The Scientific Evidence Does Not Support a Ban on Lead Ammunition for Hunting

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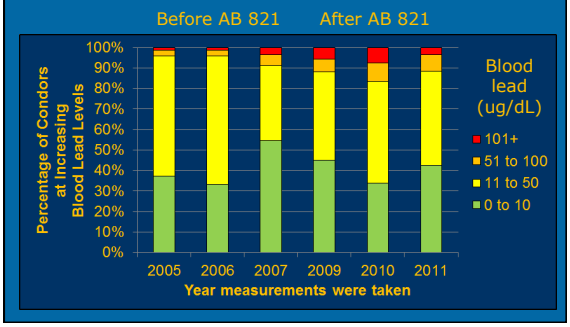
The Facts

- The AB 821 lead ban is ineffective
- Existing scientific studies are flawed and do not support a lead ammunition ban for hunting
- Scientific evidence indicates that hunter's ammunition is not the source of lead exposure to wildlife
- Several alternative sources of lead are present in the environment

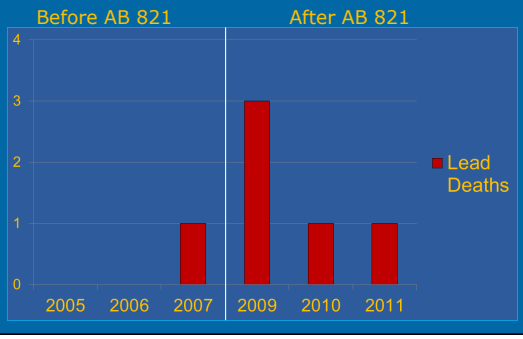
Measuring the Results of the AB 821 Lead Ban

- Condor Blood lead measurements before and after AB 821 (obtained from USFWS and NPS)
- Condor Deaths before and after AB 821 (obtained from necropsies from FWS and studbook from SDZ)
- Hunter Compliance with AB 821 (memo from CADFG law enforcement division)

Condor Blood Lead Levels Before and After the AB-821 Lead Ban



Condor Lead Deaths Before and After AB 821



99% of Hunters Complied with the AB 821 Lead Ammunition Ban

Exerpt from CA F&G Commission meeting, on hunter compliance with the AB-821 lead ban:

Commissioner Richard Rogers: *"So let me get this right, you said a total of 72 warnings out of 6,500 surveyed?"*

Chief Nancy Foley: *"That is correct"*

Commissioner Richard Rogers: *"That's a 99% compliance rate. Now that's stewardship, I'm very happy to hear that"*

Source: California Fish and Game Commission Meeting , February 5th 2009

The Results of AB 821

- One condor lead death before AB 821
- Five condor lead deaths after AB 821
- Percentage of condors exposed to lead unchanged before and after AB 821
- Percentage of condors poisoned by lead slightly increased after AB 821
- Usage of lead ammunition by hunters decreased by 99% after AB 821

Conclusions

- AB 821 is ineffective in reducing condor lead exposure and death
- Hunters' lead ammunition is not the cause of condor lead exposure and death
- There are other sources of lead in the environment that are poisoning condors

Studies Relied upon to Support Lead Ammunition Bans in California are Flawed

- UC Davis turkey vulture and golden eagle studies
- UC Santa Cruz lead isotopic ratio studies
  - Church, et al.
  - Finkelstein, et al.
- Hunt, et al. bullet fragmentation studies
- Rideout, et al. 2012 paper

UC Davis Turkey Vulture and Golden Eagle Studies

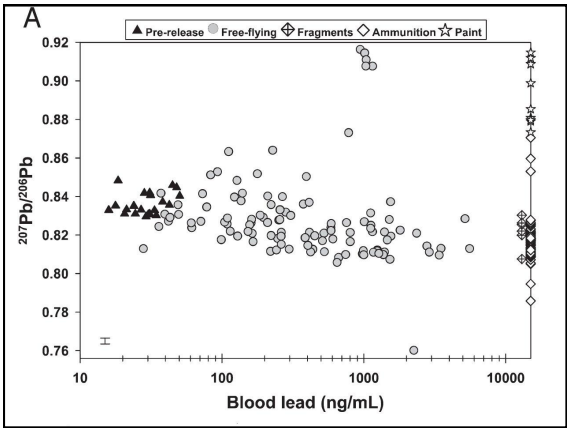
- Failed to verify the number of kills that were assumed to have occurred in the study areas
- Incorrectly assumed, without justification, that the hunting intensity of their small study areas was proportional to county-wide hunting intensity
- Failed to recognize existing ammunition bans in Tejon Ranch study area and thereby falsely categorized post-lead ammo ban data as pre-lead ammo ban data

- Actual hunter-take data for the study sites is significantly different from the assumed hunting intensity
  - "High hunting intensity" site had the greatest blood lead levels for turkey vultures, even though only one pig was actually taken
  - "Medium hunting intensity" site had much lower blood lead levels, yet it had fourteen times the amount of hunter killed pigs
  - Blood lead data does not correlate with actual number of pigs killed

UC Santa Cruz Lead Isotopic Ratio Studies

- Assumes without justification that the lead isotopic ratio range of leaded paint available in the Condor Range is limited to the isotopic ratios found on a single fire tower
- Ignores the fact that lead in paint has a very broad isotopic ratio range that completely overlaps the isotopic ratio range of lead from ammunition
- Neglects to report that their own published research reports a wide isotopic range for lead in paint in California homes and on an abandoned military base

- Neglects to report that their own publications reference scientific studies that report very broad isotopic ranges for lead in paint



Evidence that Lead Paint Has a Broad Isotopic Range

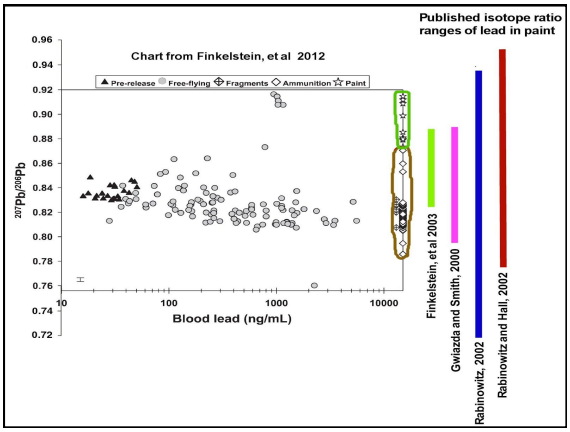
"On the basis of the limited sampling of this study, there are significant differences in the isotopic compositions of paints used on these buildings (e.g., 207Pb/206Pb ratios ranging from 0.824 to 0.887). The differences in paint isotopic ratios are not surprising since the sources of lead used in the production of paint pigments varied over time and between different paint pigment manufacturers (46)."

Source:

Myra Finkelstein, Roberto H. Gwiazda and Donald R. Smith Lead Poisoning of Seabirds: Environmental Risks from Leaded Paint at a Decommissioned Military Base Environ. Sci. Technol. 2003, 37,3256-3260.

Range of Published Lead Isotopic Ratios from Paint

- Finkelstein, et al 2012: .879-.914 (paint from Chalone fire tower)
- Finkelstein, et al 2003: .824-.887 (paint from Midway military base)
- Smith & Gwiazda 2000: .795-.89 (paint from Santa Cruz houses)
- Rabinowitz 2002: .719-.935 (refined lead pigments used for paints)
- Rabinowitz and Hall 2002: .775-.952 (42 cans of major brands of leaded paints)



Hunt, et al. Bullet Fragmentation Studies

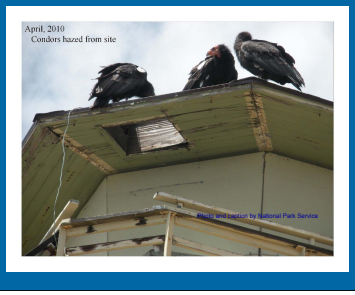
- Misleads reader to believe that the carcasses and gut piles examined were obtained from hunters in the field
- The authors, rather than hunters in the field, shot the deer from which the carcasses and gut piles used in this study were obtained
- Bullets tested in this study were chosen by the authors, not by hunters in the field
- The bullets tested in this study were chosen after the authors searched for several years for the most fragmenting bullets

- Authors ignore their own early data that showed that commonly used hunting bullets fragmented very little
- Exaggeration of X-rays by alteration of contrast and brightness
- Exaggeration of X-rays by conversion of radiographs from negative to positive image

Alternate Sources of Lead Exposure in the Environment

- Microtrash — Condors ingest garbage
- Paint Chips
- Mining Wastes
- Soil Contaminated by Legacy Leaded Gas and Legacy Pesticides

Condors Ingest Leaded Paint Chips from Abandoned Fire Lookout Tower



Leaded Paint Chips from Abandoned Fire Lookout Tower

Studies Supporting Alternative Sources of Lead

- Grizzly Bear Study
- Rogers, Thomas A., et al., Lead Exposure in Large Carnivores in the Greater Yellowstone Ecosystem, The Journal of Wildlife Management. 2011, 9999: 1-8.

- Midway Island Study
- Myra Finkelstein, Roberto H. Gwiazda and Donald R. Smith, Lead Poisoning of Seabirds: Environmental Risks from Leaded Paint at a Decommissioned Military Base, Environ. Sci. Technol. 2003, 37, 3256-3260.

Conclusions

- AB 821 lead ban is not effective in protecting condors from lead poisoning and death
- Hunters' ammunition is not the cause of lead exposure in condors
- Alternative sources of lead are causing lead exposure and poisoning in wildlife
- Microtrash, leaded paint fragments, legacy leaded gasoline and pesticides, mining wastes are plausible alternate sources of lead exposure
- Scientific studies that claim that hunters' lead ammunition is poisoning wildlife are fatally flawed and cannot be relied on

- The broad isotopic range of legacy leaded paint in California and nationwide completely overlaps the isotopic range of popular brands of lead ammunition available in California and nationwide