SAN FRANCISCO BAY
BIRD OBSERVATORY

SNOWY PLOVER RECOVERY AT HAYWARD REGIONAL SHORELINE, ALAMEDA COUNTY, CALIFORNIA

Photo taken at OBN16 by Josh Scullen

Prepared By:

Maddy Schwarz, Snowy Plover and Least Tern Program Director

Parker Kaye, Lead Biologist

San Francisco Bay Bird Observatory

524 Valley Way, Milpitas, CA 95035

For:

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SUMMARY

During the 2023 breeding season, the San Francisco Bay Bird Observatory (SFBBO) monitored Western Snowy Plover (*Anarhynchus nivosus nivosus*; Snowy Plover) population size, nesting and fledging success, and identified potential predators at two areas in Alameda County: Patterson Pond and Hayward Regional Shoreline (Hayward Shoreline). Patterson Pond is owned by Alameda County Flood Control District and Hayward Shoreline is co-owned by Hayward Area Recreation and Park District (HARD) and East Bay Regional Parks District (EBRPD). SFBBO monitored three sites within Hayward Shoreline: Franks Dump West (FDW), Franks Dump East (FDE), and Oliver Brothers North (OBN) (Figure 1, Figure 2.)

As part of the Pacific Coast breeding season window survey (May 20-27, 2023), we counted zero adult Snowy Plovers at Hayward Shoreline and one adult male Snowy Plover at Patterson Pond (Table 1).

Over the course of the breeding season (March-September), SFBBO staff monitored one nest at OBN, which successfully hatched (Table 2; Figure 3). An additional nest was detected at the brood stage in FDW. SFBBO monitored two nests at Patterson Pond, both of which successfully hatched.

SFBBO did not color-band any chicks at Patterson Pond or Hayward Shoreline this year due to low productivity in both areas. However, we did conduct band re-sight surveys at the end of the season at FDW and OBN, since those are popular locations for juveniles from across the South Bay to flock prior to fall migration. From these band re-sighting surveys, we were able to determine that nine chicks we banded in other sites throughout the South Bay survived to fledge (28 days post-hatching)(Table 3). Band re-sight surveys also occurred at Patterson Pond, but no fledges were confirmed at that site.

Avian predator surveys showed that, the most common predator species observed at Hayward Shoreline were Ring-billed Gulls (*Larus delawarensis*), California Gulls (*Larus californicus*), American Crows (*Corvus brachyrnhynchos*), Red-tailed Hawks (*Buteo jamaicensis*), Common Ravens (*Corvus corax*), and other unidentified gull species. At Patterson Pond, the most common predator species observed were California Gulls, Great Egrets (*Ardea alba*), and other unidentified gull species. Mammalian predators were also present at both areas. At Hayward Shoreline, biologists observed off-leash dog (*Canis familiaris*) prints on the pond, as well as prints from skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), and coyote (*Canis latrans*). Prints from skunk and coyote were also observed at Patterson Pond during band re-sight surveys (Table 4).

INTRODUCTION AND BACKGROUND

The Pacific Coast population of the Western Snowy Plover (*Anarhynchus nivosus nivosus*; Snowy Plover) breeds along or near tidal waters and is behaviorally distinct from the interior population (Funk 2006). Coastal-breeding Snowy Plovers have declined as a result of poor reproductive success, likely due to habitat loss, habitat alteration, human disturbance, and increasing predation pressure (Page et al. 1991, USFWS 2007). In response to this decline, the U.S. Fish and Wildlife Service (USFWS) listed the Pacific Coast Western Snowy Plover

population as federally threatened in 1993 (USFWS 1993). They are listed as a species of special concern in California (CDFW 2023). The most recent 5-year review (USFWS 2019), which reviewed all available data in all six recovery units, determined that the population remains threatened due to the same threats described above.

Western Snowy Plover Recovery Unit 3 (RU3) consists of the San Francisco Bay Estuary and includes Alameda, Napa, Santa Clara, and Solano counties, and the Bay-facing portions of Marin, San Mateo, and Sonoma Counties (USFWS 2007). Snowy Plovers in this Recovery Unit nest almost exclusively in dry salt panne habitat provided by former salt evaporation ponds, as well as on pond berms, levees, and in dry, degraded marsh habitat. In 1992, the Don Edwards San Francisco Bay National Wildlife Refuge (the Refuge) began surveying for Snowy Plovers on Refuge lands.

Since 2003, SFBBO has conducted annual Snowy Plover monitoring and research within the South San Francisco Bay in support of the goals set for RU3. In 2023, SFBBO: 1) identified areas used by Snowy Plovers through regular surveys of all potential nesting habitat from March through September, 2) participated in U.S. Fish and Wildlife Service-coordinated Range-wide breeding and winter window counts to estimate Recovery Unit 3 numbers, 3) recorded nest fates, nest densities, and chick fledging rates through nest-monitoring and chick-banding, 4) surveyed for potential avian predators, and 5) identified areas of potential disturbances from predators, trespass, construction activities and other human activities. The activities at Hayward Shoreline detailed in this report are encompassed by this larger framework of SFBBO's Snowy Plover population monitoring and research in the South Bay.

METHODS

Study Area

SFBBO staff conducted Snowy Plover and avian predator surveys at Hayward Shoreline and Patterson Pond. Hayward Shoreline is owned by Hayward Area Recreation District (HARD), managed by East Bay Regional Parks District (EBRPD), and includes 1,841 acres of salt, fresh, and brackish water marshes, seasonal wetlands, and public trails.

Suitable nesting habitat for Snowy Plovers is located at three different sites within Hayward Shoreline: FDE, FDW, and OBN. FDE and FDW are two parcels of land bordered by Sulphur Creek to the north and separated by a remnant of historical landfill that is unsuitable for plovers (Figure 1). OBN is a historical salt pond complex that is located at the southwestern edge of Hayward Shoreline. It is bordered by Highway 92 to the south and the San Francisco Bay to the west (Figure 1). OBN is divided into 17 small ponds that are abbreviated as OBN1-17 (Figure 2).

Patterson Pond is owned by Alameda County Flood Control District. It is a seasonally flooded pond approximately 73 acres in size, situated in the northeast corner of the Refuge's Coyote Hills pond complex, and is bordered by salt ponds N1A, N3A, and N4A to the west and south, the Alameda Creek Flood Control Channel to the north, and Coyote Hills Regional Park to the east. A paved public trail runs along the pond's northern levee.

Surveys

Snowy Plover Breeding Surveys

Snowy Plovers in the San Francisco Bay nest predominantly on dry pannes, berms, and levees located within former salt production ponds. To document areas used by Snowy Plovers and to estimate the number of Snowy Plovers at Hayward Shoreline and Patterson Pond, SFBBO surveyed FDE, FDW, OBN, and Patterson Pond from the week of March 1 to the week of September 15, 2023. Due to record rainfall during the winter of 2022-2023, all three sites were completely inundated for the first half of the Snowy Plover breeding season. Therefore, SFBBO conducted surveys every other week to monitor water levels and assess when suitable breeding habitat would become exposed. From the date the first Snowy Plover was observed using each site, survey frequency increased to weekly. Weekly surveys began the week of May 22 at Patterson Pond, the week of May 30 at Frank's Dump, and the week of July 3 at OBN. Surveys were performed at OBN for an additional two weeks after September 15 because one brood was still present through the end of September.

SFBBO biologists conducted site surveys by driving slowly on the levees or walking levees without vehicle access. We stopped approximately every 0.3 miles to scan for Snowy Plovers with spotting scopes. During each survey, we recorded the number and behavior of all Snowy Plovers present, identified the sex and age class of each individual using plumage characteristics (Page et al. 1991), and marked the approximate location of sightings on a geo-referenced paper map. We also recorded the color-band status, and combination if applicable, of any banded Snowy Plover sighted. Any observed instances of intraspecies aggression between Snowy Plovers and interspecies aggression between Snowy Plovers and other nesting shorebirds and/or seabirds were also recorded.

From May 20 to 27, 2023, SFBBO participated in the Pacific Coast Snowy Plover breeding window survey. This survey was coordinated by the USFWS as part of an annual, regional effort to census all coastal-breeding Snowy Plovers during the same week. SFBBO surveyed all four sites detailed in this document during the window survey.

Band Re-Sight Surveys

Band re-sighting is a crucial aspect of assessing Snowy Plover fledging and survival rates. SFBBO always opportunistically records the band combinations of any Snowy Plovers we see during every breeding survey. However, at the end of the season when breeding activity at a site is fully completed, we will also perform specialized band re-sight surveys with the specific goal of reading as many color bands as possible.

During these surveys, biologists first locate a large flock of roosting or foraging birds. After reading as many band combinations as possible from the levee, the biologists will walk onto the pond bottom and strategically flush the flock just enough for the birds to stand up and reveal their color bands. This is accomplished by slowly and quietly walking several steps at a time and pausing whenever the birds start to move. Band re-sight surveys are best done in pairs where one person walks at a time while the other person watches through a scope.

Band re-sight surveys occurred on September 21, 2023 at Frank's Dump West and Patterson Pond.

Nest Monitoring

Snowy Plover nests were located by first scanning for incubating adults or other signs of breeding behavior during weekly surveys. We then searched for nests on foot and recorded nest locations using the Field Maps by Esri mobile application. Despite surveyors best efforts, the cryptic nature of Snowy Plovers means that some nests are inevitably not discovered before they hatch. If we observe chicks at a site where we were not monitoring any nests close to hatch, we know that we missed a nest and classify it as "detected at brood stage."

SFBBO monitored nests weekly until the final nest fate could be determined. During each survey, all known nests would be observed through a scope to confirm whether an adult was still incubating. If an adult was observed incubating, the nest would be marked as active for that survey and not physically visited again until the nest began to approach its hatch date. On each survey sheet, we recorded whether the nest was still active (adults incubating). If an adult was not observed incubating through the scope, the nest would be physically visited to determine whether the nest was still active (i.e., eggs present) or if the nest was inactive, what the nest fate was when possible (i.e., hatched, depredated and if visited up close, the number of eggs or chicks in the nest.).

We defined a nest as successful if it hatched at least one egg. We calculated apparent nest success as the percentage of nests that successfully hatched at least one egg out of the total nests monitored.

Egg Floating

During each physical visit, we floated the eggs (Hays and LeCroy 1971) to estimate egg age if incubation had been observed Snowy Plover nests are typically a 3-egg clutch throughout most of season, sometimes 1-2 eggs later in season. Snowy Plover nests are active for an average of 33 days, from initiation (the date the first egg was laid) to hatching (Warriner et al. 1986), and using the known egg age, we calculated the nest initiation date and predicted hatch date for all nests monitored. When there were no longer eggs in the nest, we assigned each nest a fate based on evidence seen at the nest (Mabee 1997). Potential nest fates included: hatched, depredated, flooded, abandoned, failed to hatch, unknown, or other.

Avian Predator Surveys

To identify avian predators in the area that might impact breeding Snowy Plovers, SFBBO biologists conducted predator surveys concurrently when surveying ponds for Snowy Plovers. Observers chose survey points that provided a comprehensive scan of all required ponds for predators. At each survey point, the location, start time, and stop time were recorded. Observers recorded the number, species, behavior, and habitat type at the time of sighting of any predators present. The approximate locations of the predators were marked on a map. In addition, observers documented any predator nests in the area and their fates when possible. We calculated the average number of predators observed per survey at each pond during the season. While most predators likely have a larger territory than a single pond (Strong et al. 2004), we felt it

meaningful to present indices of predator abundance at the pond scale since both predator and Snowy Plover surveys were conducted at this level.

We defined avian predators as any species that could potentially prey on a Snowy Plover nest, chick, or adult. This includes most raptors, gulls, corvids, herons, and egrets (Table 5) found at Hayward Shoreline. While a number of potential mammalian predators (Table 6), and their signs (e.g., tracks) were recorded opportunistically, these surveys were not designed to detect mammals, particularly since many are nocturnal. Among all predators, we considered Northern Harriers (*Circus hudsonius*), Peregrine Falcons (*Falco peregrinus*), Common Ravens, California Gulls, and mammals (especially coyotes, red fox and striped skunk) to be the most critical potential predators to Snowy Plover adults, eggs, and chicks due to previous predation events captured on camera and consistent with previous documentation of predation.

Statistical Analyses

Fledge Success

We defined a fledged chick as one that survived to 28 days of age, at which point it is considered to be capable of flight (Warriner et al. 1986). We calculated apparent fledging success as the percentage of fledged, banded chicks out of the total chicks banded. Since re-sighting banded chicks on large salt ponds can be very difficult, this method of estimating fledging success has significant limitations and is a conservative estimate.

Chicks Fledged per Male

Chicks fledged per male was determined using the same data for broods in which all chicks were banded, allowing for an estimate of the number of chicks fledged per male.

RESULTS

Snowy Plover Surveys

From March 6 through September 11, we observed a mean of 14.4±23.7 adult Snowy Plovers per week at Hayward Shoreline and 3.3±4.9 adult Snowy Plovers per week at Patterson Pond, as shown in Figure 4. Looking at abundance per site, FDW supported the largest numbers of Snowy Plovers at Hayward Shoreline, with a mean of 12.5±23.1 adults observed per week (Figure 5). Pond OBN15 supported the second most adults per week (3.0±9.0). All other OBN ponds supported fewer than one adult per week on average, except for OBN14 which supported a mean of 1.4±4.9 adults per week. All abundances by pond are shown in Figure 5.

Early and Late Season Trends

At the beginning of the breeding season, all the sites discussed in this report were fully inundated with no habitat available for Snowy Plovers to utilize. Therefore, no birds were seen at these sites until sufficient habitat was exposed. The first Snowy Plover was seen at Patterson Pond the week of May 22 and at FDW the week of May 30. The first adult was not observed at OBN until July 3.

Beginning in late August through September 15, we observed large post-breeding flocks of 57.0±23.8 adults at FDW. A few OBN ponds supported smaller post breeding flocks (between 16 and 38 birds) from the beginning of August through the end of September, but these ponds were significantly less abundant than FDW. On September 15, this year's high count for all of Hayward Shoreline was 76 birds, observed between FDW, OBN4, and OBN15. However, 74 of those birds were observed at FDW while only one bird each was observed on OBN4 and OBN15 (Figure 5). These flocks form when Snowy Plovers are longer breeding, but instead either staging for migration or gathering into winter flocks.

Patterson Pond remained a low activity site for the entire 2023 season. Of the 23 surveys conducted at Patterson Pond, eight surveys recorded zero birds, twelve surveys recorded fewer than ten birds, and only three surveys recorded more than ten birds. Patterson Pond hit this year's high count on September 14 with 19 birds (Figure 5).

Snowy Plover Nesting

Nesting Abundance and success

Over the course of the breeding season, we monitored one Snowy Plover nest at OBN16 and detected one nest at the brood stage at FDW. The nest found on OBN16 was determined to have hatched, giving us a 100% hatch success for monitored nests at Hayward Shoreline. (Table 2).

At Patterson Pond, we monitored two Snowy Plover nests. Both nests were determined to have hatched, giving us a 100% hatch success for monitored nests at Patterson Pond (Table 3).

Snowy Plover Color Banding

Due to the lack of nests monitored and personnel availability, no chicks or adults were banded at Hayward Shoreline or Patterson Pond in 2023.

Avian Predators

During avian predator surveys, we counted Ring-billed Gulls as the most numerous avian predators at FDW (0.82/survey), followed by California Gulls (0.32/survey); at FDE, American Crows were the most numerous observed predator during surveys (0.55/survey), followed by Red-tailed Hawks (0.32/survey); and at OBN, unidentified gulls were the most numerous observed predator (13.1/survey), followed by California Gulls (1.9/survey) (Table 4). Gull species were usually found foraging in shallow water or roosting in large flocks on dry pond bottoms. Both American Crows and Common Ravens were observed foraging on pond bottoms.

At Patterson Pond, California Gulls were the most frequently observed predator (11.48/survey), followed by unidentified gulls (4.04/survey) and Great Egrets (0.35/survey) (Figure 5). The majority of California Gulls observed were in transit over the pond and were likely headed to or from their breeding colony located 1.5 miles to the south on levees within the Coyote Hills salt ponds; however, post-breeding flocks of gulls formed in the southwest area of the pond later in the season.

Mammalian Predators

Tracks of mammalian predators, including skunk, red fox, coyote, and domestic dog, were observed at OBN during the breeding season; however, no mammals were observed at this location during predator surveys. At FDW, the only mammalian predators observed during surveys were off leash domestic dogs, which were anecdotally observed on multiple occasions.

No observations of mammalian predators occurred at Patterson Pond, however skunk and coyote tracks were detected on the pond during band re-sight surveys at the end of the season.

Human Disturbance

At both OBN and FDW we observed signs of human disturbance. At OBN we found footprints on both OBN11 and OBN12, as well as the northern and western levees. At FDW we directly observed trespassers and unleashed dogs on the pond as well as finding tracks from both. The recently erected fence on the northern levee of FDW was found to have been cut through before the breeding season began. Multiple people and unleashed dogs were observed going through this hole in the fence on at least two separate occasions.

Patterson Pond is located along a busy section of the San Francisco Bay Trail along the Alameda Flood Control Channel, and although we did not record pedestrians observed using the trail, on one occasion we observed trespass from Coyote Hills Regional Park onto the western levee of Patterson Pond where access is restricted. After tall vegetation was mowed near the fence and gate on the northwest corner of the pond, human footprints were found going around the fence and onto the west and southern levees.

DISCUSSION

Population Size

The number of adult Snowy Plovers observed at Hayward Shoreline during the breeding window decreased to zero compared with 36 in 2022. The number of adult Snowy Plovers observed at Patterson Pond during the breeding window survey decreased from 2022 (4) to 2023 (1) as well. While these numbers are lower than previous years, it is likely due to lack of habitat availability caused by heavy rains the previous winter. At other locations throughout the Bay Area, there was an increase of adult Snowy Plovers observed during the breeding window survey, yielding the highest count of breeding adults in Recovery Unit 3 ever recorded.

Nest Abundance and Success

With a large decrease in the number of breeding adults at Hayward Shoreline during the breeding window survey, we also observed a large decrease in nesting activity from 2022 (10) to 2023 (2). The same can be said for Patterson Pond, as we also observed a decrease in nest detections form 2022 (11) to 2023 (2). These discrepancies were likely due to the high water levels and lack of habitat availability caused by heavy rain the previous winter. We did not observe our first nest at Patterson Pond until the end of June, while the only nest monitored from the egg stage at Hayward Shoreline was not detected until the last week of July at OBN. The only nest monitored at Frank's Dump West was detected at the brood stage on August 24th, suggesting a nest

initiation date near the end of July as well. These observations coincided with the ponds drying out more as the season progressed.

Even though nesting attempts made in 2023 were low, all of the nests detected at Hayward Shoreline and Patterson Pond were observed to have hatched (Table 2, Table 3). All eggs monitored at these nests hatched as well.

Snowy Plover Banding

Chick Fledging Success

By the time we began to observe nests and chicks at Hayward Shoreline and Patterson Pond, our banding effort had slowed due to budget and personnel constraints. For these reasons, we did not band any chicks at either Hayward Shoreline or Coyote Hills in 2023. Without banding information, we cannot definitively confirm whether or not a chick has fledged. That being said, we were still able to monitor broods in the weeks following hatch. The two chicks from the lone OBN nest were observed at what would have been near 28 days old, so it is likely these two birds fledged. The chick detected at the brood stage at FDW was observed for at least one week after its initial observation, but not observed after being seen for those two weeks. Both broods from the nests at Patterson Pond had a least one chick reach the C2 stage (chick is more than two weeks old), so it is likely some chicks fledged from this location as well.

While we were not able to band chicks at either Hayward Shoreline or Patterson Pond, SFBBO banded 194 chicks throughout the South Bay Area. Through band re-sighting efforts of post-breeding flocks present at FDW, we were able to confirm six new fledges. Four of these birds were found during one survey on September 21, 2023.

Avian Predators

Although unidentified gulls and California Gulls were the most numerous predator species (Table 4), most were roosting rather than actively foraging, and thus we believe that their impact on breeding Snowy Plovers was limited. While typically Common Ravens are one of the largest threats to Snowy Plover breeding success, it is difficult to gauge what kind of impact they had on Hayward Shoreline and Patterson Pond in 2023. No nests were depredated and most observations of Common Ravens were either flyovers or foraging on exposed pond bottom away from breeding activity. In order to reduce the impact of ravens on breeding Snowy Plovers at Hayward Shoreline in future years, it is important that ravens are not allowed to nest on or near the property, as recent research has found that ravens provision their chicks with a higher proportion of other bird's eggs and chicks when close to a high density nesting area (Harju et al. 2021). In the past, the California Department of Fish and Wildlife (CDFW) and the Refuge have worked in cooperation with the United States Department of Agriculture (USDA) and the Pacific Gas & Electric Company (PG&E) to remove the nests of ravens and other predators from power towers near Eden Landing Ecological Reserve and Refuge lands, including along Highway 92 and a radio tower in the northwest corner of Patterson Pond. If EBRPD and HARD were to join in this program by scouting power towers and other potential nesting sites within and adjacent to Hayward Shoreline, this could further strengthen the effectiveness of this program and limit raven predation on Snowy Plover and Least Tern eggs and chicks.

In addition to preventing ravens from nesting nearby, lethal predator control, which is already implemented at Least Tern Island, an EBRPD property slightly further north, but not yet at FDW and OBN, is an important tool that could be used to reduce the amount of eggs and chicks taken by predators in future years, especially by ravens, which can learn to target nesting Snowy Plovers. As a component of using this method, plover volunteer docents stationed along trails could also keep watch on breeding areas and notify SFBBO, EBRPD, and HARD staff when ravens and other predators are hunting in ponds. An experimental approach that may be worth considering if predator control is not a viable option is aversive conditioning, in which quail eggs treated with a mild poison that makes bird species temporarily sick are placed in fake nests in breeding areas. If this approach were affective, ravens and other avian predators that ate treated eggs would learn to avoid eating eggs. Similar experiments have been conducted in other Snowy Plover breeding areas with some success (Avery et al. 1995).

Human Disturbance

Consistent with the trends observed in past years, pedestrian and cyclist use of trails at Hayward Shoreline and along Patterson Pond remained high in 2023. Although trespass into sensitive areas was observed on multiple occasions, the impact on breeding plovers was likely minimal overall. However, since most plover breeding areas in the South Bay have relatively few trail users, the high trail use provides a unique opportunity in the Bay Area to conduct outreach with the public. Stationing docents near FDW, OBN, and Patterson Pond would allow biologists to reach a much greater amount of the public, hopefully resulting in less trespass and greater support for pond dependent breeding species like Snowy Plovers.

ACKNOWLEDGEMENTS

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Figure 1. Snowy Plover breeding areas in HARD/EBRPD's Hayward Regional Shoreline, Hayward, California.

Figure 2. Ponds within Oliver Brother's North, Hayward Regional Shoreline, Hayward, CA.

Figure 3. Snowy plover nest at Oliver Brother's North, Hayward Regional Shoreline, Hayward, CA.

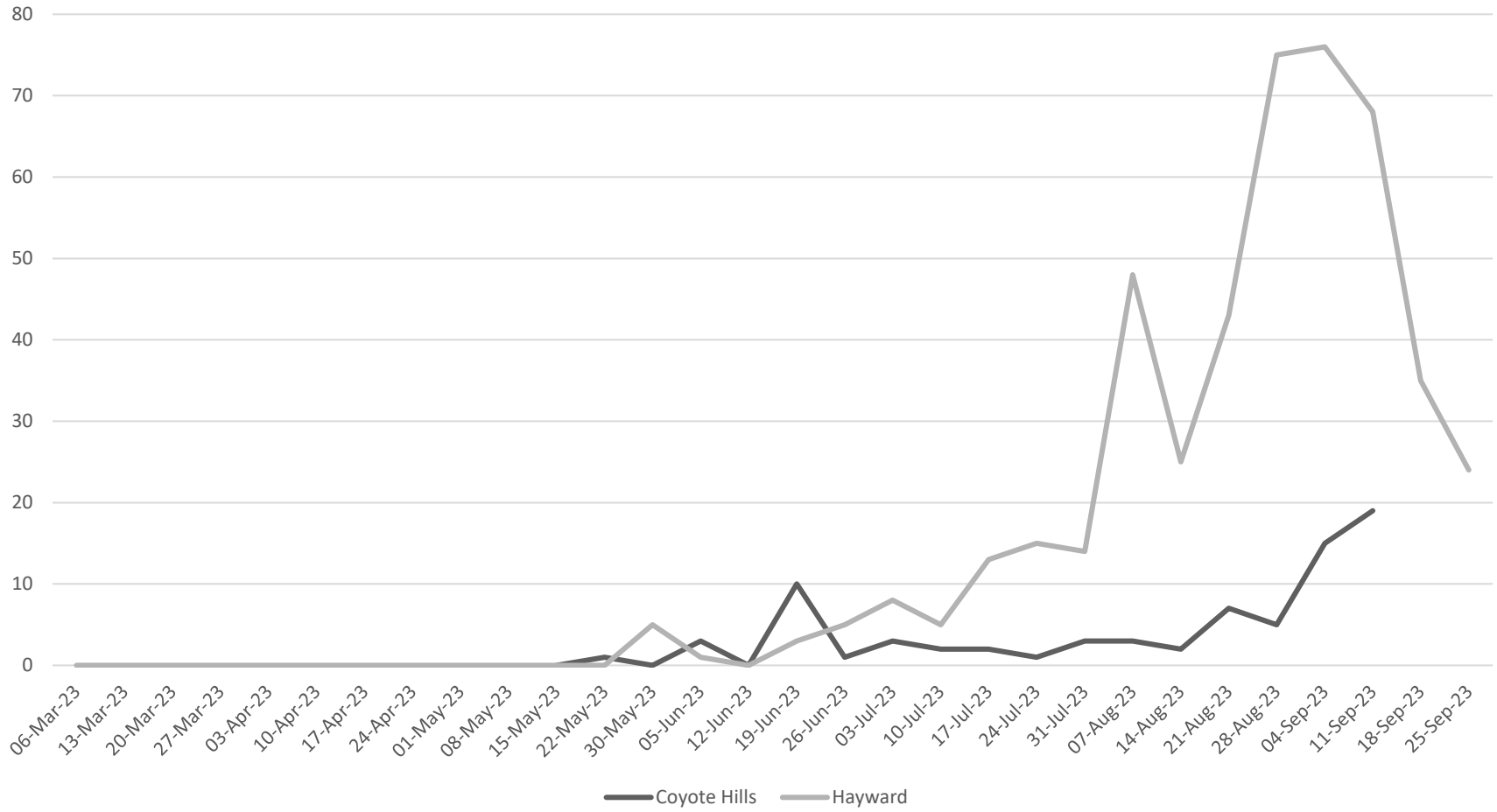

Figure 4. Weekly counts of adult Snowy Plovers at Coyote Hills and Hayward Regional Shoreline, Alameda County, California, 2023. Due to high water levels at all locations, ponds were surveyed every other week until the first observation of a snowy plover in the pond complex. After the first observation of a snowy plover in the pond complex, all ponds in that complex were surveyed weekly until the end of the season. For Coyote Hills, the first observation date was 5/22/23; for Hayward Shoreline the first observation date was 5/30/23.

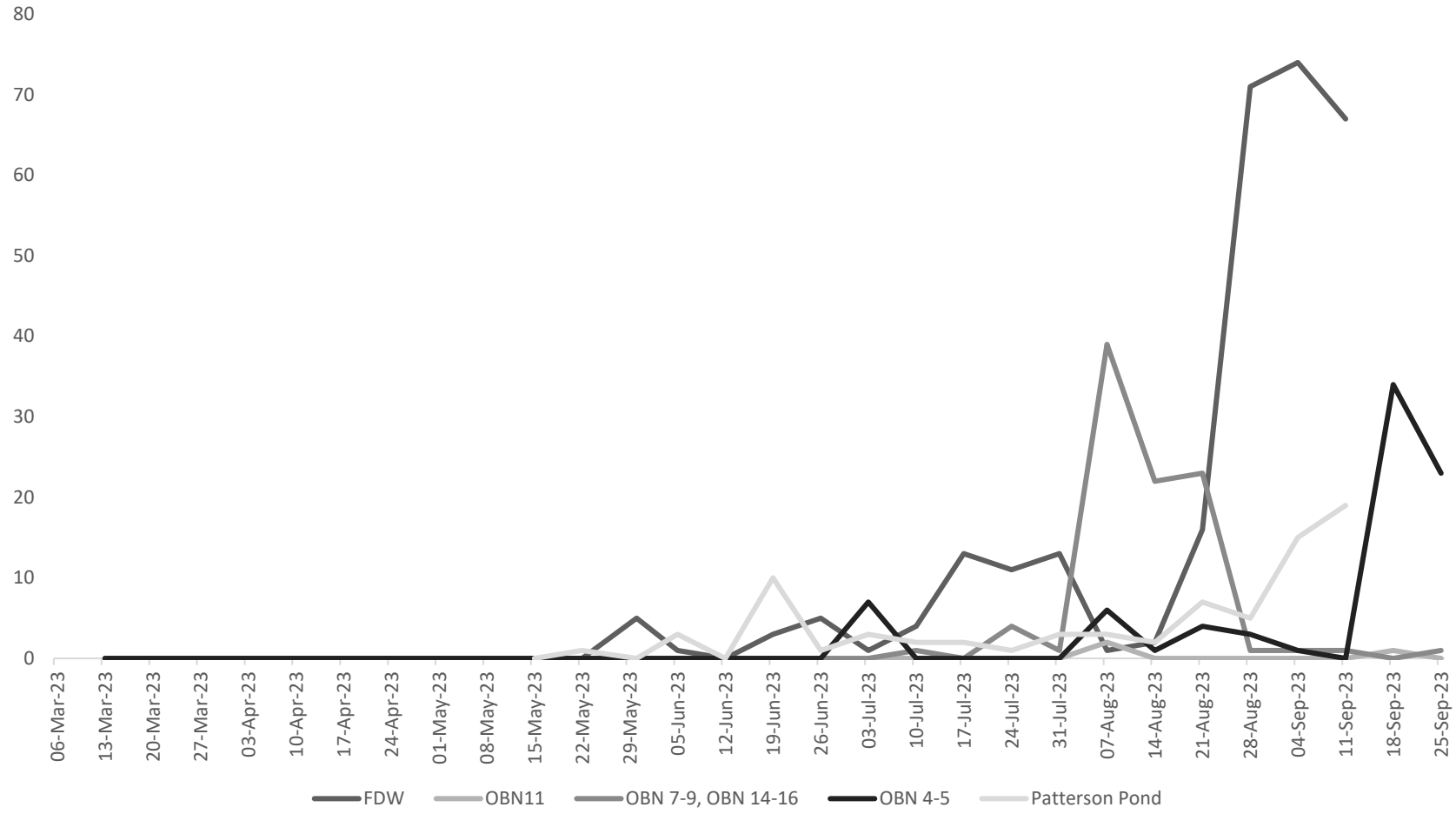

Figure 5. Weekly counts of Snowy Plover adults observed from March 6-September 25, 2023, at Frank's Dump West, East and OBN1-17, Hayward Shoreline, and Patterson Pond, Coyote Hills. No birds were observed at Frank's Dump East, OBN 1-3, OBN 6, OBN 10, OBN 12-13, or OBN 17 throughout the breeding season. Pond groups are combined together based off levee boundaries versus historic boundaries.

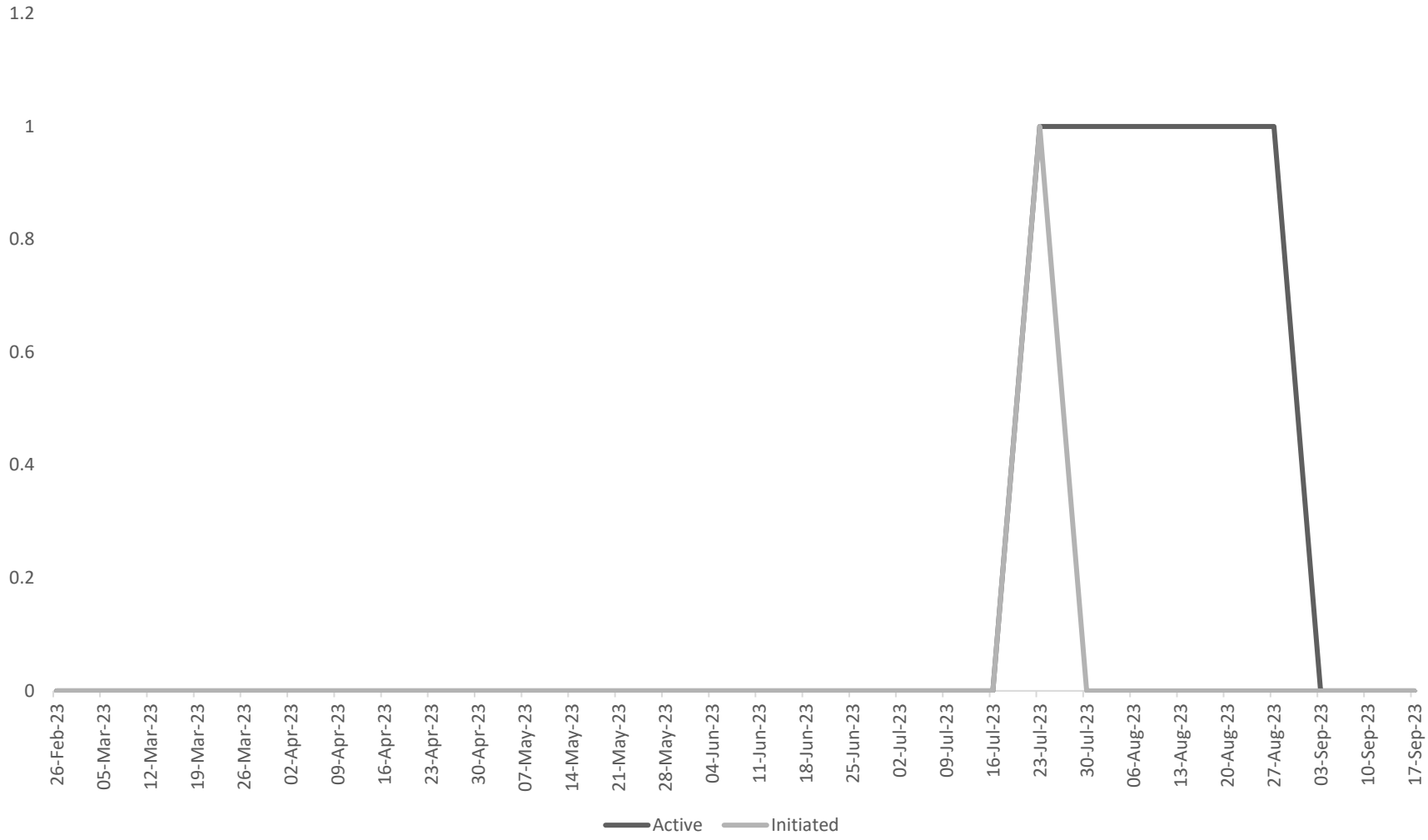

Figure 6. Active and initiated Snowy Plover nests at Franks Dump West and Oliver Brothers North, Hayward Regional Shoreline during the 2023 breeding season.

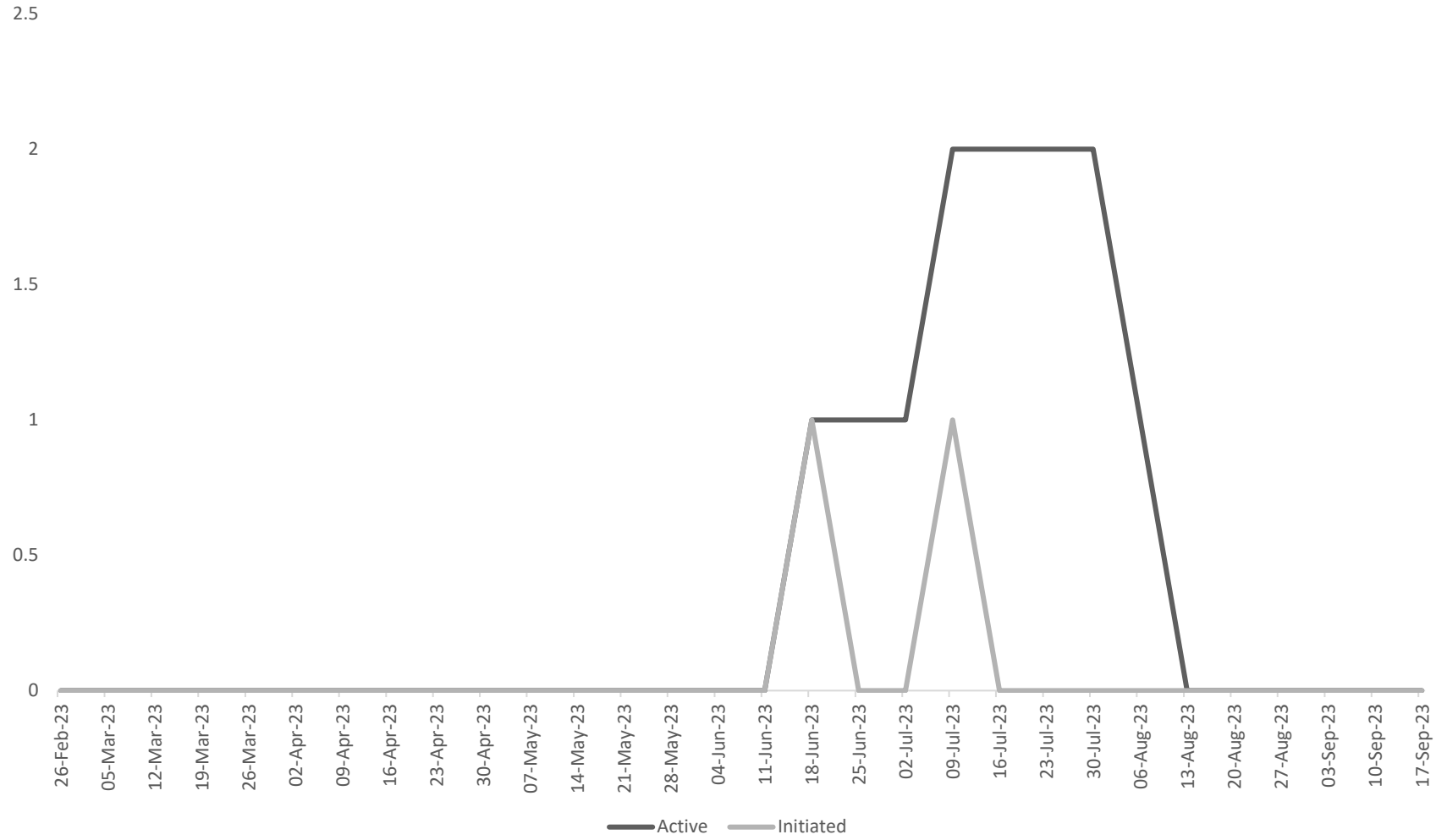

Figure 7. Active and initiated Snowy Plover nests Patterson Pond, Coyote Hills Regional Park during the 2023 breeding season.

Table 1. Number of Western Snowy Plovers observed at Recovery Unit 3 sites during annual breeding window surveys in May, 2007-2021. A dash in place of a number indicates that the site was not surveyed.

REGION	SITE	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Alameda	Eden Landing	185	82	97	94	76	120	144	142	117	115	44	89	116
	Coyote Hills	0	0	0	0	0	1	0	0	1	0	8	4	1
	Crown Beach	-	-	-	0	0	0	-	-	-	-	0	0	0
	Dumbarton	0	0	0	0	0	0	2	7	2	-	16	12	55
	Hayward	8	9	32	7	2	4	0	7	12	19	56	36	5
	Warm Springs	17	3	1	11	24	14	2	20	7	-	5	5	18
Marin	Hamilton Wetlands	-	-	-	-	-	0	-	0	0	2	0	5	9
Napa	Napa	1	0	3	10	10	0	-	2	2	-	0	4	0
San Mateo	Ravenswood	27	33	59	45	68	42	76	51	48	-	67	74	84
Santa Clara	Alviso	11	20	10	0	1	21	19	4	1	-	23	39	70
	Mountain View	-	-	-	11	0	0	0	2	0	8	35	8	1
Solano	Montezuma Wetlands	-	-	-	-	14	6	3	0	0	3	9	5	4

	Cullinan Ranch East	-	-	-	-	-	-	-	-	-	-	-	0	5
Total Unit 3		**249**	**147**	**202**	**178**	**195**	**208**	**246**	**235**	**190**	**147**	**263**	**281**	**368**

Table 2. Snowy Plover nest fates in 2023 at Hayward Regional Shoreline, Hayward, CA.

	Hatched		**Depredated**		**Total Monitored**		**Detected as Brood**		**Total**	
Pond	**Nests**	**Eggs**	**Nests**	**Eggs**	**Nests**	**Eggs**	**Nests**	**Chicks**	**Nests**	**Eggs**
FDW	0	0	0	0	0	0	1	1	1	1
OBN17	1	2	0	0	1	2	0	0	1	2
Total	**1**	**2**	**0**	**0**	**0**	**0**	**1**	**1**	**2**	**3**

Table 3. Snowy Plover nest fates in 2023 at Patterson Pond, Fremont, CA.

	Hatched		**Depredated**		**Total Monitored**		**Detected as Brood**		**Total**	
Pond	**Nests**	**Eggs**	**Nests**	**Eggs**	**Nests**	**Eggs**	**Nests**	**Chicks**	**Nests**	**Eggs**
Patterson	2	6	0	0	2	6	0	0	2	6
Total	**2**	**6**	**0**	**0**	**2**	**6**	**0**	**0**	**2**	**6**

Table 4. The average number of predators observed per survey at Franks Dump West and Oliver Brothers North Ponds, Hayward Regional Shoreline, Hayward, California, March-September 2023. The number of surveys conducted is in parentheses.

Predator Species	FDE (22)	FDW (22)	OBN1-17 (21)
Unidentified Gull	0	0.227	13.096
California Gull	0	0.318	1.904
Ring-billed Gull	0	0.818	0.809
American Crow	0.545	0	0.144
Herring Gull	0	0	0.429
Red-tailed Hawk	0.318	0	0
Western Gull	0	0.182	0.048
Common Raven	0.045	0.045	0
Bonaparte's Gull	0	0	0.048
Northern Harrier	0	0.045	0
White-tailed Kite	0.045	0	0

*OBN ponds with zero observed predators: OBN 3, OBN 12, OBN 14, and OBN 16-17

Table 5 The average number of predators observed per survey at Patterson Pond, Coyote Hills, Fremont, California, March-September 2023. The number of surveys conducted is in parentheses.

Predator Species	Patterson Pond (23)
California Gull	11.478
Unidentified Gull	4.043
Great Egret	0.348
Common Raven	0.217
Great Blue Heron	0.13

Northern Harrier	0.087
Snowy Egret	0.087
Red-tailed Hawk	0.043
Ring-billed Gull	0.043

Table 6. . Potential avian predator species.

Common Name	**Scientific Name**
American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Peregrine Falcon	*Falco peregrines*
Prairie Falcon	*Falco mexicanus*
Bald Eagle	*Haliaeetus leucocephalus*
Golden Eagle	*Aquila chrysaetos*
Cooper's Hawk	*Accipiter cooperii*
Red-Tailed Hawk	*Buteo jamaicensis*
White-tailed Kite	*Elanus leucurus*
Northern Harrier	*Circus Cyaneus*
California Gull	*Larus californicus*
Western Gull	*Larus occidentalis*
Herring Gull	*Larus argentatus smithsonianus*
Glaucous-winged Gull	*Larus glaucescens*
Mew Gull	*Larus canus*
Ring-Billed Gull	*Larus delawarensis*

American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Cattle Egret	*Bubulcus ibis*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Snowy Egret	*Egretta thula*
Loggerhead Shrike	*Lanius ludovicianus*

Table 7. . Potential mammalian predator species.

Common Name	**Scientific Name**
Red fox	*Vulpes vulpes*
Grey Fox	*Urocyon cinereoargenteus*
Striped Skunk	*Mephitis mephitis*
Virginia Possum	*Didelphis virginiana*
Domestic Cat	*Felis catus*
Coyote	*Canis latrans*