

# California Condors in the Grand Canyon Area

June 29, 2000 - December 15, 2000

*These notes are listed in reverse chronological order.*

## **December 1, 2000 - December 15, 2000--Chris Parish**

Fourteen California Condors remain in House Rock Valley investigating the new arrivals in the two holding facilities, straying only a day or two at a time towards the Colorado River corridor. Condor 176 remains true to her recent behavior frequenting the Mt. Trumble/Toroweap area almost always returning to the Hurricane Cliffs within a day or two.

At 0830 on December 6, 2000 crew members Blake Massey and Lisa Fosco opened the west door of the hack box to release the first adult, "breeding-age" pair (Condors 074 and 082) in the history of the recovery effort. That's right, you haven't seen any condor numbers beginning with "0." That's because these are older, "paired" adults hatched in 1992. As a sign of how far the captive breeding program has come, the annual release of juveniles on December 29 will consist of six and seven-month-old condors with numbers in the 200 series. If you're not confused at this point, hang in there.

After approximately three hours it was quite obvious that this adult pair would need some type of stimulus to entice them out of the box. After all, these condors have been in captivity for eight years. The next day the door was re-opened. This time however there was a fresh carcass placed outside of the hack box. Condor 074 (male) made his way to the door almost immediately. After feeding only briefly and possibly realizing his lack of confinement, he took to the air with a few loud and powerful wing beats. After eight years in captivity the effort to put nearly twenty pounds in flight seemed effortless.

The female, Condor 082, remained in the box for only a short time before the lure of the carcass was too much to resist. Apparently, Condor 082 had a slightly different agenda for the near future. She wearily fed at the carcass off and on for a full hour. By this time the other free-flying condors located the other carcass nearby. When Condor 082 attempted to approach that carcass, she was promptly chased out of sight by male Condor 123. There is a hierarchy at a carcass of which Condor 123 is close to or at the top. This incident wasn't indicative of the normal hierarchy however. This seemed more aggressive. Although we were unable to witness the end of the confrontation, it is interesting to note that several days later Condor 123 had several cuts and scrapes visible.

Condors 082 and 074 seem to be following similar patterns as previous releases of juveniles and sub-adults. Most of their time has been spent in abnormal roosting areas with short yet encouraging flights increasing by the day. It will be interesting to see the change in behavior when they re-unite.

The second scheduled release of another set of pair-bonded adults was postponed on December 13 due to poor visibility after a winter storm that left almost eight inches of snow on the Paria plateau. This will also allow us the opportunity to closely monitor Condors 082 and 074.

At this point we are expecting to remain on schedule for the upcoming annual release of seven juveniles

and two sub-adults on December 29, 2000. The public is invited to congregate below the Vermilion Cliffs to observe the release at 11a.m. Follow Highway 89A for 27 miles west of the Marble Canyon Bridge and turn right (north) on House Rock Valley Road for three miles. Weather permitting, the roads are easily passable in two-wheel drive passenger vehicles and will be clearly marked on December 29. Bringing spotting scopes or binoculars and a lawn chair will enhance the experience.

Until next time.....

### **November 15, 2000 - November 30, 2000--Chris Parish**

Once again winter habits seem to be holding true to observations in past years with two exceptions. Condor 176 and Condor 149 have been our two adventurers this month. Condor 176 has been spending time at, or near, the Hurricane Cliffs' release site. Let's first define "near" for condors. On November 15, "near" was somewhere across the Nevada state line. Her signal was located by fixed-wing-aircraft while flying in a circle encompassing Marble Canyon, Kaibab Plateau, downstream to Lava Falls, northwest towards the Grand Wash Cliffs, and back to Kanab, UT through the upper Hurricane Valley.

On November 16 new crewmember Adam Hutchins and I headed for the Hurricane release site. Condor 176 was back "near" the old release site again. Her distance traveled added up to nothing more than an hour flight or less. Our travels to locate a condor "nearby" included a four-hour flight and approximately three hours driving time from Marble Canyon to the release site.

It was suggested that when we take carcasses to the Hurricane site we should spread them far apart. Eagles and coyotes at times do a fair job of defending carcasses from other scavengers, including a single condor. Only a short time after placing carcasses on the cliff top, Adam reported a pair of Golden Eagles, a Bald Eagle, a coyote, and Condor 176 had found them. Adam reported Condor 176 being flushed by eagles several times before early afternoon of the following day.

Our other traveler has been Condor 149, again traveling fairly nearby (60 miles as the condor flies). For us, however, it's another 2.5-3.0 hour drive. Not knowing Condor 149's location, I intended to check the South Rim of the Grand Canyon for signals. Surprised, yet far from disappointed, Condor 149's signal found my receiver. After confirming signal movement and location, it was back to the site to check on the other thirteen condors.

Activities around the original hack box and the new flight aviary are fairly normal, with the free-flying condors investigating both locations on a daily basis. A few unexpected visitors, however, have frequented the boxes. On November 19 crewmember Helen Johnson reported a Golden Eagle near the hack box. This alone is not unusual, but the events to follow are surely a first. Interested in either the condors or carcasses in the box, the Golden Eagle landed on the hack box. Condor 123 flew in, landed next to the eagle and proceeded to attack. Helen reported that due to the attack the eagle had fallen backwards off of the box and to the ground. The fight didn't end there. The Golden Eagle then returned to the box, footing Condor 123. By now Helen was torn between monitoring the encounter and flushing the eagle. After what probably seemed like several minutes of footing and biting, the eagle left the area. Condor 123 preened and scratched feathers from his mouth, but seemed ok. Wow!! Throughout the years we have witnessed condor-Golden Eagle interactions usually surrounding carcasses, but never a condor attacking a Golden Eagle. It is also interesting to point out that Condor 123 is one of our eldest birds showing courtship behavior "associating" with Condor 119. Is the aggressive behavior part of the maturing process? The questions are endless. We will continue to monitor their behavior.

If the eagle-condor interactions weren't enough, coyotes have also taken a liking to frequenting the boxes. So far these interactions seem to be useful in educating the young condors. The coyotes have been observed charging the box while the young birds flush from the carcasses. It is this type of behavior that the youngsters will need to get through the first five to six months after release.

The first set of condors set to be released were tagged on November 28. Four adults, two sub-adults, and two fledglings were examined, weighed, tagged and placed back into the enclosures. The two sets of adults will be released one pair at a time during the first and second week of December. The release of the remaining fledglings and sub-adults will take place by the end of the year bring the wild Arizona population back to 28.

### **October 9, 2000 - November 15, 2000--Bill Heinrich**

Since they were re-released on August 26 and October 3, there have been no major movements among any of the 15 condors. They have been spending most of their time on the Vermilion Cliffs and near the south rim of the Grand Canyon. For food they are now relying on the carcasses that we are placing in strategic locations.

The big news is the arrival of 13 more condors on November 8 to the Vermilion Cliffs. For more information on the transfer of these condors, please see our [press release](#).

Special thanks to Jeff Humphrey with the USFWS, Ram Mapston and Ferron Leavitt with the BLM, and Sylvia Harriss with the Arizona Game and Fish Department for helping transport the condors from Marble Canyon to the release site. We would also like to thank the U.S. Forest Service pilots, Eldon Askelsen and John Stight, who helped set up the transfer and actually flew all 13 condors from Boise, Idaho to Marble Canyon.

All 13 of the condors will be released by the end of December. We will begin by releasing one of the adult pairs followed by the second adult pair a week later. We have a tentative date to release the remaining nine younger birds on December 27th.

Regrettably, Shawn Farry has elected to move on and pursue other opportunities. Shawn has been a tremendous asset to the program and will be missed by all of us. Shawn first began working for The Peregrine Fund as a Peregrine Falcon hack site attendant in Wyoming in 1993. He began working on the Arizona condor release program full-time in the spring of 1996, well before the first birds arrived at the release site that October. We owe much of the program's success to Shawn's leadership and undaunted dedication to the condors over the past four and one half years. We hope to follow his expertise and seek his advise wherever his talents land.

Chris Parish, former California Condor Coordinator for the State of Arizona Game and Fish Department, has agreed to fill the vacancy left by Shawn and began working full-time for The Peregrine Fund in early November. Chris has worked hand and hand with Shawn and the rest of The Peregrine Fund crew and our cooperators for more than three years. With all of Chris's wildlife experience we expect to have a smooth and positive transition. We will continue working closely with Shawn while he begins summarizing much of the data that has been collected over the past four years.

In the very near future we will have another update with more detailed notes from the field.

### **September 1, 2000 - October 9, 2000--Shawn Farry**

We left off at the end of August with 10 birds back in the wild and six birds awaiting release in the Vermilion Cliffs' hackbox. During the first week of September all 10 free-flying birds continued the pattern of staying very close to the VC release site. The lure of easy food and six birds in the box was keeping them close as we had hoped.

When the birds remain sedentary, as they had been during the last week of August and first week of September, they are not only easy to track, they are easy to observe. Taking advantage of such situations occasionally pays off with unexpected and exciting results. Such was the case on September 7 for both Gretchen Druliner and Janelle Cuddeford. Gretchen and Janelle were separated by 1.5 miles and 1,000 feet of red sandstone cliff, Janelle below and Gretchen "up top." However, at 0857 both fortuitously had their spotting scopes trained on Condors 119 and 123.

From the September 7 field notes: "0856 - Condor 193 is lying on the same thin (3") branch he has been on all morning. 0857 - something spooked Condor 193, he is nervous, standing tall, craning his neck. Condor 119 swoops in landing next to Condor 123. Condor 193 obviously saw her coming. Condor 193 settles back down lying on his little branch. Condor 123 turns to Condor 119, drops and spreads his wings then dips and sways his head. Condor 123 is courting 119! Condor 123 appears to be repeatedly attempting to step up on Condor 119's back. 0901 - After four minutes Condor 119 appears agitated and unreceptive to Condor 123's advances. After nipping several times at Condor 123 she jumps up to a higher rock. Condor 123 does not follow."

While we did not observe any additional courtship, the behavior of these same two birds on September 9 was even more interesting. At 1037 Condors 119 and 123 were once again observed "associating." Again, there was no observed courtship, only extensive mutual-preening. While mutual preening, especially of the head and neck is a component of pair-bonding, we often see this behavior exhibited by young birds of both sexes. Therefore, we can only assume that as the birds reach maturity such pair-bonding activities are more serious. Additional evidence of pair-bonding was observed at 1305 when Condor 119 and 123 were observed, again from that day's field notes, "flying in tandem and tail-chasing." Such synchronized pair flights are yet another pair-bonding behavior. However, the day was not over yet. At 1310, both Condor 119 and 123 were observed entering a small cave in the cliff face where both remained for the duration of the day. Prior to this observation we had never seen birds enter any similar caves or crevices. Therefore, based on the other "pair-bonding" activities observed, we can only suspect that this may be the very early stage of serious pair-bonding and nest site selection behavior.

Unfortunately, the exciting observations on September 9 of Condors 119 and 123 were to be eclipsed by an event foreshadowed earlier in the day's field notes. At 1005 Helen Johnson recorded the presence of a Golden Eagle flying in the vicinity of the release site. As we unfortunately were to find out, close to home does not always mean safe. After growing suspicious after a lack of signal movement and no visual observations on Condor 184, an attempt was made to walk in on her signal. At 1450, our fears were realized when Gretchen Druliner came across the carcass of Condor 184. The 2.5-year-old female originally released at Hurricane Cliffs was found at the base of the cliff only 1/2 a mile from the release site. Preliminary evaluation indicated that an eagle had fed upon Condor 184, however, cause of death could not be determined. Subsequent necropsy findings can only confirm post-mortem feeding on non-consumed portions of the carcass. Therefore, while an eagle is the most likely suspect, eagles will scavenge and therefore predation cannot be completely confirmed. In past field notes I reported that experienced birds are less vulnerable to predation than younger birds. This apparently is not always the case. FYI, eagle related mortalities of Condors 142 and 197 both occurred in mid-winter and most likely

involved resident eagles. However, this incident most likely involved a migrating eagle that lacked experience with condors.



On the positive side, on October 3, we released Condors 127, 134, 149, 158, 162, and 187 bringing the total in the wild to 15. Therefore, despite a long tough summer all condors in Arizona are once again healthy and free flying. During the last two weeks of September the movements of the birds picked up with an almost daily "shuttling" of birds to the South Rim and back. Fortunately, stays at the South Rim have been short and curiosity levels relatively low. As I mentioned in the August 1, 2000 notes, the makeup of this fall's arrivals has yet to be finalized, however, it may include as many as seven young of the year along with several older birds. Thanks again to all those who contributed time and energy this summer to keep the condors flying! Until next time.

### **August 16, 2000 - August 31, 2000--Shawn Farry**

Trapping and re-tagging our free-flying condors has become rather routine over the last 3.5 years. After trapping we remove old or failed transmitters and affix new transmitters with cable ties, nuts and bolts, dental floss, and super glue. Really! The birds are weighed, given a health check, and transmitter signals are double-checked. Then, the condor is carried toward the cliff edge and gently released on the ground. Typically, the condor takes a few seconds to regain its composure, then takes to the air, catching the strong uplifting winds generated along the sheer sandstone walls. We have done this dozens of times without thinking twice about it. However, on August 26, 2000 releasing condors back into the wild was very different. After losing five birds this summer, to say we were a bit apprehensive is an understatement.

However, the time had come to start getting the condors back into the wild. The first birds to go were Condors 126, 176, and 184. All three had come in with low lead levels and were never considered to have had significant exposures. We believe Condor 126, a 5.5-year-old female, had remained separated from the main group throughout the period during which they ingested the lead and therefore had not been exposed. Condors 176 and 184, on the other hand, are low ranking 2.5-year-olds and while they were present with the group during the time in which the lead pellets were ingested, they may have been "out competed" by older more dominate birds. While we did lose two members of their cohort (Condors 182 and 191), of the 16 birds that survived, the four that had the lowest blood lead levels happen to be the four youngest. Coincidence, maybe, maybe not.

To release the birds we decided to wait until later in the day. Reason being, we wanted them to stick around. After weeks in "the box" we didn't want them to bolt, especially back to the South Rim. Releasing them late gives less opportunity to make any immediate long flights. At least that's the theory. It doesn't always work though. On April 2, 1999 we re-released the "extremely curious" Condor 186 after his "first-strike." It was getting dark, strong winds, drizzly rain. "He's not going anywhere" was muttered many times just prior to Condor 186's 30-mile flight to, and disappearance into, the western Grand Canyon.



**Shawn Farry checks transmitters on a condor before its re-release.**

Back to the present. One at a time, Condors 126, 176, and 184 were removed from the holding pen, re-transmitted, and released. The first to go was Condor 176. This was fitting, as she was the first bird trapped back in June. As Condor 176 caught the uplifting winds along the cliff face, an adult female Peregrine came up to meet her. A pair of Peregrines had nested in close proximity to the holding pen this year, however, due to the condors' confinement they had yet to interact with them "in person." Unfortunately, Condor 176 took the brunt of the Peregrines attention for several uninterrupted minutes.

Before releasing additional birds, we thought it wise to see what the first group did. As we hoped, they did nothing, venturing no farther than 1/4 mile from the birds in the holding pen. On August 30, we repeated the release procedure with Condors 133, 136, and 193. Adding to the incentive to remain temporarily close is the condition of the birds' flight muscles and plumage. I expected that their muscle condition would deteriorate during confinement, however, I did not expect the extensive molt that we have observed. While it has been documented that mid-summer is the season of heaviest molt in condors, their recent molt during confinement is in excess of anything we have

seen in previous years. Condor 193 was missing the majority of his secondaries on his left wing while Condor 126 had three center tail feathers in the early stages of replacement. When tail feathers are growing, or "in the blood," tail mounted transmitters cannot be attached. FYI, the interval between the loss of a feather and its full replacement is 3 1/2 to 4 months. Unlike other Cathartids, the molt of condors is highly seasonal, highly variable in sequence, and highly asymmetric between wings following a roughly two-year cycle. What does this mean? Basically, with fewer feathers you do not fly as well and are likely to stay put.

What's next? We plan on continuing to release a few birds at a time over the next week or two until all 16 are where they belong--in the wild. I feel it important to address the argument that we are putting the birds back out into an environment when we do not know if the exact source of lead has been found. It is a risky world out there, even for condors. Condors live either in captivity, or in the wild with power lines, firearms, and lead. As I've said many times, the birds are doing their part, we need to continue to do ours by giving them as safe of an environment as possible.

The experience that we have gained in learning how to treat condors contaminated with lead will prove invaluable in future years. Our new Leadcare Analyzer Kit enables us to check for potential lead contamination within minutes, so that whenever birds are trapped they can be tested and released on the spot in the field, or if necessary, brought in for treatment. Until next time.

### **August 1, 2000 - August 15, 2000--Shawn Farry**

Since the last update the condors' blood lead levels have continued to drop in all temporarily held birds. Their last blood tests took place on August 11 with eight birds observed at <10 ug/dL and eight birds between 10-20 ug/dL. However, we did have another bird's lead level increase slightly after its initial

decline. This time Condor 149, after dropping from a high of 101 ug/dL to a low of 11.6 ug/dL increased to 17 ug/dL. While this increase again indicates the mobilization of lead in the body after chelation, the levels are well below toxic levels. At present we are playing a game of hurry-up-and-wait, eagerly anticipating getting these birds back into the wild. We will release two to four birds soon and additional birds shortly thereafter.



**New flight pen for California Condors**

Taking advantage of this “hiatus” from condor tracking, we have been working on constructing a new flight pen atop the Vermilion Cliffs. The flight pen/hack box in which the condors are now being held was originally designed for fledglings prior to release. Looking down the road, a worse case scenario would be that the hack box is full of young birds awaiting release when wild birds potentially may need to come in temporarily for treatment. Therefore, based on recent events, a new larger pen was essential. The new pen, currently about 80% complete, will give the older birds considerably more room to stretch their wings.

The birds currently being held, while healthy, appear to be a bit bored. For approximately five hours one morning they fixated on a log perch

located in the flight pen. From the observation blind some 150m away the birds were observed circling and staring incessantly at the perch. Then abruptly, Condor 119 stuck her head deep into the hollow log and emerged with a young striped skunk by the tail. Condor 119 quickly released the skunk and it vanished back into the log. The entire group, seeing the skunk’s retreat, curiously surrounded the log. They obviously did not know what they were playing with. Fortunately, their skunk encounter ended without incident. After identifying the target of the fixation and the potential outcome, we quickly removed the log, skunk and all, from the pen. Despite being grabbed by the tail, it appeared that the condors failed to elicit the skunk’s full defensive potential. We surmise that the skunk circumvented our predator-proofing and entered the pen from underneath the hackbox. Again, the condors are not predators, however, as the skunk encounter shows, they will play with just about anything.

Lastly, today I received the list of this year’s potential condor release candidates. Presently, there are seven young of the year slated for release in Arizona this fall. In addition to these young birds we will likely see the return of Condor 186 and 196. Based on behavior we may also see the return of Condor 210 who was brought to Arizona last year but not released. Currently, reports from Boise indicate she is socializing well with other condors and if all goes well will be transported back to Arizona for a second chance. Until next week...

### **July 20, 2000 - July 30, 2000--Shawn Farry**

Last week’s field notes ended on a positive note. Condors 119, 133, 136, and 158 no longer had lead pellets in them and blood lead levels in all nine birds treated for extreme lead toxicity were dropping. This week the positive trend continues.

On July 18th we ended chelation treatments. Seven days later, we took blood samples from all nine birds

that had been chelated. Their lead values along with their maximum values are listed below. Keep in mind that while > 50 ug/dL is considered toxic, we are unsure what effects long-term low exposures might have.

CONDOR	MAX	7/25/00
119	52 ug/dL	15.3 ug/dL
122	210 ug/dL	36.7 ug/dL
123	322 ug/dL	22.6 ug/dL
127	136 ug/dL	8.1 ug/dL
133	150 ug/dL	23 ug/dL
136	118 ug/dL	48.2 ug/dL
149	101 ug/dL	24 ug/dL
158	390 ug/dL	9.1 ug/dL
162	285 ug/dL	29.8 ug/dL



From a quick glance at the numbers you can see that all birds have dropped significantly from the maximum lead levels that they came in with. Most dramatically was the drop of Condor 158 from 390 ug/dL to 9.1 ug/dL. Condor 158, you may recall, went through a considerable ordeal to remove lead pellets from his gizzard. At present, Condor 158 looks excellent, weighs 20 lbs, and gives the meanest look of any condor I've encountered. Let's just say he, along with all of the birds, are not fond of the medical attention they have been receiving. The repeated blood tests and chelation shots hopefully are serving as a refresher course in "human aversion training."

Of the nine birds tested on the 25th, Condors 122 (36 ug/dL) and 136 (48.2 ug/dL) had lead levels we wanted to monitor closely. To this group we added Condor 162. While condor 162's lead level was down to 29.8 ug/dL, he came in with an extremely high lead level (285 ug/dL) and had only received one round of chelation. On July 27th, we re-tested these three birds. Blood lead levels for Condors 136 and 162 remained unchanged. Interestingly, despite no longer having any pellets in his system, the blood lead level for condor 122 increased from 36 ug/dL to 47 ug/dL. How is this possible?

Before answering, a brief explanation of how chelation works would be helpful. The chelating agent we are using is edetated calcium disodium. The pharmacological effects are due to the formation of chelates with divalent and trivalent metals. A stable chelate will form with any metal that has the ability to displace calcium from the molecule, a feature shared by lead, zinc, cadmium, manganese, iron, and mercury. The drug's half life is only 20-60 minutes and is quickly excreted by the kidney. About 50% is excreted in one hour and over 95% is excreted within 24 hours. The primary source of lead chelated is from bone. Subsequently, soft-tissue lead is redistributed to bone when chelation is stopped. Following a single dose, urinary lead output increases, blood lead concentration decreases, however, brain lead is significantly increased. Studies also indicate that following a five-day course of chelation there is no net reduction in brain lead.

So. . . back to the question of the increase in Condor 122's blood lead level. While one round of chelation therapy was able to achieve an overall reduction in Condor 122's blood lead, it also mobilized

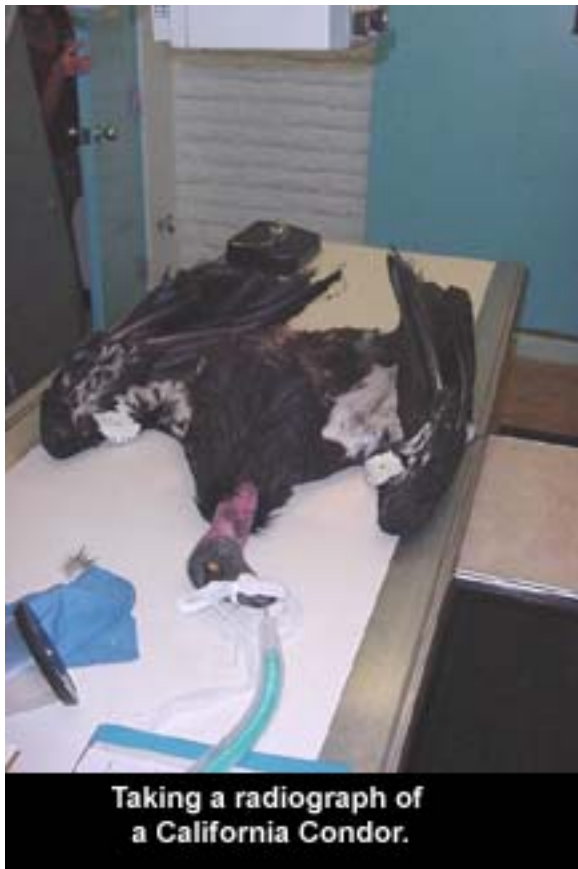
lead that had been “stored” in both bone and soft-tissue.

Based on the most recent blood lead levels for Condor 122, 136, and 162, and their exposure history, we began a second round of chelation on these birds on July 28th. We anticipate that when these birds finish chelation it will mark the end of treatment. Ending on yet another positive note, increased lead levels do not seem to affect the hormone levels of 5.5-year-old condors. In recent days, Condors 123 and 127 and Condors 119 and 122 have been spending considerable time “associating” together. We have not seen any courtship, and would not expect any this time of year, or in the crowded confines of the holding pen. However, six of our 16 birds will be six years old this winter (3 males, 3 females). Pairing and breeding attempts may soon become a reality. If that is not a reason to have hope, I don’t know what is. Until next week. . .

### **July 10, 2000 - July 19, 2000--Shawn Farry**

The last installment of the condor field notes ended with Condor 162 testing “high” or >65 ug/dL on our field lead tester. Therefore, on the morning of July 10, we made another visit to Page Animal Hospital for radiographs. Each radiograph is followed by 10-15 anxiety filled minutes of waiting while the film is developed. This time... no lead. Condor 162’s radiograph showed no metallic objects. However, while we had yet to receive lab results with his exact blood level, we knew it was high. Therefore, chelation treatments were initiated. This decision proved to be a wise one as subsequent lab results show Condor 162 with a blood lead level of 285 ug/dL.

On July 11, three more condors were trapped. All three were immediately transported to our Vermilion Cliffs’ office and tested for lead. Condors 133, 114, and 122 all tested positive for lead with levels of >65 ug/dL, 36.1 ug/dL, and > 65 ug/dL, respectively. Chelation was immediately begun on both Condors 133 and 122. Subsequent lab tests on the same samples reported Condor 133 had a blood lead level of 150 ug/dL and Condor 122 measured at a very high 210 ug/dL



Taking a radiograph of a California Condor.

On the morning of July 12, we were once again back in Page for radiographs, this time with Condors 122 and 133. The x-ray of Condor 122 showed no metallic objects. If he had received the lead from shotgun pellets they were no longer in his system. However Condor 133 was not so lucky. Her x-ray revealed a single pellet in the vicinity of the lower gizzard/upper intestines. The exact location, even with additional radiographs, was difficult to ascertain. This is significant because as with Condor 158, if the pellet was in the gizzard, it was still being digested and needed to be removed. If the pellet was in the intestine, it would be less dangerous and would likely be passed quickly. Before transporting five hours to the Phoenix Zoo, we elected to try to help Condor 133 pass the pellet and/or at least confirm the pellet's exact location. This was done by tubing a mix of fluids and Metamucil every six hours for 24 hours. If upon additional radiographs the pellet remained stationary, it was likely in the gizzard. If significant movement of the pellet was observed, it was likely in the intestine.

The next day, July 13th, even in comparison to the last few weeks, was a busy day. Radiographs of Condor 133 showed that the pellet had not moved at all indicating it was indeed in the gizzard. Our experience observing the six pellets in Condor 158 indicated significant movement in the intestine during a 24-hour period. Therefore, with evidence that the pellet was in the gizzard, we were heading to Phoenix. However, before we could get there we had another job to do. The last three birds, Condors 136, 149, and 119 had just been caught. If any of these birds had pellets high up in the GI tract they needed to join Condor 133. By early evening the radiograph results were in. While the results did not surprise us, they were nonetheless frustrating. Condor 136 had two pellets and Condor 119 had one pellet. The only good news was that the pellets in both birds were extremely low in the intestine. They could not be removed and would likely pass within the next several days. Condor 149 did not have any observable lead in his body, however, his blood lead was  $>65$  ug/dL. All had significant lead exposure and chelation was begun on all three immediately. However, with removal of the lead ruled out for Condors 136 and 119, we headed south with Condor 133. Surgery was scheduled for morning.

In Phoenix on the morning of July 14th, we once again radiographed Condor 133. The pellet had still not moved. A few options were still available before invasive surgery was conducted. The first was attempting to remove the pellet with a flexible endoscope. While this technique was successful in removing a pellet from Condor 158, it was ineffective for Condor 133. The second technique was what could be called a gizzard flush. The bird is angled head down, a tube is inserted, and water is pumped into the gizzard. The water, ideally carrying the pellet, then drains back out of the mouth. While this technique has proven effective in swans, we were unable to flush the pellet from Condor 133. Surgery seemed the only remaining option and was rescheduled for the next day.



However, on the Morning of July 15th, a pre-surgery radiograph indicated significant movement of the pellet. The gizzard flush may not have removed the pellet, however, it may have dislodged it or flushed it into the intestine. Either way, surgery was now not an option. Surprisingly, Condor 133's blood lead level, despite having a pellet in her system, had dropped to 39.3 ug/dL presumably due to chelation.

Understanding the effectiveness of chelation with lead still in the body will undoubtedly effect how we treat birds in the future. We had gone into the day dreading invasive surgery, and ended the day leaving Phoenix with both Condors 133 and 158. Condor 158, had passed the remaining three pellets that were in his intestines and his blood lead had dropped in response to chelation. While both birds would continue chelation, we felt they would do better being held atop the Vermilion Cliffs until they were healthy enough for release.

Back to Page, AZ again on July 17 to radiograph Condors 136 and 119. Finally some good news. Both birds had passed all their pellets. While both would need to continue chelation, at least they no longer had lead in their system. Lab results reported initial blood lead levels for Condor 136 as 110 ug/dL and Condor 149 had a level of 101 ug/dL. Interestingly, even though Condor 119 had a pellet in her system her lead level was only 52 ug/dL. You might remember that Condor 119 was the only bird to have high levels (109 ug/dL) back in April. At that time she was chelated and released.

More good news on July 17. What we hope to be our final radiograph for awhile indicated that Condor 133 had also passed the pellet from her system. Therefore, of the four live condors that had been observed with lead pellets (Condor 158 - six pellets, 133 - one pellet, 136 - two pellets, 119 - one pellet), all have been passed or removed. Currently, all nine birds being treated have finished at least one round of chelation. Condors 123, 127, and 158 have completed two rounds of treatment. Additional chelation may be necessary based on future blood lead levels.

It's been a tough few weeks, however, there are still 16 condors in Arizona. We owe these birds, as well as condors released in the future, a fair chance at survival. Therefore, while we will do everything we can to mitigate the lead threat to the birds (i.e. satellite tracking, frequent blood lead level checks, more aerial surveys, etc.) unfortunately these are reactive. A proactive approach addressing the larger environmental contaminant issue of the mismanagement of lead is needed. Will action be soon enough for today's wild

condors who continue to struggle for the survival of their species? I hope so.

Thanks to everyone who helped during this lead crisis. Special thanks to Dr. Kathy Orr, Dr. Crutis Eng and the staff of the Animal Care Clinic at the Phoenix Zoo and to Dr. Jerry Roundtree and his staff at Page Animal Clinic. Until next week.

### **June 29, 2000 - July 9, 2000--Shawn Farry**

In our last condor update we had just trapped Condors 127, 134, 184, and 193 and were making preparations to draw blood samples and test for lead. (FYI, in past notes I have used the two digit tag numbers to identify birds. To eliminate confusion as more condors are produced it is probably a good idea to start using each birds studbook number. At present, each bird's tag number is just the last two digits of its studbook number.) The four birds had been trapped at the South Rim and transported to our Vermilion Cliffs' field office. As I mentioned last week, in comparison to a several day turnaround for lab lead results, the three minutes needed to obtain results from our portable lead tester is nothing short of incredible. However, those three minutes while the analyzer is running are interminable. The lead results for Condors 134, 193, and 184 were 32.5 ug/dL, 28.6 ug/dL, and 5.2 ug/dL. Levels for 134 and 193 showed moderate lead exposure, while Condor 184 showed a low level. However, Condor 127, a five-year-old female, was off the chart of our field tester with a level of >65 ug/dL.

On the morning of June 30, Condors 134, 193, and 184 were transported up to the holding pen at Vermilion Cliffs and Condor 127 was transported to Page for X-rays. We established a treatment protocol in which birds with lead levels of <45ug/dL are rechecked after three days. Condors with blood lead of >45 ug/dL are immediately radiographed to check for the presence of lead and chelation therapy is begun. Again, chelation treatment entails the inter-muscular injection of Calcium EDTA twice a day for five days. The radiograph on Condor 127 came back negative and she was transported to the Vermilion Cliffs' holding facility. The scary thing was that all we knew was that her lead level was high (>65 ug/dL). Lab results confirming just how high would unfortunately be delayed because of the extended 4<sup>th</sup> of July weekend.



On July 2, we were successful in trapping Condors 158 and 123 bringing our total to seven. Following the same routine they were transported to Vermilion Cliffs and we tested for lead that evening. Disturbingly, the lead analyzer screen displayed "HIGH" for both birds indicating each had blood lead levels in excess of 65 ug/dL. On the morning of July 3, we again made a visit to Dr. Jerry Roundtree in Page, AZ. Both birds were radiographed to assess whether any lead remained in their systems. Condor 123's x-ray was negative. If lead pellets had caused his elevated blood lead, they had either been regurgitated or already passed through his system. Condor 158 was a different story. Upon raising his x-ray to the light we knew we had a problem. Six pellets were clearly visible in the vicinity of

his gizzard. Similarly to Condor 165, the pellets appeared to be of two different sizes. Again, we only knew his blood lead was >65 ug/dL. For all we knew it could be much higher, and because of the continued presence of the lead, it could continue to rise. Therefore, the lead needed to be removed.

On the morning of July 3, Condor 158 was transported to the Phoenix Zoo. Additional radiographs

indicated that three of the pellets were indeed in the gizzard and three were now in the intestines. The pellets in the intestine would be difficult, if not impossible to remove, however, their ability to effect blood lead was minimal because the pH of the intestine is not high enough to continue dissolving the lead. However, the three pellets in the gizzard were actively being dissolved and needed to be removed. Using an endoscope Dr. Kathy Orr and Dr. Cuirtis Eng successfully removed one of the pellets from the gizzard. However, significant stomach contents along with the folds of the gizzard walls precluded the location of the second two pellets. The next day, the remaining two pellets in the gizzard were removed surgically and chelation treatments were begun. We had hoped that the pellets could have been removed with the much less invasive endoscope allowing Condor 158 to be immediately returned to Vermilion Cliffs. However, because of the seriousness of the surgery, Condor 158 will remain in Phoenix.

At the South Rim we have continued our trapping efforts dawn to dusk with minimal success. We continue to modify our techniques in an effort to entice the ever-present but stubborn birds to enter the trap. Time is ticking. Based on the birds trapped thus far, it is likely that a portion of the free-flying birds have significant lead levels. Because of the seriousness of the situation we are modifying the trap to hold a lure bird. Based on past observations, the presence of a condor in the trap drastically increases the chances of other birds entering. We'll let you know how it works out.

Lastly, on July 8 we received our first batch of lab lead tests. The most significant results were the true levels for birds that had tested "high" or >65 ug/dL. Condor 127 was 136 ug/dL, Condor 123 was 322 ug/dL, and Condor 158 was 248 ug/dL. All three are extremely high. Upon completion of her first round of chelation Condor 127 dropped from 136 ug/dL to 28.6 ug/dL. Condor 123, who has completed ½ of his treatment has dropped from 322 ug/dL to 145 ug/dL. However, the most interesting result was that upon capture, Condor 158 was 248 ug/dL. However, between July 2 when he was captured and July 5 when he underwent surgery, Condor 158's lead level increased to 390 ug/dL. Apparently, we may have gotten to him just in time.

While we may have gotten to Condors 127, 123, and 158 in time, it appears that there has been yet another probable mortality. On June 21, Condor 150 left the South Rim alone and flew north to Marble Canyon. From June 22 through June 24 her signal was tracked along the Colorado River in upper Marble Canyon. Frequent visitors to the condor notes know that this section of the river is a high use area for the condors, especially in winter and under normal circumstances this flight would not be given a second thought. However, in light of recent events any bird leaving the group is cause for concern. The last two birds to leave the group, Condors 191 and 182, had flown north alone and subsequently perished. It appears that birds that are having health problems, in this case from lead, may attempt to return to the release site. Pure speculation at this point, however, an interesting trend nonetheless.

In any event, from the western rim of the canyon in the vicinity of Sheerwall Rapid we detected a very weak signal emanating from the east. The signal was definitely obscured. Attempts to triangulate the signal by circling around to the eastern rim failed. Similarly, climbing to the top of Echo Cliffs several thousand feet above the valley floor also failed to detect the signal. With the memory of Condor 191 still fresh, we were concerned Condor 150 might be alive but in poor condition. Hatch River Expeditions lent a hand by allowing us to attach telemetry transmitters to their plane and donated a short flight from nearby Cliff Dwellers, AZ. Frustratingly, even this attempt came up empty. The signal remained stationary, extremely weak, and defied pinpointing.



During this past week, Kirk Stodola, Janelle Cuddeford, and Helen Johnson continued the trapping effort at the South Rim while Gretchen Druliner and Lisa Fosco fine-tuned their condor restraining and chelating skills. My goal was to locate Condor 150. However, after three extensive excursions into the canyon, I regret to report that Condor 150 has still not been recovered. Her signal has been stationary for two weeks now and the likelihood that she is still alive is remote. This loss is significant in that Condor 150 is a four-year-old female from our very first release in December of 1996. Condor 150 was also the first condor produced at The Peregrine Fund's World Center For Birds of Prey. The fact that we know

her general location but are unable to reach her makes it all the more frustrating. Although it cannot be confirmed, based on recent events the most likely cause of death would be related to lead toxicity

Bringing you right up to date, Condors 162 and 187 were trapped at the South Rim this afternoon and transported to our Vermilion Cliffs' office for lead testing. Condor 187 weighed 17.5 lb. with a blood lead level of 28.7 ug/dL. Condor 162 weighed 18.5 lb. and once again our hearts sank as the analyzer flashed "high" upon completion of the test. The game plan is to get Condor 162 to Page, AZ in the morning for a radiograph. If he is lead fragment free we will begin chelation and await lab lead results to determine his exact lead level. If he indeed has lead remaining in his system he will likely be transported to Phoenix for treatment. Keep your fingers crossed. Until next week.