

A REPORT FROM THE CALIFORNIA CONDOR LEAD
EXPOSURE REDUCTION STEERING COMMITTEE, A
SUBCOMMITTEE OF THE CALIFORNIA CONDOR
RECOVERY TEAM

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INTRODUCTION AND SUMMARY

The reintroduction of captive-reared California condors to the wild began in California in 1992, in Arizona in 1996 under the designation as an experimental/nonessential population, and in 2002 in Baja California, Mexico. Since that time and as of April 1, 2003, 157 condors have been released and 81 remain in the wild. Survivorship of reintroduced condors has been compromised by many factors causing injury and fatality including power line collisions, shootings, predation, and ingestion of toxic agents. Many birds have simply disappeared in the rugged wildernesses of southern California and Grand Canyon region of Arizona, or have been sufficiently decomposed when found that cause of death could not be accurately determined. While all the causative factors associated with condor morbidity and mortality are not completely understood, strong evidence suggests that lead toxicity is an important issue. Condors are exposed to lead residues when they consume animal carcasses that contain spent ammunition.

As the captively-produced, released condors have matured and gained experience in the wild, they have begun to forage on carcasses not provided by field crews. Concurrent with this maturation and between 1997 and 2003, five condor deaths occurred due to acute lead poisoning and more than two dozen condors were brought into captivity because they displayed signs of lead poisoning or had elevated lead residues in their blood. Their recovery and subsequent re-release was enhanced by expert veterinary care and chemical chelation of absorbed lead from the body. Chelation involves manual injection of a chemical agent (Calcium Versenate a.k.a. CaEDTA) into the birds, twice daily, until blood levels have been reduced to near undetectable levels. The chemical binds to lead and is then excreted from the body. Condor morbidity and mortality from lead may not be a recent phenomenon only. During the mid-1980s, three lead poisoning deaths occurred in the diminishing original wild population, contributing to a decision to bring all condors into captivity.

Among the dead or sick condors encountered, lead objects were recovered from the gastro-intestinal tracts of eight, and objects whose radiographic appearance was consistent with lead fragments were noted in six others. The source of lead has been identified in some cases as spent ammunition in the form of both shotgun pellets and fragments of rifle bullets. Condor biologists and toxicologists strongly suspect a connection between spent ammunition and the occurrence of elevated lead residues in the blood of other condors and in the disappearance of some of the non-recovered fatalities.

This report summarizes background information on lead toxicity in condors associated with spent ammunition and documents the findings and recommendations of a collaborative steering committee organized by the Condor

Recovery Team (CRT) to review this issue and develop a strategic plan to address it.

HISTORY AND CURRENT STATUS OF CONDORS AND LEAD POISONING

Originally, the Condor Research Center and more recently the CRT have recognized lead as an important factor in illness and fatality of condors and have implemented a series of strategies aimed at reducing the impact. The original free-flying birds in the 1980s were provided lead-free carcasses to reduce exposure competitively to lead-contaminated carcasses in an attempt to reduce their rate of decline. Currently, captive-produced, released birds are encouraged to prolong dependency on provided food thereby discouraging, but not effectively eliminating, foraging on carcasses of unknown origin. In addition, attempts are made to capture all birds at least twice yearly and measure their blood lead levels. Birds found with elevated levels are kept in captivity and chelated, as necessary. Movements of all birds are rigorously monitored with radio telemetry so that moribund birds can be found quickly, captured, and chelated. Birds that die or disappear can be found more readily and recovered. All of this activity has the potential to negatively impact the behavioral development of the birds. In addition, it has increased the workload of the field crews, forced the application of resources toward intensive management of condors due to this problem, and drawn resources away from other important aspects of condor management, while contributing negatively to overall condor survival.

What has been learned is that while occurrence of lethal lead poisoning is a sporadically occurring event and actual sources of lead are known in only a few instances, blood lead levels across the population of free-flying birds increase with time indicating that nearly all of the birds are being exposed to lead to varying degrees on an ongoing basis. Further, there is a strong tendency for the toxicity events to occur in the fall of the year, roughly coinciding with hunting seasons, although episodes, clearly involving lead ammunition, have occurred at other times of the year also.

While many people have doubted or chosen to look past this problem, the death of one condor during the fall of 2002 and the potentially injurious poisoning of 12 birds in Arizona, known to have foraged on the Kaibab Plateau, and one in southern California clearly demanded that a great deal more emphasis and attention were needed throughout condor range to reduce the exposure of condors to lead, specifically from spent ammunition. It was only through diligent and hard work by the field crews and the expert veterinary advice that was provided to them that the lives of many of these birds were saved.

As condor managers reviewed the lead-related incidents of the previous years and looked ahead, it was also clear that although it may be possible to continue to overcome the problem to a limited extent by releasing large numbers of captive-produced birds, the intense management needed to mitigate the impact

of lead was expensive, at cross-purposes to the goal of establishing free-living, stable populations, and not defensible or sustainable in the long run on biological or economic grounds.

It is noted further, that the toxicity of lead to humans and wildlife has been recognized resulting in its reduction and or removal from paint, gasoline and ammunition used for hunting waterfowl. Presently the military is investigating the phase out of lead from its munitions arsenal.

A PLAN FOR A COLLABORATIVE RESPONSE

At the urging of a broad and diverse cross section of stakeholders a multilateral subcommittee of the CRT was appointed by U.S. Fish and Wildlife Service (FWS) Operations Manager, Steve Thompson, in January 2003 to address this issue. The Committee was appointed to provide immediate and broad representation of all of the major audiences perceived to be affected by measures to reduce lead exposure to condors. This is to include hunting and shooting sports enthusiasts who are capable of aiding greatly in the effort to effect change. Toward this end, appointees to the Committee included representatives of the firearms industry, shooting sports groups, conservation organizations, State wildlife agencies of California and Arizona, experts in the social science fields, and selected members of the CRT. The Committee met at The Raptor Center at the University of Minnesota, St. Paul, Minnesota on February 17 – 19, 2003, to explore ways in which condor survivability could be improved measurably by reducing the exposure to lead from ammunition sources.

The Committee's deliberations were conducted in a group setting with a discussion facilitator selected from outside the Committee. Guided by the FWS Operations Manager's charge, Committee members were free to put items on the table for discussion, agreement was arrived at through consensus after often-times lengthy discussion, and each day's results were recorded and summarized each evening. These summaries were reviewed for accuracy at the outset of the next day's meeting, providing a starting point for subsequent discussion. An overview of the Committee's discussion is provided below, and a detailed presentation of findings and recommendations follows under the heading of Outcomes and Deliverables.

OVERVIEW OF COMMITTEE DISCUSSION

The composition of the Committee represented diverse perspectives and beliefs regarding the issue of lead poisoning in condors and the options available to mitigate it, especially in the arena of gun use and hunting. All members immediately agreed that voluntary methods of mitigation provide the highest likelihood of acceptability. Participants also agreed that sports men and women have played a fundamental role in successful wildlife conservation efforts to date, and that obtaining their voluntary cooperation will be the key to success in the current initiative. The group concurred that voluntary cooperation must be

preceded by increased awareness of the problem among the firearm using public, and that awareness can be increased most effectively by using the best science available to define the problem and present it to the various constituencies.

While voluntary methods of mitigation are sought, incomplete information about the pathways of lead to the condors becomes problematic in defining the specific approaches that may be taken to reduce risk of exposure. In trying to identify pathways, Committee members had to wrestle with the episodic nature of the incidences of lead poisoning among condors, uncertainty as to the sources of lead that were being encountered by the birds, unknowns about the exact amount of lead or the frequency or constancy of exposure involved, and the duration of exposure required to cause morbidity or mortality. The Committee was aware also of the need to be fair, balanced, non-judgmental, and solution-oriented. There was acknowledgement from the beginning by all participants that we will not have all the desired information to craft detailed plans, but that we must move ahead resolutely with the best information available. This recognition of both the need to act immediately and the potential to increase program success in the longer term by incorporating a growing body of knowledge and information was the basis for the decision to develop a two-phased strategic plan.

The knowledge available to the Committee included the facts that 1) lead from ammunition is toxic to condors when ingested, 2) that condors have sickened and died as a result of ingesting lead from spent ammunition in carcasses, 3) that it is in the best interest of conservation to act to resolve this problem, 4) that results measured in either sociological terms (people's awareness and behavior) and biological terms (condor's blood-lead levels and mortality) will require a timeframe that may span several years, and 5) that efforts must begin immediately to increase the chance of success.

The Committee recognized that its planning must address an audience that in all probability is:

1. Not well-informed about condors and may have an indifferent or even negative perception about them or the problems with lead toxicity;
2. Skeptical about the role of spent ammunition in condor illness and fatality;
3. Leery or suspicious of any efforts or messages perceived to reflect hidden agendas regarding firearm use;
4. Sensitized by issues and fall-out from the late 1980s regulatory action requiring the use of non-lead shot for waterfowl hunting; and
5. Widely segmented culturally and geographically and comprised of people who in all probability have never had reason to consider the negative consequences associated with leaving lead-bearing carcasses in the field.

Add to this the possibility that a significant component of the problem may be generated by persons who take game with firearms outside the law and therefore may be unlikely to receive or respond to messages intended to promote behavior change, the task at hand assumed major proportions.

Finally, the Committee recognized that failure to develop a science-based and robust plan, with timelines and benchmarks, would invite legitimate criticism regarding the CRT's ability to effectively address the lead problem. This in turn could increase pressure to scale back or abort condor releases just at the time when captive condor production is approaching major proportions and successful fledging of wild-produced young from captively-produced birds is imminent after more than 20 years of work. It could also lead to pressure from other sectors to seek regulatory solutions to the lead ammunition issue.

OUTCOMES AND DELIVERABLES

In accordance with the Regional Manager's direction regarding the Committee's function, the following outcomes and deliverables were created at the initial meeting:

- A name for the Committee;
- A statement of purpose for the Committee;
- Committee operating guidelines and principles;
- Definition of the geographic scope of the Committee's efforts;
- A list of research needs to fill information gaps and strengthen the Committee's efforts, and
- A list of key messages;
- A list of key target audiences;
- A two-phased plan to effectively deliver key messages to key audiences;
- A list of objective sociological and biological benchmarks to assess progress in meeting the plan's objectives
- Preliminary budget considerations, and
- Recommendations for implementation of the plan and the future role of the Committee.

These products and deliverables are discussed under the following headings.

NAME OF COMMITTEE

The group agreed on the following name for the Committee:

**THE CALIFORNIA CONDOR LEAD EXPOSURE
REDUCTION STEERING COMMITTEE: A
SUBCOMMITTEE OF THE CALIFORNIA CONDOR
RECOVERY TEAM.**

STATEMENT OF PURPOSE

THE Committee's purpose is to develop a strategic plan to disrupt lead exposure pathways to condors from ammunition by fostering awareness and encouraging voluntary actions among firearms users.

OPERATING PRINCIPALS AND GUIDELINES

The following principles and guidelines will guide the Committee's operation and formulation of the strategic plan:

- We are not anti-hunting or anti-firearm ownership and use;
- We recognize the contribution of firearm users to conservation efforts; the hunting community is a valued and necessary partner, and their help is essential to this endeavor;
- We are working at the request of FWS through the CRT;
- We recognize the relevant authority of State wildlife agencies;
- We acknowledge that the condor population in Arizona and Utah is designated as experimental/nonessential under section 10(j) of the Endangered Species Act, and recognize that this results in differences in condor management within 10(j) and non-10(j) areas. We will adhere to all commitments made in the 10(j) Federal-rule and associated agreements.
- We have a long-term commitment to this issue. Our focus is on eliciting voluntary cooperation and avoiding regulatory controls, if possible, to achieve needed results;
- We recognize lead as a toxin that affects other wildlife, such as waterfowl, eagles and loons, in addition to condors. Lead, including lead from ammunition, is a well-recognized toxin for human beings also;

- While we recognize that there may be other sources of lead in the environment, we will focus our efforts on reducing lead poisoning from ammunition sources;
- All distributed information will be science-based and represent the most current status of our knowledge, and
- We seek partners that commit to our key messages and whose organizational messages do not conflict with our operating principals.

GEOGRAPHIC SCOPE

The strategic plan will address the present range of the restored condor population, excluding Mexico. Future success of the Condor recovery program and expansion of the Condor's range may require an expansion of the information and outreach effort. All aspects of this strategic plan are voluntary and its application is at the discretion of the appropriate State authorities in conjunction with FWS and CRT.

RESEARCH NEEDED TO SUPPORT THE PLAN

The Committee identified the following needs for research to support and strengthen the messages promoted through the plan and to assist in identifying additional recommended practices:

- Improvement of baseline condor lead level data – increase in the intensity of the now extant, twice-yearly efforts to collect samples systematically from all free-flying birds;
- Determination of incidence of lead particles or fragments in animal carcasses, by species, that condors are known to feed upon or are thought to have high potential for such;
- Statistically relevant studies on lead in gut piles – availability, amount of lead contained and condor utilization of gut piles as a food source;
- Incidence of lead in the flesh of standing ungulate populations;
- Long-term accumulation of lead by condors through isotopic analysis of feathers;
- More complete information about condor movements and foraging behavior by utilizing GPS/satellite transmitters and increased field efforts, as well as improved recovery and analysis of carcasses of dead birds, and

- Quantitative information about dynamics of condor lead ingestion, digestion, retention, absorption, and depuration and mechanisms of toxicity in condors and other carnivorous birds.

There was no intent by the Committee to indicate that these gaps in knowledge are needed to be filled before work could be undertaken to mitigate exposure of condors to lead. The Committee recognized the CRT's function in establishing the condor related research agenda.

KEY MESSAGES

The following key messages were developed by the Committee and regarded as important elements of both initial and long-term efforts to increase awareness of the problem and stimulate responsive actions. These messages are intended to be the essential elements in any communications pieces prepared in the conduct of this effort. They include not only statements of important facts but also recommendations the Committee believes would, if practiced on a wide-scale, voluntary basis, yield measurable results toward our goal of improving condor survivorship through reducing or mitigating exposure to lead. These key messages may be slightly modified as a result of focus groups and discussions with key audience members.

- The California condor is a rare and unique species that is part of our natural heritage
- California condors are on the comeback from the brink of extinction.
- Lead poisoning is a demonstrable obstacle in the recovery of the California condor
- While other lead exposure sources may exist, condors are known to have been exposed to lead by ingesting lead shot or fragments of lead bullets when feeding on carcasses; several condors have died after ingesting lead in this way and many more have had to be medically treated for lead toxicity.
- A collaborative effort with representation from the firearms industry, shooting sports, hunting and conservation groups, state and federal management agencies, social scientists, and the California Condor Recovery Team has been undertaken to address unintended lead exposure caused by spent ammunition.
- Acknowledging the long and successful tradition of wildlife conservation among hunters, we seek their voluntary assistance in reducing lead poisoning in condors.

In order to expedite results and protect the health of condors in the near future, the following voluntary actions are recommended:

- Retrieve all shot animals (including coyotes, varmints and small game) from the field, or
- Hide carcasses or gut piles by burying them, covering them with brush or rocks, or placing them in an area inaccessible to condors on the ground, or
- Remove bullets and surrounding impacted flesh when leaving carcasses or gut piles in the field, or
- Simply use alternative non-toxic ammunition, in which case none of the above items is needed

KEY AUDIENCES

The selection of key audiences was guided by the Committee's consensus that, 1) the audience could be efficiently and expeditiously accessed, 2) they are essential to have "on board" in terms of understanding the nature of the problem and the importance of operating in a "best practices" mode to reduce lead exposure, and 3) they would be able to provide feedback as to the effectiveness of the Committee's approaches and messages. A variety of methods would be used to communicate with them, including one-on-one discussions, group presentations, mailings, flyers, agency communications mechanisms, articles and editorials in trade publications, etc. While the key messages might not change from audience to audience, each would receive messages tailored to their relationship with hunting and conservation. Key audiences would include:

- Big game, varmint, and upland game hunters;
- Professional hunting guides;
- Ammunition retailers and wholesalers;
- Land owners and managers;
- Hunter education instructors;
- Youth group leaders (4H, Scouts, etc.);
- Agricultural and wildlife extension services;
- Land management agencies; and

- Sheriffs, game wardens, brand inspectors, and APHIS Wildlife Services (fka Animal Damage Control) personnel (advise on appropriate ammunition to use when dispatching nuisance or unwanted animals).

TWO-PHASE STRATEGIC PLAN

The Committee recognized (1) the need to implement steps to promote immediate awareness of the problem and the currently identified responsive actions and (2) the benefits of a longer-term effort that would allow time to test and refine messages, acquire and incorporate new data and information and, in general, mount a more comprehensive and polished campaign. This recognition was reflected in development of the two-phased strategic plan outlined below.

Phase 1: Baselines survey and material preparation

Three priority needs to be addressed in Phase 1 of the plan were identified. First was a concise compilation of information on the recovery program, the lead problem, the role of the Committee, and the strategic plan to be distributed to Committee members and the CRT. The purpose of this information package is to insure the consistency of any communications regarding this effort to the media and other entities. The second need identified was a basic description of the lead problem and recommended practices to address it that would be included in hunt proclamations and/or flyers to be distributed to hunters likely to be a field in condor range in California, Arizona, or Utah. The third need was a baseline hunter awareness survey delivered to people who had hunted in these areas last year. This survey will establish a baseline for assessing the efficacy of both the Phase 1 and 2 awareness campaign. In addition to this report, the following work products will be prepared to address the first two needs:

- Technical Information Document (TID): Intended to be used as an internal document by the Committee and the CRT, this document will provide up-to-date factual information about condor recovery efforts, occurrences of lead poisoning among condors, and other field and management activities. It will insure that everyone has the best and most consistent information available when responding to inquiries from the media and other entities.
- FAQ (frequently asked questions): This document will provide more in-depth information drawn from the TID and presented in a FAQ format. It will aid in presenting a consistent picture of the current effort. It could be distributed by a variety of means including placement on various websites.
- Fact Sheet: Similar to the FAQ above, this document will contain important information, key messages, photos of condors, and radiographs in which lead fragments can be seen in condors' stomachs. This would be prepared as a template that could be easily modified to suit different audiences in the

Targeted Mailings (below) as well as being used internally to maintain consistent communications.

- Proclamation Insert (Appendix 1): This information will be published in the big game hunt proclamations distributed to the hunting public in the states of California, Arizona, and Utah and is designed to promote a basic level of awareness. It will be enhanced by graphics of condors and a map of the range in which they now occur.
- Flyer or Brochure: This would be a piece that could be distributed in bulk at public places, displayed at point of sale counters for licenses and hunting accessories, hung on posts at entry points to hunting areas etc. It would contain pictures, essential information and key messages. It would be prepared in both English and Spanish.
- Targeted Mailings: These mailings will contain the FAQs and Fact Sheet and be sent to individuals and organizations among the key audiences identified above by state agencies. Mailings will be timed to precede the opening of specific hunts in the three-state condor range (e.g., turkey, deer, and elk hunts that geographically overlap condor range). The fact sheet will be altered in terms of “packaging” to suit the audience; however, the key messages of the Committee will not be altered.

The baseline survey is planned for two purposes:

- 1) for the Committee to gain a better understanding of the varying levels of knowledge and awareness among firearm users, and
- 2) to provide a baseline for subsequent, periodic assessments of improvement in the defined benchmarks (see Measurable Outcomes below). In order to provide a valid baseline for monitoring, the survey must be completed before the Proclamation Inserts are received by the public in mid-summer 2003. Hence, the best time for conducting the survey is late spring. The Committee will prepare a list of three to five salient questions. The survey sample will be drawn from lists of hunters who held big game or turkey licenses in portions of California (10 counties, including the Coastal Mountain Range between Los Angeles and Monterey counties, and the southern Sierra Nevada of Tulare and Kern counties), Arizona (the North Kaibab area, Coconino County), and Utah (primarily Washington, Kane, Garfield, and Iron counties) that include condor range. Lists of pertinent hunter names, addresses, and phone numbers will be solicited from State wildlife agencies. A professional team or organization should be retained to determine what portion of that population needs to be sampled in order to yield a meaningful result, conduct a telephone or mail survey, compile and analyze data, and report back to the Committee. An investigation into procedures and costs has been launched by the Committee. FWS needs to identify immediately

funds for contracting this survey work or support of future committee meetings to undertake the survey. As the Committee is in no position to raise the funds necessary for implementation of this plan, it is critical that the Service respond to this need in order to maintain the integrity of this process.

A table of assignments for preparation of these pieces by members of the Committee and a timetable for delivery is presented in Appendix 2. The Committee will review and finalize all documents. Costs for preparation, printing and distribution will be borne by the agencies and organizations of the respective Committee members, or as funded by other grants or donations.

Phase 2: Message development and dissemination)

The sum of Phase 2 activities will be coordinated public relations, education and outreach campaign of broader geographic and demographic scope and a longer timeline than phase 1. It will include presenting key messages to focus groups throughout the defined geographic focus area and to key audiences, testing those messages, refining both the messages and delivery approaches based on feedback from the focus groups, preparation of material with refined messages, and more extensive surveys to measure effectiveness in gaining awareness and practice of recommended procedures. Included will be feedback loops between the Committee and the key audiences, as well as between the Committee and the CRT to assess effectiveness and progress.

The Committee recommends retaining Wildlife Management Institute (1101 14th Street N.W., Washington, DC) as an independent project management contractor to design and execute Phase 2. They are accustomed to performing this type of work and have vendors and subcontractors available to complete necessary tasks. Furthermore and very importantly, they would have immediate credibility among the various target audiences. As a non-profit organization, they could receive funds from government sources, contributions from industry and user groups, and grants from foundations. The Committee would serve as a governance board, having fiscal oversight, oversight on development and delivery of messages, and assessment of results as well as providing a conduit between state and federal management authorities. Implementation of this recommendation is dependent upon agreement by the President of WMI and the availability of sufficient funds to establish a contract relationship. It is recommended that a contract be drawn for 3 years, at which time there would be formal review of progress and further decision made as to whether to continue the relationship or not.

MEASURABLE OUTCOMES

The Committee identified the following objective social and biological indicators of plan success in the range of the condor:

1. Reduced blood and carcass lead levels in condors;
2. Reduced condor morbidity and mortality from acute lead intoxication;
3. Increased public knowledge related to condors, lead poisoning in condors, and methods to mitigate lead exposure in condors;
4. Increased adoption by firearms users of recommended practices to reduce lead exposure in condors including use of alternative ammunitions.

The Committee felt that meaningful information about items three and four could be realized in the short term (1 – 2 years) through information dissemination, follow-up surveys conducted by mail, telephone and direct questioning at hunter check stations, and monitoring the availability and sales of non-lead ammunition in targeted areas. The first two indicators, biological outcomes for condors, are not only primary objectives but also are benchmarks for assessing the incremental impact of the plan. They are measurable only over a longer time frame, because of 1) awareness of the issue and adoption of recommended practices must occur first, and 2) the unpredictable nature of acute lead exposure incidents in condors. Implementation of plan elements and progress in terms of the cited assessments are regarded as an iterative process that will continue to refine and improve the plan.

To insure satisfactory progress in enhancing condor survival, it must be recognized by all parties that if in 5 – 7 years, it is clear that this proposed program has not been rigorously applied or usable results are not being achieved, regulatory control may be considered. It is the Committee's position that through the current level of intensive management of condors, the recovery program would not be unduly compromised within this timeframe while the voluntary approach to lead mitigation is being implemented.

BUDGET CONSIDERATIONS

Costs for operation of the Committee:

-1 meeting per year for 13 members, travel and per diems, miscellaneous administrative cost (facilitator, coordination/administration): \$15,000 - \$20,000

Costs for Preparation and printing of initial flyers and brochures: \$10,000
(one time cost)

Costs for hiring a Project Management Company to conduct focus groups and information gathering for Phase 2 including baseline survey for 2003:

c. \$50,000/y x 3 years

\$150,000

Minimum funds needed to launch first year's activity: \$80,000

Our plan is to seek operating funds from contributions of our partner organizations in subsequent years and reducing the input of Service funds on a phased basis. However if this is not successful, it will be the responsibility to the Service to determine future viability of the Committee and support it as necessary. As non-Service funds become available, the Committee will inform the Service and negotiate reduced contributions of the Service.

RECOMMENDATIONS FOR PLAN IMPLEMENTATION AND COMMITTEE FUNCTION

The Committee developed the following list of recommendations to the CRT and the Regional Manager regarding the lead toxicity issue, the strategic plan and its implementation, and the function of the Committee from this point on:

1. An intensive, long-term campaign to secure voluntary actions by firearms users to ameliorate the unintended exposure of condors to lead from spent ammunition should be mounted under the auspices of the CRT. The strategic plan outlined in this report constitutes such a campaign and should be implemented immediately. (See Two-Phased Strategic Plan, above.)
2. The Committee is investigating options for completing a baseline survey of hunter awareness in spring of 2003 pending FWS approval and funding. The survey should be completed by professionals, either through out-sourcing if that could be arranged in time or using the resources of Committee members. The CRT should facilitate this action as appropriate. (See Two-Phased Strategic Plan, Phase 1, above.)
3. A project management entity should be retained to develop and implement the outreach elements of Phase 2 of this plan in coordination with the CRT and under the direct advisorship of the Committee. The Wildlife Management Institute is recommended. (See Two-Phased Strategic Plan, Phase 2, above.)
4. If retention of a project management entity is not possible for financial reasons, the Committee may seek ways to utilize the capacities on the Committee to prepare materials, conduct necessary surveys and focus groups activities, and provide other deliverables.

5. The CRT should consider and hopefully implement the research activities identified by the Committee to support successful implementation of the strategic plan in the long term. (See Research Needed to Support the Plan, above.)
6. The intensive management program for the free-flying population of condors must be continued and improved until such time as the elements of this plan can exert an effect. This includes necessary funding for providing clean food, radio-monitoring of movements of every bird, capture for monitoring lead levels in blood on a scheduled basis, and gaining more information about foraging habits.
7. While the strategic plan is not directed at eliminating the use of lead ammunition, the use of non-lead ammunition is a basic way to break the lead exposure pathway. Therefore, part of our effort is to increase awareness of the availability and performance of alternative ammunitions, to encourage development of alternative munitions, and to seek ways to encourage voluntary use of this by hunters. This could include subsidies from private foundations and organizations who seek to enhance such utilization as well as marketing promotions by manufactures, distributors, retailers and agencies. CRT and FWS support, as appropriate, of any such activities would increase their potential for success and federal and state dollars may be essential to achieve goals.
8. The Committee should be retained in order to serve several functions, including implementation of Phase 1 of the strategic plan (see recommendation 2 and Two-Phased Strategic Plan, Phase 1, above), coordinating federal and state agencies to facilitate the distribution of the information, to seek other partners for information distribution, to refine cost estimates and to seek funding opportunities and to overseeing the work of the contractor on implementation of Phase 2 of the strategic plan (see recommendation 3 and Two-Phased Strategic Plan, Phase 2, above).

DISCUSSION AND CONCLUSIONS

The Committee examined and discussed in detail many facets of our currently held knowledge about the occurrence of unintended lead exposure from ammunition in causing illness and fatalities among California condors, and the very negative impact this will continue to have on condor recovery if the issue is not addressed now. It is acknowledged also that resolution of the problem lies largely in the hands of the firearm users, many of whom know little about the problem or tend to be unconvinced that spent ammunition is the pathway by which condors are exposed. The Committee, however, believes firmly, based on scientific data, that this pathway exists and has designed a strategic plan predicated on public awareness and voluntary assistance to solve the problem. The plan is intended to ameliorate the problem by using the best practices

identified by the Committee, and to discern better ways to approach and address the problem.

The Committee recommends the CRT to undertake specific research into lead exposure pathways that will strengthen the messages that are being delivered to the hunting public. The Committee also recognizes that our current understanding is based on incomplete information that may be compromised somewhat by small sample sizes and the irregular occurring nature of acute lead poisoning events. While these factors may have the potential to alter our messages and approaches, their existence does not negate the fundamental fact that spent lead-containing ammunition is toxic and that it is finding its way through the food chain into the stomachs of condors. Once there it poisons them and they die when intervention (chelation) does not occur or occurs too late in the process.

The Committee recognizes that implementation of the proposed strategic plan will not likely result in an immediate cessation of lead poisoning, nor are we ever likely to reduce the incidence to zero. Others should not have that expectation either. However, a significant reduction in the risk is achievable. It is not the aim of the Committee to seek elimination of lead ammunition. It is the aim of the Committee to more exactly define the pathways, raise people's awareness of the problem, and rely on the high level of conservation ethics among the hunting public and their desire to do the right thing when that is known. It is also the aim of the Committee to employ tactics that effectively reduce exposure of condors to lead from ammunition.

Finally, the Committee emphasizes that this is a long-term, iteratively refined process. While it is expected that in the short term a measurable increase in awareness and utilization of best practices can be achieved and thereby see a decrease in the frequency of the randomly-occurring lethal lead events in condors, the achievement of overall reduction in elevated lead residues in the blood and the prevalence of lead in the condor population will take several years to achieve. In the meantime, it is essential that intensive management of the free-flying population be maintained, including providing contaminant-free food sources, radio-monitoring of movements of all birds so that individual events may be detected, and recovery and necropsy of deceased birds, regular capture for blood sampling and monitoring of lead levels, and chelation of affected birds may be accomplished.

APPENDICES:

APPENDIX 1: PROCLAMATION PIECE

Draft Statement for Big Game Hunting Proclamations in California, Arizona, and Utah

California condors are on the comeback from the brink of extinction. An obstacle to the recovery of North America's largest land bird is lead poisoning. Condors are exposed to lead when they feed on carcasses that contain lead shot or fragments of lead bullets. Condors have died from lead poisoning after ingesting such imbedded lead.

To address this problem, a group of hunting, firearms & shooting sports industries and condor recovery organizations is working together to build awareness of this issue. The group is called The California Condor Lead Exposure Reduction Steering Committee, a Subcommittee of the California Condor Recovery Team. Our goal is to encourage people using lead ammunition in condor country to voluntarily help reduce the risk of lead poisoning.

Research is underway to increase our understanding of condor lead poisoning so we can effectively address the problem in the long term, but immediate action is needed to protect this rare and unique bird. Recognizing hunters' long tradition of helping to conserve wildlife, we ask that you consider the following actions when hunting in areas where condors forage:

- Retrieve all shot animals (including coyotes, varmints and small game) from the field, or
- Hide carcasses or gut piles by burying them, covering them with brush or rocks, or placing them in an area inaccessible to condors on the ground, or
- Remove bullets and surrounding impacted flesh when leaving carcasses or gut piles in the field, or
- Simply use alternative non-toxic ammunition, in which case none of the above items is needed