

**Bald Eagle and Golden Eagle Research on the California
Channel Islands
January — December 2021**

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INTRODUCTION

Bald Eagles

Bald eagles (*Haliaeetus leucocephalus*) once bred on all 8 of the California Channel Islands, but the population was extirpated by the early 1960s (Kiff 1980), likely due to the introduction of the organochlorine pesticide DDT into the Southern California Bight. DDE (a DDT metabolite) levels have been found to be inversely correlated with eggshell thickness and productivity in bald eagles (Hickey and Anderson 1968, Wiemeyer et al. 1984). The Institute for Wildlife Studies (IWS) initiated reintroduction efforts on Santa Catalina Island, California (hereafter Catalina; Fig. 1) by releasing 33 young eagles from hacking towers between 1980 and 1986. Breeding attempts in 1987 and 1988 failed (Garcelon et al. 1989) and mean levels of DDE in egg remains recovered from nests were twice as high as that which has been shown to cause complete reproductive failure (Wiemeyer et al. 1984). Eggs also exhibited thinning of the shell (Kiff 1994) and areas of gross structural abnormalities of the eggshell that resulted in rapid water loss and a weakening of the eggshell (Risebrough 1998).



Figure 1. California Channel Islands located off the coast of southern California, USA.

From 1989 through 2008, the reintroduced population on Catalina was maintained by placing artificial eggs in nests and removing the weakened eggs for artificial incubation. Sixty-six chicks were fostered into active nests and 21 additional birds were released from hacking towers. Foster chicks were from mainland wild nests (4 chicks), produced by captive adults at the Avian Conservation Center (ACC) at the San Francisco Zoo (38 chicks) or hatched from eggs removed from the Catalina nests and artificially incubated (24 chicks).

IWS expanded bald eagle restoration to the northern Channel Islands beginning in 2002 with the release of 61 eagles from hacking towers on Santa Cruz Island (hereafter Santa Cruz) over a 5-year period. In 2006, two pairs on Santa Cruz successfully hatched and fledged one chick each (Sharpe 2007), the first known bald eagle chicks to hatch naturally in the wild on the California Channel Islands since 1950 (Miller 1950). As a result of increased hatching success during artificial incubation and natural breeding on Santa Cruz, we began leaving eggs in some Catalina nests in 2007 and discontinued egg removals altogether in 2009.

The number of breeding pairs on the Channel Islands is slowly increasing and we have documented territorial pairs and successful breeding on 5 of the 8 islands.

Golden Eagles

The island fox (*Urocyon littoralis*) is the smallest North American canid and one of the most geographically restricted canid species, being found on only 6 of the 8 California Channel Islands (Coonan 2001). During the 1990s, fox populations declined precipitously on 4 of the 6 islands. On Catalina, one of the southern Channel Islands, a 90-95% decline in the fox population (*U. l. catalinae*) was attributed to an outbreak of canine distemper virus (Timm et al. 2000). Fox densities on Santa Cruz (*U. l. santacruzae*) and San Miguel islands (*U. l. littoralis*) declined from an estimated mean of 7.1 foxes/km² (~1300 and 350 adults, respectively) in 1993 to 0.8 foxes/km² (~130 and 15 adults, respectively) in 1998 (Roemer et al. 2001). Although regular surveys were not conducted for the foxes (*U. l. santarosae*) on Santa Rosa Island (hereafter Santa Rosa), trapping data from 1998 and 2000, as well as anecdotal evidence, indicated that the fox densities had declined on that island as well (Suckling and Garcelon 2000).

Evidence from fox carcasses recovered on Santa Cruz indicated that golden eagles (*Aquila chrysaetos*) were the primary cause of fox mortality on the northern Channel Islands (Roemer et

al. 2001). The decline in island fox populations occurred concurrently with an increase in golden eagle sightings on the northern Channel Islands. Breeding by golden eagles on the northern Channel Islands, which represented the first breeding record of this species on the islands, was confirmed in 1999 (Roemer et al. 2001).

Because of the threat posed by golden eagles to island fox populations, The Nature Conservancy (TNC) and the National Park Service (NPS), the two land management organizations responsible for the island fox on the northern Channel Islands, desired immediate and intensive actions to ensure that fox survival in the wild was brought to a level sufficient for population recovery. Starting in 1999, a sustained effort to live-capture golden eagles and remove them from Santa Cruz and Santa Rosa resulted in a substantial reduction of the golden eagle population (Latta et al. 2005). Between 1999 and 2006 a total of 32 free-flying and 11 nestling eagles were trapped and removed from the island by the University of California Santa Cruz Predatory Bird Research Group (SCPBRG) and IWS (Latta 2005, Institute for Wildlife Studies 2006).

Despite the removal of the last known breeding golden eagles on the Channel Islands in 2006, there have been sightings of golden eagles on the islands and continued golden eagle-related island fox mortalities, although the mortalities are infrequent in the past few years. IWS continues to monitor for the presence of golden eagles and remains available to trap and remove the eagles if TNC and the NPS decide that golden eagles are having a significant impact on island fox populations.

This report summarizes the results of the 2021 bald eagle and golden eagle season.

STUDY AREA

The California Channel Islands are composed of eight islands located off the coast of southern California (Fig. 1). All the Channel Islands are subject to a Mediterranean climate regime characterized by cool, wet winters and warm, dry summers (Coonan and Schwemm 2009). The northern Channel Islands, which are composed of San Miguel Island, Santa Rosa, Santa Cruz, and Anacapa Island are located approximately 20 to 44 km off the coast of Ventura and Santa Barbara counties (Junak et al. 1995) and are a tightly clustered group with no more than 9.6 km separating adjacent islands (Moody 2000; Fig. 1). The southern Channel Islands,

which are composed of San Nicolas Island, Santa Barbara Island, Catalina, and San Clemente Island, are located 32-79 km from the mainland (Junak et al. 1995) and are more remote and scattered than the northern islands, with the closest islands (Santa Catalina and San Clemente Islands) separated by 34 km (Moody 2000; Fig. 1). We did not conduct any activities on San Miguel, San Nicolas, or Santa Barbara islands in 2020.

Santa Rosa is the second largest of the Channel Islands and is owned by the NPS (Fig. 1). The island is approximately 24 x 16 km and encompasses about 217 km² with a central mountain range reaching an elevation of approximately 475 m (Junak et al. 1995, Rick 2009). The central highland is dissected by drainages; a relatively gentle marine terrace occurs north of the highland, whereas steep, deeply incised drainages comprise much of the south portion of the island (Coonan and Schwemm 2009).

Santa Cruz is the largest of the 8 Channel Islands and is owned by the NPS (eastern 24% of the island) and TNC (western 76% of the island). The island measures about 38 km long by 12 km wide at its widest point (Fig. 1), encompassing approximately 249 km² with a maximum elevation of 753 m (Junak et al. 1995).

Anacapa Island (hereafter Anacapa), which is composed of 3 islets (East, Middle, and West Anacapa; Fig. 1), is owned by the NPS. The island encompasses approximately 2.8 km², spanning about 8 km from end to end and reaching a maximum elevation of 283 m (Junak et al. 1995).

Catalina is located 34 km south of Long Beach, California and is owned primarily by the Catalina Island Conservancy (~88%). The island is 34 km long, 0.8 to 13.0 km wide, and has an area of 194 km² and a maximum elevation of 648 m (Junak et al. 1995; Fig. 1).

San Clemente Island (hereafter San Clemente), owned by the U.S. Navy, is the southernmost of the Channel Islands, located approximately 92 km off the coast of California (Fig. 1). The island is 143 km², about 34 km long, and has a high point of 610 m (Willey 1997). It is characterized by a series of marine terraces on the west side and a steep escarpment on the east side (Kaiser et al. 2009).

METHODS

Permitting

IWS has the required Memorandum of Understanding with the California Department of Fish and Wildlife to conduct bald eagle and golden eagle research on the California Channel Islands and a banding permit from the United States Geological Survey's Bird Banding Laboratory (# 21564) allowing us to band bald eagles.

Surveying and Nest Monitoring

Bald Eagles

We began surveying for bald eagles in January or February at each of the territories known from previous monitoring efforts. Additionally, monitoring was conducted via live web cams at 2 active nests on Catalina (West End and Two Harbors) and one nest on Santa Cruz (Sauces Canyon) that enabled close, remote observations of nesting and were available for public viewing through iws.org or Explore.org. Additionally, we had placed trail cams at many other eagle nests on Santa Rosa, Santa Cruz, and Catalina during fall 2020 that allowed us to determine chronology of breeding attempts when the cameras were collected in fall 2021.

Golden Eagles

We surveyed for golden eagles in conjunction with surveys for bald eagles on Santa Cruz, Santa Rosa, and Catalina.

Marking and Sampling

We entered bald eagle nests when the chicks were approximately 5-8 weeks old to equip them with federal leg bands and orange Acraft leg bands with alphanumeric codes (Acraft Sign & Nameplate Co., Edmonton, Alberta, Canada). We made morphological measurements to

estimate the sex of nestlings (Bortolotti 1984, Garcelon et al. 1985).

Monitoring of Previously Released/Hatched Bald Eagles

During monitoring and other field work we searched for non-territorial eagles on the islands. In addition, we received sighting information from the public, either directly or through the Bird Banding Lab, which we entered in a Microsoft Access database (Microsoft Corporation, Redmond, WA).

RESULTS

Bald Eagle Surveying and Nest Monitoring

Santa Catalina Island

We located nests in February and March in 8 previously active territories on Catalina (Pinnacle Rock, Seal Rocks, West End, Two Harbors, Twin Rocks, Rattlesnake, Middle Ranch, Empire; Fig. 2) and we did not locate any new territorial pairs.

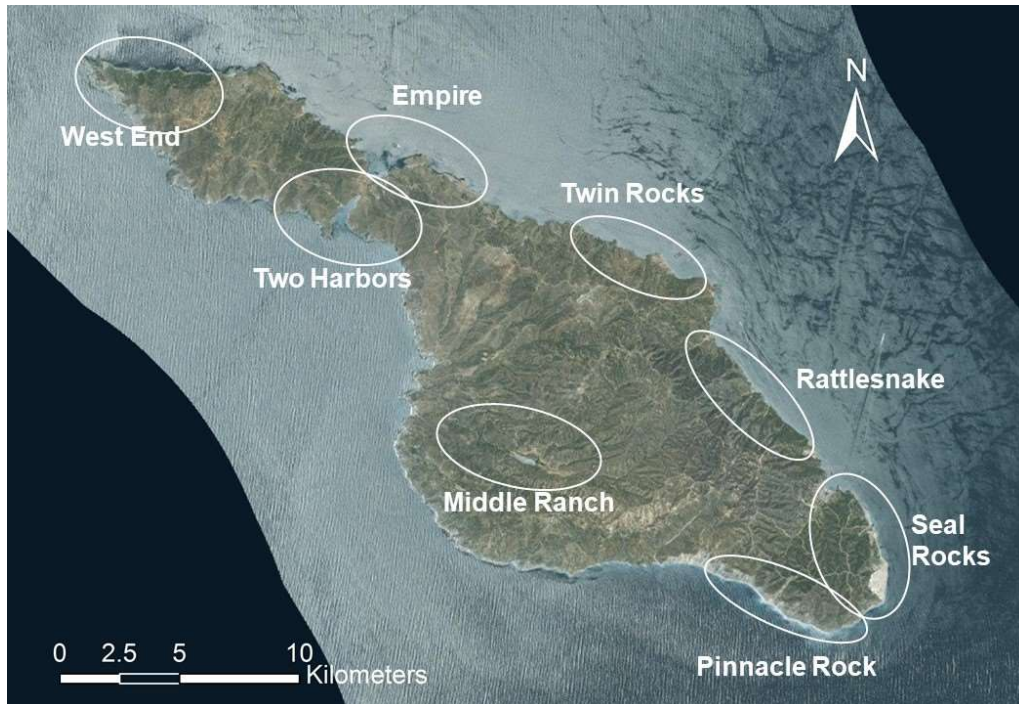


Figure 2. Bald eagle territories on Santa Catalina Island, CA in 2021.

Rattlesnake Territory. The Rattlesnake pair (Fig. 2) used a new nest in a eucalyptus tree at White’s Landing. Both the male and the female have lost their wing markers, but are likely still Male K-80, an ACC-produced bird that was fostered into the West End nest in 1998, and Female K-47, an ACC-produced bird that was fostered into the Seal Rocks nest in 2004 (both were confirmed in 2020). We did not locate the new nest until 30 March, at which time the pair was incubating at least one egg. There was one chick present on 6 April. We attempted to enter the nest to band the eaglet on 15 May, but the top of the tree was dead and unsafe for climbing. The eaglet was still in the nest on 6 June, but no birds were seen on 29 June. We believe the eaglet fledged successfully (Table 1).

Two Harbors Territory. The Two Harbors pair (Fig. 2) used the same nest as in 2020. The male, K-81, was an ACC-produced eagle that was fostered into the West End nest in 1998. The female, K-82, hatched from an egg removed from the West End nest in 1998 and was fostered into the Pinnacle Rock nest. Nesting activity was monitored via the live web camera. The first egg was laid during the night of 28 February and a second was laid during the night of 4 March. One egg broke on 18 March, but a chick hatched from the second egg on 7 April. We entered the nest on 21 May to band the eaglet (Table 1, Fig. 3) The eaglet fledged on 22 June.

Table 1. Biographical data for bald eagle chicks hatched at nests on the southern Channel Islands, CA during 2021.

Federal Band	Acraft Band	Sex	Date Fledged	Territory	Status ^c
NA	NA	.	~6/17/21	Rattlesnake	Unknown
829-00472 ^a	16/D	F	6/22/21	Two Harbors	Unknown
NA ^a	NA	.	>6/29/21	Pinnacle Rock	Unknown
829-00615 ^a	46/A	M	~6/27/21	Seal Rocks	Unknown
NA ^a	NA	.	~6/29/21	Middle Ranch	Unknown
NA ^a	NA	.	~6/29/21	Middle Ranch	Unknown
NA ^a	NA	.	~5/25/21	Twin Rocks	Unknown
NA ^a	NA	.	~5/25/21	Twin Rocks	Unknown
829-00473 ^b	00/D	M	>6/28/21	Bald Canyon	Unknown
829-00474 ^b	58/D	M	>6/28/21	Bald Canyon	Unknown

^a Catalina

^b San Clemente

^c As of 12/31/21 or date specified



Figure 3. The Two Harbors chick at banding on Santa Catalina Island, CA 2021

West End Territory. The West End pair (Fig. 2) used the same nest that has been used since 1991. The female was K-91, a 2009 Two Harbors chick, and the male was A-61, a bird that hatched at the Los Pinos nest on Santa Cruz in 2016. We monitored breeding activity via a live web cam. K-91 laid eggs on 2, 5, and 8 February. Incubation proceeded until 11 March, at which time the male left the nest and common ravens (*Corvus corax*) destroyed all the eggs. Two eggs had fully developed chicks and the third egg was taken from the nest intact. There were no further breeding attempts.

Pinnacle Rock Territory. The Pinnacle Rock pair (Fig. 2) used the same nest as in 2020. The female had no wing markers. The male's identity was not confirmed, but was likely still K-88, a bird that hatched at the Twin Rocks nest in 2008 and was the breeding male at the Middle Ranch nest in 2014 before moving to the Pinnacle Rock territory in 2017. We observed one egg on 17 March and a chick was present on 21 April. We did not attempt to band because of the difficult/dangerous nest entry. The chick was still in the nest on 14 June and could be heard vocalizing on 28 June, although it was too foggy to see the area. We assume the bird fledged.

Seal Rocks Territory. The Seal Rocks pair (Fig. 2) used a new nest this year. The female was K-32, who hatched at the Seal Rocks nest in 2013. The male is unbanded. We didn't find the new nest until 13 March and confirmed there were 2 eggs on 14 March. There was one chick present on 4 April, and we entered the nest on 16 May to band the eaglet (Table 1, Fig. 4). The eaglet was still in the nest on 20 June, but the nest was empty on 27 June. We assume the bird fledged successfully and we placed a trail camera on the nest during the fall.



Figure 4. The Seal Rocks chick at banding on Santa Catalina Island, CA 2021.

Middle Ranch Territory. The Middle Ranch pair (Fig. 2) used the same nest as in 2020. The female previously lost both her wing markers, but we believe she is A-37, a female produced by eagles at the ACC and hatched on Santa Cruz in 2005. The male was K-08, who hatched at the West End nest in 2010. The birds had at least one egg by 23 February. There was a chick present on 30 March and a second chick was present on 2 April (Table 1, Fig. 5). We did not attempt to band because of the nest's precarious location in a eucalyptus tree. Both eaglets had fledged to nearby trees on 29 June.



Figure 5. The Middle Ranch chicks near fledging age on Santa Catalina Island, CA in 2001.

Twin Rocks Territory. The Twin Rocks pair (Fig. 2) used the same nest as in 2020. The male was K-00, who hatched at the Pinnacle Rock nest in 2007, and the female was K-95, who hatched at the Pinnacle Rock nest in 2010. These birds are half-siblings because there were different females breeding at the Pinnacle Rock nest in 2007 and 2010. Most of our chronology data came from a trail cam on the nest. The first egg was laid on 3 February and a second egg was laid between 5 and 8 February. The first chick hatched on 11 March and the second hatched the night of 12 March (Table 1, Fig. 6). The chicks fledged around 25 May. We replaced the batteries and SD card in the trail cam in the fall.



Figure 6. The Twin Rocks chicks and adults on Santa Catalina Island, CA 2021.

Empire Territory. The Empire pair were found at a new nest this season. The male is unidentified, but the female is K-18, a bird that hatched at the Two Harbors nest in 2011. We located the birds working on the nest near the Empire Quarry on 28 January. An adult was incubating on 13 February and 5 March, but there were no birds in the area on 22 March. There was no evidence of a renesting attempt.

San Clemente Island

We surveyed for and monitored eagles on San Clemente in conjunction with other research on the island and located one active nest in the historic Bald Canyon territory (Fig. 7).

Bald Canyon Territory. The Bald Canyon pair used the same nest as in 2020. The birds were found incubating on 8 March and there were 2 eggs

confirmed on 20 March. There were two eaglets present on 18 April (around 1 week old) and we entered the nest on 28 May to band the eaglets (Table 1, Fig. 8). Both chicks were still in the nest (~10.5 weeks old) on 28 June, and we assume they both fledged.



Figure 7. Bald Canyon eagle territory on San Clemente Island, CA in 2021.



Figure 8. The Bald Canyon chicks at banding on San Clemente Island, CA 2021.

Santa Cruz Island

We surveyed the 9 known breeding territories on Santa Cruz and located active nests in 8 territories (Baby's Harbor, Fraser Point, Fry's Harbor, Los Pinos, Pelican Harbor, Saucés Canyon, Smuggler's, and Malva Real; Fig. 9). We surveyed most of the island but did not locate any additional territories.

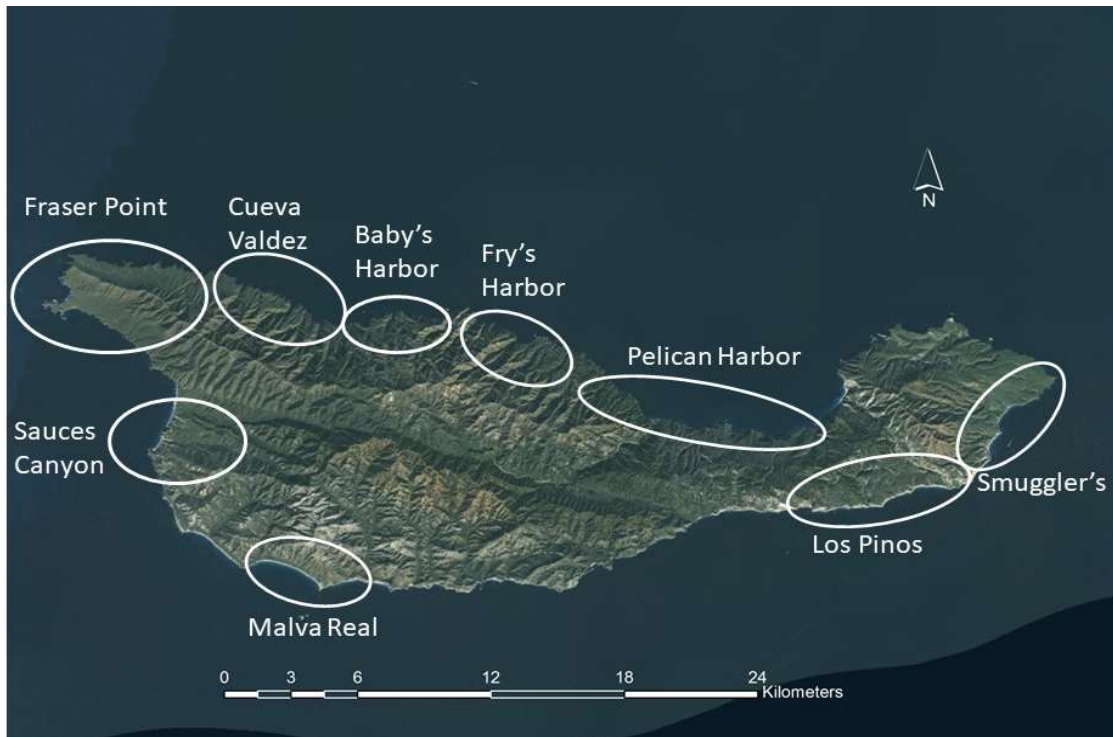


Figure 9. Bald eagle territories on Santa Cruz Island, CA in 2021.

Fraser Point Territory. The Fraser Point pair (Fig. 9) returned to their 2020 nest along the northwestern coast of the island. The male was A-64, who hatched at the Pelican Harbor nest in 2008. The female was A-49, who hatched at the Pelican Harbor nest in 2006 and was the first known chick to naturally hatch on the islands since 1950. The pair was incubating on 13 March. One chick



Figure 10. The Fraser Point eaglets at banding on Santa Cruz Island, CA in 2021.

was present by 3 April and a second chick was present on 4 April. We entered the nest on 10 May to equip the chicks with leg bands (Fig. 10, Table 2). One chick disappeared from the nest around 29 May, but it could have been on the ground under the nest. The remaining chick fledged around 26 June.

Table 2. Biographical data for bald eagle chicks hatched at nests on the northern Channel Islands, CA during 2021.

Federal Band	Acraft Band	Sex	Date Fledged	Territory	Status ^c
829-00613 ^a	19/D	M	~6/26/21	Fraser Point	One chick disappeared ~5/29
829-00614 ^a	10/D	M	~6/26/21	Fraser Point	One chick disappeared ~5/29
829-00011 ^a	53/A	F	<6/14/21	Los Pinos	Unknown
829-00012 ^a	56/D	F	<6/27/21	Fry's	Unknown
NA ^a	NA	U	<6/23/21	Pelican	Unknown
NA ^a	NA	U	<6/23/21	Pelican	Unknown
829-00010 ^a	13/D	F	6/4/21	Sauces	Unknown
829-00467 ^a	14/D	F	<8/4/21	Malva Real	Unknown
829-00468 ^a	61/D	M	<8/4/21	Malva Real	Unknown
829-00607 ^b	17/A	M	5/22/21	Lopez Canyon	Unknown
829-00608 ^b	15/D	M	Unknown	Trap Canyon	Unknown
829-00609 ^b	42/A	M	Unknown	Trap Canyon	Unknown
829-00605 ^b	17/D	F	Unknown	Mud Tank	Unknown
829-00606 ^b	20/A	M	Unknown	Mud Tank	Unknown

^a Santa Cruz Island

^b Santa Rosa Island

^c As of 12/31/21 or date specified

Los Pinos Territory. The Los Pinos pair (Fig. 9) used a new nest in 2021. The female has lost her wing markers, but could still be A-51, an ACC-produced bird that was released from the South hacking tower on Santa Cruz. The male also has lost his wing markers, but could still be A-45, a 2005 ACC-produced male released from the North hacking tower. The birds were found incubating on 18 February and there was



Figure 11. The Los Pinos eaglet at banding on Santa Cruz Island, CA in 2021.

one nestling present on 12 April. We entered the nest on 5 May to equip the chick with leg bands (Table 2, Fig. 11). The eaglet was standing on the edge of the nest on 5 June, but there were no birds present during our last visit on 14 June. We assume the eaglet fledged successfully.

Fry's Harbor Territory. The Fry's Harbor pair (Fig. 9) used the same nest as in 2020. We were unable to identify either adult, though it is likely the male was A-46, a 2006 ACC-produced male released from the North hacking tower. The birds were found incubating on 9 February and there was one nestling present on 12 March. We entered the nest on 8 May and banded a single female (Table 2, Fig. 12). The eaglet fledged by 27 June.



Figure 12. The Fry's Harbor eaglet at banding on Santa Cruz Island, CA in 2021.

Pelican Harbor Territory. The Pelican Harbor pair (Fig. 9) used a nest that we discovered in 2020. The birds were incubating on 10 March and there were two chicks present on 10 April. The male has lost his wing tags, but we believe he is still K-10, a male produced by the ACC and fostered into the Twin Rocks nest on Catalina in 2001. The female was K-26, a bird produced by the ACC and fostered into the West End nest on Catalina in 2002. We attempted to enter the nest on 7 May to band the chicks, but the nest was not safe to access. Both eaglets had fledged by 23 June.

Smuggler's Territory. The Smuggler's pair used a new nest in 2021. The male was unidentified, but is likely still A-58, an ACC bird hacked on Santa Cruz in 2006. The female had no wing tags. We observed the pair incubating on 7 April, but the nesting attempt had failed by 19 May. There were no further breeding attempts.

Baby's Harbor Territory. The Baby's Harbor pair (Fig. 9) did not appear to nest in 2021. The male was A-68, a bird hatched at the Pelican Harbor nest in 2010. The female was A-27, a bird removed from a nest near Juneau, AK in 2004 and released from the South hacking tower on

Santa Cruz. Both adults were present in the vicinity of their 2020 nest during our 5 visits between 28 February and 24 May, but we never saw them in the nest.

Sauces Canyon Territory. The Sauces Canyon pair (Fig. 9) used the same nest as in 2020. The male was A-40, a bird from the ACC that was hacked on Santa Cruz in 2005. The female, A-48, an ACC-produced bird, was hacked on Santa Cruz in 2006. This nest was monitored via a live-streaming web camera. The first egg was laid on 1 February. The camera system went offline for several days and there were 3 eggs present when it came back online on 10 February. Two eggs broke on 12 February, but a chick hatched from the remaining egg on 15 March. We entered the nest on 4 May to equip the chick with leg bands (Fig. 13, Table 2). The eaglet fledged on 4 June.



Figure 13. The Sauces Canyon chick at banding on Santa Cruz Island, CA in 2021.

Cueva Valdez Territory. We did not confirm a pair in the historical Cueva Valdez territory in 2021. We saw a probable golden eagle on 23 February, a subadult bald eagle on 26 April, and an adult bald eagle and golden eagle on 1 June.

Malva Real Territory. The Malva Real pair (Fig. 9) used the same nest as in 2020. The male was K-11, a bird produced by the ACC and fostered into the West End nest in 2001. The female was A-99, hatched at the Baby's Harbor nest in 2016. The first egg was laid on 30 March and there were two eggs present on 6 April. The first chick hatched on 5 May

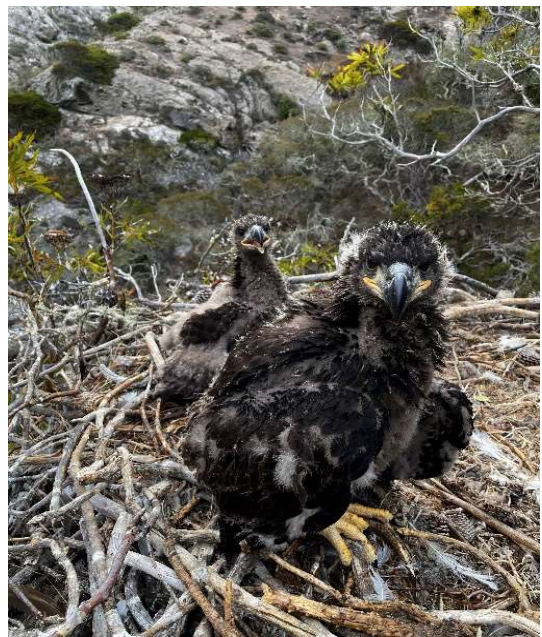


Figure 14. The Malva Real chicks at banding on Santa Cruz Island, CA in 2021.

and a second chick hatched on 7 May. We entered the nest on 16 June to band the chicks (Fig. 14, Table 2). Both eaglets had fledged by 4 August.

Santa Rosa Island

We located active nests in 3 known territories on Santa Rosa (Lopez Canyon, Mud Tank, and Trap Canyon) and an adult/subadult pair present in the East Point territory (Fig. 15).

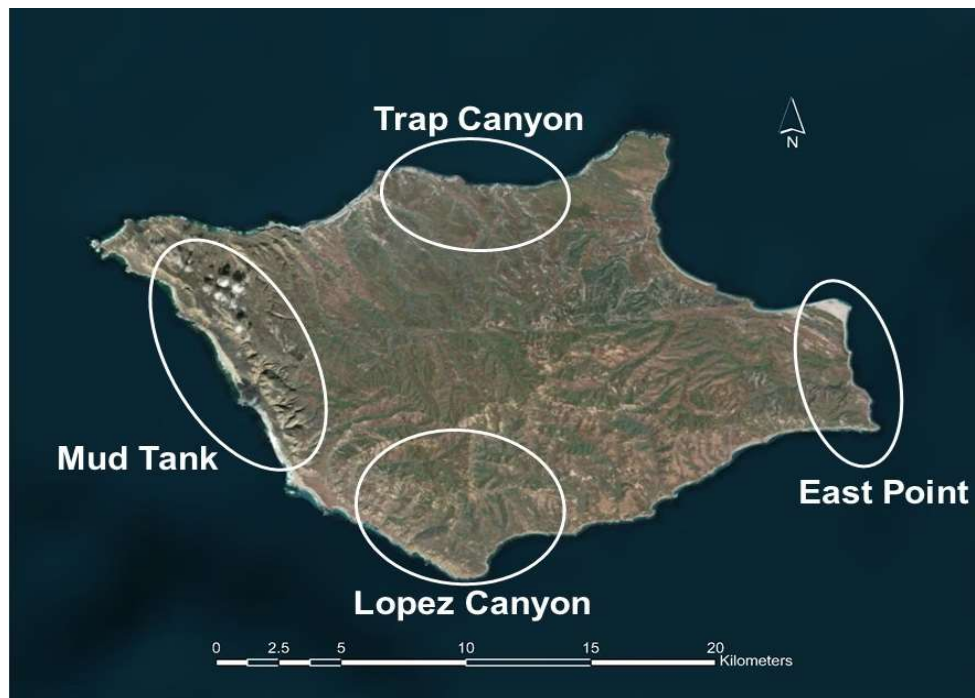


Figure 15. Bald eagle territories on Santa Rosa Island, CA in 2021.

Lopez Canyon Territory. The Lopez Canyon pair (Fig. 15) used the same nest as in 2020. The male was A-69, a 2010 Pelican Harbor chick. The female was A-43, a bird produced by the ACC and hatched on Santa Cruz in 2005. Based upon trail cam images, eggs were laid on 30 January, 2 February, and 6 February. The first chick hatched on 8 March and a second chick hatched on 9 March. The third egg remained in the nest until 30 March. One chick died of unknown causes on 10 April, but we were able to band the remaining chick on 24 April (Table 2, Fig. 16). The eaglet fledged on 22 May

Trap Canyon Territory. The Trap Canyon pair (Fig. 15) used the same nest as in 2020. The pair was present on 6 February and there was at least one nestling present on 24 March. We entered

the nest on 24 April and banded two eaglets (Fig. 17, Table 2). We did not return to the nest area to determine the outcome of nesting.



Figure 16. The Lopez Canyon chick at banding on Santa Rosa Island, CA in 2021.



Figure 17. The Trap Canyon chicks at banding on Santa Rosa Island, CA in 2021.

Mud Tank Territory. The Mud Tank pair (Fig. 15) used the same ground nest as in 2020. The male was A-60 who hatched at the Malva Real nest (also a ground nest) in 2006. The female was unidentified. The birds were incubating on 4 February. There were two chicks about 3-4 weeks old on 25 March and we banded them on 23 April (Fig. 18, Table 2). We did not return to determine the outcome of nesting.

East Point Territory. We observed a pair of eagles at a nest in the East Point territory (Fig. 15) in late February, but there was no known nesting. The male was A-02, a bird that hatched in the Fraser Point territory (Fig. 9) in 2017. The female was an unidentified subadult. We placed a trail cam on this nest in the fall in preparation for the 2022 season.



Figure 18. The Mud Tank chicks at banding on Santa Rosa Island, CA in 2021.

Anacapa Island

Oak Canyon Territory. Our trail cams captured images of the Oak Canyon pair (Fig. 19) at both of their historical nests throughout the nesting season. The female was A-11, a bird removed from a nest near Juneau, AK and released from the South Hacktower on Santa Cruz in 2002. We could not confirm the identity of the male. They had an egg on 2 June, but it disappeared by 6 June and there were no further nesting attempts.



Figure 19. The Oak Canyon bald eagle territory on Anacapa Island, CA in 2021.

Nesting Summary

We confirmed 21 pairs of bald eagles across all the Channel Islands this season, with no confirmation of pairs in one historical territory (Cueva Valdez). There also was an adult and a subadult at the East Point nest on Santa Rosa, but there has yet to be a known breeding attempt at that nest. There were 20 known nesting attempts with a minimum of 36 eggs laid, 25 chicks produced (69% hatching success), and 23 fledglings (92% fledging success). Overall nesting success was 80% and there were 1.15 fledglings per nesting attempt.

Table 3. Summary of nesting attempts by bald eagles on the California Channel Islands in 2021.

Island/Nest	Min # Eggs Laid	Min # Chicks	
		Hatched	Fledged
Santa Catalina Island			
West End	3	0	.
Pinnacle Rock	1	1	1
Seal Rocks	2	1	1
Two Harbors	2	1	1
Twin Rocks	2	2	2
Middle Ranch	2	2	2
Rattlesnake	1	1	1
Empire	1	0	.
TOTAL	14	8	8
San Clemente Island			
Bald Canyon	2	2	2
TOTAL	2	2	2
Santa Cruz Island			
Sauces	3	1	1
Fry's Harbor	1	1	1
Fraser Point	2	2	1
Los Pinos	1	1	1
Smuggler's	1	0	.
Pelican Harbor	2	2	2
Malva Real	2	2	2
TOTAL	12	9	8
Santa Rosa Island			
Trap Canyon	2	2	2
Lopez Canyon	3	2	1
Mud Tank	2	2	2
TOTAL	7	6	5
Anacapa Island			
Oak Canyon	1	0	.
TOTAL	1	0	.
All Islands Combined	36	25	23

Monitoring of Previously Released/Hatched Bald Eagles

During 2021, we identified 46 bald eagles that had hatched in previous years on the Channel Islands through our nest observations, trail cam or live cam images, and reports directly to IWS or via the Bird Banding Lab (Table 4). Eleven of these birds were on Catalina, 15 were on Santa Cruz, 1 was on Anacapa, 4 were on Santa Rosa, and 15 were on the mainland. We also had

reports of 2 eagles found dead on the mainland and one in the ocean along Santa Cruz (A-64, the breeding male from the Fraser Point territory) (Table 4).

Table 4. Status of bald eagles released from hacking towers or fledged from nests on the California Channel Islands prior to 2021 that had confirmed sightings in 2021.

FWS		Patagial		Fledge	
Leg Band	Sex ^a	Marker	Nest/Origin	Year	Status, Latest Location ^b
629-39816	M	K-81	West End	1998	Alive, Two Harbors pair, Catalina Is. 2021
629-39817	F	K-82	Pinnacle Rock	1998	Alive, Two Harbors pair, Catalina Is. 2021
629-29499	F	K-02	West End	2000	Alive, Oak Grove, CA 5/21/21
629-02782	M	K-11	Zoo	2001	Alive, Malva Real pair, Santa Cruz Is. 2021
629-02793	F	K-26	West End	2002	Alive, Pelican Harbor pair, Santa Cruz Is. 2021
629-14048	F	A-11	Alaska	2002	Alive, Oak Canyon pair, Anacapa Is. 2021
629-47375	F	A-27	Alaska	2004	Alive, Baby's Harbor pair, Santa Cruz Is. 2021
629-47391	M	A-40	Zoo	2005	Alive, Sauces pair, Santa Cruz Is. 2021
629-47399	F	A-43	Zoo	2005	Alive, Lopez Canyon pair, Santa Rosa Is. 2021
629-52406	F	A-48	Zoo	2006	Alive, Sauces pair, Santa Cruz Is. 2021
629-52407	F	A-49	Pelican Harbor	2006	Alive, Fraser Point pair, Santa Cruz Is. 2021
629-52422	M	A-60	Malva Real	2006	Alive, Mud Tank pair, Santa Rosa Is. 2021
629-52425	M	K-00	Pinnacle Rock	2007	Alive, Twin Rocks pair, Catalina Is. 2021
629-52438	M	A-64	Pelican Harbor	2008	Dead, Santa Cruz Is. 7/21/21
629-52450	F	K-91	Two Harbors	2009	Alive, West End pair, Catalina Is. 2021
679-03432	M	A-67	Trap Canyon	2010	Alive, Westlake Village, CA 12/26/21
679-03435	M	A-68	Pelican Harbor	2010	Alive, Baby's Harbor pair, Santa Cruz Is. 2021
679-03436	M	A-69	Pelican Harbor	2010	Alive, Lopez Canyon pair, Santa Rosa Is. 2021
679-03439	F	K-95	Pinnacle Rock	2010	Alive, Twin Rocks pair, Catalina Is. 2021
679-04101	F	K-18	Two Harbors	2011	Alive, Empire pair, Catalina Is. 2021
679-04103	M	K-08	Seal Rocks	2011	Alive, Middle Ranch pair, Catalina Is. 2021
679-04105	M	K-19	Rattlesnake	2011	Alive, Lake Sutherland, CA 1/22/21
679-04128	F	A-85	Lopez Canyon	2013	Alive, Breeding in Anaheim Hills, CA 2021
679-04133	F	K-32	Seal Rocks	2013	Alive, Seal Rocks pair, Catalina Is. 2021
679-04137	F	K-28	West End	2013	Alive, Point Fermin, CA 2/10/21
679-04146	F	A-91	Malva Real	2014	Dead, Highland Springs, CA 3/25/21
709-03052	M	A-94	Lopez Canyon	2014	Alive, Lakeside, CA 4/14/21
709-03053	F	A-95	Trap Canyon	2014	Alive, Riverside Co., CA 3/28/21
709-03054	M	A-96	Trap Canyon	2014	Dead, Temecula, CA 3/22/21
709-03056	F	A-98	Fraser Point	2014	Alive, Santa Cruz Is., CA 2/1/21
709-03058	M	K-41	Seal Rocks	2014	Alive, Oak Grove, CA 5/21/21
709-03067	F	A-54	Fraser Point	2015	Alive, Ojai, CA 3/30/21

Table 4. Continued

FWS		Patagial		Fledge	
Leg Band	Sex ^a	Marker	Nest/Origin	Year	Status, Latest Location ^b
709-03077	F	K-57	Seal Rocks	2015	Alive, San Diego Co., CA 4/2/21
709-03085	M	A-61	Los Pinos	2016	Alive, West End pair, Catalina Is. 2021
709-03087	M	A-63	Sauces Canyon	2016	Alive, Los Olivos, CA 10/24/21
709-03093	F	K-64	Seal Rocks	2016	Alive, Catalina Is., CA 9/7/21
709-03095	M	K-68	Pinnacle Rock	2016	Alive, Rancho Palos Verdes CA 5/11/21
709-03096	M	K-69	Rattlesnake	2016	Alive, Catalina Is., CA 4/14/21
709-03097	F	A-99	Baby's Harbor	2016	Alive, Malva Real pair, Santa Cruz Is. 2021
709-03098	M	A-66	Baby's Harbor	2016	Alive, Santa Cruz Is., CA 1/26/21
709-03099	M	A-02	Fraser Point	2017	Alive, Santa Rosa Is., CA 3/25/21
709-03100	M	A-03	Fraser Point	2017	Alive, Santa Cruz Is., CA 7/18/21
709-07351	M	K-73	West End	2017	Alive, Perris, CA 12/17/21
709-07356	M	NA	Bald Canyon	2017	Alive, Big Bear Lake, CA 3/29/21
709-07359	M	A-14	Baby's Harbor	2017	Alive, Santa Cruz Is., CA 2/21/21
709-07361	M	NA	Lopez Canyon	2018	Alive, Santa Cruz Is., CA 10/11/21
709-07368	F	NA	Sauces Canyon	2018	Alive, Santa Cruz Is., CA 3/8/21
709-07371	M	NA	Rattlesnake	2018	Alive, Big Bear Lake, CA 1/19/21
829-00017	F	NA	Fraser Point	2019	Alive, Santa Cruz Is., CA 7/15/21

^a Determined by karyotyping and/or morphometrics.

^b As of 12/31/21 unless otherwise noted.

Golden Eagle Surveying

We confirmed a single golden eagle on the islands in 2021. It was seen within the Cueva Valdez bald eagle territory (Fig. 9).

DISCUSSION

Bald Eagles

In 2021, the Channel Island bald eagles had a record number of breeding pairs (20), matched the highest number of known chicks produced (25, equaling productivity in 2019), and the second highest number of recorded fledglings (23, compared to 24 in 2019). Since 2009, the first year with no manipulations of eggs and chicks, the mean success and productivity across all the islands has been 67% and 1.0 fledglings/attempt, respectively. This productivity meets the Pacific Region Bald Eagle Recovery Plan's target of 65% nesting success and productivity of 1.0

fledgling/attempt (U. S. Fish and Wildlife Service 1986).

In the fall of 2021, we replaced batteries and SD cards in the Reconyx trail cameras that we had placed on many of the bald eagle nests on Catalina, Santa Cruz, Anacapa, and Santa Rosa in 2019 and 2020. We also placed additional cameras on nests active in 2021 that did not have live web cams or trail cams. The cameras allow us to collect better information on nesting chronology and outcome without frequent monitoring by personnel. Additionally, the trail cams have allowed us to identify breeding adults by either their leg bands or wing markers in situations where we have not been able to visually confirm identities using spotting scopes.

In 2022, we expect to have additional breeding pairs based upon observations of adult bald eagles with subadult eagles. Male A-03 was seen with a banded, but unidentified, subadult in the Scorpion Anchorage area on Santa Cruz throughout most of 2021. Male A-02 was seen with an unidentified subadult in the East Point area of Santa Rosa and trail cam images showed them working on a nest, but not breeding. We will attempt to conduct more widespread surveying and consistent monitoring on Santa Cruz, Santa Rosa, San Clemente, and Catalina islands in conjunction with a planned monitoring effort for peregrine falcons across most of the islands in 2022, which will increase our ability to locate any other new territories.

Golden Eagles

There was only one known golden eagle on the Channel Islands in 2021, located on northwestern Santa Cruz. We believe this eagle disrupted the breeding activity of the Cueva Valdez pair in 2018 and 2019 (nesting status unknown in 2020) and we have not confirmed a male bald eagle in the territory in the past 2-3 years. We will continue to monitor this area in 2022. If the golden eagle remains on the island, we will revisit the possibility of translocating the bird to the mainland if it appears to be having an impact on the island fox population and/or continues to disrupt bald eagle breeding.

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