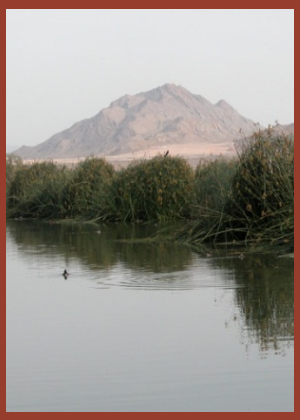

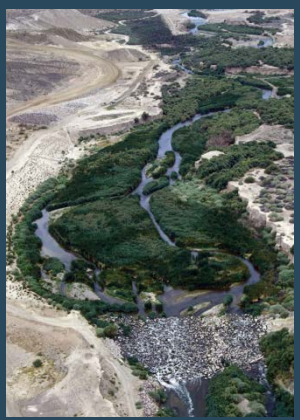

# las vegas wash coordination committee

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## Marsh Bird Monitoring, including Yuma Ridgway's Rail, along Las Vegas Wash, Clark County, Nevada, 2017

December 2017

# Marsh Bird Monitoring, including Yuma Ridgway's Rail, along Las Vegas Wash, Clark County, Nevada, 2017

**SOUTHERN NEVADA WATER AUTHORITY**
**Las Vegas Wash Project Coordination Team**

Prepared for:

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

**and**

**Las Vegas Wash Coordination Committee**

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**December 2017**

## EXECUTIVE SUMMARY

The Las Vegas Wash Coordination Committee (LVWCC), a 29-member stakeholder group, is working to stabilize and enhance the Las Vegas Wash (Wash), the channel that drains flows from the Las Vegas Valley to Lake Mead at Las Vegas Bay. The Wash also flows through the 2,900-acre Clark County Wetlands Park (Wetlands Park). Activities associated with the stabilization program and park development include wetland revegetation and expansion. As a result of informal Section 7 consultation with the U.S. Fish and Wildlife Service regarding the project, the Southern Nevada Water Authority, the lead agency of the LVWCC, began annual surveys to determine the occurrence of Yuma Ridgway's rail (*Rallus obsoletus yumanensis*; formerly known as the Yuma clapper rail [*R. longirostris yumanensis*]) within the Wetlands Park. Surveys were conducted by permitted consultants nearly annually from 2000 through 2007 (McKernan and Braden 2001, 2002; SWCA 2002, 2003, 2005, 2006, 2007, 2008). Conway (2005, 2009) developed a protocol for conducting marsh bird monitoring surveys that includes calling for Ridgway's rail. The U.S. Fish and Wildlife Service accepted this protocol as the new official Yuma Ridgway's rail survey protocol in 2006. The survey protocol enables compliance obligations regarding the Ridgway's rail to be met, while also providing information on the status, abundance and distribution of other sensitive species that may benefit from wetland revegetation efforts. The Las Vegas Wash Project Coordination Team began conducting surveys using the new protocol in 2007 (Van Dooremolen 2010a). Yuma Ridgway's 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. This report presents results from the 2017 monitoring season.

Six species were targeted during the surveys: American bittern, least bittern, black rail, Ridgway's rail, Virginia rail, and sora. Detections of pied-billed grebe, common gallinule, and American coot (referred to as non-target species) were also recorded. Surveys were conducted along three survey routes (Routes 2-4) comprising 28 points in 2017. As in prior years, least bittern, Virginia rail, sora and the three non-target species were detected, and no black rail were detected. Also as in other years, sora was the most abundant of the target species, and American coot was the most abundant of all species. American bittern was detected for just the third time. Most importantly, Yuma Ridgway's rail was identified for the first time during these surveys. While individuals had been detected during other work, none had ever been reported during the marsh bird or earlier targeted surveys. A Yuma Ridgway's rail was heard kekking on Route 4 (Clark County's in-lieu fee mitigation wetlands), in the most southern of the large wetland cells, on April 19 and on May 3.

Habitat quality on Routes 2 and 3 was fair to good, but the Mitigation Wetlands (Route 4) still offer the highest quality emergent wetland habitat in the study area, and the highest quality potentially suitable nesting habitat for Yuma Ridgway's rail, as shown by the presence of the species through the height of the breeding season.

Annual marsh bird surveys along the Wash should continue in order to comply with informal Section 7 consultation measures regarding Yuma Ridgway's rail. Points that offer poor habitat suitability for Ridgway's rail will be discarded from the surveys in 2018 and new sites that offer better habitat suitability will be added.

## ACKNOWLEDGEMENTS

I thank Nicholas Rice, Timothy Ricks, and Jason Eckberg for assisting with surveys, and Aaron Ambos for providing the photo of the Yuma Ridgway's rail that graces the cover. I also thank the Las Vegas Wash Coordination Committee for their continued support for wildlife monitoring and the implementation of the Las Vegas Wash Comprehensive Adaptive Management Plan and the Las Vegas Wash Wildlife Management Plan. These activities have been conducted by Deborah Van Dooremolen under permit no. TE148556-3 (expires May 24, 2018), Nicholas Rice under permit no. TE64580A-2 (expires May 26, 2021) and Timothy Ricks under permit no. TE67397A-2 (expires May 30, 2021) as issued by the U.S. Fish and Wildlife Service, Sacramento, California.

# Marsh Bird Monitoring, including Yuma Ridgway's Rail, along Las Vegas Wash, Clark County, Nevada, 2017

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## 1.0 BACKGROUND

The Las Vegas Wash (Wash) is the primary drainage channel for the Las Vegas Valley, carrying flows, including highly treated wastewater, urban runoff, shallow groundwater, and storm runoff, through the 2,900-acre Clark County Wetlands Park (Wetlands Park) to 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.

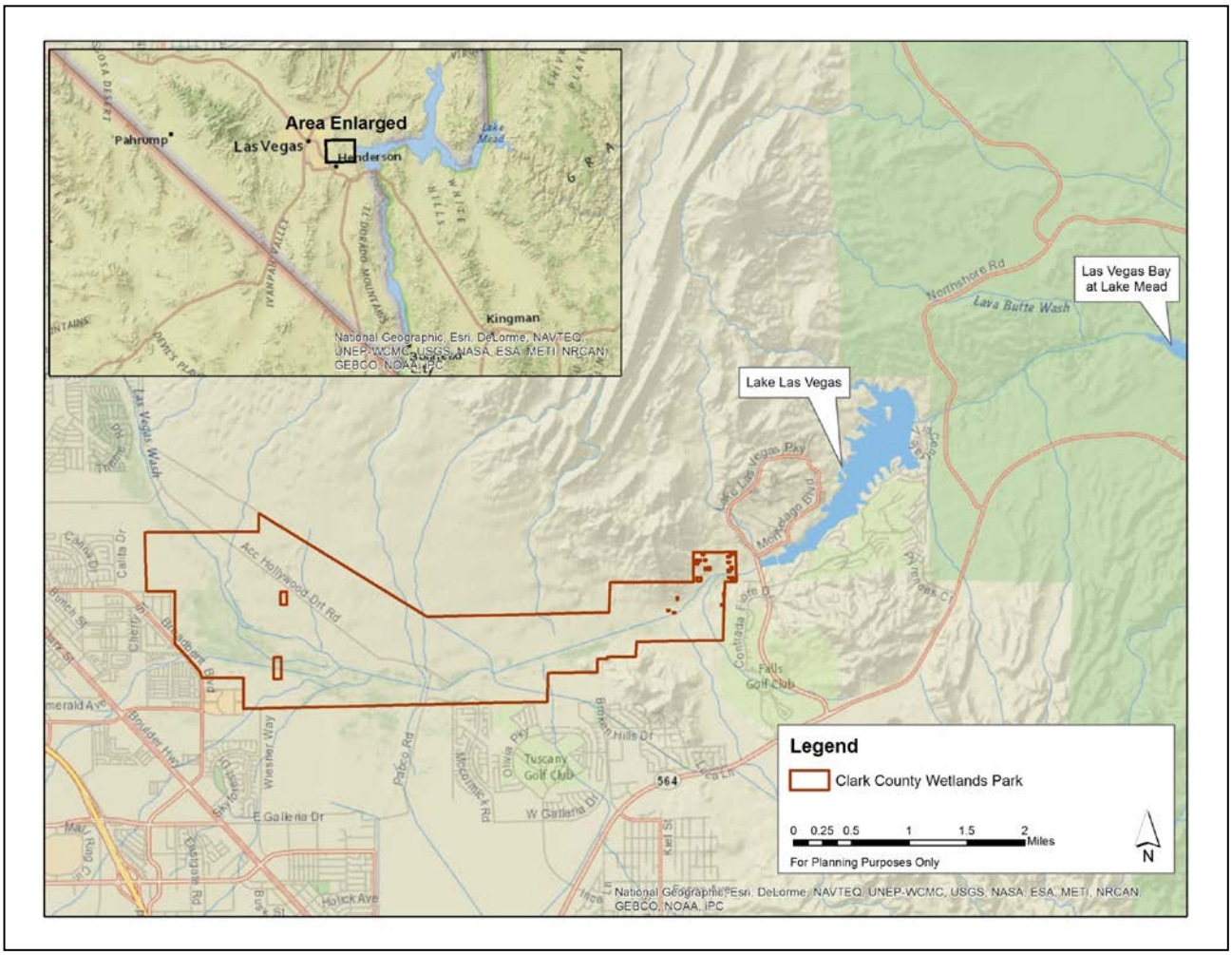


**Figure 1. Las Vegas Wash location and general study area map.**

In 1998, the Las Vegas Wash Coordination Committee (LVWCC), a now 29-member community stakeholder group, was created to address the degradation of the Wash. The group developed and is implementing the Las Vegas Wash Comprehensive Adaptive Management Plan (LVWCC 2000) to stabilize the Wash and restore its ecological functions. Stabilization and

enhancement activities, which include the construction of 21 erosion control structures (weirs) and extensive revegetation, will help deter further erosion and reduce the amount of sediment being deposited in Lake Mead; 19 weirs were in place by spring 2017.

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; cattails (*Typha domingensis*) and common reed (*Phragmites australis*) volunteer from upstream sources. Emergent vegetation can also be found in the constructed wetland ponds in the Wetlands Park Nature Preserve (Nature Preserve). Clark County has created additional wetland habitat within the Wetlands Park in the form of the in-lieu fee mitigation wetlands (Mitigation Wetlands; Figure 2), first constructed in 2009. 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 Ridgway's rail (*Rallus obsoletus yumanensis*). (Note: This species was known as the Yuma clapper rail [*R. longirostris yumanensis*] until it was reclassified as a different species by Chesser et al. [2014]; for simplicity, all references below have been updated with the new species name).

The Yuma Ridgway's rail is largely restricted to the lower Colorado River watershed and the Salton Sea, inhabiting freshwater and brackish water wetlands (Anderson and Ohmart 1985). Home range size varies seasonally and is greatest during winter and post-breeding (Eddleman 1989, Conway et al. 1993). Eddleman (1989) reported a mean annual home range size of more than 17 acres, while Conway et al. (1993) reported mean annual home range size to be 30 acres. Sites occupied by Yuma Ridgway's rail have a higher percent cover of shallow water (Eddleman 1989). Density of emergent vegetation has also been reported as an important habitat variable, although findings differ. Anderson and Ohmart (1985) found that Yuma Ridgway's rail typically reached their highest numbers year-round in the densest stands of emergent vegetation, while Conway et al. (1993) found low stem densities to be an important component. Species preferences also vary. Conway et al. (1993) found that cattails and bulrush are preferred, although Yuma Ridgway's rails have also been detected in wetlands dominated by common reed, salt cedar (*Tamarix ramosissima*), and willow (*Salix* spp.; Eddleman 1989, Hinojosa-Huerta et al. 2001). 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 Ridgway's rail (Anderson and Ohmart 1985). Habitat use also changes throughout the year, thus Conway et al. (1993) suggest that maintaining shallow, open water areas with stands of emergent vegetation at different successional stages would best support Ridgway's rails year-round.

Alcorn (1988) reported that eight Ridgway's rails were observed in the Las Vegas Sewage disposal drainage ditch on September 6, 1959, and that a lone individual was observed in the same location a few weeks later (the site of the detections is believed to be the present-day City of Las Vegas Water Pollution Control Facility discharge channel, located approximately 1.5 miles upstream of the Wetlands Park boundary; Figure 2). A Yuma Ridgway's rail was also detected along the Wash, within the Wetlands Park, on May 28 and June 18, 1998, in a wet, salt cedar-dominated area upstream of Pabco Road Weir (Southwest Wetlands Consortium 1998; Figure 2). As a result of informal Section 7 consultation with the U.S. Fish and Wildlife Service on the proposed development of the Wetlands Park and associated erosion control structures, the

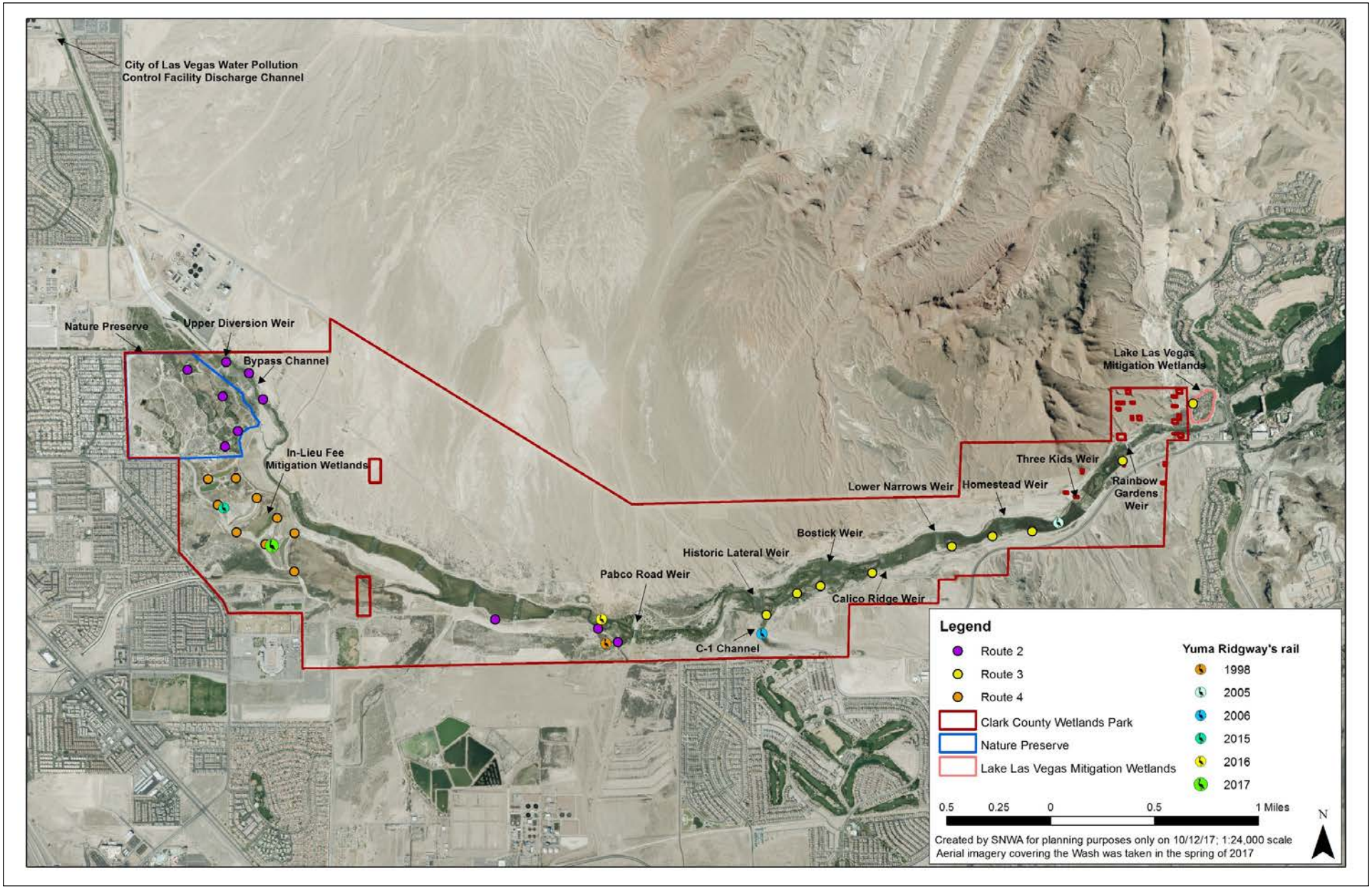


**Figure 2. Yuma Ridgway's rail detection locations and 2017 monitoring points by survey route. Locations of interest also shown.**

Southern Nevada Water Authority (SNWA), the lead agency of the LVWCC, began annual surveys to determine the occurrence of Yuma Ridgway's rail within the Wetlands Park.

SNWA contracted with permitted consultants to perform these surveys from 2000 to 2004 and 2006 to 2007. No Yuma Ridgway's rails were detected from 2000 to 2004, nor in 2007 (McKernan and Braden 2001, 2002; SWCA 2002, 2003, 2005, 2008). A Yuma Ridgway's rail was detected on May 23, 2005, during surveys for other species, calling from emergents in the impoundment of what is now the Three Kids Weir (SWCA 2006; Figure 2). On June 4 and June 7, 2006, also during surveys for other species, another Ridgway's rail was detected in the marsh along the C-1 Channel near where it discharges to the Wash (SWCA 2007; Figure 2). A Yuma Ridgway's rail was seen at the Mitigation Wetlands (Route 4) during aquatic bird counts on August 19, 2015, and was observed foraging in the same location on several mornings through September 3 (Van Dooremolen 2015). Finally, a Yuma Ridgway's rail was heard by Great Basin Bird Observatory staff during vegetation surveys on October 20, 2016. The bird called from a patch of common reed on the north bank of the Wash upstream of Pabco Road Weir (Figure 2; Van Dooremolen 2017).

Conway (2005, 2009) developed a protocol for conducting marsh bird monitoring surveys that includes calling for Ridgway's rail. The U.S. Fish and Wildlife Service accepted this protocol as the new official Yuma Ridgway's rail survey protocol in 2006. The survey protocol enables compliance obligations regarding the Ridgway's 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*), which are covered on the Lower Colorado River Multi-Species Conservation Program and may benefit from wetland revegetation efforts. Consequently, in 2007, the Las Vegas Wash Project Coordination Team (Wash Team; the implementation team of the LVWCC) initiated a marsh bird monitoring study along the Wash and within the Wetlands Park (Van Dooremolen 2010a, 2010b, 2012, 2013, 2014a, 2014b, 2015, 2017). Yuma Ridgway's rail could not be surveyed for the first year because the necessary federal permit was not in place; therefore, the species was not added to the survey until 2008. This report presents results from the 2017 monitoring season.

## 2.0 METHODS

### 2.1 Description of Survey Routes

Three routes totaling 28 points were surveyed in 2017 (Figure 2). GPS coordinates of the points are included in Appendix A.

Route 2 included ten points in 2017: four within the constructed wetland ponds at the Nature Preserve and six in the Wash, with one in the Upper Diversion Weir impoundment, two along the bypass channel, a new point above Upper Narrows Weir, and two upstream of Pabco Road Weir (Figure 2). The Nature Preserve ponds (3-acre lower pond [Vern's 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 and hardstem bulrush (*S. californicus* and *S. acutus*), common reed, sandbar willow (*S. exigua*), Goodding willow (*S. gooddingii*) and cottonwood (*Populus fremontii*). The Upper Diversion Weir point covers the 3.5-acre impoundment, which is now largely open water with little vegetation. The bypass channel points include three acres of emergent marsh dominated by bulrush and cattails, with some sandbar and Goodding willow,

and other woody riparian species. In the 13-acre impoundment of the Upper Narrows Weir, California and Olney bulrush (*S. americanus*), cattails, and common reed line the banks and there is extensive open water. The points at Pabco Road Weir cover approximately six acres of wetland habitat, with two points upstream of the weir. The emergent habitat is dominated by cattails and common reed. The riparian component of the habitat continued to recover (following clearing in winter 2015 for weir construction that was then delayed). 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.

Route 3 included nine points (approximately 55 acres of habitat; Figure 2) in 2017. The route begins in the small backwater wetland at the discharge of the C-1 Channel into the Wash (at the toe of Historic Lateral Weir) and continues downstream to end in the Lake Las Vegas mitigation wetlands, an off-channel wetland located on City of Henderson property just east of the Wetlands Park boundary. It includes points sampling the impoundments of Bostick, Calico Ridge, Homestead, Three Kids (reinitiated in 2016; originally surveyed in 2012 and 2013, prior to the construction of the weir) and Rainbow Gardens weirs, as well as the toe of Lower Narrows Weir (Figure 2). All of these locations have banks and islands covered in varying amounts of cattails, common reed, and bulrush. The oldest of them, Bostick and Calico Ridge, also have mature Goodding willow with lesser amounts of sandbar willow, cottonwood and other riparian vegetation. The other points have more limited riparian habitat.

Route 4 included nine points (approximately 60 acres of habitat; Figure 2) in 2017. The route is located in the Mitigation Wetlands created by Clark County. Two points were established on the small wetland cells, six points on the large cells, and one point immediately to the southeast, covering habitat created by Duck Creek and by the west channel, which carries overflows from Duck Creek and the Mitigation Wetlands. The three small cells are dominated by dense stands of cattails and common reed, with the closest open water approximately 150 feet or more from the points. The three large cells had been dominated by open water with cattails, bulrush, and common reed of varying width along the banks and in a few stands in the interior. Revegetation activities to enhance marsh in the cells' interiors began in fall 2016 and are further described in Section 3.2.3. Open water is deep in the small cells (greater than three feet), but mostly shallow in the large cells, which contain only narrow zones of deeper water. The habitat at the point immediately adjacent to the Mitigation Wetlands consists primarily of cattails, common reed, and flooded tamarisk.

Along each route, survey points were established a minimum of 656 feet apart. Although Conway (2005, 2009) recommends a separation of 1,312 feet, the Wash does not contain enough emergent marsh to allow for such wide spacing while still maintaining a sufficient number of points per route. Conway (2005, 2009) does allow for tighter spacing in such circumstances but warns of the risk of double-counting individuals.

### 2.2 Survey Protocol

Surveys were performed using the North American marsh bird monitoring protocol developed by Conway (2005, 2009). Trained observers conducted the surveys during the breeding season from April through early May. Three surveys of each route were conducted, as required by the protocol (from 2007-2016, a fourth survey was conducted, in mid-May) and each route was

surveyed on a separate day. Two observers conducted each survey, including at least one of the following permitted individuals: Deborah Van Dooremolen-TE148556-3, Nicholas Rice-TE64580A-2, and Timothy Ricks-TE67397A-2. Surveys began one half hour before sunrise and concluded by 9 a.m. Although Conway (2005, 2009) specifies that the survey route be run in the same direction every time, each route was run in reverse on the second survey to ensure that most points were surveyed during the earliest morning hours (the time of peak marsh bird vocalization). Surveys were not conducted if wind reached or exceeded 12 miles per hour, as measured by the Beaufort wind scale, for more than two points (see Appendix B for weather conditions on survey days).

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, Ridgway's rail, Virginia rail (*R. limicola*), and sora (*Porzana carolina*). Each species' vocalizations were broadcast for 30 seconds, followed by 30 seconds of silence to listen for responses, for a total of one minute per species. Species' vocalizations 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, Ridgway's rail, and American bittern. Vocalizations were broadcast using MP3 players with portable speakers. The observers 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 three other marsh bird species that were not targeted through the broadcast were also recorded, including pied-billed grebe (*Podilymbus podiceps*), common gallinule (*Gallinula galeata*), and American coot (*Fulica americana*). 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. The background noise level was also recorded at each point. Noise designated as loud or intense meant that at least some species could not be heard beyond approximately 165 or 80 feet, respectively.

The observers compared data after the survey was completed at each point in order to rectify any differences in detections.

### 2.3 Data Analysis

Detections of target and non-target species were summarized by 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 unique individuals per species along each route was also estimated. This number was calculated 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 number of individuals detected, i.e., the abundance, of each species. (Note: The above assumes that individuals inhabit a relatively small, defined area, a home range, throughout the survey season. Thus a sora detected at Point 1 during the second and third surveys on Route 4 would be considered a unique individual, and a sora detected at Point 6 on the same route in the fourth survey would be considered a unique individual.)

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 a per point abundance for each. Then for the study area as a whole, 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 to yield the total abundance per point for each. Per point abundance provides for a more accurate comparison between routes and between years than the raw abundance because the number of points surveyed has varied over time. However, it should also be noted that, with the exception of American coot, the number of individuals detected on each route is typically small enough that the loss or addition of just one or two individuals can have a noticeable impact on this metric.

Abundance data were compared with results from the previous year and with an average of all 11 years of surveys (eight for the Mitigation Wetlands) to look for changes. Charts of each species' abundance from 2007 through 2017 were also created to show trends and variations over time.

As stated in Section 2.1, the recommended spacing of points is 1,312 feet. Broadcasting from points with tighter spacing may impact bird behavior, calling them in from more distant points (Conway 2009). Since spacing for this study is half of the recommended distance, it is possible that some individuals were double-counted.

## 3.0 RESULTS AND DISCUSSION

As stated in Section 2.2, 2017 was the first year the three-survey only protocol was implemented. In the prior ten years of the study, four surveys were conducted. There were typically a few new individuals detected on the fourth survey, so this likely led to lower abundances for some species.

### 3.1 Species

In 2017, five of the six target species were detected: Yuma Ridgway's rail, American bittern, least bittern, Virginia rail, and sora (Table 1). Least bittern was the only target species identified on all routes. The three non-target species were also detected, with common gallinule and American coot ubiquitous, identified during all survey replicates on all routes (Table 1). Sora was the most abundant of the target species with 0.39 individuals per point (Table 2). American coot was the most abundant of all species with 11.32 birds per point (Table 2).

2017 was exceptional for marsh bird monitoring in the study area for several reasons. It was the first year five of the six target species were detected. More importantly, it was the first year field crews detected a Yuma Ridgway's rail during the official surveys. A single individual was heard

| Route | No. of Points | Date | AMBI | LEBI | YRRA | VIRA | SORA | PBGR | COGA | AMCO | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 10 | 4/4/2017 | | 2 | | 4 | | 1 | 3 | 101 | 111 |
| | | 4/17/2017 | | | | 2 | | 1 | 3 | 44 | 50 |
| | | 5/1/2017 | 1 | 1 | | 2 | | | 9 | 72 | 85 |
| 2 Total | | | 1 | 3 | 0 | 8 | 0 | 2 | 15 | 217 | 246 |
| 3 | 9 | 4/5/2017 | | | | 3 | 4 | 1 | 7 | 190 | 205 |
| | | 4/18/2017 | | | | 2 | 4 | | 6 | 29 | 41 |
| | | 5/2/2017 | | 1 | | 1 | | | 4 | 15 | 21 |
| 3 Total | | | 0 | 1 | 0 | 6 | 8 | 1 | 17 | 234 | 267 |
| 4 | 9 | 4/6/2017 | | | | | 2 | | 4 | 16 | 22 |
| | | 4/19/2017 | 1 | | 1 | | 4 | | 5 | 14 | 25 |
| | | 5/3/2017 | | 1 | 1 | | 1 | | 5 | 4 | 12 |
| 4 Total | | | 1 | 1 | 2 | 0 | 7 | 0 | 14 | 34 | 59 |
| Grand Total | 28 | | 2 | 5 | 2 | 14 | 15 | 3 | 46 | 485 | 572 |

**Table 1. Total 2017 detections for each species by route and date for the 28 points surveyed. AMBI=American Bittern, LEBI=Least Bittern, YRRA=Yuma Ridgway's Rail, VIRA=Virginia Rail, SORA=Sora, PBGR=Pied-billed Grebe, COGA=Common Gallinule, AMCO=American Coot.**

kekking from shallowly flooded cattail marsh on Route 4 on April 19 and again on May 3, more actively. The kek is the male's primary mate solicitation call (Rush et al. 2012). While two reports on eBird from May 7 stated that two individuals were heard and seen in the area (Miller 2017, Pietrzak 2017), Wash Team biologists were only able to confirm the presence of one Ridgway's rail. The bird did become much quieter on May 8, the day after this report, which could indicate that it had paired.

The 2017 detections of a Ridgway's rail, along with the 2015 and 2016 detections described in Section 1.0, suggest increased use of the project area by the species.

Other detections of note include American bittern on Routes 2 and 4. Prior to 2017, American bittern had only been detected twice during these surveys, once in 2010 and in 2015, and just on Route 4.

In other regards, 2017 results were similar to prior years. Least bittern, Virginia rail, and sora were identified, as they have been in all 11 years of surveys, as have the three non-target species (Table 2, Figures 3-5). Sora was the most abundant of the target species, as it has been every year, just as American coot has always been the most abundant, by far, of all species identified. Also as in all prior years of this study, no black rail were detected (Table 2). However, although richness increased in 2017, the abundances of several species declined year over year. While least bittern and common gallinule only declined slightly, both sora and pied-billed grebe decreased substantially, and all four species either tied historic lows or established new ones. Abundances of these species were also below their 11-year averages (Table 3, Figures 3-5), with both sora and pied-billed grebe dramatically lower. The picture for Virginia rail was more mixed, with abundance increasing year over year, but still below average. Conversely, American coot abundance increased year over year and was well above the 11-year average, establishing a new high for the study.

| | | | Target Species abundance (per point) | | | | | Non-target Species abundance (per point) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **Route** | **No. of Points** | **AMBI** | **LEBI** | **YRRA** | **VIRA** | **SORA** | **PBGR** | **COGA** | **AMCO** | **Grand Total** |
| 2007 | 1 | 9 | 0 (0.00) | 1 (0.11) | 0 (0.00) | 4 (0.44) | 7 (0.78) | 1 (0.11) | 1 (0.11) | 15 (1.67) | 29 (3.22) |
| | 2 | 8 | 0 (0.00) | 4 (0.50) | 0 (0.00) | 2 (0.25) | 5 (0.63) | 7 (0.88) | 14 (1.75) | 81 (10.13) | 113 (14.13) |
| | 3 | 7 | 0 (0.00) | 4 (0.57) | 0 (0.00) | 1 (0.14) | 2 (0.29) | 4 (0.57) | 13 (1.86) | 68 (9.71) | 92 (13.14) |
| 2007 | Total | 24 | 0 (0.00) | 9 (0.38) | 0 (0.00) | 7 (0.29) | 14 (0.58) | 12 (0.50) | 28 (1.17) | 164 (6.83) | 234 (9.75) |
| 2008 | 1 | 9 | 0 (0.00) | 0 (0.00) | 0 (0.00) | 4 (0.44) | 6 (0.67) | 1 (0.11) | 1 (0.11) | 20 (2.22) | 32 (3.56) |
| | 2 | 8 | 0 (0.00) | 2 (0.25) | 0 (0.00) | 0 (0.00) | 5 (0.63) | 4 (0.50) | 15 (1.88) | 41 (5.13) | 67 (8.38) |
| | 3 | 9 | 0 (0.00) | 9 (1.00) | 0 (0.00) | 1 (0.11) | 5 (0.56) | 5 (0.56) | 12 (1.33) | 151 (16.78) | 183 (20.33) |
| 2008 | Total | 26 | 0 (0.00) | 11 (0.42) | 0 (0.00) | 5 (0.19) | 16 (0.62) | 10 (0.38) | 28 (1.08) | 212 (8.15) | 282 (10.85) |
| 2009 | 1 | 9 | 0 (0.00) | 2 (0.22) | 0 (0.00) | 2 (0.22) | 5 (0.56) | 0 (0.00) | 0 (0.00) | 4 (0.44) | 13 (1.44) |
| | 2 | 8 | 0 (0.00) | 2 (0.25) | 0 (0.00) | 0 (0.00) | 6 (0.75) | 4 (0.50) | 11 (1.38) | 46 (5.75) | 69 (8.63) |
| | 3 | 8 | 0 (0.00) | 2 (0.25) | 0 (0.00) | 2 (0.25) | 5 (0.63) | 4 (0.50) | 13 (1.63) | 97 (12.13) | 123 (15.38) |
| 2009 | Total | 25 | 0 (0.00) | 6 (0.24) | 0 (0.00) | 4 (0.16) | 16 (0.64) | 8 (0.32) | 24 (0.96) | 147 (5.88) | 205 (8.20) |
| 2010 | 1 | 3 | 0 (0.00) | 0 (0.00) | 0 (0.00) | 2 (0.67) | 3 (1.00) | 0 (0.00) | 0 (0.00) | 0 (0.00) | 5 (1.67) |
| | 2 | 9 | 0 (0.00) | 2 (0.22) | 0 (0.00) | 2 (0.22) | 7 (0.78) | 3 (0.33) | 11 (1.22) | 28 (3.11) | 53 (5.89) |
| | 3 | 6 | 0 (0.00) | 2 (0.33) | 0 (0.00) | 0 (0.00) | 3 (0.50) | 1 (0.17) | 10 (1.67) | 50 (8.33) | 66 (11.00) |
| | 4 | 3 | 1 (0.33) | 0 (0.00) | 0 (0.00) | 3 (1.00) | 3 (1.00) | 0 (0.00) | 2 (0.67) | 3 (1.00) | 12 (4.00) |
| 2010 | Total | 21 | 1 (0.05) | 4 (0.19) | 0 (0.00) | 7 (0.33) | 16 (0.76) | 4 (0.19) | 23 (1.10) | 81 (3.86) | 136 (6.48) |
| 2011 | 2 | 9 | 0 (0.00) | 4 (0.44) | 0 (0.00) | 0 (0.00) | 5 (0.56) | 5 (0.56) | 11 (1.22) | 54 (6.00) | 79 (8.78) |
| | 3 | 6 | 0 (0.00) | 2 (0.33) | 0 (0.00) | 2 (0.33) | 2 (0.33) | 2 (0.33) | 8 (1.33) | 65 (10.83) | 81 (13.50) |
| | 4 | 9 | 0 (0.00) | 2 (0.22) | 0 (0.00) | 11 (1.22) | 9 (1.00) | 7 (0.78) | 9 (1.00) | 56 (6.22) | 94 (10.44) |
| 2011 | Total | 24 | 0 (0.00) | 8 (0.33) | 0 (0.00) | 13 (0.54) | 16 (0.67) | 14 (0.58) | 28 (1.17) | 175 (7.29) | 254 (10.58) |
| 2012 | 2 | 9 | 0 (0.00) | 5 (0.56) | 0 (0.00) | 1 (0.11) | 8 (0.89) | 5 (0.56) | 14 (1.56) | 32 (3.56) | 65 (7.22) |
| | 3 | 9 | 0 (0.00) | 4 (0.44) | 0 (0.00) | 3 (0.33) | 13 (1.44) | 2 (0.22) | 16 (1.78) | 184 (20.44) | 222 (24.67) |
| | 4 | 9 | 0 (0.00) | 6 (0.67) | 0 (0.00) | 13 (1.44) | 14 (1.56) | 6 (0.67) | 10 (1.11) | 36 (4.00) | 85 (9.44) |
| 2012 | Total | 27 | 0 (0.00) | 15 (0.56) | 0 (0.00) | 17 (0.63) | 35 (1.30) | 13 (0.48) | 40 (1.48) | 252 (9.33) | 372 (13.78) |
| 2013 | 2 | 9 | 0 (0.00) | 3 (0.33) | 0 (0.00) | 1 (0.11) | 5 (0.56) | 3 (0.33) | 15 (1.67) | 71 (7.89) | 98 (10.89) |
| | 3 | 9 | 0 (0.00) | 1 (0.11) | 0 (0.00) | 2 (0.22) | 5 (0.56) | 0 (0.00) | 8 (0.89) | 48 (5.33) | 64 (7.11) |
| | 4 | 9 | 0 (0.00) | 3 (0.33) | 0 (0.00) | 7 (0.78) | 12 (1.33) | 5 (0.56) | 10 (1.11) | 59 (6.56) | 96 (10.67) |
| 2013 | Total | 27 | 0 (0.00) | 7 (0.26) | 0 (0.00) | 10 (0.37) | 22 (0.81) | 8 (0.30) | 33 (1.22) | 178 (6.59) | 258 (9.56) |
| 2014 | 2 | 9 | 0 (0.00) | 5 (0.56) | 0 (0.00) | 0 (0.00) | 11 (1.22) | 5 (0.56) | 16 (1.78) | 45 (5.00) | 82 (9.11) |
| | 3 | 7 | 0 (0.00) | 2 (0.29) | 0 (0.00) | 1 (0.14) | 4 (0.57) | 1 (0.14) | 3 (0.43) | 140 (20.00) | 151 (21.57) |
| | 4 | 9 | 0 (0.00) | 5 (0.56) | 0 (0.00) | 5 (0.56) | 16 (1.78) | 3 (0.33) | 13 (1.44) | 33 (3.67) | 75 (8.33) |
| 2014 | Total | 25 | 0 (0.00) | 12 (0.48) | 0 (0.00) | 6 (0.24) | 31 (1.24) | 9 (0.36) | 32 (1.28) | 218 (8.72) | 308 (12.32) |
| 2015 | 2 | 9 | 0 (0.00) | 4 (0.44) | 0 (0.00) | 1 (0.11) | 7 (0.78) | 6 (0.67) | 17 (1.89) | 24 (2.67) | 59 (6.56) |
| | 3 | 7 | 0 (0.00) | 2 (0.29) | 0 (0.00) | 3 (0.43) | 5 (0.71) | 2 (0.29) | 12 (1.71) | 98 (14.00) | 122 (17.43) |
| | 4 | 9 | 1 (0.11) | 3 (0.33) | 0 (0.00) | 5 (0.56) | 6 (0.67) | 4 (0.44) | 10 (1.11) | 40 (4.44) | 69 (7.67) |
| 2015 | Total | 25 | 1 (0.04) | 9 (0.36) | 0 (0.00) | 9 (0.36) | 18 (0.72) | 12 (0.48) | 39 (1.56) | 162 (6.48) | 250 (10.00) |
| 2016 | 2 | 9 | 0 (0.00) | 2 (0.22) | 0 (0.00) | 0 (0.00) | 7 (0.78) | 4 (0.44) | 7 (0.78) | 23 (2.56) | 43 (4.78) |
| | 3 | 8 | 0 (0.00) | 1 (0.13) | 0 (0.00) | 2 (0.25) | 3 (0.38) | 1 (0.13) | 12 (1.5) | 155 (19.38) | 174 (21.75) |
| | 4 | 9 | 0 (0.00) | 2 (0.22) | 0 (0.00) | 3 (0.33) | 7 (0.78) | 4 (0.44) | 7 (0.78) | 76 (8.33) | 99 (11.00) |
| 2016 | Total | 26 | 0 (0.00) | 5 (0.19) | 0 (0.00) | 5 (0.19) | 17 (0.65) | 9 (0.35) | 26 (1.00) | 254 (9.77) | 316 (12.15) |
| 2017* | 2 | 10 | 1 (0.10) | 3 (0.30) | 0 (0.00) | 4 (0.40) | 0 (0.00) | 1 (0.10) | 10 (1.00) | 103 (10.30) | 122 (12.20) |
| | 3 | 9 | 0 (0.00) | 1 (0.11) | 0 (0.00) | 4 (0.44) | 6 (0.67) | 1 (0.11) | 10 (1.11) | 192 (21.33) | 214 (23.78) |
| | 4 | 9 | 1 (0.11) | 1 (0.11) | 1 (0.11) | 0 (0.00) | 5 (0.56) | 0 (0.00) | 7 (0.78) | 22 (2.44) | 37 (4.11) |
| 2017* | Total | 28 | 2 (0.07) | 5 (0.18) | 1 (0.04) | 8 (0.29) | 11 (0.39) | 2 (0.07) | 27 (0.96) | 317 (11.32) | 373 (13.32) |

* In 2017, three surveys were conducted along each route. Prior to that, four surveys were conducted.

**Table 2. Total and per point abundances by year and route for 2007-2017. AMBI=American Bittern, LEBI=Least Bittern, YRRA= Yuma Ridgway's Rail, VIRA=Virginia Rail, SORA=Sora, PBGR=Pied-billed Grebe, COGA=Common Gallinule, AMCO=American Coot.**

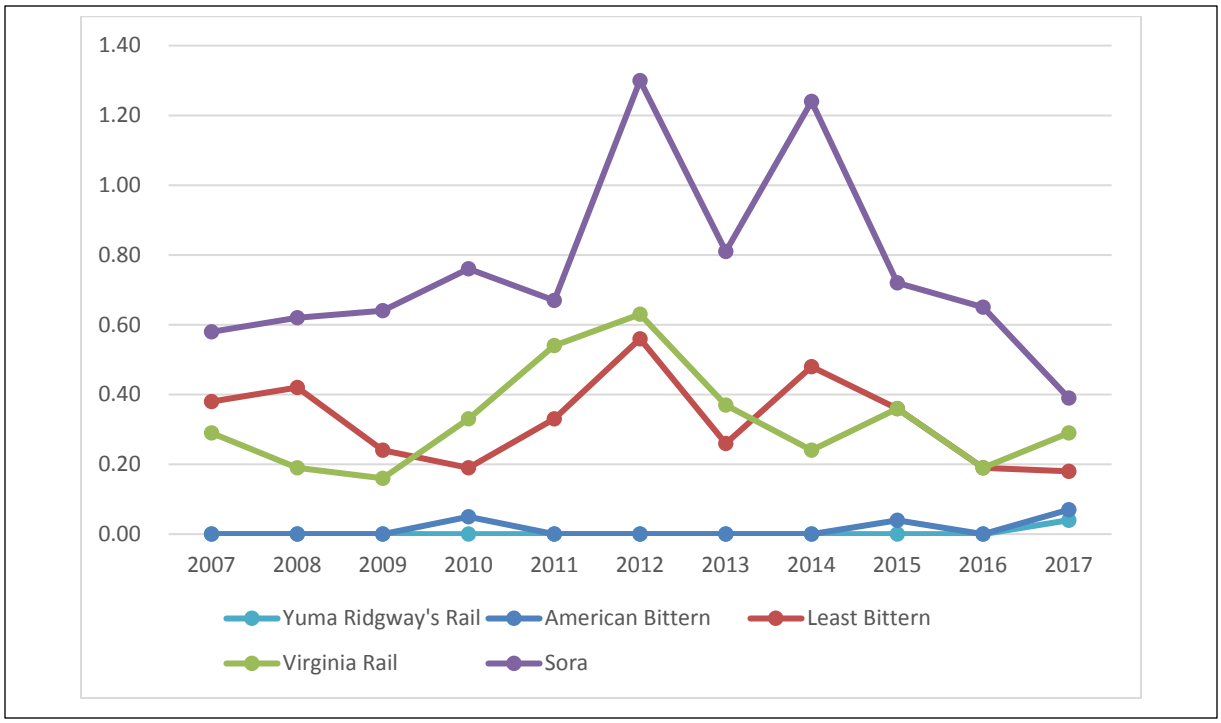


**Figure 3. Target species per point abundances by year, 2007-2017.**

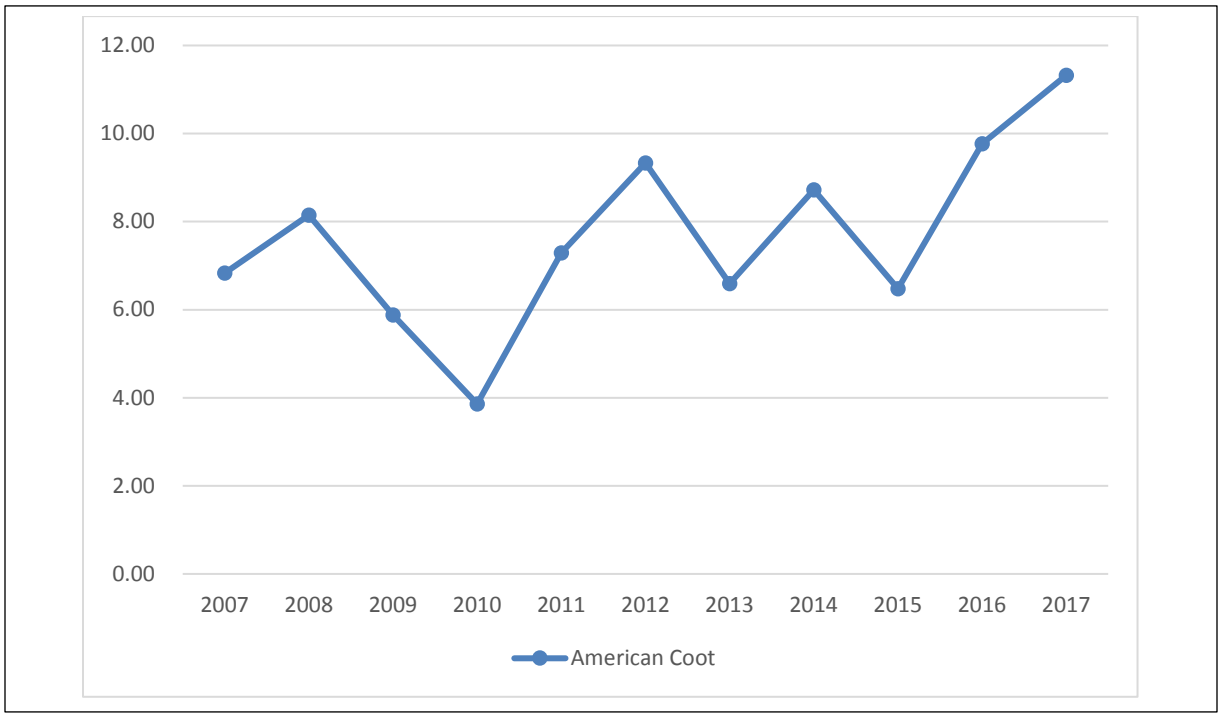


**Figure 4. American coot per point abundance by year, 2007-2017.**

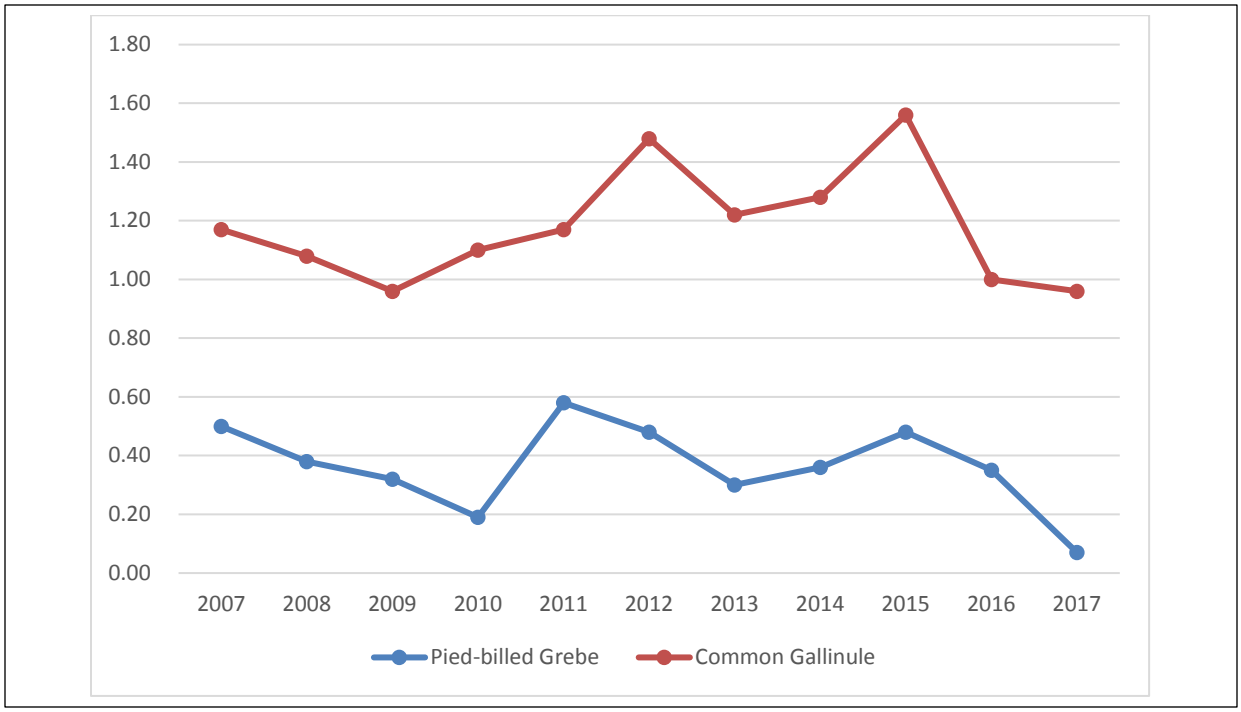


**Figure 5. Pied-billed grebe and common gallinule per point abundances by year, 2007-2017.**

## 3.2 Routes

### 3.2.1 Route 2

In 2017, Route 2 had the highest abundance of least bittern and the lowest abundance of sora, with zero detections (Table 3). The latter is exceptional, not just for this route, but for any route over the course of the study (Table 2). Also of note, American bittern was detected here in early May; as stated in Section 3.1, the few prior detections had been confined to Route 4.

Results were mixed when compared with the prior year and study averages for the route (Table 3). In addition to sora, pied-billed grebe abundance was down significantly and well below average, while Virginia rail and coot increased substantially in abundance year over year and were well above average. Least bittern and common gallinule abundances were up compared to 2016 but still below average.

Overall, habitat quality was fair to good in 2017, as in the prior year, but there were still noteworthy changes along the route. Flooding had negatively impacted the marsh in the Upper Diversion Weir impoundment in 2016, flattening a large area of cattails and depositing sediment and trash in the spring. Then in winter, all vegetation and garbage were removed, leaving open water and some mudflats. The site typically hosted several sora, a few pied-billed grebe and common gallinule, as well as the occasional least bittern. In 2017, no sora (or least bittern) were detected there. However other sites along the route have generally hosted at least a few sora detections each year, so the decline to zero cannot be attributed solely to this change. Additionally, the loss of habitat at Upper Diversion Weir was balanced out in part by the addition of the site at Upper Narrows Weir, which likely represents the most suitable potential

| Route | Year | AMBI | LEBI | VIRA | SORA | PBGR | COGA | AMCO | Grand Total |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 2016 | 0.00 | 0.22 | 0.00 | 0.78 | 0.44 | 0.78 | 2.56 | 4.78 |
| | 2017 | 0.10 | 0.30 | 0.40 | 0.00 | 0.10 | 1.00 | 10.30 | 12.20 |
| | 11Y AVG | **0.01** | **0.37** | **0.11** | **0.69** | **0.49** | **1.47** | **5.65** | **8.78** |
| 3 | 2016 | 0.00 | 0.13 | 0.25 | 0.38 | 0.13 | 1.50 | 19.38 | 21.75 |
| | 2017 | 0.00 | 0.11 | 0.44 | 0.67 | 0.11 | 1.11 | 21.33 | 23.78 |
| | 11Y AVG | **0.00** | **0.35** | **0.24** | **0.60** | **0.27** | **1.39** | **14.39** | **17.24** |
| 4 | 2016 | 0.00 | 0.22 | 0.33 | 0.78 | 0.44 | 0.78 | 8.33 | 11.00 |
| | 2017 | 0.11 | 0.11 | 0.00 | 0.56 | 0.00 | 0.78 | 2.44 | 4.11 |
| | 8Y AVG | **0.07** | **0.31** | **0.74** | **1.09** | **0.40** | **1.00** | **4.58** | **8.21** |
| Total | 2016 | 0.00 | 0.19 | 0.19 | 0.65 | 0.35 | 1.00 | 9.77 | 12.15 |
| | 2017 | 0.07 | 0.18 | 0.29 | 0.39 | 0.07 | 0.96 | 11.32 | 13.32 |
| | 11Y AVG | **0.02** | **0.31** | **0.34** | **0.76** | **0.35** | **1.16** | **7.69** | **10.64** |

**Table 3. Per point abundances for select species for each route and overall for 2016 and 2017 with study averages. Overall averages include data from Route 1, which was surveyed from 2007 through 2010. AMBI=American Bittern, LEBI=Least Bittern, VIRA=Virginia Rail, SORA=Sora, PBGR=Pied-billed Grebe, COGA=Common Gallinule, AMCO=American Coot.**

habitat currently available for Yuma Ridgway's rail on the Wash channel itself. The site has extensive cattails and bulrush and a large expanse of open water, and hosted all of the route's detections of Virginia rail (establishing a new high), most of its coots, and one of the route's three least bitterns.

While habitat had not noticeably degraded along the bypass channel, the points hosted no detections in 2017 and only a few detections (of non-target species) in 2016. The habitat is likely still suitable for some marsh bird species but has always been too narrow to be considered suitable for Ridgway's rail.

The habitat that was cleared in 2015 near the points above Pabco Road Weir continued to recover. However, construction activities for the Sunrise Mountain Weir, which had been placed on hold following the clearing, recommenced in October 2017. This will likely mean that these points will not be surveyed in 2018.

Cattails in the Nature Preserve continued to age and expand, further closing off portions of the ponds, reducing open water. Clark County's last widespread cattail management occurred in 2014.

### 3.2.2 Route 3

Route 3 had the highest per point abundances of most of the species in 2017, including Virginia rail, sora, pied-billed grebe, common gallinule and American coot (Table 3), although raw abundances were shared with Route 2 for some (Table 2). The route shared the lowest abundance of least bittern with Route 4, with only one detected. This is the same raw abundance as in 2016, but per point abundance declined to a study low of 0.11 and was well below average (Table 3). Abundances for pied-billed grebe and common gallinule also declined from 2016 and were below average, while abundances for Virginia rail, sora and coot increased year over year and were substantially above average (Table 3). In fact, each of the latter three species established new highs along the route, aided to varying degrees by the re-establishment of the

point between Homestead and Three Kids weirs (sora and coot) and the recovery of emergent marsh habitat above Rainbow Gardens Weir (sora and Virginia rail).

Overall, habitat quality in 2017 was still fair to good but with some localized improvement over the prior year. This includes the aforementioned recovery of wetlands upstream of Rainbow Gardens Weir (from being cleared in fall 2015), as well as the addition of the marsh between Homestead and Three Kids weirs. Also, habitat in the two-point stretch between Lower Narrows and Homestead weirs continued to improve and expand, and likely represents the highest quality potentially suitable nesting habitat for Ridgway's rail on the route. Habitat quality at the Lake Las Vegas mitigation wetlands continued to be marginal.

### 3.2.3 Route 4

2017 was an interesting year for Route 4. The route hosted the first Yuma Ridgway's rail to be detected by these surveys. The site also had American bittern. It had the highest richness of target species, with four of the five detected. However, the site, which had hosted the highest abundance of Virginia rail since the inception of surveys there in 2010 and of total target species since 2011, had zero detections of the former and lagged Route 3 for the latter. The route also had the lowest abundances for most species (Tables 2 and 3). Further, with the noted exception of the Ridgway's rail and American bittern, abundances were down from the prior year and below average for all but the common gallinule, which did not decline but was still below average (Table 3).

In 2016, it was suggested that water level changes in spring may have contributed to the year over year declines of some species along the route. There is little doubt that lower water levels and other changes in hydrology at the site contributed to a continued decline in 2017. Water levels were lowered in two of the three large wetland cells to aid the growth of new plantings. Common reed was removed from select areas along the banks, and riparian and wetland vegetation was planted both in the cleared areas and on hummocks in the interior of the cells to help Clark County meet their U.S. Army Corps of Engineers permit requirements for the project. Cell 5 had just a thin stream of water covering a small portion of the site during the monitoring season, allowing cattails and other wetland vegetation to volunteer across most of the interior. Cell 6 varied from shallowly flooded to largely dry but for a zone of deeper open water. Only Cell 7, which hosted the majority of the target species detections including the Yuma Ridgway's rail, three of the sora, and the American and least bitterns, had sufficient water present throughout most of the spring to flood the emergent marsh along the edges, as well as the interior.

In addition to the water level changes in the cells, in March, Clark County re-channelized Duck Creek, leading to reduced inundation at the point to the southeast. From 2010 through 2016, this point hosted an average of 3.57 individuals of target species and 6.43 individuals of all recorded species. In 2017, only three individuals were detected: one sora and two common gallinules.

Despite the somewhat mixed results, the Mitigation Wetlands continue to offer the highest quality emergent wetland habitat in the study area, and the highest quality potentially suitable nesting habitat for Yuma Ridgway's rail, as shown by the rail establishing and maintaining a breeding territory at the site throughout the spring (the last confirmed detection of the individual

was on June 1 [D. Van Dooremolen, pers. obs.]). Recent activities should further improve habitat quality on the site.

## 4.0 RECOMMENDATIONS

Annual monitoring for Yuma Ridgway's rail is necessary to comply with informal Section 7 consultation measures. The value of this monitoring is particularly apparent in light of the 2017 detections of a Ridgway's rail on territory within the study area. Thus, it is recommended that marsh bird monitoring continue in 2018.

One of the benefits of the marsh bird protocol is that it allows for the collection of data on other species while still meeting requirements for the Yuma Ridgway's rail. To that end, monitoring points sample a variety of wetland habitat, including areas that are more suitable for other target species, but not as suitable for the Ridgway's rail. Given the recent detections and its status as a primary driver for these surveys, points with little potential suitability for the Ridgway's rail will be discarded in favor of those with greater potential, where applicable.

Weir construction has been ongoing on the Wash since 1999, and several structures have been completed since marsh bird monitoring began in 2007. These weirs resulted in additional habitat that needed to be surveyed. The result was a piecemeal approach, with points being added as habitat became available. Construction is now under way on the final erosion control structures planned for the Wash. Completion is scheduled for 2019. After these areas have been revegetated, all marsh bird monitoring routes will be reviewed and reconfigured as needed.

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# Appendix A

GPS Coordinates for 2017
Marsh Bird Monitoring Points

| Route | Point | Eastings | Northings | Location (Primary) | Comments |
|---|---|---|---|---|---|
| 2 | 1 | 678178 | 3996968 | Nature Preserve, Vern's Pond | |
| 2 | 1.5 | 678276 | 3997090 | Nature Preserve, Vern's Pond | |
| 2 | 2 | 678155 | 3997357 | Nature Preserve, Middle Ponds | |
| 2 | 3 | 677879 | 3997558 | Nature Preserve, Upper Pond | |
| 2 | 4.5 | 678178 | 3997623 | Wash, Upper Diversion Weir | |
| 2 | 4.6 | 678357 | 3997540 | Wash, Bypass Channel | |
| 2 | 4.7 | 678468 | 3997338 | Wash, Bypass Channel | |
| 2 | 4.8 | 680290 | 3995659 | Wash, Upper Narrows Weir | |
| 2 | 5 | 681090 | 3995598 | Wash, Upstream of Pabco Road Weir | |
| 2 | 6 | 681245 | 3995496 | Wash, Upstream of Pabco Road Weir | |
| 3 | 1.5A | 682393 | 3995724 | Wash, C-1 Channel | ~80 feet SSE up the C-1 Channel due to changed hydrology |
| 3 | 2 | 682626 | 3995895 | Wash, Bostick Impoundment | |
| 3 | 3 | 682808 | 3995954 | Wash, Bostick Impoundment | |
| 3 | 4.5 | 683207 | 3996062 | Wash, Calico Ridge Weir Impoundment | |
| 3 | 4.55 | 683820 | 3996274 | Wash, toe of Lower Narrows Weir | Added in 2014 to cover marsh below Lower Narrows Weir |
| 3 | 4.56 | 684134 | 3996360 | Wash, head of Homestead Weir | Added in 2016 to cover marsh above Homestead Weir |
| 3 | 4.6 | 684442 | 3996402 | Wash, Three Kids Weir Impoundment | Added back in for 2017 following redevelopment of habitat |
| 3 | 7 | 685136 | 3996960 | Wash, Rainbow Gardens Weir Impoundment | |
| 3 | 8 | 685673 | 3997411 | Lake Las Vegas Mitigation Wetlands | |
| 4 | 0.5 | 678726 | 3996304 | Mitigation Wetlands, Cell 7 | |
| 4 | 1 | 678730 | 3996008 | Duck Creek and West Channel | |
| 4 | 2.5 | 678502 | 3996216 | Mitigation Wetlands, Cell 7 | |
| 4 | 3.5 | 678591 | 3996420 | Mitigation Wetlands, Cell 6 | |
| 4 | 4 | 678276 | 3996306 | Mitigation Wetlands, Cell 6 | |
| 4 | 5 | 678130 | 3996515 | Mitigation Wetlands, Cell 5 | |
| 4 | 6 | 678051 | 3996715 | Mitigation Wetlands, Cell 1 | |
| 4 | 7 | 678266 | 3996725 | Mitigation Wetlands, Cell 3 | |
| 4 | 8 | 678431 | 3996573 | Mitigation Wetlands, Cell 5 | |

# Appendix B

2017 Survey Weather Conditions

| Date | Route # | Temperature (Start/ Finish) - Fahrenheit | Sky (Start/Finish) | Beaufort (Start/Finish) |
|---|---|---|---|---|
| 4/4/2017 | 2 | 50/70 | clear skies/clear skies | 0 (<1 mph)/0 (<1 mph) |
| 4/5/2017 | 3 | 53/69 | clear skies/clear skies | 0 (<1 mph)/0 (<1 mph) |
| 4/6/2017 | 4 | 52/59 | clear skies/clear skies | 0 (<1 mph)/0 (<1 mph) |
| 4/17/2017 | 2 | 70/80 | partly cloudy/partly cloudy | 0 (<1 mph)/1 (1-3 mph) |
| 4/18/2017 | 3 | 70/72 | clear skies/clear skies | 2 (4-7 mph)/2 (4-7 mph) |
| 4/19/2017 | 4 | 54/65 | clear skies/clear skies | 0 (<1 mph)/0 (<1 mph) |
| 5/1/2017 | 2 | 54/81 | clear skies/clear skies | 0 (<1 mph)/0 (<1 mph) |
| 5/2/2017 | 3 | 57/79 | clear skies/clear skies | 0 (<1 mph)/0 (<1 mph) |
| 5/3/2017 | 4 | 70/79 | clear skies/clear skies | 1 (1-3 mph)/1 (1-3 mph) |