

# **Pinnacles National Park California Condor Reestablishment – Annual Report 2013**



Pinnacle National Park Report  
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### Volunteers

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### Interns

Nathan Melling, Arianna Punzalan, and Danielle Powell.

## INTRODUCTION

California condors are one of the rarest birds in the world and biologists have been committed to their recovery for over three decades. The Condor Reestablishment Program at Pinnacles National Park (PNP) has several objectives, with the goal of species recovery in the wild.

Project objectives include:

- 1) monitoring central California condor foraging behavior, nesting and reproduction, and population trend;
- 2) detecting and recovering mortalities so cause of death can be determined;
- 3) managing threats to condors through treatment;
- 4) increasing public awareness of threats to condor recovery; and
- 5) conducting cooperative research to aid condor recovery.

During 2013, the Pinnacles condor program managed a flock of 34 condors, tracking the birds over a range of approximately 90 miles north to south and 60 miles east to west. In 2013, there were five nesting attempts that involved Pinnacles released birds, none of which were successful. In 2013, there were seven mortalities of Pinnacles managed condors and three captive-reared juveniles were released.

## METHODS

### *Population Monitoring*

Condors are monitored year-round to document reproduction, mortality, and movements. Condor health, foraging, flock interactions, and breeding behavior are monitored through visual observations. Biologists use standard equipment to radio-track and monitor condors including:

- Radio-telemetry receiver: Communication Specialists, Inc. Model R-1000
- Yagi antenna: AF Andronicus, Inc. Model F165-3FB and Model F164-165-3FB
- Omnidirectional antenna, magnetic mount: PCTEL
- Handheld GPS: Garmin etrex Vista HCx, Garmin etrex, Trimble Juno SB
- GPS transmitters: Microwave Telemetry 45g Argos/GPS solar PTT-100 units for California condors
- GSM transmitters: Microwave Telemetry 50g GPS solar GSM 20-70 transmitter, Photo 1
- Tail mount VHF transmitters: Holohil, Model RI-2CM(12)
- Patagial mount VHF transmitters: Advanced Telemetry Systems "micro." Model A5510 and "large" Model Custom2 for adult condor wing mount
- Patagial mount VHF solar transmitters: Merlin Systems, Inc. Model "Condor Wingmount"
- Remote video and still cameras

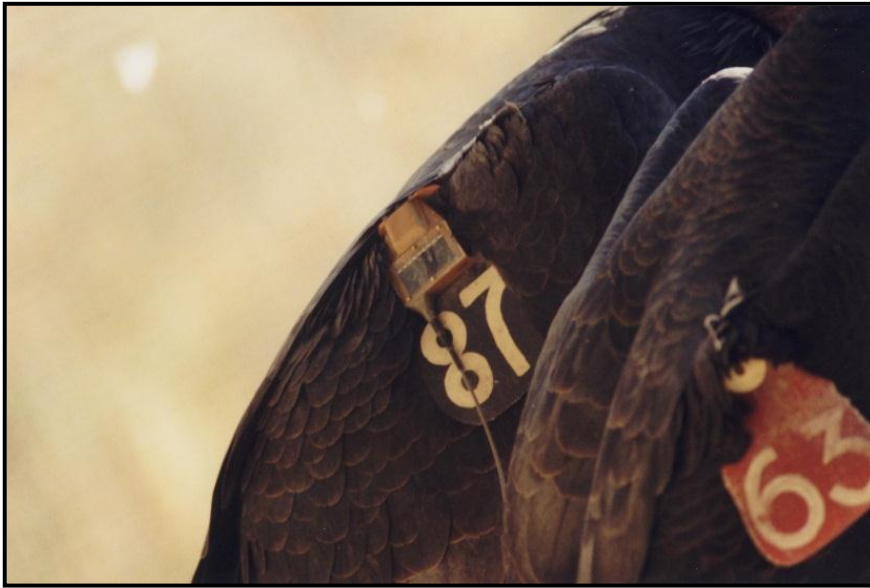


Photo 1. Microwave Telemetry 50g GPS solar GSM 20-70 transmitter

### **Survival Monitoring and Observations**

Approximately one third of the central California condor flock is monitored remotely via GPS wing tags. GPS data are downloaded daily from CLS America and mapped

in ArcGIS. Radio tracking within and around Pinnacles National Park (PNP) is conducted five to seven days per week. Biologists use high points to increase probability of hearing a signal. Monitoring outside of the park is conducted along public roads in San Benito County, portions of western Fresno County, and eastern Monterey County. Prolonged stationary GPS locations or mortality signals, which are triggered by a radio transmitter that is inactive for six to ten hours, are tracked down with handheld receivers and antennas to confirm dropped tags or the presence of sick or deceased condors. This activity takes priority above most others to maximize the chance of treating a sick or injured bird or retrieving a carcass before it decomposes. PNP follows US Fish and Wildlife Service (USFWS) condor carcass collection procedures. Data from daily tracking and monitoring, and all other activities described below, are entered into Access databases and Excel spreadsheets.

### **Trapping**

Trapping condors is critical to maintain patagial vinyl identification tags and functioning VHF and GPS tags on as many individuals in the flock as possible. In coordination with Ventana Wildlife Society (VWS) staff, PNP conducted two trapping seasons in 2013 to measure lead levels in free-flying condors, perform transmitter maintenance, and conduct sampling related to collaborative research studies. The spring trapping season was late April through late June. The autumn trapping season was conducted from the beginning of September to October 31. Opportunistic trapping was conducted throughout the year for transmitter maintenance.

Before handling condors, biologists receive extensive training in handling, bleeding, and inspecting birds at LA Zoo and from experienced co-workers who are already listed on PNP's USFWS recovery permit. Personal protective equipment (PPE) during handling includes eye protection, long-sleeved shirts and pants, closed-toe boots, leather gloves, and latex gloves for inspectors.

### **Nest monitoring**

Biologists monitor active nest sites from survey locations 300-800 meters from the nest depending on topography. They perform nest entries when feasible to confirm egg incubation, hatching, nestling age, general health, behavioral interactions, adult-nestling feeding events, and fledging of young. Biologists enter active nests following standard procedures for egg-checking and nestling checks, conducted at 30, 60, 90, and 120 days of age. Once a nest site is confirmed, biologists enter the nest when an egg is approximately 30 days old to check if it is fertile. We use a high-powered flashlight in a dark space to view inside the egg. If an egg is fertile, we weight it, measure it and leave it in the nest. If an egg is not fertile, we remove it from the nest and place an artificial egg until an egg laid in captivity is available to replace the artificial one. During nest entries PPE includes all appropriate climbing equipment, eye protection, and leather and latex gloves to ensure staff and condor safety. Biologists or a veterinarian check a nestling's blood lead levels, general health, and vaccinate it against West Nile Virus, following scheduling protocols. If a nestling has high lead exposure it is evacuated from the nest for emergency care. Biologists sift nest sites for egg-shell fragments and micro-trash, which are removed when found. Annual nest entry trainings are conducted at PNP and "mini-trainings" are organized to keep staff experienced with relevant technical skills, Photo 2.

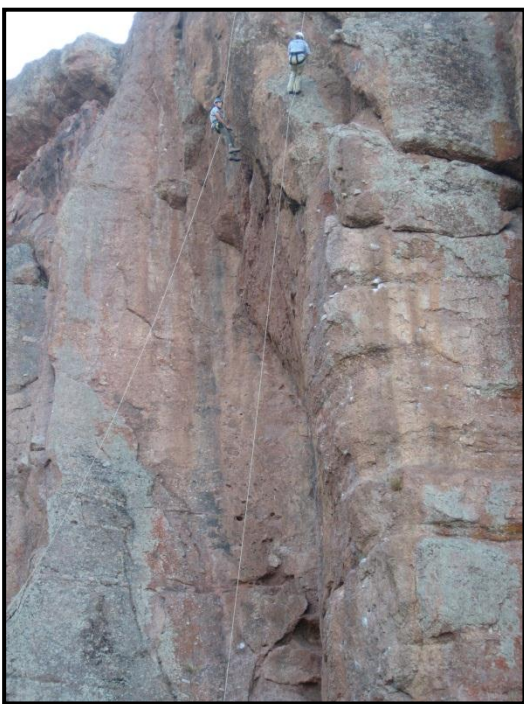


Photo 2. Nest entry training at Pinnacles.

### **Baiting**

Biologists use "clean" food supplies acquired from organic dairies and place these carcasses approximately twice a week at one or two of the established bait stations in the park. Pig and or deer carcasses may also be fed to condors but only after they are radiographed to ensure there are no foreign or metallic objects in the carcass, such as spent ammunition. Bait stations include the captive pen, Hilltop semi-permanent bait site, and Command Post temporary bait site. Established safety requirements include proper PPE, four-wheel drive training, and placement of carcasses by at least two biologists. Carcass placements are conducted at night to minimize interactions with

condors and any associations with humans as food suppliers.

### **Remote Monitoring**

Remote video cameras stationed at the captive facility and Hilltop bait site record real-time data that biologists review to observe individual birds. In addition, memory cards from motion-sensitive cameras at Command Post and Hilltop bait sites are retrieved each time food is placed and still photographs are reviewed for presence of birds. Weight data are collected using scales

with perches mounted near bait. Still photos and video allow biologists to track the weight and general condition of free-flying condors.

### **Non-proffered Food**

When condors are observed feeding on non-proffered food, biologists identify the species of the carcass when possible. Observing condors feeding on private land from public roads means carcass species identification is not always possible. Landowners are only contacted in reference to a carcass on their property when there is a specific concern, such as a carcass suspected of being contaminated.

### **Monitoring Captive Birds**

Captive condors are held at the captive pen (Photo 3) to minimize interactions with humans. An electrified power pole at the flight pen delivers negative reinforcement to modify condor behavior and discourage them from landing at or near power poles when they are in the wild. During handling and prior to initial releases of young juveniles, biologists monitor captive condor health and interactions at the captive pen and through remote video.



Photo 3. Captive pen, Pinnacles National Park.

### ***Management***

The main threat to the recovery of the central California condor population is lead exposure, predominantly from ammunition fragments in scavenged carcasses. Other risk factors may include micro-trash

consumption, West Nile Virus exposure, electrocution at or near power poles, and human interactions. Pinnacles biologists adhere to standard procedures and established protocols to study and reduce the impact of these risks.

### **Treatment**

#### **Lead exposure treatment**

Trapping condors allows for tag and transmitter maintenance as well as managing risk factors that affect their survival. Biologists take blood samples to determine blood lead levels each

time a bird is captured from the wild. LeadCare and LeadCare II Analyzers were used to measure blood lead levels, depending on whether the bird was handled at Pinnacles or in Big Sur, respectively. The threshold used to initiate chelation treatment was a blood lead value of 35 µg/dL or greater. In addition to blood sampling, a new radiograph unit at PNP was used in 2013 to help inform treatment decisions. Condors with blood lead levels above 35 µg /dL on a LeadCare Analyzer were radiographed in the Condor Care Unit (CCU). Radiographs were then emailed to LA Zoo for veterinarian review. Birds with possible metallic densities in their gastrointestinal tract or any bird with blood lead levels above 65 µg/dL were transported to LA Zoo for treatment. Condors with clear radiographs and blood lead levels between 35-65 µg/dL were treated at PNP whenever staffing allowed. Condors with clear radiographs and blood lead levels between 25 and 35 µg/dL, were held in the captive facility at PNP for a lead depuration study.

#### Veterinary care

PNP biologists are permitted to conduct basic first aid to superficial wounds discovered during handling. Any treatment requiring veterinary care is conducted by or under the guidance of a permitted veterinarian in the field, at a clinic, or at a zoo.

#### **Vaccination**

PNP biologists administer West Nile Virus vaccinations and boosters on a schedule provided by collaborating veterinarians. In 2013, the protocol remained the same as recent years, with a goal of vaccinating 100% of the flock on an annual basis. We followed this protocol with the exception of condors that were not captured.

#### **Hazing**

Hazing is needed when condors endanger themselves by staying in close proximity to humans or human infrastructure. Hazing methods vary depending on location and include clapping and running, clapping wood blocks together, using a water cannon, and throwing pebbles near, but not at, a condor.

#### *Collaborative Research*

Pinnacles biologists work closely with researchers at US Geological Survey (USGS) and the University of California (UC) at Davis and Santa Cruz to gather scientific data measuring condor responses to environmental risk factors. We sent blood samples collected during handling, emergency responses, and nest entries to both universities to confirm blood lead levels and to provide a basis for measuring isotopic signatures of lead in condors. Feather samples were also sent to UC Santa Cruz to measure lead exposure events in individual condors over time. These data are being used to confirm which environmental lead sources condors are ingesting and how this affects condor health, behavior, and survival over time.

## *Outreach*

Community, statewide, and large scale outreach all play a role in reducing the risk of condors being exposed to spent ammunition in carcasses on the landscape. The Pinnacles condor program has dedicated the time of one biologist to conducting outreach and working closely with the Institute for Wildlife Studies (IWS), VWS, and other partners to conduct outreach events and related activities. Our outreach program includes: participation in hunter education workshops, shooting demonstrations, working directly with the community surrounding the park, and using a variety of means to educate all audiences on the health risks associated with lead ammunition.

## *Personnel*

Implementing a long-term endangered species recovery program requires consistent staff capacity, which results in well-trained, experienced staff. Our program consists of a manager, wildlife health outreach coordinator, two crew leaders, a biological science technician, and two interns, all working full-time and primarily year-round. An additional wildlife biologist works with the program full-time for half of the year.

The Pinnacles condor volunteer program continued to expand during 2013. Volunteers provide vital program support and receive extensive training prior to assisting in the field. Volunteers are asked to make a commitment to the program for a minimum of two days per month. They assist in tracking, field observations, and a wide variety of logistical tasks that support management of the species. In 2013, 21 volunteers contributed 2,123 hours. In addition, three interns contributed over 3,726 hours. The condor program could not accomplish all of its goals and objectives without the significant efforts and dedication of these individuals.

## **RESULTS**

### *Population Monitoring*

In January 2013, there were 34 condors, 19 males and 15 females, in the central California flock managed by PNP, including three pre-release juveniles. There were five nesting attempts with Pinnacles condors, although none were successful. Two juvenile males (602 and 606) from LA Zoo and one juvenile female (626) from Oregon Zoo were released in January and February. In 2013, there were seven mortalities: 306, 312, 313, 332, 335, 345, and 451. With the loss of seven condors the PNP managed population fell to 27 birds, 14 males and 13 females, by the end of the year.

### Survival Monitoring

Throughout the year, PNP monitored radio and GPS-tagged condors almost daily. We observed condors without functioning tags opportunistically, often when they were near other radio tagged birds being radio tracked. This year, there were 2,002 visual observations of condors by PNP biologists. On 285 days staff recorded at least one visual observation. Whenever possible, biologists closely monitored any condor behaving abnormally and any bird with a GPS tag that did not move in over 24 hours to determine if the individual was injured or ill.

Staff used GPS data downloads to efficiently locate up to a third of the flock at a time and these data often directed where staff focused efforts for a given day. The central California flock used the landscape in all directions surrounding the park. Figure 1 maps the areas used by Pinnacles managed condors and provides a general view of the central California flock range based on some of the condors with GPS transmitters in 2013. Because condors are social, monitoring them via GPS transmitters adds great efficiency to locating all released condors, including those with no functioning radio or GPS transmitters.

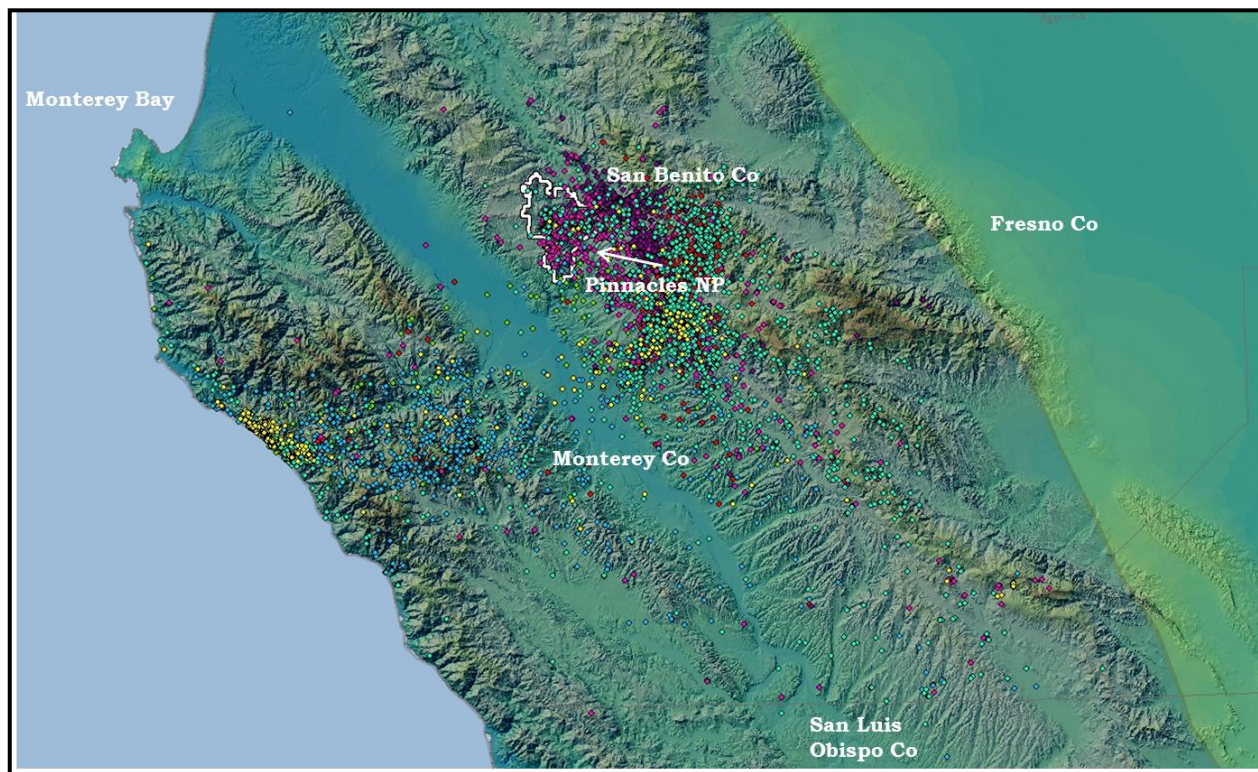


Figure 1. Location data from selected PNP managed condors with GPS transmitters in 2013.

### Mortality

In 2013, seven Pinnacles managed condors died: 306, 312, 313, 332, 335, 345, and 451. Of these seven, four were members of breeding pairs, Table 1.

Table 1. Condor mortality summary, 2013.

| <b>Bird ID</b> | <b>Date Collected</b> | <b>Cause of Death</b> | <b>Attempted Nesting in 2013</b> |
|----------------|-----------------------|-----------------------|----------------------------------|
| 312            | 4/10/2013             | Lead Poisoning        | Yes                              |
| 345            | 5/29/2013             | Lead Poisoning        | Yes                              |
| 335            | 6/6/2013              | Lead Poisoning        |                                  |
| 306            | 6/9/2013              | Electrocution         | Yes                              |
| 332            | 7/3/2013              | Lead Poisoning        |                                  |
| 313            | 8/8/2013              | Lead Poisoning        | Yes                              |
| 451            | 12/8/2013             | Pending Lab Results   |                                  |

### 312

Condor 312 was found dead in San Benito County on April 10, 2013. A USFWS necropsy concluded the cause of death was lead poisoning. Condor 312 was a female hatched on May 14, 2003 at LA Zoo. She was released at PNP on October 29, 2004. 312 paired with condor 313 and attempted nesting for the first time in February 2013. The nest was confirmed as failed on April 3, 2013 due to unknown causes.

### 345

Condor 345 was recovered in San Benito County on May 29, 2013. Based on his USFWS necropsy, lead poisoning was the cause of death. 345 was a male hatched at the San Diego Wild Animal Park on May 16, 2004. He was released at PNP on September 26, 2005. In 2013, he paired with Condor 400 and they started nesting. The nest failed within a month of 345's death.

### 335

Condor 335 was found dead in San Benito County on June 6, 2013. A necropsy performed by USFWS determined the cause of death was lead poisoning. 335 was a male hatched on April 23, 2004 at San Diego Wild Animal Park. He was released at PNP on September 17, 2005.

### 306

Condor 306 was found dead on June 9, 2013 in Monterey County. Based on a USFWS necropsy, the cause of death was electrocution. She was ten years old and was part of a breeding trio including VWS condors 222 and 251. She was hatched at the San Diego Wild Animal Park and was released at PNP on October 28, 2004.

### 332

Condor 332 was recovered in Fresno County on July 3, 2013. A USFWS necropsy concluded that lead poisoning was the cause of death. 332 was a male hatched on April 21, 2004. He was released at PNP on September 17, 2005. He had not been trapped since the fall of 2011 and did not have a functioning radio transmitter, just a GPS transmitter.

313

Condor 313 was found dead on August 8, 2013 in San Benito County. Based on a USFWS necropsy, the cause of death was lead poisoning. 313 was a ten year old male hatched on May 15, 2003 at the LA Zoo. He was released from PNP on October 29, 2004. He successfully fledged two young, 514 and 598, with two different females, 303 and 375 respectively. He attempted breeding again in 2013 with a third female, 312, but their nest failed for unknown reasons

451

Condor 451 was recovered within PNP on December 8, 2013. The necropsy was still pending when this report was finalized. 451 was a six year old male hatched on May 15, 2007 at World Center for Birds of Prey in Boise, Idaho. He was released at PNP on November 6, 2008.

### Trapping

PNP conducted trapping from late April to late June and again from early September through the end of October. In addition to scheduled seasonal trapping, some opportunistic trapping occurred throughout the year, when specific birds were captured for transmitter replacement or other needs. Trapping in 2013 was challenging as more birds used areas outside of the park and did not come to the trap. This will likely remain an issue in future years. Twelve PNP managed condors were not trapped in 2013, however of those twelve, three died before or during the spring trapping season and three more died before fall trapping began. Only seven PNP managed condors were trapped during both the spring and fall. Capture data are summarized in Table 2, which includes Pinnacles and VWS managed condors captured at PNP.

Table 2. Summary of PNP trapping effort and captures of all central California condors at Pinnacles.

|               | <b>Date Range</b>               | <b>Total Handling Days*</b> | <b>Total Captures**</b> | <b>Total Individuals Captured***</b> |
|---------------|---------------------------------|-----------------------------|-------------------------|--------------------------------------|
| Spring        | Late April to late June         | 9                           | 19                      | 19                                   |
| Fall          | Early September through October | 4                           | 7                       | 7                                    |
| Opportunistic | Year round                      | 2                           | 3                       | 3                                    |
|               | <b>All Year</b>                 | <b>15</b>                   | <b>29</b>               | <b>24</b>                            |

*\*Days biologists initially handled any condors trapped at Pinnacles. These include condors caught for health checks, transmitter replacements, or as non-targets.*

*\*\*Number of condors trapped including multiple captures of the same individual during the given time frame.*

*\*\*\*Number of individual condors trapped during the given time frame at Pinnacles.*

## Reproduction

In 2013, there were five nesting attempts in the central California population that involved Pinnacles managed condors, Table 3. Related egg status data are in Table 4.

Table 3. 2013 Nesting attempts by PNP managed birds (in bold).

| Male       | Female      | Estimated Lay Date | Estimated Hatch Date | Outcome                         | Nestling ID |
|------------|-------------|--------------------|----------------------|---------------------------------|-------------|
| 219        | <b>310</b>  | 2/4/2013           | 4/2/2013             | Estimated failure date 9/8/2013 | 693         |
| <b>340</b> | 444         | 2/8/2013           | 4/10/2013            | Failure confirmed 4/17/2013     | 681         |
| <b>313</b> | <b>312</b>  | 2/12/2013          | Failed before hatch  | Failure confirmed 4/3/2013      | N/A         |
| 251*       | <b>306*</b> | 3/14/2013          | 5/8/2013             | Failed                          | N/A         |
| <b>345</b> | <b>400</b>  | 3/24/2013          | 5/22/2013            | Failure confirmed 6/21/2013     | 715         |

\*Trio included 251, 306, and 222. Ventana Wildlife Society 2013 report includes details on this nest.

### *219 and 310*

This pair attempted nesting for a third time in 2013. They were successful in 2010, but failed with their second attempt in 2012. Due to its remote location, this nest was monitored indirectly through the movements of both adults collected via GPS transmitters. Based on GPS data, the nest appeared to be in the same location as in 2010 in Los Padres National Forest. The estimated lay date was February 4 and the egg was estimated to have hatched on April 2. Both parents regularly returned to the nesting area into early September. We estimate the nest failed on September 8.

### *340 and 444*

340 (PINN male) and 444 (VWS female) attempted nesting for the first time in 2013. This was the fifth condor nest within the boundaries of PNP since the beginning of the park's condor program in 2003. Biologists observed courtship behavior throughout January and we confirmed an egg on February 26 with an estimated lay date of February 8. On April 8, the egg was confirmed pipping with an expected hatch date of April 10. On April 15, biologists observed both parents away from the nest for significant periods of time. Nest failure was confirmed on April 17. There was no sign of the nestling but eggshell fragments were collected. Samples are in possession of and will be measured by VWS.

### *313 and 312*

313 (PINN male) attempted breeding for the third time this year and paired with his third female (PINN 312). The nest was located on private property east of PNP. The estimated lay date was February 12. Due to limited access, we monitored the nest using radio-telemetry and GPS data. When biologists visited the nesting area on April 3 neither parent was incubating. Based on GPS and telemetry data, the estimated date of nest failure was April 1. The reason for

failure is unknown. 312 was recovered dead on April 10. Biologists observed 313 displaying to VWS female, 375, on April 3, but these birds did not attempt breeding.

#### *251, 222, and 306*

The central California nesting trio attempted nesting again in 2013 after successfully fledging condor 664 in 2012. The trio consisted of two females (VWS 222 and PINN 306) and a male (VWS 251). The nest was in a cliff cavity that had been occupied in previous years. The nest failed for unknown reasons. Condor 306 was found dead before the nest was confirmed to have failed, pers commun, J. Burnett, February 11, 2014. For additional details on nest monitoring see Ventana Wildlife Society's 2013 annual report.

#### *345 and 400*

345 (PINN male) and 400 (PINN female) also attempted breeding for the first time in 2013. The nest was located on US Forest Service land that was visible and accessible from private property. The landowner supplied visual updates and the nest was monitored by GPS data, radio tracking, and nest entries. The estimated lay date for this nest was April 24. Approximately one week after suspected hatch, 345's carcass was recovered. 400 continued to visit the nest into June. The nest was confirmed as failed on June 21, cause unknown.

Table 4. Egg status for Pinnacles-managed condor pairs, 2013.

| <b>Egg ID</b> | <b>Estimated Lay Date</b> | <b>Pair</b> | <b>Hatch Date</b> | <b>Hatch Location</b> | <b>Rearing Method</b> | <b>Studbook</b> |
|---------------|---------------------------|-------------|-------------------|-----------------------|-----------------------|-----------------|
| PN113         | 2/8/13                    | 340/444     | 4/10/13           | Wild Nest: LP11       | Parents               | 681             |
| PN213         | 2/4/13                    | 219/310     | 4/2/13            | Wild Nest: TR         | Parents               | 693             |
| PN313         | 2/12/13                   | 313/312     | N/A               | Wild Nest: RS         | N/A                   | N/A             |

#### **Baiting**

Proffered carcasses were placed at three locations in PNP: captive pen, Hilltop, and Command Post. Most of the carcasses were calves procured from organic dairies in Modesto, CA. In 2013, we placed 114 calves and one pig for condors. Of the proffered carcasses, 52 calves were used to bait the captive pen and feed any condors that were captive. During trapping seasons, carcasses were placed exclusively at the captive pen to increase trapping success.

#### **Remote Monitoring**

Over 80,000 GPS locations were downloaded during 2013 from transmitters on 13 Pinnacles managed condors. Twelve of the GPS transmitters, which collected 38,160 location points, were traditional Argos models and one was a Microwave Telemetry GSM transmitter, which collected 43,241 points over approximately six months. To supplement radio and GPS monitoring, thousands of still photos and video hours were collected throughout the year. Still photos from

cameras at bait stations, such as Photo 4, were reviewed regularly and video were reviewed as needed.

### **Non-proffered Food**

Biologists observed condors feeding on non-proffered food a total of 22 times with a total of 153 different visual observations of condors feeding. Of those 22 times, we were able to identify the species of carcass ten times: two cows, one pig, one horse, one deer, one badger, two individual coyotes, and one feeding event on six coyotes.



Photo 4. Photo taken with remote still camera.

### *Management*

#### **Captive-bred Releases**

Three juvenile condors were released at PNP in January 2013.

Two were males (602 and 606) from LA Zoo and one was a female (626) from Oregon Zoo. All three were transferred to PNP in November 2012. 602 and 606 were released one day apart in late January. They immediately began roosting at communal roost sites and feeding at proffered bait sites. We held 626 longer due to minor behavioral concerns and released her on February 27. She immediately flew to the High Peaks and was not seen feeding or socializing with other condors for over two weeks. She was monitored closely by staff, who considered alternate feeding sites. However, on March 16, she returned to the bait sites and began integrating into the flock. 626 was the first of the three 2013 juveniles to cross the Salinas Valley and feed at the VWS bait site. All three have been seen feeding on proffered and non-proffered food and regularly interacting with the rest of the central California flock.

### **Treatment**

#### Chelation

In 2013, nine Pinnacles condors were treated for elevated blood lead levels. Only one bird was treated more than once. Condor 340 was treated three times during the year. Chelation treatment for birds with lead values between 35µg/dL and 65µg/dL were usually treated in PNP's CCU when staffing allowed. All other treatments were completed at LA Zoo. Pinnacles staff treated six condors in the CCU, including three VWS-managed condors.

### Radiographs

When condors had elevated blood lead levels based on the LeadCare Analyzer, radiographs helped determine whether any opaque object was within the body. Veterinarians at LA Zoo radiographed ten Pinnacles condors (340, 400, 401, 411, 418, 448, 460, 463, 481, and 550) during 2013. Seven of those ten were radiographed one time and three were radiographed on two occasions. This year six radiographs were also done at PNP to inform decisions on treatment location for birds with high blood lead levels.



Photo 5. Pinnacles National Park Condor Care Unit (CCU)

### Surgeries

In 2013, condors 340 and 463 each had surgical repairs on their left wing patagial holes while at LA Zoo. In addition, condor 606 had his patagium repaired at the Avian and Exotic Clinic of the Monterey Peninsula. The patagium is the skin along the leading edge of the wing, where radio transmitters and identifying tags are attached. All three birds recovered completely.

### **Vaccination**

In 2013, West Nile Virus vaccinations were given to 15 Pinnacles condors, following the existing vaccination protocol. Condors not captured did not receive a vaccination.

### **Hazing**

Pinnacles biologists hazed condors on 13 different occasions during 2013. Of those events, all involved Pinnacles condors. The condors were hazed for a variety of reasons and using several different methods. Seven birds were hazed after landing close to people and trails. Twelve birds were hazed due to their close proximity to a road. Two birds were hazed away from the facility during handlings. Of the condors hazed by Pinnacles staff, five had to be hazed more than once: 340, 401, 411, 481, 606, and 626.

### *Collaborative Research*

#### **Case Study of Lead-related Mortality**

Researchers at UC Santa Cruz are finalizing a comprehensive assessment postmortem of Condor 318, whose death was due to lead poisoning in 2012. This research will provide additional critical information on lead exposure events in California condors. Lead isotopic composition and concentration analysis of multiple tissues (e.g., bone, liver, kidney feather, blood) will produce a detailed assessment and generate information needed to document the bird's lead

exposure history, as well as identify possible lead sources that the condor was exposed to prior to death. Research will be completed by April 2014.

### **Feather and Blood Lead Isotopic Fingerprinting**

Evaluating lead concentrations and isotopic compositions in sequential feather segments from individual birds provides critical information on the degree, frequency, and severity of lead exposures in California condors. In 2013, Pinnacles continued collaboration with Dr. Don Smith's Environmental Toxicology Laboratory at UC Santa Cruz on projects analyzing blood and feather samples for lead concentration and isotopic ratios. In support of this research, we measured and marked at least one growing feather when a condor had any growing primaries at the time of capture, Photo 6. If a condor had molted a previously sampled feather, we collected another sample when possible. During 2013, a total of 37 feathers were notched for measurement on 32 individual condors. We collected 77 measurements made during the year. We also collected one feather sample each from four individuals during handlings and another ten feathers from six individuals post-mortem.

In addition to feather studies, blood lead isotope ratios were analyzed at UC Santa Cruz. During each initial handling of a condor we collected a blood sample and, when possible, a second sample was collected at a later date. In total, PNP biologists collected 32 blood samples from a total of 25 condors for this study. Condor isotopic ratios can be compared to ammunition and other possible sources of lead exposure.



Photo 6. Feather sampling, marking or measuring

### **Feather Growth Rates**

If a condor was held in the captive pen for a week or longer for chelation or another management issue, or if a bird was trapped twice while a single feather was growing, biologists collected feather length measurements on multiple dates of the same primary feather. The goal of these measurements was to determine how consistent

feather growth rates are over time. We continue to collect these measurements opportunistically.

### **Lead Sampling**

Biologists at Pinnacles continued semiannual condor blood lead level sampling during spring and fall trapping in 2013. We also collected additional blood samples at other times of the year

when a condor was trapped for transmitter maintenance or other needs. We sent blood samples for lead analysis to the California Animal Health and Food Safety Laboratory, UC Davis. Labs conduct more precise testing than Lead Care Analyzer kits, which are suitable for field use. Results of these analyses were provided to USFWS and are not included here.

### **Trash in Condor Nests**

During condor nest entries, biologists inspected the nest surface and sifted the substrate to document the presence of any anthropogenic material. When nestlings are present biologists palpate them to identify foreign material when possible. In 2013, one nest was checked for microtrash and none was found. Due to its remote location, we did not enter the nest used by 219 and 310. We will continue to remove any trash from condor nests to determine its quantity, type, and weight.

### **Chelation Effectiveness**

To better understand chelation effectiveness in California condors, we took blood samples from birds that required treatment after they received two and four chelation treatments and then analyzed these samples for their lead values. These data should indicate how fast chelation treatment reduces the lead load in condors. In addition, we assessed natural lead depuration when treatment was not given. This was done by collecting blood samples once per week for a two week period from condors with field lead values  $>25$  and  $<35$   $\mu\text{g/dL}$ . These data may help inform future chelation effectiveness research. This work will continue in 2014.

### ***Outreach***

A large component of the condor recovery program is educational outreach and interpretation. Being a release site in a national park, our heightened public recognition gives us an opportunity to reach an audience of thousands from all over the country and the world. Providing the public with information about the natural resources in the park and the surrounding landscape is an essential pathway to inspire environmental consciousness and enthusiasm, as well as, one of our duties as a park.

In 2013, the condor program's interpretive contacts more than doubled those of 2012. Biologists radio tracking along trails provided visitors with a resource to create a unique outdoor educational experience. Visitors engaged with park staff to see condors, ask questions, and receive information about condor biology and management issues. While tracking along trails, condor program staff spoke with over 3,600 park visitors. Biologists also interacted with 280 visitors at the PNP Campground and over 120 individuals while radio tracking outside of the park. We presented formal programs at PNP and other locations out of the park to further engage with the surrounding community and provide school or volunteer organizations with information about the program. Condor biologists spoke to over 200 individuals at these events.

Lead outreach is recognized as one of the most important tools to positively impact condor recovery throughout California. PNP staff employed varied outreach funds and efforts to educate diverse groups on the impacts of lead on condors, other wildlife, and human safety, as well as the benefits of removing lead from the landscape. Our primary partner for non-lead outreach was IWS.

### Targeted Non-lead Outreach

Targeted non-lead outreach by Pinnacles Wildlife Health Coordinator and IWS are summarized below in Table 4. However, in coordination with VWS and USFWS, PNP also accomplished significant outreach including, but not limited to, technical support for VWS's Free Non-lead Ammo program and many informal discussions with local hunters and ranchers.

Table 4. Non-lead Outreach Conducted by IWS in Coordination with PNP.

| Date(s)      | Event                                                   | Contacts |
|--------------|---------------------------------------------------------|----------|
| 1/10-13/2013 | Sacramento International Sportsmen's Expo               | 1200     |
| 1/17-20/13   | Denver International Sportsmen's Expo                   | 800      |
| 2/11/2013    | Pinnacles National Park Ceremony                        | 50       |
| 2/21/2013    | California Coalition of Outdoor Sportsmen               | 200      |
| 3/16/2013    | Hunter Education Instructors Conference, Gilroy         | 200      |
| 4/6/2013     | San Diego Hunter Education Instructors                  | 200      |
| 4/27/2013    | Blue Lake Hunter Education Instructors                  | 200      |
| 5/4/2013     | Cañada de los Osos Advanced Hunter Ed                   | 50       |
| 5/19/2013    | CA Foundation of Birds of Prey                          | 200      |
| 5/22/2013    | Placer County Fish and Game Commission                  | 12       |
| 6/15/2013    | Cañada de los Osos Advanced Hunter Ed                   | 50       |
| 7/3/2013     | KCSO: California Gun Talk Radio                         | *        |
| 7/13-14/2013 | Nevada Hunter's Education Instructors Annual Conference | 70       |
| 10/17/2013   | Central Coast Rangeland Coalition Fall Meeting          | 50       |
| 12/10/2013   | Ranchers/Pesticide Applicators Workshop, Hollister      | 50       |
| 12/20/2013   | NPR Marketplace                                         | *        |

*\*Contacts could not be estimated for these two events.*

Some additional outreach methods are more difficult to quantify the number of people reached, such as: media, requests for assistance from partners, electronic toolkits sent to other NPS units or other organizations, NPS unit coordination, and the production of outreach material for public information. PNP also worked to create a new video on hunting with non-lead that will be available for review in spring 2014.

### General Community Outreach

PNP is surrounded by private lands which provide condors and many other native wildlife species with important habitat. Pinnacles outreach program includes building relationships with land owners and managers to foster communication, help address any human/wildlife conflicts, and to build trust within the community. Ranching and hunting lifestyles are not only

compatible with, but are necessary to support condor recovery in central California. Working together with the community we hope that these traditions remain viable in the lands surrounding the Park. We request permission to access private land as needed to follow up on dropped transmitters, GPS-tagged birds that have not moved in more than one day, or possible nesting activity. These informal meetings and radio tracking along public roads create opportunities to answer questions about the condor program and interact in person with land managers and owners who can have a direct positive impact on condor survival.

## **RECOMMENDATIONS AND DISCUSSION**

### *Monitoring*

Maintaining staff capacity and efficient monitoring creates a well-rounded program that includes outreach and research components that are coordinated with condor management. GPS transmitters have increased monitoring efficiency and made observations of condors in the wild more likely as staff know where to focus their efforts while radio tracking after viewing downloaded GPS data. With a greater number of birds with GPS transmitters we could streamline our monitoring further while simultaneously collecting more data. In addition, although nest monitoring via radio tracking, observations, and GPS transmitters are sufficient to determine nest location and outcome, these tools cannot necessarily address questions on the fate of an egg or nestling. We recommend increasing the number of central California condors fitted with GPS transmitters and installing nest cameras whenever possible in future years.

### *Management*

With five condors dead due to lead poisoning in 2013, lead in the environment remains the primary threat to condor recovery in the central California flock. Condors will continue to use the public and private lands surrounding PNP that offer excellent foraging and roosting habitat. Addressing the threat of lead on these lands is an ongoing need and focus, as is providing the best care possible to condors exposed to lead. In particular, a greater understanding of the efficacy of chelation treatment will help all condor recovery programs and release sites determine when it is most useful. We recommend chelation treatment for condors be further researched and reviewed to increase our understanding of the options it provides. NPS has received some funds for a chelation efficacy research study that will begin in late 2014.

### *Research*

Each research project conducted to date has informed management decisions that affect the recovery of the species. Pinnacles biologists continue to work closely with researchers and we will continue to prioritize the collection of samples and data that support scientific research. With funding for research limited, we recommend condor programs at different release sites work together and discuss highest priority needs, research proposals, joint funding opportunities, and collaboration on a yearly basis.

## *Outreach*

2013 was a transition year for Non-Lead Outreach. PNP and IWS staff held a strategy meeting in March, identifying the need to redirect messaging and refocus our target audiences and venues. Significant events influenced this planning, including the death of multiple PNP condors due to lead; USFWS working with wind developers and obtaining mitigation funds for non-lead outreach; and the passage of AB 711 by the California state legislature, banning the use of lead ammunition for the take of all wildlife throughout the state of California by 2019.

With the death of so many condors early in 2013, we developed a Common Ground Strategy. Based on work by the Blackfoot Challenge, this strategy identifies the mutual goals of our local ranching community and condor recovery. This program builds on existing efforts to increase partnerships, communication, and cooperation between private landowners and wildlife conservation. These efforts will be further complemented by a potential southern California outreach program being developed by USFWS. The passage of AB 711 will affect long term outreach efforts more than any other factor in 2013. Scheduled to be fully implemented by 2019, we expect AB 711 will impact ammunition manufacturing and the discussion of non-lead ammunition on a state, national, and global scale.

Outreach successes during 2013 included: continued participation at International Sportsmen's Expositions in both Sacramento and Denver, Hunter Education venues in California; the development of a mobile outreach kit used in partnership with Saving Our Avian Resources at the Iowa Deer Classic and with Cable Museum of Natural History in Wisconsin and Craighead Beringia South at the Wildlife Society meeting in Milwaukee, WI. The VWS Free Non-lead Ammo Program and support from IWS and a private donor to make over 200 boxes of difficult to find non-lead .22LR ammo available to San Benito County ranchers were especially beneficial to the program.

Challenges to outreach this year included budget constraints related to federal sequestration, resulting in limited travel for outreach and a lack of additional funding to continue support for NGO outreach, specifically IWS, after January 2014. Another major challenge was the lack of available ammunition, sparked by political campaigns for and against stricter gun regulations on a national scale that led to a "run" on ammunition and resulting in shortages.

Outreach efforts continue to be critical to inform the public's perception of non-lead ammunition and understanding how lead affects all wildlife species. Outreach gives us the opportunity to highlight the importance of a hunter's role in condor recovery and how hunting, as well as ranching, provides forage and habitat for the condor. Outreach is not a short-term effort but builds over many years. Changes in attitude toward lead in the environment are happening. These changes have been observed over multiple years when staff and cooperators participate in the same sportsman's events. However, because changes in attitudes occur slowly, an immediate reduction in condor lead exposure is unlikely. That will likely take many more years. Development of a social metric to gauge changes in awareness of lead impact to wildlife health and the transition to non-lead ammunition would increase our ability to monitor the effectiveness of outreach efforts over time.

Developing strong partnerships will continue to be an important step in successful outreach efforts. Fostering inclusion and cooperation while addressing the issue of lead exposure will help us understand and appreciate our audience and partners better. As new partnerships are developed we will increase our capacity for outreach and ability to work toward a positive solution.

Radio tracking beyond park boundaries provides opportunities for biologists to interact with the public and communicate directly with local landowners. We continue to build relationships with our surrounding community to increase communication, which supports many aspects of our program. We recommend condor recovery programs across the western US work together on an outreach program that diverse audiences can understand. Each program can learn from the successes of others to date and fine tune messaging that is best suited for the audience they work with most. At PNP, we will continue with outreach at multiple scales, including our surrounding community.

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