SAN FRANCISCO BAY
BIRD OBSERVATORY

Snowy Plover Recovery at Hayward Regional Shoreline, Alameda County, California

Photo taken at OBN16 by Josh Scullen

Prepared By:
Ben Pearl, Plover Program Director
Yiwei Wang, Executive Director
San Francisco Bay Bird Observatory
524 Valley Way, Milpitas, CA 95035

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SUMMARY

During the 2021 breeding season, the San Francisco Bay Bird Observatory (SFBBO) monitored Western Snowy Plover (*Charadrius nivosus nivosus*; Snowy Plover) population size, nesting and fledging success, and identified potential predators at Hayward Regional Shoreline (Hayward Shoreline; Figure 1-2.)

As part of the Pacific Coast breeding season window survey (May 12-22), we counted 56 adult Snowy Plovers at Hayward Shoreline (Table 1).

Over the course of the breeding season (March-September), SFBBO staff determined the fate of 24 nests at Hayward Shoreline, finding that 25% hatched and 75% were depredated (Table 2; Figure 3). The presence of one brood on the Oliver Brothers North salt ponds from an undetected nest indicates that at least some breeding activity was missed in these ponds (Table 2). Elsewhere in Haywards Shoreline, East Bay Regional Parks District determined the fate of an additional three nests, finding that all three hatched (Table 2).

In 2021, SFBBO banded 8 Snowy Plover chicks at the Oliver Brothers North ponds and two at Franks Dump West that successfully hatched from four nests (Table 3; Figures 4-5). From band re-sighting surveys, we determined that at least 20% of these chicks survived to fledge (28 days post-hatching) as of November 16, 2021(Table 3).

During avian predator surveys, we counted unidentified gulls (*Larus* spp.; likely California Gulls due to the time of year and locations) as the most numerous potential avian predators at Hayward Shoreline, followed by Common Ravens (Corvus corax) and American Crows (Corvus brachyrnhcos) (Table 4). Peregrine Falcons (Falco peregrines) and Northern Harriers (*Circus cyaneus*) were the most frequently observed raptors at Hayward Shoreline.

On Thursday, September 9, Plover and Tern Program Director Ben Pearl presented on SFBBO's Snowy Plover research during one of SFBBO's Birdy Hour online educational events. This presentation covered all of SFBBO's plover research in the South Bay, but especially focused on our efforts within Alameda County. A recording of the presentation can be viewed at https://www.youtube.com/watch?v=Q_cbiGg24YM&t=1878s.

INTRODUCTION AND BACKGROUND

The Pacific Coast population of the Western Snowy Plover (*Charadrius 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 1998). 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 consists of the San Francisco Bay Estuary and includes Alameda, Napa, Santa Clara, and Solano counties, and the bay 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 (Refuge) began surveying for Snowy Plovers on Refuge lands.

From 2003-2021, SFBBO conducted annual Snowy Plover monitoring and research within the South San Francisco Bay in support of the goals set forth by the RU3. Specifically, we: 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.

METHODS

Study Area

From March 1 to September 15, 2021, SFBBO staff and volunteers conducted Snowy Plover and avian predator surveys at Hayward Regional Shoreline (Hayward Shoreline). Hayward Shoreline is owned by Hayward Area Recreation District (HARD) and 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 (Figures 1-2).

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, we identified ponds with potential nesting habitat and surveyed those ponds weekly from March 1 to September 15, 2021.

SFBBO biologist conducted weekly pond 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 recorded.

SFBBO Snowy Plover volunteers surveyed lower priority ponds monthly to check for possible nesting activity during the season.

From May 16-22, we 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 most of Hayward Shoreline for this survey, while EBRPD surveyed one location, Least Tern Island.

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 location using a custom nest monitoring application (Narwhal© on a smart phone).

We monitored nests weekly until we determined the fate of the nest. On each survey, we recorded whether the nest was still active (adults incubating) 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.

Snowy Plover Nest Monitoring

During the first visit, we floated the eggs (Hays and LeCroy 1971) to estimate egg age if incubation had been observed (typically 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.

Snowy Plover Color Banding

Chick Banding

Since 2008, SFBBO has banded Snowy Plover chicks to study their movements and to estimate fledging success rates in the South Bay, when resources allowed. To band chicks, biologists checked nests daily, starting four days before the estimated hatch date. Due to the precocial nature of chicks, arrival at nests was timed to allow complete hatching of chicks prior to their movement away from the nest; this is typically a several hour window. We banded each chick with a unique four-color combination by placing two bands on each leg below the tibiotarsal joint. Each combination consisted of three darvic (XCLA Darvic Leg Bands I/D 3.1mm n.d.) or acetal (XCLA Acetal Leg Bands I/D 3.1mm n.d.) color bands and one silver U.S. Geological Survey band. All bands were then wrapped in colored auto pin-striping tape. Both darvic and acetal color bands were used depending on availability.

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 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.

Adult Banding

In an effort to increase the number of color banded adults within the South San Francisco Bay, on several occasions we attempted to trap adults right after the eggs had hatched using noose mats placed near the nest. If adults were trapped within five minutes, biologists would quickly band and process the adult, then release and confirm they came back to the nest. If they were not trapped within five minutes, biologists would remove the noose mats and cease attempts to trap the adult.

Avian Predator Surveys

To identify avian predators in the area that might impact breeding Snowy Plovers, SFBBO biologists and interns conducted predator surveys concurrently when surveying ponds for Snowy Plovers. Volunteers conducted avian predator surveys at ponds surveyed monthly 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, Least Tern, 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 there are 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, Peregrine Falcons, 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 captured on camera and consistent with previous documentation of predation.

Due to past concerns over predators identifying nest cameras, especially mammals, SFBBO was cautious in deploying Snowy Plover nest cameras in 2021. Due to the previously observed presence of red fox at Hayward Shoreline and coyote at adjacent Eden Landing throughout the season, only one nest had a camera placed on it at Hayward Shoreline. The camera on this nest was placed directly on the ground between 2-3 meters from the nest; this method was used after testing other further but unsuccessful placements in the past. Cameras were housed in a camouflage case and made even less conspicuous by placing wood and other debris from the surrounding area around the camera. Three rapid-fire still images were taken whenever motion was detected, in color by day and monochrome infrared by night. Cameras were checked each time the nest was checked, typically once per week, at which time the memory card and batteries were replaced as needed.

RESULTS

Snowy Plover Surveys

We observed a mean of 36.5±35.5 adult Snowy Plovers per week from March 2 through September 15 at all ponds surveyed in Hayward Shoreline (Figure 7). FDW supported the largest numbers of Snowy Plovers at Hayward Shoreline, with a mean of 24.7±32.9 adults observed per week (Figure 8). Ponds OBN4-5 supported the second most adults per week (8.9±10.8) among ponds surveyed (Figure 8).

Dead Male Snowy Plover found at OBN1

On the morning of May 14, 2021, we went to check on the status of a nest in process of hatching at pond OBN1. Upon scanning the area near the nest with a scope, we found that there was a dead male Snowy Plover located approximately 3m away from the nest (Figure 6). We were able to confirm that this was not the male associated with the hatching nest, as a male was attending to the nest, which two days later hatched and the chicks were banded. The specimen was collected, properly bagged and placed in a freezer at SFBBO's office until it was transferred in October to the California Department of Fish and Wildlife's Marine Wildlife

Veterinary Care and Research Center in Santa Cruz for necropsy. The results of the necropsy are currently pending.

Early and Late Season Trends

Very few Snowy Plovers were observed at Hayward Shoreline in March, with only 2.4±3.4 adults observed throughout all ponds (Figure 7). In the first week of April, a flock of 23 was observed at OBN4-5 (Figure 8).

Beginning in late July through September 15, we observed large post-breeding flocks of 65.9±49.5 adults, with most being found at FDW (Figure 8). On September 15 a season high of 123 adults were observed between FDW and OBN4-5 (Figure 8). In both cases these birds were no longer breeding, but instead either staging for migration or gathering into winter flocks.

Snowy Plover Nesting

Nesting Abundance and success

Over the course of the breeding season, we monitored a total of 24 Snowy Plover nests at Hayward Shoreline, finding that 25% hatched and 75% were depredated (Table 2).

Snowy Plover Color Banding

Chick Fledging Success

As part of our efforts to document breeding success, we banded eight chicks from three successfully hatched nests at OBN and two chicks from one successfully hatched nest at FDW (Table 3). As of December 15, 2021, one chick each from OBN and Franks Dump West were determined to have fledged, resulting in fledge rates of 13% and 50%, respectively (Table 3). At OBN, 0.33 chicks fledged per male, while at FDW 1.0 chicks fledged per male, resulting in 0.5 chicks fledged per male at areas of Hayward Shoreline monitored by SFBBO.

Adult banding

On both May 7 and 17, we unsuccessfully attempted to trap and color band adult males attending to hatched nests at OBN. During the two other banding events at Hayward Shoreline, we did not attempt to trap adults due to a large amount of adults surrounding the nest at OBN and the presence of a roosting gull flock at FDW.

Avian Predators

During avian predator surveys, we counted unidentified gulls (*Larus* spp.; likely mostly California Gulls due to the time of year and locations) as the most numerous avian predators at FDW (1.75/survey), followed by Ring-billed gulls (0.21/survey); at FDE, American crows were the most numerous observed predator during surveys (0.46/survey), followed by unidentified gulls (0.17/survey); and at OBN, common ravens were the most numerous observed predator (0.32/survey), followed by Peregrine falcons (0.23/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, but Common Ravens

were also observed flying to and from an active raven nest located within the first electrical power tower to the west of the Highway 92 toll plaza. Peregrine Falcons (*Falco peregrines*) were frequently observed hunting in OBN, often perching on remnant salt production infrastructure to scan the pond.

Mammalian Predators

Tracks of mammalian predators, including red fox and coyote, were observed at OBN early in the breeding season; however, these species were not observed during predator surveys. The only mammalian predators observed during surveys were off leash domestic dogs, which were observed on two separate occasions at FDW (0.083/survey)(Table 4).

Human Disturbance

At both OBN and FDW we observed signs of human disturbance. At OBN we observed bike tracks on OBN11-13, while at FDW we directly observed trespassers and unleashed dogs on the pond as well as finding tracks from both.

DISCUSSION

Population Size

The number of adult Snowy Plovers observed at Hayward Shoreline during the breeding window tripled from 2020 (19) to 2021 (58), with all of the adults observed in 2021 found at OBN and FDW. This provides evidence that Hayward Shoreline is capable of supporting a relatively large number of breeding Snowy Plovers.

Nest Abundance and Success

Although we observed a large increase in the number of breeding adults at Hayward Shoreline during the breeding window survey, we located and monitored seven fewer nests in 2021 (24) than 2020 (31). This discrepancy was likely due to the high depredation observed at both OBN and FDW, where only 25% of nests hatched in 2021 compared to 65% of nests in 2020. The majority of nests monitored at Hayward Shoreline were initiated in April and May, with only five initiated in June and July (Figure 9). This indicates that possibly due to high predation, most Snowy Plovers left Hayward Shoreline in search of other locations to breed.

Snowy Plover Banding

Chick Fledging Success

We were able to band ten chicks at Hayward Shoreline, representing 52% of all known hatched chicks at OBN and FDW (including three chicks hatched from an undetected nest at OBN). Of the eight chicks banded at OBN, only one was observed to have fledged, and was only observed at 31 days. One of the two chicks banded at FDW was observed to have fledged at 33 days, but has not been seen since. The poor chick survival observed at OBN was potentially due in large part to Common Ravens, which nested nearby on a power tower on Highway 92 and were frequently observed hunting in OBN and FDW. Peregrine falcons, which nested in nearby Eden

Landing pond E10 and fledged three chicks, potentially also contributed to the poor chick survival observed.

Avian Predators

Although unidentified gulls were the most numerous predator species, most were roosting rather than actively foraging, and thus we believe that their impact on breeding Snowy Plovers was limited. Common ravens were the second most frequently observed predator, and they have previously been identified as the predator posing the greatest hurdle to Snowy Plover recovery at nearby Eden Landing (Pearl et al. 2016). Common Ravens were confirmed as the nest predator at three nests at Eden Landing in 2021 (Pearl et al. In Progress), and were suspected to be the primary nest predator at Eden Landing. It is likely that Common Ravens played a similarly large role in the poor Snowy Plover breeding success observed at Hayward Shoreline in 2021. In order to reduce the impact of ravens on breeding Snowy Plovers and Least Terns 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 Don Edwards SF Bay National Wildlife Refuge and PG&E have worked in cooperation to remove the nests of ravens and other predators from sensitive areas near Don Edwards and Eden Landing, including along Highway 92, however due to the COVID19 pandemic this program was on hold from March 2020 until mid-2021. By the time ravens were detected nesting on the Highway 92 power tower, the nest could not be removed due to the presence of nesting Double-Crested Cormorants (*Phalocrocorax auritus*) on the same tower, as attempts to remove the raven nest would likely result in abandonment of cormorant eggs and/or mortality of chicks. 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, predator control, which is already implemented at Least Tern Island 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, especially ravens, which can learn to target nesting Snowy Plovers and Least Terns. As a component of using this method, plover/least tern 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 and Least Tern breeding areas with some success (Avery et al. 1995).

Human Disturbance

Consistent with the trends observed in 2020, pedestrian and cyclist use of trails at Hayward Shoreline remained high in 2021. Although trespass into sensitive areas was observed on several 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 and OBN 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 such as Snowy Plovers and Least Terns.

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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 Frank's Dump West, Hayward Regional Shoreline, Hayward, CA.

Figure 4. Two color banded snowy plover chicks and one non-viable egg at a nest in OBN1, Hayward Regional Shoreline, Hayward, CA.

Figure 5. Two color banded snowy plover chicks at Frank's Dump West, Hayward Regional Shoreline, Hayward, CA.

Figure 6. Dead male Snowy Plover found on May 14, 2021 at OBN1, Oliver Brothers North, Hayward Regional Shoreline, Hayward, CA.

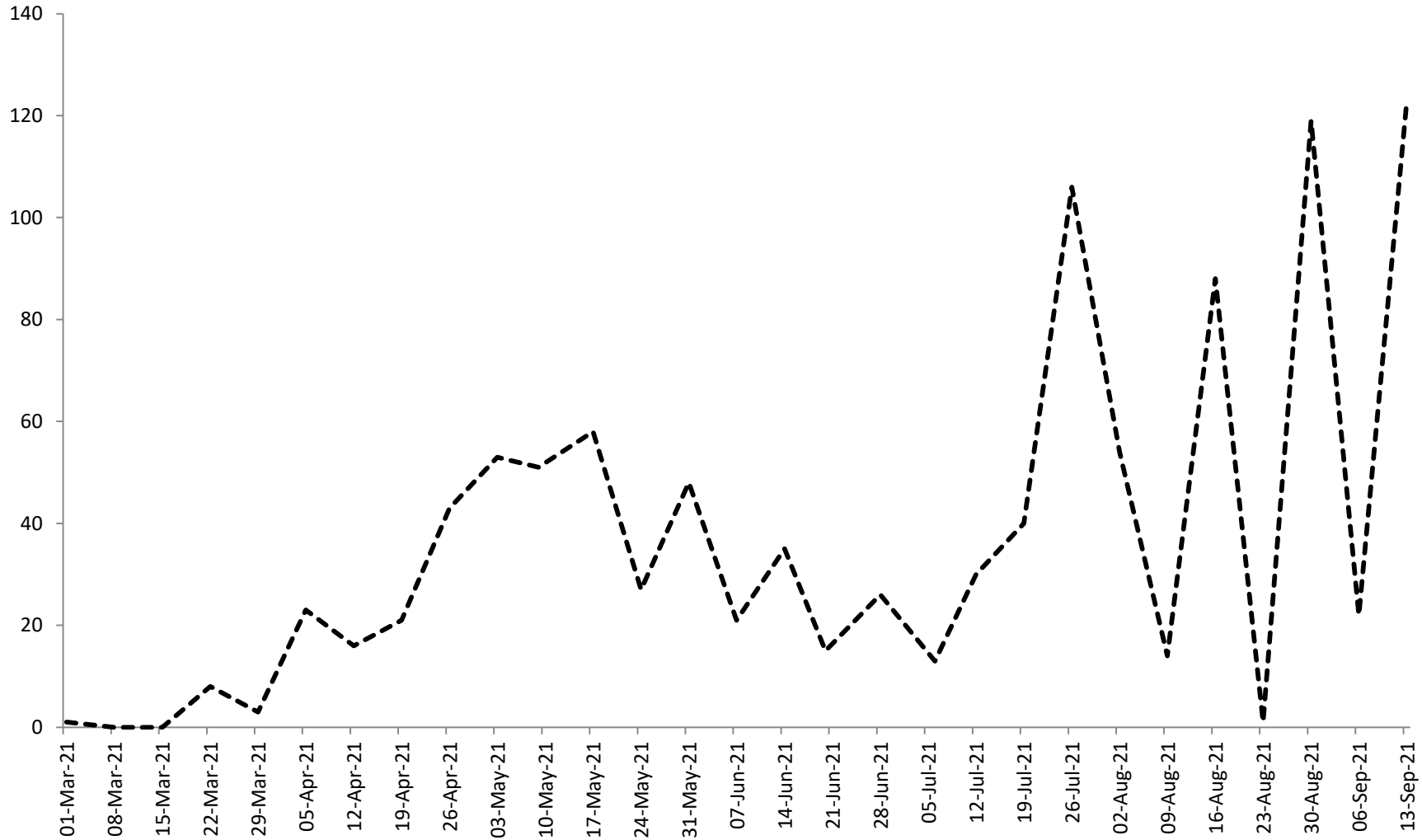

Figure 7. Weekly counts of adult Snowy Plovers at Hayward Regional Shoreline, Hayward, California, 2021.

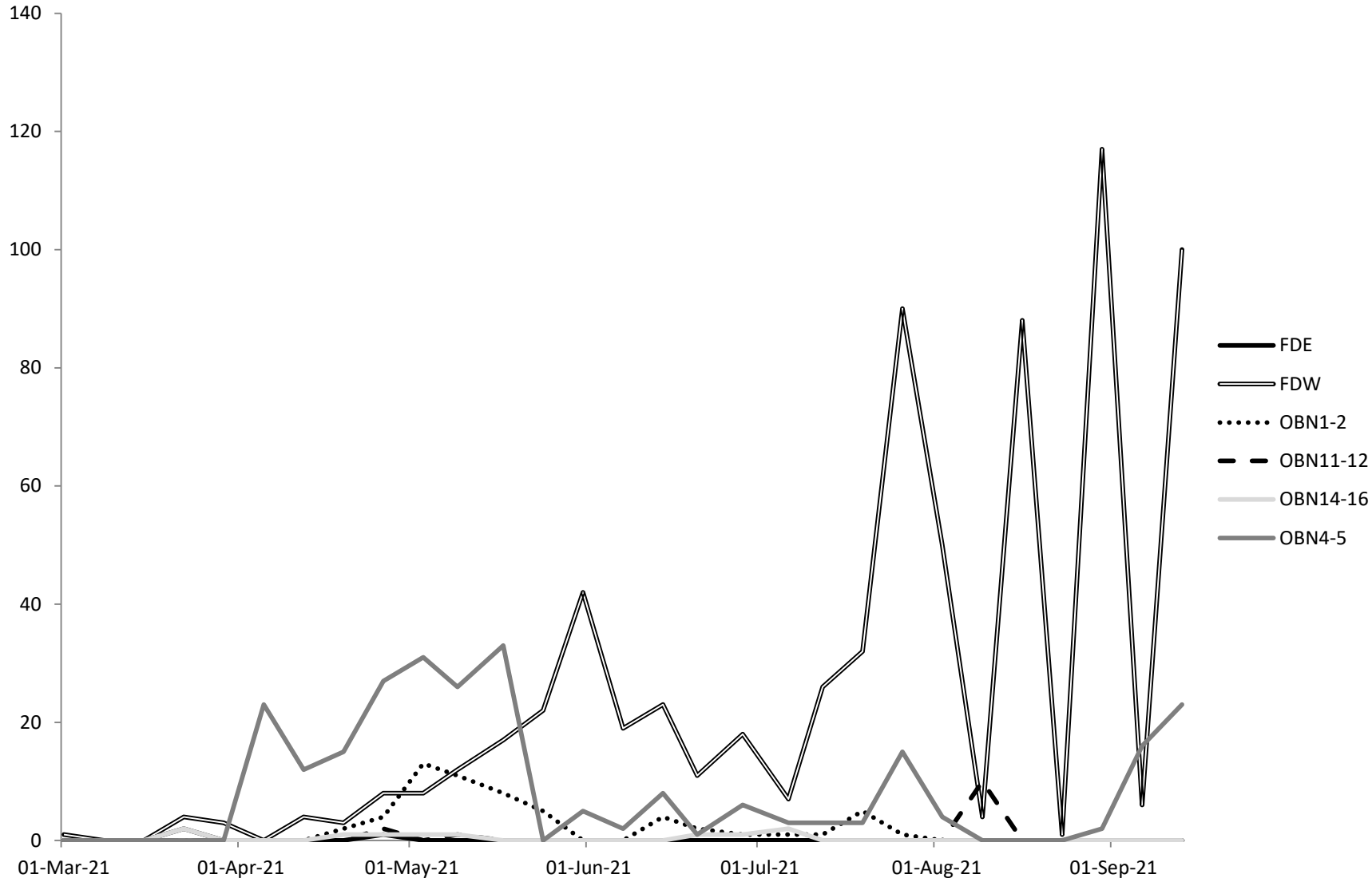

Figure 8 . Weekly counts of Snowy Plover adults observed from March 1-September 15, 2021, at Frank's Dump West, East and OBN1-17, Hayward Shoreline.

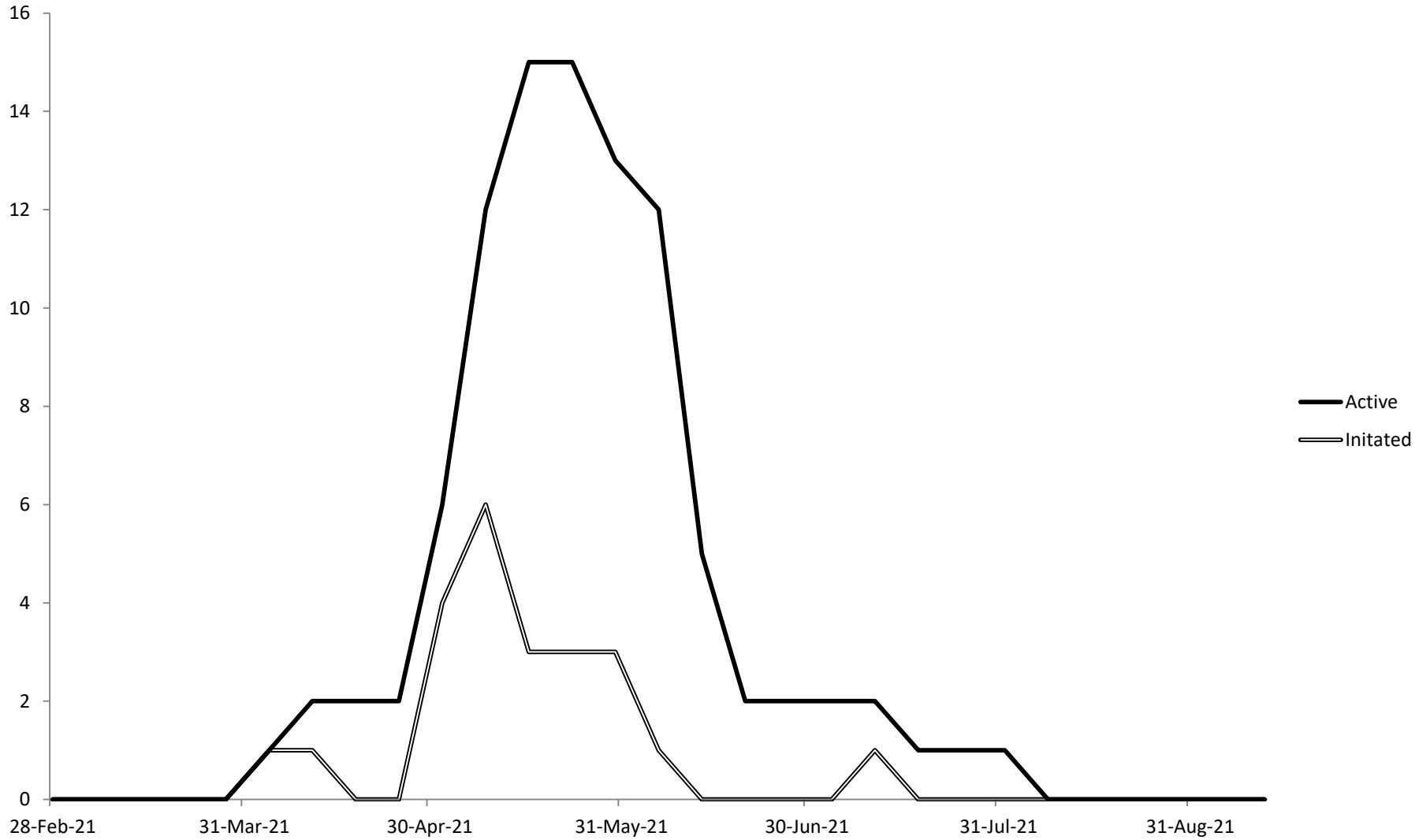

Figure 9. Active and initiated Snowy Plover nests at Franks Dump West and Oliver Brothers North, Hayward Regional Shoreline during the 2021 breeding season.

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	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Alameda	Eden Landing	88	184	185	82	97	94	76	120	144	142	117	115	44
	Coyote Hills	0	0	0	0	0	0	0	1	0	0	1	0	8
	Crown Beach	-	-	-	-	-	0	0	0	-	-	-	-	0
	Dumbarton	0	0	0	0	0	0	0	0	2	7	2	-	16
	Hayward	4	12	8	9	32	7	2	4	0	7	12	19	56
	Warm Springs	14	27	17	3	1	11	24	14	2	20	7	-	5
Marin	Hamilton Wetlands	-	-	-	-	-	-	-	0	-	0	0	2	0
Napa	Napa	12	10	1	0	3	10	10	0	-	2	2	-	0
San Mateo	Ravenswood	21	42	27	33	59	45	68	42	76	51	48	-	67
Santa Clara	Alviso	8	0	11	20	10	0	1	21	19	4	1	-	23
	Mountain View	-	-	-	-	-	11	0	0	0	2	0	8	35
North Bay Delta	Montezuma Wetlands	-	-	-	-	-	-	14	6	3	0	0	3	9
Total Unit 3		**147**	**275**	**249**	**147**	**202**	**178**	**195**	**208**	**246**	**235**	**190**	**147**	**263**

Table 2. Snowy Plover nest fates in 2021 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	2	5	11	33	13	38	0	0	13	38
*LETE Island	3	9	0	0	3	9	0	0	3	9
OBN1	1	2	4	12	5	14	0	0	5	14
OBN3	1	3	0	0	1	3	0	0	1	3
OBN4	0	0	1	3	1	3	1	3	2	6
OBN5	0	0	2	6	2	6	0	0	2	6
OBN8	1	3	0	0	1	3	0	0	1	3
OBN16	1	3	0	0	1	3	0	0	1	3
Total	**6**	**25**	**18**	**54**	**24**	**79**	**1**	**3**	**28**	**82**

*Information provided by EBRPD

Table 3. Apparent fledging success of Snowy Plover chicks by pond and chicks fledged per male in the South San Francisco Bay, California, 2021. Chicks were considered fledged if they survived to 28 days. *N* is the number of individuals banded.

Pond	N	Fledged	Fledging Success	Males	Chicks fledged/Male
FDW	2	1	50%	1	1.0
OBN1	2	0	0%	1	0.0
OBN15	3	1	33%	1	1.0
OBN16	3	0	0%	1	0.0
Total	**10**	**2**	**22%**	**4**	**0.5**

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 2021.

Predator Species	FDE	FDW	OBN1-17
Unidentified Gull	0.167	1.75	0.045
Common Raven	0.042	0.25	0.317
American Crow	0.458	0.042	0.091
Peregrine Falcon	0.042	0.042	0.227
California Gull	0	0.167	0.045
Ring-billed Gull	0	0.208	0
Northern Harrier	0	0.042	0.135
Red-tailed Hawk	0.125	0	0
White-tailed Kite	0	0.125	0
Domestic Dog	0	0.083	0
Great Egret	0	0	0.045
Short-eared Owl	0	0	0.045
Herring Gull	0	0.042	0

*OBN ponds with zero observed predators: OBN 5-8, OBN 14-15

Table 5. 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 6. 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*