SYMBIOS

WILDLIFE and CONSERVATION

CALIFORNIA CONDOR:
QUESTIONS FROM THE ROAD

Sanford "Sandy" Wilbur
June 2006

3. IS LEAD POISONING A WEAPON OF MASS DESTRUCTION FOR CONDORS
(Or Just A Problem That Needs To Be Resolved?)

UPDATE July 2008: At the bottom of this page is an article by Mike Wallace, San Diego Zoo, concerning California condors in Baja California, that apparently were poisoned by lead that was in the animal carcasses provided by the biologists. When in the early 1980s, a few years after I left the condor program, Noel Snyder started his drive to make lead poisoning the main survival issue for condors, I began to wonder about the effects of my own feeding program. In addition to road-killed deer and stillborn cattle, I contracted with a San Joaquin Valley rancher for a steady supply of domestic goats. All these animals were shot. I raised the issue with some of the new batch of condor watchers but, probably because Noel's estimates of losses to lead poisoning proved to be greatly overstated, I don't think anyone followed up. This recent event in Mexico raises another question mark about whether the lead problem has been properly diagnosed.

Wallace also makes another interesting comment in the article, to the effect that condors survive much higher levels of lead contamination than do eagles. Isn't it time to slow down the paranoid rhetoric that all condor introductions are jeopardized by lead, and get some real scientific studies done on both the source and the danger of the contamination?

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Also at the bottom of this page are some excerpts from a 3 June 2008 Associated Press story about condors "turning up sick" from lead poisoning "about a month ago" (first of May?). Jesse Grantham, government condor coordinator, was quoted as saying that "this is the highest lead exposure event we've had in 10 years." The author also alleges that Grantham identified "tainted carcasses" as the source of the lead. Assuming that the news story is at least somewhat accurate, here is another case in which lead from hunters' bullets was almost certainly not the source of the poison. Deer hunting in the area had not occurred for months; even late season special deer hunts were concluded in December, at least four months before the new poisoning was identified. Wild pig hunting does occur in the area, mostly December-June, but the harvest is pretty low, and records of condors feeding on pigs are pretty sparse. Again: isn't there a grad student out there who wants a good, fun, meaningful project to work on?

UPDATE February 2008: A few months ago, the Governor of California signed into law an act that will reduce the amount of lead used in ammunition within the range of the California condor. It was a good step, because we know there is much too much lead in our environment, and that lead has detrimental effects on both humans and wildlife. Even so, I worry that those working on the condor reintroduction programs in California will now consider the condor:lead problem "solved." As I opined in my original (June 2006) essay, which is printed below, no one has come close to showing a clear cause:effect relationship between the lead levels found in condors and the lead expended by hunters and shooters in the condor range. Information supplied to me in December 2007 by Ron Jurek (recently retired from California Department of Fish and Game, after actively working on the condor project since the 1970s) reinforces my understanding that no work has been done -- or is planned -- to actually monitor condor food supplies to see if condors are getting lead from any of their food sources. Ron's comments also address how incomplete the "ban" on lead really will be. See the bottom of this page for details.

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The provocative title to this essay might lead you to think that I am not very concerned about lead poisoning of California condors, so let me say a few things up front. First, I'm convinced that lead poisoning is a problem. Second, I think efforts such as Project Gutpile (which encourages hunters to bury or remove the leftovers from their hunting) are worthwhile. Third, I would be very glad to see lead ammunition outlawed in California (and everywhere else, for that matter). Having endorsed the program that far, let me tell you what bothers me about the lead poisoning issue:

1. The information linking lead poisoning and condors has been confusingly, unscientifically, and even amateurishly presented, leading to all kinds of questions about the validity of the findings and the motives behind some of the actions proposed.

2. I think the conclusions reached may well be wrong, which means the actions proposed won't solve the problem.

3. There don't seem to be any actions being taken to get better information, or confirm current hypotheses.

In their popular science treatment of the condor published in 2000, Noel and Helen Snyder concluded (page 252) that lead poisoning was "potentially the most important mortality problem faced by the species." But to support their claim, all they offered (in addition to the positive records of a couple condors known to have died of lead poisoning) were some important-sounding but essentially meaningless assertions. Just a few that I picked out for a review I did of the book in *"The Condor"* in 2002: (page 75) "if these condors were poisoned (which does not seem unlikely);" (p. 76), lead poisoning in the 1980s was "very possibly" caused by hunting; (p. 93), some deer carcasses "were presumably contaminated" with lead; (p.152) the Snyders are "reasonably confident that a substantial portion of the species' diet in the fall was hunter-shot deer;" and (p. 164), a lead rifle slug found in a condor nest cave "could conceivably been responsible for the poisoning of generations of condor nestlings." I know that we often simplify science for presentation to the general public, but this seems to go beyond mere dumbing down..

Later attempts to define the issue have been equally obscure and questionable. The majority of the dozen or so reports I reviewed on the subject are rife with phrases like lead poisoning being "strongly suspected," or disappearance of condors being "plausibly attributable" to lead poisoning. Condors have died "under circumstances that implicate lead ammunition," disappearances of condors are "associated with" lead sources, and condors are "thought to have fed" on lead contaminated food. All told, the presentation of the lead issue is probably the sloppiest I have ever seen on an important conservation topic.

It takes a lot of effort to separate out the condor deaths confirmed as lead poisoning from all the suspected, "probable," and possible occurrences, and from the large number of condors that have merely disappeared that some authors would (without a grain of evidence) attribute to lead poisoning. Mike Fry's 2003 report to California Department of Fish and Game specifically identifies the known condor deaths to lead: 3 condors in California in the mid-1980s, prior to the zoo releases, and 5 zoo-released birds 2000-2002 (1 in California, 3 in Arizona and 1 in Utah). In January 2005, there were two more losses in Arizona, making a total of 10 confirmed deaths. This is not the whole story, by any means, because virtually every condor whose blood has been sampled since the 1990s has shown lead contamination, perhaps as many as 10 percent of them at acute levels. Some birds with extremely high lead levels that were brought back into captivity for treatment (chelation) probably would have died without the intervention. All things considered, it does look like lead poisoning is a significant problem for condors.

Is it the biggest problem? Certainly it is one of them. Since the condor reintroductions started, the greatest known losses have been to powerline collisions and electrocutions, predation by coyotes or golden eagles, lead poisoning, and shooting. (Info in Mike Fry's report, attributable to Kelly Sorensen and the Condor Recovery Team.) Presumably the first problem has been taken care of by better training of the zoo birds before release. I'm surprised by the high predation count, but presumably this is a function of inadequate zoo training and/or a manifestation of lack of wariness by condors immediately after release to the wild. Presumably this has been, or can be, addressed in improved training and release procedures. I suspect that wanton shooting is an underreported mortality factor (4 instances identified), and I wouldn't be surprised if some of the large number of "missing and presumed dead" condors were victims of shooting. Still, that leaves lead poisoning in a pretty prominent place.

But now we come to my principal question: where does the lead contamination come from? The popular answer is that condors are picking up bullet fragments and shotgun pellets in the food they eat, the principal source being gut piles left in the field after hunters shoot and dress their kills. Indeed, some condor carcasses have contained bullet fragments and lead shot, although not all of them for which lead poisoning was diagnosed. But it seems to me somewhat significant that - in all the discussions of lead poisoning I have read - not one person claims to have actually seen a condor feeding on a gut pile.

Mike Fry, using California Department of Fish and Game data, attempted to quantify the number of hunter-shot animals available in California each year. Counting deer, pigs, coyotes, rabbits, squirrels, and miscellaneous "varmints," his data add up to some 100,000 animals killed in the condors' range, with maybe 50,000 of them left in the field to be available. That sounds pretty impressive, but probably over 80% of the kill is of animals coyote-size or smaller. Most of this "food" would never be used by condors, either because it would be scavenged by smaller, more efficient birds and mammals before the condors got to it; because condors are not likely to find and use such small carcasses, unless the birds are attracted by many killed in a small area (which seldom happens); or because a lot of the kind of "plinking" that results in loss of these small mammals is on the periphery of towns and around ranch buildings where condors would not likely be seeking food. Of the larger animals available, about 18,000 are wild pigs and 8000 are deer. Mike suggested that would amount to around 26,000 piles of available carrion, but this seems highly unrealistic to me considering that many would never be found due to ruggedness of terrain limiting access, vegetation that hides remains from view, and consumption of some of these by other scavengers before condors find them. Further, the carcasses and the condors are not always found in the same places. For example, the great majority of pigs are shot in Monterey, San Benito and San Luis Obispo counties where (so far) lead poisoning seems less of an issue than it is farther south. By far the majority of deer shot in condor country are shot in Kern, San Luis Obispo and Monterey counties.

Another significant consideration in assessing the amount of contaminated food available is, not every gutpile left in the field would contain lead. There would be animals killed by head shots rather than body shots; kills where the projectile went completely through the animal; kills where some other scavenger has already consumed the portion of the kill that had lead; or kills that had lead, but condors failed to eat those particular parts of the remains.

One should not ignore the historical record, either. Even though pig hunting has greatly increased in California in recent years, the deer kill within condor country was (according to Department of Fish and Game compilations) much higher in the 1950s and 1960s than it is now. Certainly the potential for lead poisoning from dead deer was much higher then than now, and it's unrealistic to think that some didn't occur, yet there are no indications of

changes in the condor population between the Koford and Sibley-Carrier-Wilbur studies that would suggest an epidemic of lead poisoning such as currently diagnosed.

Finally, and perhaps most significantly, there is absolutely no evidence that condors get very much of their total food from hunter-shot animals. Livestock still remain the most abundant food source, the one most easily seen in the terrain over which condors usually search, and the one most suited to the condors' foraging strategy. Hunter kills as the principal source of lead in condors just doesn't make sense.

I think that every condor is now individually identifiable. Some of them (I don't know how many) are radioed. Everywhere I go in California, I run into people associated with the condor program - there must be hundreds of them. Why, then, is it so difficult to get some good feeding records of condors? It seems that proving the lead source hypothesis would be relatively simple, and would add some scientific weight to the proposal to outlaw lead ammunition. It would also add to the incentive for hunters more safely dispose of their kills.

FEEDBACK

Ron Jurek (California Department of Fish and Game, retired) 11 December 2007: "(Recently), I got back to my interest in getting the condor programs to compile records of condor feedings on wild-found animals in CA since the release program began. In September 2006, I made a request to the Condor center in Ventura for full documentation of such feedings obtained by the southern California team and the two FWS cooperators, Ventana and Pinnacles NM release programs. Before making that request, I had found about 30 reports of such feedings, mainly from online updates prepared by the three programs.

"Last spring, I asked my former boss to provide me with whatever information he had from FWS. He received summaries last December for just the southern California and Pinnacles subpopulations; Ventana did not respond. Between what I found earlier and what was added by FWS in the Dec. 2006 compilations, there were about 90 feeding records. Most were anecdotal or very general, many were confusing, and some seemed contradictory. I organized the records into three spreadsheets and returned them to DFG, requesting that DFG send the draft charts to FWS and the recovery team for review and completion in detail. That was last September, and as far as I know FWS isn't able to work on it. Last I heard, they wanted outside help. I suspect that there is little or no significant documentation for many of the reported feedings.

"From what I've seen so far, it appears that no condors in the Big Sur and Pinnacles release areas have ever been seen feeding on a carcass of a hunter-killed animal. In contrast, there have been many reports in those area of condors feeding on road-killed, stillborn, and possibly poacher-killed deer; on a lion-killed elk; on one or two depredation-kill pigs; and on several vandal-shot or owner-shot (euthanasia) livestock. Most feedings in the Big Sur population have been on sea lions; I don't think there has yet been an assessment of prevalence of lead shot in dead sea lions on beaches (I think I mentioned to you that about 10% of sea lions rehabilitated by the Marine Mammal Center had evidence of having been shot). In 2006, condors were lead exposed from shot ground squirrels.

"The Dec. 2006 compilation for southern California included several cases of condors feeding on hunter-shot deer carcasses and gut piles. Until I saw that, I thought there had been only one documented case of released condors ever feeding on a shot-deer carcass (1997) and no cases of them feeding on gut piles anyplace in California.

"Most of the southern California reports of condors feeding on hunter-shot deer or gut piles were not reported in monthly reports, newsletters, or any other reference I had seen. As far as I know, they show up only in the Dec. 2006 compilation. I wonder whether one shot deer carcass in 1997 (which was well-documented in many places) might have been the same as a similar incident reported as a 1998 record (which I had not been aware of before their compilation).

"Two of the reported gut pile feedings were not lone gut piles but were actually entrails near deer carcasses. Two other entries were of gut piles buried by FWS staff after condors were seen flying over them--I omitted those from the list of wild feedings. Two other reports of condors feeding on isolated gut piles in California might be the only cases of condors feeding on that food source since 1992, if they can be adequately documented; those were reported by an unnamed observer within 6 days of each other in October 2002 near Hopper Refuge, and I

found no corroborating information in program monthly reports from that time period. That was about the time when I was challenging anyone in the condor program to provide evidence that condors have ever fed on a gut pile. When I made that challenge at a large meeting of the recovery team back then, after the danger of gut piles was being mentioned repeatedly, nobody in the room could come up with an example. I'll be very interested in seeing full documentation about those two October 2002 gut pile records.

"I suspect that the field staffs are not keeping detailed records of condor activities, except to record locations and abnormal behavior. Anecdotal reporting seems to be all that is expected of them. Since the field people "know" that "everyone else knows" that the lead problem is from hunter-shot deer, their own observations of feedings on anything else might not merit much attention. The Pinnacles NM staff in 2002 reported in their online update that they had to trap all of the condors that recently had been feeding on "carcasses" to test them for lead, and I wondered why they did not identify the species. I eventually figured out that the same incident was reported by the Ventana staff on their monthly online update, but they gave details about the carcasses: one was a calf shot by vandals and the other was a cow apparently bullet-euthanized by the owner. I wonder whether the Pinnacles report would have identified the carcasses if they had been deer.

"Also, I am interested in knowing how common it is for condors to feed on wild pigs. The Dec. 2006 compilations included several instances of feedings on pigs, but few clearly distinguished whether the carcass was wild or domestic. I figured out that at least several were domestic pigs. The only clear case of condors feeding on a wild pig was an event last May, when condors were lead exposed after feeding on what was termed "a pig carcass" that was likely shot with lead ammunition. The press described it as having been shot by hunters. I spoke with my ex-boss about this carcass, encouraging him to make sure that this incident gets well documented, because it might turn out to be the first confirmed case of condors feeding on wild pigs. At a condor recovery team meeting at that time, he had to make a concerted effort to get details, and it was then that the Pinnacles staff mentioned that it had been shot for depredation control purposes, not sport hunting.

"There are more reported condor feedings on livestock, or on sea lions, than deer, and I suspect most of the deer were not hunter-killed. However, the reports usually mentioned just deer, without giving the gender or age. I've seen two summary reports (an annual report and a manuscript for publication) by Ventana that each refer to condors feeding on a deer carcass on May 12, 2000. Interestingly, there was a third report about that carcass: the original report that had been placed online in the May 2000 update; it was described as being a stillborn deer.

"I was interested to see in the Dec. 2006 compilations that condors were seen at carcass dumps. I had already known about other such dump sites around the state, including a game carcass dump site at Tejon Ranch that reportedly was often visited by condors before 2003; I hope someone at the condor center will document that sometime. I suspect that dumping areas for game carcass cleaning sites, livestock "bone yards", and other dumping spots for shot animals have been sites of condor lead exposure. Just before retiring, I spoke with the wildlife manager at Ft. Hunter Liggett and mentioned my concern, and he told me he had such a dump site that was frequented by turkey vultures; he said he was going to shut it down right away.

"The recent lead ban on hunting will not affect depredation pig hunting ammunition, ground squirrel shooting, livestock euthanasia or poacher ammunition. (CA Dep. Food and Agriculture recommend livestock be euthanized by veterinarians, but if the animal owner wants to do the euthanasia, it should be done by .22 bullet in the forehead.) I understand the ban extends to coyote shooting, but no instance of coyote feeding in CA has been reported since the birds were released. I doubt there will be any way to judge the success of the lead ban in protecting condors." [Emphasis provided by Wilbur]

My Response to Ron Jurek 12 December 2007: I was very glad to see the Governator pass the lead bullet bill, but I'm still really concerned that the current condor folks are going to think they have now solved the lead problem. Your comments on what is NOT covered by the law, and your analysis of how little is really known about condor feeding habits, do not raise my confidence level that there will be any meaningful follow-up to the bill's passage.

Interest is developing in introducing California condors to Oregon and/or northwest Washington. I've been working with a grad student at Portland State who has done some preliminary work, in conjunction with the Oregon Zoo, on locating potential sites. The Zoo is forming a team to figure out the next steps. I think it's a great

idea, but am already concerned that the "lead law solution" is already part of the planning.
For example, their draft proposal for phase two has the following four primary objectives:
1. Conduct biological assessments for reintroductions into Oregon
2. ELIMINATE LEAD IN POTENTIAL CONDOR RELEASE AREAS
3. Build support among stakeholders
4. Identify necessary resources to proceed

I wrote the following to the head of the Zoo's team:

"Dr. Shepherdson,
David Moen asked me for comments on the funding proposal "Assessing the Feasibility of Returning the California Condor to the Pacific Northwest." I supect David has or will share my comments with you, but I wanted to emphasize one strong concern. As I wrote to David:

' I strongly recommend against making the elimination of lead a primary objective. I'm not saying that it won't be an issue, but to draw major attention to it before you have laid the groundwork for the overall project is just asking for trouble. If you build the subject of lead poisoning into your overall discussions with stake holders, then people are aware of it as a potential problem that they have a chance to get used to along with all the other issues that will confront you while developing an overall reintroduction plan. This will also give the California ban a chance to be in effect for awhile, to see if there is any indication that the lead ban is doing any good. I know most of the condor people are convinced that lead from bullets has been the main source of the high lead levels in condors, and it will be hard to get the Recovery Team to go slow and be objective, but I think you could really erode your potential support if you approach it too blatantly without some kind of reason for thinking that it will be a problem.'

"I think that Oregonians in general will be receptive to the idea of bringing condors back to the State, particularly if we are talking about west of the Cascades, which was certainly the main (only?) area of historic condor use. However, there are some disasters waiting to happen if the early work with stakeholders is not done well. We who live in the Willamette Valley can forget that Oregon overall is anti-government, Sagebrush Rebellion, anti-gun control, etc. The issue I raised with David regarding lead bullet restrictions is one that could strongly color the negotiations from the start, if not handled smartly. (The Arizona transplant would not have had so many poisoned and shot condors, and so much anti-endangered species feeling, if they had had a professional lead-in to the project.) Despite the excellent move by California to ban lead bullets in the condor range, no one has yet shown a direct cause-effect relationship between lead used in hunting and lead levels found in condors. In Oregon, the magnitude and methods of hunting are so different from central California that lead bullets may be no problem at all for them up here. (I'm not saying that is the case; I'm just suggesting that an emphasis on something that can be construed as "anti-hunting," that has no obvious justification here, could confuse the program from the start, and deny you some of the support you really need.)"

Jurek follow-up 12 December 2007: "That prerequisite that lead be eliminated before release in Oregon would essentially preclude condor releases for a very long time, even if restrictions applied only to ammunition used in hunting. The only way to truly protect condors from bullet lead would be through a total prohibition on sale and use of all lead bullets used for dispatching animals: game, depredators, predators, livestock, and sick or injured animals, including livestock and injured deer. Since people who shoot animals illegally are not likely to be bothered by a lead ammo ban, they would continue to shoot lead as long as their pre-ban stockpiles of lead ammo hold out. Those Oregon birds will grow old awaiting release.

"Many of those leading the hunting-lead ban effort in California, notably Michael Fry, Center for Biological Diversity and most release program staff, repeatedly conflated Arizona lead poisoning data and California data to build up their case in California. Actually, comparing rates of chelations and lead deaths over the same time period, the lead problem in Arizona/Utah has been at least ten times as high as in California. In Arizona, the connection between condor lead poisoning and condor feeding on deer and other game is overwhelming. That is not the case in California. I think it was Noel Snyder who referred to California as being a black hole for condors when he and others argued for releases in Arizona. Turns out, Arizona's Kaibab Plateau became his black hole.

"Condor behavior and food habits differ greatly between Southern California, Central California, and Arizona (and probably Baja California). I'm sure such patterns in Oregon condors would differ from each of the other areas,

too. Maybe a lead ban in Oregon should begin with the sea lion shooters.

"Blood lead testing is probably not going to be a useful way to measure the success of the California lead restriction. Past blood sampling was heavily weighted to the months during and after deer hunting seasons. The high levels of blood lead and lead poisoning cases in summer, mainly June, were not discovered because of routine sampling. It was the catch-up of birds for West Nile virus inoculation in summer 2003 that yielded the surprising (to field crews) high lead exposure rates.

"Also, I wonder whether condors feeding on lead-exposed cattle would in turn show low lead exposure in their blood with a lead isotope ratio of the lead ingested by cattle. Since bullets are cast mainly from lead from recycled batteries, the isotope ratio of bullets and batteries are similar. The researchers analyzing bullets sold in California found isotope ratio ranges almost the same as those in condor blood lead and in lead fragments found in Condors. The main cause, or one of the main causes, of poisoning in cattle almost everywhere is lead poisoning, and typical sources of lead licked by cattle are old batteries. It seems likely that such lead would sometimes show up in a condor blood sample, with an isotope ratio in the range of bullet lead. The only information I have regarding the prevalence of lead exposure in cattle in California comes from the study we did in the mid 80s, when 6 cattle and 2 placentae were tested for metals and pesticides; lead was detected in samples of both placenta and one of the cattle. If roughly 3 of 8 cattle fed upon by condors had lead in tissues, that source might be important to consider in the lead analyses. I bounced these ideas off Dr. Risebrough, and hope he'll follow up on them.

"The California lead ban will be interesting to follow. I understand that coyote shooting was specifically brought up as a concern in the legislative process. Not many people know yet that none of the 90 or so feeding observations in California involved coyotes. I'm sure condors feed on dead coyotes, but it doesn't appear to be very common. I'm surprised about that.

"I suspect that the main species beneficiary will be golden eagle. And maybe coyotes."

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The following was taken from the "California Condor Conservation" website:

http://cacondorconservation.org/content/blog/blogs/2008/condor-lead-poisoning-in-baja/

Condor Lead Poisoning in Baja
Posted at 11:32 am January 28, 2008 by Michael Wallace, Ph.D.
After the suspicious death of condor #390, the most subordinate condor of the 16 free flying birds in Baja, we stepped up
our routine annual health exams for the 22 condors both captive and free flying in Baja. On Sunday, November 18, 2007,
we discovered 5 out of 8 birds tested to have high lead poisoning using the field lead care kit (HIGH being >65 ug/dl, the
limit of the equipment). On Friday, November 23rd, all five condors were transported to the Wild Animal Park's Harter
Veterinary Medical Center, a USDA-approved quarantine facility, and chelation treatment was initiated.

The treatment consists of daily administration of two doses (one injection and one oral) of calcium EDTA that binds to the
lead in the blood and flushes it out through the kidneys. Baring complications, high lead levels in blood can be reduced
to near background levels within a few weeks, and in most cases, birds can be released back to the wild.

Heavy sleet/rain (over 4 inches) and winds (over 60 kts) made trapping some of the condors in Baja challenging. Field

assistants Juan and Catalina did an incredible job during this event. However, field conditions and a recent drop in field staff made it impossible to efficiently and safely treat the birds in Baja.

With trapping ongoing, we tested 12 additional condors for lead on Sunday, November 25th. Five more proved positive and were relocated to the Wild Animal Park on November 26th for chelation treatment. Days later, the last two birds were tested. One proved positive and was also transported north. Of the 22 birds in Baja, all were tested; 11 were positive and in need of treatment. All birds were radiographed on arrival at the hospital and only one, #323, retained a single shotgun pellet in his gut. Attempts to retrieve it by flushing the GI tract and using a laparoscope have been, so far, unsuccessful but efforts will continue.

Condors are very hardy birds. To give some perspective, bald eagles that Dr. Pat Redig at the Raptor Center at the University of Minnesota treats for lead toxicity often die at lead contamination values just over 100 ug/dl. During the course of treating these condors, a more refined analysis of blood lead levels from an outside lab indicated that lead values in all birds were well over the 65 ug/dl (as indicated by the field lead test kit) and some values as high as 590, 600 and 640 ug/dl. Unfortunately, condor #325 died suddenly while the group was being treated. We are not sure whether it was related to the lead intoxication, the treatment, or a combination of these and other unknown factors. Of the many dozens of condors treated in this way, only two other condors have died under similar circumstances.

Since both free flying and pre-release captive birds were affected during the recent episode, it is likely that the lead was in food that we fed to both the captive and free flying groups. We buy live and dead large domestic animals from local ranchers and have to rely on the owners, when possible, for their health history and our site manager Juan's inspection of the carcass. After the lead poisoning case in Baja of captive bird 319 in 2005, we have been scanning with a metal detector each carcass (horse, cow, or goat) for lead from potential gunshot wounds acquired earlier in the animal's life. This technique works, but unfortunately it is only effective to a few inches in depth, which apparently still leaves sufficient risk that lead shot deeper in the tissue can go undetected.

To reduce the risk of lead contamination in the future, we acquired field, digital x-ray equipment so each carcass proffered to condors in Baja can be entirely scanned for lead prior to being fed to the birds. While cumbersome, this technique should drastically reduce the risk of future lead contamination exposure.

As reported by Wild Animal Park veterinarian Dr. Jeff Zuba, all our condors were off treatment (lead levels less than 30 ug/dl) by January 10, 2008. (Treatment lasted 1.5 to 6 weeks, depending on the contamination level of the bird.) How quickly we can get the affected condors back into the field will determine the overall negative impact to the program. With the exception of a few glitches, all agencies contacted on both sides of the border have been immensely helpful to this point. CITES permits to re-export the birds have been applied for out of Dave Rimlinger's office at the San Diego Zoo. Again, I would like to thank all those involved with this operation including the Baja condor field staff, the keeper, vet-tech and vet staff at the Wild Animal Park. Mike Clark for coming from LAZ to assist in training the hospital keeper staff. USDA, PROFEPA and USFWS have been exceedingly corporative and helpful during the transfers with Dr. Fernando Sanchez coordinating the many details on the Mexico side. Dr. Jeff Zuba supervised many transfer details and coordinating the hospital treatment. The keeper staff at the hospital did an amazing job of managing the eleven

condors considering safety, behavioral isolation and USDA quarantine.
Only after re-release to the wild will we be able to determined the behavioral effect this experience has had on the birds.

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http://www.sfgate.com/cgi-bin/article/article?f=/n/a/2008/06/03/state/n143141D09.DTL

Endangered California condors turning up with lead poisoning
By NOAKI SCHWARTZ, Associated Press Writer
Tuesday, June 3, 2008

(06-03) 20:45 PDT Los Angeles, CA (AP) --
U.S. Fish and Wildlife officials are in "crisis mode" because seven endangered California condors have been found with lead poisoning in the weeks leading up to a statewide ban on lead ammunition.

The birds started turning up sick about a month ago during random trappings at Bitter Creek National Wildlife Refuge in the southwestern San Joaquin Valley foothills of Kern County.

"This is the highest lead exposure event we've had in 10 years," said Jesse Grantham, the agency's condor coordinator, who called it "alarming" and said they were in "crisis mode."

While officials won't know the source of the contamination until next week, Grantham said the birds were likely poisoned by eating tainted carcasses at Bitter Creek, Lake Piru or on Tejon Ranch. Of the three areas, only Tejon Ranch currently allows hunting.

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