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**2024 Final Report on the Western Snowy Plover**

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Coal Oil Point Reserve  
University of California  
Santa Barbara, CA

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Permit Number **TE073205-5**

Date of Preparation: January 29<sup>th</sup>, 2025



Site: Sands Beach, Coal Oil Point Reserve (COPR)

Location: RU5, Santa Barbara, CA

Lat-Long: 34 25 00 N, 119 52 30 W

USGS maps: Goleta 7.5, Dos Pueblos Canyon 7.5, Goleta 15

Jurisdiction: Owned and managed by the University of California Santa Barbara.

Climate: Avg precip 14-21 in/year, avg min temp 42 F, avg max temp 75 F

Total linear beach length: 1,200 m

Protected linear beach length: 300-400 m during wintering season and 800 m during the breeding season

Protected area during breeding season: 30,700 sq meters or 7.6 acres

Docent program? Yes, all year, most daylight hours

Interpretive and regulatory signs? Yes, at beach entrances and fences

Management Plan? Yes

Enforcement? Docents request compliance with leash law and restricted areas. Officers are called when problem is not solved.

Monitoring: Yes, weekly in the winter and fall and 3-4 times per week in the spring and summer.

Predator management: Crow deterrence, fencing to prevent skunk, predator control, predator exclosures as needed.

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## ABSTRACT

In 2024, we monitored the Western Snowy Plover (WSP) population at Coal Oil Point Reserve (COPR) as in previous years. The management potential for the number of breeding adults at COPR is 25. During the breeding window survey, the number of breeding adults was 59 - higher than the average of 38 for our site. During the wintering survey, the population size was 133 - below the average of 170. Flooding from high tides was the primary cause of nest failure. The hatching rate in 2024 was 47%, slightly lower than the average of 51%, but the fledging rate was 86%, well above the average of 63%. The number of fledged chicks per male (2.64) exceeded our site's recovery goal of a minimum 1.0 fledged chicks per male. All nests (84) were initiated on Sands Beach, while none were initiated on the mudflats of the Devereux Slough (delta). The nesting success of the Snowy Plover breeding population at Coal Oil Point Reserve can be directly attributed to the active management of human and dog disturbances to the nesting habitat. The high fledging success this year could be a result of the implementation of new policy prohibiting dogs on the beach. Prior to the implementation of conservation management in 2001, Snowy Plovers had not nested at this site for 30 years due to human impacts.

## INTRODUCTION

Sands Beach at Coal Oil Point Reserve (COPR; Figure 1) is part of the University of California Natural Reserve System. The entire reserve including Sands Beach is designated as an Environmentally Sensitive Area by the California Coastal Commission. Sands Beach was also designated a “critical habitat” in the recovery of the threatened WSP (USFWS Western Snowy Plover Recovery Plan). Additionally, the National Audubon Society has deemed it as an “Important Bird Area” because of the many migrating, wintering and breeding shorebirds that use it. Sands Beach sustains an average wintering population of 170 WSP and an average breeding population of 38. The lower beach, below the high tide line, is open to the public all year. Most of the dry sandy upper beach, where plovers nest and congregate while resting, is protected by a symbolic fence.

Parts of Sands Beach are open to the public for passive recreation (sunbathing, walking, and surfing). Managing public access to the beach has been essential in protecting the wildlife resources of Sands

Beach in perpetuity. Active management to protect WSP began in 2001 and resulted in the reestablishment of a breeding population of WSP that had been lost for over 30 years and a general increase in the wintering population (Lafferty, 2001a, 2001b and 2005). The most significant action that supported reestablishment of nesting at Sands Beach was the elimination of recreational public use on the upper beach habitat where Snowy Plovers nest. This is the primary area used by WSP for resting and nesting. Additionally, in 2001, a docent program was initiated to help inform visitors about the restricted areas and other reserve regulations. The docents provide direct communication with beach goers to encourage them to avoid sensitive areas and follow the posted beach regulations. This program resulted in the return of a breeding population at COPR and an increase in awareness by beach goers.

Enforcement of the Santa Barbara County leash laws has been sporadic and citations are rarely given. In 2017, the California Coastal Commission approved an amendment to the UC Santa Barbara Long Range Development Plan (LRDP) to prohibit dogs at Sands Beach. This prohibition was an attempt to eliminate the chronic issue of unleashed dogs at Sands Beach. The policy was implemented in April of 2024 for the first time.

Starting in April 2024, the reserve replaced the ‘leashed dog policy’ with a ‘no dogs policy.’ The reserve published the new policy on social media including Facebook, Instagram, and local newspapers. The staff promptly responded to questions by the public and fact-checked public comments. After the new dog prohibition policy was implemented, the number of dogs arriving at the beach was 40% of 2023 levels. Despite these measures, some dogs were still coming to Sands Beach. In these cases the docents talked about the new policy to dog owners. After contact with a docent, the number of dogs on the beach was further reduced to 14% of 2023 levels. Our goal for next year is to continue to inform the community to reduce the number of dogs on the beach by nearly 100%.

## **METHODS AND RESULTS**

The reserve staff monitors the WSP population and several aspects of beach use by the public. These include the number of people on the beach and in the ocean, number of trespassers, and dogs per hour. Standard protocols were established in 2001 to ensure that staff and regulatory agencies can rely on the data to understand trends, measure performance standards and goals, and evaluate the need for new

actions. COPR staff uses a scientific approach to gather and interpret data which is applied to guide an adaptive management approach for protecting the WSP and other wildlife. This approach is also in accordance with the UC Natural Reserve System's mission of stewardship and conservation. The protection of natural resources at Sands Beach is described in detail in the [COPR Beach Access Management Plan](#) (Sandoval, 2019).

### **Protected Areas**

In 2024, we continued the same management practices established in the 2020 Snowy Plover and Beach Access Management Plan (Sandoval, 2020). Figure 1 shows the plover habitats and all plover nest locations since the reestablishment of the breeding population, and the maximum extent of the symbolic fences. The exact position of the fences varies based on tides and season, and whether the slough mouth is open. When the slough mouth is open, a portion of the fencing is removed to prevent it from being washed away. In the last several years, the entire fence had to be removed in the winter due to beach erosion. In these cases, protection of the upper beach habitat from trespassers is provided by a few signs on the dunes and the docents, who request trespassers to leave the area behind the signs (Photo 1). The entire Sands Beach is designated 'critical habitat' for WSP. Two decades of nest data encompassing over 1,000 nests shows that the highest density of nests were established in this area (Figure 1).

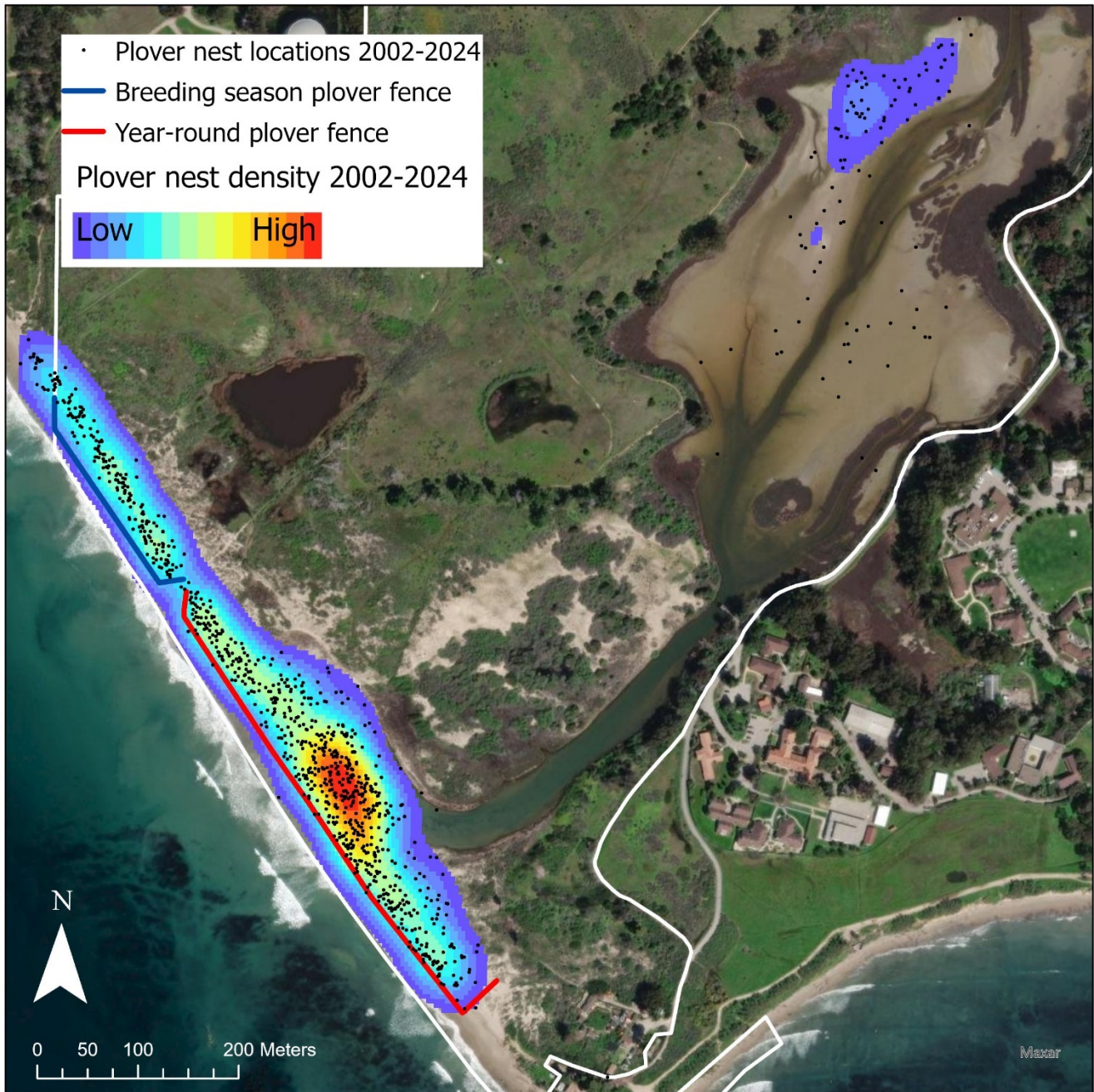


Figure 1. Critical habitat protected by symbolic fencing for WSP at Coal Oil Point Reserve and location of nests since the reestablishment of the breeding population in 2001. The heat map illustrates the density of nests from all the years.



Photo 1. Signs along the protected area inform the visitors where to walk when on Sands Beach.

### **Monitoring of the Wintering Population**

During the wintering season, we counted wintering WSP and checked for banded individuals once a week. To count WSP, we walked along the wet sand from the eastern to western boundaries of Sands Beach recording all individuals seen with binoculars. On the way back, we checked for color bands by approaching WSP just enough for them to stand up making the legs visible. During the 2024 winter window survey, we recorded 133 WSP (Figure 2). The average count of WSP during the winter window survey at COPR since 2001 is 170 individuals.



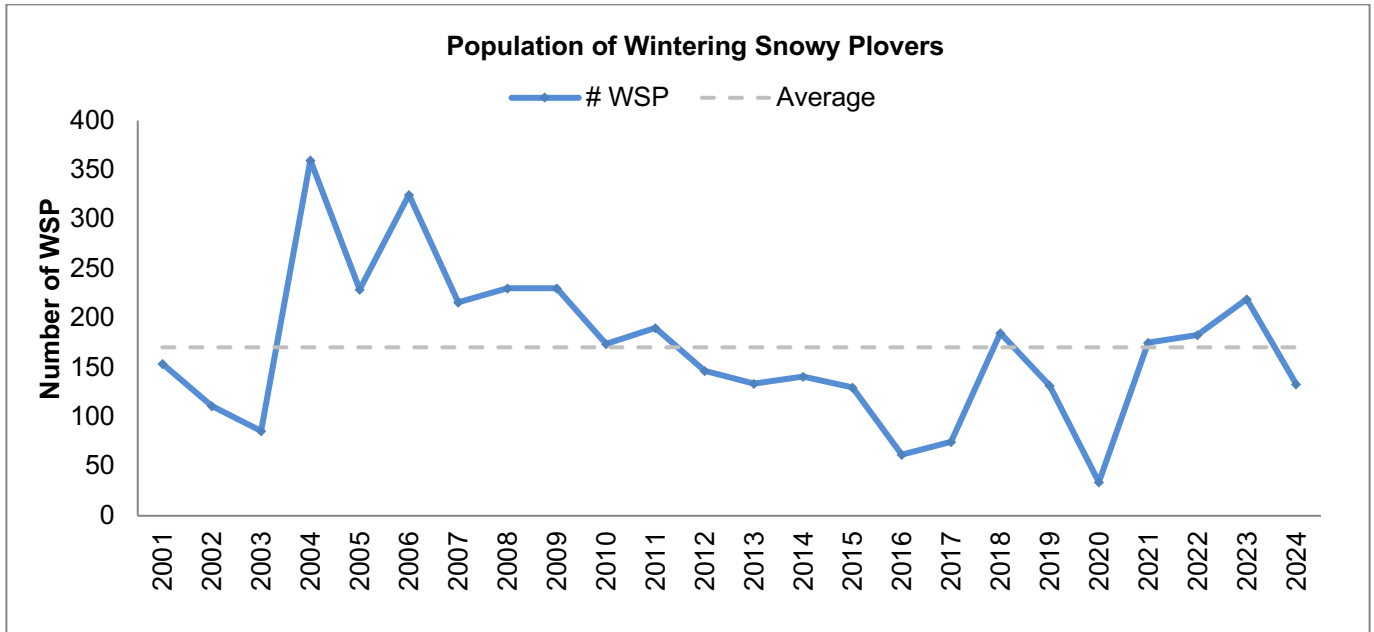


Figure 2. Counts of WSP during the winter window surveys at Coal Oil Point Reserve. *Average line represents the average from 2001-2023.*

**Monitoring of the Breeding Population**

For the annual breeding window survey, we counted WSP with the same method as in the wintering season window survey. We recorded 59 WSP during the 2024 breeding window survey, which is higher than the average (38) for COPR. The graph below shows that the number of breeding adults increased right after the implementation of the management plan in 2001 and has reached a mean of 38 adults since 2001 (Figure 3).

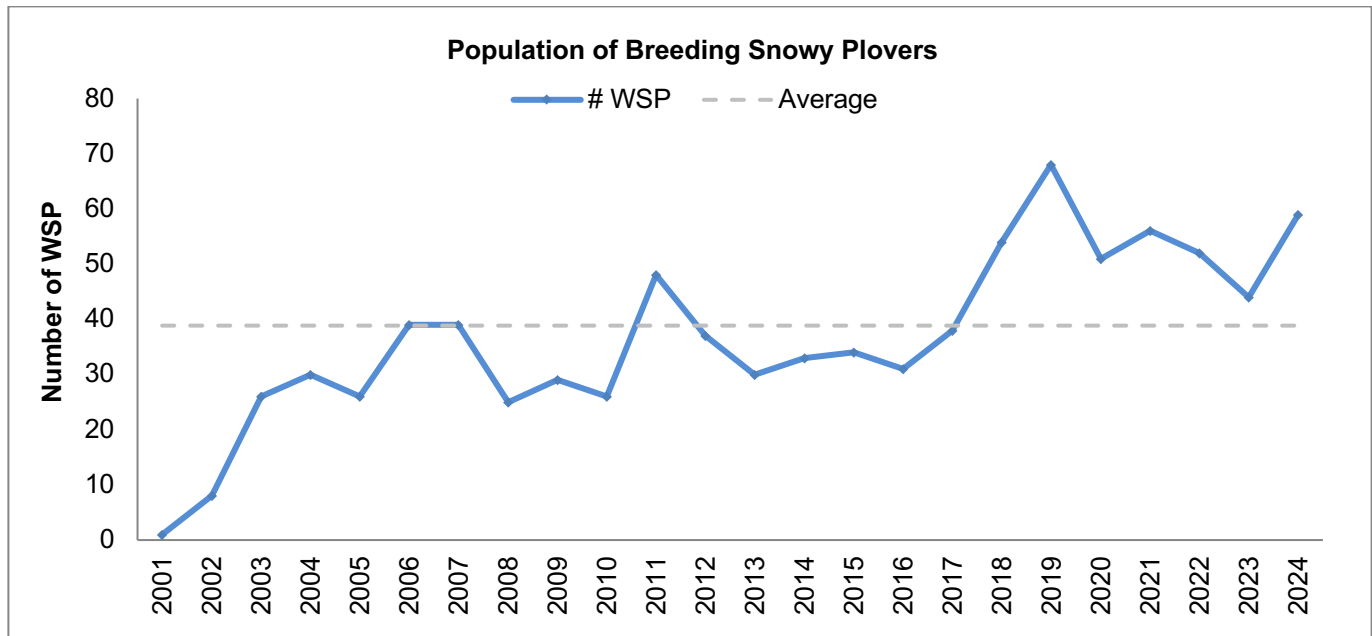


Figure 3. Counts of WSP during the breeding window surveys at Coal Oil Point Reserve. *Average line represents the average from 2003-2023. In 2001 and 2002, the breeding population was still beginning to grow. Note that these years are excluded from the calculation of all breeding averages.*

### Monitoring of Nest and Chick Fate

During the breeding season, we monitored WSP a minimum of three times per week using binoculars and a spotting scope. We recorded the number of adults, the number of nests, and the fate of nests and chicks. Band combinations are also recorded.

We conducted nesting surveys from outside of the symbolic fence as described in the Snowy Plover Management Plan. We first looked for signs of territoriality and breeding behavior, then attempted to locate nests from a distance. When nests were identified (often by a female sitting and incubating or laying eggs), we entered the fenced area and approached the nest carefully. We counted the number of eggs, took a photo of the nest and a GPS location. We entered this information in the Field Maps application and stored in the ArcGIS platform (ESRI). Finally, we placed a small twig one meter in front of the nest to facilitate subsequent monitoring from a distance. Once the chicks hatch, we tracked individual broods and recorded the number of chicks in each brood until the chicks fledged (defined as being at least 28 days old). WSP chicks at Coal Oil Point Reserve are not banded, with the exception of captive reared chicks.

If the adult plover was not seen on the nest before the hatching date, we approached the nest to check for abandonment, predation, or loss due to weather or high tides. Eggs were determined to be abandoned if the adults did not return to the nest for at least 2 days once incubation has started and there are no new footprints of adults going to the nest. If the nest was predated, we looked for footprints to determine the type of predator. If the nest was washed out by tide or buried by wind, we searched for the eggs and replaced them in the nest location. If the parent did not return to the nest to incubate, the eggs were collected. The reason for collecting abandoned eggs is to reduce attraction of crows and skunks, and to incubate the eggs in captivity in hopes of releasing chicks back into the wild.

Table 1 summarizes the results of the breeding success each year. The number of males for the estimation of fledged chicks/male was calculated based on half of the adult number counted in the breeding window survey. Because males can arrive at COPR throughout the season, the number of males per season using the window survey count is likely to be underestimated. Detailed discussion of nest and chick fate follow below (Table 1).

**Table 1. Breeding success estimates of WSP at Coal Oil Point Reserve since 2001 until present.**

*In 2001 and 2002, the breeding population was still beginning to grow. These years are excluded from the calculation of all breeding averages.*

*\* Formal WSP monitoring did not begin until 2001, but Santa Barbara Audubon conducted general surveys of this site prior to 2001.*

*\*In 2006 and 2019-2021, enclosure cages were used to protect nests from crows. These years are excluded from the calculation of average hatching and fledging rates.*

*\*\*In 2007-2008 and 2021-2024, some nests were collected, incubated in the nursery, and returned to the nest prior to hatching. These nests were not included in the calculation of hatched nests and fledged chicks.*

Year	Breeding Window Survey (BWS)	# Nests	# Nests Hatched	Hatching Rate	# Chicks Fledged	# Fledges Per estimated Male (BWS)	Fledging Rate
				(nests hatched / #nests*100) *excludes bonus nests			(nests that fledged /nests that hatched *100)
1970- 2000	few	~2-4/30yr	N/A	N/A	N/A	N/A	N/A
2001	1	1	1	100%	1	1	100%
2002	8	13	6	46%	12	2.4	83%
2003	26	24	17	70%	40	3.3	94%
2004	30	52	24	46%	27	1.8	71%
2005	26	64	16	25%	29	2.2	81%

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2006*	39	43	23	53%	39	2	91%
2007*	39	66	21	37%	17	0.9	52%
2008*	25	56	3	9%	8	0.7	100%
2009	29	65	39	57%	58	4	74%
2010	26	75	42	54%	19	1.5	26%
2011	48	84	35	40%	9	0.4	14%
2012	37	73	34	44%	22	1.2	44%
2013	30	66	34	49%	30	2	41%
2014	33	77	21	25%	26	1.6	67%
2015	34	62	34	52%	45	2.7	74%
2016	31	43	29	65%	49	3.2	86%
2017	38	52	34	63%	53	2.8	77%
2018	54	81	59	69%	82	3	70%
2019*	68	97	28	28%	8	0.2	18%
2020*	51	76	42	52%	23	0.9	38%
2021**	56	93	33	32%	42	1.5	73%
2022**	52	102	19	16%	26	1	74%
2023**	44	70	47	53%	55	2.5	60%
2024**	59	84	42	47%	78	2.6	86%
<b>COPR AVERAGE</b>	<b>38.9</b>	<b>61.4</b>	<b>32.2</b>	<b>51%</b>	<b>37.6</b>	<b>2.3</b>	<b>63%</b>
<b>COPR SD</b>	<b>12.0</b>	<b>15.9</b>	<b>11.5</b>	<b>14.8%</b>	<b>19.6</b>	<b>1.0</b>	<b>24.1%</b>

In 2024, we recorded 84 nesting attempts; 77 were nests discovered with eggs, and 7 additional broods were observed with newborn chicks but their nests were not located. We refer to the latter as ‘bonus nests.’ To calculate the hatching rate, we did not include 7 bonus nests or 2 nests in which real eggs were replaced with wooden eggs. This left 75 nests, out of which 35 hatched for an estimated 47% hatching rate.

The two egg replacement nests were replaced with wooden eggs before an extreme high tide event. We deployed wooden egg replacement when a tidal event was predicted to cover the eggs and possibly destroy the nest. Determinations were based on beach conditions, previous days’ high tide levels relative to nests, and water level forecasting from the Coastal Data Information Program. After the danger of nest flooding passed, we returned the real eggs to one of the nests and this nest hatched. The eggs from the other nest were hatched in captivity because the nest with wooden eggs was destroyed by the tide.

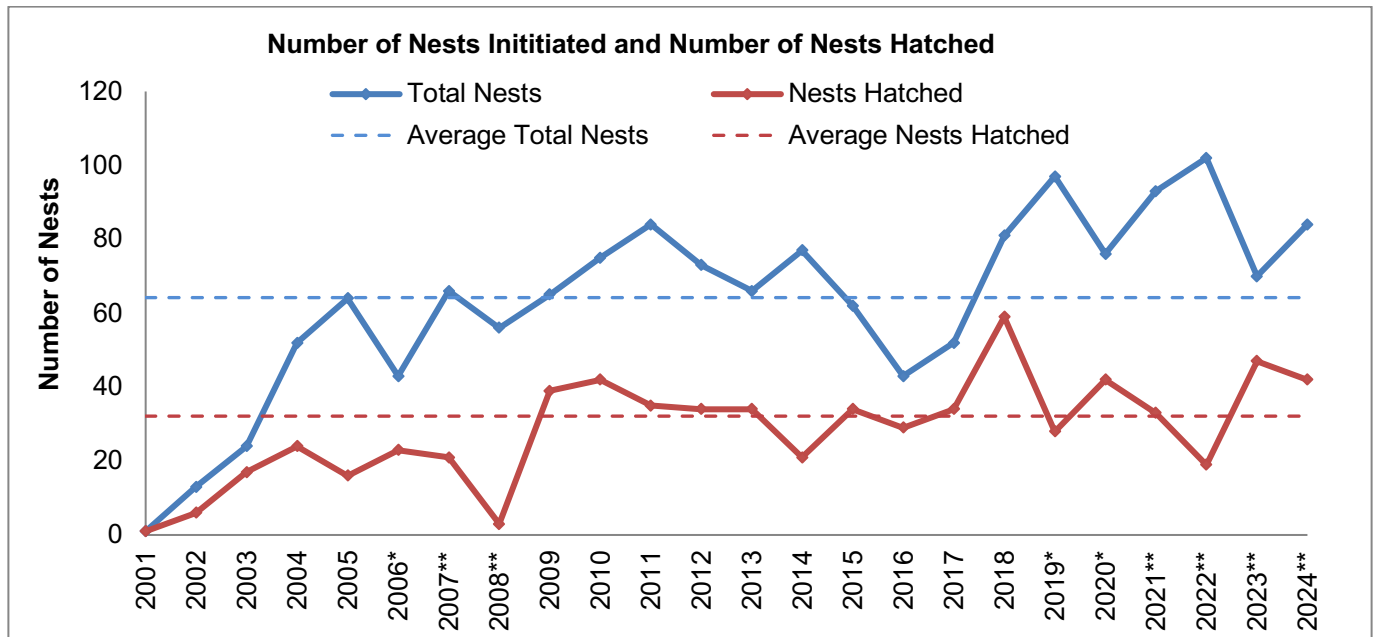


Figure 4. Nests initiated and hatched by year (total number of nests that had at least one egg vs. total number of nests that hatched at least one chick).  
*In 2001 and 2002, the breeding population was still beginning to grow. These years are excluded from the calculation of all breeding averages.*  
*\*In 2006 and 2019-2021, enclosure cages were used to protect nests from crows. These years are excluded from the calculation of average hatching and fledging rates.*  
*\*\*In 2007-2008 and 2021-2024, some nests were collected, incubated in the nursery, and replaced to the nest prior to hatching. Numbers for hatched nests and number of fledged chicks exclude those that hatched and fledged in the nursery.*

Figure 4 shows the number of nests laid and the number of nests hatched between 2001-2024.

The primary cause of nest failure this year was flooding by high tides (Table 2, Figure 5). Skunks were the primary nest predator.

Eggs were replaced for two nests (Table 3). One of the two wooden egg nests was affected by tide. Any real eggs that were unable to be returned to the original nest were transferred to Santa Barbara Zoo to be incubated and reared in captivity.

On 6/6/2024, docents Katie Miller and Payton Richardson alerted COPR staff of plover eggs found in a high traffic location where there is a break in the protective fencing to allow the public access to the Dune Pond Trail. Plover monitor Armando Aispuro came to the beach to check and found what looked like two nests on the trail approximately 1.5 meters apart. One nest contained two eggs and the other contained one

single egg. A female plover alternated back and forth between the two nests to incubate the eggs. It is likely that all three of the eggs originated from nest number 1464 which was originally 3 meters away and were displaced by either humans, tide or both. The original nest 1464 site was destroyed and unrecognizable, but the marker stick was still there. Armando created a new scrape and decorated it with small bits of kelp and other small debris. He then transferred one of the eggs, but the female returned to the nest containing two eggs. He made sure the female saw him holding the remaining eggs which she tracked. He then transferred all three eggs to the newly created nest where the original had been (and within the roped area) and the female returned to incubate them immediately. All three chicks from this nest subsequently hatched and one fledged.



Photo 2. Plover Docent, Payton Richardson, indicates the location of a displaced nest at the entrance to the Dune Pond Trail.



Photo 3. The displaced eggs were separated by a distance of ~1.5 m but intact and undamaged.



Photo 4. Plover monitor, Armando Aispuro, creates a new nest to place all 3 eggs back together.



Photo 5. All 3 eggs were transferred to the new nest location and the female plover returned to incubate.

Two instances of plover adoption by non-biological parents were recorded this year. In July, nest number 1485 originally hatched 3 eggs but the male plover from this nest ultimately cared for 5 chicks. Neighbor nest number 1486 originally hatched 3 eggs but the male only raised one. In August, one chick from nest number 1489 migrated to nest number 1492, so the male from nest 1492 cared for four chicks.

Table 2. Number of nests lost by fate from 2002-2024. Note: this table does not include data on chick mortality; which is shown in Table 4.

*\*Note that in 2006, & 2019-2021, predator exclosure cages were used which may have affected nest fate.*

*\*\*Note that in 2007-2008 & 2021-2023, some nests were collected, replaced with decoy eggs, incubated in the nursery, and replaced prior to hatching. The fate of these nests is listed as “Eggs Replaced.”*

Year 20-XX	'02	'03	'04	'05	'06 *	'07 **	'08 **	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19 *	'20 *	'21 **	'22 **	'23 **	'24 **
Total nests	13	24	52	64	43	66	56	65	75	84	73	66	77	62	43	52	81	97	76	93	102	70	84
Hatched	6	17	24	16	23	21	3	39	42	35	34	34	21	34	29	34	59	28	42	33	19	47	42
Skunk	0	0	9	18	2	19	18	10	0	0	0	4	10	15	6	4	3	9	0	23	18	2	10
Crow	2	4	7	3	0	0	0	1	1	0	0	0	0	0	0	0	0	32	7	0	8	0	0
Abandoned	0	1	1	9	3	0	0	2	3	5	3	4	9	1	2	1	4	2	0	6	0	1	1
Abandoned/Owl	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Raccoon	0	0	2	1	0	0	0	1	0	0	2	2	4	0	1	0	0	0	0	0	0	1	1
Whimbrel	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Gull	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0
Opossum	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0

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<b>Dog</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<b>Crow and Skunk</b>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Unknown Avian Predator</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	0	1	
<b>Unknown Canid Predator</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
<b>Unknown Mammalian Predator</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
<b>Unknown Predator</b>	0	0	0	1	1	0	0	4	0	10	3	15	9	3	0	2	3	0	1	4	4	0	2
<b>Unknown Cause</b>	0	0	0	0	0	0	0	0	17	8	3	0	21	0	0	0	0	0	0	0	1	0	
<b>Unknown Fate</b>	0	0	0	1	3	12	4	1	0	0	9	0	0	3	0	0	3	2	0	2	4	1	0
<b>Human</b>	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	3	0	1	0	
<b>Wind</b>	1	2	2	6	1	2	2	5	2	10	2	0	0	1	0	3	1	3	8	4	2	1	4
<b>Tide</b>	0	0	4	5	2	1	6	2	5	12	16	6	3	5	2	8	7	17	16	6	6	10	21
<b>Flooded by Slough</b>	0	0	0	3	0	0	0	0	4	3	0	0	0	0	0	0	3	1	0	0	0	0	
<b>Eggs Replaced</b>	0	0	0	0	0	11	23	0	0	0	0	0	0	0	0	0	0	0	9	35	5	2	
<b>Missing Data</b>	4	0	1	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	

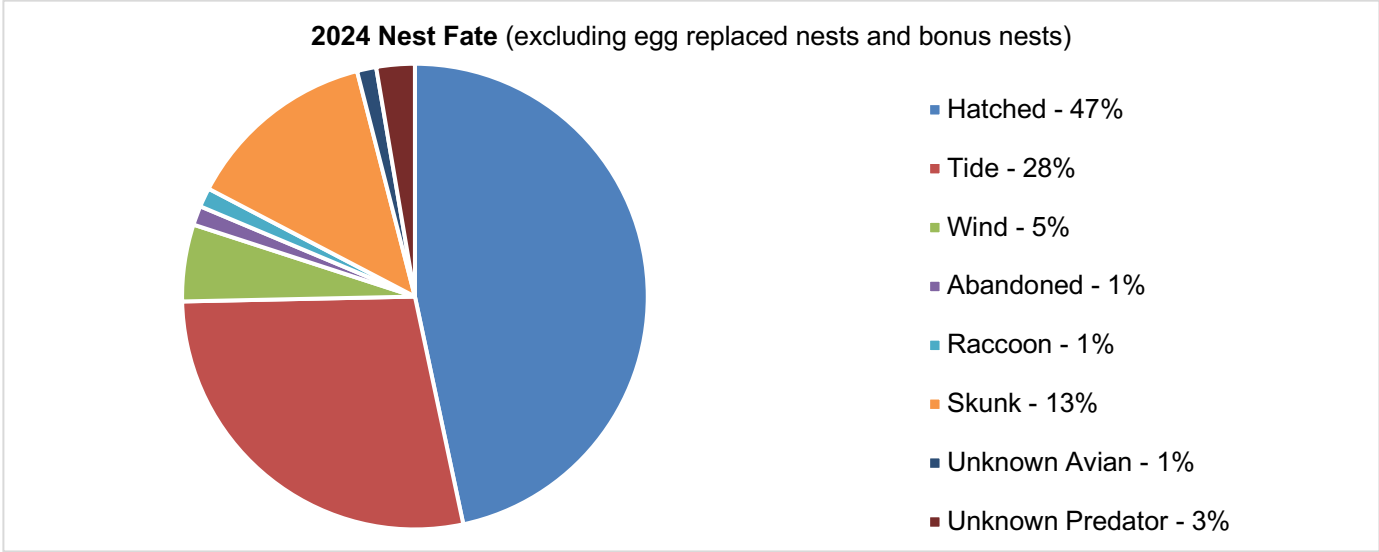


Figure 5. Nest fate proportions at COPR in 2024, excluding the 2 nests that had eggs replaced and the 7 nests that were discovered as hatched broods. Data is also in Table 2 below.

Table 3. Fates of the nests in which eggs were replaced with wooden eggs in 2024.



Nest Number	Nest Fate	Number of eggs returned to the beach
1452	Tide washed out wooden eggs and nest site; real eggs transferred to SB Zoo	0
1453	Both real eggs successfully returned to the beach	2

### Nest Predation

There were low levels of predation on nests this year. Out of 84 documented nesting attempts, 10 nests were predated by skunks, one nest was predated by a raccoon, one nest was predated by an unknown avian predator, and two by unknown predators. We attribute low levels of predation to the administration of USDA-contracted predator control early in the season. Predator control extended from March through July and focused on the common predators such as crows and skunks, and occasional predators such as opossums, raccoons and one gull. USDA was contracted to remove skunks and crows near the plover habitat and remove crows through the implementation of traps and corvidicide treatment (see USDA report in Appendix C). Additionally, a Western Gull was observed killing an adult plover. We tracked the individual until a USDA technician arrived to remove it.

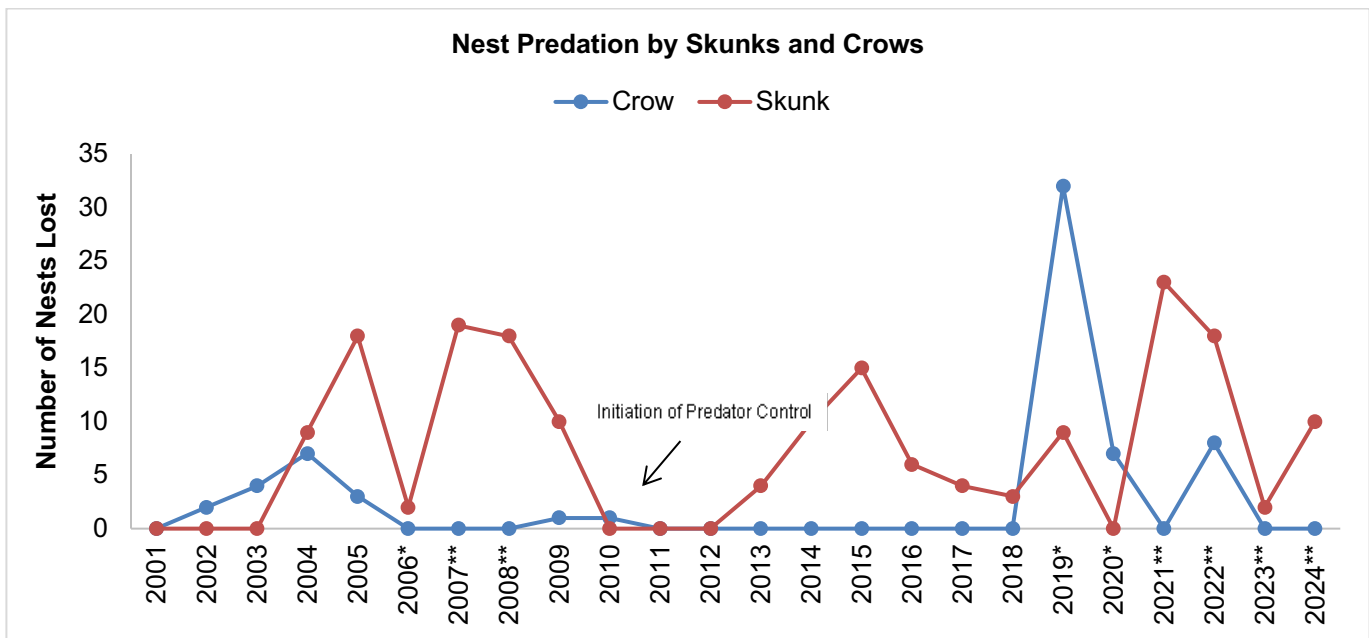


Figure 6. Skunk and crow predation of eggs by year.

See footnote on other figures about the exclusion of some nests from the calculations when the staff assisted with hatching success.

### Chick Survival

The survival rate of chicks (86%) was high this year (Figure 7). In 2024, 78 WSP chicks fledged at COPR without intervention (Figure 8). An additional two chicks fledged on the beach after the eggs were incubated in an incubator and returned to the nest after the risk of high tide passed. This year, COPR plovers produced 2.64 fledged chicks per male, which exceeds the minimum goal of one chick per year per male to maintain a stable population (Table 1).

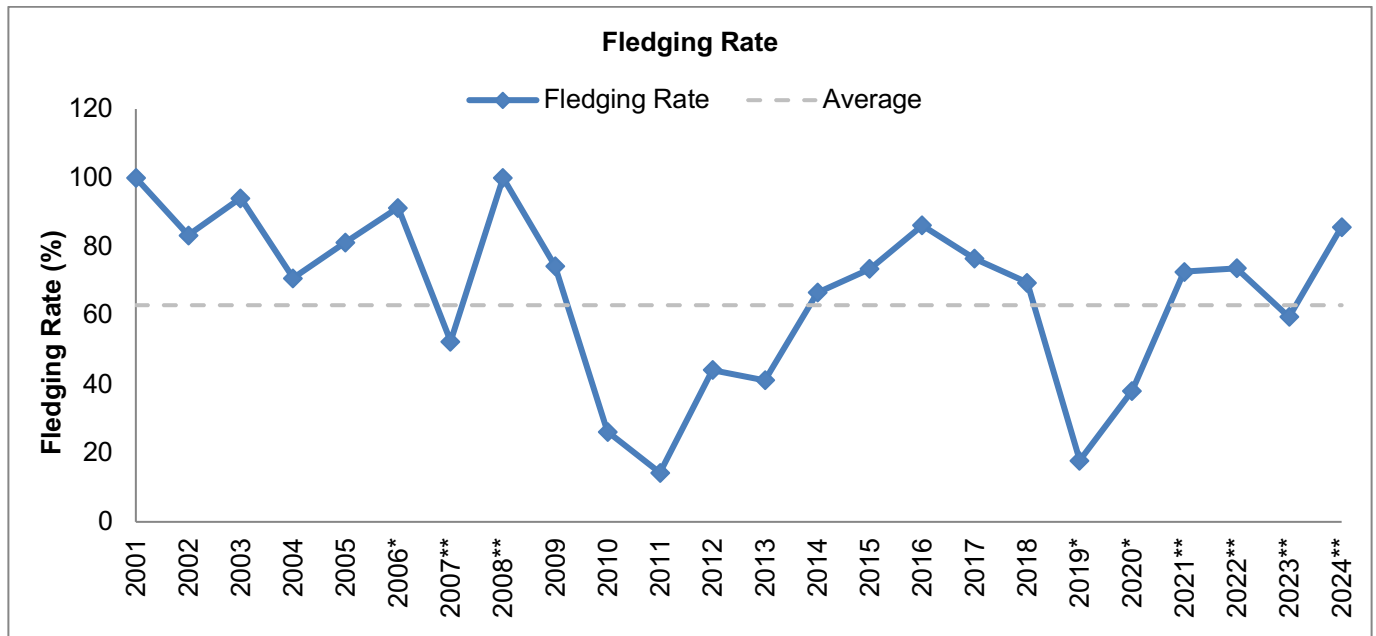


Figure 7. Fledging rate by year (# nests that fledged at least one chick/# total nests \*100).

*In 2001 and 2002, the breeding population was still beginning to grow. Note that these years are excluded from the calculation of all breeding averages.*

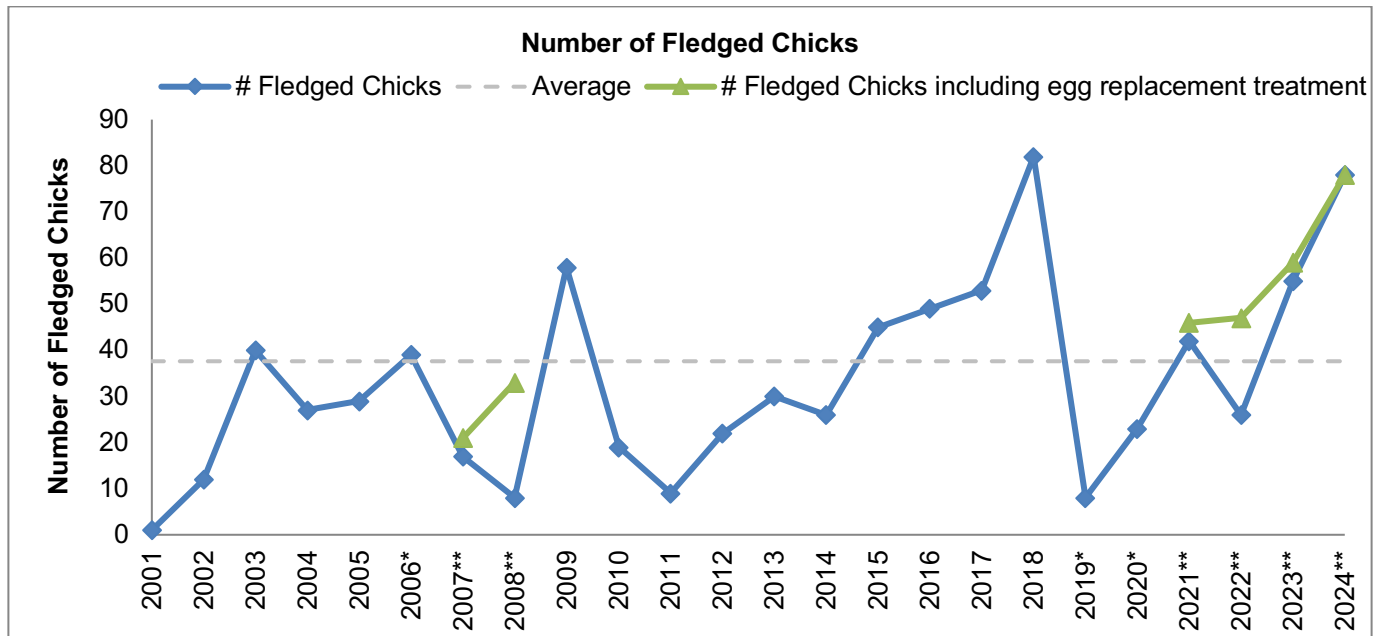


Figure 8. Number of chicks fledged by year without intervention (blue) and including intervention to improve survival by replacing real eggs with fake eggs temporarily.

See footnote on previous figures about exclusion of some data from the statistics.

There were no direct observations of predation on plover chicks however one dead chick was discovered on the morning of 5/1/2024 during a plover survey. Armando noted only two chicks from nest 1426 when there were previously three. Later that evening, a docent, Marwa, found a dead plover chick in the general area where the brood was located, approximately 30 meters west of the start of the protective plover fencing (Photo 8). Armando inspected it the following day and determined it did belong to this brood by the similar age characteristics to its siblings. It was obviously laterally flattened and the carcass was placed in a refrigerator. Armando noted obvious signs of a ball game or other game seen in the form of a defined rectangle starting from before the plover fence up until around 30 m (Photo 9). The border of the game appeared to be adjacent to the plover fence. The rope fencing was also taken down from the zero to 15-meter post, with at least one set of footprints showing an entry into the critical habitat (Photo 10). A frisbee game of four players was confirmed by docent Cameron Curtin to have occurred the previous evening (4/30/2024) between 4:00 pm and 6:00 pm. The previous docent on duty, Daira Torres, recalls seeing all three chicks from this brood before she left her shift at 4:00 pm. Thus, this chick was likely stepped on by players of the frisbee game.



Photo 8. Location of the dead plover chick (circled in blue at the bottom of the photo). The blue circle at the top of the photo indicates the 25 meter marker on the plover fence. Notice all the footprints made by the people playing frisbee.



Photo 9. Heavy foot traffic evident directly in front of the plover fence around the 30 m marker on 5/1/2024.



Photo 10. Rope fencing detached from the plover fence between the 0-15 m marker with footprints, indicating that a human entered the protected habitat.

On 5/10/2024, plover monitor Armando Aispuro discovered a dead adult female WSP located 227 meters west of the start of the plover fence. The carcass was only 3 meters away from nest number 1433 but was not the female incubating this nest (Photo 11). No obvious signs of injury were noted. The carcass was collected and stored in the freezer.



Photo 11. Dead adult female plover found behind another female plover incubating nest number 1426.

On 7/8/2024, plover monitor Armando Aispuro observed a juvenile Western Gull predate an adult WSP. The gull was standing amongst a few active plover nests in the slough mouth and 5-7 plovers were mobbing it, approaching very close and even under it. The gull reached out and grabbed one of the plovers in its bill and beat it on the ground. Armando ran over to see if the gull might release the plover but the gull flew off, perching about 100 meters away, still with the plover in its bill. It then flew away and either ate the plover or dropped it in the slough. Armando was able to photograph the individual and its plumage was distinctive enough to be able to track it throughout the day. It continued to stray from the main flock of gulls towards the area where it caught a plover, resulting in Armando contacting USDA Wildlife Services. The USDA technician was able to isolate and remove the problem gull.

On 7/25/2024, plover docent Ray Kirk, alerted COPR staff of an oiled chick that looked sick or injured. Armando and a plover docent, Sydney Van Atta, were able to collect the chick, which belonged to nest number 1493. The chick was transferred to Santa Barbara Zoo for oil removal and rehab. The chick died that night due to a ruptured air sac. The ruptured air sac suggests the chick may have been attacked, but the oiling could have contributed to its death.

Direct observations of predation and other take of chicks and adults can be difficult to document. Table 4 lists the reported causes of chick and adult mortality since 2001. Table 5 and Figure 9 summarizes all documented take of WSP by humans and dogs.

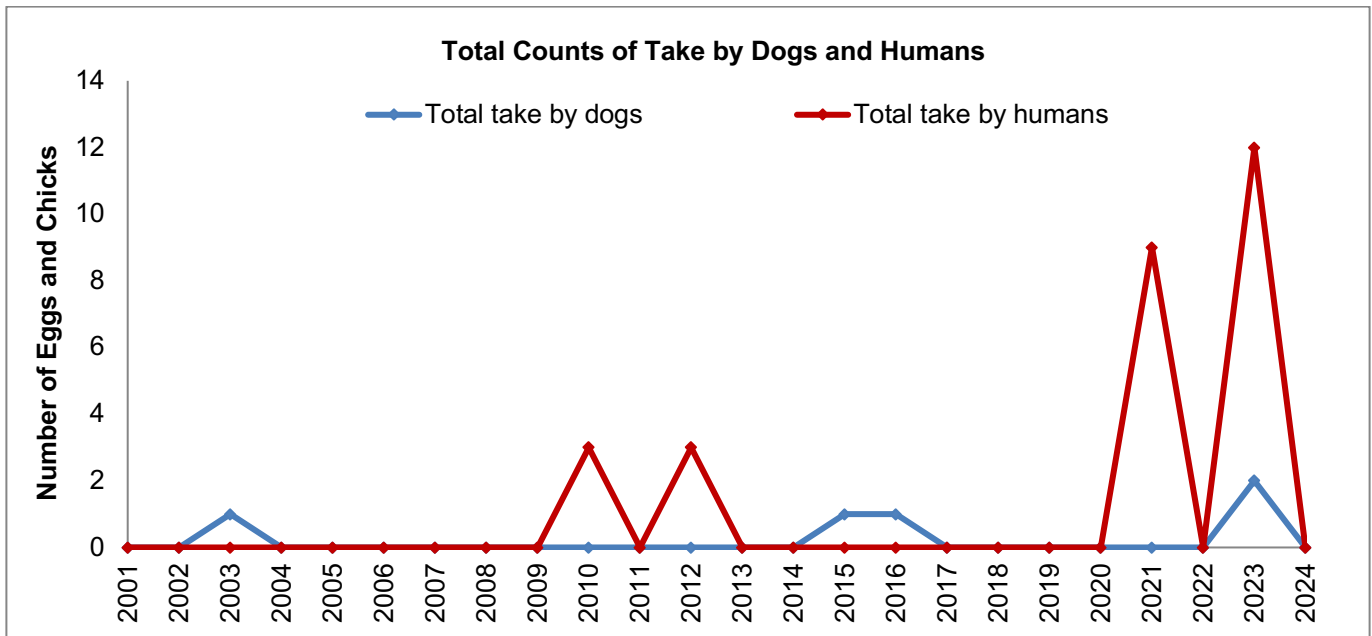
Table 4. Documented cause of chick and adult mortality. Almost half of the chicks that hatch die before fledging, but it is difficult to observe the cause of chick and adult mortality because they are mobile and some mortality events happen fast. “C” means chick mortality and “A” means adult mortality.

Year 20-XX	01	02	03	04	05	06 *	07 **	08 **	09	10	11	12	13	14	15	16	17	18	19 *	20 **	21 **	22 **	23 **	24 **	Total	
Total # chicks hatched	2	16	45	56	40	62	48	9	90	95	79	59	81	57	80	74	83	136	71	105	85	41	113	113	1527	
Red-Tailed Hawk	0	0	0	13 C	0	0	0	0	0	0	0	0	0	0	0	0	2 C	0	0	0	0	0	0	0	0	15
Wind	0	0	1 C	4 C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Dog	0	0	1 C	0	0	0	0	0	0	0	0	0	0	0	1 C	0	0	0	0	0	0	0	2 C	0	0	4
Crow	1 C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 C	2 C	0	0	0	0	0	4
Western Gull	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3 C 4 A	0	0	1 A	0	8
Peregrine Falcon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1 A	0	0	2
Tar	0	0	1 C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 5. Documented take of nests and chicks by humans and dogs.

Year	Take by Dogs	Take by Humans
2001	0	0
2002	0	0
2003	1 chick	0
2004	0	0
2005	0	0
2006	0	0
2007	0	0
2008	0	0

2009	0	0
2010	0	1 nest
2011	0	0
2012	0	1 nest
2013	0	0
2014	0	0
2015	1 chick	0
2016	1 nest	0
2017	0	0
2018	0	0
2019	0	0
2020	0	0
2021	0	3 nests
2022	0	0
2023	2 chicks	4 nests
2024	0	0



**Figure 9.** Number of eggs and chicks of WSP taken by dogs or people trespassing in the nesting area, mostly at night when the docents are not present to intervene.

### Nest Phenology

In 2024, the nesting season began on March 27<sup>th</sup>, 9 days later than the average for our site (March 18<sup>th</sup>). This was possibly due to winter storms and swells continuing through the end of March. The first nest

was initiated on March 27<sup>th</sup> and the last chick fledged on August 23<sup>rd</sup> (Table 6), for a total breeding season length of 149 days (defined by the number of days between first nest initiation and last observed chick or nest). This year's breeding season was 5 days shorter than the average for Coal Oil Point Reserve. The peak nesting period fell between May 20<sup>th</sup> and May 26<sup>th</sup>. The dates of all nesting events in 2024 fell within the range of previous years' dates (Figure 10).

Table 6. Dates of nesting events in 2024

2024 Nesting Event	Date
First Nest Initiation	3/27/2024
Last Nest Initiation	7/8/2025
First Hatch	4/23/2024
Last Hatch	8/2/2024
First Fledge	5/21/2024
Last Fledge	8/23/2024

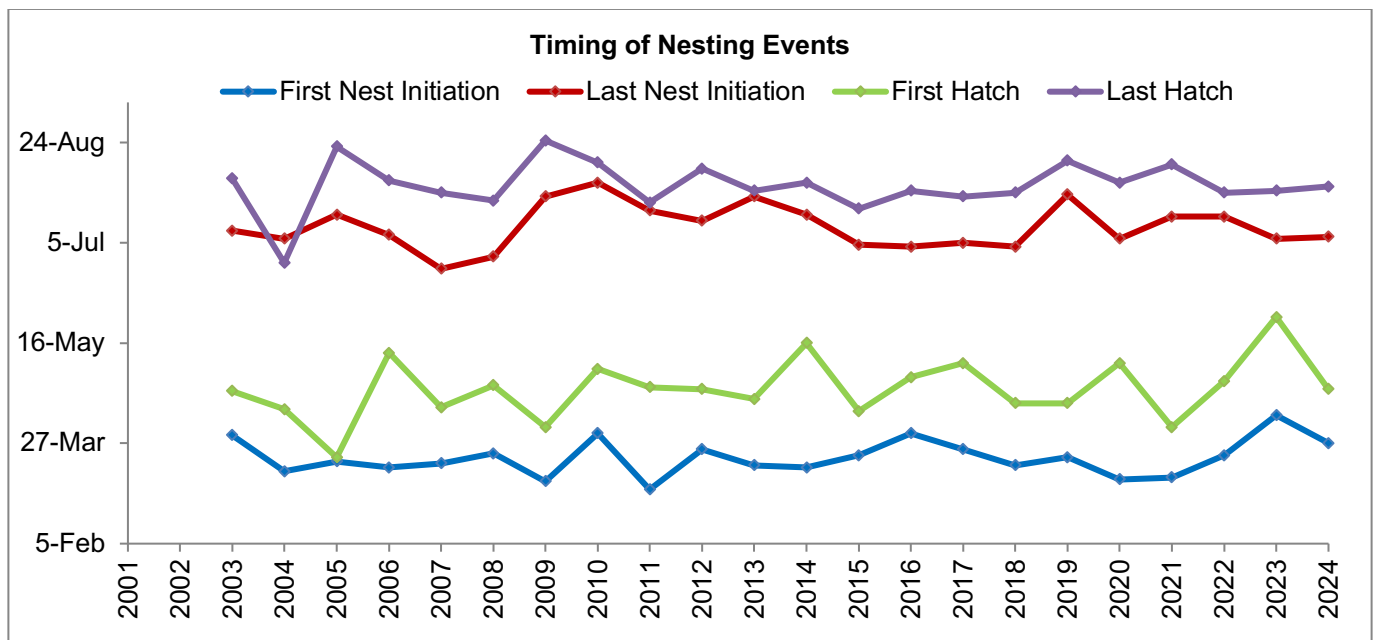


Figure 10. Timing of nest events by year.

*\*\*In 2007-2008 and 2021-2024, some nests were collected, incubated in the nursery, and replaced prior to hatching. This was a change from the standard protocol at this site. Hatch and fledge dates reported are for nests that hatched and fledged in the wild without intervention.*



**Rehabilitation of Abandoned Eggs and Chicks**

In 2024, one chick and twelve eggs were collected from Coal Oil Point Reserve (Table 7) to be transferred for viability testing and rehabilitation at the Santa Barbara Zoo (SBZ). Of these eggs, eight were eventually released as chicks at COPR in addition to thirteen more chicks rescued as eggs from other sites (Oceano Dunes, Point Mugu, and Vandenberg Space Force Base).

Table 7. Number of eggs collected from COPR and taken to the Santa Barbara Zoo to be tested for viability, and then hand reared for release if they were viable.

Reason for collection	Number of eggs collected	Number of chicks released
Tide	6	3
Wind	4	3
Abandoned	2	2
<i>Total eggs</i>	<i>12</i>	<i>8</i>

We placed the collected eggs in an incubator on site at COPR at a temperature of 98.5° F, with a water dish to achieve adequate humidity. As soon as possible, they were transported to the zoo in a dish with warm sand to keep them from rolling over. Once hatched, SBZ staff fed the chicks a diet of bloodworms, pinhead crickets, mini mealworms, and beach hoppers. Special care was taken to keep the chicks from imprinting on humans. The terrarium was in an isolated area of the zoo's veterinary hospital and care for plovers was limited to only the SBZ bird team. When the chicks reached about 14 days old, they were moved from the terrarium to a flight pen. The flight pen was enriched with fresh kelp to mimic conditions of a beach. All individuals satisfied the USFWS requirements of age, health, and minimum size for release prior to their release date.

Three groups of captively reared chicks from COPR and other sites were released on Sands Beach on the mornings of July 9<sup>th</sup>, September 4<sup>th</sup>, and October 1<sup>st</sup>. They were released away from any current nest or brood territories (~200 m west of the start of plover fence). The captive-reared plovers spent one hour in mesh pens on the beach to allow for acclimation to their new environment prior to release. The pens were constructed out of chicken wire with 1" x 1.5" mesh size. The dimensions of the pens were 3' x 2' x 2'. Pens were secured to the ground with PVC posts in each corner. In order to supplement the plovers while they acclimated, kelp wrack and beach hoppers were added to the pens.

The chicks were observed during acclimation to ensure normal behavior, and to ensure that the chicks were not disturbed by predators or humans. All chicks exhibited normal behavior within minutes of being in the pen, alternating between feeding, standing, walking, and stretching wings. Wild plovers in the area approached the pen and did not display any territorial behavior towards the plovers within the pen. At release time, the side of the pen facing the fenced plover habitat was opened. Some released plovers took flight within five minutes of opening the holding pen, while others calmly walked out and remained as a group in the area.

Prior to release, all captive-reared plovers were banded at SBZ with a unique band combination (Table 8). Of the 21 banded and released plovers, 11 have been resighted at COPR by staff or docents.

Table 8. Band data for plovers that were captively reared at SB Zoo and released at COPR in 2024.

Release Date	Lay Location	Left Leg	Right Leg	Sightings at COPR post-release
9-Jul-24	COPR	py	al	Yes
9-Jul-24	COPR	py	bb	Yes
9-Jul-24	COPR	py	bl	Yes
9-Jul-24	COPR	py	br	No
9-Jul-24	COPR	py	bw	No
9-Jul-24	COPR	py	by	Yes
9-Jul-24	McGrath	py	ba	Yes
9-Jul-24	McGrath	py	bv	Yes
9-Jul-24	ODSVRA	py	ab	Yes
9-Jul-24	ODSVRA	py	bo	Yes
9-Jul-24	Pt. Mugu	py	bg	Yes
4-Sep-24	ODSVRA	py	gb	No
4-Sep-24	ODSVRA	py	gl	No
4-Sep-24	ODSVRA	py	lb	No
4-Sep-24	ODSVRA	py	lg	No
4-Sep-24	ODSVRA	py	lr	No
4-Sep-24	ODSVRA	py	lv	Yes
1-Oct-24	COPR	py	la	Yes
1-Oct-24	COPR	py	ly	No
1-Oct-24	Pt. Mugu	py	lw	No
1-Oct-24	VSFb	py	ll	No

**Location of Nests**

GPS coordinates were recorded for each WSP nest. We used the location of nests to look for spatial patterns in hatching and fledging success. This year, all nests (84 nests) were initiated on the beach and none were initiated on the delta (mudflat) of Devereux Slough (Figure 11). The low level of nesting on the delta may be attributed to the consistent presence of a large population of crows at Devereux Slough and adjacent North Campus Open Space.

The majority of the nests were concentrated on the slough mouth and west side (Table 9). Each winter, the slough has been breaking farther west and widening the slough mouth. This has created a large nesting habitat for plovers in the slough mouth and has also resulted in the establishment of increased vegetation and the development of nascent dunes on the east half of the slough mouth where the slough no longer breaks through. The map of nest location and fate is shown below Figures 11 and 12.

Table 9. 2024 hatching rate and fledging rate by location.

Location at COPR	Total Nests Initiated	Hatching Rate	Fledging Rate
	# nests	(# nests that hatched / # nests *100)	(# nests that fledged / #nests that hatched *100)
East of slough mouth	20	45%	89%
Slough mouth	34	41%	71%
West of slough mouth	30	63%	95%
Delta	0	0%	NA

*Nests that hatched and fledged as the result of egg replacement are included in the number of nests initiated, but excluded from the calculation of hatching and fledging rates. East and west sides refer to the beach east or west of the slough mouth. The east side of slough mouth is designated between 0-200 meters along the protected fence, the slough mouth is between 200-399 meters, and the west side of slough mouth is between 400-800 meters.*

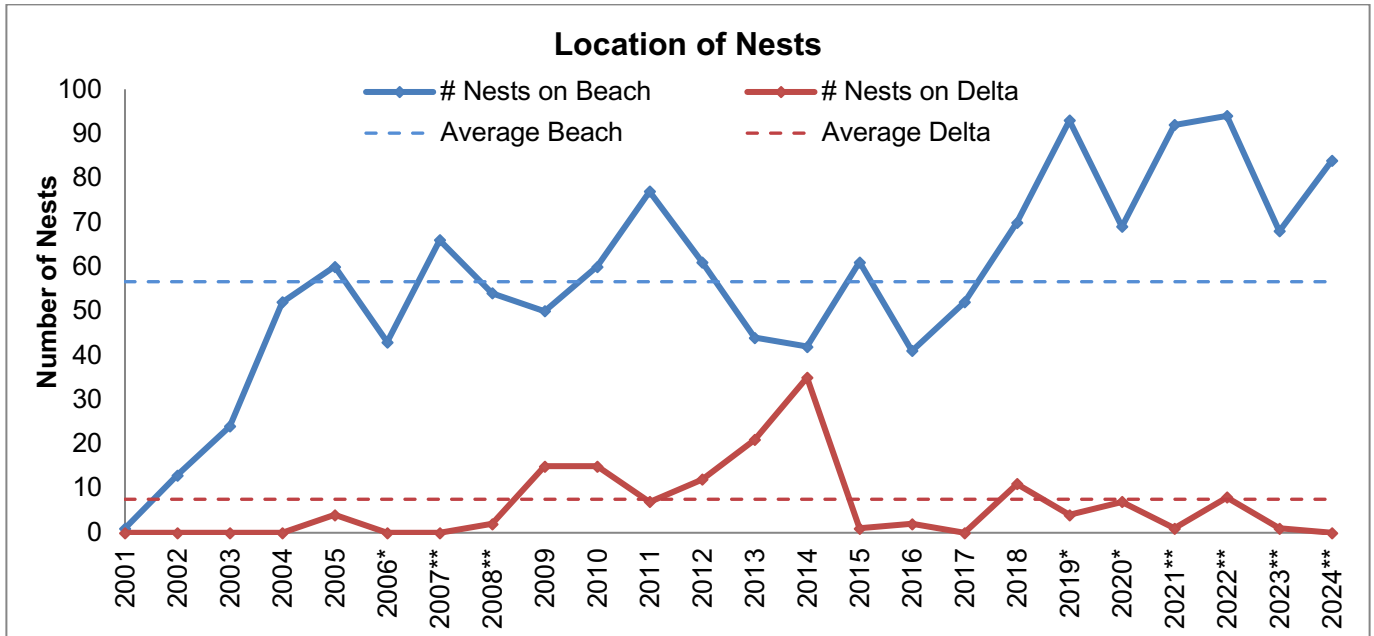


Figure 11. Number of nests on Sands Beach and the Devereux Slough mudflat between 2001-2024.

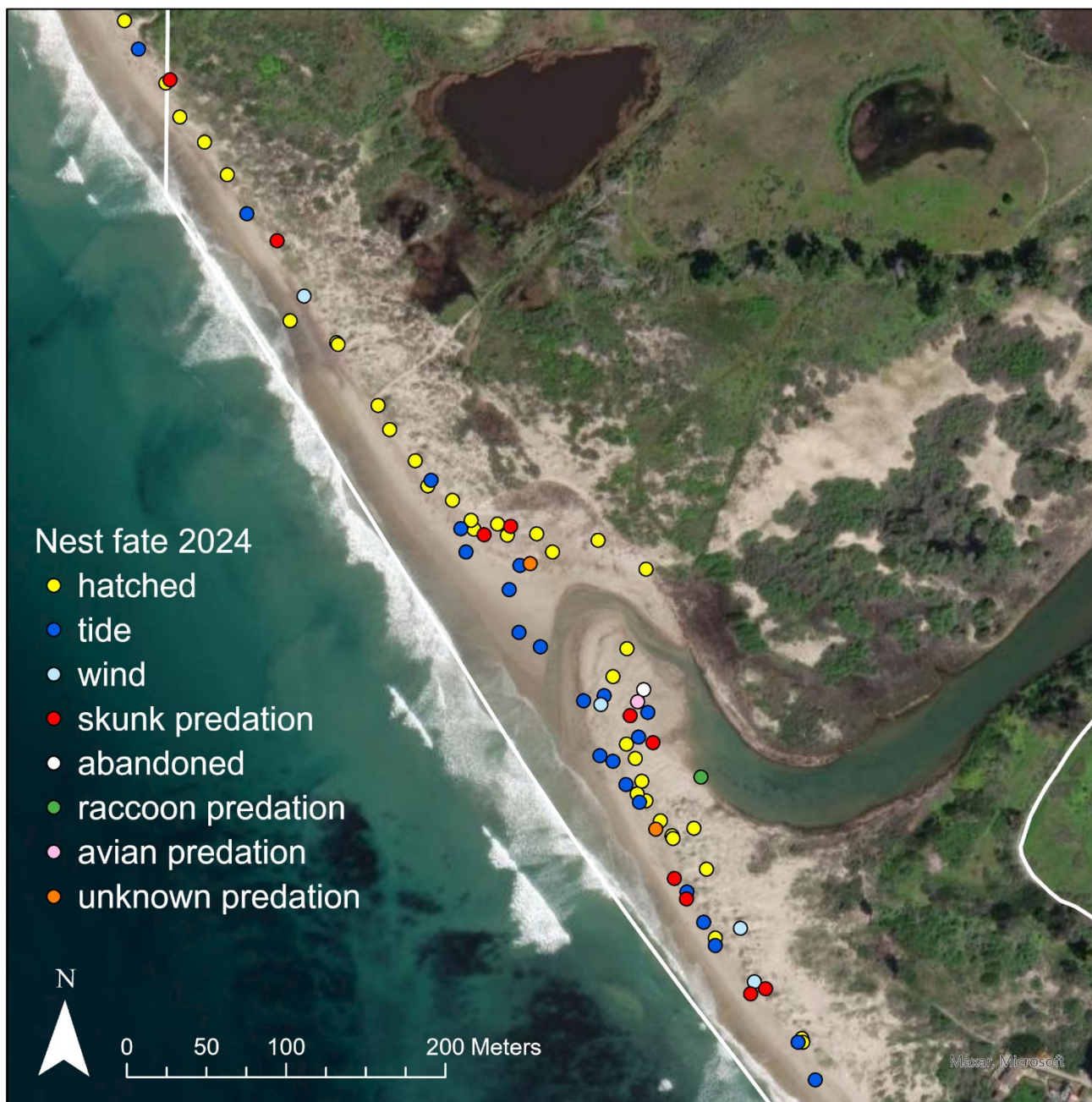


Figure 12. Locations of WSP nests color-coded by their fates at Sands Beach in 2024.

### Enforcement of Beach Regulations

COPR policies are not enforced by rangers. In 2020, officers from UCSB Police Department communicated to the COPR staff that they would not enforce the leash law at COPR. In addition, UCSB PD made a determination that the beach below the symbolic fence, where the WSP feed and rest, is not part of their jurisdiction and therefore they would not enforce laws in that area. In December 2017, the California Coastal Commission approved an LRDP amendment that prohibits dogs at COPR. This new policy was implemented in April 2024. The COPR advisory committee met in 2021 and recommended providing alternatives for parking and beach access to reduce the number of people recreating on Sands Beach.

### Docent Program and Beach Use

The docent program continues to be crucial to the success of WSP recovery at Coal Oil Point. In 2024, docent coverage averaged 72 hours per week, the highest in the history of the program (Figure 13).

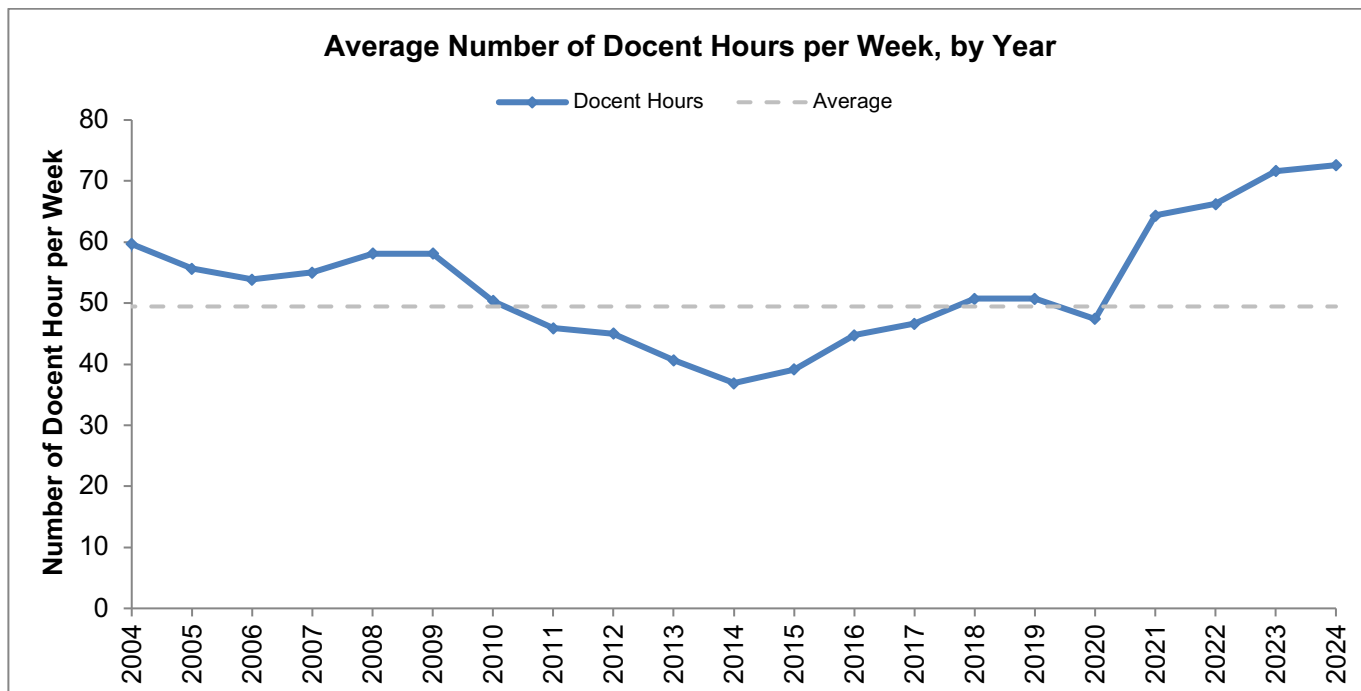


Figure 13. Average number of hours that Snowy Plover Docents spent per week at Sands Beach (total number of docent hours/52 weeks). Note that in 2020, the docent program was inactive for 6 weeks due to Covid-19 restrictions, so the total number of hours for 2020 was divided by 46 weeks.

The docents teach people about the plovers, request compliance with the dog policy, request people to stay away from the symbolic fence and avoid ball games on the beach, request people to move around the plover flock, scare away crows, and inform the staff about birds of prey observed around the nesting area. During each shift, the docents collect data on the numbers of people, dogs, and trespassers, as well as other data on beach use. Docents recorded a total of 6,742 interactions with beach visitors (Figure 14). Of these interactions, docents recorded that 96% of visitors responded with a positive or neutral attitude.

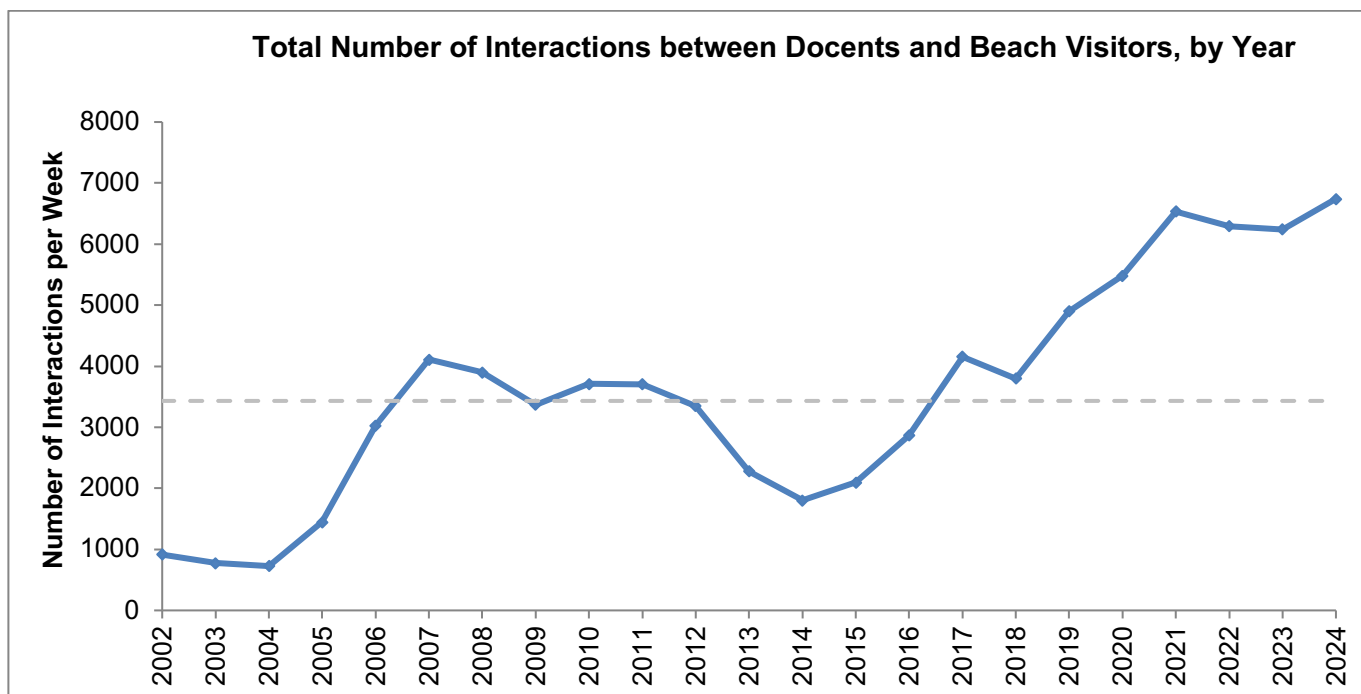


Figure 14. Number of interactions between docents and beachgoers each year.

The most important times for a docent presence on the beach are the breeding season (March 15-September 15), holidays, and weekends. These are precisely the most difficult times to find available volunteers. As a result, the COPR staff pays UCSB student interns to fill in these gaps. The interns are paid through grants provided by UCSB Coastal Fund and private donors.

The area where sunbathing is permitted on Sands Beach has space for approximately 50 beachgoers. When the number of people on the beach exceeds this threshold, sunbathers are more likely to overflow into the plover feeding area and trespass. In 2011, a new parking lot for recreation opened on UCSB’s West Campus which provided the nearest access to Sands Beach. Since then, the docents have recorded

more days when the beach exceeds 50 people at Sands Beach. Spring and summer are the quarters when the beach is most busy.

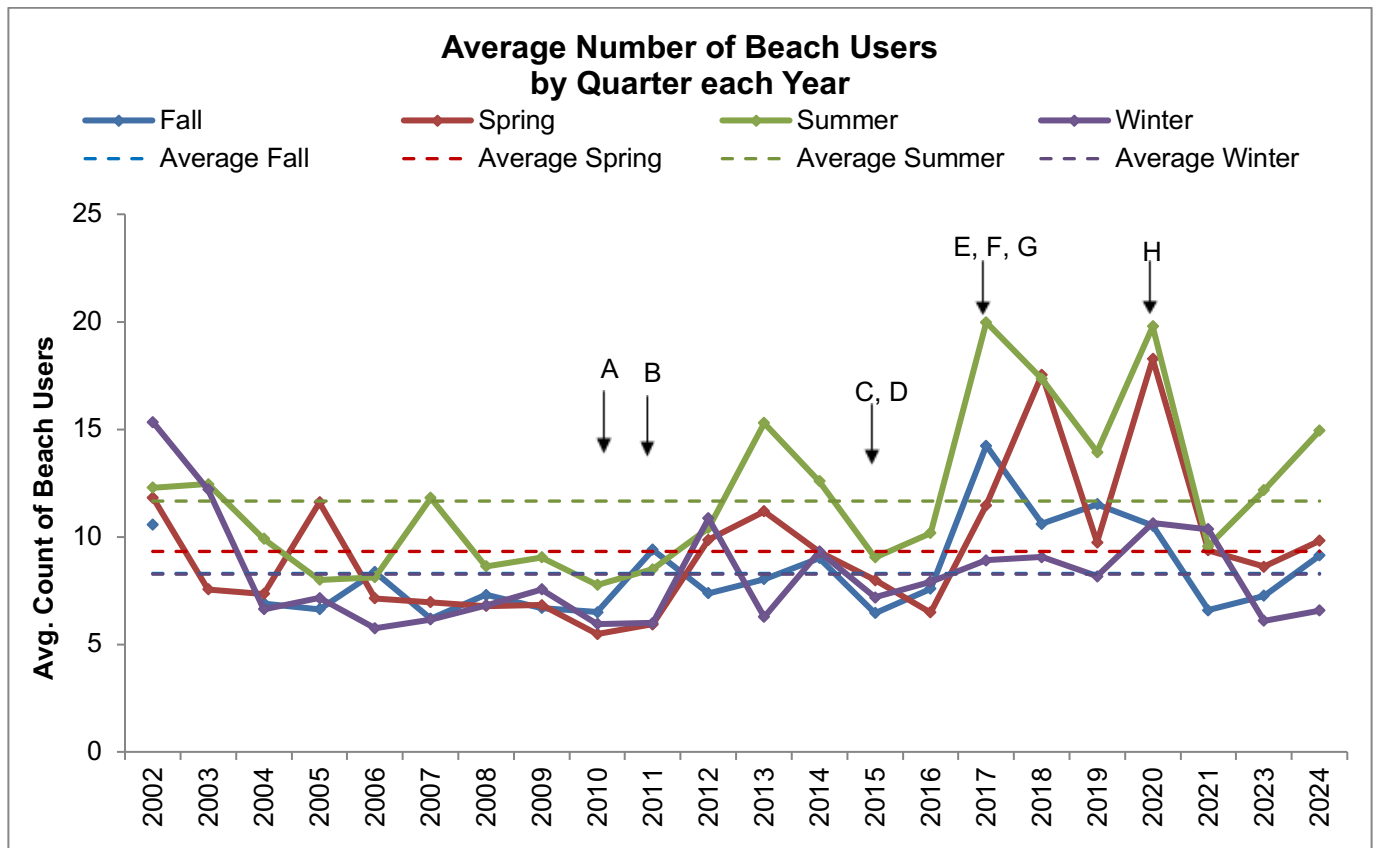


Figure 15. Average number of beach users counted by docents on snapshot surveys at Sands Beach. These data do not include people in the ocean. This graph shows the frequency of “busy beach” days by quarter, since 2002. The arrows correspond to various events that may have influenced changes in beach use: (A) 2010: A gate was installed at the end of Slough Road to reduce illegal beach parking, (B) 2011: A new beach parking lot (Lot 45) opened on West Campus, (C) Summer 2011: UCSB started offering Summer sessions, (D) Summer 2015: Refugio oil spill closed the beach for 4 weeks, (E) Fall 2015: Opening of Sierra Madre Dormitory, 506 students, (F) Fall 2017: Opening of San Joaquin Dormitory, 1,300 students, (G) Fall 2017: Opening of Sierra Madre Apartments, 36 units, and (H) 2017 Opening of Santa Catalina renovations, 1,500 students.

After the new dog prohibition policy was implemented in April 2024, the number of dogs arriving to the beach was reduced to 40% of 2023 levels (Figure 16). After contact with a docent, the number of dogs on the beach was further reduced to 14% of 2023 levels. (Figure 17). Overall docent coverage was similar between years (Figure 18) suggesting that dog numbers counted in Figure 17 are not related to observer effort.



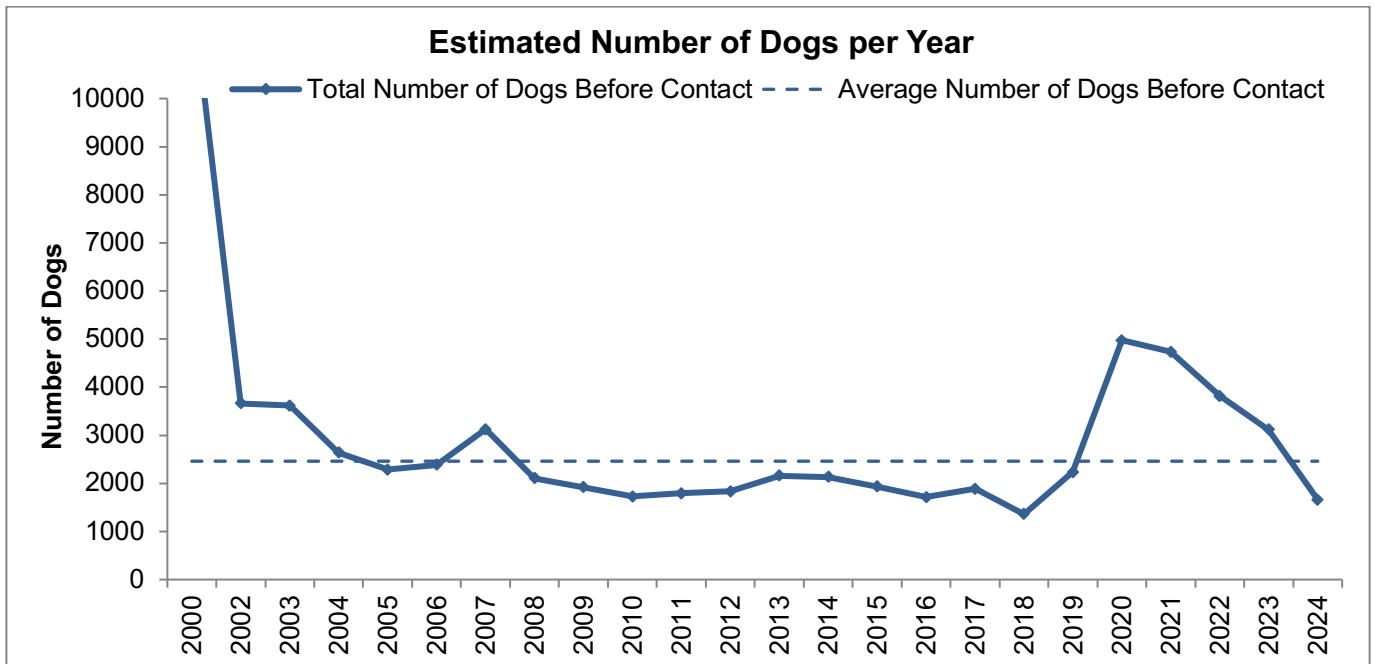


Figure 16. Estimated total number of dogs at the reserve each year. Estimates based on the hourly rate of dogs observed by docents ((# dogs/hr)\*(12 hrs/day)\*(365 days/yr)).

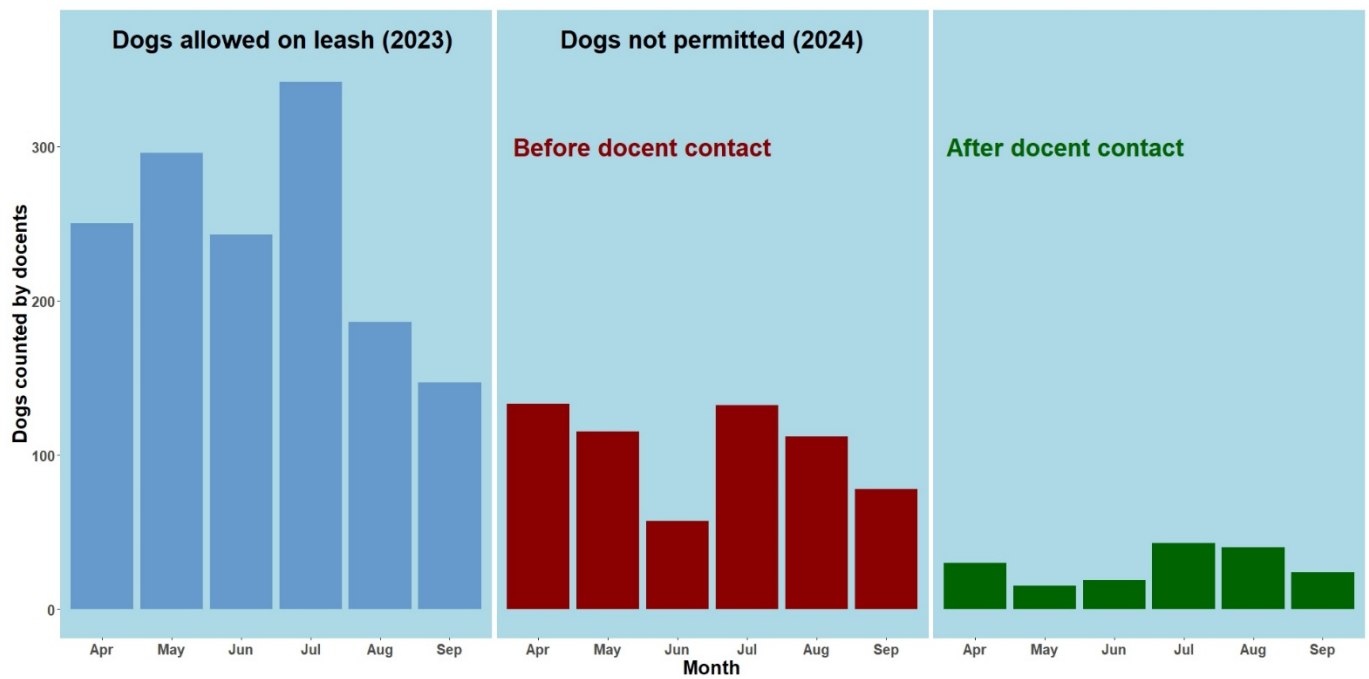


Figure 17. Number of dogs counted by docents each month. The first panel, in blue, shows counts from 2023 when dogs on leashes were allowed on the beach. The center panel, in red, shows dog counts for the

same months in 2024 when the dogs were not permitted on the beach. The last panel in green shows dog counts in 2024, after a docent politely informed the dog owner about the ban.

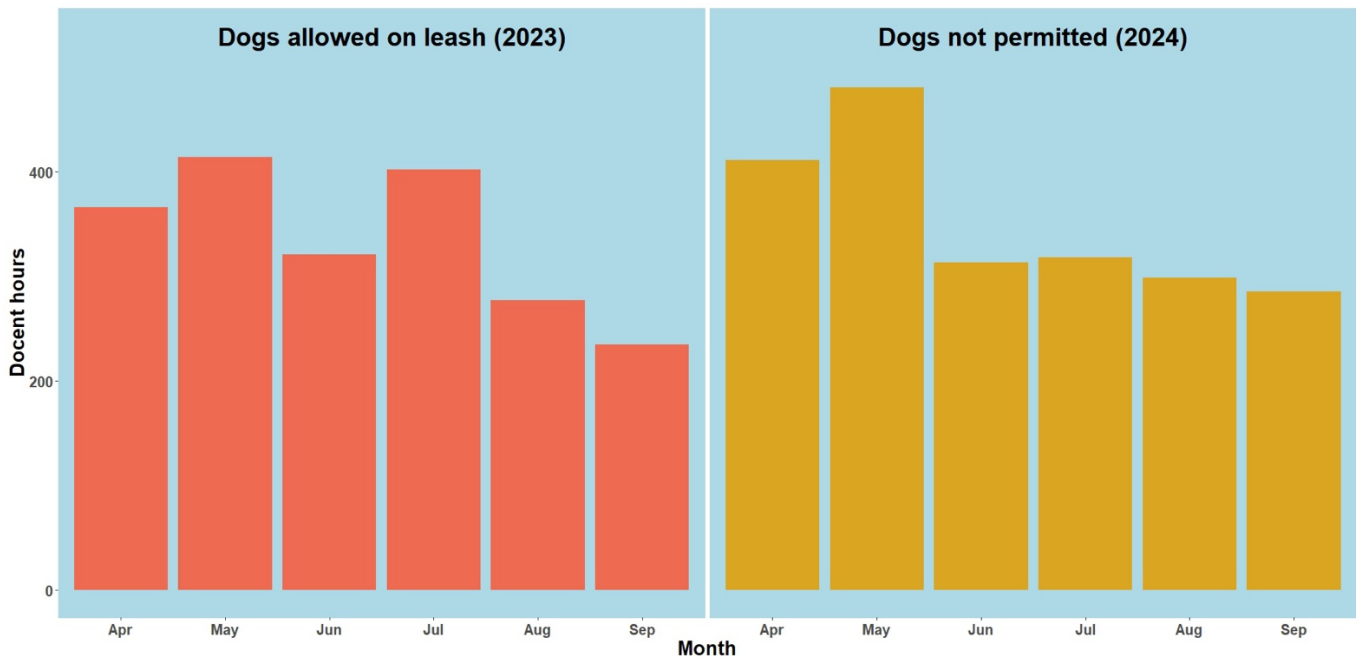


Figure 18. Docent coverage (number of docent hours) on Sands Beach per month in 2023 when dogs were allowed on leash, and 2024 when dogs were not allowed on the beach. This data shows the reduction in the number of dogs observed was due to the dog ban and not as a result of a lower observation effort.

Based on docent data, we estimate that there were 882 trespassing events of people into the plover nesting area in 2024 (Figure 19). This is higher than average and likely related to the additional time that the symbolic fence was absent from the beach during the winter and spring season. Typically, the symbolic fence is installed in early March, however this year it was not installed until early April due to the late season storms. The fence was removed for the winter season in mid-November. The majority of trespassing occurred when the fences were removed due to storms. This explains the clearly elevated rate of trespassing in winter (Figure 20).

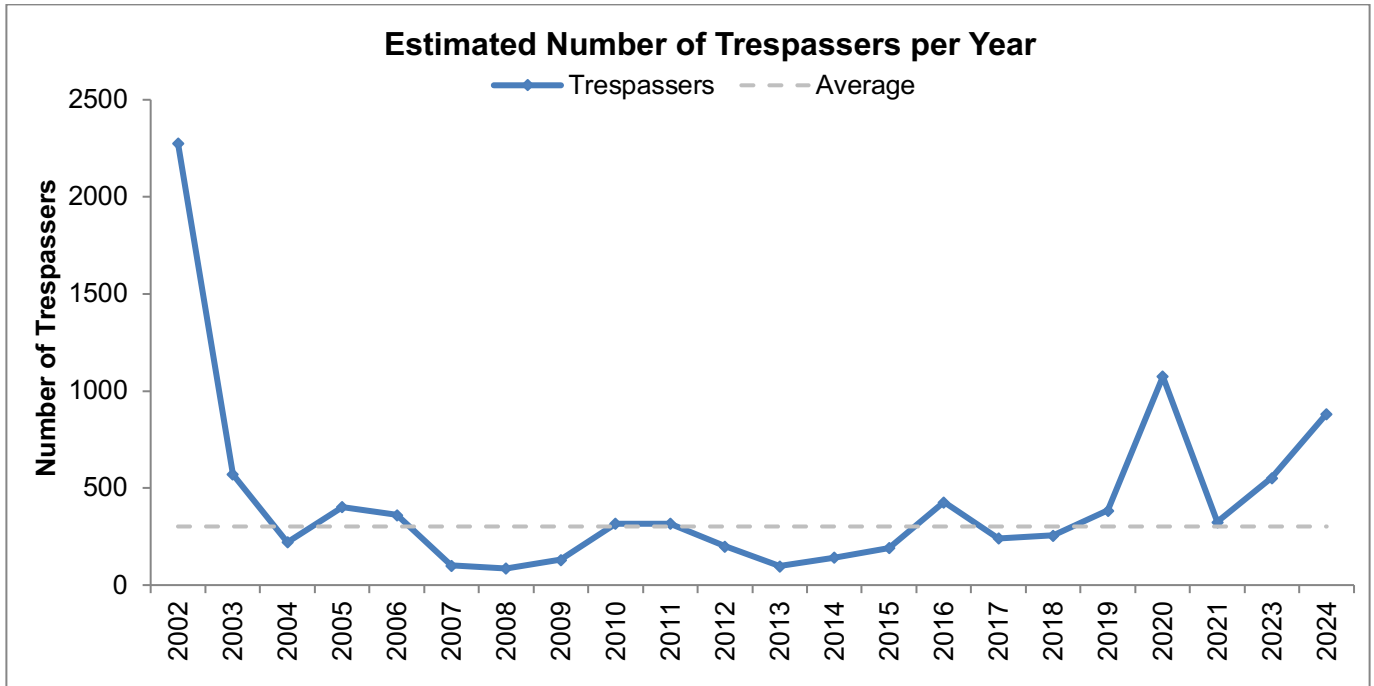


Figure 19. Estimated total number of visitors trespassing into protected habitat each year. Estimates based on the hourly rate of trespassers observed by docents ( $(\# \text{ trespassers/hr}) \times (12 \text{ hrs/day}) \times (365 \text{ days/yr})$ ).

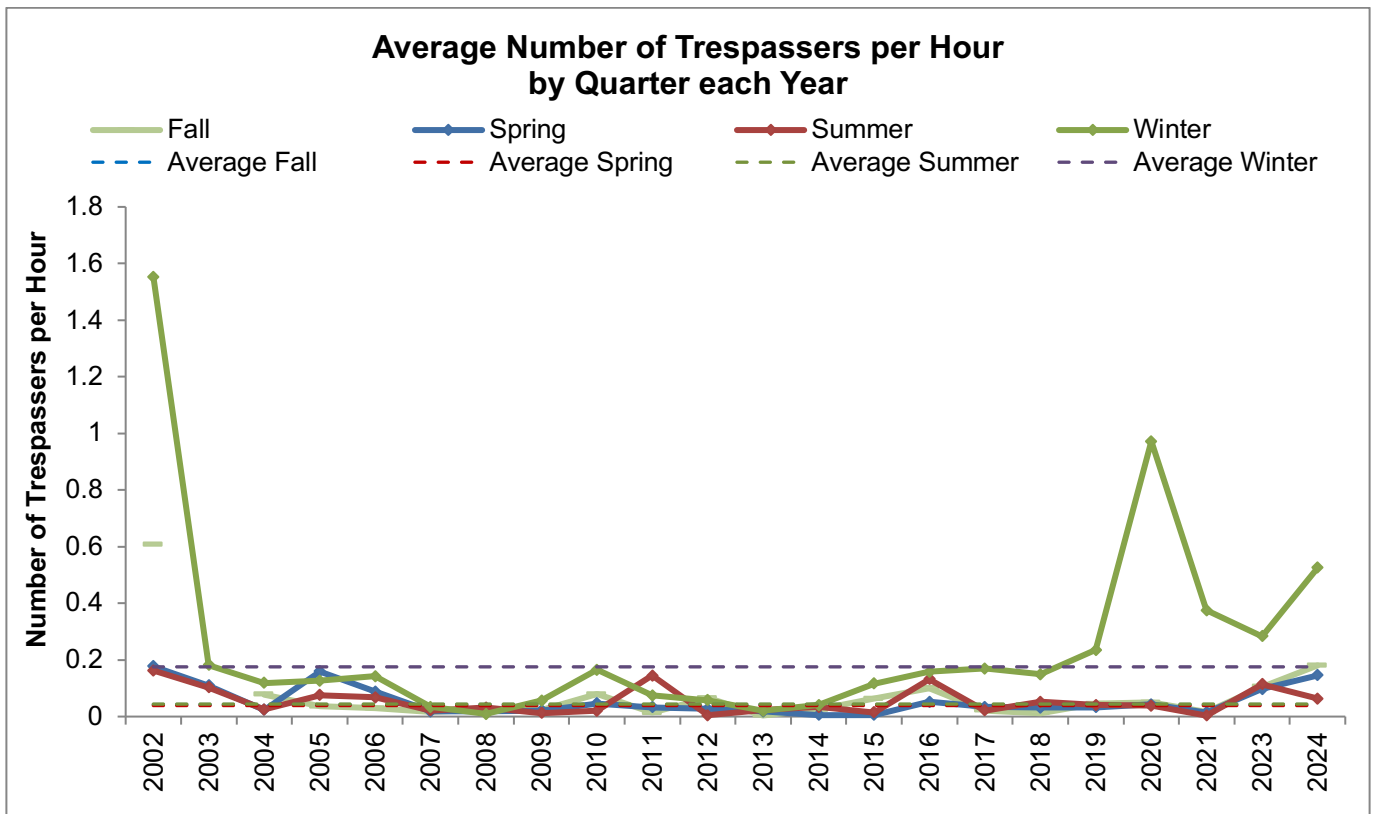


Figure 20. Average number of trespassers each quarter. Note that the highest numbers of trespassers are during the winter quarter when the symbolic fence is removed and the WSP habitat is marked only with signs.

## CONCLUSION

The breeding population of WSP at COPR has recovered since the implementation of a conservation plan in 2001. The wintering population at the reserve this year was above average for this site and the number of breeding adults has been above average over the last five years. The docent program continues to be an effective and integral conservation strategy to reduce human disturbance on the plovers. However, pressure from increasing human population using the beach, a university owned parking lot with approximately 120 visitor spaces on West Campus, and a reduction in beach area from sea level rise are making it more challenging for docents to protect the plovers from human disturbance. Despite the great benefits that signs, fences, and docents contribute towards improving compliance of beach regulations by beach goers, the total amount of disturbances can still increase as the number of people on the beach increases. A great example is the problem of dogs off leash. In the last 5 years, more people were complying with the leash law, but still, the number of unleashed dogs had increased because the total number of both leashed and unleashed dogs has increased at Sands Beach. Only once we implemented the dog prohibition policy at Sands Beach in 2024 did we see the total number of dogs decrease. This pattern shows the importance of capping the number of people on beaches that are habitats for sensitive wildlife such as WSP. The development of beach parking lots and beach access trails has potential impacts on sensitive resources and should require careful planning to avoid beach overuse and deterioration of natural resources. For example, despite the docent efforts and signage about appropriate beach use, a large group of students had a frisbee game and caused the “take” of one chick in 2024. Relocating parking lots to less sensitive areas and reducing the number of parking spaces may be a way to improve the impacts of beach overuse.

The control of urban predators such as skunks, crows, and gulls has become a management priority to improve both hatching and fledging success of plovers. COPR has not yet secured recurrent funds for predator control and thus employs a minimum number of USDA staff hours each year. It continues to be

crucial to initiate predator control prior to the plover nesting season, or as soon as there is evidence of potential predators in the vicinity of the nesting area.

### RECOMMENDATIONS

- The predator control program needs to be funded with more trap hours and in perpetuity.
- Other means to deter skunks should be explored, as exclosures and trapping have not always been effective in protecting nests from skunks. Skunks are an urbanization problem and may be improved if dog and cat food in local neighborhoods were not left outdoor at night.
- An alternative beach access and parking for Devereux Beach could help reduce recreational pressure at Sands Beach and protect the WSP.
- The number of take by people trespassing and partying in the plover nesting area has increased. A possible way to reduce the take is to close the West Campus parking lots at night since these trespassing happen at night when docents are not available.
- The reserve staff is developing a campaign to reduce the disturbance to chicks along the corridor, their main feeding area.

### ACKNOWLEDGEMENTS

Armando Aispuro (Resource Manager), Cristina Sandoval (Reserve Director), and Jessica Gray (Conservation Specialist) conducted plover monitoring. Jessica managed the docent program. We are very thankful to Rick Fellows and Bill Boelcke who each donated over 200 hours towards the Snowy Plover Docent Program this year, in addition to countless additional hours spent conducting restoration work and maintaining the reserve. The docents, 91 volunteers and interns over the course of 2024, maintained a presence at the beach every day of the year. Barry Lowry, Arthur Young, Tony Jennings and Don Simms (USDA) implemented predator management during the breeding season. The Santa Barbara Zoo conducted all captive rearing of WSP rescued from COPR.

### California Least Terns

We did not observe any courtship or mating behavior of California Least Terns this year. There has not been confirmed nesting of Least Terns at COPR since 2011 (Table 12).

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**APPENDIX A**

## Band sightings by COPR staff at Sands Beach

*Note: "X" represents unknown band, i.e. when plover is standing on one leg and observer can only view bands on exposed leg.*

Table 7. Summary of banded WSP recorded at COPR by staff and docents in 2024. TO BE UPDATED in January.

Left leg	Right leg	Band Origin (if known)	Remarks
aa	kr	unknown	
ak	gp	Eden Landing Ecological Reserve, Hayward (2022)	
an	ko	VSFB - Wall Beach (2023)	
an	kr	unknown	VSFB combo, but VSFB has not used this combo yet - likely a misread of an:ko
b	kb	unknown	
bb	lb	SBZ (2019), rescued at ODSVRA, released at COPR	
bb	yo	ODSVRA (2024)	
bn	ko	unknown	not a VSFB combo but could also be a misread of an:ko
ga	bb	ODSVRA (2017 or 2018)	
ga	pa	ODSVRA (2024)	
ga	pb	ODSVRA (2017)	
Gb	kb	unknown	
gg	br	ODSVRA (2023)	
gg	og	ODSVRA (2024)	
gg	rb	ODSVRA (2018)	
gg	rg	ODSVRA (2024)	
gg	vw	OSDVRA (2023)	
gg	yy	OSDVRA (2023)	
gn	yp	VSFB - Wall Beach (2024)	
gy	ak	Eel River Wildlife Area (2024, 3 chicks banded with this combo)	
Kb/p	bp	unknown	
l/g/l	k	unknown	
lg	ol	unknown	
lg	pw	unknown	
lk	gp	unknown	
ll	bp	unknown	
no	wo	VSFB - Shuman South (2023)	
no	wr	VSFB (2017)	possible misread of no:wo since it was seen around the same time, no:wr is from 2017
nw	lp	VSFB - Surf North Beach (2024)	
ny	rv	VSFB - Shuman South Beach (2021)	
p	rv	unknown	

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pg	aa	OSDVRA (2023)	
pg	ab	OSDVRA (2024)	
pg	oo	OSDVRA (2023)	
pv	ao	unknown	possible misread of py:ao. Pv:ao is an Oceano band but not currently in use.
pv	ga	OSDVRA (2024)	
py	ab	SBZ (2024), rescued at OSDVRA, released at COPR	
py	ag	Oceano (2021), raised at SBZ, released at COPR	
py	al	SBZ (2024), rescued at COPR, released at COPR	
py	ao	SBZ (2022), rescued at Ormond Beach, released at COPR	
py	ar	SBZ (2022), rescued at OSDVRA, released at COPR	
py	ba	SBZ (2024), rescued at McGrath State Beach, released at COPR	
py	bb	SBZ (2024), rescued at COPR, released at COPR	
py	bg	SBZ (2024), rescued at Pt. Mugu, released at COPR	
py	bl	SBZ (2024), rescued at COPR, released at COPR	
py	bo	SBZ (2024), rescued at OSDVRA, released at COPR	
py	bp	unknown	
py	bv	SBZ (2024), rescued at McGrath State Beach, released at COPR	
py	by	SBZ (2024), rescued at COPR, released at COPR	
py	gp	unknown	
py	gr	unknown	
py	gv	unknown	
py	la	SBZ (2024), rescued at COPR, released at COPR	
py	ll	SBZ (2024), rescued at VSFB, released at COPR	
py	lv	SBZ (2024), rescued at OSDVRA, released at COPR	
py	oa	Ormond (2021), raised at SBZ, released at COPR	
py	rv	unknown	
py	to	unknown	
py	va	SBZ (2021), rescued at COPR, released at COPR	
py	vr	SBZ (2021), rescued at COPR, released at COPR	
py	vw	SBZ (2021), rescued at Ormond Beach, released at COPR	
py	vy	SBZ (2022), rescued at OSDVRA, released at COPR	
py	wa	SBZ (2021), rescued at OSDVRA, released at COPR	
py	wg	SBZ (2021), rescued at COPR, released at COPR	
py	ww	SBZ (2021), rescued at OSDVRA, released at COPR	
py	yw	SBZ (2022), rescued at Ormond Beach, released at COPR	
py	yy	SBZ (2022), rescued at OSDVRA, released at COPR	
r	a/r/a	VSFB - Minuteman (2022)	
Rw	rb	Marina Dunes Date Park (2010), banded as an adult	
Silver	ap	unknown	



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Silver b	kb	unknown	
va	yw	North Beach, PRNS (2022)	nests at PRNS
vg	wa	ODSVRA (2024)	
vw	gg	unknown	possible misread of gg:vw, (vw:gg combo last used in 2007, last observed in 2010)
Wb	kb	unknown	
wb	kv	unknown	
wb	ky	unknown	
yg	wa	unknown	likely misread of yg:wl (lime band often misread as aqua). Fort Ord Dunes State Park (2016)
yo	wo	unknown	possible misread: this combo is from Monterey but bird is not alive

## APPENDIX B USDA Report



United States Department of Agriculture

Animal and Plant  
Health Inspection  
Service

Subject: Coal Oil Point Reserve Predator Management Report for Fiscal Year 2024.

Date: 10/18/2024

Wildlife Services

To: Cristina Sandoval

3419A Arden Way  
Sacramento,  
CA 95825  
Voice  
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Coal Oil Point Reserve  
Natural Reserve System  
University of California

This report covers predator management activities conducted by USDA Wildlife Services (WS) between October 1<sup>st</sup> 2023 and September 30<sup>th</sup>, 2024 at Coal Oil Point Reserve. The main objective of this project is to protect the Federally Endangered Western snowy plover (*Charadrius nivosus*) from mammalian and avian predation. Predator removal was conducted by Assistant District Supervisor Arthur Young, Wildlife Biologist Charles Richards, and Wildlife Specialists Tony Jennings and Don Simms. A breakdown of the hours worked on the project can be found in Table 1.

**Table 1. Hours worked**

Task	Hours
Field work	118.5
Office duties	1.5
Equipment Maintenance	0
Travel	0
<b>Total</b>	<b>120</b>

Control methods used were DRC-1339 avian pesticide, cage traps, and firearms to remove a total of 71 target predators. Fifty-four American crows (*Corvus brachyrhynchos*), one Western gull (*Larus occidentalis*), seven striped skunks (*Mephitis mephitis*), two Virginia opossums (*Didelphis virginiana*), and seven raccoons (*Procyon lotor*) were removed during this period (Table 2). All mammals were euthanized by shooting, CO<sub>2</sub>, or sodium pentobarbital. Predator carcasses were disposed of according to WS directives, and all applicable state and federal laws and regulations. Traps were mostly set along the exclusion fence on the southern part of reserve. DRC-1339 was deployed at three nest towers (Map 1).

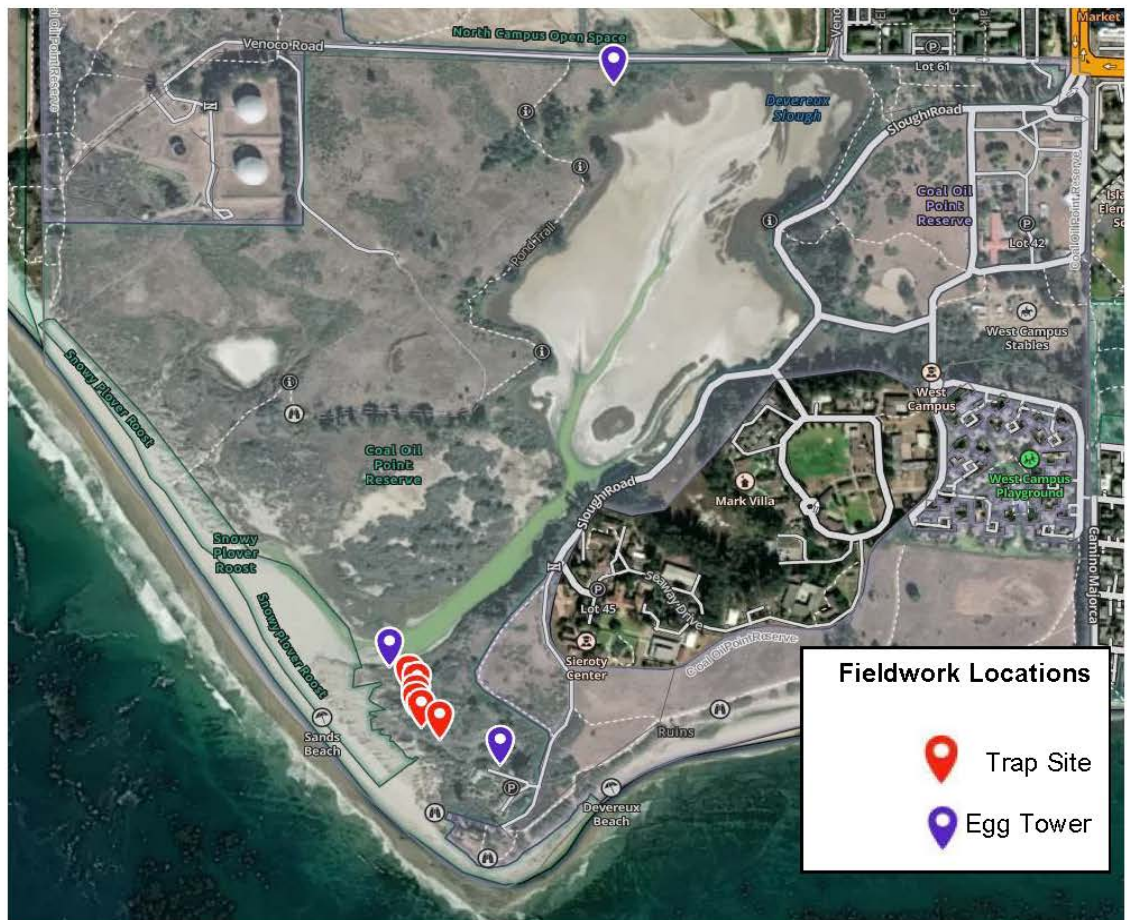
**Table 2. Predators captured and methods employed**

Method	Opossum	Raccoon	Western Gull	Crow	Skunk	Total
Cage Trap	2	7	0	0	7	16
DRC-1339	0	0	0	54	0	54
Firearm	0	0	1	0	0	1
<b>Total</b>	<b>2</b>	<b>7</b>	<b>1</b>	<b>54</b>	<b>7</b>	<b>71</b>

**Table 3. Timeline of Predator Removal**

Date	Method	Species	Number
3/8	DRC-1339	American Crow	18
3/18	DRC-1339	American Crow	10
4/5	DRC-1339	American Crow	8
4/16	DRC-1339	American Crow	8
4/18	Cage Trap	Raccoon	1
4/18	Cage Trap	Striped Skunk	1
4/19	DRC-1339	American Crow	10
4/19	Cage Trap	Raccoon	2
4/23	Cage Trap	Striped Skunk	3
4/24	Cage Trap	Striped Skunk	1
5/30	Cage Trap	Striped Skunk	1
5/31	Cage Trap	Striped Skunk	1
6/3	Cage Trap	Raccoon	1
7/8	Firearm	Western Gull	1
7/9	Cage Trap	Opossum	1
7/9	Cage Trap	Raccoon	2
7/11	Cage Trap	Raccoon	1
7/12	Cage Trap	Opossum	1

Map 1. Locations of fieldwork



**APPENDIX C**  
Nesting Data from WSP habitat adjacent to COPR

Table 11. WSP nesting data from UCSB North Campus Open Space (NCOS). First nest observed in 2018.

Year	# nests	# nests hatched	# nests predated by skunks	# nests predated by crows	# nests abandoned	# nests fledged
2018	1	0	0	1	0	0
2019	3	0	2	1	0	0
2020	1	1	0	0	0	0
2021	0	n/a	n/a.	n/a.	n/a	n/a
2022	3	2	unknown	unknown	0	2
2023	0	n/a	n/a.	n/a.	n/a	n/a
2024	0	n/a	n/a	n/a	n/a	n/a

Table 12. WSP nesting data from Ellwood Beach, Goleta. First nest observed in 2019.

Year	# nests	# nests hatched	# nests predated by skunks	# nests predated by crows	# nests washed out by tide	# nests abandoned	# nests fledged
2019	1	0	0	1	0	0	n/a
2020	0	n/a	n/a	n/a	0	0	n/a
2021	0	n/a	n/a	n/a	0	0	n/a
2022	0	n/a	n/a	n/a	0	0	n/a
2023	2	2	0	0	0	0	2
2024	5	2	0	0	2	1	2

**APPENDIX D**  
California Least Tern Nesting Data from at COPR

Table 13. LETE nesting data from COPR. First nest observed in 2006.

Year	# nests	# nests hatched	# nests predated by skunks	# nests predated by crows	# nests abandoned
2006	5	4	0	0	1
2007	6	1	5	0	0
2008	1	0	1	0	0
2009	0	n/a	n/a	n/a	n/a
2010	0	n/a	n/a	n/a	n/a
2011	1	0	0	0	1
2012	0	n/a	n/a	n/a	n/a
2013	0	n/a	n/a	n/a	n/a
2014	0	n/a	n/a	n/a	n/a
2015	0	n/a	n/a	n/a	n/a
2016	0	n/a	n/a	n/a	n/a
2017	0	n/a	n/a	n/a	n/a
2018	0	n/a	n/a	n/a	n/a
2019	0	n/a	n/a	n/a	n/a
2020	0	n/a	n/a	n/a	n/a
2021	0	n/a	n/a	n/a	n/a
2022	0	n/a	n/a	n/a	n/a
2023	0	n/a	n/a	n/a	n/a
2024	0	n/a	n/a	n/a	n/a