14 July 2019

Public Comments Processing
Attn: Docket No. FWS–HQ–ES–2018–0097
U.S. Fish & Wildlife Service Headquarters MS: BPHC
5275 Leesburg Pike
Falls Church, VA 22041–3803 ELECTRONICALLY SUBMITTED

Dear Fish & Wildlife Service,
I have studied gray wolves since 2000 as a researcher at the University of Wisconsin–Madison and I oppose on scientific grounds the proposed rule to delist gray wolves nationwide.

I am supplementing my official peer review with information that came out after 31 May 2019 and emphasizing older information that I feel was over-looked in the proposed rule and needs amplification for the future. I would like the USFWS to consider the following in revisions of the proposed rule or future attempts to remove federal protections from any wildlife.

(1) I amplify my official peer review with excerpts describing the careful, sophisticated accounting for public trust assets such as wolves, that is demanded from public trustees preparing a decision such as the proposed rule.

(2) Standards of evidence in science are clear that not all published results are equal and not even all peer-reviewed publications are equal, but rather the USFWS must distinguish between weak and strong inference based on the scientific integrity of the publication and the standards of evidence presented transparently in the publication. I present guidance on standards of evidence drawn from a broader literature than wildlife science.

Blow I include hyperlinks to peer-reviewed scientific papers and I attach those to my comments also.

1. The attributes of careful, sophisticated accounting needed from public trustees when making decisions to preserve or use public trust assets such as gray wolves were not met in the proposed rule. The characteristics of careful, sophisticated account are explained in Treves, A., Chapron, G., LóPez-Bao, J.V., Shoemaker, C., Goeckner, A., Brukotter, J.T. (2017). Predators and the public trust. Biological Reviews 92, 248-270. Below I simply reprint our recommendations and conclusions from the latter article because they were expressly meant to address future efforts such as the proposed rule to delist gray wolves nationwide.

> "**VI. BALANCING COMPETING USES OF PREDATORS WITH COMPLEX BEHAVIOURAL ECOLOGY**
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> The public expresses a variety of legally recognized uses and interests in predators. People observe, feed, track, and discuss them, in addition to hunting, trapping, and retaliating for property losses. In principle, the PTD protects all legally recognized interests against infringement by any of the others. Therefore depletion of the asset requires scrutiny, following Illinois Central (1892) in the U.S.A. and other countries' constitutional provisions (Blumm & Guthrie, 2012; see online Appendix S1). The nature of any infringement between uses will necessarily be influenced by the behavioural ecology of predators and humans.
>
> **(1) Lethal and non-lethal customary uses**
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> Because most people are urban residents and that trend is continuing worldwide, the majority will probably never use predators by killing them (Treves & Martin, 2011; Bruskotter *et al.*, 2013). Even within an urbanizing world, diffuse uses of predators continue. For example, the Anishinaabe (Ojibwe) value the gray wolf above other animals

http://www.ojibwe.org/home/about_anish.html (David, 2009; Shelley *et al.*, 2011). Diverse groups of people appreciate the wolf aesthetically in art or in wildlife-watching (Duffield, Neher & Patterson, 2008). For example, the Swedish Association of Ecotourism Industries complained in 2013 to the Swedish government that the decision to eliminate wolf packs in a licensed hunt would jeopardize the profitability of eco-tourism companies (see also Center for Biological Diversity, 2013; Collins, 2013). Organized non-consumptive users may perceive infringement by con- sumptive users such as predator-hunters although data on this infringement are sparse at present. Consumptive uses bear a special burden when one employs public trust thinking. Intergenerational equity demands that one prioritize preservation of the principal of the asset for future generations. Whether this goal is achieved by legally recognizing the intrinsic value of environmental assets (i.e. independent from current human uses) or by requiring trustees to advocate explicitly for future generations remains debated. Regardless, current generations should not decide how future citizens should preserve or use the assets. Setting aside this argument about intrinsic value and intergenerational equity, we turn to the adjudication of conflicts between current uses of predators.

Similar to how courts may play counter-majoritarian roles to protect minority interests, the government trustees that allocate wildlife resources should not be swayed unduly by the popularity of certain uses. The test for a trustee adjudicating between uses should rather be whether the trustee has recognized and successfully balanced the diverse public interests in predators, especially the diffuse uses (Sax, 1970).

Although hunters are a minority in the U.S., E.U., and likely most industrialized countries (Pergams & Zaradic, 2008; see also http://www.face.eu/about-us/members/ across-europe/census-of-the-number-of-hunters-in-europe- september-2010 accessed April 2015), majorities in most regions support regulated hunting with variable bounds on its purposes, methods, locations, and sustainability (Reiter *et al.*, 1999; Treves & Martin, 2011). Nevertheless, neither the number participating, nor the popularity of a particular use, should dictate strongly how a trustee allocates wildlife to beneficiaries. Because future generations inherit the asset in perpetuity, without substantial impairment, the allocation to current users that deplete the asset is an incremental addition to 'impairment', which must always be less than 'substantial' (Illinois Central, 1892). In the following sections, we explain why diffuse uses would receive preferential treatment under the U.S.A. Supreme Court's interpretation of the PTD (see online Appendix S1).

Generally public trust thinking would view non- consumptive uses as more prudent uses of a trust asset because they rarely deplete the asset. Certainly some diffuse uses deplete the asset. For example, tourism can harm wildlife, although rarely to the point of mortality (e.g. Dunstone & O'Sullivan, 1996; Treves & Brandon, 2005). On the other hand, some diffuse uses of wildlife may enhance the asset by increasing others' access or enjoyment. For example, if feeding, creating refuges, restoring habitat, etc. were measurably enhancing the benefits for other users, the activity might be seen as highly preferred to taking wildlife or otherwise depleting the asset. Given the possibility of harming or depleting wildlife, trustees should look more cautiously at lethal uses than has been traditional under North American wildlife management (Section III). Trustees held to a fiduciary trust standard would likely suspend lethal uses until uncertainty and scientific controversy about sustainability are deemed minor (Section IV). However the PTD recognizes customary uses, which include hunting, so outright bans on predator-killing seem unlikely. Therefore balancing lethal and non-lethal uses of predators will remain important.

Balancing lethal and non-lethal uses is not straightforward. Advocates often claim a broad public interest in killing predators. Similar statutory claims exist. For example, the ESA allows proactive killing of wild animals before human injury occurs as an exception to prohibitions on take, when wild animals 'constitute a demonstrable but non- immediate threat to human safety'

(http://www.fws.gov/ policy/library/2002/02fr1494.html accessed 31 August 2015 citing 50 CFR1 § 17.31). The ESA also accommodates predator-killing as a conservation practice, ' . . . predator control, protection of habitat and food supply, or other conservation practices . . . ' (16 USC § 1531 Sec. 4(b)). Indeed state and federal agencies have long cited the protection of listed species, as well as health and human safety reasons, to kill small numbers of listed predators, including entire wolf packs. However the most frequent and widespread rea- son governments give to kill predators is to protect wild game or domestic animals and other property (Doremus, 1999; Treves, 2009). There are three problems with this justification as a broad public interest.

First, protection of property is a private interest in most cases. U.S.A. federal courts have repeatedly rejected the notion that the government is responsible for takings that result from the actions of wild animals (Thompson, 1997). Reintroduced wild animals are more often subject to lethal intervention though (Doremus, 1999). Second, justifying killing predators to prevent property damage erects a false dichotomy, ' . . . ''Environment or healthy human economics. You cannot have both.'' This classic false dichotomy of an inexorable tradeoff is a powerful and seductive mind-framing which serves to undercut environmental regulation generally' (Plater, 2004, p. 303). A recent review of that question concluded, 'an increase in stringency of environmental policies does not harm productivity growth' (The Economist, 2015). Treves, Wallace & White (2009*b*) provided evidence for why there is always more than one intervention to resolve human–wildlife conflicts, one that addresses the outcomes of encounters between people and wildlife, and another that addresses how people perceive such encounters. Thus lethal management should be viewed as a candidate intervention, not the only option. Indeed, physical intervention directed at wildlife, should always be juxtaposed with other interventions that influence human perceptions or behaviour (Treves *et al.*, 2006). A prudent trustee should be aware of and weigh alternatives on their merits as well as their effect on preservation and other legal uses. Third, experts worldwide agree that non-selective killing of predators typically does not prevent property losses (Knowlton, Gese & Jaeger, 1999; Greentree *et al.*, 2000; Bartel & Brunson, 2003; Donnelly & Woodroffe, 2012; Vial & Donnelly, 2012; Krofel, Cerne & Jerina, 2011), except for the extreme of local eradication or extremely high mortality for long periods over large geographic areas, which is incompatible with public trust thinking. Even moderately selective killing has a poor record of preventing predator damages (Knowlton *et al.*, 1999; Greentree *et al.*, 2000; Peebles *et al.*, 2013; McManus *et al.*, 2015; Wielgus & Peebles, 2014; Krofel *et al.*, in press). The allegedly most effective techniques for eliminating confirmed culprit predators thus far documented include the following: shooting lions *Panthera leo* L. over a carcass within 24h of a kill (Woodroffe & Frank, 2005) or acoustic mimicry of coyotes *Canis latrans* Say, 1823, followed by shooting those that arrive to investigate the caller (Sacks, Blejwas & Jaeger, 1999; Mitchell, Jaeger & Barrett, 2004). Neither has been subjected to experimental comparisons with non-lethal methods (reviewed in McManus *et al.*, 2015). The shortage of evidence for the effectiveness of killing predators to protect property or human safety should induce hesitancy among trustees to provide for this use. Under a fiduciary standard, trustees presented with evidence of inefficacy or counter-productive effects (Wielgus & Peebles, 2014) might prohibit the practice as a precaution. Finally, killing predators to protect private property is an unlikely public interest, but falls under the more general legal issue of 'takings' that often regulates conflicts between public interests and private title (Section II). If one cannot demonstrate a broad public interest in killing predators, then predator-killing becomes a competing, private use without priority.

Adopting public trust thinking sheds a different light on permit fees and payments for private uses of public assets. In the U.S.A., those seeking a pragmatic remedy to the status quo of preferential treatment of hunters in allocation of wildlife assets have argued that non-consumptive users should pay equivalent taxes and fees for bird feeders, binoculars, tripods, etc. as hunters pay for ammunition, permits, etc. Public trust thinking would suggest that taxes and

fees are levied for uses that deplete the asset or infringe on other protected public interests. Uses that do not deplete or even enhance the asset should be encouraged not taxed, in this view. Legally recognized private uses must be balanced with other legal uses. However, predator behavioural ecology complicates the search for balance between depleting and non-depleting uses….In sum, uses of predators that deplete the asset have the potential to reduce the success of later users over large areas for years. Although the quality and quantity of predator population depletion by human use is still genuinely debated, the conclusion that lethal use needs prudent and precautionary management has been made repeatedly for many predators (Whitman *et al.*, 2004; Balme *et al.*, 2010; Artelle *et al.*, 2013). Yet concerns have lately risen that government agencies are failing to apply the precautionary principle and prudent interventions (Bruskotter *et al.*, 2013; Chapron *et al.*, 2013; Vucetich *et al.*, 2013; Artelle *et al.*, 2014). We end this review with recommendations for prudent trustees to adopt precautionary management that prioritizes preservation of predators as trust assets.

VII. CONCLUSIONS

(1) Traditional wildlife conservation in the U.S.A. and western Europe, and particularly predator conservation, has been dominated by a constitutive process that favoured hunting and other forms of lethal management. Those traditions often led to abdication of governmental trust duties and eradication of predators over vast areas, contrary to public trust principles. However recolonization by several species of predators since the 1970s suggests that stronger public trust doctrines can prevent renewed cycles of eradication.

(2) In Section II and Appendix S1, we described the modern codification and vision of the environmental public trust. We distinguished and rejected a variant that expressed preference for narrow, lethal uses of wildlife. Public trust thinking demands disinterested trustees that take a broad public interest approach to allocating environmental assets to current and future generations, while keeping up to date with evolving legal and societal recognition of new and customary uses and accounting transparently and scientifically for the assets and their uses. A logical but idealized form of the public trust that holds governments to a fiduciary standard for environmental assets would demand stronger preservation by non-extractive use predominantly, 'prudent man' standards for allocations, and the strictest accounting standards involving the best available science. Improving trustee effectiveness will require equitable partnerships between trustees and scientists who are as insulated as possible from political and financial incentives for undemocratic allocations. Those partnerships must avoid the political misuse of scientific evidence and eliminate the current conflicts of interest inherent to agency capture by narrow interests. Governance reforms that address constitutive rules are needed in the U.S.A. and beyond to enforce the broad public interest in the environment.

(3) In Section III, we reviewed variable expressions of PTDs across jurisdictions and the abdication of trust duties for many predators in many U.S.A. states. We examined recent legal decisions that incorporated public trust principles for wolf preservation. In the U.S.A., we identified uncertain, legal application of the PTD and power struggles between the federal and state governments that together make a fiduciary trust for wildlife unlikely in the near future.

(4) In Sections IV–VI, we reviewed the essential role of scientific evidence from multiple disciplines in assisting a public trustee to account for predators transparently and quantitatively. We refined the oft-repeated call for interdisciplinarity in conservation sciences by explaining how scientific uncertainty often revolves around understanding and balancing legal and illegal uses by humans. That balance will require a sophisticated understanding of human cognition and action, wildlife behavioural ecology, and the sustainability of human uses that deplete the assets, as well as multiple criteria for evaluating the effectiveness of policy interventions.

(5) In Section IV, we reviewed genuine conceptual uncertainty about the sustainability of human-caused mortality. In Sections IV and V, we reviewed poaching research and the consequences of policy interventions for people's attitudes to predators and behaviour toward predators. In Section VI, we reviewed several aspects of behavioural ecology among sympatric humans and predators, which can complicate the trustees' tasks of balancing competing uses. To avoid tyrannies of the minorities or majorities who may demand depletion of unpopular, native wildlife, we recommend that trustees use the most prudent principles of scientific evaluation, precaution, and intergenerational equity to balance competing uses. We explain how lethal uses of predators need immediate scientific scrutiny to justify their proposed contribution to the public interest.

(6) We recommend public trust principles be applied to the appointment of trustees, separation of powers between trust managers (wildlife agencies) and trustee decision-makers, and judicial oversight and intervention when executive or legislative branches abdicate their trust obligations. Judges should not hesitate to review agency decisions if given evidence of mismanagement, unscientific accounting, or undemocratic decisions. The judiciary should not hesitate to examine scientific facts, using independent scientists it selects itself rather than the litigants' experts. Deference to agencies risks capture of the judiciary by narrow interests. Delegates of the government should adhere to the same legal standards of trust duties as the government. Universities with enforceable academic freedom will be essential in the face of political pressures to submerge or distort scientific findings. Without such reforms, public trust in science may dwindle and the credibility of scientific evidence in policy debates and legal proceedings may erode further. Regardless we expect predator policy will remain controversial and continue to test public trust in government." (Treves et al. 2017 Predators and the public trust".

2. Modern standards of evidence and scientific integrity in wild animal research were not met in the proposed rule. Below I include an abstract of that document but I draw the USFWS attention to the entire document for details.

"**Abstract**

This document is designed as a list of principles and expectations for gold standard research on wild animals. It is intended for those funders, scientists, peer reviewers, editors, publishers, or reporters who are supporting, conducting, reviewing, or communicating research to any audience. Stated simply, gold standard research aims for the strongest inference conducted with the highest standards of evidence and scientific integrity.

First, research should adhere to 4 essential principles of scientific integrity.

- **Transparency** is the clear and thorough explanation of all assumptions, methods, and steps in science. As a precondition and consistent pattern, every step in the research process should be clear and understandable to an educated lay audience. The principles of objectivity, reproducibility, and independent review depend on thoroughgoing clarity. Therefore, each of the following steps should pass its own test of transparency.
- **Objectivity** is "the ability to consider or represent facts, information, etc., without being influenced by personal feelings or opinions; impartiality; detachment" . Starting assumptions, worldviews, and presuppositions should be made explicit at the outset, beginning with anthropocentric or non-anthropocentric value judgments (does the researcher grant humans and nonhumans equitable consideration or place priority on humans or nonhumans?) In addition, the researcher should make clear if legal structures or institutional permits relating to property rights or responsibilities toward animals have shaped their research design and be explicit about which legal requirements act under what jurisdiction. Objective research almost always includes statement of opposed alternatives, as in "We tested x against its alternative(s) y and z" rather than "We tested the effectiveness of x". Also, y and z should be genuine plausible alternative explanations. Even for research that is not experimental, it is wise for scientists to keep in mind

alternative explanations for cause-and-effect or for the origins of natural phenomena throughout the research process. Note that some research on animals involves animals as interventions in addition to animals as subjects (e.g., predator-prey experiments). In such experiments, all of the recommendations in this document should be considered for both the treatment animals and the subject animals. For simplicity, we refer to subjects below for all animals involved in research.

- **Reproducibility** is the quality of a scientific finding that can be replicated by other scientists under the same conditions as the original: Independent scientists should be able to follow written descriptions of research methods to replicate every step and the findings, given sufficient resources and equipment. Facilitating reproducibility is a responsibility of the original researcher and they should welcome oversight of that facilitation and welcome efforts at replication, including sharing materials, techniques, and raw data no matter how intellectual property is conceived and despite rivalry or interpersonal animosities. Failure to reproduce is a bad sign for the evidentiary strength of the original research if the effort at replication is done in good faith with care. There are three categories of reproducibility: exact, technical, and conceptual. Exact reproducibility requires every step in the original process be replicated identically, which is rare because the location, timing, materials, individuals, etc. might be influential on the findings and might differ in the subsequent replication efforts. Failure to replicate under exact reproducible research suggests the original findings were misleading. Technical reproducibility is more common and consists of replicating with very close approximations of all methods. Failure to replicate under such circumstances might require review of the described methods and repetition by one or both parties. Finally, conceptual reproducibility aims to replicate the findings by a different cause-and-effect pathway or using different methods. Such efforts can be powerfully confirmatory of underlying biological mechanisms exposed by the original research. Failure to replicate might indicate the causal mechanism was misidentified by the original researchers or the subsequent researchers erred.
- **Independent review**: Before data collection, scientists should subject the proposed methods to scrutiny and subject their own interpretation of data after their collection to scrutiny. Publicizing scientific communications prior to independent review is a questionable practice, although this is an evolving debate in the literature on pre-publication review. The scrutiny of methods and scrutiny of interpretations should be undertaken by qualified parties with an arm's length relationship to the researcher and without conflicts of interest about the scientists conducting the research or their findings. Conflicts of interest relate mainly to financial or career advancement issues, not to differences of opinion. Researchers should welcome review by experts in their field, not side-step such review by omitting citation to such experts or by explicitly discouraging those experts as reviewers. Peer reviewers should also follow the steps in this document, particularly for transparency and objectivity. Reviewers, editors, and publishers also have specific responsibilities for the quality of scientific communications. The specific responsibilities relate to maintaining the quality of the scientific record long after a particular scientific communication has been made public and passed review (See the 2019 guidelines of the Committee on Publication Ethics (COPE here(accessed 30 June 2019). Researchers have primary responsibility for correcting, retracting, or publicly expressing diminished confidence in their own scientific communications no matter how old they might be. The broader scientific community has secondary responsibility for cleaning the scientific record if credible evidence surfaces of omissions, errors, or misconduct (fabrication, falsification, or plagiarism). Efforts by any party to silence critics or ignore qualified criticisms are unacceptable. Efforts to retaliate against critics should lead oversight organizations to investigate possible misconduct by the retaliators (See the National Academies 2017 recommendations on fostering scientific integrity here (accessed 30 June 2019).

Second, consider the gold standard for strength of inference.

- **Randomized, controlled experiment**: Researchers should randomly select the subjects who receive treatment and those who receive no treatment (control conditions). Any departures from

fully random selection should be documented and justified. If the treatment involves interventions that are presumed to have no effect in addition to the effective treatment, the control conditions should also include those interventions, e.g., placebo controls. Only the presumed effective component of the treatment should differ between treatment and control conditions, lest uncertainty about the effectiveness of treatment reduce the strength of inference.

- **Lesser standards**: We accept the rare need to study wild animals using the lower silver or bronze standards because some sociopolitical or biophysical settings preclude gold standard experiments. Such situational constraints should be rare. These lower standards lower confidence in the results by 50% or more. Silver standard or lower research is affected by uncontrolled factors that weaken inference. Many such factors can intrude. For example, the silver standard of before-and-after comparisons introduces the variable of time passing, because all subjects receive the treatment and its effect on subjects are followed over time. The bronze standard of correlational or observational study introduces many such potentially misleading factors because the researcher did not exert control over the intervention timing, magnitude, design, or the subjects receiving it.
- **Higher standards**: We defined the higher platinum standard that strengthens inference beyond the gold-standard of randomized, (placebo) controlled experiments without bias (see below for more on bias). The platinum standard includes both cross-over design and some level of blinding. Cross-over design requires the reversal of treatment and control within subjects. Because of randomization, some subjects will begin as placebo controls and others in treatment conditions, but all subjects will reverse to the other condition at approximately the same time midway through the experiment. A third reversal further strengthens inference about the effect of treatment. Blinding refers to concealing aspects of the experiment from different persons responsible for different portions of the research team or from reviewers, as we explain next.
- **Single-, double-, triple-, or quadruple-blinding**: Blinding is a design element intended to further reduce possible intentional or unintentional bias by researchers. The amount of blinding (single-, double-, triple-, or quadruple-) refers to how many steps in the experiment are concealed from researchers or reviewers. The steps that might be blinded include: (i) those intervening randomly should be unaware of subject histories and attributes and should not communicate which subjects received the control or treatment intervention to others in the research team (this depends on having used an undetectable intervention); (ii) those measuring the effects are unaware of which intervention the subject received (this too depends on having used an undetectable intervention); (iii) those interpreting results are unaware of which subjects received treatment or control; and (iv) those independently reviewing results are unaware of which subjects received treatment or control and unaware of the identity of the scientists who will or have conducted the research. Because science knows no authority, only evidence, blinding independent reviewers to conceal all unnecessary information might avoid several forms of bias (below). Note that blinding steps (ii) and (iii) might be feasibly done by the same set of people but the role in step (i) should be separate from all other roles to assure the success of blinding, and the role in step (iv) should be separate from all other roles to meet the criterion of independence.

Third, consider potential biases (intentionally or unintentionally slanting evidence to favor or disfavor one hypothesis or treatment) especially when it favors the scientist's preferred result.

- **Selection or sampling bias and selecting a suitable sample of subjects**: Any research on animals should consider the minimum number of subjects needed to detect an effect of intervention (treatment), while at the same time minimizing the infringement on the lives of those animals. Hence sample size is both a scientific and ethical decision that should be made transparently and subject to external review (see above). Once the appropriate number of subjects has been identified, selection of which subjects to investigate demands the utmost care to prevent self-selection bias and researcher bias, both of which might lead to treating subjects likely to show an effect of treatment. Self-selection and researcher bias are forms of selection bias that are very

common and pernicious sources of unreliable findings. Random assignment is recommended to avoid the worst form of bias, which is systematic error in favor of a preferred results. When randomization is impossible, the next best procedure is blinding the selection and choosing subjects haphazardly without regard to their attributes or history and without regard to the potential effects of treatment or control.

- **Treatment bias**: This bias arises when placebo control or treatments are applied without regular, consistent intervention methods (e.g., haphazard doses of a medicine). The worst form of treatment bias is systematic for a favored result, when the timing, magnitude, or quality of the intervention is tailored to the history, attributes, or susceptibility of the subjects. Blinding (see above), standardized intervention protocols, and registered reports (see below) are reliable defenses against treatment bias.
- **Measurement bias**: This bias arises when measurement methods are inconsistent, imprecise, or inaccurate. The worst form of systematic bias arises when measurements are tailored to the history, attributes, or susceptibility of the subjects. Blinding (see above), standardized measurement protocols, and registered reports (see below) are reliable defenses against measurement bias.
- **Reporting bias**: This bias arises when analysis, of data, interpretation of results, or scientific communications misrepresent research methods or findings. The worst form arises when the reporting favors the scientists' preferred outcomes and naturally this is the most common form. Blinding (see above), standardized analysis protocols, and registered reports (see below) are reliable defenses against reporting bias.
- **Independent review and publication bias**: This bias arises when independent reviewers are favorably or unfavorably disposed toward the scientists, their results, or the nature of the scientific communications arising from the research. The worst form (and most common) arises when reviewers, editors, or publishers have an interest in findings or the power structures that might be affected by findings. A related form of independent review bias arises after scientific communications are made public, when critics try to silence or retaliate against the scientists who made those communications. Criticism should be welcomed but silencing or retaliating against scientists is unacceptable. The best defense against bias in independent reviews is the registered report and concealing the identity of authors from their peer reviewers. Registered reports are a new tool spreading in the scientific peer-reviewed journals. It adds an initial round of peer review of methods prior to data collection. If the first round of peer review accepts the methods, the journal commits to publish the findings regardless of the outcome, as long as no substantive changes in methods occurred after the first round of peer review. Registered reports guard against a publication bias that favors novel, striking results and disfavors confirmatory, replication efforts, while simultaneously guarding against reviewer bias that can favor or disfavor findings based on non-objective preferences of the reviewers." Treves, A. (2019) Standards of evidence in wild animal research. Report for the Brooks Institute for Animal Rights Policy & Law. 30 June 2019, available at http://faculty.nelson.wisc.edu/treves/CCC.php/standards .

In sum, I hope these resources and excerpts help the USFWS to prepare draft biological reports that aim for the highest possible standards of evidence and scientific integrity, before proposing policy changes that should flow from the evidence. Thanks for your attention,

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