PROJECT COYOTE

FOSTERING COEXISTENCE

August 12, 2019

Ignacio Nash Gonzalez, AICP Recovery Director
501 Low Gap Rd, Rm. 1010
Ukiah, CA 95482
gonzalezn@mendocinocounty.org

RE: Draft EIR analyzing Mendocino County's proposed Integrated Wildlife Damage Management Program Project

Dear Director Gonzalez:

On behalf of Project Coyote, Animal Welfare Institute, Center for Biological Diversity, and Mountain Lion Foundation, we submit the following comments regarding Mendocino County's Integrated Wildlife Damage Management (IWDM) Program Project Draft Environmental Impact Report (DEIR), published on the County's website on June 13, 2019.

We incorporate by reference all comments and attachments we submitted previously on this IWDM Program, including our October 1, 2018 comments concerning the Notice of Preparation of an Environmental Impact Report (EIR) for the proposed IWDM Program Project. In those scoping comments, we stated our expectation that Mendocino County (County) would give careful consideration to the issues outlined therein, and would rely on peer-reviewed literature, gold-standard experimental design, and consultation with outside governmental and non-governmental organizations and individuals in preparing the draft EIR (DEIR). Many of our concerns regarding the recently published DEIR pertain to shortcomings in one or more of these areas of research, consultation and analysis.

The following comments are presented in an order that tracks the organizational outline of the DEIR, and may be equally applicable to subsequent sections of the document that examine the same issue in additional contexts or from different perspectives.

I. EXPANSION OF KILLING METHODS (§ 1.6, Project Changes Since Publication of the NOP)

- Euthanasia

Section 1.6 of the DEIR addresses "additional potential lethal methods of wildlife damage management as part of the IWDM Program," which are also categorized as "euthanasia." We note

that the term "euthanasia" has a specific meaning and is widely misused, not only by laypersons but sometimes even in technical documents. This DEIR often uses "euthanasia" when "killing" is a more appropriate term, a semantic choice that is likely to mislead the public into believing that all deaths of wild animals in damage control are quiet and humane, which is clearly not the case. AVMA Guidelines provide a conceptualization of euthanasia as involving techniques that provide the "most rapid and painless and distress-free death possible" (AVMA 2013 at 6), with a codependent variable being the "humane disposition" of the individual carrying out the euthanasia procedure. The DEIR should include a section that would identify methods that do not satisfy euthanasia standards and are demonstrably inhumane, such as neck snares and body-crushing traps (e.g., Conibear kill traps).

The DEIR is also vague about how the proposed lethal methods would be employed under the IWDM Program, what species each method would target in what scenarios, and how animal welfare concerns would be addressed. For example, the DEIR identifies thoracic compression as an AVMA-approved method, but fails to mention that this method is only approved for small mammals and birds, and even then only when animals are anesthetized or insentient by other means. Yet some recreational and commercial trappers routinely employ thoracic compression to kill trapped animals such as fox (by standing on their chest)— a practice that is unacceptable in the view of the AVMA.

The DEIR must clearly express the need for strict adherence to AVMA procedures and practices. This can be achieved by revising the list contained in the "Summary of Proposed Management Methods," spelling out both acceptable and unacceptable methods of killing and including clear details about how each method would be employed. For example, it is insufficient to simply note that carbon dioxide (CO_2) will be used to euthanize animals. How would this method be administered? What training would be required of applicators and what equipment would be used? Would CO_2 be used in the field or under captive, controlled scenarios (or both)? Would its use be limited to metered application in specially designed chambers or to fumigate burrows?

- <u>Gunshot as a method of euthanasia</u>

While historical data from the past 10 years shows gunshot to be the most common method by which WS-CA kills animals trapped under the county's IWDM Program, the mere fact that a method is "common" is not determinative of its efficacy or humaneness. If gunshot is to be a "commonly" employed method of killing animals, then its use should be explored in detail with appropriately cited science. This is not to argue that it is not a preferred field technique for dispatching wild animals; rather, it needs to be more thoroughly described. The use of non-lead ammunition also should be mandated pursuant to state law.

- <u>Claims that limiting euthanasia methods could curtail responses to wildlife damage or threats to humans, or preclude the most humane methods of killing</u>

Potential scenarios supporting this claim seem far-fetched, except perhaps where safety at airfields is involved. Even there, hazing (or aversive conditioning) likely would be the most expedient means of responding to an immediate and urgent need to clear an area. The DEIR must explore credible scenarios where it would be necessary to deploy killing methods other than gunshot, as well

as evidence that it could be a more reliable responder in these situations than local law enforcement, animal control or other first responders.

II. MONITORING, SCIENTIFIC VALIDITY, LACK OF DISCUSSION OF AFFORDABLE TECHNIQUES & STATE INVOLVEMENT IN CONTROLLING PROBLEM WILDLIFE (§ 1.7, Non-Lethal Program Alternative)

For **each Program Alternative**, including IWDM as well as both Non-Lethal Program Alternatives, the DEIR should have included an analysis of what monitoring would be required to determine the effects of interventions. Such monitoring need not be expensive to be efficient, but without it the public and local government are left in the dark regarding whether a program's interventions are effective (or even necessary).

Any wildlife intervention program of the type being analyzed in this DEIR should be viewed as experimental until such time as sufficient evidence has been gathered to show or rebut its effectiveness. This does not imply that each complaint regarding wildlife need be treated as an experiment, but rather that the program as a whole should be treated as such. Until the totality of its interventions has been evaluated scientifically, none of the project alternatives meets the gold (or even silver) standard of scientific research.

Many of the specialized non-lethal deterrent techniques and equipment noted in the DEIR are expensive and complex to use—i.e., not farmer-based solutions that are easy to employ and maintain. (For example, there is not yet any gold-standard evidence showing that electrified fladry is more effective than regular fladry.) The DEIR should analyze methods requiring less expense and/or technology.

Regarding the Variation on the Non-Lethal Alternative, the guidelines are inadequately defined—e.g., as written, the Variation would allow an agent to shoot multiple animals over long periods of time and far from the site of the original complaint.

The DEIR needs to clarify that neither the Non-Lethal Alternative Program nor the Variation to the Non-Lethal Alternative precludes removal of a particular wild animal that threatens human health or safety. The DEIR already acknowledges (see §3.2) that if a wild animal were deemed a threat to human health or safety, California Department of Fish and Wildlife agents could kill that animal under the agency's existing Memorandum of Understanding (MOU) and contract with USDA-Wildlife Services. Hence, the state will intervene even when a county or other local jurisdiction does not contract directly with Wildlife Services for that purpose.

Therefore, claims that in the absence of a contract with Wildlife Services the county would have no way of controlling animals that threaten human health and safety are simply unfounded. For example, although Marin County ended its contract with USDA-Wildlife Services in 2000, the state's Department of Fish and Wildlife relied on its MOU to obtain Wildlife Services' assistance in killing a coyote that may have been threatening public safety.

III. DEFINITION OF BASELINE (§ 1.9)

A. CEQA Baseline:

1. Regarding the IWDM Program, the assertion that "the IWDM Program is part of the baseline, and no net new impacts would occur" is arguable at best. For example, each time an agent responds to a complaint and intervenes there is a new impact, and the claim that the agent's impact is the same as past impacts needs closer evaluation. A recently hired agent might bring a new invention to the field—say a night scope for a firearm—and begin using it to kill one or more species of wildlife at a property that had never had wildlife damage before. In this scenario, everything would be "new" except for the WSCA procedure and the county itself. What legitimate basis would exist for claiming that the program is the same as before?

Moreover, other than as a contrivance for claiming that no new environmental impacts would occur under the IWDM Project, it makes little sense for the DEIR to claim that the mere existence since 1989 of a wildlife damage management program somehow qualifies the currently suspended program as part of the CEQA environmental baseline. This error is all the more acute and requires correction, particularly where a legal challenge led the County to admit that its program was functioning without first undertaking the requisite CEQA review. The previous IWDM Program was legally unauthorized and cannot serve as part of the CEQA baseline, and the claim that "no new impacts would occur" is fallacious.

2. Regarding the Non-Lethal Program, the suggested complete ban on the use of live capture devices requires further examination. Certain non-lethal management methods—including translocation, catch-punish-release on site, the use of scent dogs to locate individual "culprits" followed by aversive conditioning—might be foreclosed by a complete ban on cage/culvert traps, nets, tracking dogs and chemical immobilization.

Additionally, the DEIR asserts on the one hand that the Non-Lethal Program can be considered part of the baseline, and no net new impacts would occur. Yet the Non-Lethal Alternative is characterized as a net change from the CEQA baseline because it would create a new mechanism by which property owners could seek reimbursement for the purchase of non-lethal equipment and livestock protection animals, and also because WS has not previously offered such services. However, this characterization does not appear to be supported by evidence and seems unreasonable, as 1) similar technical methods have always been available to residents of the county; and 2) non-lethal interventions would not involve a new use of taxpayer money, insofar as WS interventions in Mendocino County have for decades been funded in part with taxpayer dollars, leaving no new impacts to alter the baseline.

B. No Program Baseline:

The averaging of data over a 20-year period as a proxy for assessing the anticipated level of take for future implementation of the IWDM Program is neither useful nor accurate for predicting the future, except in cases of long-term stability or phenomena with low variability and slow change. This

is problematic from a scientific standpoint, as averages are useful representations of the whole data set only when: (1) distributions are not unduly affected by outliers (rare, extreme events); and (2) there is no significant change over time that makes the average obsolete. Better alternatives might be to use the median when outlying events are not of concern, or either a moving average or regression over time in the absence of significantly changed circumstances.

IV. WILDLIFE DAMAGE MANAGEMENT BACKGROUND AND PRACTICES (§ 1.14)

Scientific Studies of Wildlife Control Methods

The section entitled "Scientific Studies of Wildlife Control Methods" should be re-designated as "Scientific Studies of Wildlife Control Methods, Policies and Practices," to take into account the considerable body of science that recently has advanced Wildlife Damage Management as a discipline. The commitment to "gold standards" in research is commendable, but equal emphasis should be placed on "Best Management Practices."

In discussing the gold and silver standards of research, an important element of both standards is overlooked in the DEIR summary. The design and conduct of the experiment must be without systematic bias (intentional or unintentional bias in sampling, treatment, measurement, or reporting). This is described in varying levels of detail for predator control in three publications since 2016:

- Treves, A., Krofel, M., McManus, J. (2016). *Predator control should not be a shot in the dark. Frontiers in Ecology and the Environment* 14:380-388.
- Treves, A. (June 30, 2019). *Standards of evidence in wild animal research*. Report for the Brooks Institute for Animal Rights Policy & Law, *available at* http://faculty.nelson.wisc.edu/treves/CCC.php/standards.
- van Eeden, L.M. et al. (2018). *Carnivore conservation needs evidence-based livestock protection*. PLOS Biology, https://doi.org/10.1371/journal.pbio.2005577:https://doi.org/10.1371/journal.pbio.2005577.

Light-frightening devices

A 2019 better-than-gold standard study by Ohrens et al. demonstrated the effectiveness of Foxlights in deterring pumas in the Chilean altiplano, but not for deterring Andean foxes at the same site. However, the paper cautioned that habituation might occur over time (beyond the four-month experiment) and that predators accustomed to human lighting might not be deterred even for a short time. (Ohrens, O., Bonacic, C., Treves, A. (2019). *Non-lethal defense of livestock against predators: Flashing lights deter puma attacks in Chile*. Frontiers in Ecology and the Environment 17:1-7.)

Since preparation of the DEIR, a study on captive coyotes demonstrated the effectiveness of fladry on some individual coyotes, when the fladry is designed differently to have narrower gaps between individual flags. (Young, J.K., Draper, J., Breck, S. (2019). *Mind the Gap: Experimental Tests to Improve Efficacy of Fladry for Nonlethal Management of Coyotes*. Wildlife Society Bulletin (in press).)

This was a USDA-WS study and was available prior to 2019 as a dissertation. The DEIR also should consider this gold-standard experiment that did not involve livestock, but demonstrated the effectiveness of fladry and a motion-activated light and siren device in protecting a deer carcass from scavengers such as wolves, coyotes, black bears, and others:

- Shivik, J.A., Treves, A., Callahan, M. (2003). *Non-lethal techniques: Primary and secondary repellents for managing predation*. Conservation Biology. 17:1531-1537.

Lethal Control of Wolves

The DEIR at page 1-26 presents an incomplete, outdated, and misleading summary of lethal control of wolves. The information appears only current to 2015; since then, a number of important and relevant papers have been published. Moreover, the text of the DEIR misleads by presenting Bradley et al. (2015) without offering the scientific rebuttal of that paper by Santiago-Avila, F.J., Cornman, A.M., Treves, A. (Jan. 10, 2018). *Killing wolves to prevent predation on livestock may protect one farm but harm neighbors*. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0189729; correction https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0209716 (also freely available at http://faculty.nelson.wisc.edu/treves/pubs/Santiago-Avila_etal.pdf).

This 2018 analysis of Michigan's lethal control program found no benefit from lethal control but did note a high risk of increases in loss of cattle to wolves. This published critique of Bradley et al. 2015 shows why that paper is not reliable until such time as its authors provide data and methods to substantiate their claims:

> Large carnivores, such as gray wolves, *Canis lupus*, are difficult to protect in mixed-use landscapes because some people perceive them as dangerous and because they sometimes threaten human property and safety. Governments may respond by killing carnivores in an effort to prevent repeated conflicts or threats, although the functional effectiveness of lethal methods has long been questioned. We evaluated two methods of government intervention following independent events of verified wolf predation on domestic animals (depredation) in the Upper Peninsula of Michigan, USA between 1998-2014, at three spatial scales. We evaluated two intervention methods using log-rank tests and conditional Cox recurrent event, gap time models based on retrospective analyses of the following quasi-experimental treatments: (1) selective killing of wolves by trapping near sites of verified depredation, and (2) advice to owners and haphazard use of non-lethal methods without wolf-killing. The government did not randomly assign treatments and used a pseudo-control (no removal of wolves was not a true control), but the federal permission to intervene lethally was granted and rescinded independent of events on the ground. Hazard ratios suggest lethal intervention was associated with an insignificant 27% lower risk of recurrence of events at trapping sites, but offset by an insignificant 78% increase in risk of recurrence at sites up to 5.42 km distant in the same year, compared to the non-lethal treatment. Our results do not support the hypothesis that Michigan's use of lethal intervention after wolf depredations was effective for

reducing the future risk of recurrence in the vicinities of trap- ping sites. Examining only the sites of intervention is incomplete because neighbors near trapping sites may suffer the recurrence of depredations. We propose two new hypotheses for perceived effectiveness of lethal methods: (a) killing predators may be perceived as effective because of the benefits to a small minority of farmers, and (b) if neighbors experience side-effects of lethal intervention such as displaced depredations, they may perceive the problem growing and then demand more lethal intervention rather than detecting problems spreading from the first trapping site. Ethical wildlife management guided by the "best scientific and commercial data available" would suggest suspending the standard method of trapping wolves in favor of non-lethal methods (livestock guarding dogs or fladry) that have been proven effective in preventing livestock losses in Michigan and elsewhere.

Id., Abstract, Santiago-Avila, F.J. et al. (Jan. 10, 2018; correction Dec. 19, 2018).

Quoting the above paper at p.15-16 as it relates to Bradley et al. (2015):

Our results appear to contradict those of the [Bradley et al. 2015] in the Northern Rocky Mountains (NRM) for the period 1989–2012. Although [Bradley et al. 2015] conducted similar survival analyses, they found lethal methods significantly reduced the risk of recurrence, and that killing an entire wolf pack was more effective than the killing of a subset of members of a pack. They reported only a marginal difference between partial pack removal and no removal if wolves were killed within the first 7 days following a depredation event and no difference if 14 days elapsed. Most lethal interventions in Michigan were probably partial pack removals (median wolves killed = 1,...) so our results are consistent. However, other differences in results between their study and ours could be due to different sites and methods.

The analysis in [Bradley et al. 2015] included more varied methods of lethal intervention and the landscapes differ (theirs being mountainous and wider while Michigan's is flatter and surrounded by water on three sides, with attendant differences in vegetation, lake effects, human population density, wolf migration, livestock husbandry practices, etc.). In addition, the survival analyses employed by [Bradley et al. 2015] differed from ours in ways that we could not resolve despite several email exchanges with the lead author and the analyst co-author.

First, [Bradley et al. 2015] did not account for treatment effects beyond a single spatial scale … Their analysis was restricted to the affected wolf pack territory, despite their own reports that killing wolves had at times scattered surviving pack members beyond their original territory... This previous research would argue for an analysis that examined neighboring areas potentially affected by spill-over from scattered survivors.

Second, apparent shortcomings of the statistical modeling in [Bradley et al. 2015] may have affected its results. Their measure of delay to recurrence for full pack

removals spans the time from death of the last pack member to the time when a new pack attacked livestock in the same territory. This measure of delay to next depredation artificially inflates effectiveness because it incorporates a potentially long timespan before a new pack establishes, which probably includes many time-consuming events unrelated to the intervention (e.g., immigration, breeding). By contrast, our method censored observations at the end of each year, so subjects were compared on a more-equal footing after intervention. For partial removal and no removal interventions in [Bradley et al. 2015], the territory was still occupied by wolves so delays probably did not include as many time- consuming demographic events (if any). Although we understand that their intent was to analyze if depredations could be delayed for longer by killing entire wolf packs, we would argue that the appropriate control for the evaluation of this intervention would be sites with suitable wolf habitat but without an established pack because of events unrelated to killing wolves, such as recolonization of vacant habitat.

Using a biomedical analogy, [Bradley et al. 2015] identified the hospital bed (the pack territory) as the subject rather than the patient (the wolf pack), regardless if the wolf pack is the same or if it dies and is replaced by a new pack. Researchers continued measuring the delay to the next infection (depredation) in that bed over time, without correcting for the delay to arrival of a new patient to that bed if a previous patient dies. The delay to the next infection once a patient dies is contingent on the arrival of a new patient to that empty bed, which has little to do with the intervention implemented to the bed other than making it available for a new patient (with full pack removal). By contrast, in our study the patient (area) is the only patient, each infection receives a treatment, and delay to next infection is always measured for the same patient with a reset each year.

Third, differences with [Bradley et al. 2015] could also potentially arise from different handling of the proportional hazards (PH) assumption. We evaluated the compliance of our models with the PH assumption through the inclusion of a time-varying covariate (tvc) ... A significant tvc affects both our treatment hazard ratios and their significance,... We assume that [Bradley et al. 2015]'s team employed other model diagnostics to evaluate their compliance with the PH assumption, but they did not report such diagnostic tests. Until the summary data are published, we cannot agree with the conclusions in [Bradley et al. 2015].

Finally, some might argue that by defining our subjects as area-years and including the same area over different years we pseudo-replicated non-independent samples. In our dataset, only 16 out of 106 sections had depredation incidents in multiple years. To address that concern, we built an alternative model in which areas were omitted in succeeding years…. Results for this dataset are consistent with our main results at the section scale.

Id., Santiago-Ávila et al. (Jan. 10, 2018; correction Dec. 19, 2018) (internal citations, references to text

boxes and to supplementary data omitted).

Finally, the DEIR approaches lethal control generally with outdated information. The effectiveness of lethal predator control has been questioned by two reviews of the peer-revised scientific literature and 30 years of scientific research published in peer-reviewed, top-ranked international science journals in 2016 and 2018, both available free of charge at http://faculty.nelson.wisc.edu/treves/publications.php:

- Treves A, Krofel M, McManus J. 2016. Predator control should not be a shot in the dark. Frontiers in Ecology and the Environment 14:380-388.
- van Eeden LM, et al. 2018. Carnivore conservation needs evidence-based livestock protection. PLOS Biology https://doi.org/10.1371/journal.pbio.2005577:https://doi.org/10.1371/journal.pbio.2005577.

These are the abstracts from the above-cited reviews:

> Carnivore predation on livestock often leads people to retaliate. Persecution by humans has contributed strongly to global endangerment of carnivores. Preventing livestock losses would help to achieve three goals common to many human societies: preserve nature, protect animal welfare, and safeguard human livelihoods. Between 2016 and 2018, four independent reviews evaluated >40 years of research on lethal and nonlethal interventions for reducing predation on livestock. From 114 studies, we find a striking conclusion: scarce quantitative comparisons of interventions and scarce comparisons against experimental controls preclude strong inference about the effectiveness of methods. For wise investment of public resources in protecting livestock and carnivores, evidence of effectiveness should be a prerequisite to policy making or large-scale funding of any method or, at a minimum, should be measured during implementation. An appropriate evidence base is needed, and we recommend a coalition of scientists and managers be formed to establish and encourage use of consistent standards in future experimental evaluations. (Abstract from van Eeden et al. (2018).)

> Livestock owners traditionally use various non-lethal and lethal methods to protect their domestic animals from wild predators. However, many of these methods are implemented without first considering experimental evidence of their effectiveness in mitigating predation-related threats or avoiding ecological degradation. To inform future policy and research on predators, we systematically evaluated evidence for interventions against carnivore (canid, felid, and ursid) predation on livestock in North American and European farms. We also reviewed a selection of tests from other continents to help assess the global generality of our findings. Twelve published tests – representing five non-lethal methods and 7 lethal methods – met the accepted standard of scientific inference (random assignment or quasi-experimental case-control) without bias in sampling, treatment, measurement, or reporting. Of those twelve, prevention of

livestock predation was demonstrated in six tests (four non-lethal and two lethal), whereas counterintuitive increases in predation were shown in two tests (zero non-lethal and two lethal); the remaining four (one non-lethal and three lethal) showed no effect on predation. Only two non-lethal methods (one associated with livestock-guarding dogs and the other with a visual deterrent termed "fladry") assigned treatments randomly, provided reliable inference, and demonstrated preventive effects. We recommend that policy makers suspend predator control efforts that lack evidence for functional effectiveness and that scientists focus on stringent standards of evidence in tests of predator control. (Abstract from Treves et al. (2016).)

Marin County Program Review

The following analysis was written by Dr. Adrian Treves, University of Wisconsin-Madison, based on his view that the DEIR's assessment of Marin County's Program poses several major shortcomings:

Part A. Why does the DEIR cite only one source?

To begin, the DEIR is incomplete and one-sided because it contains citations to a single source (Larson 2006) but ignores at least half a dozen other published documents on the specific topic, without any explanation of the omission.

Citation to Larson Stephanie. 2006 – *The Marin County Predator Management Program: Will It Save the Sheep Industry*. Approved for Print – is an incomplete citation, so I will refer to Larson S. 2006, *The Marin County Predator Management Program: Will It Save the Sheep Industry?* on pages 294-297 in Timm RM, and O'Brien JM, eds. Proceedings of the 22nd Vertebrate Pest Conference. University of California, Davis, CA.

I can only see one scientific rationale for inclusion of only Larson 2006, i.e. if it were the only reliable evidence. But even then, a single sentence, citing the other studies and explaining why they were excluded from the review would be transparent and defensible. Outright omission raises flags about objectivity, transparency, and scientific integrity in general.

Even a simple Google Scholar search for (keywords "Marin County" agriculture* predat* sheep livestock wildlife) turns up at least a dozen articles, so the inclusion of only one in the DEIR is puzzling. Furthermore, Larson 2006 cites three earlier works, so the drafters of the DEIR should have been aware that another professional had investigated Marin County on the same topic. Therefore, a simple error of omission seems rather unlikely.

It is possible that those who drafted the DEIR were aware of other research but opted to omit it because it was not anonymously peer-reviewed by a scientific journal. I reject this possibility for a simple reason: Larson 2006 also appears to be open to the

same criticism, i.e., not anonymously and independently peer-reviewed by a scientific journal. The paper derives from conference proceedings, which do not have a specified peer review policy, guidelines on ethical conduct of research and publishing, or an impact factor, which are all signs of reputable scientific journals. Furthermore, the publisher employed both the author and editor at one time or another, so the necessary independence of review for this article was not met, either.

In conducting the peer review of Larson 2006, I followed the guidelines and recommendations of the National Academies on scientific integrity available here: NASEM 2017. Fostering Integrity in Research. The National Academies Press, Washington, DC. Given that my review is not anonymous, I cite my own work*, infra*, which is freely available at <http://faculty.nelson.wisc.edu/treves/publications.php>. Please note that I limit citations to top ten international peer-reviewed scientific journals relating to predators, conservation or science generally.

Part B. My review of the published version of Larson 2006

Beginning with sentence 1 and throughout the text of Larson 2006, the author makes assertions without methods or citation to evidence. Several such unsubstantiated assertions are notable:

The very first sentence states, "Predation, particularly by coyotes (Canis latrans), has been an increasing problem for the sheep producers on California's northern coast." (no citation). Drafters of the DEIR should be aware of recent work on "Myths and assumptions about human-wildlife conflict and coexistence" by Treves A, Santiago-Ávila FJ. 2019. Conservation Biology in press. And a recent survey of evidence across wildlife management agencies of North America that has exposed problems with "fact by assertion": "Distinguishing science from 'fact by assertion' in natural resource management." by Artelle KA, Reynolds JD, A. T, Walsh JC, C. PP, Darimont CT. 2018. Science Advances 4:eaao0167.

The same paragraph stated "coyote-caused losses are one of the main reasons for producers going out of the sheep business (Larson and Salmon 1988)." I have not read the cited work by Larson, but in 2006 this claim was debunked at a national and regional level by Berger KM. 2006. Carnivore-livestock conflicts: Effects of subsidized predator control and economic correlates on the sheep industry. Conservation Biology 20:751-761 (available at https://www.predatordefense.org/docs/coyotes_article_WCS_Berger_sheep_econ_2006.pdf). By examining the sheep industry in regions with and without coyotes. Berger showed that the main reason for decline in the sheep industry was decreasing value of wool in markets accompanied by lower demand for wool. Therefore, to be accurate and precise, Larson should specify where, when, and how many producers went out of business. Furthermore, the single citation for the claim is published in the same conference proceedings. Indeed the majority of citations to authored work (not archives

and anonymous databases) in Larson 2006 are to herself or to her colleagues, including the editors of the conference proceedings. Ideally, scientific evidence is based on independent review and scholarship; otherwise the endeavor perpetuates beliefs from one set of authors, which can propagate errors and individual presuppositions or biases.

An example of bias in Larson 2006 appears when she writes, "However, it became apparent that the program's funding could not pay for all losses that occurred …." This example is noteworthy because of its vagueness regarding how less than full compensation became apparent, to whom, and how the inference was drawn that a change in compensation policy reflected excessive claims or excessive losses. Here the author has made an unsubstantiated inference that is prejudicial.

By page 2, the author is reporting ostensible facts about the program she proposes to evaluate scientifically before revealing any of her research methods. In a scientific paper, the Introduction should not present new evidence until the Methods have been presented. For the section of the paper entitled "Program Results" to appear before any methods have been presented is highly irregular in scholarly work, leaving no way to evaluate the veracity of the data presented.

Reproducibility (can a study be replicated from its complete and transparent description of methods?) is a hallmark of the scientific method, enabling subsequent investigators to replicate findings. Because Larson (2006) does not describe her methods, the work is not reproducible or falsifiable (subject to a test for validation or rejection). Work that is not reproducible is invalid and work that is nor falsifiable is unscientific.

Furthermore, the legitimacy of Larson 2006 as evidence is questionable because of ethical concerns about research on human subjects. Larson appears to have spoken to Marin County officials, to farmers in Marin County, and reviewed data collected by both the University of California and WS-CA on farmer complaints. For example:

· "However, during the past decade, the number of producers has declined and some producers have reduced their flock size (Anita Sauber, Marin Co. Dept. of Agriculture, pers. commun.)." (Larson 2006, p. 295, emphasis added). Why wasn't a data sharing or collaborative agreement acknowledged?
· "During the first year, the Marin County Agricultural Commissioner's staff and University of California Cooperative Extension (UCCE) personnel randomly verified losses." (No citation.) The latter statement indicates that Larson had access to data collected on farms and about farmers husbandry and compensation payments (mentioned throughout Larson 2006). How was farmer privacy protected?
· Table 1 in Larson 2006 presents data from WS CA. How did Larson obtain these data?
· Table 1 – 3, p. 1 – 32 in the DEIR footnote 4 states that Larson 2006 had "communications with ranchers". Larson 2006 also reports on interviews with Marin

County residents and published statements made by anonymous farmers and hunters. Where is the permit number for research on human subjects?

I would have expected Larson 2006 to contain statements 1) acknowledging the data sharing agreement both with the County and with WS-CA; and 2) noting permissions to conduct research on humans for publication. This indicates she had addresses or phone numbers of research subjects to whom she would ask sensitive questions about compensation payments and poaching.

The human subjects research Larson conducted raises questions about the ethical oversight of the research. Researchers and the journals that publish their work have an ethical obligation to present evidence that research protocols were reviewed by an Institutional Review Board (IRB) for protection of Human Subjects prior to starting research, and that the final product adhered to the approved protocol. In my opinion, the University of California's IRB would not have exempted this research from ethical review, because Larson was asking sensitive questions about personal finances of farmers and sensitive questions about illegal killing of wildlife.

In summary, the DEIR's reliance on Larson 2006 raises three serious concerns: (Prepared and written by Adrian Treves, PhD, University of Wisconsin-Madison)

1. The entire section of the DEIR on Marin County is unscientific, because of its reliance on a single unscientific source as I describe, *supra*. I recommend removing it until a proper scientific review of evidence is completed.

2. Apparently Table 1 in Larson 2006 was reprinted in the DEIR, but not in its original published form. If the DEIR version of the Table was reprinted identically from an unpublished document (note the incomplete citation Larson, Stephanie 2006. *The Marin County Predator Management Program: Will It Save the Sheep Industry*. Approved for Print), then the discrepancy between the latter and the public version (Larson 2006) that I have reviewed raises the following additional questions of a serious nature.

3. The DEIR presents a significantly different version of data reported in Larson 2006 (compare Table 1 in Larson 2006 to Table 1-3 p. 1- 32 in the DEIR below). The effect of the change in the table in the DEIR is to convey greater certainty about the data than in the original Larson 2006 Table. Three of the footnotes relate to self-reported losses plus some that were undocumented, and replaces them with claims about methods that are not substantiated in Larson 2006. Had I been a peer reviewer for a reputable journal, I would have raised concerns about the appearance of falsification of evidence.

Yet another shortcoming in the DEIR appears where it asserts that, by "requiring that only WS personnel implement lethal methods, WS was able to account for virtually all target and non-target wildlife taken at participating ranches (in reference to the Marin Program). This assertion begs but does not answer the questions of what, if any method did WS use to confirm that: 1) no independent

lethal take occurred, and 2) private participants did not take target/non-target wildlife. These matters cannot simply be assumed, because as the DEIR itself recognizes, "lethal control methods implemented independently by ranchers are not reported to Marin County, and, consequently, an authoritative record of the number of animals taken by lethal control methods following implementation of the Marin County program is not available."

The DEIR posits that rancher self-reporting of lethal methods, number and species of animals taken is a less reliable and comprehensive source of data than reporting by WS-CA personnel. "Self-reporting" of data by private participants in a government program is not an accepted or proven accurate method of data collection. There is no way to verify the accuracy of such reports or to recover data not reported.

Therefore, the claim that "evidence suggests, but does not conclusively prove, that private implementation of lethal control activities is resulting in greater coyote take than the level of take that occurred during WS-CA provision of wildlife management in the County" is an unduly strong and categorical statement based on admittedly inconclusive evidence, along with the DEIR's own admission that rancher self-reporting is unreliable.

For the same reasons, the claim that "implementation of the Marin County program appears to have reduced the amount of publicly available data, and may be contributing to an increase in private use of lethal control, as supported by the self-reported coyote take numbers," also is flawed, unsupported by high quality evidence and needs correction (or retraction) in the DEIR.

V. ENVIRONMENTALLY SUPERIOR ALTERNATIVE (§ 2.6)

The DEIR claims that "Implementation of the IWDM Program under the CEQA Baseline would not result in any significant and unavoidable impacts or impacts requiring mitigation to reduce to less-than-significant levels, therefore an alternative that would substantially reduce impacts need not be selected." This appears to be an attempt to justify the continuation of that program, regardless of its level of impacts, provided that the level of impacts does not increase. It also seems to imply that the County has no legal or moral obligation to reduce the baseline level of the impacts of the prior implementation of its IWDM Program.

It also asserts that because California Department of Fish and Wildlife (CDFW) has a role in approving the take of cougars, killing of cougars would be anticipated to continue within the County regardless of any County actions. The analysis offered by the DEIR suggests a Public Trust issue of jeopardy to the continued survival of cougars in the County under current levels of killing from all sources. Why then add another layer of cougar take authority by granting such authority to the County, when it seems inappropriate for the public trustee responsibility for cougars to be delegated below the level of CDFW, i.e., state responsibility?

VI. WS-CA DIRECT CONTROL ASSISTANCE (§ 3.6, Project Implementation and Operation)

This section begins with the assertion that "[n]either WS-CA nor Mendocino County are proposing any changes to the WS-CA IWDM Program in Mendocino County, as compared to the IWDM Program that was in place until 2015." This is clearly a pre-decisional bias; the County should not be identifying a proposed—i.e., preferred—alternative in a draft EIR.

Additionally, USDA-Wildlife Services' decision-making model (referenced in §3, pp. 17-20 and elsewhere) generally is outmoded, having been surpassed by more recent science and policies that engage diverse stakeholders in collaborative processes with the aim of reaching consensus concerning programs and actions. The DEIR should acknowledge that the WS programmatic EIS from1994, which introduced this decision-making model, has not been revised and reissued. WS has parried this criticism by arguing that its subsequent environmental assessments overcome that systemic defect, but this is inadequate. Wildlife damage management is a fast-evolving field, and the DEIR fails to adequately address the range and scope of issues involved in its operations, especially those relating to animal welfare and best management practices.

- Relocation

Relocation is not a preferred tool for nonlethal intervention in conflicts between humans and wildlife, although it may represent the last non-lethal option. In any event, CDFW does not allow the relocation of wildlife causing damage except in limited cases where it exercises its discretion to make an individual exemption (see Cal. Code Reg., Title 14 § 465.5(g)(1)). Rather, trapped/captured wildlife is typically killed via gunshot and the carcasses disposed of off-site as required by applicable regulations.

Relocation could provide a proper justification for the use of immobilizing drugs, but if WS seeks to employ immobilization drugs outside of the context of relocating animals (see DEIR: 3-32), then the DEIR should specify and provide details regarding those potential scenarios.

- Live Capture Traps.

    - *Cage and Corral Traps*

The use of cage or box traps has welfare consequences for wildlife, as does any capture or handling method. The DEIR should address these consequences and specify the operating parameters for devices used, including minimum and maximum temperatures allowed, other climatic conditions that could compromise welfare, exposure of non-target animals and protection from depredation. Similarly, corral or any type of gang traps should operate according to established protocols that are subject to public review and comment.

The DEIR fails to address the potential scope of WS activities in "residential areas" or even suggest that these occur at all, yet it stipulates to the effectiveness of cage traps in urban environments except for certain species, such as coyotes. The DEIR should explain fully the extent to

which WS uses or would project use of cage traps, and in what environments they would be deployed.

When the DEIR discusses potential scenarios where traps may be used to capture feral cats, dogs or wildlife that inadvertently wandered into developed areas without causing damage, the document is vague on where WS would operate and what species might be pursued in different contexts. It does not indicate any coordination or cooperation with county or municipal agencies such as animal control, yet it identifies feral cats and dogs as potential targets for "relocation." This section requires clarification, given that companion animals—whether feral, owned or stray—should be surrendered to local authorities empowered to hold and secure them.

"Daily" trap inspection is vague and insufficient to address concerns for varying environmental conditions and the fate of trapped animals.

- *Snares*

The DEIR is extremely vague when addressing the use snares as "live capture devices," failing to include relevant analysis addressing efficiency, target specificity and animal welfare. Overall, the discussion of use of all types of snares is opaque, superficial and not grounded in best available science.

- Tracking Dogs or Trailing Dogs

The use of dogs except in wildlife detection is problematic, both for target and non-target species of wildlife as well as the dogs. The DEIR is silent, hence flawed and needing to provide more information regarding the conditions of husbandry and training for dogs, the species they might be used to track or trail, and specifics concerning the tracking and trailing procedures.

- Chemical Immobilization

As indicated, *supra*, the DEIR needs to clarify in what contexts and situations chemical immobilization would be needed or called for.

- Lethal Methods Identified in the Notice of Preparation/Initial Study

  - Trap Devices and Snares

Snares

Snares of all kinds should be rejected because of welfare concerns for both target and non-target species. It seems disingenuous to declare that neck snares with stops might be used as a "live capture device" without admitting that unstopped snares would be used. Both are unacceptably inhumane, as are all of the devices labeled as "quick-kill," and the DEIR should indicate when and where any of these might be used and what species would be targeted.

The DEIR states at 4.2-78, "Statewide between 2015 and 2017, most animals that were unintentionally captured using neck snares died . . . ." However, the DEIR fails to comprehensively analyze the potential impacts of snares on target and non-target wildlife and on pain and suffering to their victims (DEIR at 3-30). This is a serious omission and must be corrected in the final EIR. While the DEIR notes the use of snares may be incompatible with the use of livestock guard dogs because snares pose a hazard to domestic dogs (DEIR at 3-21), no literature is cited regarding the non-selectivity of snares. Moreover, the DEIR inaccurately portrays the use of snares as a non-lethal capture method (DEIR at 3-38), when WS frequently uses neck and body snares as a lethal killing device, particularly for coyotes, foxes and beaver.

One meta-analysis of the scientific literature on snares[1] summarizes its main findings as follows:

1. Snares do not operate humanely, either as restraining or as killing traps
2. The mortality and morbidity of animals caught in snares is higher than with most other restraining traps, such as box traps
3. Snares are inherently indiscriminate and commonly catch non-target, including protected, species
4. Snares can cause severe injuries, pain, suffering, and death in trapped animals (target and non-target species).
5. Stopping of snares may not prevent injury or death in trapped animals (target and nontarget species)
6. The free-running mechanism of a snare is easily disrupted and likely to fail, resulting in injury, pain, suffering, and death in trapped animals (target and non-target species)
7. Animals can legally be left in snares for up to 24 hours, exposing them to the elements, to thirst, hunger, further injury and attack by predators
8. It is difficult to assess the severity of injury in an animal when it is caught in a snare
9. Animals that escape, or that are released, may subsequently die from their injuries, or from exertional myopathy, over a period of days or weeks
10. The monitoring of correct snare use is difficult, if not impossible
11. Neck snares are open to abuse because they are cheap and require minimum effort to set and maintain
12. Methods used to kill animals caught in snares are not regulated, and may not be humane
13. The use of neck snares is seen as the least favorable option and the least humane of all legal trapping methods by the public.

[1] ROCHLITZ, I., PEARCE, G.P. & BROOM, D.M. (2010). *The Impact of Snares on Animal Welfare*. Cambridge University Press, Cambridge, UK

Padded Leghold Traps, Cage Traps & Trap Monitor Devices

Under state law, padded leg- or foot-hold traps are only allowed for protection of human health and safety or to protect threatened and endangered species. Such traps should be used only under protocols that ensure they are monitored with telemetry that immediately signals a capture, with agents responsible (and accountable) for following a response protocol that ensures the time an animal is held in a trap is minimized. This should apply to cage trapping as well.

Conibear traps

While the DEIR notes the use of Conibear traps are used by Wildlife Services to capture and kill beaver in shallow water or underwater (DEIR at 3-33), it fails to comprehensively analyze or cite any literature regarding the potential impacts of Conibear traps on target and non-target wildlife, or on pain and suffering. This serious omission must be corrected in the final EIR.

Glue boards

Glueboards are completely indiscriminate and inhumane. As their name implies, they seize and hold their victims in a manner that typically leads to an agonal death through either dehydration, starvation, inanition, suffocation or a combination of all these. By no measure of animal welfare can their use be considered humane.

The DEIR should acknowledge that neck snares and glueboards <u>never</u> provide for a humane death. Conibear traps may meet AVMA standards at times, but are used in ways that can lead to an animal being maimed or injured and left to experience agonal suffering, often for many hours, until an agent attending the trap provides what WS euphemistically calls “humane euthanasia.”

- <u>Lethal Methods Identified for Consideration Since Release of NOP/IS.</u>

The DEIR engages in unscientific and unacceptable speculation when it asserts that limitations on euthanasia could curtail a response to wildlife damage or threats. The document should clarify in what situations WS might be called upon to respond but where limitations on euthanasia methods might limit its response. The DEIR also needs to identify whether carbon dioxide could only be used to euthanize wildlife captured in live traps, or whether other uses would be contemplated.

Regarding WS operations in “large urban areas” when euthanasia drugs might be deployed, the DEIR should explain how WS would operate in "larger urban areas" in Mendocino County and on the need for access to euthanasia drugs.

Concerning physical euthanasia, the DEIR should stipulate which of these methods are considered to be adjunctive by the AVMA protocols, and on what species and in what scenarios they might be used.

In regard to the Variation on the Non-Lethal Alternative, the DEIR does not provide an adequate

review and summary of the relevant science, let alone a meaningful analysis of that program. These defects need to be remedied before an EIR is published.

VII. AGRICULTURAL AND FOREST RESOURCES: IMPACTS AND MITIGATION MEASURES: Changes in the existing environment which, due to their location or nature, could result in conversion of farmland or forestland to non-agricultural or non-forest use (§ 4.1-2)

In analyzing the IWDM Program under a No Program Baseline assessment, the DEIR asserts that "evaluation of the efficacy of the direct control methods included in the IWDM Program is beyond the scope of this EIR." This conclusion is untenable and requires revision, insofar as that particular evaluation should be a primary focus of the EIR. If animals are being killed for no verifiable effect, isn't that an "impact" worthy of assessment? If the "efficacy "of the IWDM program cannot be assessed, then how can continuation of the program be supported?

VIII. BIOLOGICAL RESOURCES (§ 4.2)

- Poaching

  - Number of individual animals of different species killed by poachers is either unknown or not addressed in the DEIR.
  - The DEIR lacks any meaningful assessment of the frequency, methods, lethality and locations of poaching in the county, or whether such information has been solicited.

- Combined impacts from killings by Wildlife Services and poachers

  - The DEIR does not adequately address the immediate and cumulative impacts upon current and future populations of each species of wildlife that is targeted for killing by various parties: Wildlife Services agents, private individuals and/or poachers.
  - The DEIR recognizes that the survival of cougar populations in Mendocino County is jeopardized by Wildlife Services' killing of individuals from that species, and appropriately recognizes the potential grave risk to that species from further killings unrelated to public safety. However, the document fails to provide an adequate analysis of that same combination of lethal threats to black bears and bobcats. The final EIR must assess impact of poaching on all targeted species, not just cougars.

IX. EXISTING ENVIRONMENTAL SETTING (§ 4.2.2)

- Black Bears

For each Alternative, the DEIR should analyze several non-lethal bear management plans, grounded in aversive conditioning and establishing clear guidelines for the protection of resources (livestock, beehives or crops), and suggest how such a plan would be created and implemented by any service provider, including WS.

- Cougars

The DEIR cites state Fish and Game Code (FGC) section 4801.5, whereby "nonlethal procedures shall be used when removing or taking any mountain lion that has not been designated as an imminent threat to public health or safety." The use of "shall" here implies an absolute mandate to use nonlethal procedures unless human health or safety is threatened; thus, all cougar deterrence under the IWDM program must be nonlethal, and the EIR should reflect that fact. Except in the direst emergency, it is up to CDFW, not WS-CA or the County, to determine whether a cougar threatens public health and safety.

The DEIR also should mention that when livestock or property actually has been damaged or destroyed, FGC § 4802 allows the owner or agent to request a CDFW investigation, while section 4803 compels the agency to promptly issue a depredation permit to take the depredating mountain lion if satisfied that there had been such depredation.

- Regulatory Context (§ 4.2.3)

Specially protected mammals

The DEIR notes that cougars are the only species currently identified as a specially protected mammal under FGC § 4800, and any take of the species is tightly controlled, including a prohibition on sport killing of that animal in California. FGC § 4801 authorizes CDFW or an approved local agency with public safety responsibility to remove or even kill an individual cougar that poses a public safety threat, but section 4801.5 states, "nonlethal procedures shall be used when removing or taking any mountain lion that has not been designated as an imminent threat to public health or safety."

However, it appears the DEIR may err in claiming that "[c]ougars that have depredated, or are in the act of depredating, livestock or other property may be taken as provided for under sections 4802-4809, but only in accordance with provisions designed to ensure that the correct animal is taken, and as authorized by a depredation permit issued by CDFW. (See FGC §§ 4202-4803, *supra*.) The cited sections seem to override section 4801.5, which mandates nonlethal methods except for threats to human health/safety. In any event, CDFW still clearly bears ultimate authority via its decision whether to issue a depredation permit.

- Special Status Animals (Pursuant to § 4.2-1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish & Wildlife, U.S. Fish & Wildlife Service or National Oceanic and Atmospheric Administration Fisheries)

- *Beaver (Castor canadensis) and Point Arena Mountain Beaver (Aplodontia rufa nigra).*

In California last year, Wildlife Services killed nearly 900 beavers using traps, snares and firearms. While the DEIR acknowledges that WS kills beaver with the use of lethal snares (used to capture and drown the animal) and body-gripping Conibear kill traps (DEIR at 4.2-73), the DEIR downplays the need to analyze the impact of killing beaver stating:

> *Given that lethal control of beavers is expected to be minimal to nonexistent under the IWDM Program, the use of trapping methods would likely never be employed. If trapping methods are employed under the IWDM Program, such methods would be conducted in strict accordance with state regulations and WS Directives governing the use of traps. Any traps deployed would be sized for beavers and other field precautions would be taken to minimize the risk of non-target take, including unintentional take of special-status species. For the foregoing reasons, injury or mortality of the special-status species considered in this section as a result of beaver trapping is extremely unlikely to occur under the IWDM Program.*

DEIR at 4.2-73 (italics added).

However, on July 29, in response to a threat of litigation from the Center for Biological Diversity, WS was compelled to stop trapping and shooting California beavers on more than 11,000 miles of river and 4 million acres of land where the killing could hurt endangered wildlife.[2] Native salmon, southwestern willow flycatchers and other highly imperiled animals use habitats created by beavers. As part of the settlement agreement, Wildlife Services will work with the U.S. Fish and Wildlife Service and National Marine Fisheries Service to analyze the impacts of killing beavers on threatened and endangered species.

Moreover, the DEIR states at 4.2-76-77:

> *Because individual Point Arena mountain beavers do not venture far from their burrow systems and do not scavenge or consume meat, Point Arena Mountain beavers would be unlikely to be attracted to traps or snares that may be set for target species under the IWDM Program.* (Italics added.)

However, the DEIR fails to produce scientifically valid information that establishes the assumption that Point Arena mountain beaver will not be threatened by snares and Conibear kill traps set for other species, especially since Conibear traps are set in shallow water and primarily intended to break backs, while snare sets are intended to drown, which is inhumane.[3]

The final EIR must provide a more robust analysis of 1) the impacts of killing beaver on threatened and endangered species; 2) the pain and suffering caused by body snares and body-

[2] https://www.biologicaldiversity.org/campaigns/wildlife_services/pdfs/20190729-USDA-WS-response-letter-to-Center.pdf
[3] Ludders, J. W., Schmidt, R. H., Dein, F. J., & Klein, P. N., *Drowning is not euthanasia*. 27 Wildlife Society Bulletin 666-670 (Autumn 1999).

gripping Conibear kill traps set to drown beaver; and 3) the threats such traps pose to non-target animals. For example, *Ludders et al*. concluded that drowning of beaver and other aquatic species as a form of euthanasia is inhumane. This, and other literature pertaining to the impacts of drowning sets upon beaver and other target species must be included in the final EIR.

- *Fisher and Ringtail*

The DEIR notes that the IWDM Program would not authorize the use of rodenticides or pesticides, the same being true for the Non-Lethal Alternative Program or its Variation. (DEIR at 4.2-46, 76-77; 4.3-1.) We support exclusion of these entire classes of expressly lethal chemicals. However, to avoid public misconception or misunderstanding based on the initial study's reference to "strictly limited scenarios" where toxicants and pesticides "may be used," a prohibition on the use of rodenticides and pesticides in the context of wildlife damage management should be affirmed in DEIR § 3.6, with specific reference to prohibited toxicants such as DRC-1339. Additionally, the "Raccoon Eviction Fluid" identified as a "repellent" in the DEIR, is not registered by the EPA; therefore its use should be disallowed. (See WS Comments re: IS/NOP, item 47, DEIR at p. 609.)

In support of the rodenticide prohibition, we first note that rodenticides are designed to kill small mammals such as rats, mice, gophers and ground squirrels. There are three general categories of rodenticides, with biologically different killing mechanism: non-anticoagulant rodenticides, first generation anticoagulant rodenticides ("FGARs"), and second generation anticoagulant rodenticides ("SGARs").

Non-anticoagulant rodenticides currently used in the United States include bromethalin, cholecalciferol, zinc phosphide, and strychnine. Each of these rodenticides work in a different way. Bromethalin is a single-dose rodenticide that causes the cells of the central nervous system to swell, which puts pressure on the brain, causing paralysis and death. Cholecalciferol, also known as vitamin D3, was registered as a rodenticide in 1984. Vitamin D helps the body maintain calcium balance by enhancing absorption of calcium. When rodents eat several doses of the poison, calcium in the blood becomes overabundant. This overwhelms the body's ability to regulate the central nervous system, muscles, gastrointestinal tract, cardiovascular system, and the kidneys, resulting in death. Zinc phosphide turns into toxic phosphine gas in the presence of water and acid in the stomach, which causes cell death. Strychnine, the oldest of these commonly used rodenticides, affects the cells in the spinal cord, causing severe muscle spasms that lead to breathing paralysis and death.

Anticoagulant rodenticides, including both FGARs and SGARs, work by stopping the liver from recycling vitamin K to make blood-clotting enzymes. This causes uncontrolled bleeding throughout the body and eventual death. Due to the metabolic processes involved in vitamin K recycling and blood clotting, there is a lag time between ingestion of the poison and death. FGARs generally require an animal to eat multiple doses of bait over several days to accumulate a lethal dose. SGARs were developed in response to target rodents' perceived resistance to the FGAR warfarin. SGARs, which include brodifacoum, bromadiolone, difethialone, and difenacoum, are single-dose anticoagulants that can deliver a lethal level of toxin in one feeding, with death resulting five to seven days later.

It is unclear whether SGARs are actually more effective than FGARs, and if so, how much more effective they are. What is clear, however, is that the chemical composition of SGARs makes them more deadly to non-target wildlife. Because it takes several days for rodents to die due to lag time between ingestion and death, animals often eat multiple doses, allowing for super-lethal concentrations of the rodenticide to accumulate in their bodies, and thus any non-target predator who consumes that rodent.[4] The half-life, or the amount of time it takes a substance to reduce its concentration by half, of most FGARs in both target and non-target wildlife is generally hours to days, compared to the half-life of SGARs, which is generally four months to a year.

If an animal who consumes an anticoagulant rodenticide is eaten by a predator, the predator can experience sub-lethal and lethal effects from the rodenticide due to bioaccumulation.[5] However, the ability of FGARs to bioaccumulate in target and non-target animals is considered low relative to SGARs, due to the stark differences in half-lives of FGARs and SGARs. Predators who eat poisoned rodents may ingest a toxic dose in small amounts over a long period of time because of the cumulative body burden of SGARs, as DPR has recognized.[6]

In 2015, the U.S. Fish and Wildlife Service issued a Species Report on Coastal Oregon and Northern Coastal California Populations of the Pacific Marten (*Martes caurina*), examining stressors on the pacific marten populations in northern coastal California and coastal Oregon. The report identified widespread use of anticoagulant rodenticides and other pesticides at illegal marijuana grow sites as an emerging stressor and examined the potential individual and population level impacts to martens exposed to toxicants at grow sites.[7] It also found that legal use of anticoagulant rodenticides may also pose risks to martens in some parts of their range both currently and over the next 15 years.[8]

Among the pesticides found at marijuana grow sites, SGARs are the primary type of pesticide

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[4] G. Herring et al., *Characterizing Golden Eagle Risk to Lead and Anticoagulant Rodenticide Exposure: A Review*, 51 J. of Raptor Research 273, 276 n. 18 (2017), *available at* https://bioone.org/journals/Journal-of-Raptor-Research/volume-51/issue-3/JRR-16-19.1/Characterizing-Golden-Eagle-Risk-to-Lead-and-Anticoagulant-Rodenticide-Exposure/10.3356/JRR-16-19.1.full. Herring, *supra*, at 276 n. 18.

[5] B.A. Rattner, et al., *Adverse Outcome Pathway and Risks of Anticoagulant Rodenticides to Predatory Wildlife*, Envtl. Science and Tech. 8433, 8434, 8436 (2014); E.V. Abernathy, et al., *Secondary Anticoagulant Rodenticide Exposure in Migrating Juvenile Red-Tailed Hawks (Buteo Jamaicensis) in Relationship to Body Condition*, 52 J. Raptor Research 225, 226 (2018); M.W. Gabriel, et al., *Exposure to Rodenticides in Northern Spotted and Barred Owls on Remote Forest Lands in Northwestern California: Evidence of Food Web Contamination*, 13 Avian Conservation & Ecology 1, 1, 7 (2018), D. Fraser, et al., *Genome-wide Expression Reveals Multiple Systemic Effects Associated with Detection of Anticoagulant Poisons in Bobcats (Lynx rufus)*, 27 Molecular Ecology 1170, 1171, 1182 (2018).

[6] CA DPR 2013, *supra* n. 14; California Department of Pesticide Regulation, An Investigation of Anticoagulant Rodenticide Data Submitted to the Department of Pesticide Regulation (2018); U.S. Fish & Wildlife Service, Comments on EPA's Comparative Approach 3 (2005); U.S Environmental Protection Agency, Potential Risks of Nine Rodenticides to Birds and Nontarget Mammals: a Comparative Approach 72 (2004), *available at* http://www.fwspubs.org/doi/suppl/10.3996/052012-JFWM-042/suppl_file/10.3996_052012-jfwm-042.s4.pdf.

[7] U.S. Fish and Wildlife Service, Coastal Oregon and Northern Coastal California Populations of the Pacific Marten (*Martes caurina*) Species Report 54 (2015), *available at* https://www.fws.gov/oregonfwo/ExternalAffairs/News/2015/Coastal_Marten_Final_Species_Report_April_2015%20(1).pdf.

[8] *Id.* at 55.

that has been analyzed in marten tissue.[9] The report specifically highlighted the extent of illegal marijuana grow operations located on public land in California. National forests in California account for the largest marijuana plant eradication total from public lands in any region, and 60–70 percent of national marijuana seizures come from California, with 60 percent of that number coming from public lands. This is important for California's marten population because over 65 percent of the Northern Coastal California Extant Population Area[10] for martens consists of public lands (primarily Forest Service lands) and large numbers of illegal marijuana grows have been found on these lands.[11] The Report noted that anticoagulant rodenticides are widely available to those with a certified pesticide applicator's license and can be brought into California and the United States if purchased legally elsewhere.[12]

- *Cougars*

The DEIR notes that the average annual WS take of the cougar during the baseline period relative to that species' low population estimate in the County constituted approximately 21 percent of adults, yet "cascading effects deleterious to special-status wildlife are not anticipated," and "[s]ubstantial indirect effects on special-status wildlife in Mendocino County are not expected to result from WSCA take of the County's apex predators." This conclusion is suspect, insofar as the annual cougar take is highly variable and potentially disruptive of cougar social structure and population self-regulating mechanisms, particularly when combined with take from depredation permits (and from poaching, even if poaching impacts are unknown). This begs the question of what is the basis for the "no substantial effects" determination?

X. GENERAL OBSERVATIONS CONCERNING DEIR SHORTCOMINGS

1. The DEIR presents the potential scope of work to be performed under the IWDM Program in ways that fail to explain what types of interventions might be practiced in different contexts and places. Specifically, would WS conduct damage management in urban and suburban contexts, or are the various methods and practices discussed simply intended to cover various agricultural sites such as ranches, fields, storage facilities, shops and other structures, etc.? It would clarify and reduce potential confusion if the DEIR were to examine various residential and agricultural contexts within the County, and to discuss them separately.

2. Agencies responsible for wildlife interventions in residential areas (e.g., animal control, humane and rescue societies, police) should be identified as available resources and responders in the "Review of Existing Wildlife Damage Management Programs." (DEIR at 1-28 et seq.)

3. Much of the analysis of the DEIR fails to adequately consider site-specific data. For example, if one ranch were responsible for eighty percent of all complaints about bears, this would directly

[9] *Id.* at 56.
[10] For a definition of the Northern Coastal California Extant Population Area, see page 36 of the Report.
[11] *Id.* at 56.
[12] *Id.* at 93.

affect any mitigation strategies. But WS continues to invoke the Privacy Act of 1974 to shield their individual clients and their properties from disclosure. While the nondisclosure of individual information may be justified, it is very hard to conduct countywide wildlife damage mitigation without a close look at geographic context. The DEIR could and should minimally provide more cite specific analysis of its activities on the environment (which includes all target and non-target animals) without disclosing private information of clients served.

4. The practice of "integrated" damage management should be based upon a "lethal as last resort" decision-making hierarchy, wherein proposed actions would be decided under a comprehensive plan that considers not only costs/benefits but also the humaneness of any proposed action, prohibiting practices that are arguably inhumane. It is inescapable that in California and beyond, people have become more concerned about humaneness in wildlife control, even for so-called "pest" species. CEQA appears to give less weight to the social or "human" environment than NEPA, but the argument for consideration of this factor was not rejected in the reviews of the NOP, suggesting it should have been addressed in the DEIR. Even if the DEIR consultants wished to dismiss humaneness concerns as irrelevant, they still had an obligation to consider it and explain their decision.

The claim by WS that "humaneness" is a subjective construct, whose meaning varies from one person to another, ignores both 1) the large body of research in animal welfare science that deals with empirical determinations of pain and suffering, and 2) welfare measures such as those proposed by Kirkwood et al. and Hickling.[13] These studies provide welfare assessments that are partly empirical (e.g., in establishing time to death) as well as experiential (e.g., the observation that a death is agonal). Welfare assessments are commonly used to address the use of animals in research, production and education, and there certainly is a place for them in wildlife damage management. Specifically, the DEIR should engage and implement the assessment protocols proposed by Sharp & Saunders.

CONCLUSION

While we appreciate the opportunity to comment on this important issue, as it stands, the DEIR is woefully deficient in the areas outlined above and fails to meet CEQA thresholds. Therefore, we believe it is incumbent upon the County to revise and improve the DEIR accordingly and issue a revised draft for public review and comment before taking further action on this project. At a minimum, the County should seriously consider the Non-Lethal Alternative as a way forward to ensure the least

[13] Hickling, G. J. (1994). *Animal welfare and vertebrate pest management: compromise or conflict?* Paper presented at the Animal welfare in the twenty-first century: ethical, educational and scientific challenges, Christchurch, New Zealand.

Kirkwood, J. K. (2013). Wild animal welfare. *Animal Welfare, 23*, 147-148.

Kirkwood, J. K., Sainsbury, A. W., & Bennett, P. M. (1994). The welfare of free-living wild animals: methods of assessment. *Animal Welfare, 3*, 257-273.

amount of harm to County resources and to provide the agricultural community with the tools and technical assistance needed to mitigate conflicts with wildlife. We stand committed to helping the County move in this direction in any way that we can.

Respectfully submitted,

Camilla H. Fox
Founder & Executive Director
Project Coyote

Donald Lipmanson
Attorney at Law
Of Counsel to Project Coyote

John Hadidian, PhD
Ecologist
Science Advisory Board, Project Coyote

David R. Parsons, MS
Wildlife Biologist
Science Advisory Board, Project Coyote

AND ON BEHALF OF:

Johanna Hamburger
Wildlife Attorney
Animal Welfare Institute

/s/ Collette Adkins
(by Camilla Fox, with permission)
Collette Adkins
Carnivore Conservation Director
Center for Biological Diversity

Lynn Cullens
Executive Director
Mountain Lion Foundation