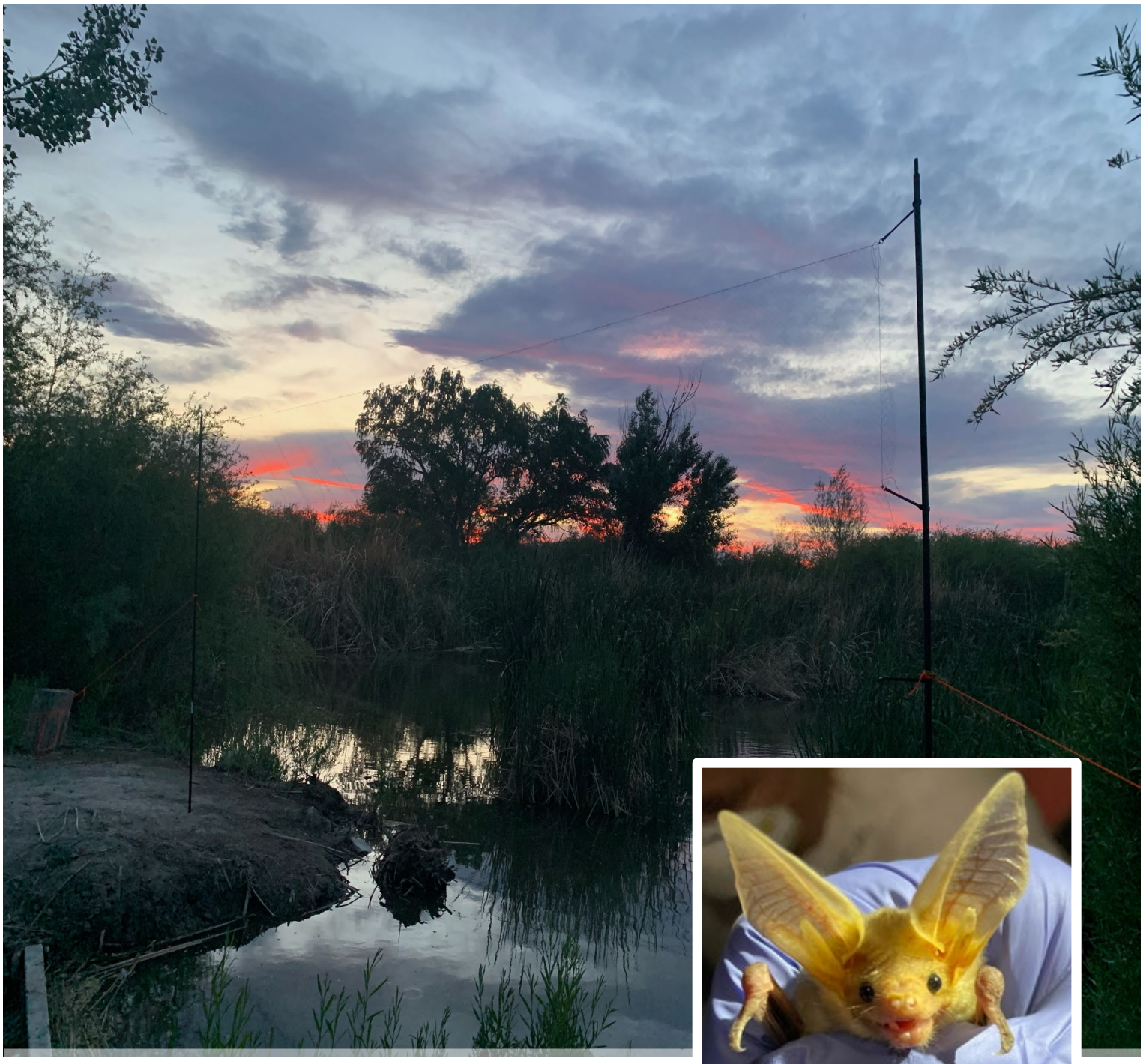

Bat Mist-netting Surveys along the Las Vegas Wash, 2023–2024

September 2025

Las Vegas Wash Coordination Committee

lvwash.org

Bat Mist-netting Surveys along the Las Vegas Wash, 2023–2024

SOUTHERN NEVADA WATER AUTHORITY
Las Vegas Wash Project Coordination Team

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ABSTRACT

For more than 25 years, the Las Vegas Wash Coordination Committee (LVWCC) has been working on stabilizing and enhancing the Las Vegas Wash (Wash). Throughout this process, the LVWCC has completed many wildlife studies to determine program impacts on species that utilize the Wash, including bats. The most recent surveys were completed in 2010 and since then the Wash has undergone substantial changes including the addition of eight erosion control structures, removal of nonnative plants and revegetation with native plants. Additionally, since 2006, *Pseudogymnoascus destructans* (*Pd*), the fungus that causes white-nose syndrome (WNS), has been spreading rapidly and is now found in 40 states and nine Canadian provinces. WNS has caused the deaths of millions of bats throughout the country with some species having lost more than 90% of their populations. With these changes, along with a concern that *Pd* could spread to the bat population at the Wash, there has been a growing need for another iteration of bat surveys.

Capture surveys were originally slated to run from April through September 2023 but were paused in the beginning of that June due to the presence of threatened and endangered birds in the study area, since there was no authorized incidental take for project activities. Upon receipt of the biological opinion, surveys recommenced and ran from March through September 2024. Ten net nights were conducted in 2023 and 24 net nights in 2024, resulting in the capture of 162 bats comprised of six species. Species richness varied between sites and no site captured all six species. The Historic Lateral North and Nature Preserve sites accounted for nearly 80% of sampling nights and captured more than 95% of bats. All six species were also captured between these two sites. Once known as one of the best locations to capture bats, Pabco South has degraded over the years and resulted in the capture of only four *Myotis yumanensis* during surveys. All sampling months except for March and June resulted in the capture of more than 20 individuals. There is no obvious explanation for the low catch rates in June, but March may be a result of sampling too early in the season, when most species are still in hibernation or have not begun migration. Although early spring sampling does not typically result in large numbers of individuals, it provides the best chance of detecting the presence of *Pd*. *Pd* sampling occurred in the months of March–May. During this sampling, 52 bats were captured and swabbed along their forearm and muzzle. *Pd* was not detected in any of the Wash samples, and *Pd* has not been detected within the state of Nevada.

With the continued spread of *Pd* throughout the country, the ever-changing landscape due to revegetation, wildfires and construction, and possible changes to the conservation status of species due to WNS, bat surveys should be replicated every five years along the Wash, with WNS sampling occurring every spring. This suggested schedule can change to allow for less time between surveys if deemed appropriate.

ACKNOWLEDGMENTS

This project required many individuals to be successful, and I extend my utmost gratitude to everyone involved in this work over the years. I thank Nayelit Ramirez, Adrienne Reschman and the many volunteers who participated in surveys. A special thank you goes to Aaron Ambos for being an important part of this program. Aaron has offered knowledge, expertise and help during surveys. Thank you to the Nevada Department of Wildlife for their assistance during surveys, offering up equipment, and for making the WNS sampling and analysis possible. Additionally, thank you to the National Wildlife Health Center for analyzing all WNS samples that were sent in from this project. I would like to thank Southern Nevada Water Authority for offering security each night during surveys to ensure our safety. Thank you to Megan Singleton and Tamra O'Halloran for their support in continually improving the survey application and creating maps for this report. A thank you goes out to Jason Eckberg for imparting his knowledge, assistance and expertise in this study. I would like to thank Debbie Van Dooremolen for reviewing and editing the report. Finally, I thank Keiba Crear and the Research and Environmental Monitoring Study Team for their continued support and guidance throughout the study.

Bat Mist-netting Surveys along the Las Vegas Wash, 2023–2024

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1.0 INTRODUCTION

1.1 Background

The Las Vegas Wash (Wash) is located in Clark County, NV, USA, and is the primary drainage channel for the Las Vegas Valley, carrying highly treated wastewater, shallow groundwater, urban runoff and stormwater to Lake Mead (Figure 1). Population increases in the valley resulted in perennial flows that created wetland and riparian habitat along the Wash, but the continued increase in daily flows coupled with large flooding events caused significant habitat degradation and erosion in the latter half of the 20th century. In 1998, the Las Vegas Wash Coordination Committee (LVWCC) was formed to protect and enhance this valuable waterway. The LVWCC developed the Las Vegas Wash Comprehensive Adaptive Management Plan (CAMP) to help guide management practices (LVWCC 2000). The CAMP outlined 44 action items, one of which was to develop long-term monitoring and management plans including a long-term fish and wildlife management plan.

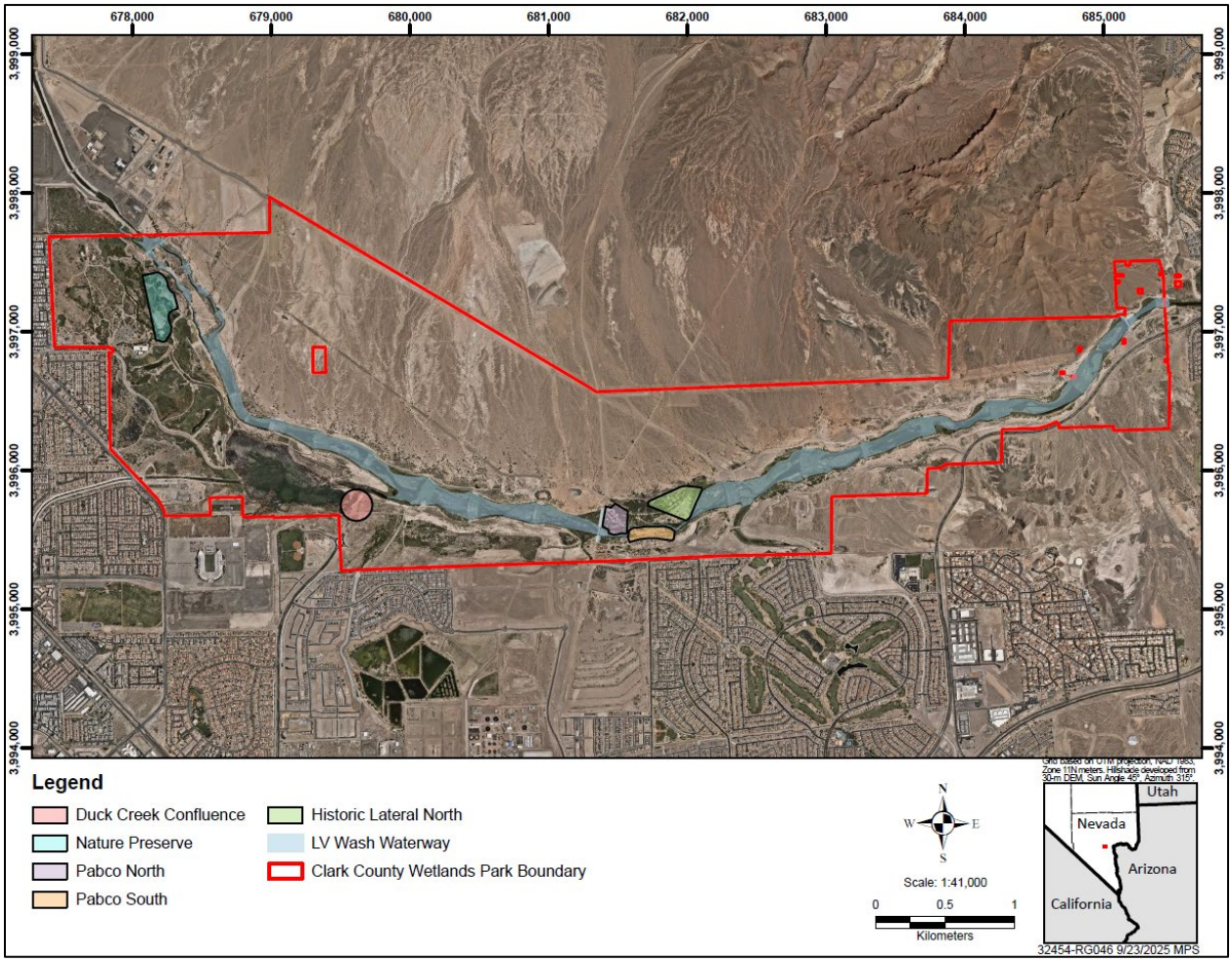

Figure 1. Las Vegas Wash location and general study area map.

Las Vegas Wash Project Coordination Team (Wash Team) staff have completed many wildlife studies to inventory, and determine program impacts on, species that utilize the Wash. Data from

several of these studies was used to develop the Las Vegas Wash Wildlife Management Plan (WMP; Shanahan et al. 2008). One of the management objectives set forth in the WMP is to conserve the abundance and diversity of native wildlife species that have been found along the Wash. The WMP provides recommended actions to help meet this objective, and one recommended action is to continue to monitor the abundance and diversity of wildlife, including bats.

Bradley and Niles (1973) conducted the first known wildlife study at the Wash that included information on bats. Although no bat sampling was conducted, they listed 10 species identified through previous collections by shooting and mist netting. O'Farrell and Shanahan (2006) recorded 17 bat species acoustically during surveys led by the Wash Team in 2004–2005. Of the 17, five species had not been previously documented in the valley and eight were not reported in Bradley and Niles (1973). A larger study, including the results from O'Farrell and Shanahan (2006) and capture data, was completed from 2004 through 2009 (Foster and Svedlow 2011). This study included the 17 species previously identified, an additional species identified acoustically and data collected from 195 captured bats comprised of eight species. A 2010 bat survey conducted at the Wash used acoustic and capture methods to look at habitat and food preferences (Eckberg and Foster 2011). This study identified 13 species of bats acoustically and five species through capture, all of which had been recorded previously.

Since the completion of the Foster and Svedlow (2011) and Eckberg and Foster (2011) studies, the Wash has undergone substantial changes including the addition of eight erosion control structures (weirs), removal of more than 65 hectares of nonnative plants and the revegetation of more than 80 hectares with native plants. In total, there are now 21 weirs, and more than 242 hectares have been revegetated with native vegetation along the channel. Given these changes, as well as the directives of the WMP, mist netting for bats was conducted along the Wash in 2023–2024.

1.2 *Pseudogymnoascus destructans* and White-nose Syndrome

In the winter of 2006, *Pseudogymnoascus destructans* (*Pd*), the fungus that causes white-nose syndrome (WNS), was first detected in bats in New York. To date, the fungus has been detected in 40 states and nine Canadian provinces (White-nose Syndrome Response Team [WNSRT] 2025). WNS has caused the deaths of millions of bats throughout the country, mostly east of the continental divide. Some species have lost more than 90% of their populations, with *Myotis lucifugus* being reviewed by the U.S. Fish and Wildlife Service (USFWS) for endangered status in 2021 as a direct result (WNSRT 2025).

Pd has not been identified in Nevada as of the writing of this report, but bats have tested positive for *Pd* in Inyo County, CA, San Juan County, UT, and most recently Cochise County, AZ (WNSRT 2025, Figure 2). Inyo County is located only a few hours west of the Wash. Consequently, sampling for *Pd* was conducted each spring; *Pd* grows during winter hibernation, so it is recommended to collect samples immediately following spring emergence.

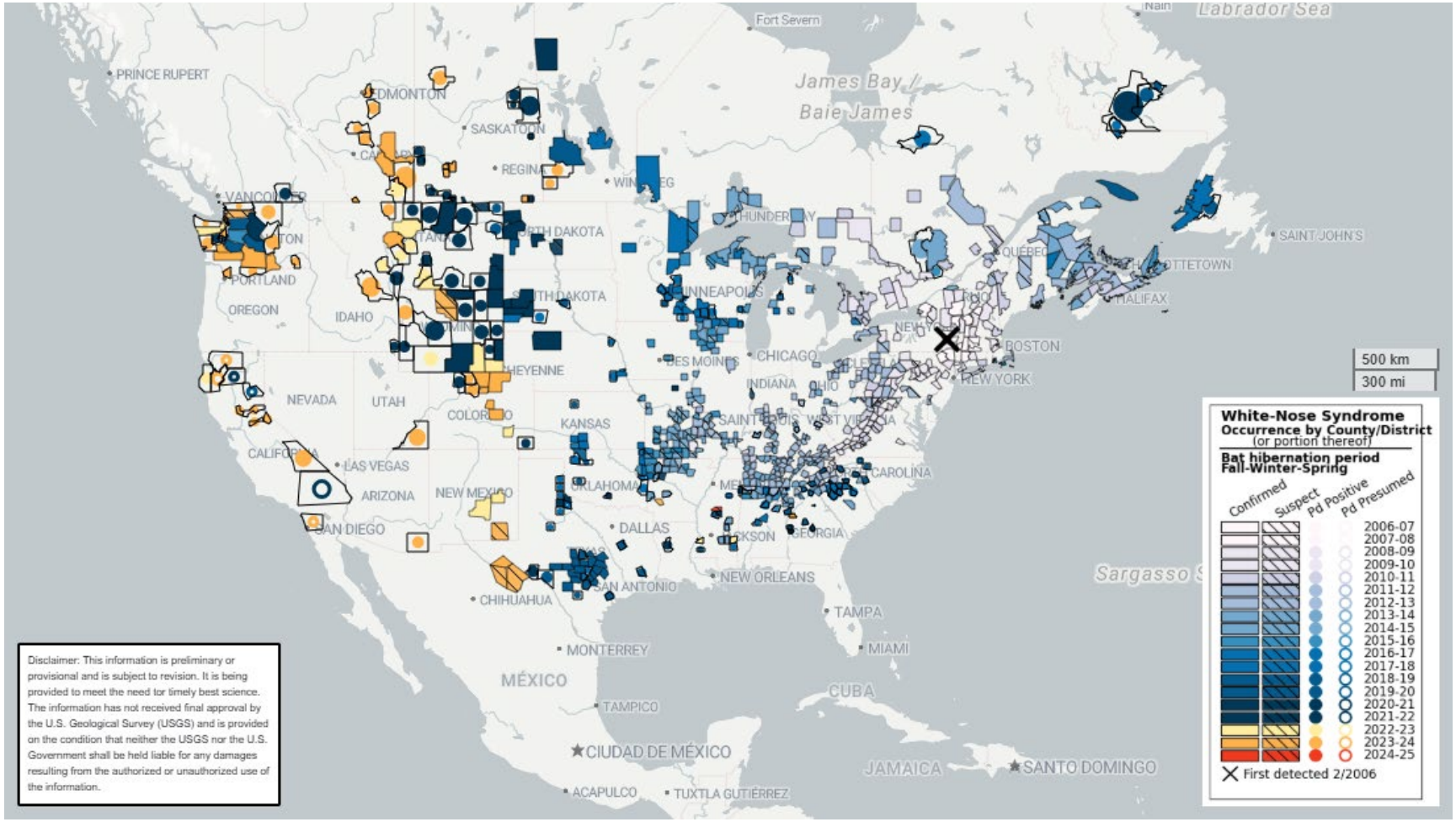

Figure 2. White-nose syndrome occurrence map (map provided by White-nose Syndrome Response Team).

2.0 METHODS

2.1 Survey Timing and Effort

Capture surveys were originally slated to run from April through September 2023 but were paused that June due to the presence of federally listed bird species—southwestern willow flycatcher and yellow-billed cuckoo—in the study area. A biological opinion (BO) was sought and obtained from USFWS that allows limited incidental take (1 of each total) during bat mist-netting surveys. Wash Team staff recommenced live capture surveys in March 2024.

Ten net nights were conducted in 2023 and 24 net nights in 2024. During regular live capture surveys (May–September), mist netting occurred four nights a month. During *Pd* sampling in April 2023 and March–April 2024, net nights were less consistent (2–5 nights per month).

2.2 Live Capture Equipment

Following the recommendation in Foster and Svedlow (2011), only mist nets were used for these surveys. Mist nets had a 38-mm mesh, were 2.6-m high and had varying lengths (6 m and 9 m). Single mist nets, as well as triple-high mist nets were used to help capture bats that fly at different elevations. A triple-high mist net is three single-high mist nets stacked on top of one another with a pulley system to raise and lower the nets as needed. Figure 3 shows both the single-high (top) and triple-high (bottom) mist-net setups that were used during surveys.

2.3 Live Capture Methods

To minimize the likelihood of incidental take of listed bird species and follow BO guidelines, mist nets were opened after sunset each night and closed before sunrise. Nets were checked every 15–20 minutes unless bat activity was high, then nets were checked more regularly.

Once a bat was caught, trained personnel worked quickly, gently untangling the bat from the net (Figure 4). Once the bat was untangled, it was placed in a brown paper bag and carried to the processing station (see Section 2.3.2 for safety protocols). At the processing station, staff recorded the individual's capture time, capture technique (single- or triple-high mist net), species, reproductive status, relative age, sex, weight and the length of three body parts: forearm, ear and hind foot. To reduce handling time, staff only measured the tragus when necessary for species identification.

Figure 3. Single-high (top) and triple-high (bottom) mist-net setups at Pabco South.

Figure 4. A trained biologist untangling *Tadarida brasiliensis* from a mist net.

2.3.1 Spring Sampling for *Pseudogymnoascus destructans* (*Pd*) and White-nose Syndrome (WNS)

All bats that were captured during March through May were a part of spring emergence *Pd* sampling. In addition to the above data, swab samples were collected from each bat. Following National Wildlife Health Center (NWHC) protocols (U.S. Geological Survey 2024), all bats were swabbed by gently rolling the swab across the surface of the skin between the elbow and wrist five times, then the same swab was rolled across the muzzle five times (Figure 5). When available, guano samples were collected from individuals and placed in guano vials. To use as many vials as possible from each kit, environmental samples were also collected during some surveys. Environmental samples were obtained by swabbing surfaces that captured bats had touched (nets, gloves, holding bags, etc.).

All swab, guano and environmental samples were sent to the NWHC where they were analyzed for the presence of *Pd*.

2.3.2 Safety

USFWS and Nevada Department of Wildlife (NDOW) were reluctant to allow bat handling because it remains unknown whether humans can spread COVID-19 to bats, which are already under significant threat from WNS. To reduce the risk of potential spread of COVID-19 from humans to bats, field staff observed the following protocol: (1) only a small group of people (2–4) participated in the work each night, (2) only individuals who were vaccinated for COVID-19 and properly trained handled bats, (3) all those participating in surveys wore an N-95 mask and gloves while handling bats and (4) handlers wore a new pair of gloves for each bat handled.

Field staff properly disinfected all equipment used after each captured bat was processed and after each survey night, following the guidelines set forth by the White-nose Syndrome Disease Management Working Group (2024) to help prevent the spread of WNS (Figure 6).

In addition, bats are vectors for rabies transmission to humans, so all field staff were required to have a rabies vaccination. Finally, due to the nature of the surveys, occurring in the middle of the night and in relatively remote areas, a security officer accompanied staff.

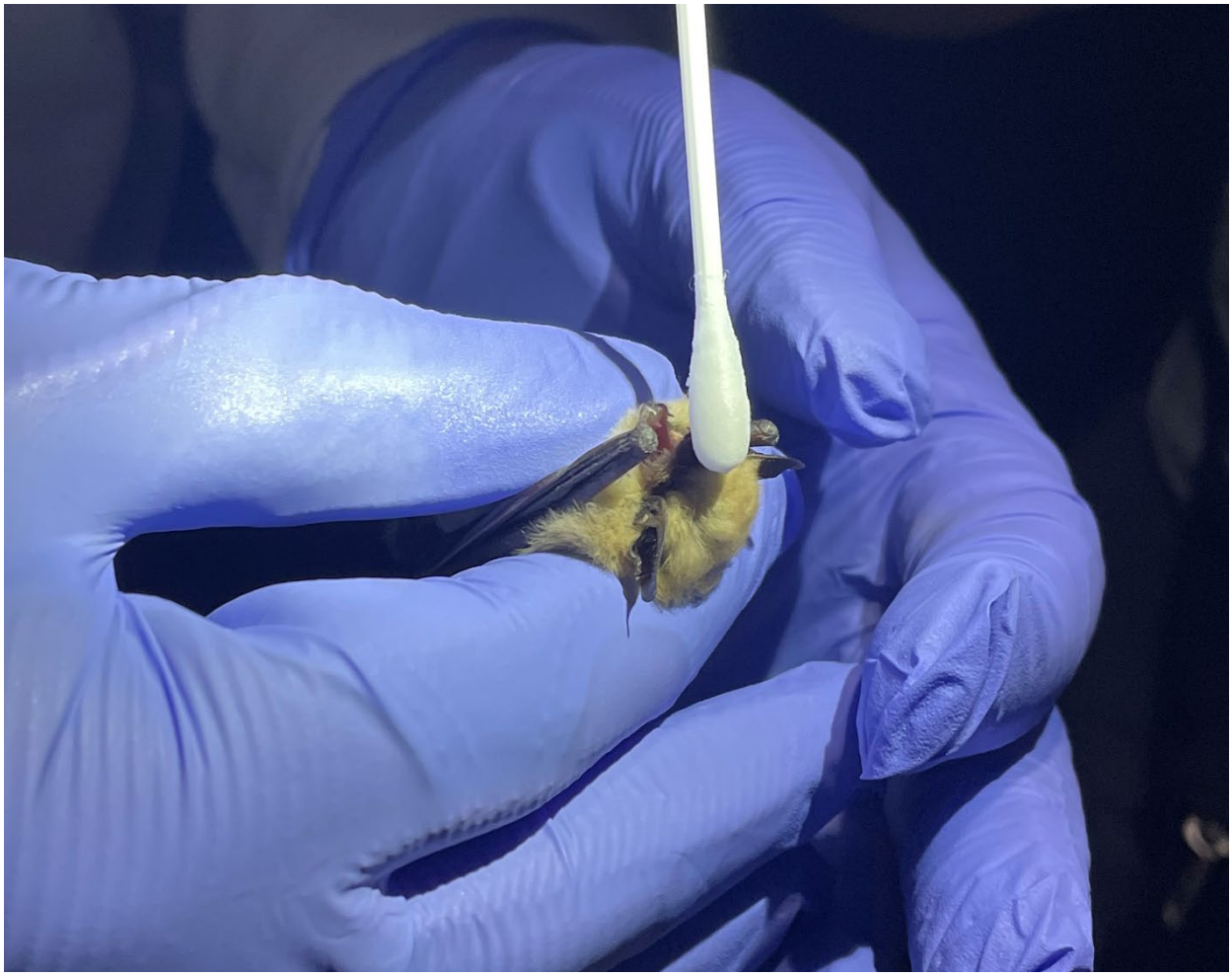

Figure 5. Trained personnel gently rolling a collection swab over the muzzle of a *Myotis californicus*.

2.4 Live Capture Sites

All capture locations were located within the Clark County Wetlands Park (CCWP; Figure 6), through which the Wash flows. The two main sites that were sampled were the Nature Preserve (NP) and Historic Lateral North (HLN). Mist netting occurred at these sites on a rotating basis 1–2 nights per month during the survey period. These capture sites were chosen because they had tall stands of native trees that created potential flight corridors and were located near slow-moving bodies of water. Flight corridors are open paths typically surrounded by mature stands of vegetation such as Fremont's cottonwood (*Populus fremontii)* and Goodding's willow (*Salix gooddingii*). Insects are abundant in these areas and bats tend to forage there each night. The large trees creating these corridors make it easier for nets to be set in locations with a higher probability of catch.

Field staff also set nets periodically at Duck Creek Confluence (DCC), Pabco North (PN) and Pabco South (PS) during surveys (Figure 6). The quantity of nets used each night varied, ranging from one triple-high net up to two triple-high nets and two single-high nets.

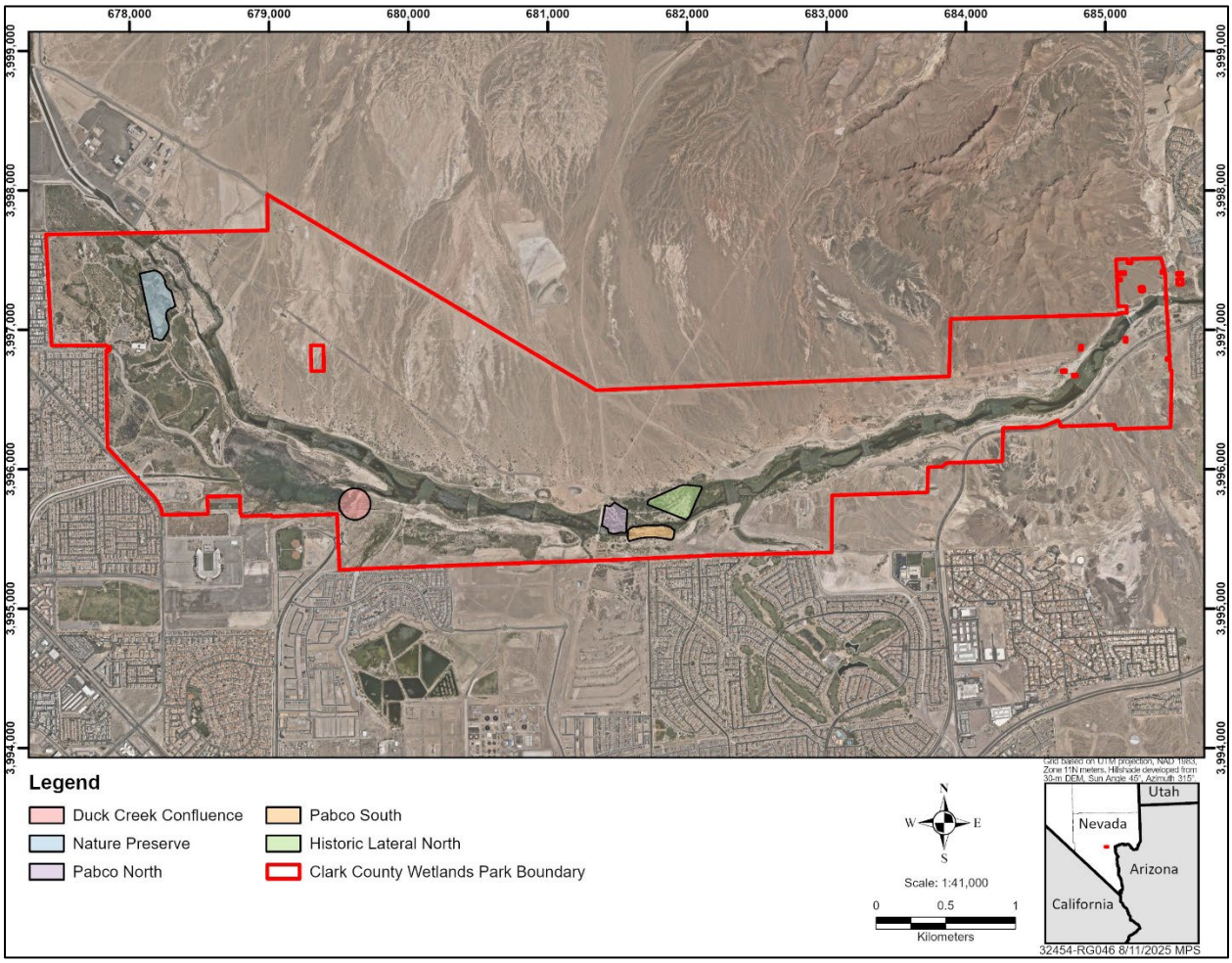

Figure 6. Map of mist-netting locations along the Las Vegas Wash.

2.4.1 Historic Lateral North (HLN)

This site is on the north side of the Wash. Twelve nights of mist netting occurred at this location. On its east end, there is a large stand of mature cottonwoods that have passively established bordering a backwater area along the Wash. Within this stand, there is a large gap that has no vegetation, creating a possible flight corridor for bats (Figure 7). Additionally, to the north of this area is another stand of cottonwoods originally planted between 2002 and 2007 where *Lasiurus cinereus* (LACI) may roost. Figure 7 shows the triple-high mist-net setup that resulted in the most bat captures throughout surveys. The second triple-high and two single-high nets were randomly used during surveys at this location and placed near or within cottonwood stands or water.

In the background of Figure 7, toward the center, a second triple-high mist-net setup is visible. Behind these cottonwoods was an open space where field staff placed a second triple-high mist net for several nights during surveys at this location. This second triple-high mist net was located next to open, stagnant water which could be an area used by bats for drinking.

Figure 7. The main triple-high mist-net setup at Historic Lateral North. A second triple-high mist-net setup is in the open space directly behind the patch of cottonwood trees. The front net location resulted in the most bats captured during surveys.

2.4.2 Nature Preserve (NP)

The NP is a restored area with paved and unpaved walking trails. This area sees a lot of foot traffic and is regularly maintained for visitors. Mist nets were placed within and surrounding a cottonwood grove located within the northeast portion of the NP. This area has a patch of mature cottonwoods separated by a walking path creating a possible flight corridor for bats (Figure 8). During surveys at this site, a triple-high mist net was placed across this path each night. An additional triple-high, two single-highs or a combination of the three nets were used during surveys and were placed within or near this corridor. Fourteen nights of mist netting were conducted at the cottonwood grove location. A single night of mist netting occurred at Vern's Pond, which is located just south of the cottonwood grove, but no bats were captured.

Figure 8. A triple-high mist-net setup in the main capture location at the Nature Preserve. This picture was taken after the March 31, 2025, fire that burned an estimated 13.8 hectares.

2.4.3 Pabco South (PS)

Originally planted in 2003, this site has drastically changed over the years. At its peak Fremont's cottonwoods covered more than 60% of the area, but recent vegetation monitoring has recorded as low as 15% cover in 2020 and 37.5% cover in 2022 (Eckberg 2022, Lantow 2024). At the upstream end of the site, the Wash channel makes a sharp left turn and during storm events the entire site becomes part of the channel. This has caused many trees to become uprooted, contributing to the

decline in cottonwood cover over the years. With the lack of trees in the area, there are no obvious flight corridors, so field staff set nets near open water areas (Figure 9). Four nights of mist netting occurred at this location.

Figure 9. A single-high and a triple-high mist-net setup next to the Las Vegas Wash at Pabco South.

2.4.4 Duck Creek Confluence (DCC)

DCC has open, stagnant water and is one of the last known salt cedar (*Tamarix ramosissima*) stands in the CCWP (Figure 10). At its peak, salt cedar covered about 607 hectares along the Wash, but today only a small percentage remains. Unfortunately, due to multiple homeless encampments in the salt cedar stand, the triple-high mist net had to be set up at a less-than-ideal location. This site is also susceptible to light pollution. Even in the middle of the night, nets could be seen by the naked eye. Only one night of mist netting was conducted at this location.

Figure 10. Triple-high mist-net setup over open water that is surrounded by aquatic vegetation at Duck Creek Confluence.

2.4.5 Pabco North (PN)

This site's vegetative cover is comprised mainly of screwbean mesquite (*Strombocarpa pubescens*) and honey mesquite (*Neltuma odorata*) with a narrow stand of cottonwoods and Goodding's willows located on the south end near the Wash channel. Most mist nets were set up to run perpendicular or parallel to this stand of trees with a single triple-high setup in the middle of mesquites. Mist netting was conducted two times at this location.

3.0 RESULTS

3.1 Capture Success

Of the 34 net nights, 26 nights (76.5%) resulted in bat captures: 5 in 2023 and 21 in 2024 (Table 1, Appendix A). Both HLN and PN had 100% capture success (i.e., at least one individual captured each night). HLN had two successful capture nights in 2023 and 10 in 2024 and accounted for 64.2% of the total number of bats captured (Figure 11). PN was not surveyed in 2023 and only surveyed twice in 2024. The NP had three nights of successful bat captures in 2023 and seven in 2024. Mist netting at HLN and the NP accounted for 79.4% of net nights and 95.7% of bats captured. PS had no successful capture nights of the two attempts in 2023 but 100% capture success of the two attempts in 2024. DCC was not surveyed in 2023 and only surveyed once in 2024 with no success.

Number of Successful Capture Nights						
Year	HLN	NP	PS	DCC	PN	**Total**
2023	2	3	0	-	-	**5**
2024	10	7	2	0	2	**21**
Total	**12**	**10**	**2**	**0**	**2**	**26**

Table 1. Number of successful capture nights out of 34.

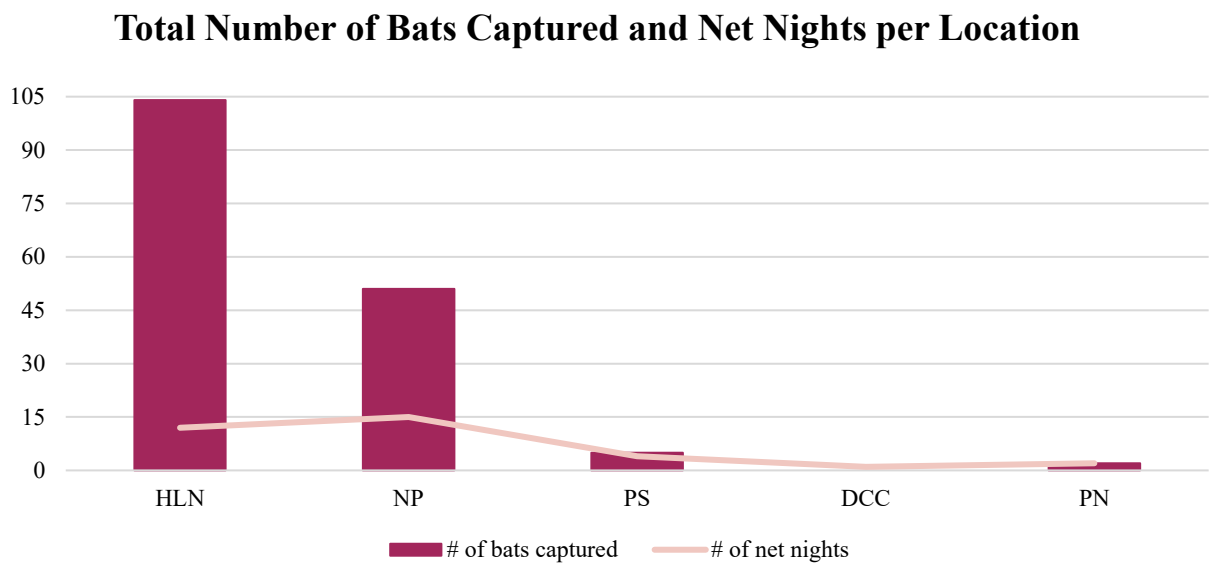

Figure 11. Number of bats captured (maroon) and net nights per location (light pink) during surveys.

3.2 Species Richness and Abundance

Over the course of the 34 net nights, 162 bats were captured (Table 2). The number of captured bats increased from 23 in 2023 to 139 in 2024, but the level of effort also significantly increased. Five species were identified in 2023 and six species in 2024. All bat species in the state of Nevada are designated as protected mammals under state regulation (Nevada Bat Working Group [NBWG] 2024).

Family	Scientific Name	Common Name	Species Code	BLM Status[1]	NDOW Status[2]
Vespertilionidae	*Antrozous pallidus*	Pallid bat	ANPA	S	SGCN
Vespertilionidae	*Lasiurus cinereus*	Hoary bat	LACI	S	SGCN
Vespertilionidae	*Myotis californicus*	California myotis	MYCA	S	PM
Vespertilionidae	*Myotis yumanensis*	Yuma myotis	MYYU	S	SGCN
Vespertilionidae	*Parastrellus hesperus*	Canyon bat	PAHE	S	SGCN
Molassidae	*Tadarida brasiliensis*	Mexican free-tailed bat	TABR	S	SGCN

[1]Bureau of Land Management (BLM) Status: S=Sensitive Species – Species designated by State Director of Nevada BLM
[2]Nevada Department of Wildlife (NDOW) Status: SGCN=Species of Greatest Conservation Need, PM=Protected Mammal

Table 2. Captured species during mist-netting surveys along the Las Vegas Wash in 2023–2024 and their conservation status.

Species richness varied between each site and no site captured all six species (Table 3). *Myotis yumanensis* (MYYU) was the only species that was captured at the four sites with captures and the only species captured at PS (Table 3). A single MYYU and *Antrozous pallidus* (ANPA) were captured at PN (Table 3). LACI was only captured at HLN, while *Myotis californicus* (MYCA) was only captured at NP (Table 3). NP showed the greatest species richness, with five of the six species captured, but it only accounted for 31.5% of bat captures.

Bat Captures by Location									
Location	**Net Nights**	ANPA	LACI	MYCA	MYYU	PAHE	TABR	**Total**	**Richness**
HLN	**12**	82	4		9		9	**104**	**4**
NP	**15**	8		2	29	1	11	**51**	**5**
PS	**4**				5			**5**	**1**
PN	**2**	1			1			**2**	**2**
Total	**33**	**91**	**4**	**2**	**44**	**1**	**20**	**162**	**6**

Table 3. Species richness and the number of bats captured by location from April 2023 through September 2024. See Table 2 for species codes.

ANPA was the only species captured at least once during all survey months (Table 4). April and May had the highest richness with five species captured each month (Table 4). *Parastrellus hesperus* (PAHE) was not captured during April and MYCA was not captured during May. April and May also had the most net nights with seven and eight nights, respectively. July was the most successful month, capturing 53 bats; however, only two species were caught (Table 4). The only

PAHE captured was in May at the NP. All survey months except March and July resulted in *Tadarida brasiliensis* (TABR) being captured. MYYU saw an increase in captures later in the season, while ANPA saw a decrease (Table 4).

Bat Captures by Month									
Month	**Net Nights**	ANPA	LACI	MYCA	MYYU	PAHE	TABR	**Total**	**Richness**
March	**2**	1						**1**	**1**
April	**7**	12	1	1	1		6	**21**	**5**
May	**8**	17	3		3	1	6	**30**	**5**
June	**5**	1		1	1		2	**5**	**4**
July	**4**	40			13			**53**	**2**
August	**4**	17			8		5	**30**	**3**
September	**4**	3			18		1	**22**	**3**
Total		**91**	**4**	**2**	**44**	**1**	**20**	**162**	**6**

Table 4. Species richness and number of bats captured by month for all sites from April 2023 through September 2024. See Table 2 for species codes.

3.3 Sex and Reproductive Status

There were 106 females, 52 males and four bats of unknown sex captured during surveys (Figure 12). Female ANPA accounted for more than 38% of captured bats (Figure 12). Of the 10 bats that were identified as pregnant during surveys (Table 5), seven were caught in May and three in July. Four of the seven caught in May were ANPA with the other three being TABR, and all three caught in July were ANPA. There were 13 individuals identified as lactating and two that were post-lactating (Table 5). The lactating bats were captured during June and July while the post-lactating bats were captured during July and August. Of the 52 males captured, 21, all ANPA, were scrotal, and the remaining 31 were in a non-reproductive state (Table 5). The bats with unknown reproductive status were three ANPA and one MYYU. All species had at least one male and one female captured during surveys except PAHE and LACI which only had females.

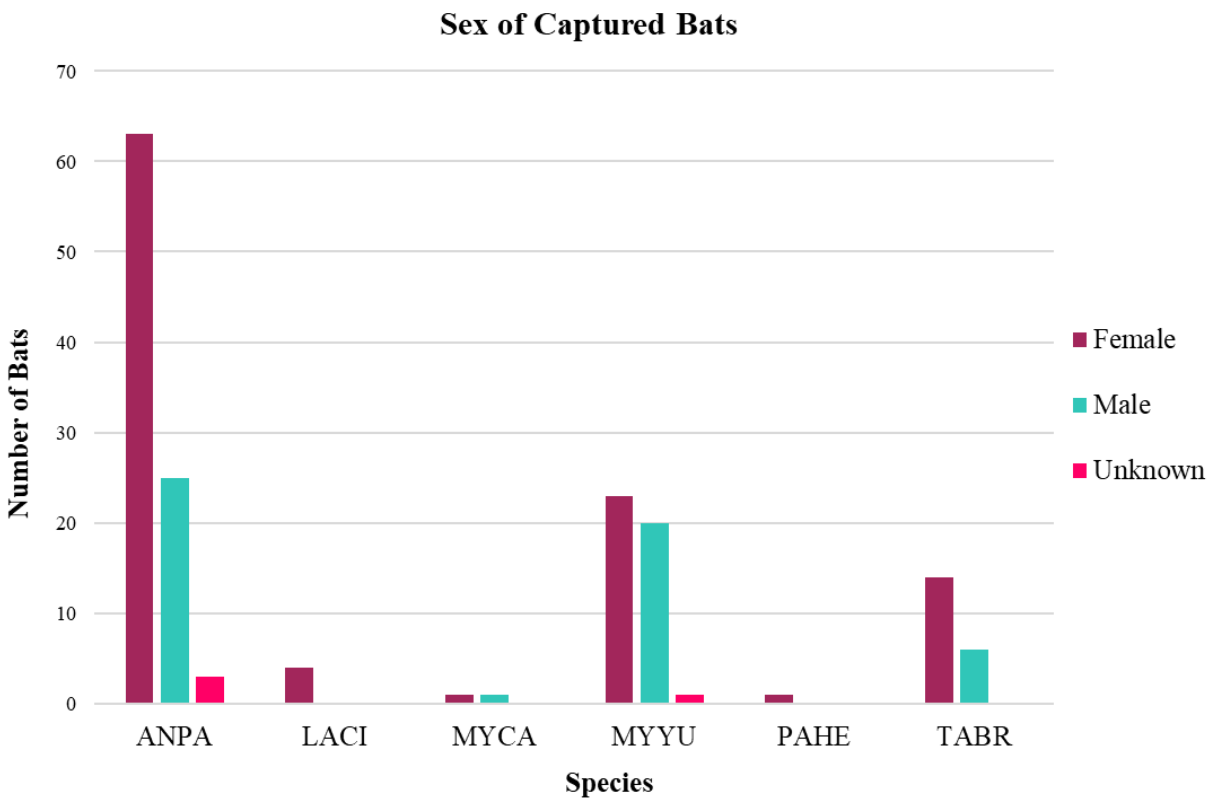

Figure 12. Sex of captured bats. See Table 2 for species codes.

	Reproductive Status							
	Males		Females				Unknown	Total
Species	NR	Scrotal	NR	Pregnant	Lactating	PL		
ANPA	4	21	42	7	12	2	3	**91**
LACI			4					**4**
MYCA	1		1					**2**
MYYU	20		22		1		1	**44**
PAHE			1					**1**
TABR	6		11	3				**20**
Total	**31**	**21**	**81**	**10**	**13**	**2**	**4**	**162**

Reproductive Status: NR=Non-reproductive, PL=Post-lactating.

Table 5. Reproductive status of captured bats. See Table 2 for species codes.

3.4 Capture Techniques and Times

The majority of net setups during surveys were triple-highs using 9-m mist nets which resulted in more than 84% of bat captures. Twenty bats were captured in single-high setups: 13 using a 6-m net length and 7 using a 9-m net length. Four individuals were captured in a single night using a triple-high mist net with 6-m nets.

Following the guidelines in the BO, nets were opened after dark and typically would close around midnight. On August 14, 2024, staff kept nets open until 3:00 a.m. to see if different species were captured during later hours. MYYU and TABR were the only species captured.

The majority of bat captures occurred during blocks 2 and 4 (Table 6). The only PAHE capture was in block 2. MYYU was the only species that was captured at least once during all survey hours.

	Capture Times						
Time Block	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	0:00 0:59	1:00 1:59	2:00 2:59
ANPA	7	30	17	23	11		
LACI	1			2	1		
MYCA		1	1				
MYYU	7	16	5	7	6	2	1
PAHE		1					
TABR		1	3	11	4	1	
Total	**15**	**49**	**26**	**43**	**22**	**3**	**1**

Table 6. Capture times for bats captured during surveys. See Table 2 for species codes.

3.5 Spring Sampling for *Pseudogymnoascus destructans* (*Pd*) and White-nose Syndrome (WNS)

Fifty-two bats including at least one individual from all six species were captured during spring emergence. An additional 23 guano and 11 environmental samples were collected. Samples were sent to the NWHC where each vial was tested for the presence of *Pd.* All samples came back negative, showing no indication that *Pd* is present in bats at the Wash.

4.0 DISCUSSION

Over the course of 34 sampling nights in 2023–2024, field staff captured 162 bats comprised of six species. Accounting for nearly 80% of sampling nights and resulting in the capture of more than 95% of the individuals, HLN and NP were the two most successful locations during surveys. Additionally, all six species were captured between these two sites.

The Wash Team has completed three mist-netting studies over the years: (1) in 2004–2009 (Foster and Svedlow 2011), (2) in 2010 (Eckberg and Foster 2011) and (3) in 2023–2024. These resulted in the capture of nine species (Table 8). The two most abundant species captured during the 2023–2024 surveys, ANPA and MYYU, were also captured during the earlier mist-netting efforts along the Wash, as was MYCA. Comparing all studies, species richness showed a correlation with sampling effort; the study that had the most sampling nights (47) also had the most species captured

(8, Foster and Svedlow 2011; Table 8). Three species captured in the Foster and Svedlow (2011) study were not captured during the 2023–2024 surveys: *Corynorhinus townsendii* (COTO), *Lasiurus xanthinus* (LAXA) and *Myotis ciliolabrum (*MYCI). All three species were captured at either the NP, PS or Lake Las Vegas Mitigation Wetlands (LLVMW). Lantow (2022) proposed to not include LLVMW due to it being outside of the CCWP boundary and the potential bat habitat has greatly degraded since 2009, and therefore this site was not sampled during the 2023–2024 surveys.

Bat Captures by Survey				
Species Code	**Scientific Name**	**2004–2009**	**2010**	**2023–2024**
ANPA	*Antrozous pallidus*	X	X	X
COTO	*Corynorhinus townsendii*	X		
LACI	*Lasiurus cinereus*		X	X
LAXA	*Lasiurus xanthinus*	X	X	
MYCA	*Myotis californicus*	X	X	X
MYCI	*Myotis ciliolabrum*	X		
MYYU	*Myotis yumanensis*	X	X	X
PAHE	*Parastrellus herperus*	X		X
TABR	*Tadarida brasiliensis*	X		X
TOTAL		**8**	**5**	**6**

Table 7. Bat species captured during all mist-netting surveys along the Las Vegas Wash from 2004 through 2024.

Once known as one of the best locations to capture bats, PS has experienced significant declines over the years. As described in Section 2.4.3, mature trees are now scarce resulting in a more open area with no obvious flight corridors. Although bats may still use the area, it is challenging to know where to set mist nets that will result in captures. Restoration work within this site could significantly increase the chances of capturing bats if these efforts result in more defined flight corridors.

All sampling months except March and June were very successful at capturing bats. Of the two sampling nights in March only one bat was captured and of the four nights in June only five individuals were captured. June saw a significantly lower number of bats captured compared to May (30 bats) and July (53 bats). There is no obvious explanation for the low catch rates in June, but March may be so early in the season that most species are still in hibernation or have not begun migration. Although early spring sampling has not resulted in large numbers of individuals captured, it is critical to sample during this time for the presence of *Pd*. The ability to detect *Pd* on an individual decreases the further the individual is captured from spring emergence. Therefore, although early spring sampling may not produce large numbers of captures, it gives the best chance for detecting the presence of *Pd.*

Although PAHE were identified flying by mist nets most nights prior to them being opened, only one individual was captured, in May at the NP. This species is commonly observed flying before sunset and is most active immediately following sunset and right before sunrise (Grinnell 1918). Due to the measures to help avoid incidental take established in the BO, staff were unable to open mist nets until dark which may help explain why just the one PAHE was caught.

Capturing LACI during spring (Table 4) is consistent with other studies indicating that this migratory species is only in Nevada during spring (April and May) and fall (August through October) migrations (Cryan 2003, NBWG 2024). LACI was only captured at HLN during 2023–2024 surveys but was captured at the NP during 2025 *Pd*/WNS surveys (pers. obs.), which occurred 16 days after a 13.8-hectare fire burned through the area (Figure 13). Multiple studies suggest that LACI and other larger bodied, high wing loading species may prefer recently burned areas because the fire reduces clutter and may lead to improved foraging conditions (Cox et al. 2016, Starbuck et al. 2020).

Figure 13. Aftermath of the Nature Preserve 13.8-hectare fire that occurred on March 31, 2025. A triple-high mist net resulting in no bats captured, is set up in the background perpendicular to the Goodding's willow stand. This net was located ~30 meters from the main NP mist-netting location.

5.0 RECOMMENDATIONS

Spring emergence sampling for WNS should continue indefinitely at the Wash. In addition, if any wildfires occur at the NP or HLN where mist netting occurred, staff should attempt to survey the area within the month to better understand species presence and absence following a burn event.

Although these surveys may be highly influenced by time of year, it is still important to see what species use the area immediately following a fire. Wildfires occur within the CCWP multiple times annually and understanding how and if this impacts bats may help guide conservation efforts and future management decisions.

Barring significant changes, HLN and NP should continue as primary sites for future surveys. Additionally, future surveys should attempt to locate other sites with possible flight corridors or areas of open water that have different habitat types than HLN and NP. Although most bats were caught in riparian areas, mist netting in different habitat types may result in different species being captured. Furthermore, future surveys should reevaluate the LLVMW location, and if there are possible flight corridors then this site should be reconsidered. Although it is outside of the CCWP boundary, it borders the park, and past surveys have captured additional species at this location. A large restoration project is slated to take place in 2025-2026 at the PS site. This site can be reevaluated once the vegetation has matured to determine if additional sampling efforts should be undertaken there.

This report includes all data collected through mist-netting efforts along the Wash during 2023 and 2024. Three acoustic monitoring stations were also deployed from January 2023 through December 2024. Acoustic monitoring uses a passive device to record echolocation calls. These calls are currently being analyzed by a contractor and will hopefully result in additional species identified utilizing the Wash. Neither sampling technique is known to detect all species, and therefore future surveys should continue to include both acoustic monitoring and mist-netting efforts. Upon receiving the final acoustic monitoring report, staff should reevaluate the current survey protocol and determine if changes are needed. For example, if acoustic monitoring only detects certain species during winter months, then staff should extend mist-netting efforts from the current seven-month plan (March through September) to 12 months.

Given the continued spread of *Pd* throughout the country, the ever-changing landscape within the CCWP due to revegetation, wildfires and construction, and possible changes in the conservation status of species as WNS threatens populations, bat surveys should be replicated every five years along the Wash, with *Pd*/WNS sampling occurring every spring. This suggested schedule can change to allow for less time between surveys if deemed appropriate.

6.0 CONCLUSIONS

For more than 25 years, the LVWCC has been working on stabilizing and enhancing the Wash. The Wash Team has completed many wildlife studies to determine program impacts on species, including bats. The fungus that causes WNS has been spreading rapidly and is now found in bat species only a few hours from the Wash. WNS has caused the deaths of millions of bats throughout the country since 2006.

Bat capture surveys ran from April to early June 2023 and from March through September 2024. A total of 10 net nights were conducted in 2023 and 24 net nights in 2024, resulting in the capture

of 162 bats comprised of six species. Species richness varied between each site and no site captured all six species. The HLN and NP sites accounted for nearly 80% of sampling nights and captured more than 95% of bats. All six species were also captured between these two sites. Once known as one of the best locations to capture bats, PS has seen much degradation over the years and resulted in the capture of only five MYYU during surveys.

Although early spring sampling does not typically capture large numbers of individuals, it presents the best chance of detecting the presence of *Pd*. During 2023–2024 WNS surveys, 52 bats were captured and swabbed along their forearm and muzzle. No detections of *Pd* were found in any of the samples and *Pd* has still not been detected within Nevada, including samples from 2025.

Bats play a critical role in the Wash's ecosystem. Surveys should be replicated every five years along the Wash, with WNS sampling occurring every spring.

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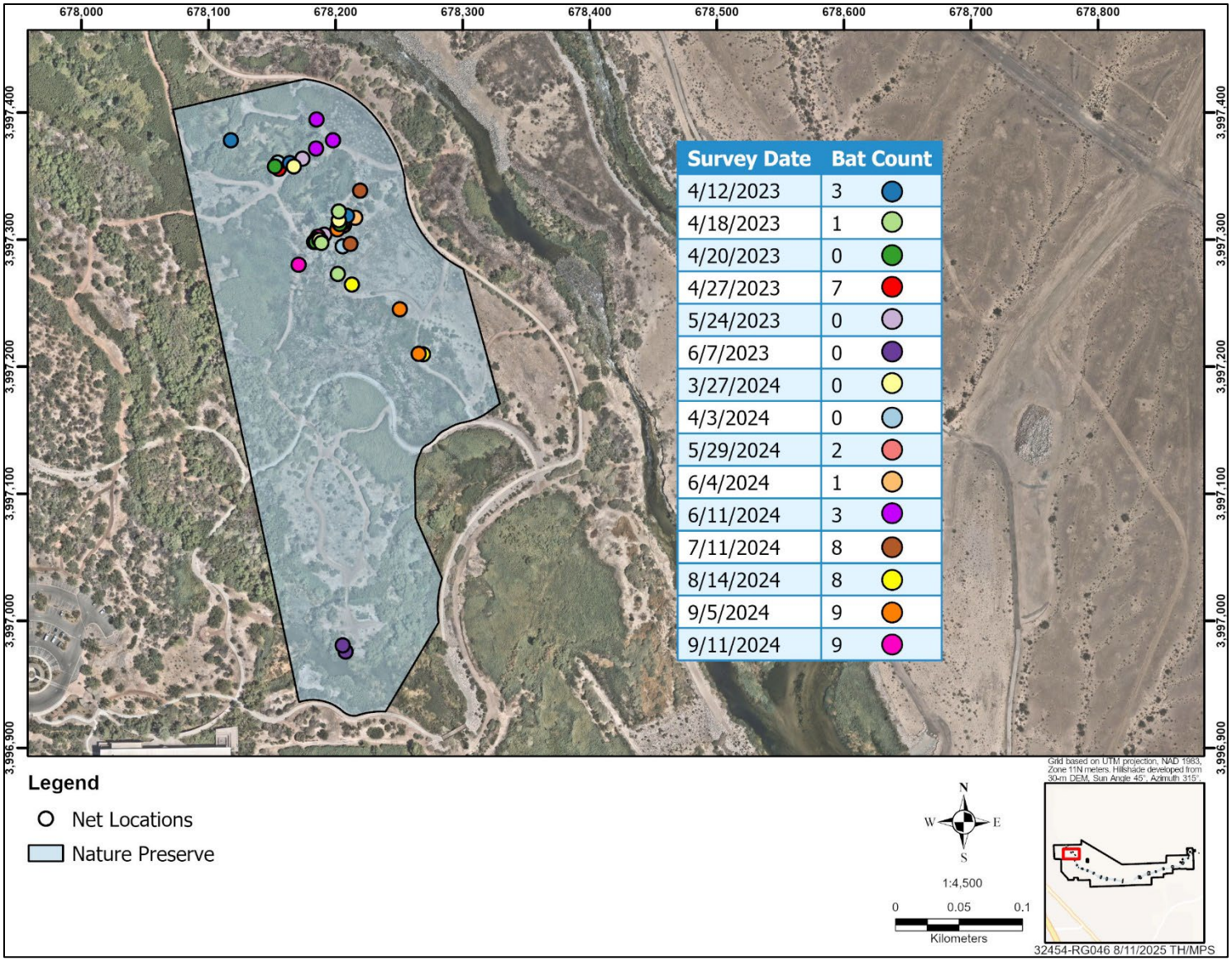
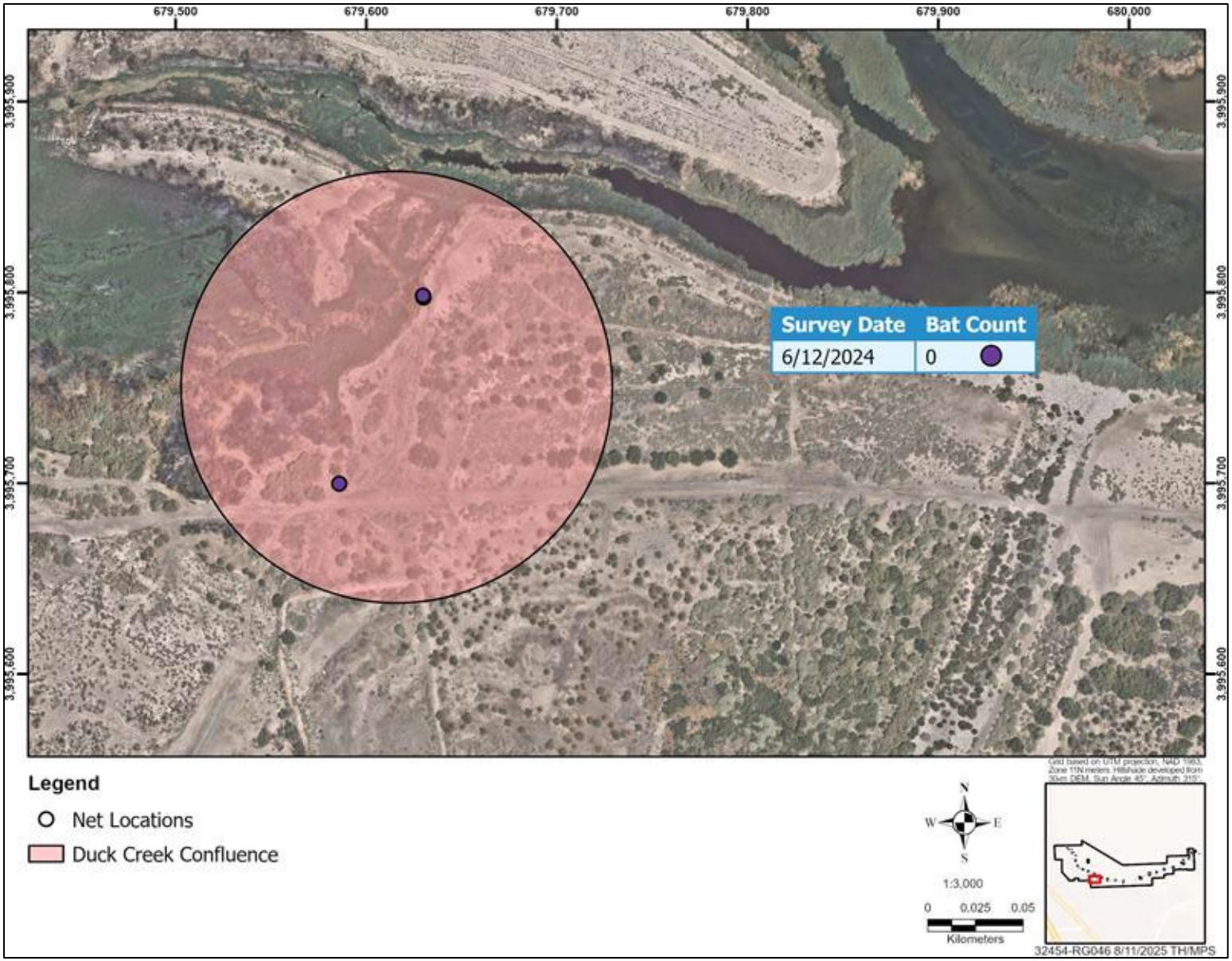
Appendix A

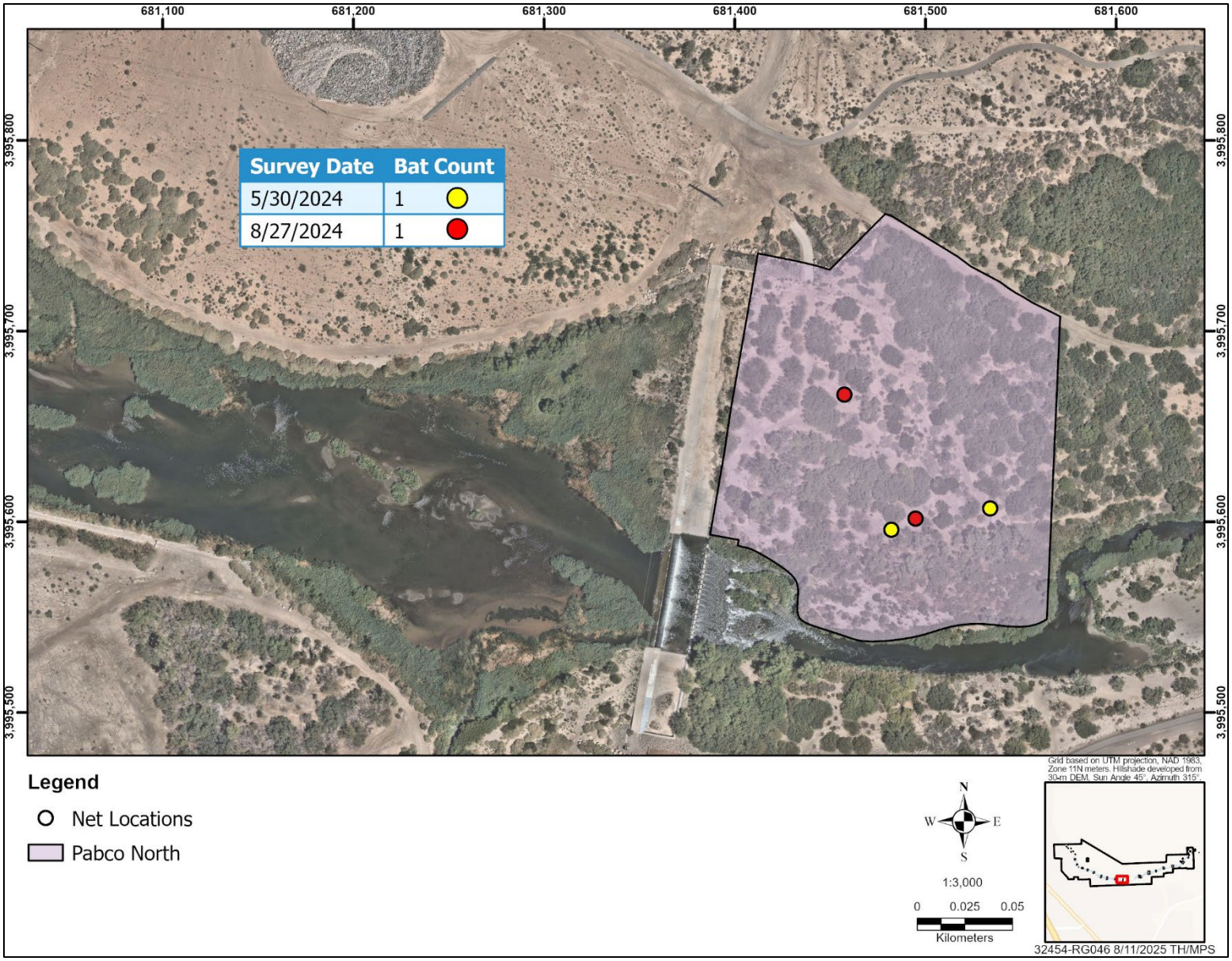
Net Locations per Night and Number of Bats Caught at Each Location



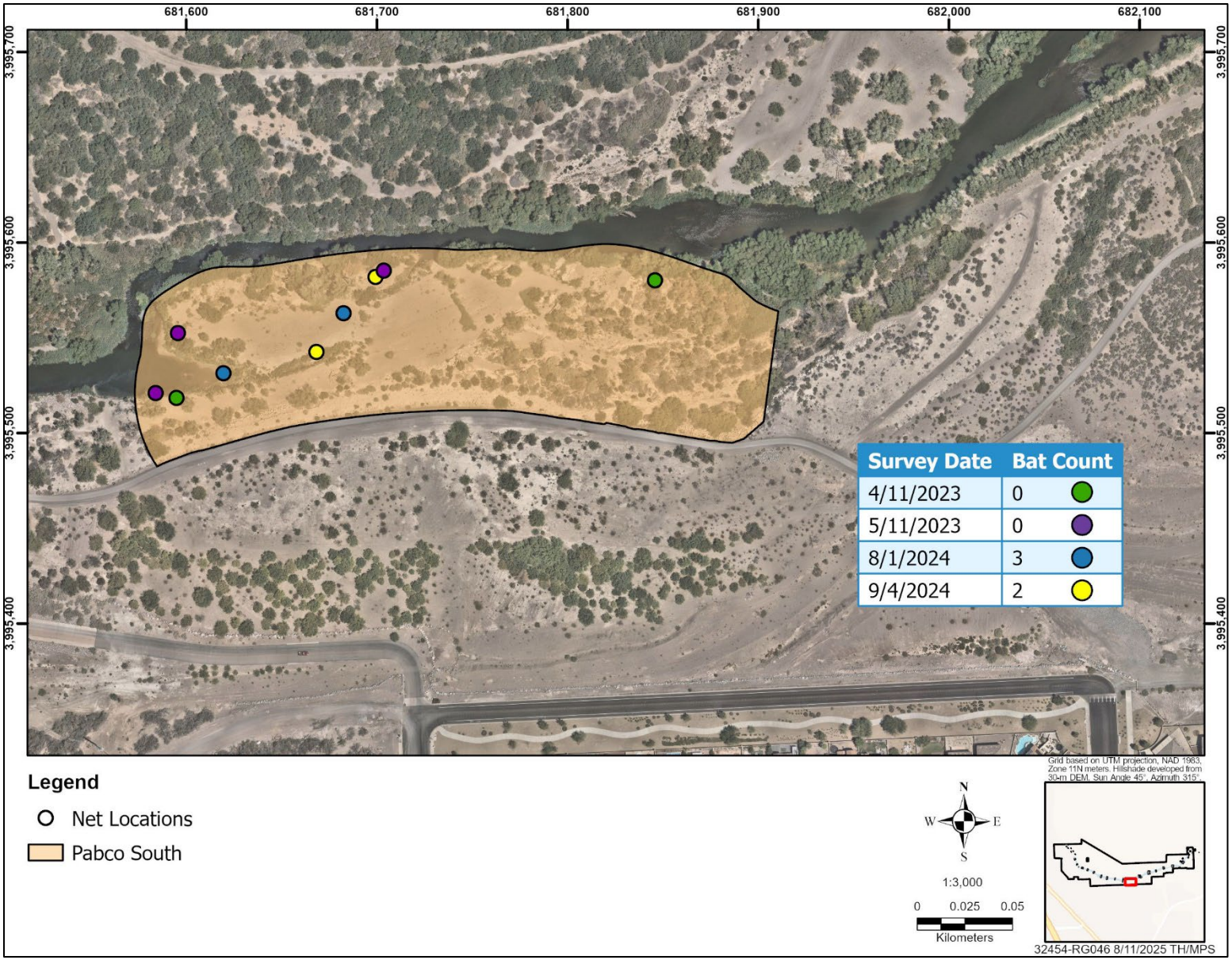
Nature Preserve net locations per night sampled and number of bats caught at each net.



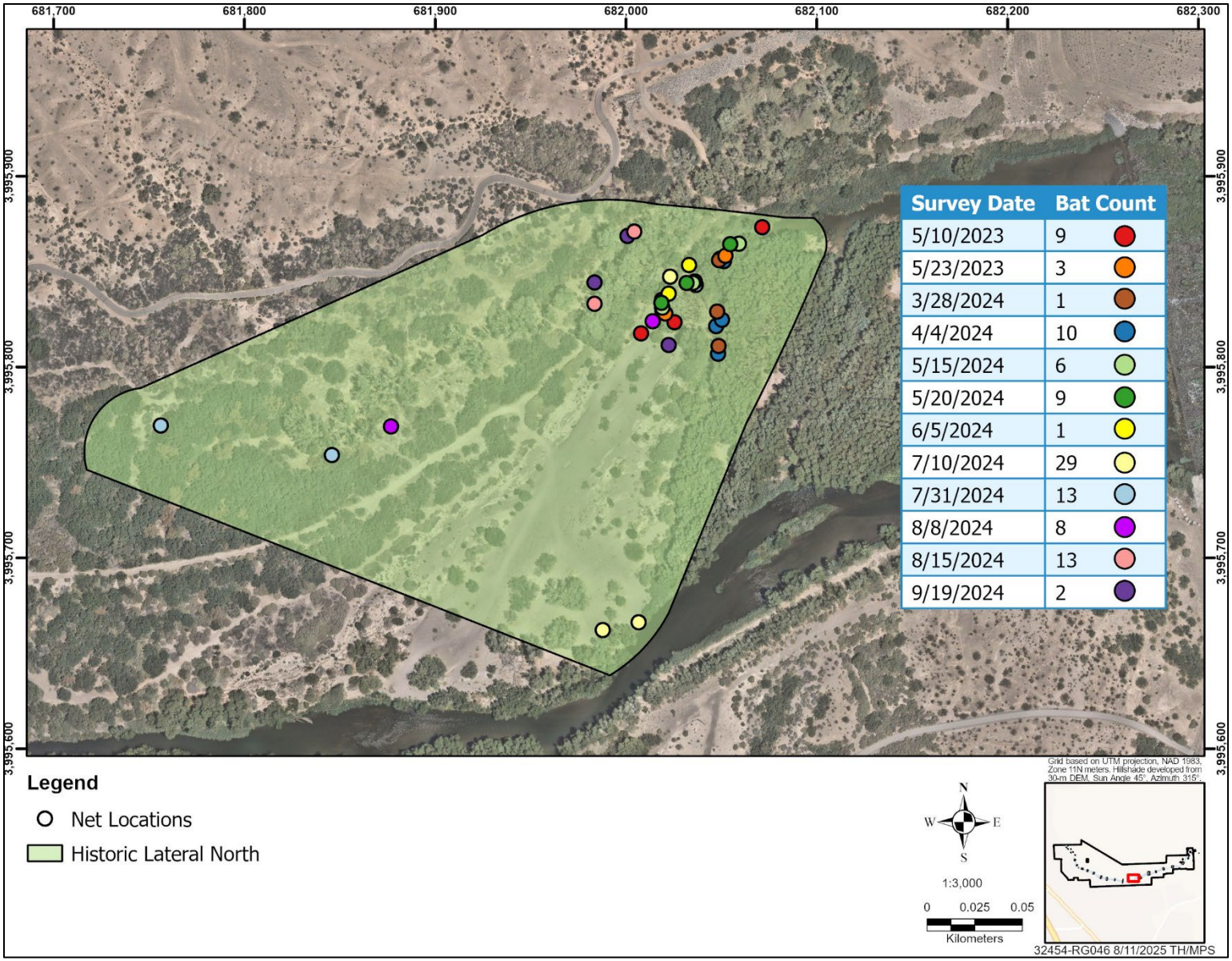
Duck Creek Confluence net locations per night sampled and number of bats caught at each net.



Pabco North net locations per night sampled and number of bats caught at each net.



Pabco South net locations per night sampled and number of bats caught at each net.



Historic Lateral North net locations per night sampled and number of bats caught at each net.