.

4.2 Yellow-billed Cuckoo

4.2.1 Results

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

4.2.2 Observations on Suitability of Existing and Potential Future Habitat

The present and potential yellow-billed cuckoo habitat appears marginal 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 within the Park are both suboptimal. In addition, some of the best potential yellow-billed cuckoo habitat was destroyed by wildfire before the cuckoo surveys began. The 2003 field season showed no real improvement to these habitats. Additionally, more tamarisk woodland, which was not good habitat to begin with, was destroyed during construction of erosion control weirs. The Park has good potential for developing suitable cuckoo habitat in the future, provided that revegetation efforts for cottonwood and willow are successful.

4.3 Southwestern Willow Flycatcher

4.3.1 Results

Two flycatchers were detected calling (*whit*) and singing (*fitz-bew*) in response to a playback recording at 0837 and again, after the survey was completed, at 1130 on June 3. The two individuals were also visually confirmed. The individuals were located roughly 2 kilometers (1.25 miles) upstream of Pabco Road erosion control structure on the North side of the wash, as shown on Figure 1. The flycatchers responded immediately to the first playback recording of *fitz-bew* song by flying out of a dense, tall (6-7 meter, 20-22 feet) tamarisk patch toward the tape player and observers, after which they returned to the vegetation and softly uttered *whit* calls for several minutes. The individuals were seen several more times before at least one of them gave several faint *fitz-bew* songs, confirming their identity. We returned to the site of the detection just before 1130 hours on the same morning and replayed the tape, when the flycatchers were again seen and then heard to utter both *whit* calls and *fitz-bew* songs. Surveys on subsequent dates failed to detect any flycatchers at or near this locale. Therefore, these two individuals were assumed to be migrants.

Information on the occurrence of southwestern willow flycatchers along the Wash prior to 1998 is lacking (see Unitt 1987; Alcorn 1988). The 1998-2002 surveys (SWCA 1998, 1999, 2000, 2001, 2002) represent the first systematic surveys for this species within the boundaries of the

Park. In 1998, two willow flycatchers were detected during the first survey period at a point approximately 2.4 kilometers (1.5 miles) downstream of Pabco Road. It was later concluded that these individuals were migrants due to the fact that they were detected only in the first of the three surveys. In 1999 and 2001 no willow flycatchers were detected. 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 flycatcher detections were considered to be migrants. Two willow flycatchers were detected during the 2002 surveys. Both were later concluded to be migrants as one was discovered during the first survey and one during the second survey, but not during the last three surveys.

The detection of non-nesting flycatchers during the 1998, 2000, 2002 and 2003 surveys tends to suggest the occurrence of a migratory wave (or flight) for the species between mid-May and mid-June. A migratory wave occurs as the bulk of a migratory population or species (or in this case, probably subspecies) rises and recedes with the peak of their passage (Pettingill 1970:274). We speculate that the riparian areas of the Wash and the Park are viewed as useful stopover habitat by migrant flycatchers, which use it for 1-2 days or more (generalized stopover time for many passerines; Lincoln 1979) before moving northward. A migratory wave's annual occurrence could be expected to change by a few days to a week or more each year, depending on weather patterns and other environmental factors. Therefore, it is possible that migrating willow flycatchers have stopped over in the riparian areas of the Wash and the Park in 1999 and 2001 at times that fell in between our survey periods due to random sampling error. The Park may or may not be an important annual stopover point for migrant flycatchers, as this year's data did not shed any light on this issue.

4.3.2 Observations on Suitability of Existing and Potential Future Habitat

Our qualitative observations of habitat conditions in spring of 2003 indicate that the construction of erosion control weirs in the interval between the 2002 and 2003 survey periods has substantially reduced the amount of potentially suitable flycatcher nesting habitat. Most of the construction has occurred downstream in the lower one-third of the wash. Additionally, 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, have not regenerated to the point of being suitable habitat.

Lateral erosion, although no doubt still occurring within the active floodplain, was not observed to have had a major effect on flycatcher habitat in the last year. While lateral erosion will, in the short term, likely continue to result in the loss of existing riparian habitat, the associated widening of the floodplain will tend to create more braided channels, abandoned meander loops, and isolated floodplain depressions over time. The creation of these habitat elements should eventually increase the extent of moist-soil and standing shallow-water habitats that are useful to flycatchers. It should be noted that development of this habitat tends to occur at the expense of marginal flycatcher habitat associated with relict floodplains and old alluvial terraces located high above the active floodplain.

While lateral erosion of the floodplain can help to create substrate conditions favorable to the development of flycatcher habitat, this process is tempered by catastrophic flooding and vertical

erosion (i.e., headcutting). To the extent that the planned installation of erosion control structures can dissipate floodwater energy (preventing headcutting and attenuating lateral scour), future conditions should be favorable for the natural development of suitable flycatcher habitat along this reach of the Wash. Erosion control structures recently installed at and above Pabco Road, where we estimate little potentially suitable habitat currently exists, could likewise increase the extent of these habitats and attract nesting southwestern willow flycatchers in the future.

Another aspect of 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, which has been shown to significantly reduce nesting success in flycatchers (Brown 1994; Sogge et al. 1997; USFWS 1995). All six flycatcher surveys have shown cowbirds to be abundant (more than 50 seen on a daily basis, Appendix A), and one of the most common if not the most common bird found within the study area. In addition, the somewhat fragmented habitat, which presently is becoming more fragmented, makes flycatcher nests more susceptible to this type of parasitism than they would be in habitats with more contiguous canopy coverage.

4.4 Wading and Marshland Birds

Our qualitative observations of habitat conditions in spring 2003 indicate that the construction of erosion control structures has continued to increase both the quantity and quality of emergent marsh vegetation. This change has had a positive effect on the numbers of wading and marshland birds in the Wash, including red-winged and yellow-headed blackbirds, great blue herons, green herons, great egrets, snowy egrets as well as ducks and grebes. Our qualitative observations have also suggested that three nesting species in particular, mallards, coots and moorhens, have become much more abundant than when we first began investigations in 1998.

4.5 Recommendations

Four consecutive years of intensive, systematic surveys for Yuma clapper rails and yellow-billed cuckoos along the Wash have not detected any clapper rails or cuckoos and therefore indicate an extremely low probability that either of these species is a regular breeding resident. However, there are two reasons to suggest that colonization of the Wash by Yuma clapper rails may occur in the near future. First, the two clapper rail detections in 1998, during intensive systematic surveys for southwestern willow flycatchers, demonstrated that the Wash has been inhabited or at least visited by clapper rails in the recent past. Second, the erosion control weirs that are presently being installed have created and will continue to create microhabitats more favorable to Yuma clapper rails, possibly providing further impetus for this species to colonize the area. SWCA recommends that SNWA continue conducting annual clapper rail surveys along the Wash. The purpose of the continued annual surveys would be to track when and where Yuma clapper rail colonization occurs and to help avoid or minimize impacts to this species if and when colonization does occur.

The yellow-billed cuckoo does not seem as likely to colonize the Wash in the near future. Although there was one detection of a yellow-billed cuckoo in 1998 during southwestern willow

flycatcher surveys, existing habitat is still relatively sparse and small in stature compared to optimal cuckoo nesting habitat. Much of the Wash's best potential cuckoo habitat was destroyed by fire in 2002. However, enhancements presently being made at the Wash will lead to long term improvements as native cottonwoods and willows become established. Thus, the likelihood that yellow-billed cuckoos will colonize the area will increase over time. SWCA recommends biannual surveys for cuckoos until such time as this species colonizes the Wash, with annual surveys recommended thereafter.

Six consecutive years of intensive, systematic surveys for southwestern willow flycatchers along the Wash have not detected nesting flycatchers and therefore indicate an extremely low probability that the species is a regular breeding resident. However, there are three compelling reasons to suggest that colonization of the Wash by southwestern willow flycatchers may occur in the near future. First, the 1998, 2000, 2002 and 2003 surveys detected willow flycatchers within the study area. Although these detections could be part of a normal willow flycatcher migration pattern, it could be that migrant flycatchers are adjusting their migratory route to take advantage of the creation of new riparian habitat in the Wash. This suggests increased probability of the Wash being colonized by a migrant, wandering or dispersing pair. Second, the erosion control weirs 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, there are three known southwestern willow flycatcher active nesting areas within close proximity of the Las Vegas Wash: Mesquite, Nevada, approximately 81 kilometers (50 miles) northeast of Las Vegas; Pahranaagat, Nevada, approximately 122 kilometers (75 miles) north northeast of Las Vegas; and Mormon Mesa on the Virgin River approximately 97 kilometers (60 miles) east of Las Vegas. In the summer of 2003, there were 37 total southwestern willow flycatchers and 19 active nests in Mesquite. There were 22 total southwestern willow flycatchers and 12 active nests in Pahranaagat and 20 southwestern willow flycatchers and 14 active nests in Mormon Mesa. These populations have the potential to act as a source from which flycatchers could colonize the Wash.

These three factors suggest a strong potential for southwestern willow flycatchers to become breeding residents of Las Vegas Wash in the future. Consequently, SWCA recommends that SNWA continue conducting annual flycatcher surveys along the Wash. The purpose of the continued annual surveys would be to track when and where willow flycatcher colonization occurs and to help minimize and avoid impacts to this species if and when colonization does occur.

LITERATURE CITED

- Alcorn, J.R. 1988. The birds of Nevada. Fairview West Publishing, Fallon, Nevada. 418 pp.
- American Ornithologists' Union. 1998. Check-list of North American birds. Seventh Edition. American Ornithologists' Union, Washington, D.C. 829 pp.
- Anderson, B.W., and R.D. Ohmart. 1985. Habitat use by clapper rails in the lower Colorado River valley. *Condor* 87:116-126.
- 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. 38 pp.
- 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 pp.
- Bureau of Reclamation. 1997. Draft Program Environmental Impact Statement for the Clark County Wetlands Park. U.S. Department of the Interior Bureau of Reclamation and Clark County Departments of Comprehensive Planning and Parks and Recreation. July 1997.
- 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, AZ. 49 pp.
- 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 pp.
- Halterman, M.D. 1991. Distribution and habitat use of the Yellow-billed Cuckoo (*Coccyzus americanus*) on the Sacramento River, California, 1987-1990. Unpublished Master's Thesis, California State University, Chico, CA.
- Halterman, M.D., S.A. Laymon, D.S. Gilmer, and G. Falxa. 2000. Status of the yellow-billed cuckoo in California - 2000. Interim Report, Biological Resources Division, U.S. Geological Survey, Dixon, CA. 20 pp. + figs., tables, and appendices.

- Hamilton, W.J., III, and M.E. Hamilton. 1965. Breeding characteristics of the yellow-billed cuckoo in Arizona. *Proceedings of the California Academy of Sciences* (4th series) 32:405-432.
- 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. Unpublished Report to the New Mexico Department of Game and Fish, Santa Fe. Contract No. 516.6-75-09. 31 pp.
- Hunter, W.C., R.D. Ohmart, and B.W. Anderson. 1987. Status of breeding riparian obligate birds in southwestern river systems. *Western Birds* 18:10-18.
- Johnson, R.R., L.T. Haight, and J.M. Simpson. 1987. Endangered habitats versus endangered species: A management challenge. *Western Birds* 18:89-96.
- Laymon, S.A. 1998. Yellow-billed Cuckoo: Partners in Flight bird Conservation Plan. Online search at www.prbo.org. 23 pp.
- Laymon, S.A., and M.D. Halterman. 1989. A proposed habitat management plan for Yellow-billed Cuckoos in California. Pp. 272-277 *In* Proceedings of the California riparian systems conference: Protection, management, and restoration for the 1990s. USDA Forest Service General Technical Report PSW-110, Pacific Southwest Forest and Range Experiment Station, Berkeley, CA. 544 pp.
- Lincoln, F.C. 1979. Migration of birds. Circular Number 16, USDI Fish and Wildlife Service, Washington, D.C. 119 pp.
- 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, Nevada, prepared by San Bernardino County Museum, Redlands, California.
- McKernan, R.L., and G.T. Braden. 2002a. 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, Nevada, prepared by San Bernardino County Museum, Redlands, California.

- McKernan, R.L., and G.T. Braden. 2002b. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the Lower Colorado River, year 6 -- 2001. Annual Report prepared by the Biological Science Division, San Bernardino County Museum, Redlands, CA. Submitted to the U.S. Bureau of Reclamation, Lower Colorado Region, Boulder City, NV; the U.S. Fish and Wildlife Service, Carlsbad Field Office, Carlsbad, CA; and the U.S. Fish and Wildlife Service, Reno Office, Reno, NV. 59 pp. incl. 4 appendices.
- McKinstry, R. 1995. Revised instructions for Yuma clapper rail surveys. Unpublished Memorandum, U.S. Fish and Wildlife Service, Phoenix, Arizona. 3 pp.
- Phillips, A.R., J. Marshall, and G. Monson. 1964. The birds of Arizona. University of Arizona Press, Tucson. 212 pp.
- Pettingill, O.S., Jr. 1970. Ornithology in laboratory and field. Fourth edition. Burgess Publishing Company, Minneapolis, Minnesota. 524 pp.
- Rosenberg, K.V., R.D. Ohmart, W.C. Hunter, and B.W. Anderson. 1991. Birds of the Lower Colorado River Valley. University of Arizona Press, Tucson, AZ. 416 pp.
- Ryser, F.A., Jr. 1985. Birds of the Great Basin: A natural history. University of Nevada Press, Reno. 604 pp.
- 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. 39 pp.
- SWCA, Inc., Environmental Consultants. 1997. Biological Assessment for the Clark County Wetlands Park.
- SWCA, Inc., Environmental Consultants. 1998. A survey for southwestern willow flycatchers along Las Vegas Wash, Clark County Wetlands Park, Nevada. Final Report to the Clark County Dept. of Parks and Recreation, Las Vegas, Nevada, prepared by SWCA, Inc. Environmental Consultants, Salt Lake City, Utah.
- SWCA, Inc., Environmental Consultants. 1999. A survey for southwestern willow flycatchers along Las Vegas Wash, Clark County Wetlands Park, Nevada. Final Report to the Clark County Dept. of Parks and Recreation, Las Vegas, Nevada, prepared by SWCA, Inc. Environmental Consultants, Salt Lake City, Utah.
- SWCA, Inc., Environmental Consultants. 2000. A survey for southwestern willow flycatchers along Las Vegas Wash, Clark County Wetlands Park, Nevada. Final Report to the Clark County Dept. of Parks and Recreation, Las Vegas, Nevada, prepared by SWCA, Inc. Environmental Consultants, Salt Lake City, Utah.

SWCA Environmental Consultants. 2001. A survey for southwestern willow flycatchers along Las Vegas Wash, Clark County Wetlands Park, Nevada. Final Report to the Clark County Dept. of Parks and Recreation, Las Vegas, Nevada, prepared by SWCA Environmental Consultants, Salt Lake City, Utah.

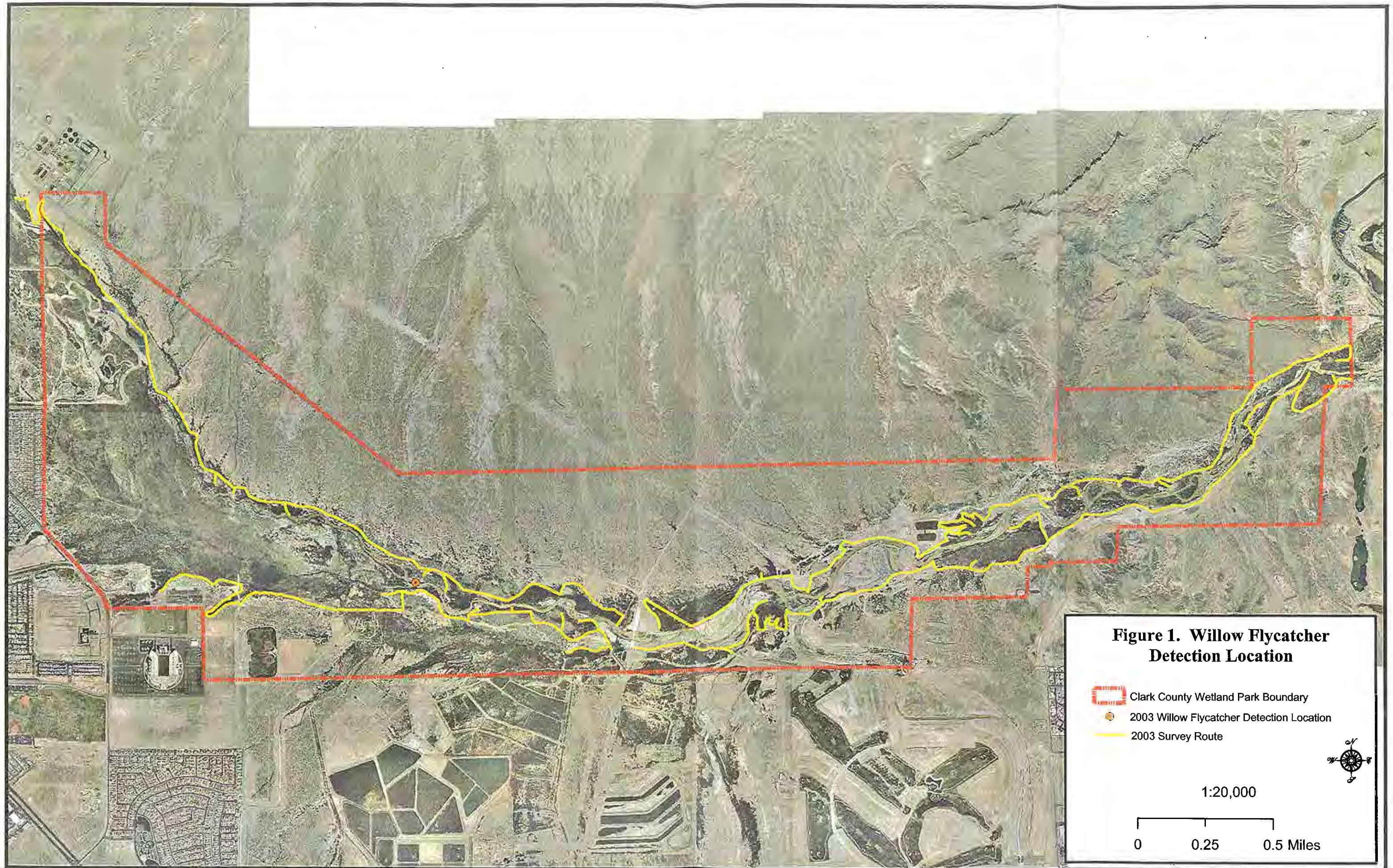
SWCA Environmental Consultants. 2002. A survey for Yuma clapper rails, yellow-billed cuckoos and southwestern willow flycatchers along Las Vegas Wash, Clark County Wetlands Park, Nevada. Final Report to the Clark County Dept. of Parks and Recreation, Las Vegas, Nevada, prepared by SWCA Environmental Consultants, Salt Lake City, Utah.

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 Dept., Phoenix.




Unitt, P. 1987. *Empidonax traillii extimus*: an endangered subspecies. Western Birds 18:137-162.

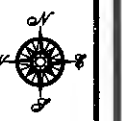
U.S. Fish and Wildlife Service. 1995. Final rule determining endangered status for the southwestern willow flycatcher. Federal Register 60(38): 10694-10714, Monday, February 27, 1995.

FIGURES



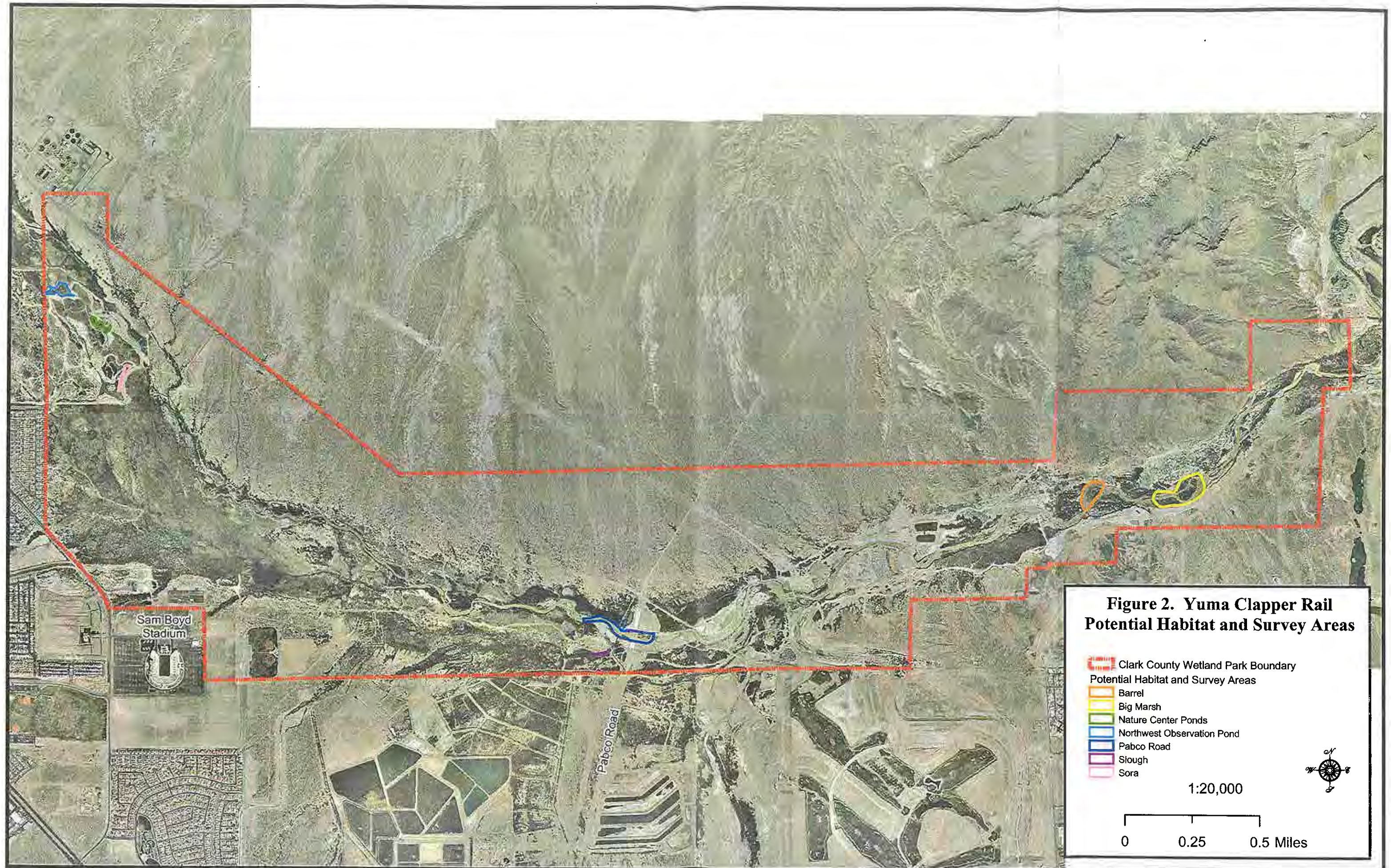
**Figure 1. Willow Flycatcher
Detection Location**

-  Clark County Wetland Park Boundary
-  2003 Willow Flycatcher Detection Location
-  2003 Survey Route



1:20,000

0 0.25 0.5 Miles



APPENDIX A

**Annotated Checklist of Bird Species Detected
in Clark County Wetlands Park,
March – July, 2003**

APPENDIX A

ANNOTATED CHECKLIST OF BIRD SPECIES DETECTED IN CLARK COUNTY WETLANDS PARK, MARCH - JULY, 2003

This annotated checklist identifies the bird species that were detected along Las Vegas Wash in Clark County Wetland Park, Nevada, during surveys for Yuma clapper rails, yellow-billed cuckoos and southwestern willow flycatchers from late March through early August 2002. 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 (1998) and subsequent revisions.

Presumed Status

- | | |
|--------------|--|
| Resident (R) | Species apparently occurs in 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) | The presumed status is in question because insufficient information existed for evaluation of status. |

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. |

Common Name	Scientific Name	Presumed Status	Relative Abundance
mallard	<i>Anas platyrhynchos</i>	R	FC
blue-winged teal	<i>Anas discors</i>	R	R
cinnamon teal	<i>Anas cyanoptera</i>	R	R
ruddy duck	<i>Oxyura jamaicensis</i>	R	R
pied-billed grebe	<i>Podilymbus podiceps</i>	R	R
eared grebe	<i>Podiceps nigricollis</i>	R	R
western grebe	<i>Aechmophorus occidentalis</i>	R	R
Clark's grebe	<i>Aechmophorus clarkii</i>	R	R
double-crested cormorant	<i>Phalacrocorax auritus</i>	R	R
great blue heron	<i>Ardea herodias</i>	R	FC
great egret	<i>Ardea alba</i>	R	U
snowy egret	<i>Egretta thula</i>	M	FC
green heron	<i>Butorides virescens</i>	R	FC
black-crowned night-heron	<i>Nycticorax nycticorax</i>	R	FC
white-faced ibis	<i>Plegadis chihi</i>	M	U
osprey	<i>Pandion haliaetus</i>	M	R
Cooper's hawk	<i>Accipiter cooperii</i>	R	R
red-tailed hawk	<i>Buteo jamaicensis</i>	R	U
American kestrel	<i>Falco sparverius</i>	R	R
peregrine falcon	<i>Falco peregrinus</i>	M?	R
Gambel's quail	<i>Callipepla gambelii</i>	R	C
Virginia rail	<i>Rallus limicola</i>	R	R
sora	<i>Porzana carolina</i>	R	R
moorhen	<i>Gallinula chloropus</i>	R	U
American coot	<i>Fulica americana</i>	R	FC
killdeer	<i>Charadrius vociferus</i>	R	U
black-necked stilt	<i>Himantopus mexicanus</i>	M	R
solitary sandpiper	<i>Tringa solitaria</i>	M	R
spotted sandpiper	<i>Actitis macularia</i>	R	FC
common snipe	<i>Gallinago gallinago</i>	M	R

Common Name	Scientific Name	Presumed Status	Relative Abundance
red-necked phalarope	<i>Phalaropus lobatus</i>	M	R
rock dove	<i>Columba livia</i>	R	R
white-winged dove	<i>Zenaida asiatica</i>	R	C
mourning dove	<i>Zenaida macroura</i>	R	A
greater roadrunner	<i>Geococcyx californianus</i>	R	U
barn owl	<i>Tyto alba</i>	R	R
lesser nighthawk	<i>Chordeiles acutipennis</i>	R	FC
white-throated swift	<i>Aeronautes saxatalis</i>	R	FC
black-chinned hummingbird	<i>Archilochus alexandri</i>	R	C
Costa's hummingbird	<i>Calypte costae</i>	R	R
belted kingfisher	<i>Ceryle alcyon</i>	M	R
western wood-pewee	<i>Contopus sordidulus</i>	M	R
willow flycatcher	<i>Empidonax traillii</i>	M	R
black phoebe	<i>Sayornis nigricans</i>	R	FC
Say's phoebe	<i>Sayornis saya</i>	R	U
ash-throated flycatcher	<i>Myiarchus cinerascens</i>	R	FC
western kingbird	<i>Tyrannus verticalis</i>	R	C
loggerhead shrike	<i>Lanius ludovicianus</i>	R	R
common raven	<i>Corvus corax</i>	R	FC
violet-green swallow	<i>Tachycineta thalassina</i>	M	R
northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	R	A
verdin	<i>Auriparus flaviceps</i>	R	C
bushtit	<i>Psaltiriparus minimus</i>	M	R
Bewick's wren	<i>Thryomanes bewickii</i>	R	A
marsh wren	<i>Cistothorus palustris</i>	R	C
blue-gray gnatcatcher	<i>Polioptila caerulea</i>	R	U
black-tailed gnatcatcher	<i>Polioptila melanura</i>	R	C
northern mockingbird	<i>Mimus polyglottos</i>	R	U
crissal thrasher	<i>Toxostoma crissale</i>	R	U
LeConte's thrasher	<i>Toxostoma lecontei</i>	R	R

Common Name	Scientific Name	Presumed Status	Relative Abundance
Lucy's warbler	<i>Vermivora luciae</i>	R	C
yellow warbler	<i>Dendroica petechia</i>	R	FC
common yellowthroat	<i>Geothlypis trichas</i>	R	C
yellow-breasted chat	<i>Icteria virens</i>	R	C
Abert's towhee	<i>Pipilo aberti</i>	R	C
black-throated sparrow	<i>Amphispiza bilineata</i>	R	R
song sparrow	<i>Melospiza melodia</i>	R	C
blue grosbeak	<i>Passerina caerulea</i>	R	C
red-winged blackbird	<i>Agelaius phoeniceus</i>	R	C
yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	R	FC
great-tailed grackle	<i>Quiscalus mexicanus</i>	R	C
brown-headed cowbird	<i>Molothrus ater</i>	R	A
house finch	<i>Carpodacus mexicanus</i>	R	U

APPENDIX B

**Willow Flycatcher Survey and Detection Form
Sent to
Arizona Partners in Flight,
Southwestern Willow Flycatchers Survey Coordinator**

Willow Flycatcher Survey and Detection Form (rev. 4/97)

Site Name Las Vegas Wash, Nevada Was site surveyed in previous year? ☒ Yes ☐ No
 If yes, what site name was used? same (or Clark Co. Wetlands Park)

County Clark State NV USGS Quad Name Las Vegas SE; Henderson

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

start N3998000 ~~and~~ E677500
 Coordinates stop N3997000 E 685300 Lat Long / Township-Range / UTM (circle one)
 Elevation 1664 - 1460 (feet) meters (circle one)

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

Survey # Observer(s)	Date (m/d/y) Survey time	Number of WIFLs Found	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N	Cowbirds Detected? Y or N	Comments about this survey (e.g., evidence of pairs or breeding, number of nests, nest contents, potential threats, cowbird abundance, presence of livestock, etc.)
1 T. Sharp S. Hatch B. Brown	date <u>5/15-16/03</u> start <u>0545</u> stop <u>1000</u> <u>4x3=</u> total hrs <u>12</u>	0	0	0	N	Y	- no livestock - many BHCO
2 C. Elsworth T. Sharp S. Hatch B. Brown	date <u>6/3-4/03</u> start <u>0510</u> stop <u>1000</u> <u>5hr x 4 =</u> total hrs <u>20</u>	2	0	0	N	Y	- assumed to be migrants.
3 B. Brown T. Sharp S. Hatch J. McMillen	date <u>6/24-25/03</u> start <u>0506</u> stop <u>1000</u> <u>5x4</u> total hrs <u>20</u>	0	0	0	N	Y	
4 T. Sharp S. Martin S. Hatch D. Swisher	date <u>7/20/03</u> <u>7-10</u> start <u>0515</u> stop <u>1010</u> <u>5hr x 4 =</u> total hrs <u>20</u>	0	0	0	N	Y	
5 T. Sharp D. Swisher S. Martin	date <u>7/15-16/03</u> start <u>0520</u> stop <u>1000</u> <u>4.5x3</u> total hrs <u>13.5</u>	0	0	0	N	Y	
Overall Summary							Were any WIFLs color-banded? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Total survey hrs <u>85.5</u>							If yes, report color combination(s) in the comments section on back of form

Name of Reporting Individual Bryan Brown Date Report Completed Sept. 9, 2003

Submit the original of this form. Retain a copy for your records.

Fill in the following information completely. Submit original form. Retain copy for your records.

Name of Reporting Individual Bryan Brown Phone # 801-322-4307

Affiliation SWCA Environmental Consultants Email bbrown@swca.com

Site Name Las Vegas Wash, NV (Clark Co. Wetlands Park)

Did you verify that this site name is consistent with that used in previous years? ☒ Yes ☐ No (circle one)

Management Authority for Survey Area (circle one): Federal ☐ Municipal/County ☐ State ☐ Tribal ☐ Private

Name of Management Entity or Owner (e.g., Tonto National Forest) Clark Co. Parks + Recreation Dept.

Length of area surveyed: 6 mi. (specify units, e.g. ☒ miles = mi, kilometers = km, meters = m)

Did you survey the same general area during each visit to this site this year? ☒ Yes ☐ No If no, summarize in comments below.
If site was surveyed last year, did you survey the same general area this year? ☒ Yes ☐ No If no, summarize in comments below.

Vegetation Characteristics: Overall, are the species in tree/shrub layer at this site comprised predominantly of (check one):

- ☐ Native broadleaf plants (entirely or almost entirely) ☐ Mixed native and exotic plants (mostly native)
☐ Mixed native and exotic plants (mostly exotic) ☒ Exotic/introduced plants (entirely or almost entirely)

Identify the 2-3 predominant tree/shrub species: tamarisk

Average height of canopy: 5m (specify units)

Was surface water or saturated soil present at or adjacent to site? ☒ Yes ☐ No (circle one)

Distance from the site to surface water or saturated soil: 0-100 m (specify units)

Did hydrological conditions change significantly among visits (did the site flood or dry out)? Yes ☒ No ☐ (circle one)
If yes, describe in comments section below.

Remember to attach a xerox copy of a USGS quad/topographical map (REQUIRED) of the survey area, noting the survey site and location of WIFL detections. You may also include a sketch or aerial photograph showing details of site location, patch shape, survey route in relation to patch, and location of any willow flycatchers or willow flycatcher nests detected. Such sketches or photographs are welcomed, but DO NOT substitute for the required USGS quad map.

Comments (attach additional sheets if necessary): More erosion and flood-control structures completed, resulting in increase in cattail marsh habitat. Re-planting of native trees (cottonwood, willow, mesquite) has resulted in some small patches of broadleaf deciduous riparian vegetation in an early successional stage.

APPENDIX C

SWCA Personnel Conducting the 2003 Study

APPENDIX C

SWCA PERSONNEL CONDUCTING THE 2003 STUDY

Project Manager	R. Spencer Martin
Project Scientist	Dr. Bryan T. Brown
Field Coordinator	Thomas Sharp
Field Ornithologist	Susan Hatch
Field Ornithologist	James McMillan
Field Ornithologist	Craig Ellsworth
Field Ornithologist	Daryn Swisher