las vegas wash coordination committee

lvwash.org

Marsh Bird Monitoring, including Yuma Clapper Rail, along Las Vegas Wash, Clark County, Nevada, 2007-2009

February 2010

SOUTHERN NEVADA WATER AUTHORITY

Las Vegas Wash Coordination Committee

Marsh Bird Monitoring, including Yuma Clapper Rail, along Las Vegas Wash, Clark County, Nevada, 2007-2009

SOUTHERN NEVADA WATER AUTHORITY
Las Vegas Wash Project Coordination Team

Prepared for:

Las Vegas Wash Coordination Committee

Prepared by:

Deborah Van Dooremolen
Southern Nevada Water Authority
Las Vegas Wash Project Coordination Team
P.O. Box 99956
Las Vegas, Nevada 89193-9956

February 25, 2010

ABSTRACT

The Las Vegas Wash Coordination Committee, a 30-member stakeholder group, is working to stabilize and enhance the Las Vegas Wash (Wash), the channel that drains flows from the Las Vegas Valley to Lake Mead at Las Vegas Bay. The Wash also flows through the 2900-acre Clark County Wetlands Park. Activities associated with the stabilization program and park development include wetland revegetation and expansion. In 1997, during Section 7 consultation on the project, the U.S. Fish and Wildlife Service recommended that annual surveys for Yuma clapper rail (*Rallus longirostris yumanensis*) be conducted during the breeding season to determine the species occurrence within the park. Surveys have been conducted by permitted consultants nearly annually since 2000 (Mckernan and Braden 2001, 2002; SWCA 2002, 2003, 2004, 2006, 2007, 2008). Wanting to obtain information on all secretive marsh bird species that may benefit from wetland enhancement in the study area, the Las Vegas Wash Project Coordination Team began a study using the standardized North American marsh bird monitoring protocol (Conway 2005) in 2007. Six species were targeted during the surveys: American bittern, least bittern, black rail, clapper rail (from 2008 on, after the federal permit to conduct surveys was obtained), Virginia rail, and sora. Detections of pied-billed grebe, common moorhen, and American coot were also recorded. Surveys were conducted along three survey routes comprising 24-26 points from 2007-2009. No clapper rail, American bittern or black rail were detected in any year. Least bittern, Virginia rail, and sora were detected in all years. Sora was the most abundant of the target species detected, least bittern was the second most abundant, and Virginia rail was the least abundant. Including non-target species, American coot was the most abundant in all years. Species richness varied across routes and per point abundances varied across routes and years. Abundances were lower for most species in 2009 when compared to 2007. Annual marsh bird surveys along the Wash should continue in order to comply with informal Section 7 consultation measures regarding Yuma clapper rail and to gain further information regarding the richness, abundance and distribution of these secretive species in the study area.

ACKNOWLEDGEMENTS

I would like to thank the Bureau of Reclamation for providing funding to the Southern Nevada Water Authority for this project under assistance agreement number 06FG300035. I would also like to extend my thanks to Seth Shanahan, Tim Ricks, Nick Rice, Marissa Foster, Eric Loomis, and Briand Peterson for assisting with surveys. In addition, I would like to thank Lake Las Vegas Resort for allowing access to their mitigation wetlands. Finally, I would like to thank the Las Vegas Wash Coordination Committee for their continued support for wildlife monitoring research and the implementation of the Las Vegas Wash Comprehensive Adaptive Management Plan and Las Vegas Wash Wildlife Management Plan. These activities have been conducted under Endangered Species Permit No. TE-148556-0 for Clark County, Nevada, as issued to Deborah Van Dooremolen by the U.S. Fish and Wildlife Service, Sacramento, California.

Marsh Bird Monitoring, including Yuma Clapper Rail, along Las Vegas Wash, Clark County, Nevada, 2007-2009

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 BACKGROUND

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

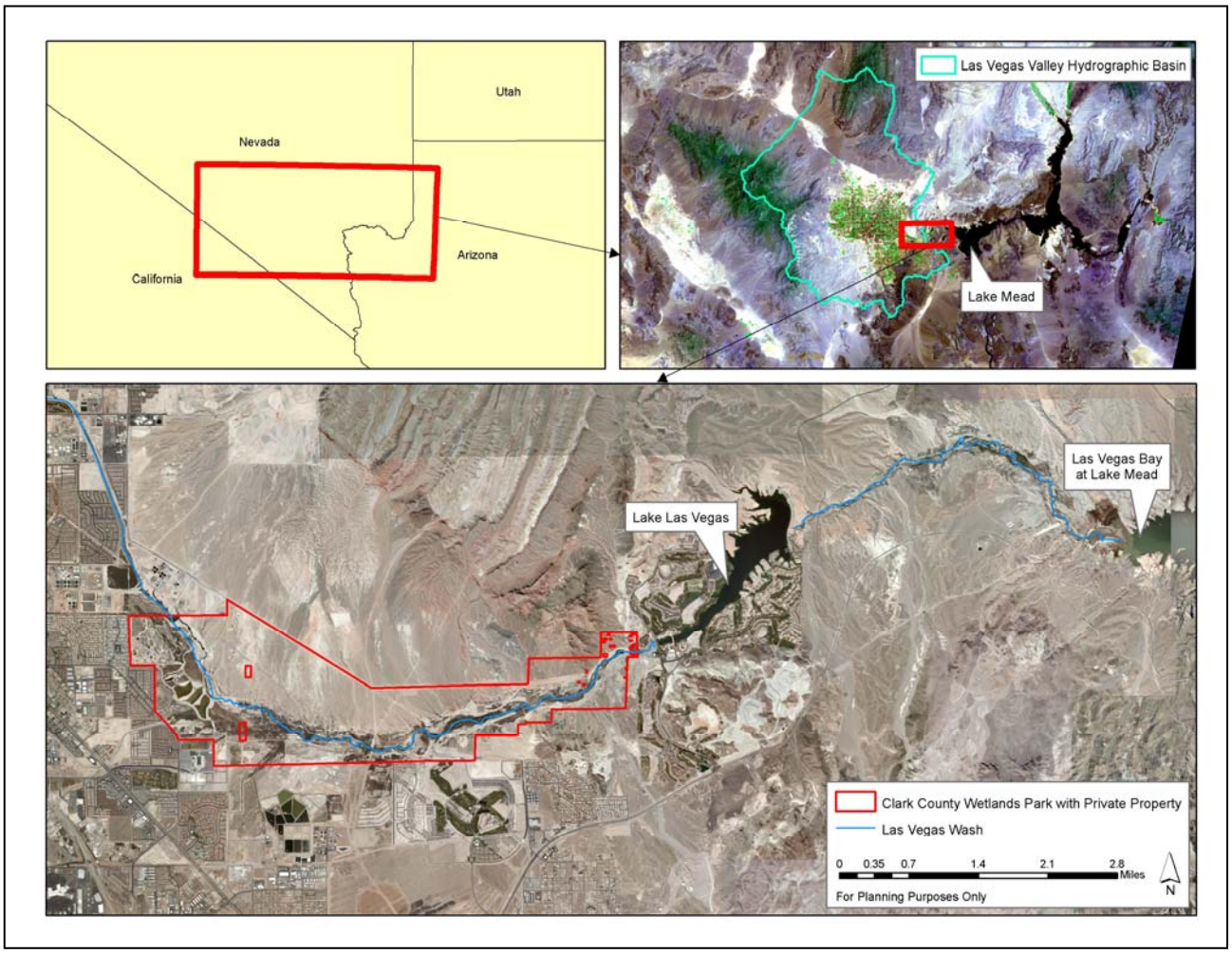

Figure 1: Las Vegas Wash location and general study area map.

In 1998, the Las Vegas Wash Coordination Committee (LVWCC), a now 30-member community stakeholder group, was created to address the degradation of the Wash. The group developed and is implementing the Las Vegas Wash Comprehensive Adaptive Management Plan to stabilize the Wash and restore its ecological functions. Stabilization and enhancement activities, which include the construction of 22 erosion control structures (weirs) and extensive

revegetation, will help deter further erosion and reduce the amount of sediment being deposited in Lake Mead; ten weirs were in place by spring 2007.

The LVWCC is increasing wetland habitat along the channel by planting bulrush (*Schoenoplectus* spp.) in the impoundments of the weirs and along the weir faces, and cattail (*Typha domingensis*) and common reed (*Phragmites australis*) volunteer from upstream seed sources. Emergent vegetation can also be found in the constructed wetland ponds in the nearby Nature Preserve, the developed portion of the Clark County Wetlands Park (Wetlands Park) through which the Wash flows. The county will be creating additional wetland habitat within the Wetlands Park over the next several years. The increase in wetland habitat along the Wash and throughout the Wetlands Park could have a positive impact on secretive marsh birds (e.g., rails and bitterns), including the federally endangered Yuma clapper rail (*Rallus longirostris yumanensis*).

The Yuma clapper rail is found in the lower Colorado River watershed and the Salton Sea, inhabiting freshwater and brackish water wetlands (Anderson and Ohmart 1985). Home range size varies seasonally, with mean home range size equal to approximately 20 acres (Eddleman 1989). Sites occupied by Yuma clapper rail have a higher percent cover by shallow water (Eddleman 1989). Density and species of emergent vegetation have also been reported as important habitat variables with dense emergent vegetation typically yielding the highest densities of clapper rail year-round (Anderson and Ohmart 1985) and cattail and bulrush as the most preferred species of emergent plant (Conway et al. 1993). However, Yuma clapper rail have been detected in wetlands dominated by common reed, tamarisk and willow (Eddleman 1989) and in relatively sparse to just moderately dense stands of emergents (Anderson and Ohmart 1985). The differences in preferred density and species of emergent vegetation among different geographic locations may relate to densities of crayfish, the most abundantly consumed prey item of the Yuma clapper rail (Anderson and Ohmart 1985). Habitat use changes throughout the year, thus Conway et al. (1993) state that maintaining a mosaic of shallow, open water pools interspersed with stands of emergent vegetation at different successional stages would best support clapper rails year-round.

Alcorn (1988) reports that eight clapper rails were observed in the City of Las Vegas Water Pollution Control Facility discharge channel on September 6, 1959, and then a lone individual was observed in the same location a few weeks later (Figure 2). A Yuma clapper rail was also detected along the Wash, within the Wetlands Park, on May 28 and June 18, 1998, in a wet, tamarisk-dominated area upstream of the future site of the Pabco Road Weir (Figure 2; Southwest Wetlands Consortium 1998). As a result, during informal Section 7 consultation regarding the proposed development of the Wetlands Park and associated erosion control structures, the U.S. Fish and Wildlife Service (USFWS) required that the Southern Nevada Water Authority (SNWA), the lead agency of the LVWCC, conduct annual surveys to determine the breeding status of Yuma clapper rail within the Wetlands Park.

SNWA contracted with permitted consultants to perform these surveys from 2000-2004 and 2006-2007. No Yuma clapper rails were detected from 2000-2004, nor in 2007 (Mckernan and Braden 2001, 2002; SWCA 2002, 2003, 2004, 2008). A Yuma clapper rail was detected on May

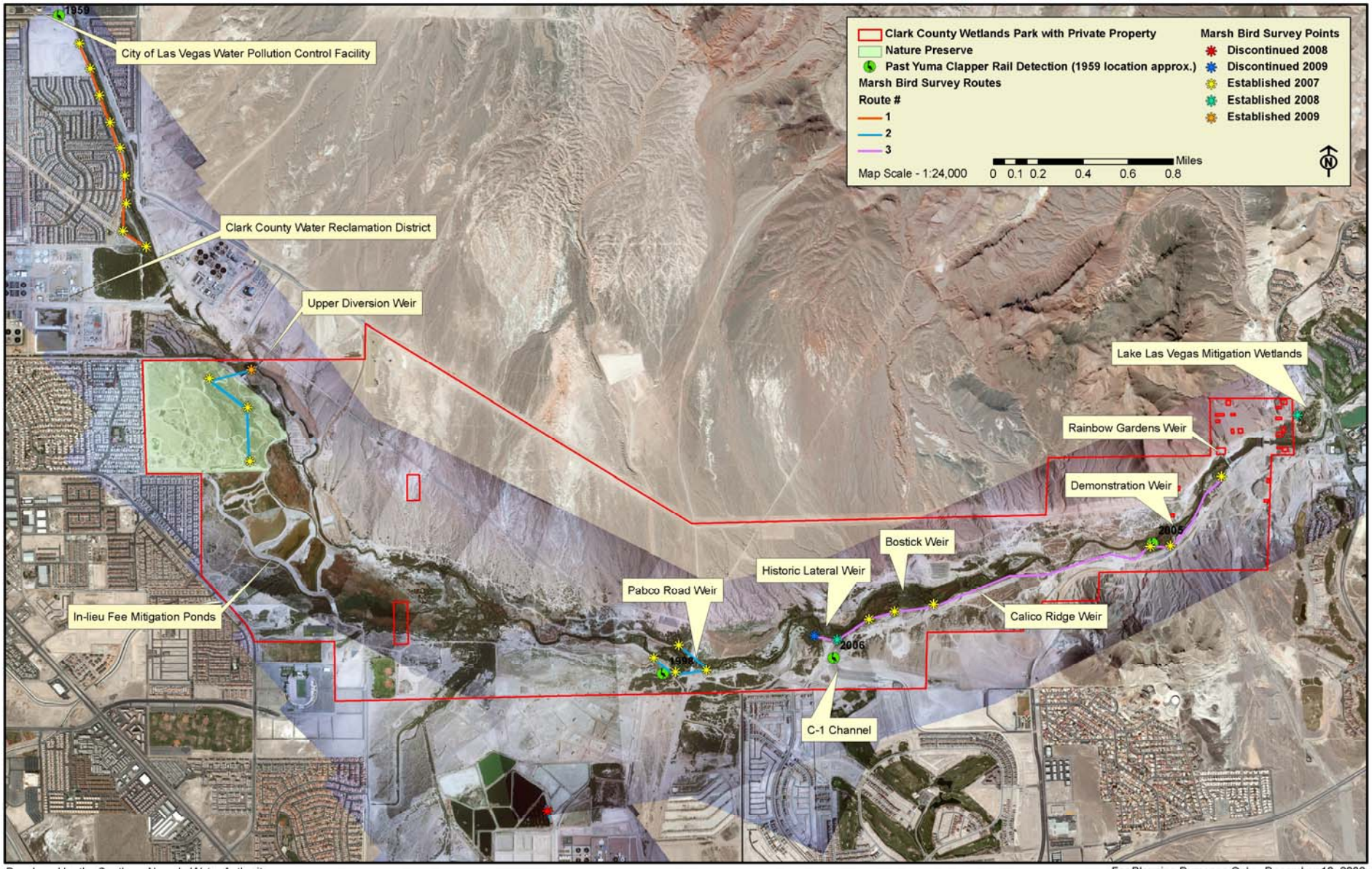

Figure 2: Marsh bird monitoring survey routes and points and past Yuma clapper rail detection locations.

23, 2005, during surveys for other species. It was calling from the emergent habitat in the impoundment of the Demonstration Weir (Figure 2; SWCA 2006). Another was detected in the marsh in the C-1 Channel on June 4 and June 7, 2006, also during surveys for other species (Figure 2; SWCA 2007). The C-1 Channel has since been lined with rock and concrete.

Conway (2005) developed a protocol for conducting marsh bird monitoring surveys that includes calling for clapper rail. USFWS accepted this protocol as the new official Yuma clapper rail survey protocol in 2006. The survey protocol enables compliance obligations regarding the clapper rail to be met, while also providing information on the status, abundance and distribution of other sensitive species, such as the least bittern (*Ixobrychus exilis*) and black rail (*Laterallus jamaicensis*) that may benefit from LVWCC and Clark County wetland revegetation efforts. Consequently, in 2007, the Las Vegas Wash Project Coordination Team (Project Team), the implementation team of the LVWCC, initiated a marsh bird monitoring study along the Wash and within the Wetlands Park. Yuma clapper rail could not be surveyed for the first year because the necessary federal permit was not in place. The species was added to the survey in 2008, and an annual report was submitted to USFWS summarizing survey results that year (Van Dooremolen 2009). This document reports on the results from 2007 through 2009.

2.0 METHODS

2.1 Description of Survey Routes

Three survey routes were established in marsh habitat along the Wash both within and adjacent to the Wetlands Park (Figure 2). GPS coordinates of the points are included in Appendix A.

Route 1 is located along the Wash between the City of Las Vegas Water Pollution Control Facility and the Clark County Water Reclamation District and includes nine points (Figure 2). The route comprises approximately 18 acres of wetland habitat dominated by cattails with lesser amounts of tamarisk (*Tamarix ramosissima*). Other nonnative plants such as tall whitetop (*Lepidium latifolium*), Bermuda grass (*Cynodon dactylon*), and other urban landscape weeds are present to varying degrees. Some sandbar willow (*Salix exigua*), Goodding willow (*S. gooddingii*) and cottonwood (*Populus fremontii*) appear at select points, as does common reed. The Wash channel is narrow along the route and bordered on both the east and west by housing developments. The vegetated zone varies from approximately 80-165 feet wide. A thin strip of open water, approximately 15-40 feet wide, runs down the center of the channel. The route includes a 3.5-acre wetland pond that is located within the floodplain but off the main Wash. The pond connects to the Wash via a short, narrow channel. There is a small backwater wetland where this channel and the Wash meet that is also included in the route. The habitat along Route 1 currently represents the largest stretch of contiguous cattail-dominated habitat along the Wash.

Route 2 included eight points in 2007: three within the constructed wetlands ponds at the Nature Preserve, one within the Demonstration Wetland at the City of Henderson Water Reclamation Facility (Henderson Demonstration Wetland) and four along the Wash near Pabco Road Weir (Figure 2). Halfway through the 2008 monitoring season, the point at the Henderson Demonstration Wetland was permanently dropped from the survey, and in 2009 a point was added in the newly created Upper Diversion Weir impoundment. The Nature Preserve ponds (3-acre lower pond, 1.5-acre middle pond complex, and 1.5-acre upper pond) have varying amounts of open water and the vegetation is composed of cattails, California bulrush (*S. californicus*),

common reed, sandbar willow, Goodding willow and cottonwood. The Henderson Demonstration Wetland is an approximately 6-acre constructed wetland pond with 11 vegetated hummocks composed of California bulrush, hardstem bulrush (*S. acutus*) and Olney bulrush (*S. americanus*) and approximately 80% open water. While the habitat was suitable for several marsh bird species, the point was dropped midway through the 2008 survey season because noise from the nesting grackle population made it extremely difficult to hear; the site was better surveyed during ongoing monthly hour-long passive listening surveys. The Upper Diversion Weir was completed in late summer of 2008. The survey point added in 2009 covers the 3.5-acre impoundment that had begun filling in with cattail. The points at Pabco Road Weir cover approximately 12 acres of wetland habitat, with three points upstream of the weir and one downstream. The habitat is dominated by common reed and sandbar and Goodding willows, with stands of cattail, hardstem bulrush, and cottonwood interspersed. The channel varies from 70-150 feet wide at these points. The water upstream of the weir is slow-moving and includes a small backwater pond and wetlands created by the City of Henderson Water Reclamation Facility outfall channel. Downstream of the weir, water flows quickly.

Route 3 included seven points covering approximately 43 acres of wetland habitat in 2007, nine points covering approximately 50 acres of wetland habitat in 2008, and eight points covering approximately 46 acres of wetland habitat in 2009. The route originally began just above the Historic Lateral Weir and continued downstream to the Rainbow Gardens Weir, including points in the impoundments of those weirs as well as in the Bostick Weir, Calico Ridge Weir and Demonstration Weir impoundments (Figure 2). Some points are on narrow side channels with acres of dense common reed. Most sample large impoundments with banks and islands covered in cattail, hardstem bulrush, common reed and Goodding willow with lesser amounts of sandbar willow and cottonwood. Points added in 2008 include the small backwater wetland at the discharge of the C-1 Channel into the Wash and the Lake Las Vegas mitigation wetlands, an off-channel wetland located on private property just east of the Wetlands Park boundary. The latter point was not added until the second survey replicate of the season, once approval to access the property was obtained from the landowner. In 2009, the point above Historic Lateral Weir was permanently dropped from the survey due to concerns over changing hydrology.

Along each route, survey points were established a minimum of 656 feet apart, with the exception of Points 5 and 6 on Route 3, which are 480 feet apart. Although Conway (2005) recommends a separation of 1,312 feet, the Wash does not contain enough emergent marsh habitat to allow for such wide spacing while still maintaining a sufficient number of points per route.

2.2 Survey Protocol

Surveys were performed using the North American marsh bird monitoring protocol developed by Conway (2005). Project Team staff conducted the surveys during the breeding season in April and May. Four surveys of each of the three routes were conducted. One to two observers conducted each survey. As only one staff member was permitted to conduct unsupervised surveys for Yuma clapper rail, that person was present for all surveys beginning in 2008. Surveys began one half hour before sunrise and concluded by 9 a.m. Although Conway (2005) specifies that the survey route be run in the same direction every time, the direction the route was run was reversed every other survey to ensure that most points were surveyed during the earliest

morning hours – the time of peak marsh bird vocalization – twice each season. Surveys were not conducted if wind reached or exceeded 12 miles per hour, as measured by the Beaufort wind scale.

At each point, surveys began with a five-minute period of passive listening followed by broadcasting the vocalizations of each target species in succession to elicit a response. Target species for the Wash survey include American bittern (*Botaurus lentiginosus*), least bittern, black rail, clapper rail (from 2008 on), Virgina rail (*Rallus limicola*), and sora (*Porzana carolina*). Each species call was broadcast for 30 seconds, followed by 30 seconds of silence to listen for responses, for a total of one minute per species. Species calls were broadcast in succession from most sensitive (i.e., likely to be deterred from responding by hearing the call of another species) to least sensitive: Black rail, least bittern, sora, Virginia rail, clapper rail, and American bittern. Calls were broadcast using MP3 or portable CD players with portable speakers. The observer(s) recorded all target species heard and/or seen during the survey, making a separate record for each bird and noting each minute of the survey period in which it was heard calling and/or seen. Individuals were also recorded if they were heard or seen at the point immediately before or after the survey. Detections of other marsh bird species that were not targeted through the broadcast were also recorded, including pied-billed grebe, common moorhen, and American coot. Given the sheer numbers of coots present at some points, observers often counted them either before or after the survey. Other data collected include the call type heard, the distance and direction to each detected bird, and whether the bird was detected at a previous point.

2.3 Data Analysis

Detections of target and non-target species were summarized by year, route and date to provide an overall picture of when and where birds were detected. However, since multiple detections could be made of the same bird over the course of a survey season, the number of individuals per species along each route was also estimated. This number was estimated as the sum of the maximum number of birds of the species that were detected at each point during the season. Whether or not a bird was counted as a unique individual was determined by the following criteria. If one or more individuals of a species were detected at the same point on more than one survey, they were considered to be the same individual(s). If an individual had been detected at a previous point during a survey, the second survey detection was not counted. If an individual was detected at a point within 656 feet of a location where an individual had been detected on a prior survey, and the individual was calling from approximately the same direction where the other bird had been detected, it was considered to be the previously detected bird and was not counted as a new individual. This yielded an estimate of the minimum number of individuals present (i.e., abundance) of each species.

For each route, the total number of individuals detected of each species and the total number of individuals detected regardless of species were divided by the number of points the route contained, yielding an abundance per point. Additionally, for each year, the total number of individuals detected of each species and the total number of individuals detected regardless of species were divided by the total number of points surveyed that year to yield the total abundance per point for each species for the study area and the total abundance for the study area. Per point abundance provides a more accurate comparison between routes and years because different numbers of points were surveyed.

Differences in observers and the number of minutes spent surveying each point after the addition of the clapper rail to the broadcast sequence may also have impacted the number of birds detected from year to year. However, differences related to these issues are not addressed in the data analysis included in this report.

3.0 RESULTS

Detections of target and non-target marsh bird species are reported in Table 1. No Yuma clapper rail, American bittern, or black rail were detected during the 3-year period. Observers detected least bittern, sora and Virginia rail each year, as well as the non-target species pied-billed grebe, common moorhen and American coot. In 2007, the three target species observed were detected on all routes, but only two were detected on Route 1 in 2008 and on Route 2 in 2008 and 2009. The non-target species were detected on all routes in all years with the exception of Route 1 in 2009, when common moorhen and pied-billed grebe were not detected. Detections were generally higher during the first three surveys.

Total and per point abundances are shown in Table 2. Of the target species, sora accounted for the largest abundance each year, least bittern was the second most abundant and Virginia rail was the third. Sora per point abundance increased slightly over the three years. Per point abundances of the other target species decreased (least bittern increased from 2007 to 2008, but declined below the 2007 value in 2009). Total per point abundance for target species as a group held steady from 2007 to 2008 but then declined in 2009. Including non-target species, American coot was the most abundant of all species detected, with abundance nearly six to seven times higher than that of the next most abundant species, common moorhen, in all years (Table 2). These were the only two species to have per point abundance exceeding 1.00 for any year. Although American coot per point abundance increased from 2007 to 2008, it declined below the 2007 level in 2009. This caused the same upward then downward trend to occur in total per point abundance, while abundance per point for the other non-target species declined each year.

Abundances varied across routes as well as years (Table 2). For target species, in 2007 and 2008 Route 1 had the highest per point abundances of sora and Virginia rail, while Route 3 had the highest least bittern. In 2009, Route 2 had the highest per point abundance of sora, Route 3 had the highest of Virginia rail, and least bittern was basically the same on all routes. The highest per point abundances of the non-target species were reported on Route 3 with the exception of American coot and pied-billed grebe in 2007 and common moorhen in 2008, which were highest on Route 2. Route 1 had the lowest per point abundances of the non-target species in all years. Route 2 had the highest per point abundance of target-only and of total species in 2007 and Route 3 had the highest in 2008 and 2009.

4.0 DISCUSSION

Total richness (number of species) and the individual species detected each year remained the same when summarized for the study area, but richness and composition fluctuated across routes and per point abundance fluctuated across routes and years during the three-year period. Data were tested for significance, and the consistent outcome was that they were not statistically significant. However, given the small sample sizes, the tests lacked power and are therefore not

Year	Route	Date	LEBI	VIRA	SORA	PBGR	COMO	AMCO	Grand Total
2007	1	4/4/2007			6	1		12	19
		4/19/2007	1	4	5	1	1	6	18
		5/1/2007		1	3	1		9	14
		5/15/2007						2	2
	1 Total		1	5	14	3	1	29	53
	2	4/5/2007	3	2	3	1	6	44	59
		4/23/2007			3	4	7	38	52
		5/2/2007	3			1	10	60	74
		5/16/2007	1			4	6	32	43
	2 Total		7	2	6	10	29	174	228
	3	4/6/2007	2	1			8	60	71
		4/24/2007	1	1	1	4	6	14	27
		5/4/2007	1		2		7	11	21
		5/21/2007				3	8	6	17
	3 Total		4	2	3	7	29	91	136
2007 Total			12	9	23	20	59	294	417
2008	1	4/7/2008			6	1	1	16	24
		4/22/2008		4	3			5	12
		5/2/2008			3	1	1	5	10
		5/27/2008		1				2	3
	1 Total			5	12	2	2	28	49
	2	4/8/2008	2		4	1	9	24	40
		4/25/2008			1	2	6	40	49
		5/7/2008			2	1	6	12	21
		5/28/2008				2	5	5	12
	2 Total		2		7	6	26	81	122
	3	4/10/2008	3		5	1	9	143	161
		4/28/2008	4	1	3	3	2	59	72
		5/8/2008	4			4	8	55	71
		5/29/2008	6			2	6	15	29
	3 Total		17	1	8	10	25	272	333
2008 Total			19	6	27	18	53	381	504
2009	1	4/7/2009	1	2	5			3	11
		4/20/2009	1		2			3	6
		5/4/2009	1		1				2
		5/18/2009							
	1 Total		3	2	8			6	19
	2	4/10/2009	2		5	1	8	45	61
		4/21/2009			3	3	4	29	39
		5/5/2009			2	1	7	18	28
		5/19/2009	1			2	1	11	15
	2 Total		3		10	7	20	103	143
	3	4/13/2009		1	4	2	3	95	105
		4/22/2009	1	1	4	1	6	82	95
		5/8/2009	1			1	11	25	38
		5/20/2009	1			1	5	14	21
	3 Total		3	2	8	5	25	216	259
2009 Total			9	4	26	12	45	325	421
Grand Total			40	19	76	50	157	1000	1342

Table 1: Detections by year, route and date for 2007-2009. LEBI=Least Bittern, VIRA=Virginia Rail, SORA= Sora, PBGR=Pied-billed Grebe, COMO=Common Moorhen, AMCO=American Coot.

		Target Species (TS) abundance (per point)				Non-target Species abundance (per point)			
Year	**Route**	**LEBI**	**VIRA**	**SORA**	**Total TS**	**PBGR**	**COMO**	**AMCO**	**Grand Total**
2007	1	1 (0.11)	4 (0.44)	7 (0.78)	12 (1.33)	1 (0.11)	1 (0.11)	15 (1.67)	29 (3.22)
	2	4 (0.50)	2 (0.25)	5 (0.63)	11 (1.38)	7 (0.88)	14 (1.75)	81 (10.13)	113 (14.13)
	3	4 (0.57)	1 (0.14)	2 (0.29)	7 (1.00)	4 (0.57)	13 (1.86)	68 (9.71)	92 (13.14)
2007 Total		9 (0.38)	7 (0.29)	14 (0.58)	30 (1.25)	12 (0.50)	28 (1.17)	164 (6.83)	234 (9.75)
2008	1	0 (0.00)	4 (0.44)	6 (0.67)	10 (1.11)	1 (0.11)	1 (0.11)	20 (2.22)	32 (3.56)
	2	2 (0.25)	0 (0.00)	5 (0.63)	7 (0.88)	4 (0.50)	15 (1.88)	41(5.13)	67 (8.38)
	3	9 (1.00)	1 (0.11)	5 (0.56)	15 (1.67)	5 (0.56)	12 (1.33)	151 (16.78)	183 (20.33)
2008 Total		11 (0.42)	5 (0.19)	16 (0.62)	32 (1.23)	10 (0.38)	28 (1.08)	212 (8.15)	282 (10.85)
2009	1	2 (0.22)	2 (0.22)	5 (0.56)	9 (1.00)	0 (0.00)	0 (0.00)	4 (0.44)	13 (1.44)
	2	2 (0.25)	0 (0.00)	6 (0.75)	8 (1.00)	4 (0.50)	11 (1.38)	46 (5.75)	69 (8.63)
	3	2 (0.25)	2 (0.25)	5 (0.63)	9 (1.13)	4 (0.50)	13 (1.63)	97 (12.13)	123 (15.38)
2009 Total		6 (0.24)	4 (0.16)	16 (0.64)	26 (1.04)	8 (0.32)	24 (0.96)	147 (5.88)	205 (8.20)
Grand Total		26 (0.35)	16 (0.21)	46 (0.61)	88 (1.17)	30 (0.40)	80 (1.07)	523 (6.97)	721 (9.61)

Table 2: Total and per point abundance by year and route for 2007-2009. LEBI=Least Bittern, VIRA= Virginia Rail, SORA= Sora, PBGR=Pied-billed Grebe, COMO=Common Moorhen, AMCO= American Coot.

included in the report. While a robust statistical examination of the data is not possible at this time, a qualitative discussion may shed some light on the differences reported. It should also be noted that, with the exception of American coot, the number of individuals detected on each route was small enough that the loss or addition of just a few individuals had a noticeable impact on per point abundance.

Route 2 experienced a large decline in per point abundance of target species, slipping from having the highest in 2007 to having the lowest in 2008. A portion of the decrease may be attributable to an increase in background noise reported at the constructed wetlands ponds at the Nature Preserve that year. Detections and per point abundances of least bittern and Virginia rail decreased along this portion of the route in 2008. The noise from construction of the Upper Diversion Weir and from a water pump near Point 1 made it very difficult to hear, interfering with the ability to hear bird calls. The construction noise may also have made the ponds less attractive nesting habitat. However, while per point abundance increased in 2009, it was still well below 2007 values. Once again, no Virginia rail were detected, and the increase of one least bittern at the ponds was off-set by the loss of detections at the points along the Wash.

The large decline in total (including non-target species) per point abundance along Route 2 from 2007 to 2008 is primarily due to the difference in the number of coots counted. Counts of coots declined at the Pabco Road Weir sites from 2007 to 2008 and 2009. The timing of the loss of the Henderson Demonstration Wetland may have also played a role. This site always yielded the highest number of coot detections, and the highest number of coots counted at that site occurred on the third survey in 2007. Surveys were discontinued at that site after the second survey in 2008. Total per point abundance remained basically flat in 2009 because the point covering the Upper Diversion Weir impoundment yielded a similar number of coots as early season surveys of the Henderson Demonstration Wetland site.

Per point abundance of target and non-target marsh birds detected on Route 3 increased steeply from 2007 to 2008. While the high quality of the habitat at the points added in 2008 may help explain part of this change, a portion of the increase in least bittern and all of the increase in sora

occurred at points established in 2007. Thus, the increase may indicate that the quality of the wetland habitat along Route 3 improved in 2008. The route contains the largest amount of weir-created wetland habitat, including both active and passive revegetation, within the study area. While per point abundance came down in 2009, levels for both target and non-target species still exceeded those of 2007.

The decline in target and non-target species along Route 1 over the 3-year period may be related to changes in habitat quality, which appeared drier and more weed-invaded (mainly by tamarisk and tall whitetop) each year.

Of the target species, sora had the highest per point abundance and was fairly evenly distributed across survey routes, indicating that the study area provides suitable habitat for the species. Although it was the most abundant during surveys, it is difficult to determine whether or not the species is actually nesting in the study area. Sora is currently considered to be a winter resident and migrant in the area. While several individuals were detected only during the first and/or second surveys, some continuously occupied sites through the third survey, into early May. Yet, in three years of marsh bird surveys, no sora have been detected in the fourth survey along any route, suggesting that they may have departed the Wash by mid to late May. Surveys conducted as a part of the Nevada Breeding Bird Atlas were unable to confirm sora breeding in southern Nevada, although there were records of possible breeding on the Muddy River (Floyd et al. 2007). Likewise, researchers have been unable to find evidence of breeding along the lower Colorado River, despite the extensive potential nesting habitat present in the watershed (Rosenberg et al. 1991). However, sora young have been observed at the Henderson Bird Viewing Preserve (J. Branca pers. comm.), of which the Henderson Demonstration Wetland pond is a part.

Least bittern was the second most abundant target species. It is a covered species under the Lower Colorado River Multi-Species Conservation Program (LCRMSCP), and is a relatively new arrival to the Wash. The first confirmed detection occurred in April 2005 and the species, which is now considered a summer resident, was confirmed nesting near the Bostick Weir in 2006 (D. Van Dooremolen pers. obs.). The greatest numbers of least bittern were reported on Routes 2 and 3 each year, which may indicate a preference for the habitat present along these routes. After increasing from 2007 to 2008, per point abundance of least bittern slipped below 2007 levels in 2009. However, it should be noted that in 2009 a least bittern was detected at a point on Route 2 and another was detected at a point on Route 3 just two weeks after surveys ended. Interestingly, the greatest number of least bitterns detected on a single survey was reported on May 29, 2008, when six birds were recorded on Route 3 during the final survey of the season. The date that survey was conducted is more than a week later than other final surveys (the survey had originally been scheduled for the prior week but had to be cancelled due to bad weather). It could be that more least bittern are present or the species is calling more frequently and is thus more detectable during that time.

Virginia rail had the lowest per point abundance of all species in all years, and its abundance declined by nearly 50% from 2007 to 2009. This may indicate that the habitats present within the study area are less suitable for Virginia rail than for the other marsh bird species. Virginia rail

are known to be present in the Wash year-round (although the population may increase in the winter) and were confirmed nesting at the Bostick Weir in 2006 (D. Van Dooremolen pers. obs.).

No Yuma clapper rail were detected during the passive listening in 2007 nor after the species was added to the call broadcast portion of the survey in 2008. This is not too surprising considering that Yuma clapper rail have only rarely been detected during the past 11 years despite intensive survey efforts. It is possible, however, that individuals were present and simply did not respond to the call broadcasts. Conway et al. (1993) reported that Yuma clapper rail have a very low response rate to call broadcasts; 40% during the early breeding season and only 20% in the late breeding season. Miller et al. (2006) have found the breeding populations on the Muddy and Virgin rivers, the closest of which is approximately 40 miles to the northeast, to be variable from year to year, reporting that occupancy of most sites is low to intermittent. Given the poor response rate to call broadcasts, Miller et al. (2006) go on to state, "[S]ites where few rails are known to be present that have intermittent rail detections across the years may or may not be occupied in years when no rails are detected." Miller et al. (2006) also note that the location of these sites, at the northern limit of the species' breeding range, may also be affecting the presence/absence of Yuma clapper rail from year to year.

As with Yuma clapper rail, it was not particularly surprising that neither American bittern nor black rail were detected. Although the Wash offers potentially suitable nesting habitat for the American bittern, it is currently within the wintering, not breeding, range of the species. It is unlikely that black rail, which is also covered by the LCRMSCP will be detected in the study area. However, while the Wash is distant from known breeding populations, there have been a few detections along the Virgin River recently (Braden et al. 2007) and an unconfirmed detection was reported in the in-lieu fee mitigation ponds (Figure 2) on September 24, 2009 (NVBirds listserv posting on September 28, 2009).

As wetland revegetation efforts conducted by both the LVWCC and Clark County continue, potentially suitable nesting habitat for marsh birds should increase along the Wash and within the Wetlands Park. In spring 2009, revegetation of the 112-acre in-lieu fee mitigation ponds should be completed, a significant addition to emergent marsh habitat within the study area.

5.0 RECOMMENDATIONS

Three years of marsh bird monitoring have been conducted, two of which included calling for Yuma clapper rail. More years of data are needed to determine trends in the richness, abundance and distribution of these secretive species within the study area and whether any changes to breeding status have occurred. Also, annual monitoring for Yuma clapper rail is needed to comply with informal Section 7 consultation measures. Thus, it is recommended that marsh bird monitoring continue in 2010 and that a new survey route be added to cover the in-lieu fee mitigation ponds, should their revegetation be complete by the onset of the survey season.

6.0 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.

Braden, G.T., A. Miller, and L. Crew. 2007. The status of Yuma clapper rail and yellow-billed cuckoo along portions of the Virgin River and Muddy River in Southern Nevada: 2006 Final. Final report to the Southern Nevada Water Authority, Las Vegas, prepared by San Bernardino County Museum, Redlands, California.

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. J. Wildl. Manage. 57(2):282-290.

Conway, C.J. 2005. Standardized North American Marsh Bird Monitoring Protocols. Wildlife Research Report #2005-4, U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, Arizona.

Eddleman, W.R. 1989. Biology of Yuma clapper rail in the southwestern U.S. and northwestern Mexico. Final Rep. Intra-Agency Agreement No. 4-AA-30-02060, U.S. Bureau of Reclamation, Yuma Project Office, Yuma, Arizona. 127pp.

Floyd, T., C.S. Elphick, G. Chisholm, K. Mack, R.G. Elston, E.M. Ammon, and J.D. Boone. 2007. *Atlas of the Breeding Birds of Nevada.* Reno, Nevada: University of Nevada Press.

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.

Miller, A., L. Crew, and G.T. Braden. 2006. The status of Yuma clapper rail and yellow-billed cuckoo along portions of Virgin River and Muddy River in Southern Nevada: 2005 Final. Final report to the Southern Nevada Water Authority, Las Vegas, prepared by San Bernardino County Museum, Redlands, California.

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

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

Van Dooremolen. 2009. Marsh bird monitoring, including Yuma clapper rail, in 2008 along Las Vegas Wash, Clark County, Nevada. Final report prepared for the U.S. Fish and Wildlife Service, Southern Nevada Field Office, Las Vegas, Nevada.

Appendix A

GPS Coordinates for
Marsh Bird Monitoring Points

Coordinate System: UTM

Datum: NAD 83

Survey Route	Survey Point	Eastings	Northings	Comments
1	1	677412	3998498	Established in 2007
1	2	677243	3998606	Established in 2007
1	3	677264	3998807	Established in 2007
1	4	677252	3999007	Established in 2007
1	5	677215	3999205	Established in 2007
1	6	677140	3999391	Established in 2007
1	7	677063	3999580	Established in 2007
1	8	676994	3999770	Established in 2007
1	9	676913	3999954	Established in 2007
2	1	678178	3996968	Established in 2007
2	2	678155	3997357	Established in 2007
2	3	677879	3997558	Established in 2007
2	4	680342	3994478	Discontinued in 2008
2	4.5	678178	3997623	Established in 2009
2	5	681090	3995598	Established in 2007
2	6	681245	3995496	Established in 2007
2	7	681468	3995512	Established in 2007
2	8	681268	3995692	Established in 2007
3	1	682233	3995763	Discontinued in 2009
3	1.5	682400	3995747	Established in 2008
3	2	682626	3995895	Established in 2007
3	3	682808	3995954	Established in 2007
3	4	683088	3996010	Established in 2007
3	5	684633	3996449	Established in 2007
3	6	684776	3996456	Established in 2007
3	7	685136	3996960	Established in 2007
3	8	685673	3997411	Established in 2008