

CALIFORNIA FISH AND GAME COMMISSION

REPORT ON THE LEVELS OF LEAD FOUND IN CALIFORNIA CONDORS DURING 2009

June 23, 2010

Summary

This report summarizes the levels of lead reported in California condor (*Gymnogyps californianus*) in California during 2009 and was prepared pursuant to Section 3004.5 of the Fish and Game Code. The levels of lead in the blood of free-flying condors were reported to the Department of Fish and Game by the U.S. Fish and Wildlife Service in May 2010. The report is scheduled for discussion by the Fish and Game Commission at its June 23 and 24, 2010 meeting.

Blood lead levels were evaluated for 90 condors during 2009 (42 in southern California and 48 in central California). Blood levels were also evaluated for 5 nestlings (3 in southern California and 2 in central California).

Sixty-percent (60%) of condors sampled in January-July had blood lead levels > 10 µg/dL (greater than "background") and 54 percent of condors sampled from August-December had blood lead levels > 10 µg/dL.

Eighty-one (81) condors were sampled during both sampling periods and 39 (48%) had lower blood levels from August-December than January-June and 40 condors (49%) had higher blood levels during August-December than January-July (5 in southern California and 35 in central California). Nine condors sampled in both periods had blood lead levels during the August-December sampling period that were >100 µg/dL higher than levels in the January-July period. Two condors exhibited blood lead levels during August-December period that were >100 µg/dL L lower than levels for the January-July period.

Blood levels monitored for four of five condor nestlings showed a negligible blood lead level; one nestling in central California had blood lead levels ranging from 2-24 µg/dL.

Twenty-six free-flying condors were treated for lead toxicosis in 2009 (2 in southern California and 24 in central California). Nine lead treatments occurred during the January-July period and 23 treatments occurred during the August-December period (3 condors received treatments in both periods). Two condors were taken to the Los Angeles Zoo for treatment, but died.

The Department and Commission have concluded that this information, representing the second year of data after adoption of the regulation to prohibit lead in condor range, should not be considered conclusive of any "cause and effect" relationship between the prohibition of lead projectiles in condor range and blood lead levels detected in condors.

Background

In 2007, California Fish and Game Commission (Commission) regulatory action (Sections 353 and 475 of Title 14, California Code of Regulations relating to methods of take) prohibited the use of projectiles containing lead for hunting of big game species and for nongame species within the range of the California condor (Figure 1 and Attachment B). These regulations implemented Section 3004.5 of the Fish and Game Code (Attachment C). In practice, the regulations ban the use of lead ammunition for hunting of deer, wild pig, elk, black bear, pronghorn antelope, coyote, and ground squirrel within the range of the federal and state endangered California condor (*Gymnogyps californianus*). The purpose of the regulation change was to reduce the potential for lead poisoning of condors by eliminating lead that could be contained as fragments within carcasses of hunted big game and nongame species. Through the intended protection of the condor, this regulation may also reduce lead exposure in other scavenger bird and mammal species, including eagles and vultures. In hunting of big game, the animal is required to be retrieved, however, there are occasions where the animal is lost and not retrieved and field dressing of harvested big game often results in the internal organs being left in the field (referred to as offal or gut piles). Nongame species that are hunted are not required to be retrieved by the hunter and may be left in the field, thereby potentially being a source of food for condors. As part of the legislation, the Commission will prepare and issue a report on findings:

"The commission shall issue a report on the levels of lead found in California condors. This report shall cover calendar years 2008, 2009, and 2012. Each report shall be issued by June of the following year."

The data on blood lead levels detected in California condors sampled during calendar year 2009 were provided to the California Department of Fish and Game (Department) by the U.S. Fish and Wildlife Service (USFWS) to inform the Commission for this report.

As neither the Department, nor the Commission, collects the condor blood data, we are cautious in re-analyzing or interpreting the raw data, not knowing the assumptions and/or caveats that may need to be considered for any analysis. Consequently, the Department and Commission relied on the USFWS provisional report summarizing the results of blood lead levels for 90 free-flying condors in California during 2009. Their summary is included in its entirety as Attachment A. During the period January-July 2009, 60 percent of the condors sampled had blood lead levels that were considered above background levels (>10 micrograms/deciliter); 54 percent of condors exhibited blood lead levels above background levels during August-December 2009.

Reporting of Lead Levels in California Condor

The USFWS is the lead agency for the recovery and management of the state and federally endangered California condor through the Condor Recovery Program. The Department, along with the USFWS, Non-government organizations, zoos, and universities, and other agencies, participates in recovery efforts for the condor and participates in management direction, condor release, capture, care, and treatment efforts.

The Department is not directly involved in field handling or sampling of blood lead levels of condors. Consequently, the Department relies on collaboration with the Recovery Program partners to provide this information. The Department requested the data from the USFWS and others, and received a 5 page summary of the 2009 condor data, for Central and Southern California condors, which is included as Attachment A. Figures 1 and 2 in the USFWS report graphically illustrate the blood lead levels from sampled condors in 2009 that are the basis of the report.

Summary of 2009 Condor Blood Levels

The summary below is based in the report submitted to the Department by the USFWS (Attachment A).

California's free-flying condor population varied between 82 and 91 individuals during the 2009 calendar year. During this time, 247 blood samples were obtained. Blood lead levels < 10 µg/dL (micrograms per deciliters) were not considered lead exposure events because this level of lead in the blood may occur from normal exposure to lead in the environment (considered background levels).

In total, blood lead levels were evaluated for 90 individual free-flying condors during 2009 (42 in southern California and 48 in central California). In addition, blood levels were evaluated for 5 nestlings (3 in southern California and 2 in central California) (Table 1).

For the southern and central California condor population combined, 87 condors were tested for blood lead levels during the January-July sampling period and 84 condors in the August-December period (Table 1). Of this sample size, not all condors were captured in both periods. Sixty-percent of condors sampled in January-July had blood lead levels > 10 µg/dL and 54% of condors sampled from August-December had blood lead levels > 10 µg/dL.

Eighty-one individual condors were sampled during both sampling periods of January-July and August-December (38 in southern California and 43 in central California) (Table 1). Thirty-nine of the 81 condors (48%) exhibited lower blood levels from August-December than January-June (32 in southern California and 7 in central

California) and 40 condors (49%) exhibited higher blood levels during August-December than January-July (5 in southern California and 35 in central California). Nine condors sampled in both periods had blood lead levels during August-December sampling period that were >100 µg/dL higher than levels in the January-July period. Two condors exhibited blood lead levels during August-December period that were >100 µg/dL lower than levels for the January-July period.

Blood levels were also monitored for five condor nestlings. All southern California nestlings had undetectable blood lead levels. One central California nestling showed a blood lead level ranging from 2-24 µg/dL.

Twenty-six free-flying condors were treated for lead toxicosis in 2009 (2 in southern California and 24 in central California). Nine lead treatments occurred during the January-July period and 23 treatments occurred during the August-December period (3 condors received treatments in both periods). Two condors died while receiving treatment at LA Zoo. Five of the 24 central California birds received treatment more than once during 2009, with a majority of treatment taking place during the August-December period.

Table 1. Summary of number of free-flying California condors sampled during the 2009 calendar year.

Number of Condors Sampled	CA-wide	Southern	Central
Total for 2009	90	42	48
Spring period (January-July)	87		
Fall period (August-December)	84		
Same individuals in both periods	81	38	43
Nestlings	5	3	2

Conclusions

The Department and Commission have concluded that this information, representing the second year of data after adoption of the regulation to prohibit lead in condor range, should not be considered conclusive of any "cause and effect" relationship between the prohibition of lead projectiles in condor range and blood lead levels detected in condors. In part, this is because the specific sources and locations of lead sources detected in sampled condors are not specifically known, relationships of sampled condors to hunting activity are not specifically known, and as it relates to the regulations in place that prohibit lead projectiles in condor range, the condor feeding habits for this period of time are also not specifically known.

Ultimately, it is too soon to tell whether the ban on lead ammunition for big game and nongame hunting has significantly reduced the frequency and level of lead exposure in condors. The data are not adequate for in-depth or meaningful comparative analyses regarding the possible consequences of the 2008 lead ammo ban in condor range;

however, they do begin to provide the basis for future comparison. In-depth analyses of blood lead levels before and after the ban must take into account changes in key factors that influence blood lead exposure, such as time in the wild, long range movements, food sources, foraging habits, and exposure to hunting activities during the sampling periods.

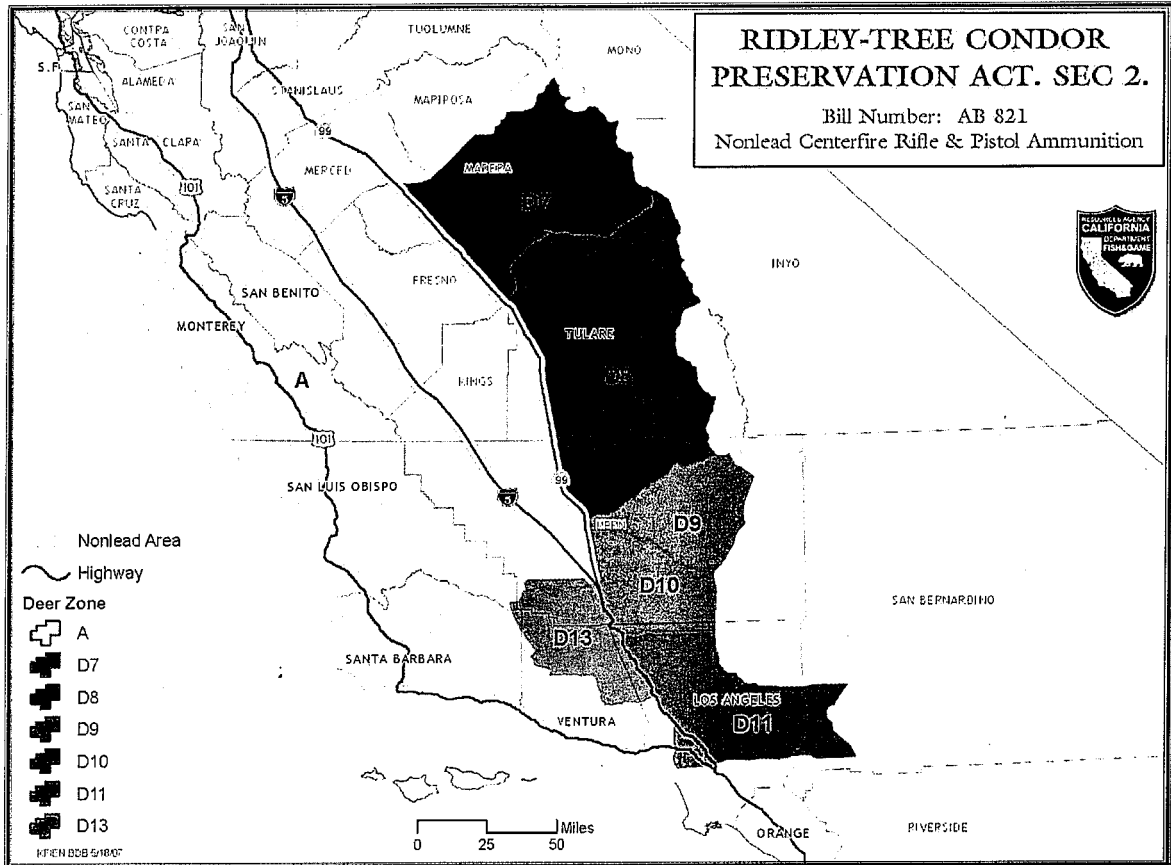
The Department and Commission are hopeful that a more comprehensive and collaborative strategy to collect, compile, and report on condor blood levels will be in place soon. A two year research project titled "Monitoring post-ban lead exposure in the California condor" is being collaboratively developed by the Department, USFWS, U.S. Geological Survey (USGS), University of California , Davis, (UCD) and Ventana Wildlife Society. In addition, USFWS, together with several partners, have initiated a three year research project addressing the effectiveness of the Ridley-Tree Condor Preservation Act.

Future Reporting

The reporting requirements for the Commission are expected to benefit from an improved mechanism in place for condor data collection, compilation, and sharing. This will further improve the Department's ability to assist in meeting the Commission's obligation.

Through an agreement funded through Federal Section 6 dollars to the Department and contracted with the University of California Davis, Wildlife Health Center (WHC), there will be a standardized repository for this data with the USGS that will be collaboratively supported by the interested parties. The WHC will be the scientific body to work with recovery entities to compile condor blood lead level data, and through data sharing agreements with the USFWS and USGS, the data will be available to affected agencies. It is anticipated that this agreement will provide a more standardized, consistent, and repeatable approach to sampling condors for blood lead levels, as well as new original research into the feeding habits of condors in the field. This information will assist in better understanding the blood lead levels in the California condor and its relationship to the environment and human influences.

Figure 1. The geographic area where projectiles are banned in relation to deer hunting zones. Deer are one of the primary species hunted in this geographic area.



Attachment A.

Summary report from the U.S. Fish and Wildlife Service on blood lead levels in southern and central California condor populations during 2009.

U.S. Fish and Wildlife Service
Hopper Mountain National Wildlife Refuge Complex
California Condor Recovery Program
May 19, 2010

Free-flying California condor blood lead levels sampled during 2009 are summarized for the southern and central California populations. The U.S. Fish and Wildlife Service and its partners (Ventana Wildlife Society and the National Park Service, Pinnacles National Monument) attempted to sample blood lead levels from all free-flying condors in southern and central California at least twice during 2009 (one sample/condor/sampling period, sampling periods = January – July and August – December). Blood samples were analyzed at the Wildlife Health Center at the University of California Davis and the Louisiana Animal Disease Diagnostic Laboratory at Louisiana State University's School of Veterinary Medicine. Data summaries are based on a single years worth of data and should not be interpreted as an evaluation of the Ridley-Tree Condor Preservation Act (2008). In 2008, U.S. Fish and Wildlife Service and several research partners initiated a 3-year study of the effectiveness of the Ridley-Tree Condor Preservation Act. All data and summary statistics should be considered provisional.

The free-flying condor population size in California ranged from 82 to 91 individuals monthly during 2009, and blood lead levels were assessed for 0-40% (central California = 0-78%, southern California = 0-63%) of the free-flying population each month (Table 1). Blood lead levels were quantified for 90 individual free-flying condors (southern California = 42, central California = 48, total number of samples both populations = 247) and 5 nestlings (southern California=3, central California=2, total number tests for both populations= 19) during 2009. In central California, blood lead levels were sampled once for 4 condors (251, 286, 438, and 470), twice for 11 condors, and the remaining 33 condors were sampled more than twice (150 total samples). In southern California, blood lead levels were sampled once for 4 condors (156, 282, 324, and 358), twice for 22 condors, three times for 15 condors, and four times of 1 condor (97 total samples). A total of 81 individual condors were sampled during both sampling periods (i.e. January-July and August-December; southern California = 38, central California = 43).

Data summaries are based on a single years worth of data and should not be interpreted as an evaluation of the Ridley-Tree Condor Preservation Act (2008). In 2008, U.S. Fish and Wildlife Service and several research partners initiated a 3-year study of the effectiveness of the Ridley-Tree Condor Preservation Act. All data and summary statistics should be considered provisional.

