Bald Eagle Restoration on the California Channel Islands

January — December 2012

11th Annual Report

MONTROSE SETTLEMENTS RESTORATION PROGRAM

MSRP

Restoring Natural Resources
harmed by DDTs and PCBs

Bald Eagle Restoration on the California Channel Islands

January — December 2012

11th Annual Report

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EXECUTIVE SUMMARY

Bald eagles (*Haliaeetus leucocephalus*) once nested on all the California Channel Islands off the coast of southern California, but disappeared by the early 1960s. Human persecution contributed to the population decline, but the introduction of DDT into the Southern California Bight, starting in the late 1940s, is thought to have led to their ultimate extirpation from Southern California.

The Institute for Wildlife Studies (IWS) began bald eagle restoration efforts on Santa Catalina Island in 1980, but residual DDT continued to impact the birds and successful reproduction was inhibited. In 2002, IWS initiated a 5-year bald eagle restoration feasibility study on Santa Cruz Island, in cooperation with the National Park Service, to determine whether the eagles could reproduce successfully if located farther from the primary DDT source off the Palos Verdes Peninsula. IWS released 61 eagles on Santa Cruz Island from 2002-2006. In 2006, the first known nesting attempts occurred on the northern Channel Islands. Two pair of eagles successfully fledged one chick each from nests at Pelican Harbor and Malva Real on Santa Cruz Island. Since 2006, there have been a total of 89-90 successful hatchings on Santa Cruz, Santa Rosa, Anacapa, and Santa Catalina Islands, and IWS has not manipulated eggs or nestlings at any nest on Santa Catalina Island since 2008.

In 2012, there were six known nesting attempts on Santa Catalina Island, seven on Santa Cruz Island, one on Anacapa Island, and two on Santa Rosa Island. A total of 19-20 chicks hatched (six on Catalina, seven on Santa Cruz, three on Santa Rosa, unknown outcome on Anacapa) in twelve nests. On Santa Catalina Island, twins were produced at the Rattlesnake, Seal Rocks, and Two Harbors nests, and the West End nest had triplets. At the Two Harbors nest, one chick died soon after hatching and the other chick was killed by an island fox. One of the Rattlesnake chicks disappeared during a severe wind storm. The six remaining Santa Catalina chicks successfully fledged; but three are known to be dead and only one is known to be alive as of 31 December 2012.

On Santa Cruz Island, the Sauces and Malva Real pairs hatched and fledged two chicks each, and the Pelican Harbor pair hatched and fledged a single chick. The Cueva Valdez pair hatched a chick and it survived until it was approximately 11 weeks old, at which time it died of

unknown causes. A-49, the 2006 Pelican Harbor chick, bred for the first time this season as part of the Fraser Point pair. They hatched a single chick, but it died within a couple of days. There were also first time nesting attempts by the Fry's Harbor and Los Pinos pairs that failed during incubation.

On Santa Rosa Island, the Trap Canyon pair used a new nest about 400 m east of the 2011 nest. They successfully hatched and fledged a single chick, which survived through the end of the year. The Lopez Canyon pair rebuilt the nest that was partially destroyed in 2011 and hatched two chicks. Only one survived to fledging and it was still alive at the end of the year.

Due to the presence of nesting seabirds, we had no access to West Anacapa Island to be able to see the Oak Canyon nest clearly. We saw activity at the nest while viewing from the water on various boats, but could not determine whether any chicks hatched. We are confident that the nest failed during incubation or early in chick-rearing.

As of the end of December 2012, there were approximately 53 bald eagles on the California Channel Islands. There were 35 eagles known to be on the northern Channel Islands, 16 eagles on Santa Catalina Island, and 2 eagles on San Clemente Island. Seven additional eagles were on the mainland and were either tracked via their GPS transmitters or were sighted and reported by mainland observers.

The number of breeding attempts on Santa Cruz increased this season, although many failed. We expect to have a few new nests scattered across the islands in 2013, as well as increased success among the pairs that had their first nesting attempts in 2012. In 2013, we estimate that there will be 7 nests on Santa Catalina Island, 12 nests on the northern Channel Islands, and 1 nest on San Clemente Island. We will continue our annual surveys for new nests and monitoring of known nests through the 2013 breeding season.

ACKNOWLEDGMENTS

IWS thanks the National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), California Department of Fish and Wildlife, National Oceanic and Atmospheric Administration (NOAA), The Nature Conservancy, the U.S. Navy, and the Ventura County Office of Education. We also would like to thank this year's field crew: Steffani Jijon, Don Jones, Helen Johnson, Kim Smith, Maria Dominguez, and Ania Wrona. Helen Johnson also helped to summarize the 2012 movement data. Funding for the project was made available by the Montrose Settlements Restoration Program.

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INTRODUCTION

Since 2006, bald eagles (*Haliaeetus leucocephalus*) have successfully bred on four of the eight California Channel Islands for the first time since their extirpation nearly 50 years earlier. Although human persecution likely played a role in the eagles' decline, the introduction of the organochlorine pesticide DDT into the Southern California Bight is what is believed to have led to the disappearance of bald eagles from the Channel Islands. DDE (a metabolite of DDT) 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), in cooperation with the United States Fish and Wildlife Service (FWS), California Department of Fish and Wildlife, and the Santa Catalina Island Conservancy, initiated reintroduction efforts on Santa Catalina Island, California (Catalina; Fig. 1) with the release of 33 young eagles from hacking towers between 1980 and

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

1986. Breeding attempts in 1987 and 1988 failed, most likely due to residual DDE (Garcelon et al. 1989). Mean levels of DDE in egg remains removed 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 (L. Kiff, Expert Report) and areas of gross structural abnormalities of the eggshell that resulted in rapid water loss and a weakening of the eggshell (Risebrough 1998).

From 1989 through 2008, the reintroduced population on Catalina was maintained primarily by fostering chicks at active nest sites (66 chicks) and through hacking of 21 additional birds. 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). As a result of increased hatching success during artificial incubation (47% hatching success 2005-2006 compared to 17.3% 1989-2004) and natural breeding on Santa Cruz Island (Santa Cruz) in 2006 (see below), we began leaving eggs in some Catalina nests in 2007 and discontinued egg removals altogether in 2009. To date, adult bald eagles on Catalina have successfully reared 98 of 113 chicks that were either fostered into nests, hatched from two of three healthy eggs placed into nests, or naturally hatched from eggs left in the nest since 2007 (41 chicks). All the breeding pairs on Catalina have now hatched at least two chicks each (range 2-11).

Bald eagle restoration expanded to the northern Channel Islands in 2002 with the release of 61 eagles from hacking towers on Santa Cruz over a 5-year period. In 2006, two separate pairs on Santa Cruz successfully hatched and fledged one chick (Sharpe 2007), the first known bald eagle chicks to hatch naturally in the wild on the California Channel Islands since 1950 (Miller 1950). There are now seven breeding pairs on Santa Cruz, two on Santa Rosa Island (Santa Rosa), and one on Anacapa Island (Anacapa).

In 2012, we monitored all known bald eagle nests on the Channel Islands and searched for additional breeding eagles. In this report we summarize the results of the 2012 bald eagle season.

STUDY AREA

In 2012, we monitored bald eagles on Catalina, Santa Cruz, Santa Rosa, and Anacapa. Catalina is located 34 km south of Long Beach, California. The island is 34 km long, 0.8 to 13.0 km wide, and covers 194 km^2 (Fig. 1). Elevations range from sea level to 648 m. Mean annual minimum and maximum temperatures in Avalon are approximately 12 and 20^o C, respectively, and yearly precipitation averages 30.2 cm (Western Regional Climate Center Website; http://www.wrcc.dri.edu).

The northern Channel Islands, which are composed of San Miguel Island (San Miguel), Santa Rosa, Santa Cruz, and Anacapa are located approximately 19 to 44 km off the coast of Ventura and Santa Barbara counties (Fig. 1). Santa Cruz is the largest of the eight California Channel Islands, measuring about 38 km in length and 12 km wide at its widest point (Fig. 1). The island is approximately 249 km^2 with a maximum elevation of 753 m. Santa Cruz is the most rugged and topographically diverse of the northern Channel Islands and has a

Mediterranean climate, with mean monthly temperatures ranging from 11.7 - 20.9° C and a mean annual rainfall of 50 cm (Junak et al. 1995). The NPS owns and manages the eastern 24% of the island and The Nature Conservancy (TNC) owns the western 76% of the island.

Santa Rosa is the second largest of the Channel Islands and is owned by the NPS (Fig. 1). The island encompasses approximately 214 km^2 and is less topographically diverse than Santa Cruz. A central mountain range reaches an elevation of 484 m and the coastal habitat varies from gentle slopes and sandy beaches to sheer cliffs (Channel Islands National Park website, http://www.nps.gov/chis).

Anacapa, which is comprised of three islets (East, Middle, and West Anacapa) is owned by the NPS and is the smallest of the Channel Islands (Fig. 1). The island encompasses approximately 2.8 km^2 and is about 8 km from end to end (Channel Islands National Park website, http://www.nps.gov/chis).

METHODS

Permitting

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

Surveying and Nest Monitoring

Observations of adult eagles began in January or February at each of the known territories. We also conducted weekly ground surveys of Catalina and Santa Cruz to locate new nesting pairs. Due to logistical constraints, we surveyed Santa Rosa about one week per month. For the northern Channel Islands, we mapped our survey routes using Arcview (ESRI, Redlands, CA) GIS software so that survey crews could more easily identify areas that needed to be searched. Once we confirmed nesting eagles, we set up observation blinds or found partially hidden locations from which to observe the nests. We monitored the chronology of nesting through incubation and chick-rearing. We had established video cameras prior to the nesting season at three active nests on Catalina (West End, Rattlesnake, and Two Harbors) and two nests

on Santa Cruz (Sauces and Pelican Harbor nests), which enabled close, remote observations of nesting activity. The West End, Two Harbors, Sauces and Pelican Harbor nests were available for live viewing on our website (http://www.iws.org).

We used VHF radio-telemetry (Catalina and Santa Cruz) and GPS-PTT transmitters (Microwave Telemetry Inc., Columbia, Maryland; Santa Rosa only) to locate and monitor fledged eagles every 1-3 days during their first month of flight. We attempted to observe, or at least determine that the birds were moving, a minimum of once per week through December, or until they left the islands. For eagles banded on Catalina or Santa Cruz, we attached a VHF transmitter (Communications Specialists, Inc., Orange, California or Advanced Telemetry Systems, Isanti, Minnesota) that transmitted a signal once per second. We were able to locate the birds for visual monitoring using a VHF telemetry receiver (R-1000; Communications Specialists, Inc., Orange, California). The GPS-PTT units were used for Santa Rosa fledglings because we would not be on the island to manually locate the birds. The GPS-PTT units record GPS locations of the bird up to 14 times per day and then upload the data to a satellite approximately every three days. The data can then be retrieved via computer from Argos, Inc. (Largo, Maryland). We checked for new data daily and any bird that had not moved more than 50 m in a day was located as soon as feasible to determine its status.

Marking and Sampling

We entered each nest when the eagle chicks were approximately 8 weeks old to equip them with federal leg bands, wing markers (orange on Catalina, light blue on NCI), and a backpack-style GPS-PTT or VHF radio-transmitter (described above). We also collected a blood sample (~10 cc) for future contaminant analyses, and made morphological measurements to determine sex (Bortolotti 1984, Garcelon et al. 1985). Sex was confirmed later with a blood sample sent for DNA analyses (Avian Biotech International, Tallahassee, FL).

Monitoring of Previously Released Eagles

We closely monitored the status of all GPS-tagged eagles fledged in previous years. On Catalina, as we went about our other activities, we used vehicle-based telemetry VHF receivers to scan for previously released eagles that had stayed on or returned to the island. During

monitoring and other field work we searched for other eagles that were no longer carrying functioning transmitters. We entered sighting information from observers on the islands and the mainland in a Paradox database.

RESULTS

Surveying and Nest Monitoring

Santa Catalina Island

Nests were located in February and March in six of seven previously active territories on Catalina (Pinnacle Rock, Seal Rocks, West End, Two Harbors, Rattlesnake, Middle Ranch; Fig. 2). We surveyed much of the coastline by foot searching for new nests and conducted a helicopter survey of the island on 27 March.

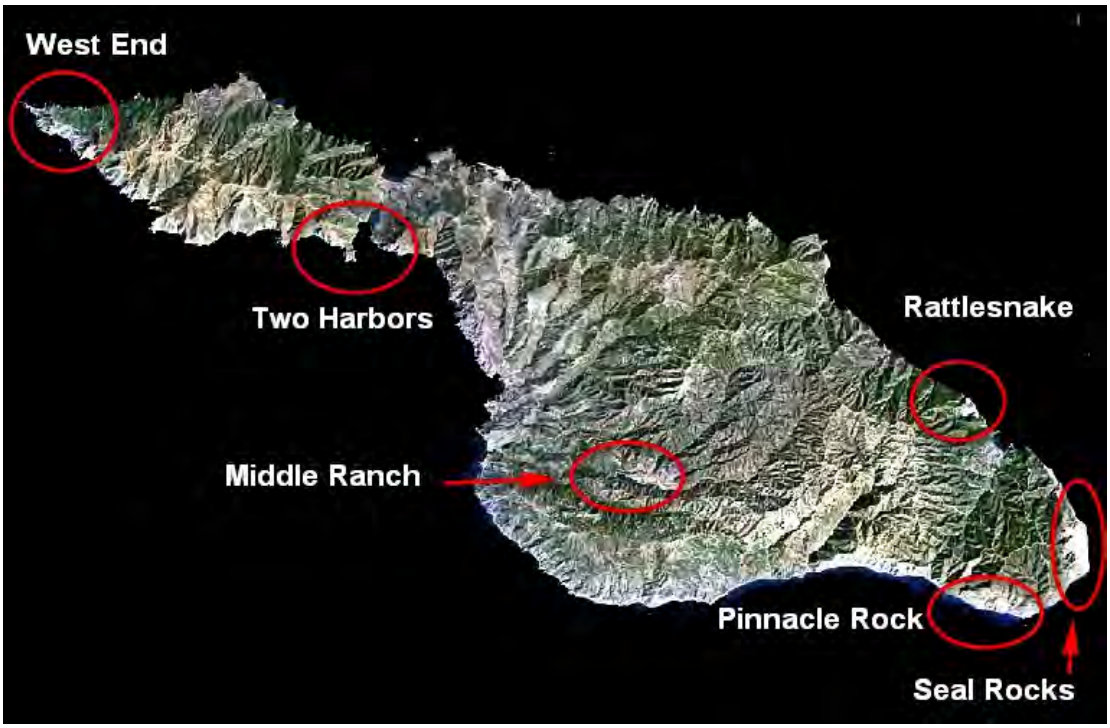

Figure 2. Santa Catalina Island and the active bald eagle territories in 2012.

West End Territory. The West End pair used the same nest that has been used since 1991. The male, K-01, was produced by captive birds at the ACC and fostered into the Pinnacle Rock nest in 2000. The female was released at the Sweetwater hacktower in 1986. We monitored the nest

primarily via our live web cam and birds were seen at the nest throughout February. The first egg was laid on 18 February, a second on 22 February, and a third on 26 February. The eggs hatched on 29 March, 30 March, and 3 April, respectively.

We entered the nest on 25 May to equip the birds with leg bands, VHF transmitters, and wing markers, and to obtain blood samples (Fig. 3, Table 1). The last chick to hatch was too small to attach a transmitter or wing markers, so we attached an orange ACraft leg band (5/Z) in addition to the federal leg band. We continued to monitor the birds until they fledged between 25 June and 12 July (Table 1). K-24 got a fish hook stuck in its toe during the last few weeks in the nest, but the hook disappeared a week or two after fledging. He moved around the island, but was found dead at Cherry Cove along the northwest coast of Catalina on 6 September. K-27 left the island in mid-August and was seen on the Palos Verdes Peninsula on 15 August. She was found dead near Laporte, Saskatchewan Canada on 11 October. Eagle 5/Z was last confirmed alive on 4 August at the West End nest.

Figure 3. The West End triplets at the time of banding, Santa Catalina Island, CA, 2012.

Pinnacle Rock Territory. The Pinnacle Rock pair used the same nest as in 2011. The female, K-56, was hatched from a Seal Rocks egg and fostered into the Seal Rocks nest in 2005. The male, K-73 (replaced K-65 this year), hatched from an egg removed from the West End nest in 2007 and was fostered back to the West End nest. We observed the first egg on 14 February, but they lost the egg by 16 February. A second egg was seen in the nest on 18 February, but it was gone by 20 February. A third egg was laid by 23 February, but it failed to hatch and disappeared around 16 April.

Table 1. Biographical data for bald eagle chicks hatched at nests on Santa Catalina Island, CA, during 2012.

Federal Band	Sex	Wing Tag	Date Fledged	Territory	Status[a]	Comments
679-04117	F	K-20	~6/12	Seal Rocks	Unknown	
679-04118	M	K-21	~6/5	Seal Rocks	Alive	Vancouver Is., B.C
679-04120	M	K-22		Rattlesnake	Dead	Found dead on Catalina 7/19
679-04121	F	K-24	6/25	West End	Dead	Found dead on Catalina 9/6
679-04122	M	K-27	6/28	West End	Dead	Found dead in Canada 10/11
679-04123	F	.	7/12	West End	Unknown	Orange leg band (5/Z)

[a] As of 12/31/12

Seal Rocks Territory. The Seal Rocks pair used the same nest as in 2011. The female, K-34, is from the captive ACC eagles and was hacked at the Bulrush tower in 1993. The male, K-25, hatched from an egg from the West End territory and was fostered into the Pinnacle Rock nest in 1992. The first egg was seen in the nest on 9 February and a second egg was seen on 10 February. The first chick was seen in the nest on 15 March and a second chick was present by 19 March (probably hatched 16-17 March).

We entered the nest on 11 May to equip the birds with leg bands, VHF transmitters, and wing markers and to collect blood and feather samples for contaminant and stable isotope analyses (Fig. 4, Table 1). We continued to monitor the birds until they fledged between 5 and 12 June. K-20 was last seen on the island on 17 July. K-21 was last seen on the island on 14 July and is known to have survived through the end of the year (seen in British Columbia in early January 2013).

Figure 4. The Seal Rocks chicks at the time of banding, Santa Catalina Island, CA, 2012.

Two Harbors Territory. The Two Harbors pair used the same nest as last season. The male, K-81, is 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. The nest was monitored primarily via our live web cam. The first egg was laid on 19 February and the second egg on 22 February. It appeared that the first chick hatched

on 26 March, based upon the behavior of the adult. K-81 was the incubating adult at the time and was standing and turning around frequently. The chick was never seen alive via the live camera, but K-81 was later observed burying what looked like a chick in the nest material (K-82 uncovered it several days later and dropped it off the nest). A second chick hatched on 29 March. For unknown reasons, neither adult returned to the nest on the night of 19 April, resulting in the chick being removed by an island fox early in the morning of 20 April.

Rattlesnake Territory. The Rattlesnake pair used the same nest in Gallagher's Canyon that they have used since 2010. The male, K-80, was produced by eagles at the ACC in 1998 and was fostered into the West End nest. The female, K-47, was produced by eagles at the ACC in 2004 and was fostered into the Seal Rocks nest. The first egg was seen in the nest on 16 February and a second egg was seen on 18 February. One of the chicks hatched on 22 March and the second hatched on 24 March. One of the chicks disappeared around 27 April after a severe wind storm. We were unable to find the bird or its remains.

We entered the nest on 18 May to install a leg band, VHF transmitter, and wing markers on the remaining chick, and to obtain blood samples (Fig. 5, Table 1). The eaglet fledged around 17 June and remained on the island until it was found dead near Howlands Landing on 19 July.

Figure 5. The Rattlesnake chick at the time of banding, Santa Catalina Island, CA, 2012.

Middle Ranch Territory. The Middle Ranch pair used the same nest as in 2011. The male, K-93, was produced by eagles at the ACC in 1999 and was hacked at the Bulrush hacktower on Catalina. The female, A-37, was produced by eagles at the ACC in 2005 and hacked from the South Tower on Santa Cruz. The first egg was laid on 9 February and a second was laid on 11 February. One egg was missing on 13 February and the remaining egg disappeared on 5 March. There were no further nesting attempts.

Twin Rocks Territory. There were two adults in this territory in 2012, but no sign of nesting. The 2011 male, K-33, was replaced by K-00, a male that hatched at the Pinnacle Rock nest in 2007. The female, K-17, was a bird released at the Bulrush hacktower in 1984. The birds were seen in the territory throughout the nesting season.

Santa Cruz Island

We surveyed much of Santa Cruz by foot in 2012 (Fig. 6). We concentrated surveys in areas outside of known breeding territories in an effort to locate new territories and nests. Areas that were difficult to reach by foot, such as the central north coast, were surveyed by boat. Some areas were surveyed repeatedly because of continued sightings of eagles without known nesting. During surveys, we located four new nests (Fraser Point, Fry's Harbor, Pelican Harbor, Los Pinos) and monitored the previously known nests in the Sauces, Cueva Valdez, and Malva Real territories (Fig. 7).

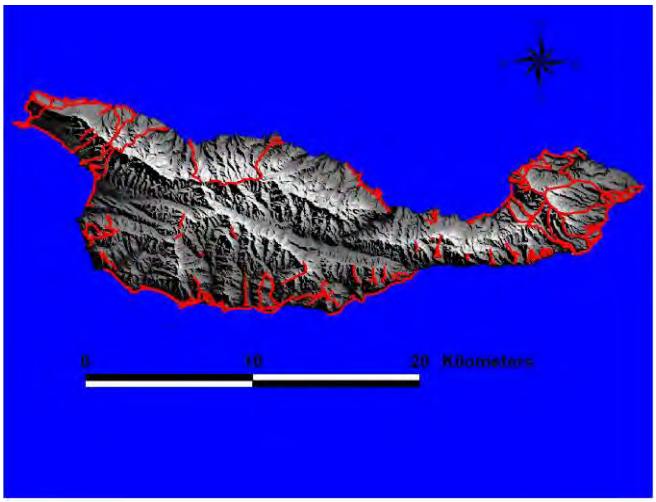

Figure 6. Survey routes (in red) on Santa Cruz Island, CA in 2012.

Figure 7. Active bald eagle territories Santa Cruz Island in 2012.

Sauces Territory. The Sauces pair used the same Sauces Canyon nest as in 2011 (Fig. 7). Male A-40, a bird from the ACC, was hacked on Santa Cruz in 2005. The female, A-27, was collected from Alaska and hacked on Santa Cruz in 2004. The first egg was laid on 2 March and a second was laid on 6 March. Chicks hatched on 8 and 10 April

We entered the nest on 8 June to install leg bands, VHF transmitters, and wing markers on the eaglets, and to obtain blood samples (Fig. 8, Table 2). Eagle A-81 fledged on 21 June and

A-82 fledged on 2 July. A-81 was seen on Santa Rosa on 30 August, but he returned to Santa Cruz within about a week. On 12 September, we found him in a narrow erosion gully from which he could not escape on the west end of the island. We accessed the gully with a ladder, captured the bird, and placed him in a dog crate. Once the bird was out of the gully we provided him with fish (it is believed to have been trapped for a couple of days) and released him near Christy Ranch. He was seen flying and feeding several times after his release and was last seen on 22 September. He likely moved to Santa Rosa around this time, as we did pick up a signal from his transmitter towards Santa Rosa on 5 November. A-82 flew to Santa Rosa by 31 August and we last received a signal from her VHF transmitter on 9 September on Santa Rosa.

Figure 8. The Sauces Canyon chicks after banding on Santa Cruz Island, CA in 2012.

Table 2. Biographical data for bald eagle chicks hatched at nests on the northern Channel Islands, CA during 2012.

Federal Band	Sex	Wing Tag	Date Fledged	Territory	Status[a]	Comments
679-04114	M	A-77	5/31	Malva Real	Unknown	
679-04115	F	A-78	5/28	Malva Real	Dead	Found dead 7/23
679-04116	F	A-79	6/9	Lopez Canyon	Alive	
679-04119	F	A-80	6/11	Trap Canyon	Alive	
679-04124	M	A-81	6/21	Sauces Canyon	Unknown	
679-10125	F	A-82	7/2	Sauces Canyon	Unknown	
679-10126	M	A-83	.	Cueva Valdez	Dead	Died 7/11 at Ojai Raptor Center
679-04127	M	A-84	6/29	Pelican Harbor	Unknown	

[a] As of 12/31/12

Pelican Harbor Territory. The Pelican Harbor pair (Fig. 7) moved to a nest near Chinese Harbor that they had originally built in 2011. The male, K-10, was produced by the ACC and fostered into the Twin Rocks nest on Catalina in 2001. The female, K-26, was produced by the ACC and fostered into the West End nest on Catalina Island in 2002. The first egg was laid on 6 March and a second was laid on 8 March. One of the eggs broke on 27 March and the remaining egg hatched on 13 April. The timing indicates that the egg that broke was the first egg laid.

We entered the nest on 10 June to install a leg band, VHF transmitter, and wing markers on the eaglet, and to obtain blood and feather samples (Fig. 9, Table 2). The eaglet fledged on 29 June and was seen at the nest through 6 August. The last sighting was on Santa Rosa on 31 August, after which we received no further radio signals or sightings.

Figure 9. The Pelican Harbor chick at the time of banding on Santa Cruz Island, CA, 2012.

Cueva Valdez Territory. The Cueva Valdez pair (Fig. 7) built a new nest about 2 m above the 2011 nest. The male, A-00, was produced by the ACC and hacked on Santa Cruz in 2002. The female, A-16, was removed from a nest in Alaska and hacked on Santa Cruz in 2003. We found the adults incubating on 27 March (not incubating when checked 11 March). A single chick hatched around 19 April.

We entered the nest on 9 June to install a leg band, VHF transmitter, and wing markers on the eaglet, and to obtain a blood sample (Fig. 10, Table 2). In early July, we noticed that the bird did not appear to be able/willing to lift his head, even when exercising his wings. We found the bird on the ground on 9 July and transported him to the Ojai Raptor Center. Despite their best efforts, A-83 died on 11 July from unknown causes.

Figure 10. The Cueva Valdez chick at the time of banding on Santa Cruz Island, CA, 2012.

Malva Real Territory. The Malva Real pair (Fig. 7) used a nest built in a bishop pine on Carl Peak. The male has no wing markers, but may still be K-11, produced at the ACC and fostered into the West End nest on Catalina in 2001. It is not uncommon for the wing markers to degrade and fall off over time and we were unable to get close enough to see leg bands. Female A-35, who was originally seen in the territory during a helicopter survey in 2011, is now the breeding female. She is an ACC-produced bird that was released on Santa Cruz in 2005. We found the

birds in incubation posture on 4 February and two chicks hatched around 5 March.

On 27 April, only one of the eaglets was observed in the nest. We went to the nest on 28 April for banding and located the missing eaglet standing on the ground approximately 50 m uphill from the nest tree. We evaluated the bird and found no apparent injuries. It is likely it got blown out of the nest tree during a recent storm. We fit each bird with a leg band, wing markers, and a VHF transmitter and drew blood for contaminant analyses (Table 2). A-78 fledged around 28 May and A-77 fledged around 31 May. Both birds appear to have remained on the island until 23 July. On that date, we found A-78 dead on a beach near Malva Real and received our last VHF signal from A-77.

Los Pinos Territory. We have seen A-45, a 2005 ACC-produced male, and A-51, a 2006 ACC-produced female, on the south side of the island for the past two seasons. This season we located the birds working on a nest just east of the Navy Site on the south side of the island (Fig. 7). They were seen incubating on 27 March, but the nest failed by 5 April. There was no indication of further nesting attempts.

Fry's Harbor Territory. Eagle A-46, a 2006 ACC-produced male, and A-24, a female collected in Alaska in 2004 made their first nesting attempt this season (Fig. 7). A-46 is still carrying a functioning GPS transmitter, so it allowed us to pinpoint their nest more easily (he remained on Santa Cruz all year, almost entirely within his territory). The birds were first seen incubating on 30 March, but the nest failed by 30 April. There were no further nesting attempts.

Fraser Point Territory. We located a new pair comprised of female A-49 and male A-64, produced by the Pelican Harbor pair in 2006 and 2008, respectively (Fig. 7). They were observed incubating on 7 March and we estimate that the egg(s) were laid around 29 February, based upon data from A-64's GPS transmitter. The adults' behavior changed around 1 April, which we believe was in response to hatching activity. A chick was seen briefly on 4 April, but the nest failed around 9 April. There were no further nesting attempts.

Santa Rosa Island

We spent 10-17 January, 21-28 February, 13-20 March, 3-6 April, 1-8 May, and 15-17 May surveying for eagles on Santa Rosa. During those surveys we were able to cover most of the coastal areas of the island, as well as many of the canyons (Fig. 11). We located two active nests in 2012: Trap Canyon and Lopez Canyon (Fig. 12).

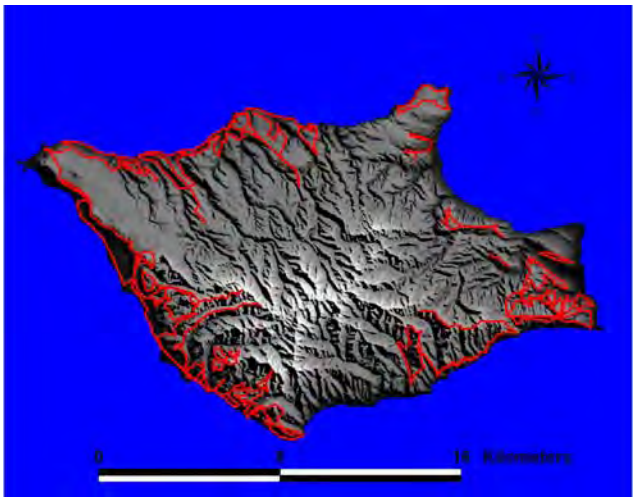

Figure 11. Survey routes (in red) on Santa Rosa Island, CA in 2012.

Figure 12. Active bald eagle territories on Santa Rosa Island, CA, 2012.

Trap Canyon Territory. The Trap Canyon pair used a new nest about 0.4 km east of their 2011 nest (Fig. 12). The male, A-08, was removed from a nest in Alaska and hacked on Santa Cruz in 2002. The female, A-22, was produced by the ACC and hacked on Santa Cruz in 2004. The nest was difficult to see and could not be viewed without disturbing the pair. On 24 February, an adult was flushed from the new nest, but no eggs were seen. On 15 March, the adults were both acting defensively, but we could see no eggs or chicks. On 6 April, we saw a chick in the nest that appeared to be approximately one week old. We returned to the nest on 16 May to attach a leg band, wing markers, a GPS-PTT, and take a blood sample (Fig. 13; Table 2).

The bird fledged around 11 June, based upon the GPS data, and visited all four of the northern Channel Islands through the end of the year (Fig. 14). She made trips to San Miguel on 25-26 July and 26-31 August. On 31 August, she returned to Santa Rosa and then flew to Santa Cruz in the evening. She returned to Santa Rosa on 3 September and made two more trips to Santa Cruz on 12-16 September and 19- 23 September. She made frequent trips among the islands throughout the fall, visiting San Miguel on 26 September-3 October, 12-16, 18-20, and 26-31 October, and 11 November – 3 December, and Santa Cruz on 4-10 and 25-26 October, 2-

Figure 13. The Trap Canyon chick after banding on Santa Rosa Island, CA 2012

11 November, and 13-19 December. She made a single trip to Anacapa on 3 November, but returned to Santa Cruz within a couple of hours. She ended the year on Santa Rosa.

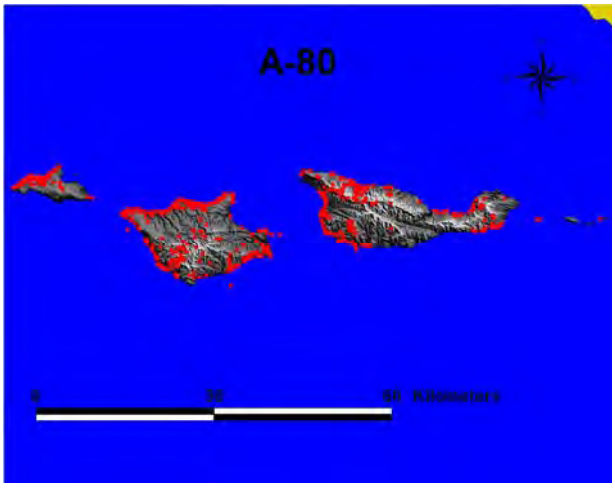

Figure 14. Movements of Eagle A-80 on the northern Channel Islands in 2012.

Lopez Canyon Territory. The Lopez Canyon pair (Fig. 12) used the same nest in a large toyon (*Heteromeles arbutifolia*) as in previous years. Both the male, A-39, and the female, A-43, were produced by the ACC and hacked on Santa Cruz in 2005. The birds were observed incubating on 21 February and two chicks were seen in the nest on 14 March. The chicks appeared to be about 1 week old. Only one chick was seen when we next observed the nest during the first week of April. We returned to the nest on 2 May to attach a leg band, wing markers, and a GPS-PTT on the eaglet and to draw blood

Figure 15. The Lopez Canyon chick just before banding on Santa Rosa Island, CA 2012.

for contaminant analyses (Fig. 15; Table 2). We found the remains of the second chick on the ground below the nest and estimated it was ~3 weeks old when it died.

The eaglet fledged around 9 June and moved among all 4 of the northern Channel Islands through the end of the year (Fig. 16). She remained on Santa Rosa until 27 July, except for a day-trip to San Miguel on 25 July. She made her first flight to Santa Cruz on 27 July and then flew to Anacapa on 28 July. She returned to Santa Cruz on 29 July and remained there until 7 August. She spent the rest of the year moving among the islands frequently. She visited San Miguel on 9 and 11 August, 18-25 October, and 10 November – 4 December, and Santa Cruz on 12-13 October and 2-7 November. Her remaining time was spent on Santa Rosa, where she ended the year.

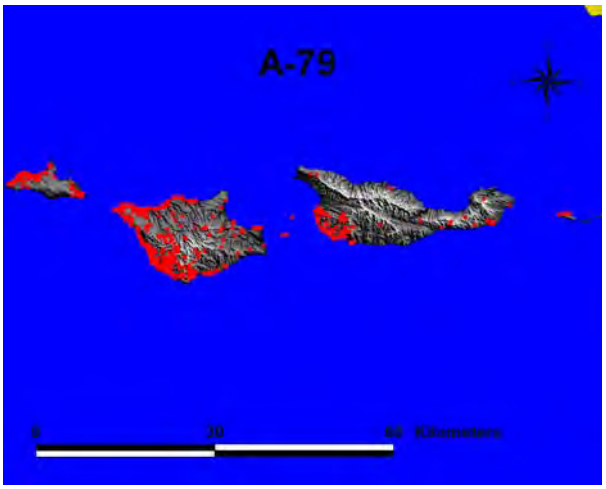

Figure 16. Movements of Eagle A-79 on the northern Channel Islands, CA in 2012.

Anacapa Island

Oak Canyon Territory. The pair on West Anacapa Island was observed at or near the 2011 nest several times in the late winter/early spring. Due to seabird nesting closures, we did not have access to the island, so it was difficult to determine their nesting status from our boat. It appeared that they were incubating when seen on 8 April, but the nest had failed by 20 May.

Nesting Summary

Based upon our observations and the number of chicks that hatched in nests on the Channel Islands, we estimate that the eagles laid 28-34 eggs this season, of which 19-20 (56-71%) hatched (Table 3). Thirteen chicks (68%) fledged and 3-9 (23-69%) of the fledged eaglets survived until the end of the year (two known alive, four known dead, seven unknown status).

Table 3. Summary of nesting attempts by bald eagles on the California Channel Islands in 2012.

Island/Nest	Eggs Incubated	Chicks Hatched	Chicks Fledged	Number Surviving Until End of Year
Santa Catalina Island				
West End	3	3	3	0-1
Pinnacle Rock	3	0	0	.
Seal Rocks	2	2	2	1-2
Two Harbors	2	2	0	.
Rattlesnake	2	2	1	0
Middle Ranch	2	0	0	.
TOTAL	14	9	6	1-3
Santa Cruz Island				
Pelican Harbor	2	1	1	0-1
Sauces	2	2	2	0-2
Cueva Valdez	1-2	1	0	.
Malva Real	2	2	2	0-1
Fraser Point	1-2	1	0	.
Los Pinos	1-2	0	0	.
Fry's Harbor	1-2	0	0	.
TOTAL	10-14	7	5	0-4
Santa Rosa Island				
Trap Canyon	1-2	1	1	1
Lopez Canyon	2	2	1	1
TOTAL	3-4	3	2	2
Anacapa Island				
Oak Canyon	1-2	0-1	0	.
TOTAL	1-2	0-1	0	.
All Islands Combined	28-34	19-20	13	3-9

Monitoring of Previously Released/Hatched Bald Eagles

Besides monitoring this year's fledglings, we continued to monitor the eagles that had been released or hatched naturally on the Channel Islands prior to 2012. Twenty six bald eagles that were released or hatched on Catalina in previous years were seen during 2012 (Table 4). Sixteen of the birds were on Catalina, three on Santa Cruz, two on San Clemente Island, one on Santa Rosa, and four on the mainland.

As of 31 December, 10 of the eagles previously released or naturally hatched on Santa Cruz and Santa Rosa are being monitored via GPS data and 20 others were identified during our surveys or through sightings by other observers (Table 5).

Table 4. Status of bald eagles released or fledged from nests on Santa Catalina Island, CA prior to 2012 and seen in 2012.

FWS Leg Band	Sex[1]	Patagial Marker	Nest/Release Tower	Fledge Year	Status, Latest Location[2]
629-16077	F	K-17	Bulrush Tower	1984	Alive, Twin Rocks pair, Catalina Is.
629-16085	F	NA	Sweetwater Tower	1986	Alive, West End pair, Catalina Is.
629-19925	M	K-25	Pinnacle Rock	1992	Alive, Seal Rocks pair, Catalina Is.
629-19928	F	K-34	Bulrush Tower	1993	Alive, Seal Rocks pair, Catalina Is.
629-39815	M	K-80	West End	1998	Alive, Rattlesnake pair, Catalina Is.
629-39816	M	K-81	West End	1998	Alive, Two Harbors pair, Catalina Is.
629-39817	F	K-82	Pinnacle Rock	1998	Alive, Two Harbors pair, Catalina Is.
629-29497	M	K-93	Bulrush Tower	1999	Alive, Middle Ranch pair, Catalina Is.
629-29498	M	K-01	Pinnacle Rock	2000	Alive, West End pair, Catalina Is.
629-29499	F	K-02	West End	2000	Alive, Lake Hemet, CA
629-02780	M	K-10	Twin Rocks	2001	Alive, Pelican Harbor pair, Santa Cruz Is.
629-02793	F	K-26	West End	2002	Alive, Pelican Harbor pair, Santa Cruz Is.
629-47371	F	K-47	Seal Rocks	2004	Alive, Rattlesnake pair, Catalina Is.
629-47398	F	K-56	Seal Rocks	2005	Alive, Pinnacle Rock pair, Catalina Is.
629-52425	M	K-00	Pinnacle Rock	2007	Alive, Twin Rocks pair, Catalina Is.
629-52428	M	K-73	West End	2007	Alive, Pinnacle Rock pair, Catalina Is.
629-52434	F	K-03	Seal Rocks	2007	Alive, Lake Elizabeth, CA 3/8/12
629-52442	F	K-83	Two Harbors	2008	Alive, Mission Bay, CA 3/7/12
629-52443	M	K-88	Twin Rocks	2008	Alive, San Clemente Island 12/19/12
629-52446	F	K-67	West End	2008	Alive, Santa Rosa Island 6/20/12
629-52449	F	K-87	Two Harbors	2009	Alive, San Clemente Island 4/22/12
629-52450	F	K-91	Two Harbors	2009	Alive, Catalina Island 9/12
629-03429	F	K-97	West End	2009	Alive, Catalina Island 5/17/12
629-03431	F	K-05	Seal Rocks	2010	Alive, Santa Cruz Island 4/20/12
629-04104	F	K-15	Rattlesnake	2011	Alive, Catalina Island 9/28/12
629-04106	F	K-12	West End	2011	Alive, Dillon, MT 2/18/12

[1] Determined by karyotyping and/or morphometrics.
[2]As of 12/31/12 unless otherwise noted.

A-17 Movements

Eagle A-17 spent 1 January to 6 March on Santa Rosa, except for visits to Santa Cruz on 25-27 January, 20-24 February, and 1-2 March. On 6 March, she returned to Santa Cruz and then flew to the mainland on 7 March, where she ventured as far north as central Oregon (Fig. 17). She remained on the

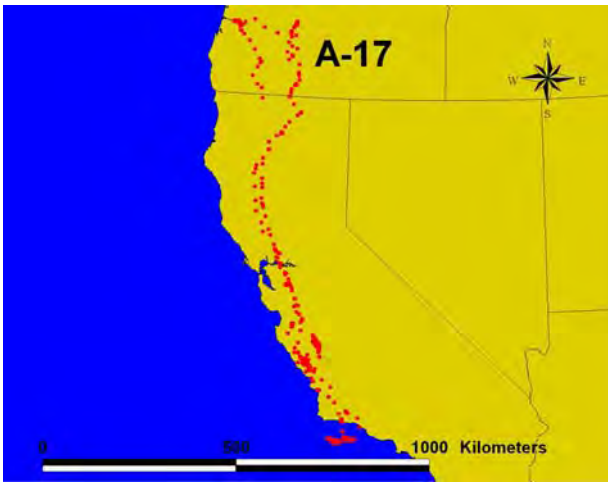

Figure 17. Movements of Eagle A-17 in 2012.

Table 5. Status of bald eagles released or fledged from nests on Santa Cruz and Santa Rosa Islands, CA in 2002-2011 and known to have been alive in 2012.

FWS Leg Band	Sex[1]	Patagial Marker	Source[2]	Fledge Year	Status, Latest Location[3]
629-02795	M	A-00	Zoo	2002	Alive, Cueva Valdez pair, Santa Cruz Is.
629-14045	M	A-08	Alaska	2002	Alive, Trap Canyon pair, Santa Rosa Is.
629-14048	F	A-11	Alaska	2002	Alive, Oak Canyon pair, Anacapa Is.
629-47359	F	A-16	Alaska	2003	Alive, Cueva Valdez pair, Santa Cruz Is.
629-47360†	F	A-17	Alaska	2003	Alive, Santa Rosa Is.
629-47356	M	A-21	Alaska	2003	Alive, Oak Canyon pair, Anacapa Is.
629-47366	F	A-23	Zoo	2004	Alive, Fort Hunter-Liggett, CA
629-47372	F	A-24	Alaska	2004	Alive, Fry's Harbor pair, Santa Cruz Is.
629-47375	F	A-27	Alaska	2004	Alive, Sauces pair, Santa Cruz Is.
629-47385†	F	A-34	Zoo	2005	Alive, Santa Rosa Is. 4/21/12
629-47386	F	A-35	Zoo	2005	Alive, Malva Real pair, Santa Cruz Is.
629-47388	F	A-37	Zoo	2005	Alive, Middle Ranch pair, Catalina Is.
629-47390	M	A-39	Zoo	2005	Alive, Lopez Canyon pair, Santa Rosa
629-47391	M	A-40	Zoo	2005	Alive, Sauces pair, Santa Cruz Is.
629-47399	F	A-43	Zoo	2005	Alive, Lopez Canyon pair, Santa Rosa
629-02800	M	A-45	Zoo	2005	Alive, Los Pinos pair, Santa Cruz Is.
629-52404†	M	A-46	Zoo	2006	Alive, Fry's Harbor pair, Santa Cruz Is..
629-52406	F	A-48	Zoo	2006	Alive, Ventura, CA. 9/23/12
629-52407	F	A-49	Pelican Harbor	2006	Alive, Fraser Point pair, Santa Cruz Is.
629-52410	F	A-51	Zoo	2006	Alive, Los Pinos pair, Santa Cruz Is.
629-52411	F	A-52	Zoo	2006	Alive, Santa Rosa Is. 12/12
629-52419†	F	A-57	Zoo	2006	Alive, Santa Cruz Is.
629-52420†	M	A-58	Zoo	2006	Alive, Santa Rosa Is.
629-52422†	M	A-60	Malva Real	2006	Alive, Santa Rosa Is.
629-52438	M	A-64	Pelican Harbor	2008	Alive, Fraser Point pair, Santa Cruz Is.
629-03432†	M	A-67	Trap Canyon	2010	Alive, Santa Rosa Is.
629-03436†	M	A-69	Pelican Harbor	2010	Alive, Santa Rosa Is.
629-03440†	F	A-70	Lopez Canyon	2010	Alive, Santa Cruz Is.
629-03444†	M	A-72	Cueva Valdez	2010	Alive, Santa Cruz Is.
629-04110	F	A-74	Pelican Harbor	2011	Alive, Santa Cruz Is. 10/3/12
629-04112	F	A-76	Cueva Valdez	2011	Alive, Santa Rosa Is. 1/7/12

[1] Determined by karyotyping for birds from San Francisco Zoo, and morphometrics for Alaskan birds.
[2] San Francisco Zoo (Zoo), wild nests near Juneau, Alaska (Alaska), or nests on Santa Cruz (Pelican Harbor, Malva Real, Sauces, Cueva Valdez) or Santa Rosa (Trap Canyon, Lopez Canyon).
[3] As of 12/31/12, unless otherwise noted.
† Carrying a GPS transmitter.

mainland until 9 November. She returned to Santa Rosa on 9 November, where she remained through the end of the year, except for trips to San Miguel on 13-14, 16-17, and 19-20 November, and to Santa Cruz on 5-17 December.

A-34 Movements

Eagle A-34 spent 1 January through 10 February on Santa Rosa. She flew to Santa Cruz on 10 February, but returned to Santa Rosa on 15 February, where she remained until 10 March. She flew to Santa Cruz on 10 March and then spent 13-16 March on Anacapa. She then spent 16 March – 21 April on Santa Cruz, except for a trip to Santa Rosa on 24 March – 11 April. We received no further data after 21 April (Fig. 18).

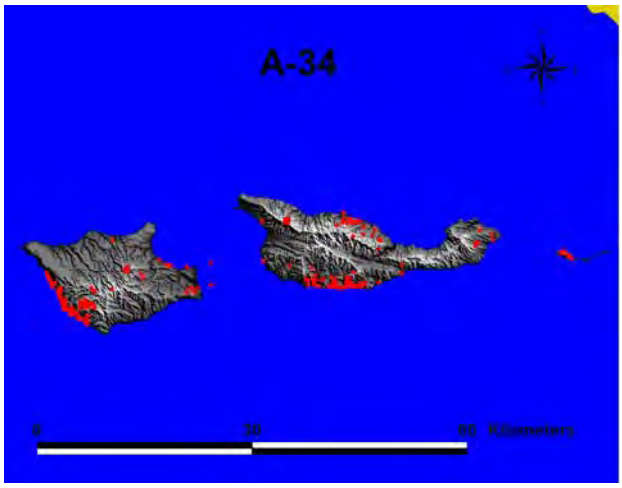

Figure 18. Movements of Eagle A-34 on the northern Channel Islands, CA in 2012.

A-52 Movements

Eagle A-52 spent time on all four northern Channel Islands and the mainland in 2012 (Fig. 19). She started the year on Santa Rosa and flew to San Miguel on 16-17 January. She then flew to Santa Cruz and remained there until 27 January. She returned to Santa Rosa on 27 January, flew to San Miguel on 5 February, returned to Santa Rosa on 10 February, and then flew to Santa Cruz on 11 February. On 21 February, she flew to the mainland and remained there until 10 November. On 10 November, she flew to Santa Rosa via San Miguel. She returned to San Miguel on 11 November and remained there until 6

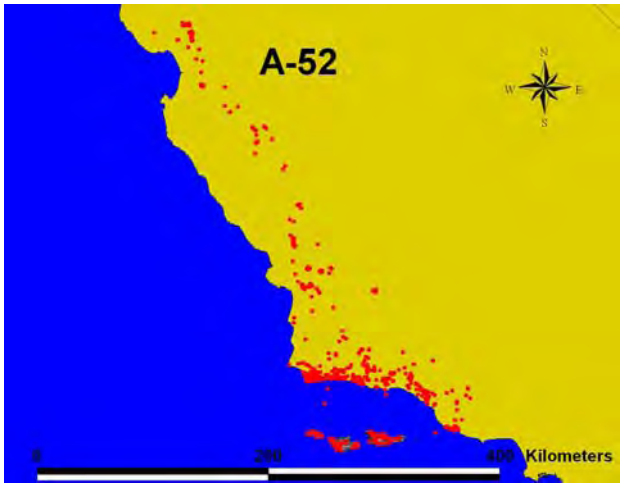

Figure 19. Movements of Eagle A-52 in 2012.

December, at which time she flew to Santa Rosa. She flew to Santa Cruz on 7 December and dropped her transmitter near Prisoner's Harbor on 11 December.

A-57 Movements

Eagle A-57 spent the first half of the year on Santa Cruz, except for visits to Santa Rosa on 8-16 January and to Anacapa on 8-9 June. On 16 July she flew to Santa Rosa and remained there until 12 October. During the rest of the year she spent 12-26 October on Santa Cruz, 26 October – 7 November on Santa Rosa, 7 November through the end of the year on Santa Cruz (Fig. 20).

A-58 Movements

Eagle A-58 spent most of the year on Santa Cruz, except for visits to Santa Rosa on 28 January – 9 February, 27 August – 1 September, 18 September – 5 October, 21 October – 3 December, and 18-31 December. He made one trip to Anacapa on 8-18 June (Fig. 21).

A-60 Movements

Eagle A-60 moved between Santa Rosa and Santa Cruz in 2012, but spent most of his time on Santa Rosa (Fig. 22). There were breaks in data received (up to

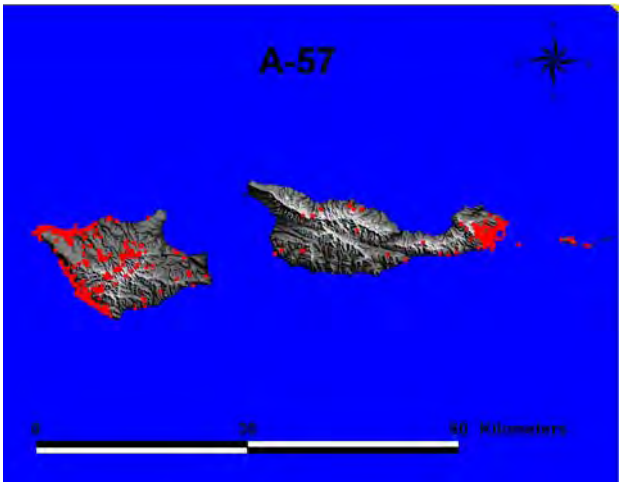

Figure 20. Movements of Eagle A-57 on the northern Channel Islands, CA in 2012.

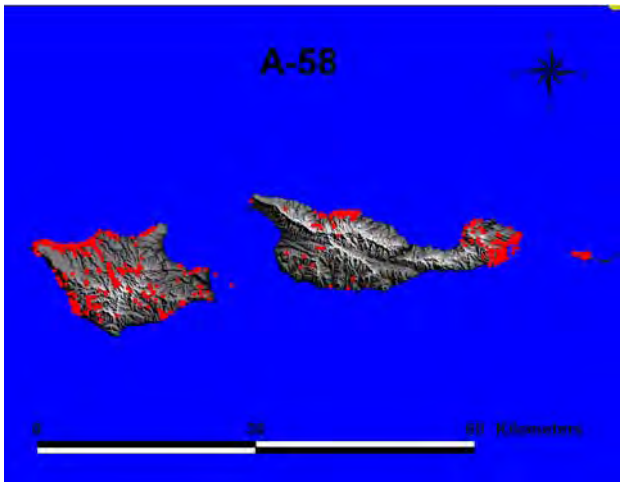

Figure 21. Movements of Eagle A-58 on the northern Channel Islands, CA in 2012.

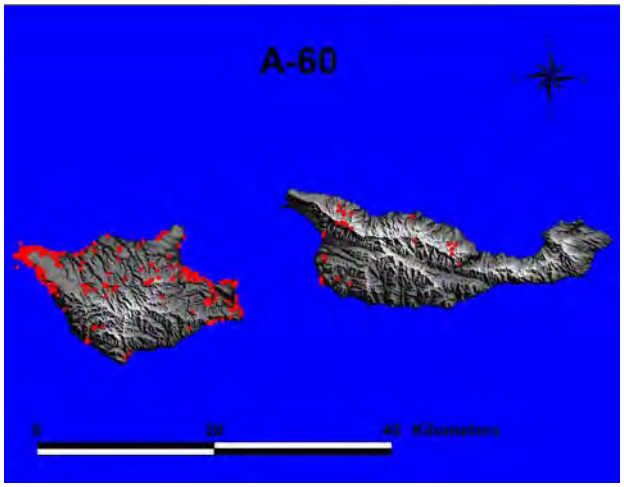

Figure 22. Movements of Eagle A-60 on the northern Channel Islands, CA in 2012.

11 days), so on occasion we do not know exactly when he moved between islands. He began the year on Santa Rosa, but flew to Santa Cruz on 19 January. He was back on Santa Rosa by 25 January and then made short trips to Santa Cruz on 21 February, 2 March (back on Santa Rosa by 5 March), 29 March (back on Santa Rosa by 9 April), 11-13 April, 29 April (back on Santa Rosa by 3 May), 5-7 October, and 5-7 December. We stopped receiving data from the bird on 16 December when he was back on Santa Rosa.

A-64 Movements

Eagle A-64, one of the 2008 Pelican Harbor chicks, remained on Santa Cruz throughout the year as part of the Fraser Point pair (Fig. 23). He dropped his GPS transmitter around 12 October near Fraser Point.

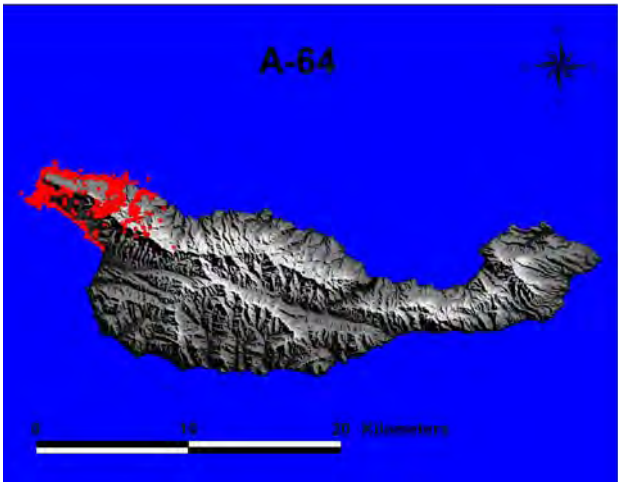

Figure 22. Movements of Eagle A-64 on Santa Cruz Island, CA in 2012.

A-67 Movements

Eagle A-67, the 2010 Trap Canyon chick, visited all four of the northern Channel Islands in 2012 (Fig. 24). He spent January on Santa Rosa and then visited Santa Cruz on 9-14 February and Anacapa on 14-22 February. He returned to Santa Cruz on 22 February and flew to Santa Rosa on 7 March. During the rest of the year he spent the majority of his time on Santa Rosa, but he did revisit Santa Cruz on 19 March – 10 April, 1-24 September, and 2 November – 3 December. He also made a single visit to San Miguel on 14-17 December.

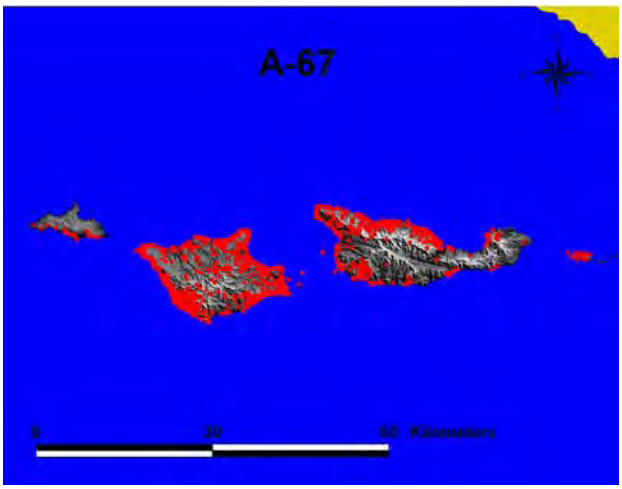

Figure 24. Movements of Eagle A-67 on the northern Channel Islands, CA in 2012.

A-69 Movements

Eagle A-69, one of the 2010 Pelican Harbor chicks, moved between the islands more than any other eagle in 2012. His longest stay on any one island was 1-21 January on Santa Rosa. He then made 69 flights between the four northern Channel Islands (Fig. 25), which included 10 visits to San Miguel, 25 visits to Santa Cruz, 11 visits to Anacapa, and 24 additional visits to Santa Rosa. He ended the year on Santa Cruz.

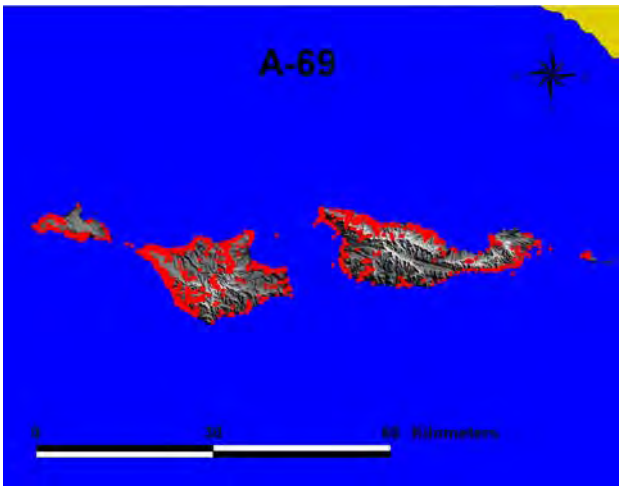

Figure 25. Movements of Eagle A-69 on the northern Channel Islands, CA in 2012.

A-70 Movements

Eagle A-70, the 2010 Lopez Canyon chick, also moved frequently among the four northern Channel Islands (Fig. 26). She began the year on Santa Rosa, but made her first of 24 flights between the islands on 22 January, when she flew to Santa Cruz. In total, she made 4 visits to San Miguel, 8 more visits to Santa Rosa, 9 visits to Santa Cruz, and 3 visits to Anacapa. Her longest stay on an island was from 29 February to 23 March on Santa Cruz.

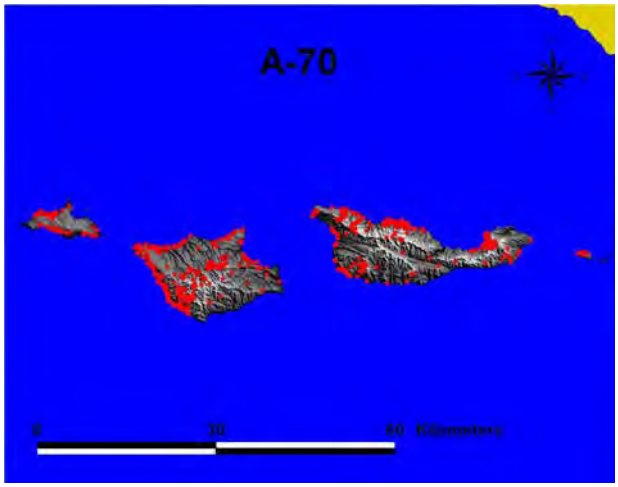

Figure 26. Movements of Eagle A-70 on the northern Channel Islands, CA in 2012.

A-72 Movements

Eagle A-72, the 2010 Cueva Valdez chick, visited all four of the northern Channel Islands in 2012 (Fig. 27). He began the year on Santa Cruz and spent the largest portion of his time on that island. He made 2 visits to Anacapa on 16-20 January and 26 April – 2 May and 6 visits to Santa Rosa on 27 January

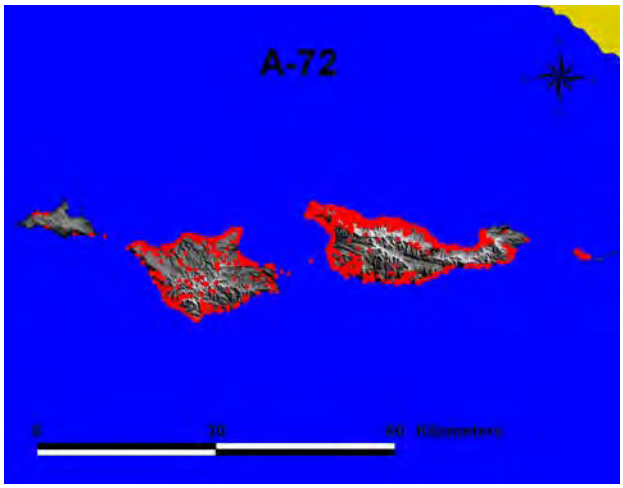

Figure 27. Movements of Eagle A-72 on the northern Channel Islands, CA in 2012.

– 26 February, 9-19 April, 19 August – 19 September, 6-22 October, 23 October – 1 November, and 2-6 November. He also made 2 short visits to San Miguel on 22-23 October and 1-2 November.

Overall Island Use

During 2012, we received 47,364 GPS locations on the islands from 15 different eagles that spent at least part of the year on the northern Channel Islands. Santa Cruz and Santa Rosa were used more than any other islands (Fig. 28). Use of Santa Rosa was higher than any other island in January, July-October, and December (peak of ~64% of points in August) and use of Santa Cruz was higher than any other island in February-June (peak of ~81% in March). Use of San Miguel was higher than on any other island in November with about 36% of points, the highest recorded use of the island since we began restoration efforts in 2002.

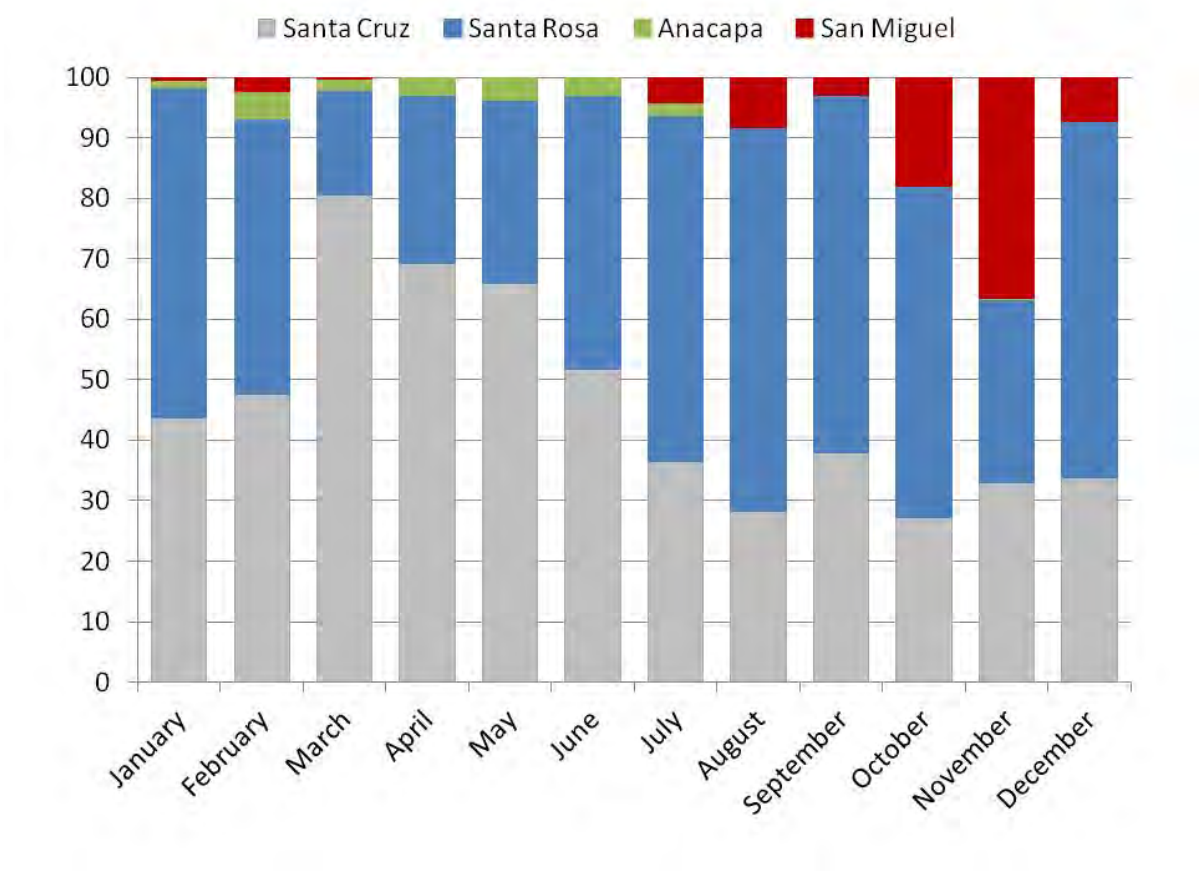

Figure 28. Use of the northern Channel Islands, CA by bald eagles during 2012. The bars represent the percent of GPS points on each island by month.

DISCUSSION

There was an increase in bald eagle reproductive attempts on the Channel Islands in 2012, but the number of chicks that reached fledging and survived through the end of the year was lower than in 2011. Nearly one third of the hatched chicks died prior to fledging, more than in any year on record since the restoration efforts began in 1980. Chicks died from a variety of causes, including storms and predation. Both Two Harbors chicks died when the female did not return to the nest at night. The first chick likely was accidentally killed by the breeding male soon after hatching. Females are usually on the nest at night, but in this case the male remained on the nest overnight and this may have been his first experience with hatching. He was stepping in and around the egg cup as the chick was hatching and likely stepped on it. He was later seen burying a fully-developed chick in the nest material. In the case of the second chick, no adult returned to the nest at night and we observed the first known incident of fox predation on a bald eagle, although foxes have been seen in the nests on both Catalina and Santa Cruz when eaglets near fledging were alone on the nest.

There also were a high number of nesting failures during incubation or within days of hatching. At least one of the pair were first time breeders at the Pinnacle Rock, Malva Real, Fraser Point, Fry's Harbor, and Los Pinos nests, which likely contributed to the high rate of nesting failure among these nests (80%). Reproductive success is known to drop for a year or more when there is a mate replacement (Jenkins and Jackman 2006) and we have observed 1-2 years of nesting failure in young pairs of bald eagles on Catalina and Santa Rosa prior to successful hatching and raising of young (e.g., Trap Canyon pair and Rattlesnake pair). It is likely that these nesting failures were largely caused by inexperience and these nests could have successful reproduction in 2013 or 2014.

The 2012 nests produced 0.81 fledglings/breeding attempt (1.0 fledgling/attempt on Catalina, 0.7 fledgling/attempt on the northern Channel Islands) and had a nesting success rate of 50% on both Catalina and the northern Channel Islands. In order to ensure the species recovery, the Pacific Region Bald Eagle Recovery Plan had a target of 1.0 fledgling/attempt and 65% nesting success (U.S. Fish and Wildlife Service 1986). Even though the 2012 breeding season fell below these goals, the 7-year average (since the first breeding on the northern Channel Islands in 2006) has been 1.05 fledglings/attempt and 64% nesting success. Therefore, the

current population appears to be on track to be able to maintain itself without human intervention.

Patterns of island use appear to be changing, possibly in response to the changes in prey availability with the removal of deer and elk on Santa Rosa in 2011. Use of Santa Rosa was still highest in the fall, but the eagles tended to move among the islands more frequently than in previous years. In addition, the use of San Miguel during the fall was higher than in the past, with over one third of the GPS data points occurring there in November. Eagles on San Miguel could be taking advantage of sea lion, elephant seal, and/or seabird carcasses that likely are present on the beaches, especially during the winter (Rich and Richards 2005, Richards and Rich 2006).

There were a couple of milestones this season. First, A-49 (the first chick to hatch naturally on the Channel Islands since around 1950) began nesting and hatched a chick, although it died within days. The second is that the breeding population of 16 territories reached the habitat management goal for the Channel Islands under the Recovery Plan (U.S. Fish and Wildlife Service 1986). This is considered "the minimum number of territories needed to provide secure habitat for the recovered population" (U.S. Fish and Wildlife Service 1986). We believe that the number of territories will continue to increase and expand to other islands as the current subadults mature and the existing territories continue to produce young.

San Clemente Island is poised to be the next island to support breeding bald eagles. In 2011, two bald eagles (K-51 and A-32) were seen on the southern portion of the island multiple times. Unfortunately, access to the portion of the island that was used by the birds was restricted in 2012 because of unexploded ordinance concerns and IWS employees could not search the area for a nest. Eagles K-87 and K-88 (see Table 4) also were seen on the island in 2012 and will be of breeding age in 2013, so there could be the potential for 2 breeding pairs on the island in 2013. Additionally, an untagged subadult (physical description suggested a 1-2 year old) was seen in mid-August 2012, so it is possible that either there was a successful nest on the island in 2011 or birds from mainland populations also are making the flight out to San Clemente Island.

In 2013, we expect the number of bald eagle nests to remain stable on Anacapa and Catalina, and increase by 1-2 nests on Santa Rosa and Santa Cruz. In addition to surveying Catalina, Anacapa, Santa Cruz and Santa Rosa for bald eagles, we also will conduct surveys on San Miguel, Santa Barbara, San Nicolas, and San Clemente islands in conjunction with peregrine falcon surveys that IWS will be conducting on all 8 of the California Channel Islands.

RECOMMENDATIONS

We will be entering Phase 2 of the Montrose Settlements Restoration Program in 2013, which calls for reducing efforts from year-round population monitoring to less intensive monitoring (Montrose Settlements Restoration Program 2012). We recommend continuing efforts to locate new territories and monitoring the nesting status of known pairs at least once per week through fledging. We recommend fitting each eaglet with a VHF transmitter at banding so that personnel can check their status for a minimum of 2 months after fledging. An effort should be made to survey the southern portion of San Clemente Island to determine if there is a nesting pair there. Continued efforts should be made to survey the more inaccessible portions of the islands by foot and boat.

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