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2020 Final Report on the Western Snowy Plover

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The data associated with this publication are available upon request.

2020 Final Report on the Western Snowy Plovers

Coal Oil Point Reserve
University of California
Santa Barbara, CA

Cristina Sandoval and Jessica Nielsen
Permit Number **TE073205-5**

Date of Preparation: January 29th, 2021
Date Updated: February 9th, 2021



Site: Sand's 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 winter and fall 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 2020, we continued with the monitoring of the Western Snowy Plover (WSP) population at Coal Oil Point Reserve as in previous years. The number of breeding adults this year (51) was higher than the average (36) for our site. The wintering population size (34) was the lowest on record since monitoring began at COPR in 2001. This year, one fifth of all nests were washed out by high tides. Wind and predation by crows also had a large impact on the fate of nests and chicks. In early April, we implemented the use of predator exclosures to prevent further predation of nests by crows. While COPR had a higher than average hatching rate (55%), predation on chicks by gulls and crows resulted in a low fledging rate of 38%. The number of fledged chicks per male (0.9) was less than half the average for our site. 91% of nests (69) were initiated on the beach, and 9% (7) were initiated on the mudflats of the slough (delta).

INTRODUCTION

Sands Beach at Coal Oil Point Reserve (COPR) is part of the University of California Natural Reserve System. The entire reserve including Sands Beach has an Environmentally Sensitive Area designation 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). Sands Beach is an important habitat for many species of shorebirds and is considered an Audubon “Important Bird Area.” Currently, Sands Beach has an average wintering population of Western Snowy Plover (WSP) of 174 individuals and an average breeding population of 36. The lower beach is open to the public all year, but 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 the Western Snowy Plovers began in 2001 and resulted in the recovery of a breeding population of WSP that had been lost for decades and a general increase in the wintering population. The most significant action that led WSP to start nesting at Sands Beach again was to eliminate recreational public use on the upper beach habitat, used by WSP for resting

and nesting. A docent program was initiated in 2001 to inform people of restricted areas and other reserve regulations. The docents provide direct communication with beach goers and, together with signs media, and lectures, they encourage most beach goers 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. There is still some trespassing and non-compliance with the leash law, which have resulted in 3 cases of “take” of chicks and eggs. Approximately 60% of dog owners arrive to the beach with their dog on leash. The communications by docents improve overall compliance to 90%. Of the dog owners that arrive at the reserve with their dog off leash, 76% choose to leash their dog after contact by a docent. However, as evidenced by a case of “take” in which a chick was killed by a dog while the docent was talking to the dog owner, to avoid future killing and harassment by dogs, the compliance to the leash law needs to be near 100% or dogs should not be permitted at COPR.

Enforcement of the Santa Barbara County leash law has been sporadic and citations are rarely given. It seems that the compliance with the leash law will not improve unless citations are issued on a regular basis at Sands Beach. In 2017, the California Coastal Commission approved an amendment to the UCSB LRDP to prohibit dogs at Sands Beach. This prohibition was an attempt to eliminate the chronic issue of unleashed dogs at Sands Beach. This policy has not yet been implemented or enforced as per the request of UCSB’s administration.

METHODS AND RESULTS

The reserve staff monitors the WSP population and several aspects of the public use of the beach such as the number of people on the beach and in the ocean and the number of trespassers and dogs per hour. Standard protocols were established at the beginning of 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. In summary, COPR staff uses a scientific approach to gather data and uses these data to guide an adaptive management approach that best protects the WSP and other wildlife in conformance 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 2020, we continued with the same management practices established in the 2004 and 2015 Snowy Plover Management Plans (Sandoval, 2004 & 2015). Figure 1 shows the location of the plover habitat and the maximum extent of the symbolic fences. The exact location 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.

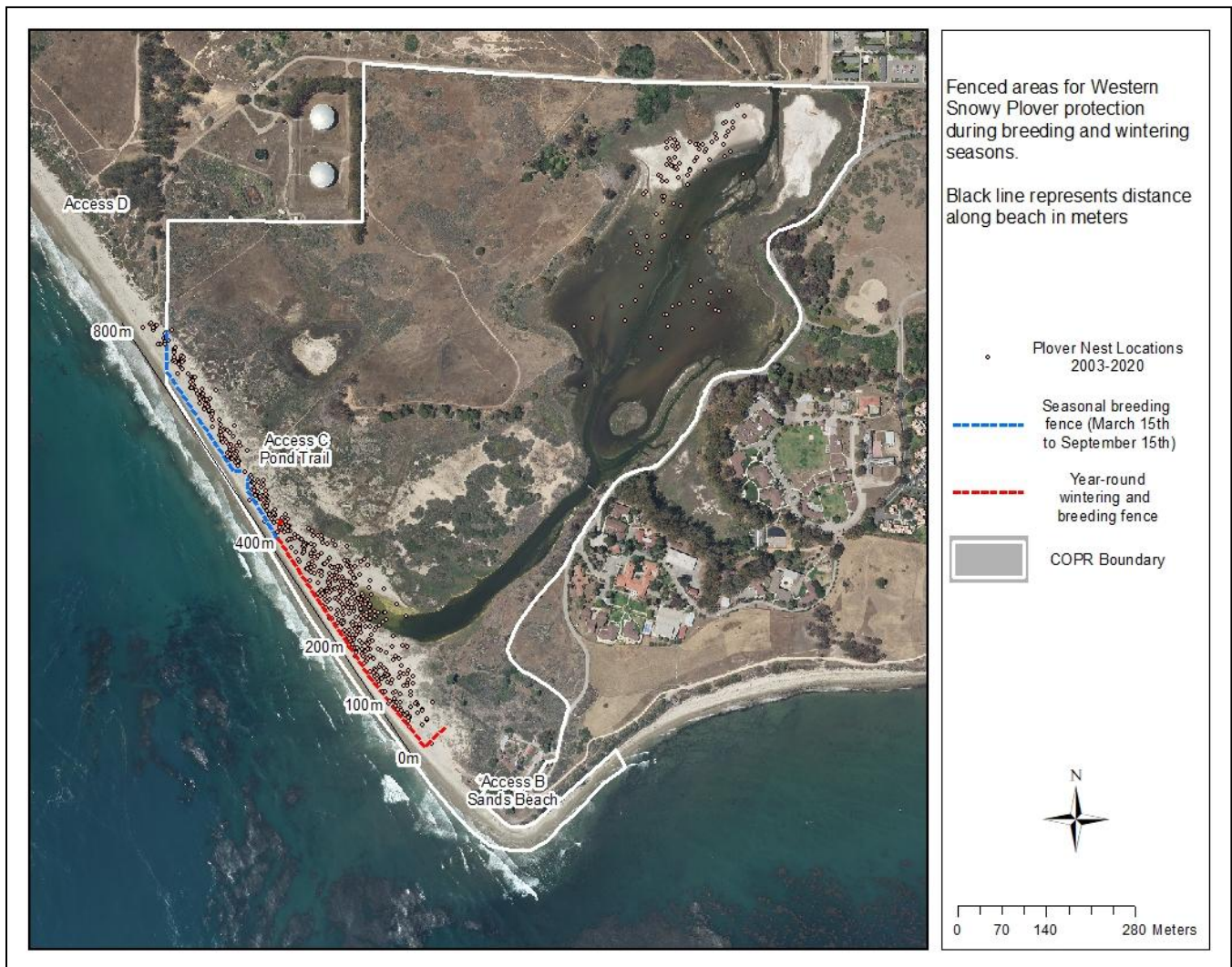


Figure 1. Location of the habitat protected by symbolic fencing for the Western Snowy Plovers at Coal Oil Point Reserve and location of nests since the recovery of the breeding population in 2001.

Monitoring of the Wintering Population

To count WSP, we walked along the wet sand from the eastern boundary of Sands Beach to the western boundary of the reserve and recorded all individuals seen with binoculars. On the way back, we stopped at groups of individuals to look for color bands on the legs. The monitor counts wintering WSP and check for banded individuals once a week. During the 2020 winter window survey, we counted 34 WSP (Figure 2). The average number of wintering WSP at Coal Oil Point Reserve since 2001 is 174 individuals. This lower number in 2020 could be a result of the wintering flock flying away momentarily. This often happens if a predator is present at the beach. The general trend in the decrease of the wintering population at COPR since 2004 (Figure 2) it not well understood.

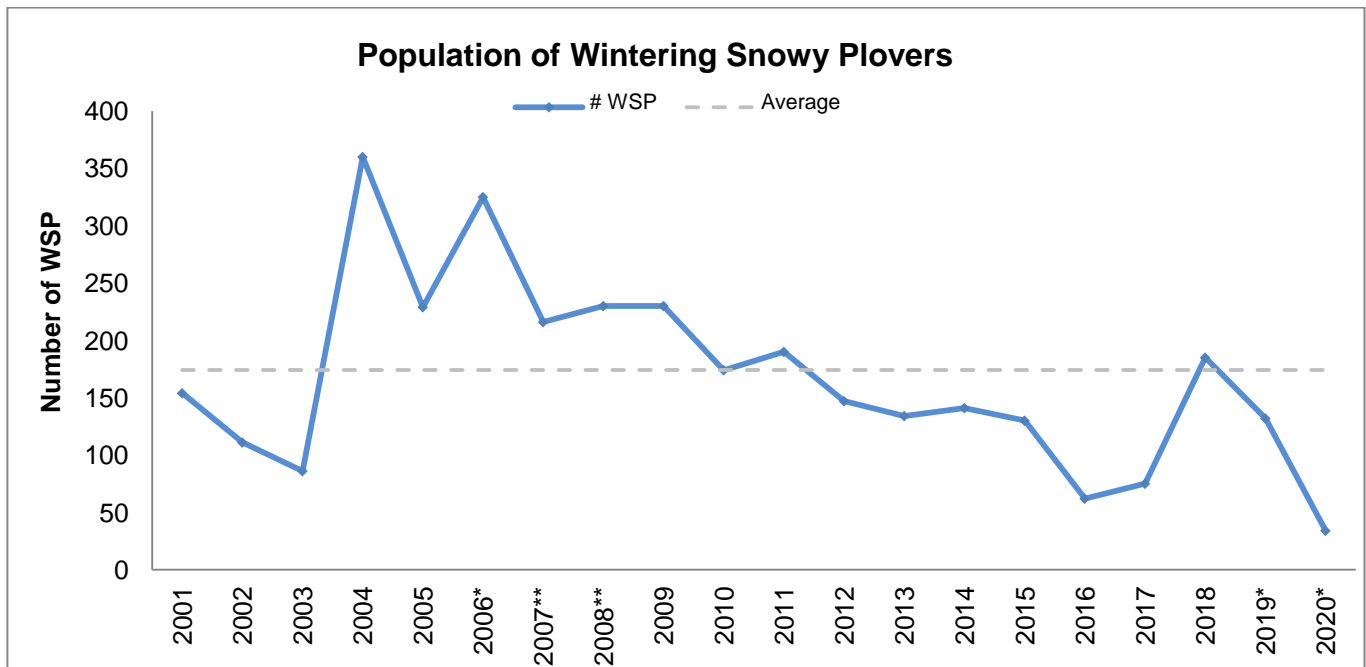


Figure 2. Results of winter window surveys at Coal Oil Point Reserve. Average line represents the average from 2001-2019.

Monitoring of the Breeding Population

We counted WSP during the breeding season window survey using the same method as for the wintering season window survey. We counted 51 WSP during the 2020 breeding window survey, which is higher than the average (36) 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 36 adults since 2001 (Figure 3). The breeding population at COPR may still be growing, suggesting that the nesting habitat hasn't reached its carrying capacity (Figure 3).

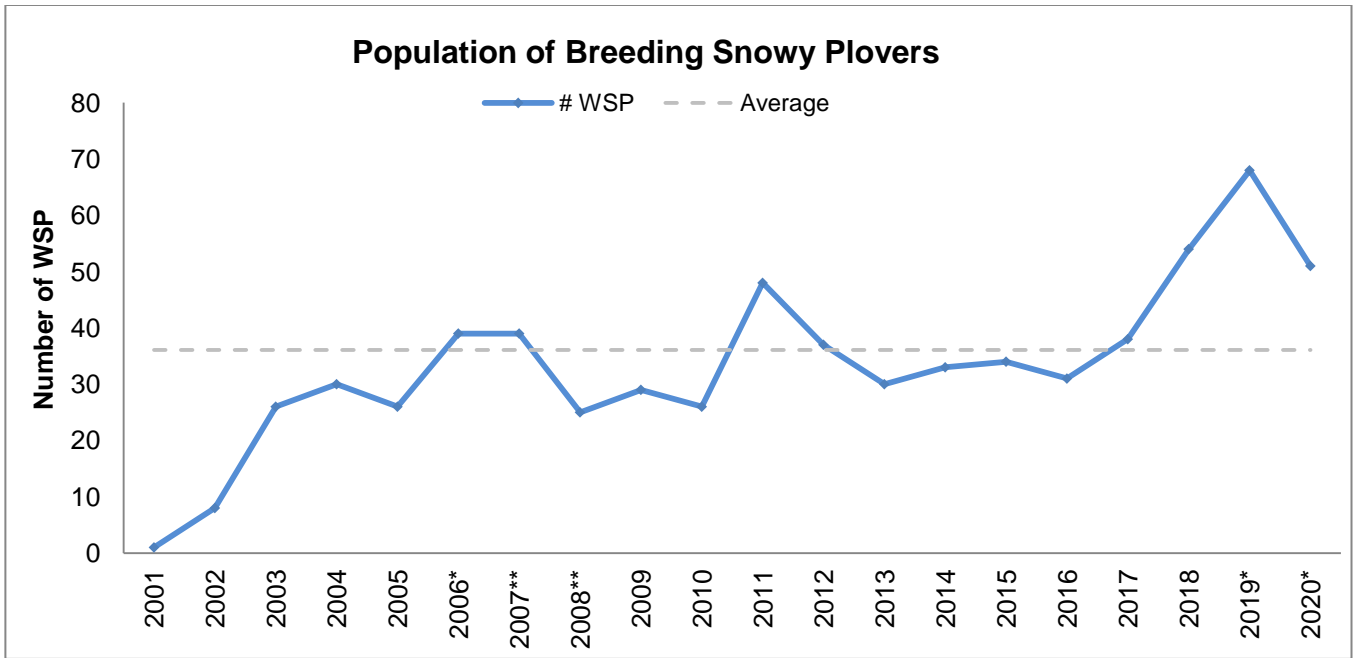


Figure 3. Number of WSP adults counted during the breeding window surveys at Coal Oil Point Reserve.

Average line represents the average from 2003-2019. 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 nesting season in 2020, the numbers and locations of adult plovers, nests, and chicks were counted 3-4 times per week by Jessica Nielsen and Cris Sandoval. 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.

In 2020, 76 WSP nests were initiated at COPR and 42 of them hatched (55% hatching rate). Figure 5 shows the number of nests laid and the number of nests hatched between 2001-2020. The primary cause of nest failure this year was high tides (Figure 6, Table 2). In early May, two days of high tides combined with large swells resulted in a loss of 13 nests across the nesting habitat. An additional 3 nests were lost during high tide events in June and July. Nests were also affected by crow predation until predator exclosures were implemented on April 6th, 2020.

Detailed discussion of nest and chick fate follow below (Table 1).

COPR WSP Report 2020

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

Year	Breeding Window Survey (BWS)	# Nests	# Nests Hatched	Hatching Rate	# Chicks Fledged	# Fledges Per estimated Male (BWS)	Fledging Rate
				(# nests hatched / # nests*100)			(# nests that fledged / #nests that hatched *100)
1970- 2000	few	~2-4/30yr	none	0	none	none	none
2001	1	1	1	100%	1	1	100%
2002	8	13	6	46%	14	2.8	83%
2003	26	24	17	71%	40	3.3	94%
2004	30	52	24	46%	27	1.8	67%
2005	26	64	16	25%	30	2.3	81%
2006*	39	43	22	51%	37	2.0	91%
2007*	39	66	20	30%	17	0.9	55%
2008*	25	57	3	5%	8	0.7	100%
2009	29	65	39	60%	61	4.2	74%
2010	26	75	42	56%	19	1.5	26%
2011	48	84	35	42%	9	0.4	14%
2012	37	73	34	47%	22	1.2	44%
2013	30	65	34	52%	30	2	41%
2014	33	77	21	27%	26	1.6	67%
2015	34	62	34	55%	45	2.7	74%
2016	31	43	29	67%	49	3.2	86%
2017	38	52	34	65%	53	2.8	77%
2018	54	81	61	75%	82	3.0	67%
2019*	68	97	27	28%	8	0.2	19%
2020*	51	76	42	55%	23	0.9	38%
COPR AVERAGE	36.1	63.5	32.3	53%	37.9	2.3	62%
COPR SD	11.4	17.6	11.9	15.5	19.8	1.0	24.0

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.

**In 2006, 2019, & 2020, enclosure cages were used to protect nests from crows. This was a change from the standard protocol at this site and may have affected nest fates. These years are excluded from the calculation of average hatching and fledging rates.*

***In 2007-2008, some nests were collected, incubated in the nursery, and replaced prior to hatching. This was a change from the standard protocol at this site. Numbers reported for number of hatched nests and number of fledged chicks are those that hatched and fledged in the wild without intervention, and exclude those that hatched and fledged in the nursery. These years are excluded from the calculation of average hatching and fledging rates.*

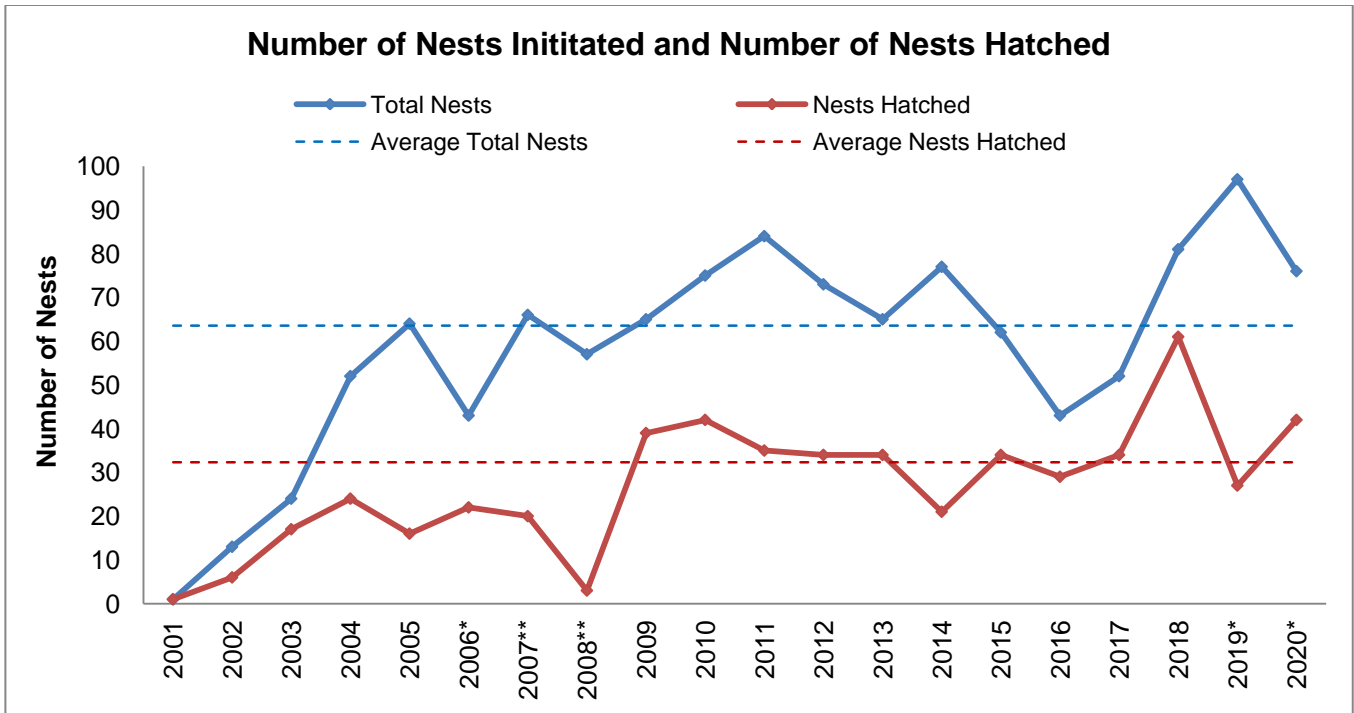


Figure 5. Nests initiated and hatched by year (total number of nests that had at least one egg vs. total number of nests that hatched at least one chick). Average line represents the average from 2003-2019.

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.

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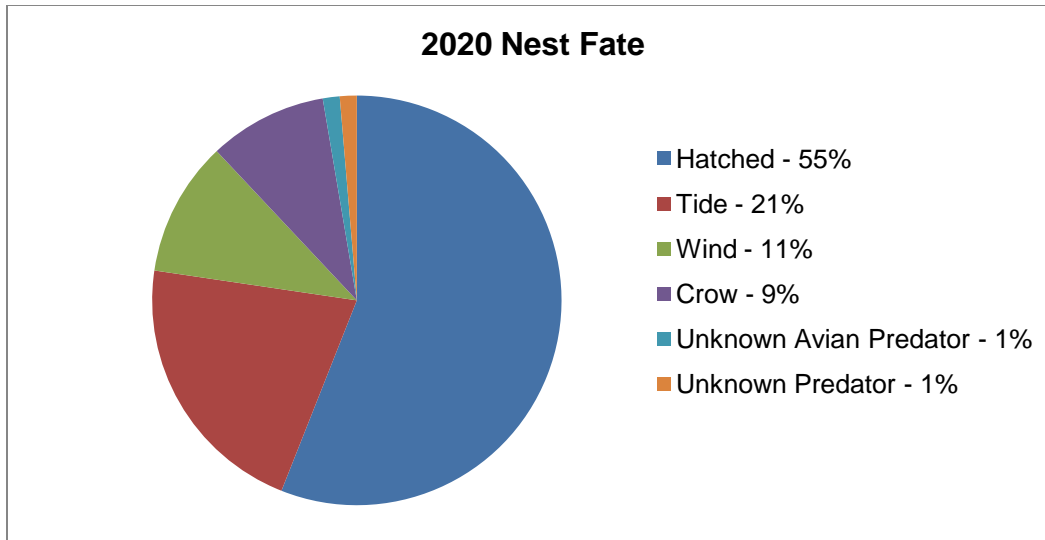


Figure 6. Nest fate at COPR in 2019. Each section in the graph shows the proportion of nests that failed by each cause and the proportion of nests that hatched (data is in Table 2).

Table 2. Number of nests lost by fate from 2002-2020.

Year 20-XX	'02	'03	'04	'05	'06 *	'07 **	'08 **	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19 *	'20 *
Total nests	13	24	52	64	43	66	57	65	75	84	73	65	77	62	43	52	81	97	76
Hatched	6	16	20	16	22	20	3	39	42	35	34	34	21	34	29	34	61	28	42
Skunk	0	0	9	18	2	19	18	10	0	0	0	4	10	15	6	4	3	9	0
Crow	2	4	8	3	0	0	0	1	1	0	0	0	0	0	0	0	0	32	7
Abandoned	0	1	1	9	3	1	0	2	3	5	3	4	9	1	2	1	3	2	0
Abandoned /Owl	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Egg Replacement	0	0	0	0	0	11	23	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
Whimbrel	0	0	1	0	0	0	0	0	0	1	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
Opossum	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dog	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Unknown Cause	0	0	0	0	0	0	0	0	17	8	4	0	21	0	0	0	0	0	0
Human	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Unknown Predator	0	0	0	1	1	0	0	4	0	10	3	15	9	3	0	2	3	1	2
Wind	1	2	2	6	1	2	2	5	2	10	2	0	0	1	0	3	1	3	8
Flooded/ Tide	0	0	4	5	2	1	6	2	5	12	16	6	3	5	2	8	6	17	16
Flooded/ Delta	0	0	0	3	0	0	0	0	4	3	0	0	0	0	0	0	0	3	1

*Note that in 2006, 2019 and 2020, predator exclosure cages were used which may have affected nest fate.

**Note that in 2007 and 2008, some nests were collected, replaced with decoy eggs, incubated in the nursery, and replaced prior to hatching which may have affected nest fate.

Nest Predation

12% of nests (9) were lost to predation in 2020. Tracks leading to and around the predated nests confirmed that the majority of predation was caused by crows (Figure 7). Crows were a problem at the beginning of the program but were controlled through harassment until 2018. In 2017 and 2018, the North Campus Open Space Project attracted hundreds of crows seeking food in the newly disturbed soils. Several of these crows stayed in the area and became residents at COPR and its vicinity.

Nest monitors and docents harassed all crows observed on the beach using slingshots. Additionally, we implemented crow hazing techniques using crow carcasses to deter the crows from the nesting area. Crows were unresponsive to harassment and hazing in 2019 and 2020. USDA was contracted to remove crow nests near the plover habitat and remove crows (Appendix C) but the opportunities for removal were rare because COPR is a public beach.

In the first week of April, 6 out of 7 active nests were predated by crows over the span of less than 2 days. COPR immediately deployed a predator enclosure on the one remaining nest and all subsequent nests in the 2020 season. We used the same model of predator enclosure that was approved by USFWS in 2019. There were no signs of changes in nesting behavior as a result of the cages. For more details on the design and the monitoring protocol for enclosure deployment, refer to [COPR's 2019 Final Report on WSP](#). This was the second consecutive year that predator enclosures were needed to protect nests from significant loss by crows. Prior to 2019, COPR had not experienced any crow predation for 8 years. 2020 was the first season in 8 years in which no nests were predated by skunks.

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. It is necessary to start a large collaborative effort between NCOS and COPR to trap or remove crows throughout the year. The Wildlife Care Network raises and releases 200-300 crows each year. Despite good intentions, this effort unfortunately creates additional problems to WSP and other birds that are preyed upon by crows.

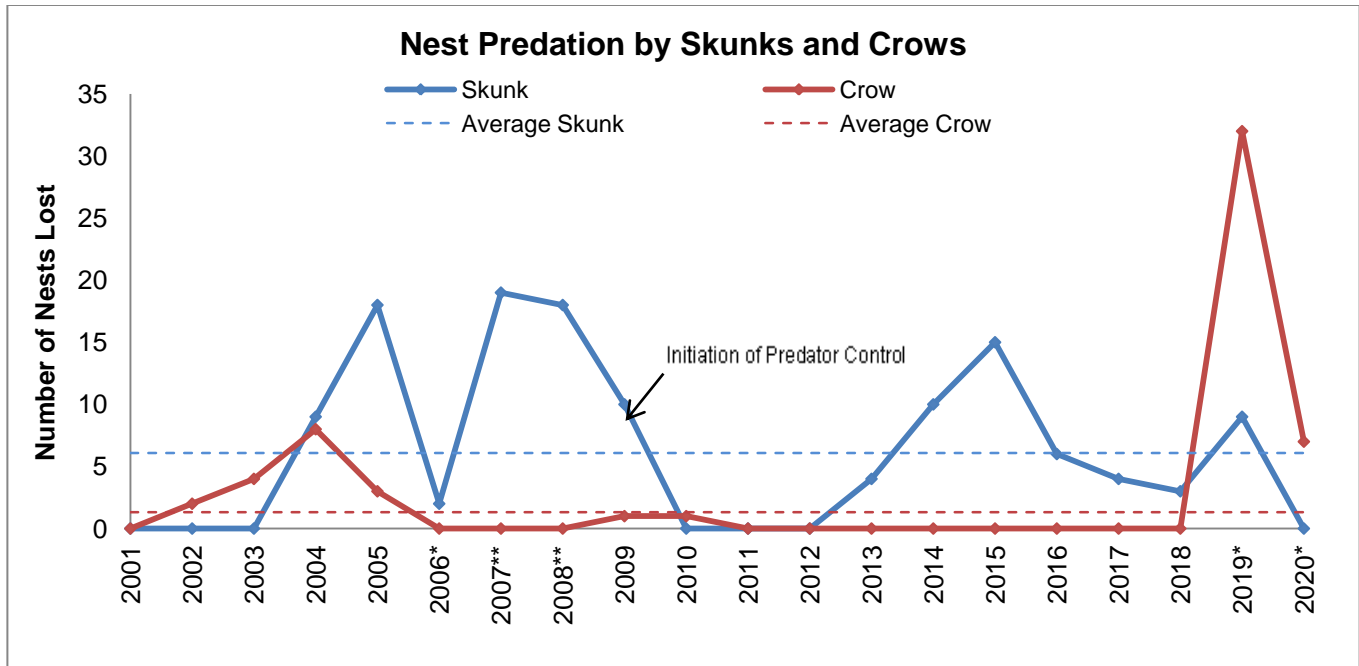


Figure 7. Skunk and crow predation by year. Average line represents the average from 2003-2005, 2009-2018.

In 2001 and 2002, the breeding population of WSP was still beginning to grow.

**In 2006, 2019 and 2020, enclosure cages were used to protect nests from crows. This was a change from the standard protocol at this site and may have affected nest fates. These years are excluded from the calculation of average hatching and fledging rates.*

***In 2007-2008, some nests were collected, incubated in the nursery, and replaced prior to hatching. This was a change from the standard protocol at this site. Numbers reported for number of hatched nests and number of fledged chicks are those that hatched and fledged in the wild without intervention, and exclude those that hatched and fledged in the nursery. These years are excluded from the calculation of average hatching and fledging rates.*

Infertility

34 abandoned eggs were collected from COPR in 2020. They were placed in an incubator and later checked to determine viability. Eggs were collected when nests were abandoned because of wind, tide, and failing to hatch in the field. Of the 34 eggs, 11 did not hatch. 14 died during development, and 9 were infertile (Figure 8 and 9). 3.9 % of the WSP eggs in 2020 were infertile which is higher than average, but not outside of the normal range for our site. Some of those eggs that seemed infertile in 2020 could have been, in fact, new eggs that were fertile, but died due to problems with the incubator.

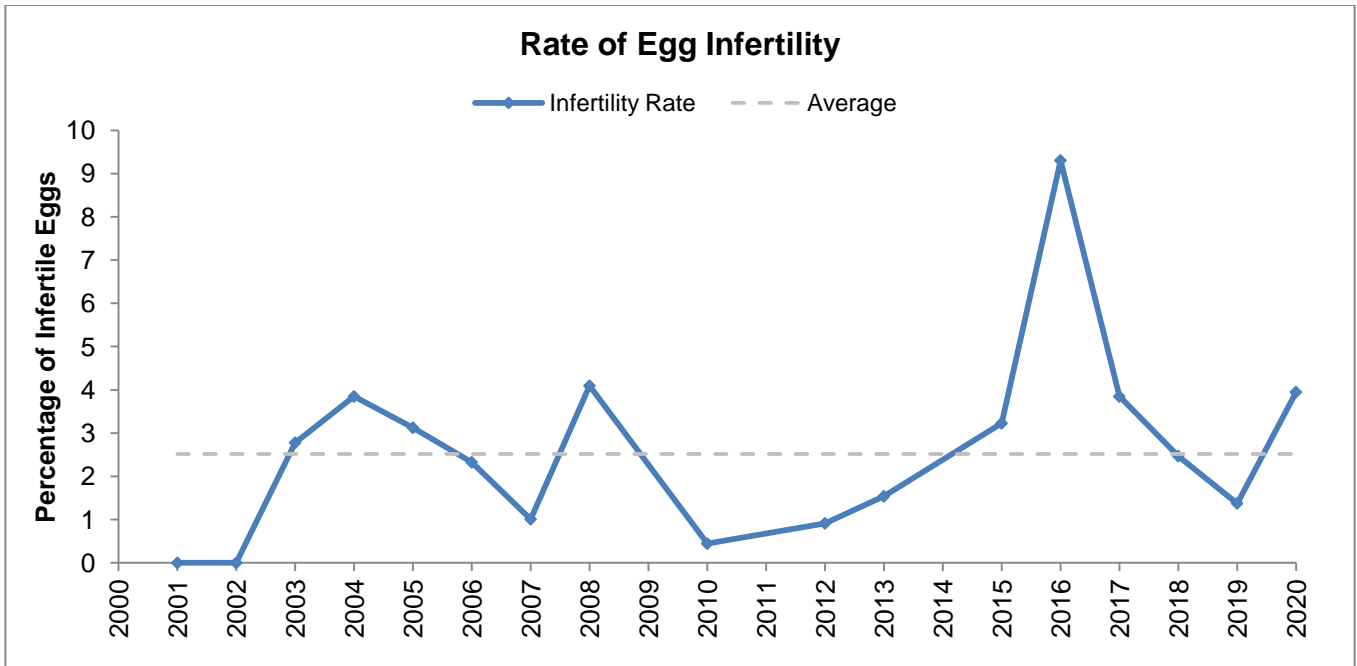


Figure 8. Percentage of infertile eggs by year ($\# \text{ infertile eggs} / \# \text{ total eggs} * 100$).

Average line represents average for 2001-2019. Infertility data were not collected during the years 2009, 2011, and 2014.

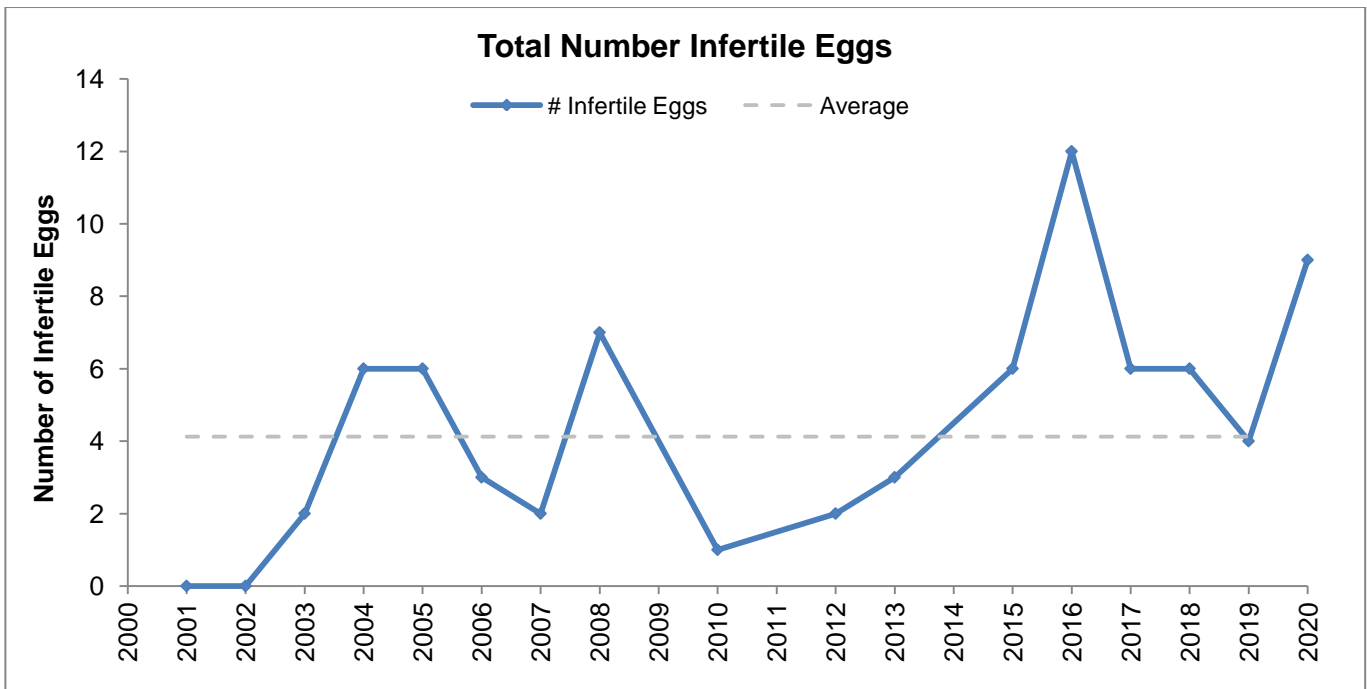


Figure 9. Total number of infertile eggs by year.

Average line represents average for 2001-2019. Infertility data were not collected during the years 2009, 2011, and 2014.

Chick Survival

The survival rate of chicks was very low this year. In 2020, 23 WSP chicks fledged at COPR as compared to the average of 38 (Figure 10). The fledge rate of individual chicks was 22%. The fledge rate of nests (nests that fledged at least one chick/total nests that hatched at least one chick) was 38% (Figure 11). This year, COPR plovers produced 0.9 fledged chicks per male, which is below the expected rate of 1 chick per year per male (Table 1).

This year, both gulls and crows were confirmed as predators of plover chicks by visual observation (see Photo A). We implemented predator control for crows and gulls as described in page 12.

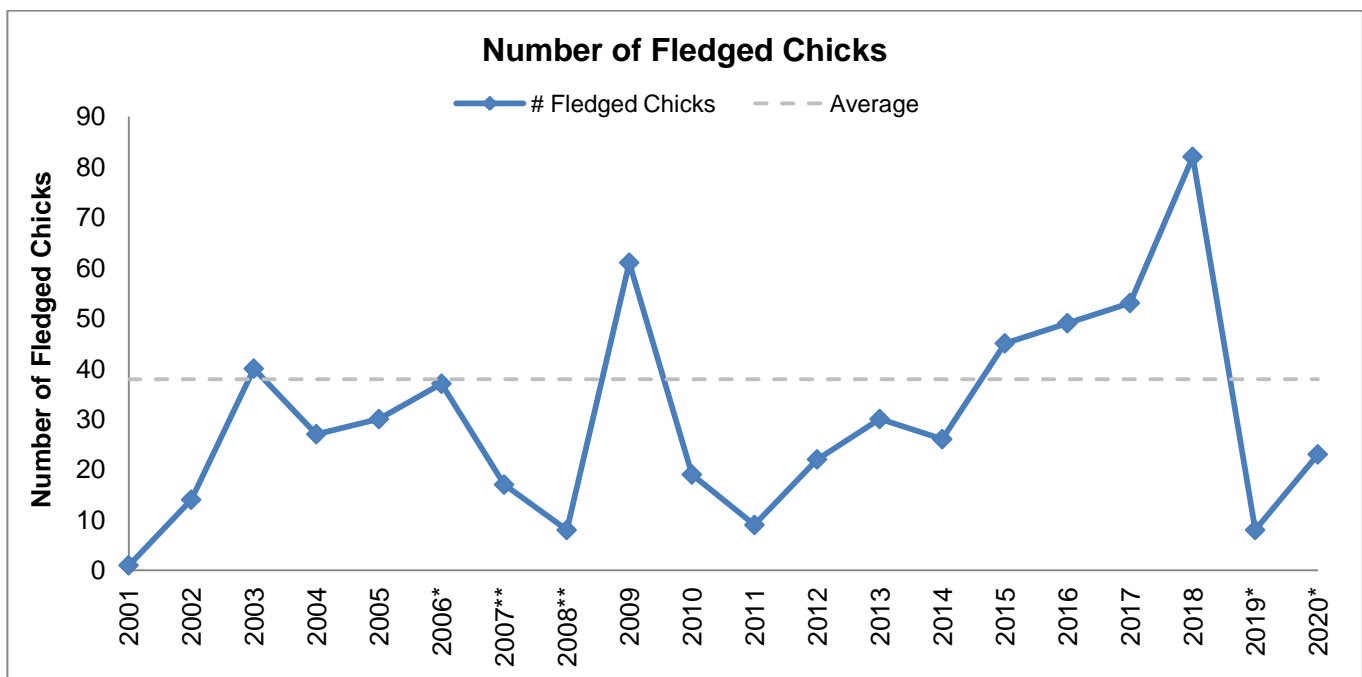


Figure 10. Number of chicks fledged by year. Average line represents the average from 2003-2005, 2009-2018.

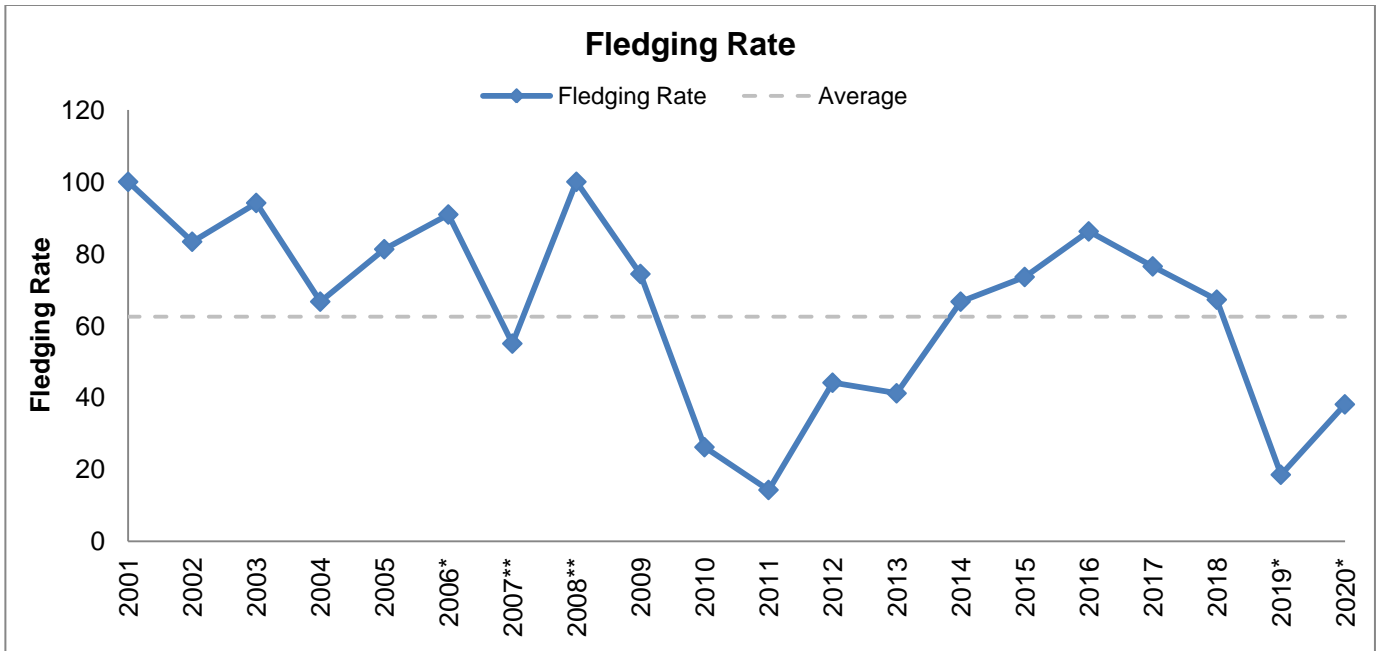


Figure 11. Fledging rate by year (# nests that fledge one chick/# total nests *100). Average line represents the average from 2003-2005, 2009-2018.

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.

**Note that in 2006, 2019 and 2020, predator exclosure cages were used which may have affected chick fate. These years are excluded from the calculation of all breeding averages.*

***Note that in 2007 and 2008, some nests were collected, replaced with decoy eggs, incubated in the nursery, and replaced prior to hatching which may have affected chick fate. This was a change from the standard protocol at this site. Numbers reported for number of fledged chicks are those that hatched and fledged in the wild without intervention, and exclude those that hatched and fledged in the nursery.*



Photo A. 2020 documentation of crow predating plover chicks. Photo taken by Mark Romanov.

Nest Phenology

In 2020, the first nest was initiated on March 9th and the last chick fledged on September 1st (Table 3). The peak nesting period fell between April 29th and May 4th. The total breeding season length was 176 days (defined by the number of days between first nest initiation and last observed chick or nest). The length of this year's breeding season was 22 days longer than the average at COPR. The dates of all nesting events in 2020 fell within the range of previous years' dates (Figure 12). Thus, at COPR, there is no indication that nesting phenology is changing.

Table 3. Dates of nesting events in 2020

2020 Nesting Event	Date
First Nest Initiation	3/9/2020
Last Nest Initiation	7/7/2020
First Hatch	5/6/2020
Last Hatch	8/4/2020
First Fledge	6/16/20
Last Fledge	9/1/2020

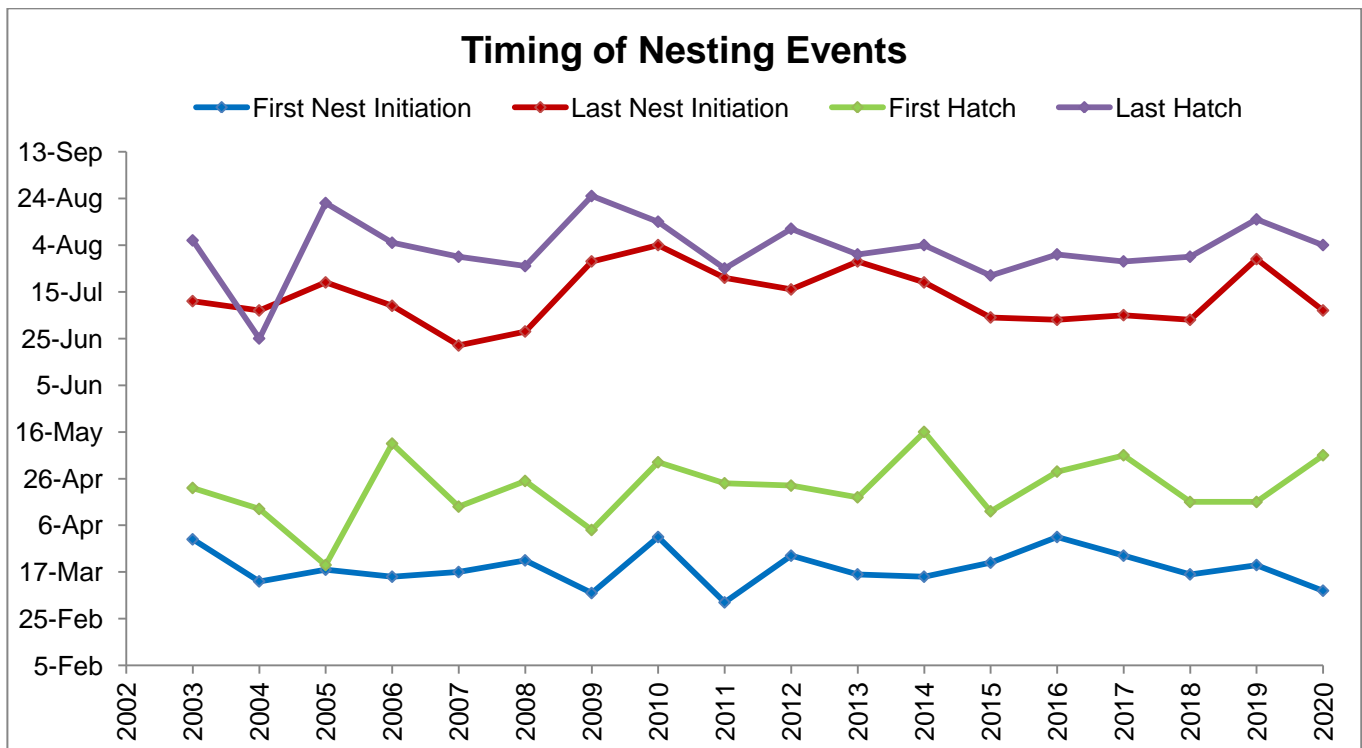


Figure 12. Timing of nest events by year

Location of Nests

GPS coordinates were recorded for each individual WSP nest. We used the mapping data to look for spatial patterns in hatching and fledging success. This year, 91% of all nests (69 nests) were initiated on the beach (Figure 13) and 9% on the delta (mudflat) of Devereux Slough. While the delta location had a low number of nests, this location had the highest success in terms of hatching and fledging rate (Table 4). The majority of the nests were concentrated on the western portion of the beach and the slough mouth. 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. The map of nest location and fate is shown below (Figure 14 & 15).

Table 4. 2020 hatching rate and fledging rate by location.

Location at COPR	Hatching Rate	Fledging Rate
	(# nests that hatched / # nests *100)	(# nests that fledged / #nests that hatched *100)
East Side	69%	22%
Slough Mouth	55%	33%
West Side	44%	33%
Delta	86%	83%

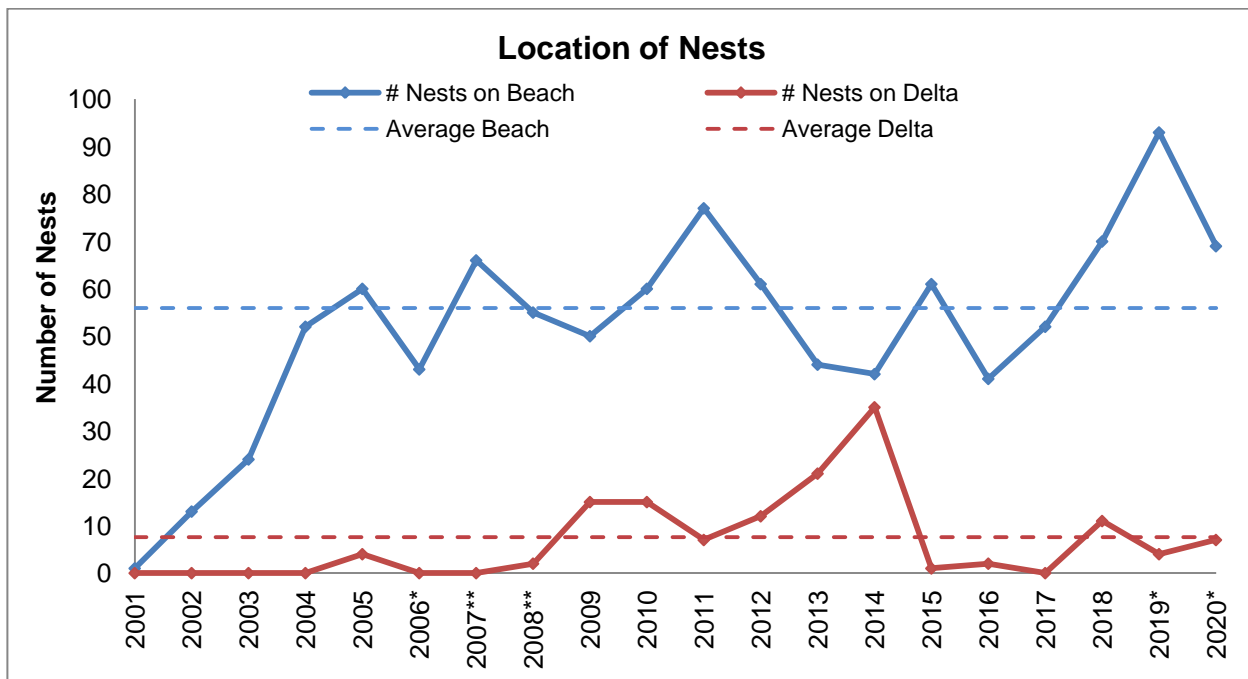


Figure 13. Number of nests on the beach and delta between 2001-2020. Average lines represent averages from 2003-2018.

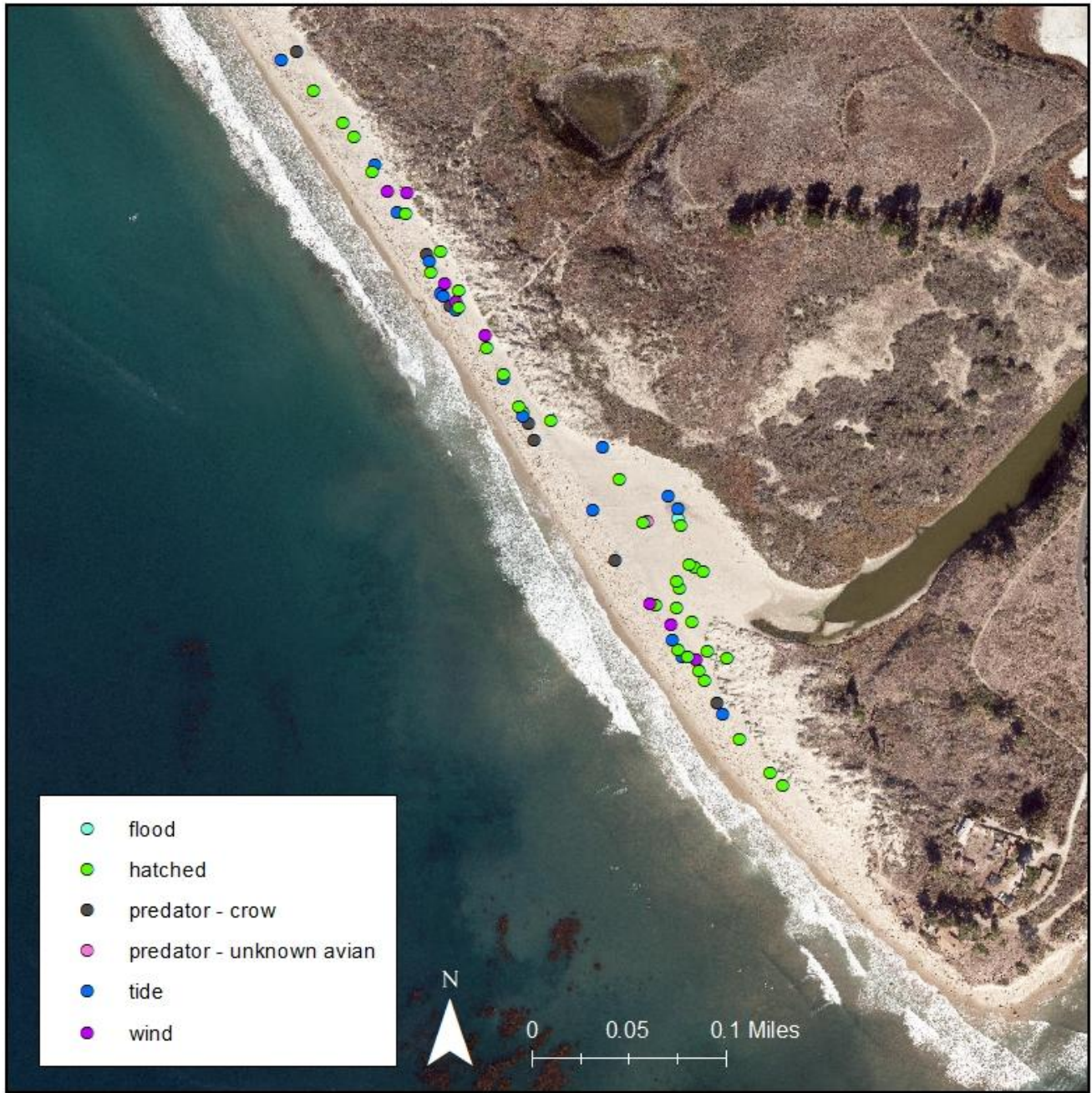


Figure 14. Map of nest fates on beach in 2020.



Figure 15. Map of nest fate on delta in 2020. Note that we were unable to collect GPS locations for all 7 nests on the delta in 2020. Some of the nest locations were unknown because the presence of a nest was confirmed only by the appearance of young chicks.

Rehabilitation of Abandoned Eggs and Chicks

Due to the closure of Santa Barbara Zoo's captive rearing facilities in 2020, Coal Oil Point Reserve reared rescued plover eggs and chicks on site. A total of 34 eggs were collected from Coal Oil Point Reserve.

56% of the eggs were collected after the nest was buried by wind. Other reasons for rescue included eggs that were left behind in the nest after the other eggs in the nest hatched (26%) and tide washout (18%). It is notable that during a high tide combined with a large swell in early May, the ocean went very far back into the slough mouth. Some of the washed out nests were over 40 meters behind the symbolic fence. All eggs affected by tide were rinsed with freshwater prior to incubation. A summary of the 2020 captive rearing program can be found in Table 5.

In addition to the eggs rescued from COPR, 2 eggs and 4 chicks from Oceano Dunes and one chick from Point Mugu were rescued and transferred to COPR. The collected eggs were placed in the incubator at 99.5 F, with a water dish to achieve adequate humidity. Once hatched, COPR staff fed the chicks a diet of mini mealworms and beach hoppers. Special care was taken to keep the chicks from imprinting on humans. When the chicks reached 10 - 14 days old, they were moved from the terrarium to a flight pen.

This year, 6 captive chicks died or were euthanized due to illness. There were 12 eggs that had dead embryos, not including those affected by tide as seawater intrusion may affect egg survival. The staff from the Santa Barbara Zoo performed tests and provided advice to improve husbandry issues. Table 6 describes issues that were experienced this year and how to potentially prevent these problems in the future.

12 chicks were successfully released from the captive rearing program. Prior to the chicks' release, plover biologist Doug George, from Point Blue, banded chicks with a unique band combination (Table 7). Some of the released chicks were not banded due to logistical delays. Each individual satisfied the USFWS requirements of age, health, and minimum size for release prior to the release date.

All captive reared plover chicks were released at Coal Oil Point Reserve outside of any current nest or brood territories (~300 m west of the start of plover fence). We staged the fledged plover chicks in a release pen on the beach two hours before the scheduled release time to allow them time to acclimate to their new environment before full release. The pen was constructed out of chicken wire with 1" x 1.5" mesh size. The pen was 5' x 5' x 2' and secured to the ground with rebar posts in each corner. We supplemented the pen with kelp wrack and beach hoppers so that the plovers could feed. We covered the top of the pen with blankets to prevent plovers from attempting to fly up into the lid of the pen.

We observed the chicks in the pen while they acclimated to ensure normal behaviors and to ensure that the chicks were not disturbed by predators or humans. All chicks exhibited normal behaviors within minutes of being released into 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 toward the chicks. At release time, we opened up one side of the pen facing toward the fenced plover habitat. All banded chicks released at COPR this year have been observed at Coal Oil Point Reserve since the release.

Table 5. Summary of all captive rearing at COPR in 2020

WSP Captive Rearing at COPR - 2020 Summary Table	
Total # collected as eggs	36
Total # collected as chicks	5
Total # eggs hatched in captivity	13
Total # eggs infertile	9
Total # eggs w/ dead embryo	14
Total # eggs w/ dead embryo minus tide effects	12
Hatching rate of captive eggs	36%
<i>[for comparison] Avg. hatching rate in wild at COPR</i>	42%
Total # chicks raised in captivity	18
Total # chicks released	12
Survival rate of captive chicks	67%
<i>[for comparison] Avg. chick survival rate in wild at COPR</i>	52%

Table 6. Solutions to issues in rearing captive eggs and chicks

Issue	Solution
Dead embryos	Place any potentially inviable eggs in a separate incubator to avoid contamination of viable eggs. Avoid using the egg floating technique in case of contamination from water. Instead, use the candling method to determine egg development.
Weakness, deformity (possibly congenital), or death at hatch	Move weak or deformed chicks to a separate incubator to avoid contamination of viable eggs.
Dehydration	Closely monitor temperature in terrarium with thermometer. As chicks reach 10 days old, heat source may be removed if inside, or the chicks may be moved to an outside aviary with two heat sources.
Malnutrition	Dust all mealworms with calcium and vitamins. Supplement diet with beach hoppers when possible.
Eye infection	For young chicks, use paper towel as a liner to avoid sand getting in their eyes. For older chicks, install a fine mesh screen to the interior of the aviary to prevent chicks from scratching their eyes on the larger mesh size of the aviary. Clean plover pens and tubs daily.
Intestinal Infection - cestodes	Buy mealworms sourced from a trusted supplier (Rainbow Mealworms).
Hawk predation on outside aviary	Install a fine mesh screen to interior of the aviary to prevent predation/injury from hawks inserting their talons through the larger mesh size of the aviary.
Injury from entanglement	Avoid using a feather duster as surrogate. Instead, use fleece cut into strips.

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Table 7. Descriptions and band combinations for all plovers raised and released at COPR in 2020

Band Combo	Origin	Nest #	Life Stage	Date of Collection	Reason for Collection	Hatch Date	Release Date	Release Site	Sightings Post Release
not banded	COPR	1096	egg	5/15/2020	wind	5/16/2020	6/29/2020	COPR	.
not banded	COPR	1097	egg	5/19/2020	wind	5/22/2020	6/29/2020	COPR	.
not banded	COPR	1099	egg	5/6/2020	tide	5/17/2020	6/29/2020	COPR	.
not banded	COPR	1104	egg	5/6/2020	tide	5/22/2020	6/29/2020	COPR	.
vg:uu	OCEANO	.	chick	6/19/2020	injury on right leg/foot	5/13/2020	6/29/2020	COPR	Yes
not banded	POINT MUGU	.	chick	5/20/2020	orphaned	5/20/2020	6/29/2020	COPR	.
not banded	COPR	1139	egg	7/17/2020	failed to hatch	7/20/2020	8/17/2020	COPR	.
vg:pa	OCEANO	.	chick	7/17/2020	orphaned	7/14/2020	8/17/2020	COPR	Yes
vg:pa	OCEANO	.	chick	7/17/2020	orphaned	7/14/2020	8/17/2020	COPR	Yes
vy:vy	OCEANO	.	egg	7/6/2020	abandoned	7/28/2020	9/2/2020	COPR	Yes
vy:gg	OCEANO	.	egg	7/6/2020	abandoned	7/28/2020	9/2/2020	COPR	Yes
not banded	OCEANO	.	chick	8/6/2020	abandoned	8/5/2020	9/2/2020	COPR	.

Enforcement

There is no regular police presence at Sands Beach. In 2020, officers from UCSB Police Department communicated to the COPR staff that they would not enforce the leash law at COPR. Instead, they decided to focus on communication and hope that their presence would be sufficient to have people comply with the leash law. 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. However, this new policy has not been implemented as UCSB Administration requested that COPR explore alternative options.

Docent Program and Beach Use

With higher than average levels of beach use at Sands Beach over the last four years, the docent program continues to be crucial to the success of Western Snowy Plover recovery at Coal Oil Point. The docents teach people about the plovers, request compliance to the leash law, 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.

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.

In 2020, docent coverage averaged 47 hours per week (Figure 16), with the exception of a 6 week closure of the docent program from March 20 - April 30 due to the Covid-19 pandemic. During the spring and summer, after stay-at-home orders were announced, we observed approximately twice the average number of beach visitors for these time periods (Figure 17, 18). The docents have reported to COPR staff that it is difficult to handle large crowds of people on the beach and their requests for compliance becomes less effective.

The area where sunbathing is permitted 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. In spring and summer of 2020, the percent of beach user counts that exceeded 50 people was three times our average (Figure 19).

The percentage of dog owners arriving to Sands Beach with their dog off leash was lower this year - 29% compared with an average of 42% (Figure 19). Despite a higher percentage of compliance, with more dogs visiting the reserve overall, the total number of unleashed dogs at the reserve was higher than average. Based on the hourly rates collected by the docents, we estimate that 1,283 off leash dogs visited Sands Beach this year (Figure 20). The presence of docents on the beach has a significant impact on the compliance rates of dog owners (Figure 21).

Based on docent data, we estimate that there were 1,075 trespassing events in 2020 which is the most we have experienced since the start of the docent program (Figure 22). The high trespassing levels were driven by trespassing during the winter when the fences were removed (Figure 23).

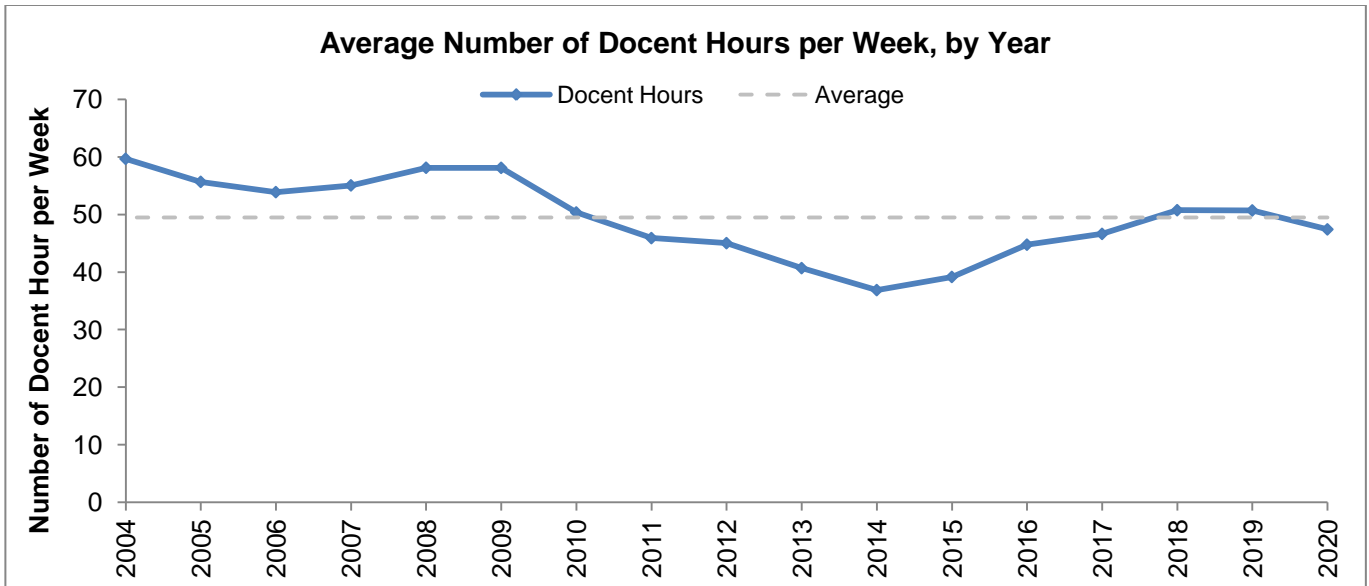


Figure 16. Average weekly coverage by Snowy Plover docents (total number of docent hours/52 weeks). Note that in 2020, the docent program was inactive for 6 weeks due to Covid-19 precautions so the total number of hours for this year was divided by 46 weeks.

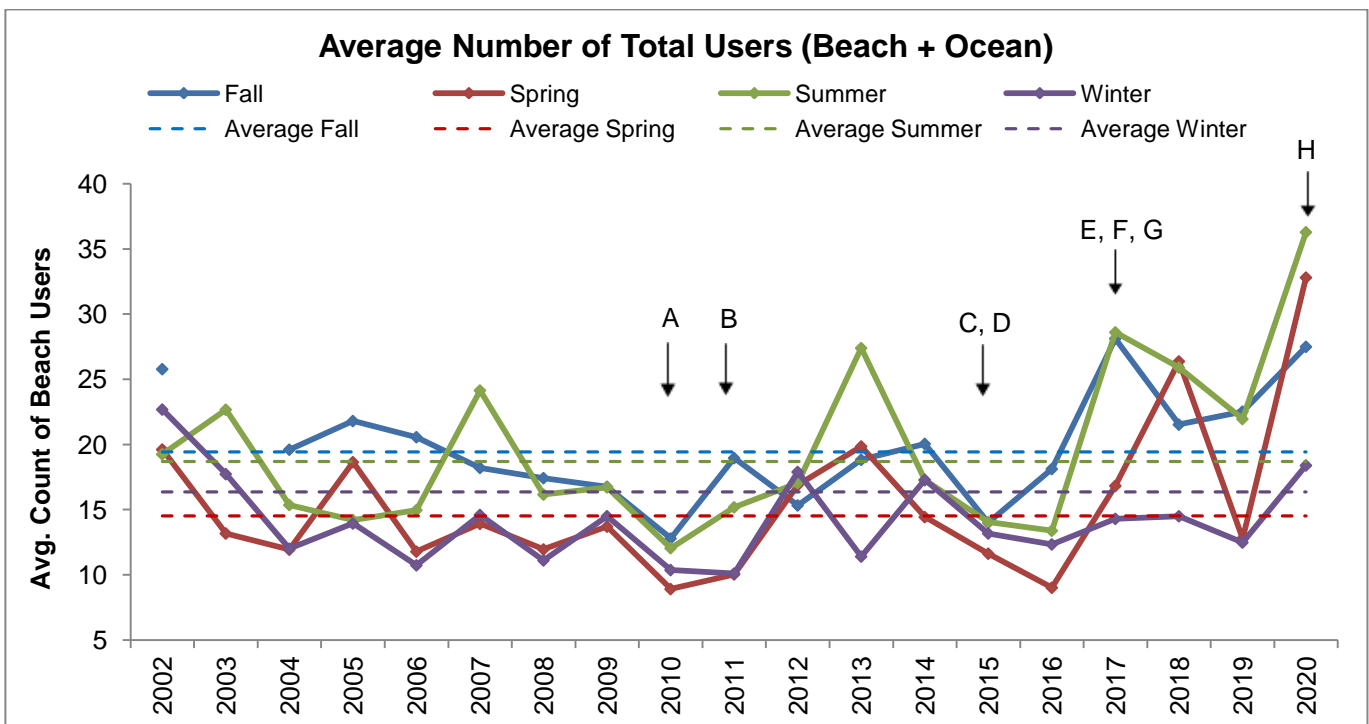


Figure 17. The total number of beach users was counted at the beach on snapshot surveys. These data are a total count of people on the reserve beach and in the ocean. This graph shows the frequency of “busy beach” days by quarter each year, since 2002. The arrows correspond to various events that may 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 2015 Oil spill closed the beach for 4 weeks, (D) Fall 2015: Opening of Sierra Madre Dormitory, 506 students, (E) Fall 2017: Opening of San Joaquin Dormitory, 1,300 students, (F) Fall 2017: Opening of Sierra Madre Apartments, 36 units, (G) 2017 Opening of Santa Catalina renovations, 1,500 students, and (H) Spring and Summer 2020: COVID-19 stay-at-home order.

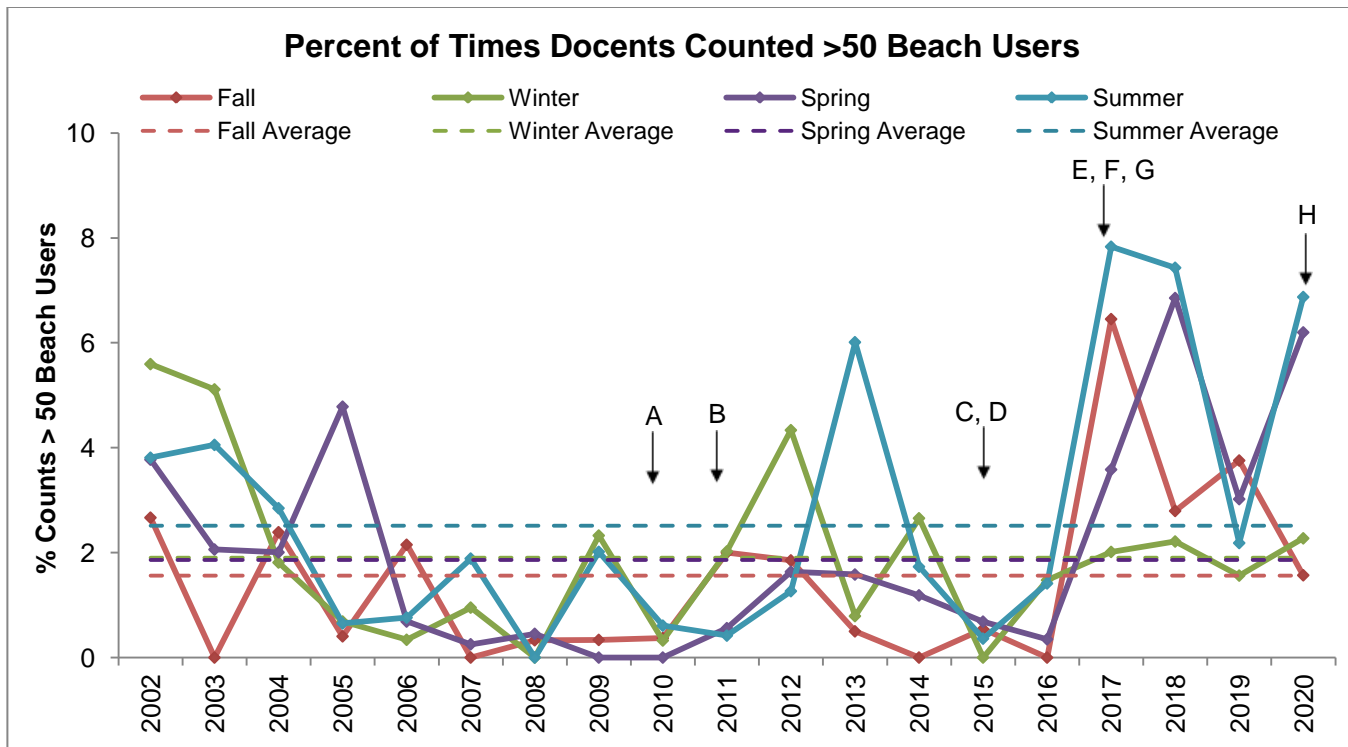


Figure 18. The number of beach users was counted at the beach on snapshot surveys. These data do not include people in the ocean. This graph shows the frequency of “busy beach” days by quarter, since 2002. The arrows correspond to various events that may have influenced changes in beach use: (A) 2010: 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 2015 Oil spill closed the beach for 4 weeks, (D) Fall 2015: Opening of Sierra Madre Dormitory, 506 students, (E) Fall 2017: Opening of San Joaquin Dormitory, 1,300 students, (F) Fall 2017: Opening of Sierra Madre Apartments, 36 units, (G) 2017 Opening of Santa Catalina renovations, 1,500 students, and (H) Spring and Summer 2020: COVID-19 stay-at-home order.

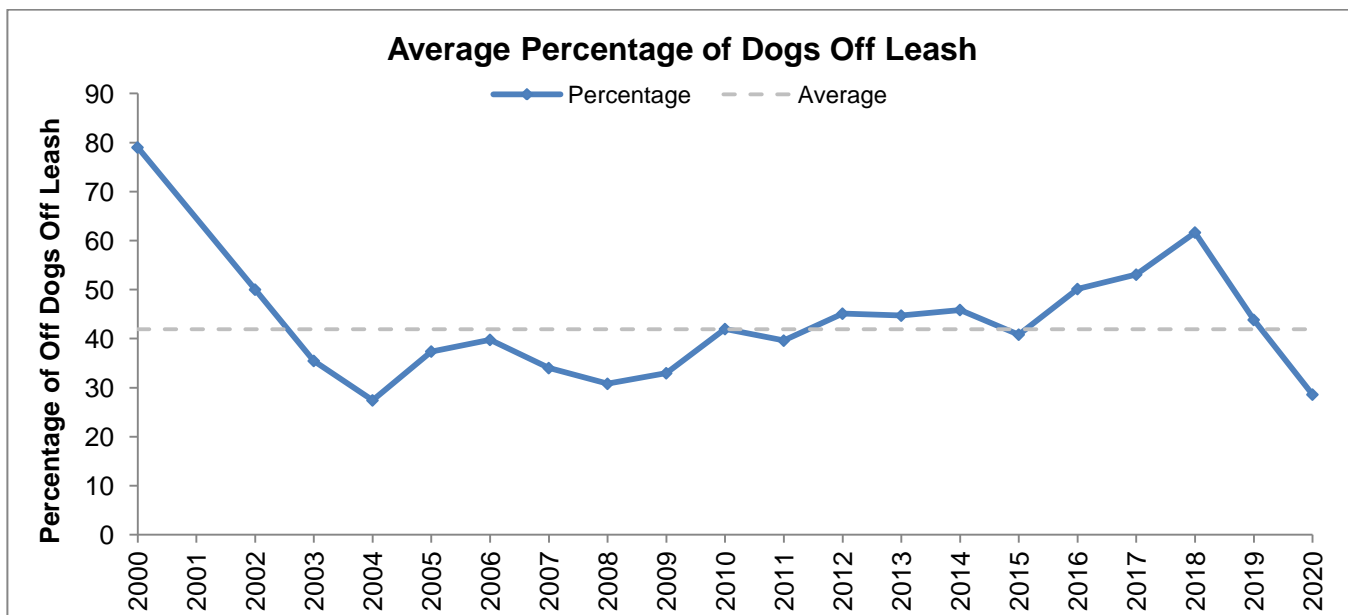


Figure 19. Average percentage of dogs arriving to Sands Beach without a leash.

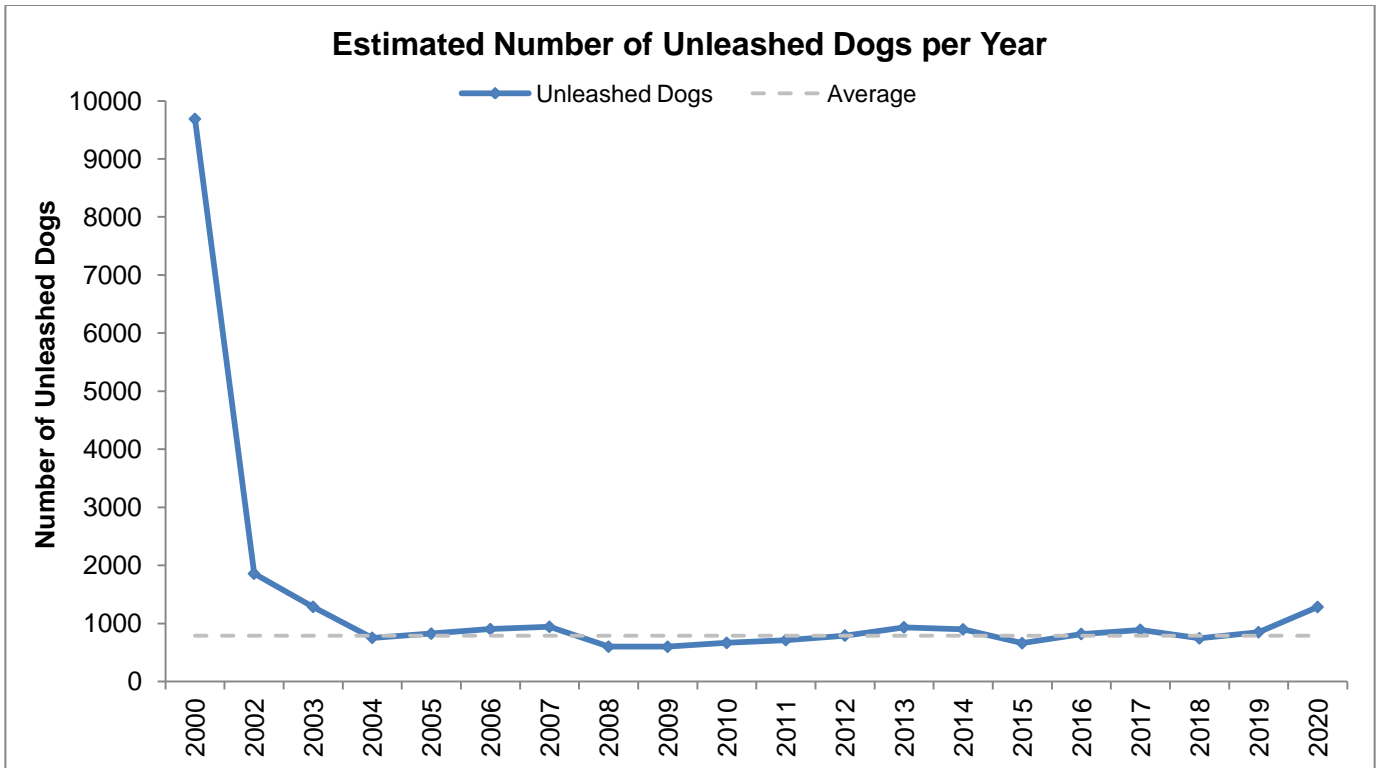


Figure 20. Estimated total number of unleashed dogs at Sands Beach each year. Estimates based on the hourly rate of unleashed dogs observed by docents ((# unleashed dogs/hr)*(12 hrs/day)*(365 days/yr)).

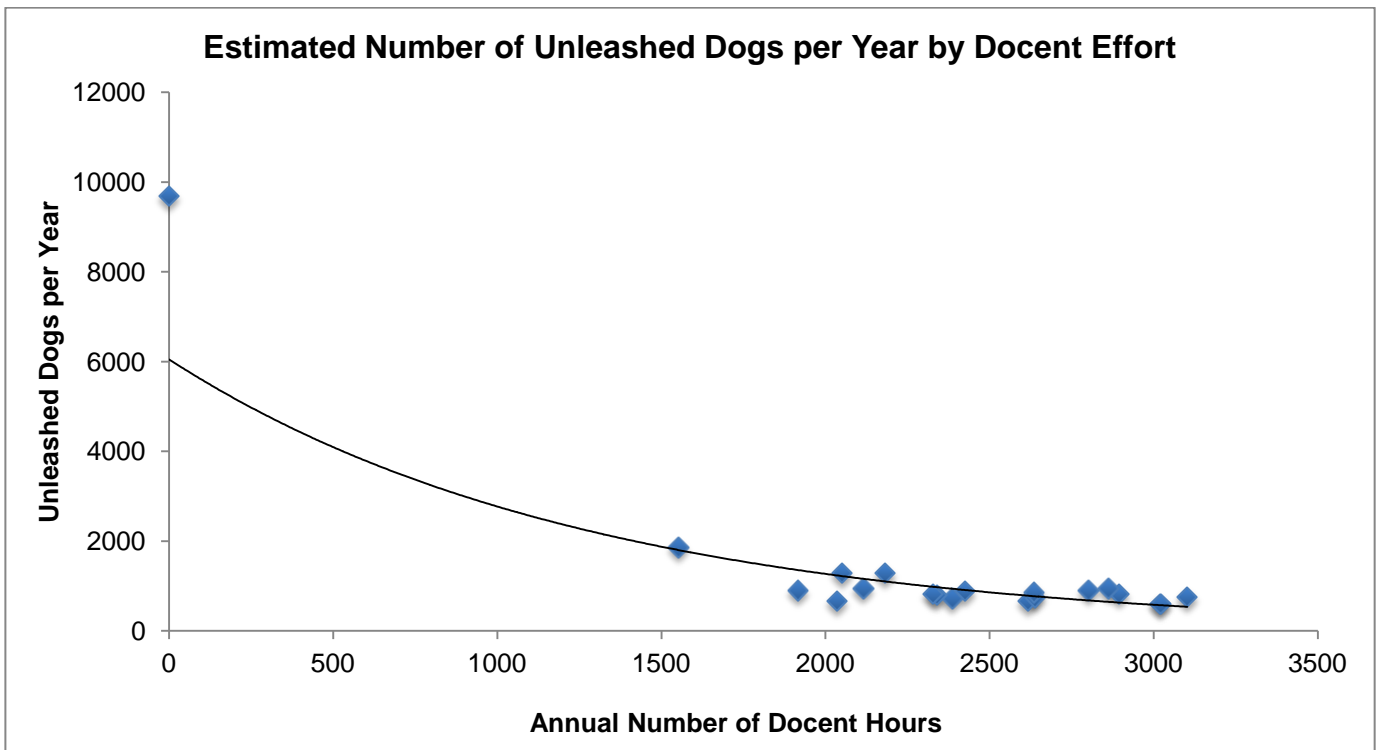


Figure 21. Estimated total number of unleashed dogs at Sands Beach each year by annual number of docent hours worked.

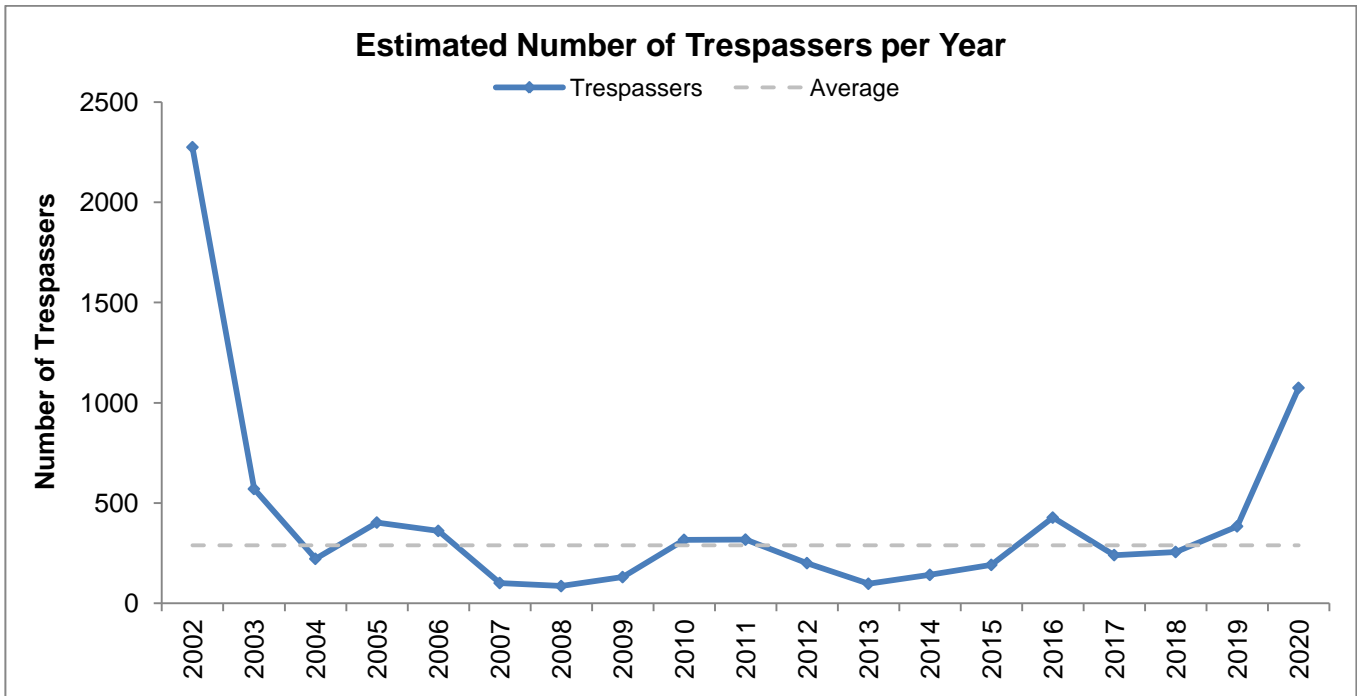


Figure 22. Estimated total number of visitors trespassing into protected habitat each year. Estimates based on the hourly rate of trespassers observed by docents ((# trespassers/hr)*(12 hrs/day)*(365 days/yr)).

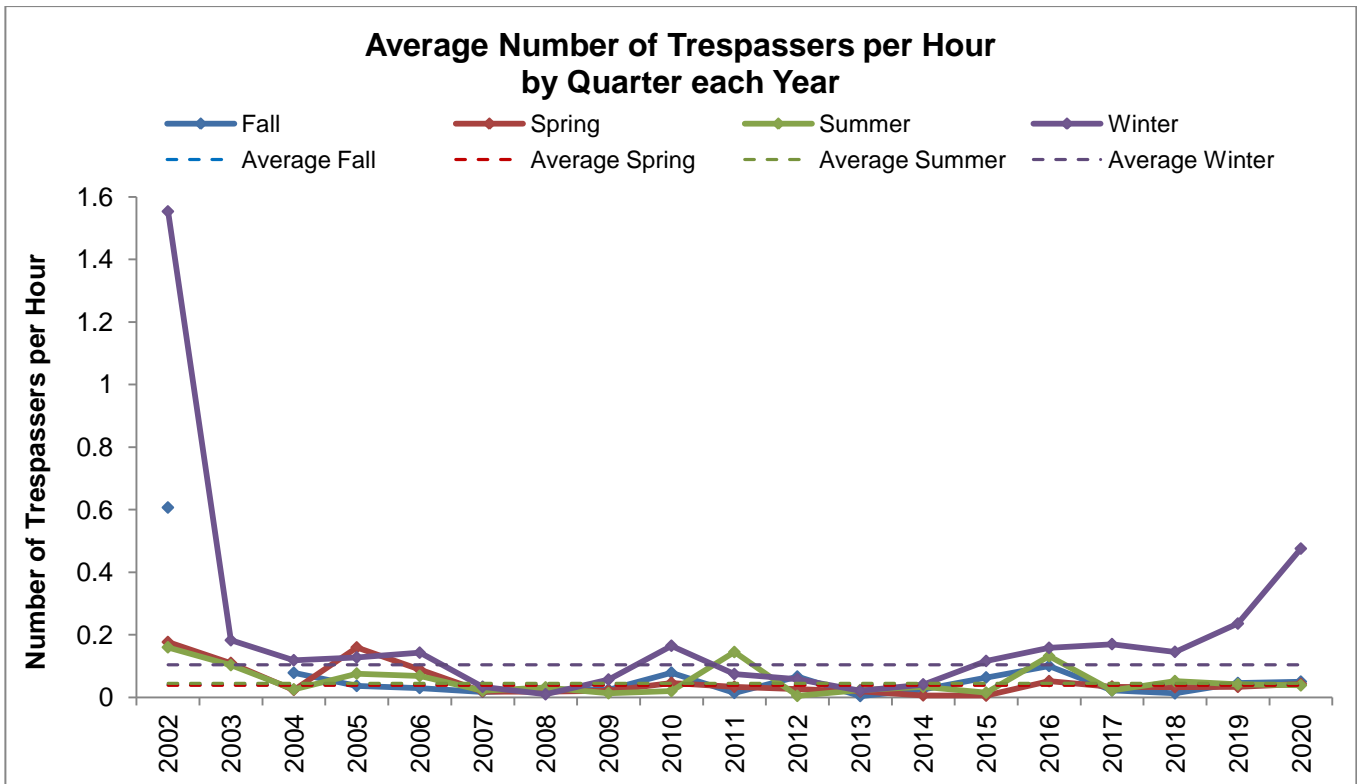


Figure 23. Average number of trespassers each quarter.

CONCLUSION

The breeding population of WSP at COPR has recovered since the implementation of a management plan in 2001. The wintering population at the reserve continues to be below average for this site, but the number of breeding adults has reached record highs over the last 3 years. The docent program continues to be an effective way to reduce human disturbance on the plovers. However, pressure from increasing human population using the beach, a new 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.

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

RECOMMENDATIONS

- The predator control program needs to be funded in perpetuity and increase trap hours each season.
- Predator control should be increased during the breeding season and potentially be initiated within the month prior to the start breeding season. Staff and docents should watch for predators, both from the beach and potentially from blinds.
- Only approximately 60% of beach goers leash their dogs. Unleashed dogs disturb breeding and wintering WSP as well as other species of protected migratory birds that use Sands Beach to feed and rest.
- To reduce the disturbances caused by dogs, there needs to be active enforcement of the leash law or dogs be prohibited from the beach as stated in the LRDP.
- A new beach access plan is needed to address the options to protect the WSP in perpetuity given the recent threats such as increase in the number of people using the beach and a decrease in beach habitat from erosion.

ACKNOWLEDGEMENTS

Jessica Nielsen (Conservation Specialist) and Cristina Sandoval (Reserve Director) conducted plover monitoring. Jessica managed the docent program. We are very thankful to Rick Fellows who 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, 57 volunteers and interns over the course of 2020, maintained a presence at the beach every day of the year with the exception of a 6 week closure of the docent program due to Covid-19. Alexa Kerr interned this year to develop management strategies in response to projected sea level rise at COPR. She will continue to work on this in 2021 for her senior thesis. Eric Covington and Anthony Jennings (USDA) implemented predator management during the breeding season.

California Least Terns

Several adult and juvenile California Least Terns were observed flying over and stopping through COPR with but they did not nest. We did not observe any courtship or mating behavior this year.

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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 8. Sightings of banded WSP at COPR by COPR staff and docents

Date	Bands Left	Bands Right	Plover Activity	Time	Remarks	Band Origin (if known)
1/6/2020	a	rw	.	9:00	missing foot	VAFB (2014)
1/24/2020	a	rw	.	9:40	missing foot	VAFB (2014)
1/24/2020	nr	ny	.	9:40		VAFB (2016)
1/24/2020	an	rg	.	9:40		VAFB (2016)
1/24/2020	wa	wv	.	9:40		unknown
1/31/2020	pa	or	.	10:40		COPR (2019), raised at SBZ, released at COPR
2/14/2020	bb	lb	.	11:00		Oceano Dunes (2019), raised at SBZ, released at COPR 10/31/2019
2/20/2020	a	rw	.	11:30	missing foot	VAFB (2014)
2/20/2020	ba	wb	.	11:30		unknown
2/20/2020	bb	lb	.	11:30		Oceano Dunes (2019), raised at SBZ, released at COPR 10/31/2019
3/5/2020	ny	wg	.	10:15		VAFB
3/5/2020	ga	pb	.	10:15		Oceano
3/5/2020	a	rw	.	10:15	missing foot	VAFB (2014)
3/5/2020	pa	or	.	10:15		COPR (2019), raised at SBZ, released at COPR
4/1/2020	pa	or	.	12:00		COPR (2019), raised at SBZ, released at COPR
4/3/2020	pa	ob	.	9:00		COPR (2019), raised at SBZ, released at COPR
4/3/2020	pa	or	.	9:00		COPR (2019), raised at SBZ, released at COPR
4/13/2020	an	rw	.	7:55	missing foot, near nest	VAFB (2014)
4/15/2020	an	rw	.	8:05	missing foot, near nest	VAFB (2014)
4/15/2020	pa	ob	.	8:05		COPR (2019), raised at SBZ, released at COPR
4/15/2020	vv	yv	.	8:05		Ormond (2019), raised at SBZ, released at COPR
4/20/2020	an	rw	incubating	9:00	missing foot, incubating nest	VAFB (2014)
4/22/2020	an	rw	incubating	8:00	missing foot, incubating nest	VAFB (2014)
4/22/2020	ga	pb	incubating	8:00	incubating nest	Oceano (2016 or 2017)
4/22/2020	vv	yv	.	8:00		Ormond (2019), raised at SBZ, released at COPR
4/22/2020	pa	or	.	8:00		COPR (2019), raised at SBZ, released at COPR
4/23/2020	w	Fs	.	.	red flag above joint with code (possibly R3 or R4).	Baja, Ca MEXICO
4/24/2020	bb	lb	.	7:00		Oceano (2019)
4/24/2020	kb	wb	.	7:00	anodized band faded to silver	Naval Base Coronado (2017)
4/24/2020	pa	ob	.	7:00		COPR (2019), raised at SBZ, released at COPR
4/24/2020	vv	yv	.	7:00		Ormond (2019), raised at SBZ, released at COPR
4/24/2020	pa	rw	.	7:00		COPR (2019), raised at SBZ, released at COPR
4/24/2020	bb	lb	.	7:00		Oceano (2019)
4/24/2020	ga	bb	.	7:00		Oceano (2017)
4/29/2020	an	rw	.	8:10	missing foot	VAFB (2014)
4/29/2020	kb	wb	.	8:10	anodized band faded to silver	Naval Base Coronado (2017)
4/29/2020	pa	or	.	8:10		COPR (2019), raised at SBZ, released at COPR
4/29/2020	vv	yv	.	8:10		Ormond (2019), raised at SBZ, released at COPR
5/1/2020	pa	or	.	8:30		COPR (2019), raised at SBZ, released at COPR
5/1/2020	kb	wb	.	8:30	blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
5/11/2020	vv	yv	incubating	8:30	incubating nest #1110	Ormond (2019), raised at SBZ, released at COPR
5/11/2020	an	rw	incubating	8:30	incubating nest #1095, missing foot and "n" band on left leg	VAFB (2014)
5/11/2020	an	wy	mating	8:30	paired up, observed mating	VAFB
5/19/2020	ga	pb	.	7:00		Oceano (2016 or 2017)
5/19/2020	kb	wb	.	7:00	paired up, blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
5/19/2020	an	rw	.	7:00	missing foot and "n" band on left leg	VAFB (2014)

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5/25/2020	pa	or	.	9:15		COPR (2019), raised at SBZ, released at COPR
5/27/2020	an	wy	.	7:30		VAFB
5/27/2020	an	rw	.	7:30	missing foot and "n" band on left leg	VAFB (2014)
5/27/2020	pa	or	.	7:30		COPR (2019), raised at SBZ, released at COPR
5/27/2020	ga	pb	.	7:30		Oceano (2016 or 2017)
5/28/2020	bb	lb	brooding	8:00	with chick	Oceano (2019)
6/1/2020	an	wy	.	9:00		VAFB
6/1/2020	pa	or	.	9:00		COPR (2019), raised at SBZ, released at COPR
6/1/2020	an	rw	.	9:00	missing foot and "n" band on left leg,	VAFB (2014)
6/1/2020	kb	wb	.	9:00	blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
6/5/2020	ga	pb	incubating	10:00	incubating nest #1130	Oceano (2016 or 2017)
6/10/2020	pa	or	.	8:30		COPR (2019), raised at SBZ, released at COPR
6/10/2020	an	rw	.	8:30	missing foot and "n" band on left leg,	VAFB (2014)
6/15/2020	vv	yv	.	9:00		VAFB (2014)
6/15/2020	bb	lb	.	9:00		Oceano (2019)
6/17/2020	an	rw	.	9:15	missing foot and "n" band on left leg,	VAFB (2014)
6/17/2020	bb	lb	.	9:15		Oceano (2019)
6/22/2020	kb	wb	.	10:40	blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
6/22/2020	vv	yv	.	10:40		Ormond (2019), raised at SBZ, released at COPR
6/22/2020	pa	or	.	10:40		COPR (2019), raised at SBZ, released at COPR
6/24/2020	kb	wb	incubating	9:30	inc nest #1143, blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
7/1/2020	bb	lb	.	10:30		Oceano (2019)
7/1/2020	ga	pb	brooding	10:30	with chick	Oceano (2016 or 2017)
7/1/2020	pa	or	.	10:30		COPR (2019), raised at SBZ, released at COPR
7/3/2020	bb	lb	.	6:45		Oceano (2019), raised at SBZ, released at COPR
7/3/2020	pa	or	.	6:45		COPR (2019), raised at SBZ, released at COPR
7/3/2020	pw	yw	.	6:45		unknown
7/5/2020	an	rw	.	8:15	missing foot and "n" band on left leg	VAFB (2014)
7/5/2020	vg	uu	.	8:15		Oceano (2020), raised and released at COPR
7/8/2020	bb	lb	.	7:45		Oceano (2019)
7/13/2020	ga	vg	.	8:50		unknown
7/15/2020	pa	or	.	8:45		COPR (2019), raised at SBZ, released at COPR
7/15/2020	vv	yv	.	8:45		Ormond (2019), raised at SBZ, released at COPR
7/15/2020	vg	uu	.	8:45		Oceano (2020), raised and released at COPR
7/20/2020	a	g/w/g	.	8:40		VAFB (2016)
7/20/2020	kb	wb	brooding	8:40	with chicks from nest #1143, blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
7/22/2020	pa	or	.	7:00		COPR (2019), raised at SBZ, released at COPR
7/22/2020	vv	yv	.	7:00		Ormond (2019), raised at SBZ, released at COPR
7/22/2020	bb	bv	.	7:00		Oceano (2020)
7/22/2020	a	g/w/g	.	7:00		VAFB (2016)
7/22/2020	vg	uu	.	7:00		Oceano (2020), raised and released at COPR
7/22/2020	kb	wb	.	7:00	blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
7/22/2020	bb	lb	.	7:00		Oceano (2019)
7/29/2020	vv	yv	.	7:20		Ormond (2019), raised at SBZ, released at COPR
7/29/2020	pa	or	.	7:20		COPR (2019), raised at SBZ, released at COPR
7/29/2020	o	w/b	.	7:20	left leg may have bands "or"	VAFB (2020)
8/3/2020	yy	wr	.	6:45		unknown
8/3/2020	an	rw	.	6:45	missing foot and "n" band on left leg	VAFB (2014)
8/3/2020	pa	or	.	6:45		COPR (2019), raised at SBZ, released at COPR
8/10/2020	bb	lb	.	7:45		Oceano (2019)
8/10/2020	pa	or	.	7:45		COPR (2019), raised at SBZ, released at COPR
8/12/2020	pa	or	.	9:00		COPR (2019), raised at SBZ, released at COPR

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8/14/2020	pa	or	.	7:20		COPR (2019), raised at SBZ, released at COPR
8/14/2020	av	yo	.	7:20		North Beach, Point Reyes National Seashore (2020)
8/21/2020	pa	wv	.	13:30		unknown
8/21/2020	an	wv	.	13:30		VAFB (2017)
8/21/2020	bb	lb	.	13:30		Oceano (2019)
8/28/2020	vg	pa	.	7:00		Oceano (2020), raised and released at COPR
8/28/2020	an	rw	.	7:00	missing foot and "n" band on left leg	VAFB (2014)
8/28/2020	lu	yu	.	7:00		unknown
8/28/2020	bb	lb	.	7:00		Oceano (2019)
9/9/2020	an	rw	.	9:15	missing foot and "n" band on left leg	VAFB (2014)
9/23/2020	pa	or	.	9:30		SB Zoo (2019) rescued from COPR, released at COPR
10/1/2020	vy	vy	.	10:00		COPR (2020), rescued from Oceano, released at COPR
10/1/2020	vy	gg	.	10:00		COPR (2020), rescued from Oceano, released at COPR
10/1/2020	pa	or	.	10:00		SB Zoo (2019) rescued from COPR, released at COPR
10/1/2020	kb	wb	.	10:00	blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
10/8/2020	vg	uu	.	10:15		Oceano (2020), raised and released at COPR
10/8/2020	nr	og	.	10:15	may be og	VAFB (2020)
10/8/2020	nr	gl	.	10:15		VAFB (2020)
10/8/2020	an	ol	.	10:15		VAFB (2020)
10/9/2020	vy	gg	.	14:00		COPR (2020), rescued from Oceano, released at COPR
10/11/2020	pa	or	.	12:00		SB Zoo (2019) rescued from COPR, released at COPR
10/14/2020	an	rw	.	10:00	missing foot and "n" band on left leg	VAFB (2014)
10/14/2020	vy	vy	.	10:00		COPR (2020), rescued from Oceano, released at COPR
10/14/2020	ny	wg	.	10:00		VAFB
10/16/2020	pa	or	.	14:00		SB Zoo (2019) rescued from COPR, released at COPR
10/21/2020	ny	wg	.	7:45		VAFB
10/28/2020	ny	wg	.	9:15		VAFB
10/28/2020	kb	wb	.	9:15	blue anodized band on left leg faded to silver	Naval Base Coronado (2017)
11/6/2020	pa	or	.	14:00		SB Zoo (2019) rescued from COPR, released at COPR
11/10/2020	Yy	yy	.	7:00		Zmudowski State Beach (2020)
11/10/2020	an	rg	.	7:00		VAFB, Surf Beach North (2016)
11/10/2020	gn	or	.	7:00		VAFB (2020)
11/10/2020	ny	wg	.	7:00		VAFB
11/17/2020	Yy	yy	.	13:50		Zmudowski State Beach (2020)
11/17/2020	a	g/w/g	.	13:50		VAFB (2016)
11/17/2020	an	yw	.	13:50		VAFB (2017)
11/17/2020	an	rg	.	13:50		VAFB, Surf Beach North (2016)
11/17/2020	bb	wg	.	13:50		Oceano Dunes (2020)
11/17/2020	an	wy	.	13:50		VAFB
11/17/2020	pa	or	.	13:50		SB Zoo (2019) rescued from COPR, released at COPR
11/23/2020	nr	og	.	8:20		VAFB (2015)
11/23/2020	ny	wg	.	8:20		VAFB
11/23/2020	vy	vy	.	8:20		COPR (2020), rescued from Oceano, released at COPR
11/23/2020	Yy	yy	.	8:20		Zmudowski State Beach (2020)
12/3/2020	an	wy	.	7:30		VAFB (2017)
12/3/2020	gn	or	.	7:30		VAFB (2020)
12/3/2020	gn	rn	.	7:30		unknown



APPENDIX B
USDA Predator Management Report

Eric Covington
USDA Wildlife Services
San Luis District
PO Box 957
Taft, CA 93268

Cristina Sandoval
Director, Coal Oil Point Reserve
Marine Science Institute
University of California
Santa Barbara, CA 93106

10 October 2020

Report of Predator removal for Coal Oil Point Reserve:

Predator management activities were conducted on the Coal Oil Point Reserve in an effort to protect the threatened Western Snowy Plover against predation by avian and mammalian predators during the 2020 nesting season. Predator removal activities began on 28 February 2020 and ended 30 July 2020.

Striped skunks, Virginia opossums, red fox, Western Gulls and American Crows were the target predators during the 2020 snowy plover nesting season. Trapping was the method used to remove mammalian predators. Traps used to capture mammalian predators were 10" X 12" X 32" Tomahawk cage traps and 1-1/2 padded jaw leg-hold traps. One striped skunk, one Virginia opossum and one red fox were removed by trapping during the 2020 Western Snowy Plover nesting season.

Six American Crows and two Western Gulls were removed during the 2020 nesting season. Removal of American Crows was conducted with a 22 caliber air rifle and 1-1/2 padded jaw leg-hold traps. Western Gulls were removed with a Ruger 22 rifle shooting non-lead CCI Short Range Green ammunition. Shooting was focused mainly on human safety and humane euthanasia. All Wildlife Services employees must go through rigorous training in the safe and proper use of firearms before using them in the field.

All euthanasia of wildlife conducted by Wildlife Services is done in accordance with all applicable Wildlife Services Directives, all state and local policies and the American Veterinary Medical Association's Guidelines for the Euthanasia of Animals: 2013 Edition (See references at the end of the report).

Wildlife Services spent 146 hours on predator removal activities, carcass disposal, and associated administrative duties at Coal Oil Point Reserve during the 2020 season. A total of 69 trap nights with cage traps and 48 trap nights with padded jaw leg-hold traps were spent trapping and removing mammalian predators. A trap night



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is where one trap is set for one night. Two traps set for one night would be two trap nights, etc.

Wildlife Services recommends beginning predator removal activities prior to pairing and breeding season in 2021. Each year the cost of conducting predator removal increases. Coal Oil Point Reserve should consider this and secure sufficient funding to conduct the desired amount of predator removal.

Spotlight and scent station surveys should be conducted during the non-nesting season to identify predator species that inhabit the nesting area.

Predator management should be continued each year to help ensure fledging success of the threatened Western Snowy Plover.

Feel free to contact me if you have any questions.

Eric Covington
USDA Wildlife Services
San Luis District Supervisor
(661)765-2511

References:

<https://www.avma.org/KB/Policies/Documents/euthanasia.pdf>

https://www.aphis.usda.gov/wildlife_damage/directives/pdf/2.430.pdf

https://www.aphis.usda.gov/wildlife_damage/directives/pdf/2.505.pdf

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http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=FGC§ionNum=4004

21 CFR 1308 – Schedules of Controlled Substances, Section 1308.03 – Administration Controlled Substances Code Number, Sections 1308.11 – 1308.15 Schedules I-V.

APPENDIX C
 Nesting Data from WSP habitat adjacent to the COPR

Table 9. 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
2018	1	0	0	1
2019	3	0	2	1
2020	1	1	0	0

Table 10. Nesting Data from Ellwood Beach, Goleta. First nest observed in 2019.

Year	# nests	# nests hatched	# nests predated by skunks	# nests predated by crows
2019	1	0	0	1
2020	0	.	.	.