

COMMITTEE STAFF SUMMARY FOR JANUARY 18, 2017

7. PREDATOR POLICY WORKGROUP**Today's Item**Information Direction

Provide an update on recent predator policy workgroup (PPWG) activities and discussion of the draft predator policy developed by the PPWG.

Summary of Previous/Future Actions

- Previous PPWG meeting Nov 1, 2016; PPWG Sacramento
- **Today's discussion Jan 18, 2017; WRC, Redding**
- Next PPWG meeting Feb 21, 2017; PPWG, Sacramento

Background

The WRC's PPWG met in Sep and Nov 2016 to discuss and review a draft predator policy and proposed changes to existing predator regulations. Summaries and audio-recordings of the meetings are available online at www.fgc.ca.gov/meetings/2016/index.aspx. At the Nov 2016 meeting, the PPWG prepared a final draft policy (Exhibit 1) for consideration by the WRC.

The next PPWG meeting is scheduled for Feb 21, 2017 and will focus on proposed changes to existing predator regulations related to depredation and recreational take.

Today, FGC staff will present the final draft predator policy for WRC discussion and input and provide an overview of recent PPWG activities and the work plan timeline.

Significant Public Comments

1. Comment letter with suggested edits to draft predator policy.
2. Comment letter with alternative predator policy statement.
3. Comment letter from four members of with PPWG with comments on the draft predator policy related to lethal and non-lethal options.
4. Compilation of recent literature on predator-prey relationships and management
5. Comment letter on predator policy process.

Recommendation (N/A)**Exhibits**

1. [Draft predator policy, dated Nov 1, 2016](#)
2. [Letter from Tom O'Key concerning draft predator policy, received Jan 5, 2017](#)
3. [Email from Keli Hendricks and others with predator policy statement, received Jan 5, 2017](#)
4. [Letter from Jean Su and others concerning draft predator policy, received Jan 5, 2017](#)
5. [Literature citation from Miriam Seger and others concerning predator management, received Jan 5, 2017](#)
6. [Letter from Miriam Seger concerning the PPWG, received Jan 5, 2017](#)

Committee Direction/Recommendation (N/A)

DRAFT California Fish and Game Commission
Terrestrial Predators Policy
Developed by the Wildlife Resources Committee's
Predator Policy Workgroup
Revised Nov 1, 2016

It is the policy of the Fish and Game Commission that:

- I. For the purposes of this policy, terrestrial predators are defined as all native, wildlife species in the Order Carnivora, except those in the Family Otariidae (seals, sea lions) and the Family Phocidae (true seals).
- II. Pursuant to the objectives in Section 1801 of Fish and Game Code, the Fish and Game Commission (Commission) acknowledges that native terrestrial predators are an integral part of California's natural wildlife and possess intrinsic, biological, historical, and cultural value which benefit society and ecosystems. The Commission shall promote the ecological, scientific, aesthetic, recreational, and educational value of native terrestrial predators in the context of ecosystem-based management while minimizing adverse impacts on wildlife and reducing conflicts that result in adverse impacts to humans, including health and safety, private property, and other public and private economic impacts.
- III. The Commission further recognizes that sustainable conservation and management strategies are necessary to encourage the coexistence of humans and wildlife. It is, therefore, the policy and practice of the Fish and Game Commission that:
 - A. Existing native terrestrial predator communities and their habitats are monitored, maintained, restored, and/or enhanced using the best available science. The department shall protect, conserve, and provide consumptive and non-consumptive recreational opportunities. The recreational take of native terrestrial predator species shall be managed in a way that ensures sustainable populations of predator and prey are maintained.
 - B. Human-predator conflicts shall rely on management strategies that avoid and reduce conflict that results in adverse impacts to human health and safety, private property, agriculture, and public and private economic impacts. Efforts should be made to minimize habituation of predators where it is leading to conflict. The department shall consider human safety a priority, and management decisions shall evaluate and consider lethal and non-lethal controls that are efficacious, feasible, and in compliance with all applicable state and federal laws and regulations.

C. Native terrestrial predator management shall be consistent with the goals and objectives of existing management and conservation plans. Management strategies shall recognize the ecological interactions between predators and other wildlife species and consider all available management tools.

DRAFT

California Fish and Game Commission
PO Box 944209
Sacramento, CA 94344-2090
fgc@fgc.ca.gov

Dear Commissioners,

As a member of the Reviewers team within the Predator Policy Work Group, I wish to add a thought about some minor language changes to the Draft Terrestrial Predators Policy as revised on November 1, 2016

First, I wish to point out the phrase “in a way”, as written in section III part A. Defining the methodology for this open ended phrase is not specific enough in terms of how use of such things as poisons or control methods that are points of contention in the humane management methods for achieving the goals of this section. Disclosure of intentions and the potential methods imagined in the extent of this phrase needs to be more defined and clarified, in my opinion.

Second, in section III part B, the word “should” is vague in bringing assured quality of required action and I believe the word “shall” is a better choice.

Last is a typo in my received copy of the Draft Policy (tools)

As a matter of related thoughts that I wish to express, though perhaps not directly included in the current task assigned to our group at this time, are issues related to objectives that are not being implemented although the rules are clearly a matter of record.

At the highest level for necessary action by the Commission are the fee structures related to recovering administrative costs that are supposed to be paid by the consumptive users of administrative efforts such as trapping costs and the sort. These laws, as contained in California SB1148 have been active for nearly five years, yet have not been made current, particularly in section 4006c of the California Dept. F&G Code. As such, tax payers continue to carry the expense of paying for services that are NOT theirs to bear. It is time that the existing rules regarding this issue are put into action without further delay.

Another issue remains with the organized contest killing of predators where the Commission ended prize incentives for such contests. It is time that contests to kill predators indiscriminately as a matter of fun and recreation be terminated.

The new paradigm of wildlife management and the science that guides the wisdom in our stewardship is upon us. The “Hunt to Table” practice is the only defensible and socially acceptable activity that has merit in this age of climate change, habitat destruction, and general devastation that besets the wildlife on our Planet. California is a leader in these recognized situations and must set the example as the path to better management strategies and policies are demonstrated.

Thank you,
Tom O’Key



Founder Project Bobcat
Predator Policy Work Group Review Team

**DRAFT California Fish and Game Commission
Terrestrial Predators Policy
Developed by the Wildlife Resources Committee's
Predator Policy Workgroup
Revised Nov 1, 2016**

It is the policy of the Fish and Game Commission that:

I. For the purposes of this policy, terrestrial predators are defined as all native, wildlife species in the Order Carnivora, except those in the Family Otariidae (seals, sea lions) and the Family Phocidae (true seals).

II. Pursuant to the objectives in Section 1801 of Fish and Game Code, the Fish and Game Commission (Commission) acknowledges that native terrestrial predators are an integral part of California's natural wildlife and possess intrinsic, biological, historical, and cultural value which benefit society and ecosystems. The Commission shall promote the ecological, scientific, aesthetic, recreational, and educational value of native terrestrial predators in the context of ecosystem-based management while minimizing adverse impacts on wildlife and reducing conflicts that result in adverse impacts to humans, including health and safety, private property, and other public and private economic impacts.

III. The Commission further recognizes that sustainable conservation and management strategies are necessary to encourage the coexistence of humans and wildlife. It is, therefore, the policy and practice of the Fish and Game Commission that:

A. Existing native terrestrial predator communities and their habitats are monitored, maintained, restored, and/or enhanced using the best available science. The department shall protect, conserve, and provide consumptive and non-consumptive recreational opportunities. The recreational take of native terrestrial predator species shall be managed **in a way** (definition of **in a way**) that ensures sustainable populations of predator and prey are maintained.

B. Human-predator conflicts shall rely on management strategies that avoid and reduce conflict that results in adverse impacts to human health and safety, private property, agriculture, and public and private economic impacts. Efforts **should** (**shall**) be made to minimize habituation of predators where it is leading to conflict. The department shall consider human safety a priority, and management decisions shall evaluate and consider lethal and non-lethal controls that are efficacious, feasible, and in compliance with all applicable state and federal laws and regulations.

C. Native terrestrial predator management shall be consistent with the goals and objectives of existing management and conservation plans. Management strategies shall recognize the ecological interactions between predators and other wildlife species and consider all available management tool (s)

From: [Keli Hendricks](#)
To: [FGC](#)
Cc: [Chappell, Erin@FGC](mailto:Chappell_Erin@FGC)
Subject: PPWG - Policy Statement Review
Date: Thursday, January 05, 2017 10:20:03 PM
Attachments: [Conservation Review Group - Policy Stmt.pdf](#)

Jan 5, 2017

Commissioner Williams
Commissioner Burns
Wildlife Resources Committee

Dear Commissioners:

We understand the Predator Policy Workgroup's Policy Statement draft will be under examination at the upcoming January WRC meeting. As reviewers, we respectfully ask that you also consider the attached version of the draft.

Please note that the appointed writing group consists disproportionately of consumptive stakeholders and this inequity within the PPWG motivated our creation of an alternative document.

We based our Terrestrial Predators Policy on modern science and what it indicates about the crucial role that predators play in ecosystems. We feel our version also reflects the values of the majority of Californians who cherish all of our native wildlife for its non-

consumptive benefits.

Thank you,

Conservation Review Group

Marilyn Jasper
Sierra Club, Public Interest Coalition

Damon Nagami
Senior Attorney
Director, Southern California Ecosystems Project
Natural Resources Defense Council

Sharon Ponsford
California Council for Wildlife Rehabilitators

Keli Hendricks
Project Coyote and Sonoma County Wildlife Rescue

Erin Hauge
Certified California Naturalist

Tom O'Key
Project Bobcat

Miriam Seger
Wildlife Advocate

Christina Souto

Associate Director
California Wolf Center

Oliver Starr
President, Good Wolf

Fauna Tomlinson
Project Coyote and California Council of Wildlife
Rehabilitators

Susan Kirks, Naturalist (American Badger)
Paula Lane Action Network

cc: Erin Chappell

KELI HENDRICKS - PROJECT COYOTE
Ranching with Wildlife Coordinator

www.ProjectCoyote.org - 415 945-3232
HQ Office: P.O. Box 5007 Larkspur, CA 94977
FB: ProjectCoyote - Twitter: @ProjectCoyote

California Fish and Game Commission
Terrestrial Predators Policy

Review Group Draft, October 13, 2016

I. (Values statement)

Pursuant to the objectives in Section 1801 of Fish and Game Code, the Fish and Game Commission (Commission) agrees that native terrestrial predators are an essential and integral part of California's natural wildlife and possess intrinsic, and cultural value which benefits society and ecosystems. The Commission shall ensure the current and future ecological, scientific, aesthetic and recreational value of terrestrial predators while inhibiting adverse impacts to other species and impeding conflicts with humans, human enterprise and private property.

II. (Conservation + management principles)

The Commission further identifies that justifiable conservation and management strategies are necessary to obligate the coexistence of humans and wildlife. It is, therefore the policy and practice of the Fish and Game Commission that:

A sustainable predator population requires local and regional genetic variability, physical health, undiminished social structure, and opportunities for dispersal as well as abundant prey and habitat.

A. Native terrestrial predator communities and their habitats are monitored, maintained, restored, and enhanced using the best available science. Wildlife managers may protect, conserve, and provide judicious non-consumptive and consumptive recreational opportunities.

B. Wildlife managers shall consider human safety a priority and may use lethal control methods in cases where predators pose a risk to human health or safety. If conflicts arise between predators and human enterprise or private property, wildlife managers may resort to the limited use of lethal controls but only after all reasonable efforts at preventing habituation and/or non-lethal methods have proven ineffective.

C. When terrestrial predators adversely impact other wildlife species it may be necessary to employ strategies to reduce those conflicts. Evidence-based methods will be used to evaluate the relative long-term efficacy of conflict prevention and response alternatives. Wildlife managers shall consider the ecological relationships which may be affected. Management decisions shall be consistent with objectives or management plans for other species, and ecosystem health shall take precedence over recreational opportunity within the contest of conflict resolution.



Sent via electronic mail

January 5, 2017

Wildlife Resources Committee
Commissioner Anthony Williams
Commissioner Russell Burns

CC: California Fish and Game Commission (“the Commission”)
President Eric Sklar
Commissioner Jacque Hostler-Carmesin
Commissioner Peter Silva
Executive Director Valerie Termini
Wildlife Advisor Erin Chappell

Re: Wildlife Resources Committee Meeting (January 18, 2017), Item #7 – Predator Policy Workgroup, Draft Predator Policy

Dear Committee Co-Chairs Commissioner Williams and Commissioner Burns,

As members of the predator policy workgroup representing the Center for Biological Diversity, Project Coyote, The Humane Society of the United States, and the National Association for Wildlife Emergency Services, we thank the Commission for the opportunity to participate in the drafting workgroup and to work closely with multiple stakeholders toward the reform of California’s predator policy to usher it into the 21st century. While members of the drafting group have put in solid efforts into the proposed policy statement presented to the Wildlife Resources Committee at the January 2017 meeting, we note that the draft statement represents the views only of certain workgroup members who together constitute the majority vote. We write this letter to inform the Commission of the minority opinion of the draft predator policy statement.

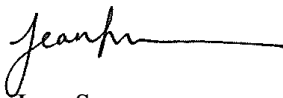
Specifically, we raise the following salient points for your consideration for the final predator policy statement, as it undergoes the review and consideration of the Wildlife Resources Committee and subsequently the full Commission. These points underscore the need for predator policy in California to espouse standards of equitable, humane, and ecologically-sound treatment of the state’s predators.

Section III (Conservation and Management Principles), Part B of the policy statement should adopt the policy that any take of predator species for depredation purposes should be very limited in scope and authorized only where truly necessary, and non-lethal methods should be exhausted before lethal methods are used in such cases. Specifically, we ask that this section require the Department of Fish and Wildlife to not just “consider” lethal and non-lethal methods but instead require that the Department exhaust all non-lethal and preventive measures, including all reasonable efforts at preventing habituation and conflict, prior to resorting to or authorizing any take under depredation. Further, the term “humane” should also be inserted to describe any approved methods of take, including lethal methods that are used.

Further, Section III (Conservation and Management Principles), Part C of the policy statement should also be modified to include the concept that predator management should not only be consistent with “the goals and objectives of existing management and conservation plans” but also take into account the goals and objectives informed by best available science, public values, and other social factors, as public attitudes are increasingly moving toward more humane treatment of wildlife – not less. The current proposed version of this section steeps predator management into an existing and antediluvian paradigm which calls for rethinking, reform, and rejuvenation under a changing ecological climate and public value system.

Thank you for your consideration of these points. If you have any questions, we are happy to discuss them with you.

Sincerely,



Jean Su
Associate Conservation Director & Staff Attorney
Center for Biological Diversity
jsu@biologicaldiversity.org



Jennifer Fearing
Fearless Advocacy, Inc.
jennifer@fearlessadvocacy.com



Rick Hopkins, Ph.D.
Senior Conservation Biologist
Live Oak Associates, Inc.
Science Advisory Board Member
Project Coyote
rhopkins@loainc.com



Rebecca Dmytryk
President and CEO
National Association for Wildlife Emergency Services
Founding Officer
Humane Wildlife Control Association
rebecca@wildlifeservices.org

California Fish and Game Commission
Attn: Wildlife Resources Committee
Commissioner Anthony C. Williams
Commissioner Russell Burns

Re: Predatory Policy Workgroup reviewer input

Jan. 5, 2017

Dear Commissioners Williams and Burns,

As a collective of Predator Policy Workgroup reviewers, and in light of California's mandate to examine best available science when revising and establishing wildlife policy, we are presenting a handful of published works to provide insight into some of our issues.

The submitted documents speak to the existence of much larger bodies of study, and represent only a few among hundreds of publications that lead us to conclude that:

- descriptions of relationships as single predator/prey are highly misrepresentative
- intact predator social structures and maintaining established territories are likely to result in lower depredating frequency over time (breeding chaos, inexperienced hunting, predator exchange) than liberal removal policies
- random and trophy removals are detrimental to ecosystem and prey health

Thank you for considering the important works that follow. We're looking forward to submitting additional papers as they come to our attention.

Respectfully,

Miriam Seger, Project Bobcat
Keli Hendriks, Project Coyote, Sonoma County Wildlife Rescue
Fauna Tomlinson, Project Coyote
Lynn Cullens, Mountain Lion Foundation
Damon Nagami, Senior Attorney, National Resources Defense Council
Sharon Ponsford, California Council of Wildlife Rehabilitators
Tom O'Key, Project Bobcat
Marilyn Jasper, Sierra Club California
Oliver Starr, Goodwolf.org
Susan Kirks, Paula Lane Action Network
Veronica Yovovich, Mountain Lion Foundation

TABLE OF CONTENTS

I. THE INEFFECTIVENESS OF LETHAL REMOVAL

- 1. Dead or Alive? Comparing Costs and Benefits of Lethal and Nonlethal Human-Wildlife Mitigation on Livestock Farms.....pg. 3**
- 2. Nonlethal Techniques for Managing Predation: Primary and Secondary Repellents.....pg. 3-4**
- 3. Effects of Wolf Mortality on Livestock Depredations.....pg. 4**
- 4. When the Hunter Becomes the Hunted.....pg. 5**
- 5. Predator Control Should Not be a Shot in the Dark.....pg. 5**
- 6. License to Kill: Reforming Federal Wildlife Control to Restore Biodiversity and Ecosystem Function.....pg. 6-7**

II. THE FAILURES OF SINGLE PREDATOR-PREY MANAGEMENT APPROACHES

- 7. Human-Predator-Prey Conflicts: Ecological Correlates, Prey Losses, and Patterns of Management.....pg. 8**
- 8. Shoot a Coyote, Save a Fawn.....pg. 9**
- 9. Ducks, Habitat Conservation, and Predators.....pg. 10**

III. COMPLEX RELATIONSHIPS BETWEEN HUMANS AND PREDATORS

- 10. A Natural Cure for Lyme Disease.....pg. 11**
- 11. Human Predators Outpace Other Agents of Trait Change in the Wild.....pg. 12**

IV. LANGUAGE EXAMPLES OF OTHER AGENCIES

- 12. Environmental Assessment Predator Damage and Conflict Management in Montana.....pg. 12**

I. THE INEFFECTIVENESS OF LETHAL REMOVAL

Conflict mitigation, social tolerance/intolerance of predators, long term efficacy of non-lethal over short term lethal resolutions, growing support for non-consumptive wildlife usage

1. McManus, J.S., Dickman, A.J., Gaynor D., Smuts, B.H., Macdonald, D.W., (2014) Dead or Alive? Comparing costs and benefits of lethal and non-lethal human-wildlife mitigation on livestock farms

Full article here:

https://www.researchgate.net/publication/263163546_Dead_or_Alive_Comparing_the_costs_and_benefits_of_lethal_and_non-lethal_human-wildlife_conflict_mitigation_on_livestock_farms

Abstract:

Livestock depredation has implications for conservation and agronomy; it can be costly for farmers and can prompt retaliatory killing of carnivores. Lethal control measures are readily available and are reportedly perceived to be cheaper, more practical and more effective than nonlethal methods. However, the costs and efficacy of lethal vs non-lethal approaches have rarely been compared formally. We conducted a 3-year study on 11 South African livestock farms, examining costs and benefits of lethal and non-lethal conflict mitigation methods. Farmers used existing lethal control in the first year and switched to guardian animals (dogs *Canis familiaris* and alpacas *Lama pacos*) or livestock protection collars for the following 2 years. During the first year the mean cost of livestock protection was USD 3.30 per head of stock and the mean cost of depredation was USD 20.11 per head of stock. In the first year of non-lethal control the combined implementation and running costs were similar to those of lethal control (USD 3.08 per head). However, the mean cost of depredation decreased by 69.3%, to USD 6.52 per head. In the second year of non-lethal control the running costs (USD 0.43 per head) were significantly lower than in previous years and depredation costs decreased further, to USD 5.49 per head. Our results suggest that non-lethal methods of human-wildlife conflict mitigation can reduce depredation and can be economically advantageous compared to lethal methods of predator control.

2. Shivik, John A., Treves, A., (2003) Nonlethal Techniques for Managing Predation: Primary and Secondary Repellents

Full article here:

https://www.researchgate.net/publication/227619210_Nonlethal_Techniques_for_Managing_Predation_Primary_and_Secondary_Repellents

“(excerpted)...To promote the existence and expansion of large carnivores, conservation biologists should assist with the real-world problems predators. New, especially nonlethal, tools for management are important for us as conservation biologists in our interface with the public and policy-makers, and the concepts we describe here are designed to help us to effectively operate within this real world... it is preferable from a biological point of view to maintain natural predator demographics and behavior while attempting to minimize the conflicts between humans and wildlife. Thus, nonlethal techniques that preserve

stabilization of social and demographic structure may limit conflicts with humans and have additional benefits in management efficiency. That is, removal of territorial predators results in a breakdown of territorial defense and allows access to livestock by predators that were formerly excluded. Nonlethal methods for managing predation allow continuance of territorial defense and may have longer-term effects by preventing other predators from intruding into an area containing livestock. Furthermore, efficiency of nonlethal techniques may be greater because they can last beyond the year of management ... Clearly, when cultural history, ecology, management, and the policy process conflict, reasonable compromises must be identified to mollify all parties. Nonlethal approaches to managing predation are not without costs and limitations, but they do provide a means for conservation biologists to target areas with high predation levels and increase acceptance of large mammalian predators.”

3. Weiglus, Robert B., Peebles, Kaylie A., (2014) Effects of Wolf Mortality on Livestock Depredations

Full article here:

https://www.researchgate.net/publication/269097204_Effects_of_Wolf_Mortality_on_Livestock_Depredations

excerpted: Predator control and sport hunting are often used to reduce predator populations and livestock depredations, – but the efficacy of lethal control has rarely been tested... We found that the number of livestock depredated was positively associated with the number of livestock and the number of breeding pairs. However, we also found that the number of livestock depredated the following year was positively, not negatively, associated with the number of wolves killed the previous year. Our results do not support the “remedial control” hypothesis of predator mortality on livestock depredations the following year. However, lethal control of wolves appears to be related to increased depredations in a larger area the following year. Our results are supported by the findings of Harper et al. (2008) in Minnesota where they found that across the state (large scale) none of their correlations supported the hypothesis that killing a high number of wolves reduced the following year's depredations... Culling of wolves may also cause frequent breeder turnover [11] and related social disruption – which can result in reduced effective prey use (through loss of knowledge of prey sources and ability to subdue prey) which may also result in increased livestock depredations [27], [28]. All of these effects could potentially result in increased livestock depredations... We would expect to see increased depredations, wolves killed, and breeding pairs as the wolf population grows and recolonizes the area - but our data suggest that lethal control exacerbates these increases.”

4. Woodroffe, R., Redpath, S., (2015) When the Hunter Becomes the Hunted

Full article here:

https://www.researchgate.net/publication/281414973_CONSERVATION_When_the_hunter_becomes_the_hunted

(excerpted) ...the complexity of ecological systems means that **predator control does not invariably benefit wild prey**. In some ecosystems, factors such as habitat loss or weather conditions influence prey numbers more strongly than does predation. **Suppressing the populations of one predator species may cause other predators to increase in number, leaving prey to face unchanged or even heightened predation rates**. For example, Ellis-Felege et al. have shown in an experimental study that predator control efforts reduce mammalian predation on bobwhite quail nests in the southeastern United States, but these benefits are offset by increased predation from snakes (7). Similarly, pronghorn (which are preyed on by coyotes but seldom by wolves) appear to have declined in response to the extirpation of wolves, which caused a dramatic expansion of coyotes across North America (8). Robust scientific evidence alone is not sufficient to manage predators effectively; social acceptability is equally important....**Predator control conducted for a specific purpose often has broader consequences, which may be as unwelcome as they are unintended**....Controversy about predator management can lead to intense social discord, which may undermine management decisions...Where social conflict is intense, scientific evidence is often used selectively, contested, or dismissed. In such situations, involving stakeholders in the design, implementation, and interpretation of experimental studies may help to build trust and improve social learning. For example, controversy over grizzly bear management in Banff National Park, Canada, was successfully resolved by engaging stakeholders in a problem-solving group, which shared responsibility for interpreting scientific evidence and making management decisions (15).... The challenge, especially in more intense social conflicts over predators, is that polarized views may prevent parties from engaging with the process at all. If policy-makers, scientists, and stakeholders from all sides can show leadership in overcoming this challenge, predator management might become more evidence-based, as well as more responsive to changing social perspectives. ■

5. Treves, A., Krofel, M., McManus J. (2016) Predator Control should not be a shot in the Dark

Full article here:

https://www.researchgate.net/publication/307569182_Predator_control_should_not_be_a_shot_in_the_dark

(excerpted) Non-lethal methods were more effective than lethal methods in preventing carnivore predation on livestock generally; at least two lethal methods (government culling or regulated public hunting) were followed by increases in predation on livestock; zero tests of non-lethal methods had counterproductive effects....We recommend suspending lethal predator control methods that do not currently have rigorous evidence for functional effectiveness in preventing livestock loss until gold-standard tests are completed.”

6. Bradley J. Bergstrom, Lily C. Arias, Ana D. Davidson, AdamW. Ferguson, Lynda A. Randa , Steven R. Sheffield (2014) License to kill: reforming federal wildlife control to restore biodiversity and ecosystem function

Full article here:

https://www.researchgate.net/publication/249007704_License_to_Kill_Reforming_Federal_Wildlife_Control_to_Restore_Biodiversity_and_Ecosystem_Function

(genesis of our current management system and need for reform)
(excerpted)... **Lethal predator control is not effective at reducing depredation in the long term... More than 70 million Americans spend \$55 billion and generate over \$100 billion in total economic activity on non-consumptive uses of wildlife in native habitats, especially on federal public lands (Leonard 2008; USFWS 2012a). At the same time, leading ecologists have concluded that many of the world's pandemics, irruptions of undesirable species and collapses of desirable ones, and destabilization of ecosystems, resulting in lost ecosystem services, have been caused by the loss of apex predators (Estes et al. 2011) and of important small native herbivores (Delibes-Mateos et al. 2011)...** Lethal control and its unintended consequences continue... unmanaged populations of gray wolves in the Yellowstone ecosystem preferentially prey on old and diseased elk (Wright et al. 2006), so allowing wolves to establish and maintain natural pack structure could theoretically aid disease prevention in ungulate populations (Roy & Holt 2008). Reducing wolf populations increases coyote populations through "mesopredator release" and can have other unintended consequences on native ungulate populations (Berger et al. 2008; Prugh et al. 2009). For example, **pronghorn fawn survival in areas with wolves was four times higher than in areas without wolves, because wolves suppressed coyotes and consequently fawn depredation (Berger et al. 2008). Predator control may, at least locally, decrease ecosystem resilience and lead to state shifts where invasive species become dominant (Wallach et al. 2010), which only increases the need for invasive control while decreasing its likelihood of success...** As long as private livestock producers can externalize the costs of predator losses via government-subsidized predator control, they will have little incentive for responsible animal husbandry techniques, i.e., reduce stocking levels, clear carcasses and afterbirths quickly, confine herds at night or during calving/lambing, install fencing and fladry, or adopt numerous other nonlethal preventive methods to avoid depredation (Shivik et al. 2003). **Lethal wildlife control for livestock: ineffective and wasteful lethal control measures, short of eradication, appear no more effective in the long term than no lethal control at all.** Three gray wolf removal studies in different decades in different areas of North America indicate that effects are short-lived, because remaining individuals and recolonizing packs just as often depredate as those removed (Treves & Naughton-Treves 2005). **Coyote control usually has involved population reduction rather than selective killing (Mitchell et al. 2004); this can create temporary local extirpations, soon attracting immigrants that experience dramatically higher reproductive output, resulting in no long-term effect on depredation (Connolly 1978; Knowlton et al. 1999). Removing more than the territorial breeding pair of coyotes (which commit most depredations of sheep) from a wider zone around a depredation site may even increase the overall problem by allowing more breeding pairs to immigrate (Sacks et al. 1999).** Despite considerable effort by WS at lethal coyote control in the western United States, evaluation of a 60-year data set indicated that the decline of the sheep

industry in both eastern and western United States could be attributed to market trends and production costs, and that predator control (lacking in the East) did not have a significant impact on the decline (Berger 2006). Lethal control often proceeds without certain knowledge that targeted individuals are responsible or that a depredation has occurred (as in “preventive” culling of coyotes; GAO 1990; Knudson 2012c). But the compensatory aspect of depredation control described above suggests that even highly specific lethal control methods such as poison collars (Connolly et al. 1978) would not be a long-term solution. Preventive, nonlethal methods, such as fencing, guard dogs, and taste aversion conditioning hold more promise for long-term reduction of depredation (Green et al. 1984; Gustavson & Nicholas 1987; Treves & Karanth 2003; Knudson 2012b). That the unmanaged wolf population of Yellowstone National Park has declined 40% since its peak density in 2006 and appears to have stabilized at ≤ 100 animals (Figure 3) suggests that simply ending lethal control elsewhere in the NRM could lead to, at worst, a stable rate of depredation ($\leq 5\%$; Bergstrom et al. 2009; USDA 2011), which could be decreased by aggressive application of nonlethal methods... The Wildlife Society (TWS), in its recent technical review of carnivore management, states “Although the Public Trust Doctrine for Wildlife Management clearly articulates that federal and state agencies manage wildlife for the benefit of all citizens, often the opinions of non consumptive users are ignored. Unbalanced information that supports the perceptions of some stakeholders over others can increase conflicts (Peek et al. 2012).” This seems to us to be the case when state or federal agencies conduct predator control on wilderness areas (see WS 2012b) and/or implement predator control to promote certain game species over other native wildlife. The latter arguably benefits 11.6 million people in the United States who hunt big game to the detriment of 22.5 million active wildlife watchers, whose direct expenditures are three times that of big-game hunters (USFWS 2012a)... Even if enhancing wild ungulate populations were a justifiable goal, predator control is an unproven instrument for achieving it. A meta-analysis of predator removal experiments in 113 systems found prey populations subsequently declined in 54 of them (Sih et al. 1985).

II. THE FAILURES OF SINGLE PREDATOR-PREY SCIENCE

7. Kate Graham, Andrew P. Beckerma, Simon Thirgood, (2005) Human-Predator-Prey Conflicts: Ecological Correlates, Prey Losses, and Patterns of Management

Full article here:

https://www.researchgate.net/publication/222576635_Human-Predator-Prey_Conflicts_Ecological_Correlates_Prey_Losses_and_Patterns_of_Management

(excerpted)...Conflicts between humans and predators are the product of socio-economic and political landscapes and are particularly controversial because the resources concerned have economic value and the predators involved are high profile and often legally protected. **Most animals live in species-rich communities, yet most human–predator conflicts are described in terms of direct effects arising from simple 1-predator–1-prey interactions.** The perception has been that a single predator directly reduces the density of prey available to humans and this can be prevented by removing predators from the system (Yodzis, 2001). This simplistic and intrinsically symmetric view of the predator–prey system is a simplification of the trophic interactions in complex ecosystems. 2.1. Predator–livestock conflicts Livestock predation by mammalian carnivores is one of the most frequent sources of conflict between humans and wildlife throughout the world (Mech, 1981; Cozza et al., 1996; Kaczensky, 1996; Pedersen, 1999; Mazzoli, 2002). Perceived economic losses due to livestock depredation often lead to retaliatory responses by agro-pastoralists. These include carnivore persecution, opposition to wildlife sanctuaries close to farms, or resistance to the reintroduction of extirpated predators to protected areas. In many cases these responses hinder the conservation of threatened species, and increasingly, contravene the public and political aims of large carnivore management. **Conflicts arise for several reasons. First, the large home ranges of carnivores draw them into recurrent resource-competition with humans, a problem exacerbated by habitat loss and fragmentation. Second, human exploitation of natural herbivores may reduce the availability of wild prey to predators and can increase the likelihood of attacks on livestock (Yalden, 1993 ; Mishra, 1997 ; Sillero-Zubiri and Laurenson, 2001)...** Human negligence plays an important role in many predation incidents, where losses could be prevented by greater vigilance during grazing, preventing animals from straying, and returning herds to enclosures in daylight. In parts of Europe, changes in animal husbandry now mean that domestic livestock are rarely guarded and are thus more vulnerable to predation (Sillero-Zubiri and Laurenson, 2001)... Efforts to manage depredation invariably concentrate on attempts to control predator abundance, but our analysis showed that losses appear to be unrelated to predator density... Knowlton (1999) suggested coyote (*Canis latrans*) abundance is a poor predictor of sheep losses if livestock attacks involve only a few problem individuals. Conner et al. (1998) reported that kills of sheep by coyotes in California were not correlated with the number of coyotes, and Greentree et al. (2000) demonstrated that fox control had little effect on lamb production. **Several studies (Bjorge and Gunson, 1985 ; Sagor et al., 1997 ; Landa et al., 1999 ; Stahl et al., 2001a,b ; Blejwas et al., 2002) have shown that the removal of predators results in only a short-term reduction in prey losses, because the same or other predator species rapidly re-establish themselves. .Most of the focal predators in our case studies are considered to be endangered, at least on a regional basis, so that reducing their numbers is likely to conflict with other management objectives...** Predator conflicts are routinely described as

a single pairwise predator–prey interaction, when in reality they are part of a complex ecological and economic community. The complex interactions arising from multispecies assemblages can have enormous practical implications for the effectiveness of different management systems (Yodzis, 2000). Consequently, there has recently been a shift in emphasis in ecology and conservation from single-species to multi-species and ecosystem management (Yodzis, 1994 ; Palomares et al., 1995 ; Sih et al., 1998 ; Kunkel and Pletscher, 1999 ; Yodzis, 2000 ; Murdoch et al., 2002).

8. Hart, David., (2016), Outdoor Life: Shoot a coyote, save a fawn

It's true: A dead coyote will never eat another fawn, and a dead raccoon can't scavenge another quail's nest. But that doesn't mean that plugging the occasional predator from your deer stand will actually do a great deal to help your local game population. It's much more complicated than that, says University of North Dakota wildlife professor Dr. Susan Felege, who led a three-year study examining the impact of predator removal on quail nesting success in Florida and Georgia. Her findings were startling. Although professional trappers removed as many as 737 mammalian predators in one year from individual 3,500-acre study sites—raccoons and possums accounted for most of the animals—overall nesting success did not change. **“The predator community is very complex,” says Felege. “If raccoons aren't eating quail eggs, something else is.”** What's more, the number of mammalian predators caught by trappers actually remained stable from one year to the next. **“If there are studies that removed this many animals with no discernible impact on prey, it is pretty clear that randomly removing one or two would be unlikely to have much impact,”** says Dr. Mike Conner, a research scientist at the Jones Ecological Research Center. **DOG DAYS**

Coyote removal doesn't make much of a difference either. A three-year study in South Carolina found that coyote control efforts did boost whitetail fawn survival, but only slightly. **Despite intense trapping pressure—coyotes were reduced by 78 percent each year, and at a rate of about four per square mile—their numbers rebounded to pre-trapping levels within just nine months.** **“About a third of the coyotes in our study areas are transient,”** says University of Georgia professor Dr. Karl Miller. **“If you shoot a resident coyote, a transient moves in and sets up his own territory pretty quickly.”** That's not to say that shooting a coyote won't save a few fawns. Of more importance is to shoot them at the right time of the year—where legal. Miller was involved in various studies that showed higher fawn survival rates in some study areas when management efforts were conducted just prior to the fawning season. However, coyote trapping didn't help on other sites. Similar to the results of the South Carolina study, trapping efforts during his research period were intense and sustained. Most hunters likely don't have the time or resources to duplicate those efforts. So what helps? At one time, biologists believed fawn predation was lower in areas with high-quality fawning and bedding habitat, but new research disputes that—predation rates are similar in a variety of habitats. **After years of research focused on coyotes and deer, biologists seem to be leaning toward a single management tool for boosting deer numbers where coyotes are present: Shoot fewer does**

9. Petrie, Chuck, (Dec. 2003), Ducks Unlimited Magazine, Ducks, Habitat Conservation, and Predators

Full article here:

https://www.ducks.org/media/Conservation/Conservation_Documents/documents/Ducks%20and%20Predators%20low%20res.pdf

ABSTRACT:

Habitat Conservation vs. Predator Control: **Predator control cannot result in meaningful increases in duck numbers or birds in the bag and threatens to undermine the broad coalition of public support on which modern waterfowl conservation depends. Dollars diverted to killing predators are dollars lost to habitat conservation.** In business terminology, this is known as opportunity cost. Doing one thing means not doing something else. Spending scarce habitat dollars on predator control will assure that more critical habitat will be lost. **Nearly every dollar spent on habitat for waterfowl is matched by special funds such as the North American Wetlands Conservation Fund (NAWCF), which is set aside by Congress for habitat work.** Many other partners also add to the pot, and it is not unusual to have dollars from DU and other sources matched three or four times to do even more habitat conservation in the highest priority areas. **Dollars diverted to predator control are not matchable, and therefore not eligible to leverage NAWCF funds or other dollar-matching habitat funds because of the lack of partners who see the merit in such short-term practices.** On a local scale, predator control can provide immediate benefits to a few waterfowl, but it does not contribute to the long-term security of waterfowl habitat and waterfowl abundance on a continental or even regional scale. **Predator control provides no lasting impact on waterfowl numbers because as predators are removed, those individuals are quickly replaced or other predator populations increase.** Predators must be removed every year, simply to temporarily suppress their numbers, and that is not a practical or sustainable option over large areas or over the long term. Habitat conservation results in incremental gains each and every year. The core challenge is to improve and sustain the productive capability of the “Duck Factory” over the long term. During drought years, the breeding effort in the prairie duck factory effectively shuts down and populations decline because ducks nest very sparingly across vast areas of dry landscape. If few ducks are nesting, even predator control cannot improve duck-breeding success enough to result in meaningful improvements in continental duck populations. Waterfowlers simply have to pull in their belts during those years as they have during all of the last century and beyond. What is critical is that the nesting habitat base remains secure so that ducks can flourish again when water returns to the breeding grounds.

III. COMPLEX RELATIONSHIPS BETWEEN HUMANS AND PREDATORS

10. Velasquez-Manoff, Moises (New York Times, Aug. 20, 2016), A Natural Cure for Lyme Disease

Full article here:

<http://www.nytimes.com/2016/08/21/opinion/sunday/a-natural-cure-for-lyme-disease.html>

(excerpted) What's behind the rise of Lyme? Many wildlife biologists suspect that it is partly driven by an out-of-whack ecosystem. Lyme disease is transmitted by bites from [ticks](#) that carry the Lyme-causing bacterium, *Borrelia burgdorferi*. Ticks get it from the animals they feed on, primarily mice and chipmunks. And rodents thrive in the fragmented, disturbed landscapes that, thanks to human activity, now characterize large sections of the Northeast. If humans have inadvertently increased the chances of contracting Lyme disease, the good news is that there's a potential fix: allow large predators, particularly wolves and cougars, to return.... As with much of ecology, these connections are hypothetical. And predators are not the only important factor; overall diversity matters, too. Consider the fastidious opossum, which, because it grooms obsessively and is expert at removing ticks, functions as a tick death trap. More opossums in the ecosystem might mean fewer ticks, reducing the chance of getting bitten by one that carries Lyme.

But there is evidence to support the predator theory. On California's Channel Islands, off the coast of Santa Barbara, scientists found that, once variation in rainfall and island size was accounted for, those islands with the greatest number of predator species had the lowest prevalence of [hantavirus](#), a nasty rodent-borne disease that kills 36 percent of the people it infects. "Predators can really regulate infectious disease, and actually protect us," Dr. Buttke said. "I think the best chance to make Lyme disease go away would be re-colonization by cougars," Dr. Levi told me... How many days spent ill with Lyme disease might cougars prevent? How much suffering?

The relationship between the health of ecosystems and humans extends beyond Lyme. Over 60 percent of emerging [infectious diseases](#), including Ebola, SARS, the Nipah virus and hantaviruses, originate in animals. The major killers of history — [smallpox](#), [measles](#) and the plague — also came from animals. Yet the emergence of these zoonotic diseases seems to have accelerated...And degraded ecosystems may harbor more pathogens.

The first animals to go are usually the large predators. The last ones standing are often small rodents, bats and their ilk — the very animals that serve as reservoirs of disease. It's true that large predators can take livestock, eat pets and even occasionally attack people. But, by preventing disease, they may ultimately help far more of us than they harm.

**11. Darimont, Chris T., Carlson, Stephanie M., et al, (November 21, 2008)
Human predators outpace other agents of trait change in the wild**

Full article here:

<http://www.pnas.org/content/106/3/952.full>

ABSTRACT:

The observable traits of wild populations are continually shaped and reshaped by the environment and numerous agents of natural selection, including predators. **In stark contrast with most predators, humans now typically exploit high proportions of prey populations and target large, reproductive-aged adults. Consequently, organisms subject to consistent and strong 'harvest selection' by fishers, hunters, and plant harvesters may be expected to show particularly rapid and dramatic changes in phenotype.** However, a comparison of the rate at which phenotypic changes in exploited taxa occurs relative to other systems has never been undertaken. Here, we show that average phenotypic changes in 40 human-harvested systems are much more rapid than changes reported in studies examining not only natural ($n = 20$ systems) but also other human-driven ($n = 25$ systems) perturbations in the wild, outpacing them by $>300\%$ and 50% , respectively. **Accordingly, harvested organisms show some of the most abrupt trait changes ever observed in wild populations, providing a new appreciation for how fast phenotypes are capable of changing. These changes, which include average declines of almost 20% in size-related traits and shifts in life history traits of nearly 25%, are most rapid in commercially exploited systems and, thus, have profound conservation and economic implications.** Specifically, the widespread potential for transitively rapid and large effects on size- or life history-mediated ecological dynamics might imperil populations, industries, and ecosystems.

IV. LANGUAGE EXAMPLES OF OTHER AGENCIES

12. United States Dept. of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (September, 2016); Environmental Assessment Predator Damage and Conflict Management in Montana

Full assessment here:

<https://www.regulations.gov/document?D=APHIS-2016-0064-0002>

The language of this assessment recognizes the spectrum of stakeholder concerns by: extensively discussing non-lethal alternatives, differentiating Predator Damage Management (PDM) policies between private and public lands, acknowledging the unpopularity of PDM at taxpayer expense, and by including ethics, humaneness, and trophic cascades as an important part of wildlife conversations.

California Fish and Game Commission
Attn: Wildlife Resources Committee
Commissioners Williams and Burns

Re: PPWG

Jan. 5, 2017

Dear Commissioners,

To revisit the genesis of the PPWG, many of us were at the WRC meeting in LA when then-Commissioner Baylis outlined the intent of workgroup idea. He emphasized “non-consumptive as well as consumptive uses”, and the need for new approaches in the face of the human population explosion, drought, and climate change. The purpose of forming the workgroups recognized the Commission’s role to inclusively broaden focus to address demographic shifts. Furthermore, by creating workgroups, stakeholders would hopefully create a broad middle ground, and avoid endless, divisive public comment. Commissioner Baylis went on to say that “managing wildlife is really about managing people”, and negotiating stakeholder polarity was surely one aspect of that comment.

Now that we’re in the practical application phase of the PPWG, we have six drafters holding openly consumptive biases and four non-consumptive drafters. Among drafters, there exists a “minority” and “majority” opinion, and this fact must be noted to allow the Commission to read materials through an educated lens. It’s highly arguable that the majority in this case is misrepresentative of the preponderance of the state’s stakeholders.

As we move forward in revising policy, I suggest putting a fresh coat of paint on some of the wildlife think-speak that has become hackneyed over time, so that we can have a true revision process and avoid delusional micro change.

Best available science:

- Population health (population abundance) DOES NOT represent genetic health, which is the true scientific measure of sustainability over time.
- Stochastic processes such as fur take, geographically concentrated depredation, and trophy removals undermine collecting reliable data. This margin of error must be considered wherever these activities occur.
- Studies take years; decades even, to establish a baseline for population ebbs and flows. Data drawn over a single year or two may be a survey, but it is not science. Harvest reports are not science.
- One predator to one prey relationship science may be convenient and digestible, but not credible when set against modern science.

Redefine “cost and efficacy” in regards to depredation: short term results can always be achieved through cheap and fast methods of lethal predator dispatch, but they produce no lasting effect and may even exacerbate problems. Cost and efficiency must be measured in both the long and short term when evaluating policy, to avoid “penny wise pound foolish” methods. Cost and efficiency must also be balanced with the best fiscal interests of the public: i.e. subsidy programs, loss of trust assets. Given that extermination-level depletion is the only way by which lasting “success” can be achieved through lethal means, we must instead reroute resources to aggressive encouragements for good animal husbandry.

Heritage: Historically used as a term that guarantees intrinsic right to take. But human-driven changes to our environment have eroded both the consumptive and non-consumptive opportunities to “utilize” wildlife. Under revised policies, the notion of heritage must be broadened to recognize our shared loss. The decision now is whether we want to pass wildlife on to future generations: and under public trust, it is our obligation to do so.

Animal rights extremists: For clarification, extremists do not generally take unpaid leaves to travel long distances with an ironed shirt in a dry-cleaning bag, for the purpose of making a three-minute public comment. A few uncontrollable elements on either side do not cast entire groups.

In closing, the original intent of the Predator Policy Workgroups was to make management contemporary through revisions. This is a time for dynamic policies in California, on all levels, and many hopeful eyes are on us for leadership. As a citizen, this is why I’m involved. Thank you for allowing me the opportunity to express my concerns.

Respectfully,

Miriam Seger

As a kid, I used to hunt pheasant in Eastern Oregon with my Dad: I got to drive the car on dirt hunting roads, eat spaghetti from a can, and I was the only girl in my school who understood the weight of a rifle. I was expected to do everything that a boy could: in those days, that was not so common as it is now. Ultimately it wasn't for me, but my judgments as a stakeholder aren't oversimplified either.

We need to see the modernization of the word "heritage" to represent a future in which our kids can know that there's still wilderness that holds wildlife in it's natural state. And for those who hunt, they can teach their kids to do so also. But things will never ever go back to the way that they were. Habitat fragmentation has made sustainability more complex than simply having a breeding population: ignoring widely held predator concepts like edge effects, social structure, and genetic exchange is tantamount to disregarding "best science". Our environment has undergone extreme changes, and the implications of "heritage" must change in tandem by undergoing a reality check. One group can slam-dunk a quorum, but that doesn't alter the fact that the opportunities to "utilize" wildlife have diminished for all Californians. Policy must adapt to things that are out of our human control, by regulating what we can affect. Revisions must be based on this idea.

Thank you again for always listening, and lending your voice to so many complex issues. If you don't mind, I'd like to share this letter with a few other reviewers (I'll delete your name), and please feel free to share any of the thoughts above with which you concur. I look forward to seeing you soon!

Since they held greater numbers, they were notated by staff as "majority opinion", and held the bully pulpit. On behalf of Project Bobcat, I'm writing today to express my cautious optimism regarding upcoming predator policy revisions. This time of revisions offers the perfect opportunity to pause and reevaluate where we have been as a State and where we are going: rather, where we chose to go. At this time, we would be foolish not to take a serious look at abandoning Manifest Destiny, as this would equate to the act of passing even greater magnification of issues to our heirs.

With the help of our varied geography, California enjoys our nation's greatest biodiversity, and with that comes our greatest responsibility as individuals who value wildlife. We often speak of "utilizing" wildlife, and disregard the fact that we must leave a percentage of natural systems intact and free from human interference in order for native species to prevail. The unimaginable complexity and frailty of seemingly abundant natural systems is sometimes beyond human grasp, and revealed through irrevocable loss.

We do gain insight into natural systems through science. But tragically, we chose to believe that human conceits of time and money prohibit us from acknowledging best science, and applying it to policy until it's too late for anything short of desperate, unsatisfying, and extremely costly mitigation. This is the definition of crisis management.