BEFORE THE UNITED STATES DEPARTMENT OF THE INTERIOR
DATA QUALITY OFFICIAL

GARFIELD COUNTY, COLORADO	)	**Data Quality Act Challenge**
GRAND COUNTY, COLORADO	)	**to U.S. Department of the Interior**
JACKSON COUNTY, COLORADO	)	**Dissemination of Information**
MESA COUNTY, COLORADO	)	**Presented in the Buffer Report**
MOFFAT COUNTY, COLORADO	)	
RIO BLANCO COUNTY, COLORADO	)	
CARTER COUNTY, MONTANA	)	
FALLON COUNTY, MONTANA	)	
FERGUS COUNTY, MONTANA	)	
MCCONE COUNTY, MONTANA	)	
MUSSELSHELL COUNTY, MONTANA	)	
PHILLIPS COUNTY, MONTANA	)	
PRAIRIE COUNTY, MONTANA	)	
RICHLAND COUNTY, MONTANA	)	
TOOLE COUNTY, MONTANA	)	
YELLOWSTONE COUNTY, MONTANA	)	September 14, 2015
ELKO COUNTY, NEVADA	)	
EUREKA COUNTY, NEVADA	)	
DUCHESNE COUNTY, UTAH	)	
UINTAH COUNTY, UTAH	)	
WESTERN ENERGY ALLIANCE	)	
AMERICAN EXPLORATION & MINING	)	
ASSOCIATION	)	
COLORADO MINING ASSOCIATION	)	
COLORADO WOOL GROWERS ASSOCIATION	)	
INDEPENDENT PETROLEUM ASSOCIATION	)	
OF AMERICA	)	
INTERNATIONAL ASSOCIATION OF	)	
DRILLING CONTRACTORS	)	
MONTANA ASSOCIATION OF OIL, GAS &	)	
COAL COUNTIES	)	
MONTANA ASSOCIATION OF STATE	)	
GRAZING DISTRICTS	)	
MONTANA PETROLEUM ASSOCIATION	)	
NEVADA MINING ASSOCIATION	)	
PETROLEUM ASSOCIATION OF WYOMING	)	
PUBLIC LANDS COUNCIL	)	
UTAH MULTIPLE USE COALITION	)	
	)	
Petitioners,	)	
	)	
v.	)	

THE U.S. DEPARTMENT OF THE INTERIOR.)
)

CHALLENGE PURSUANT TO THE DATA QUALITY ACT

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I. Introduction

The counties and organizations listed above (the "Petitioners") hereby submit this Challenge for Correction of Information ("Challenge") related to the November 21, 2014, United States Geological Survey ("USGS") "Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review"[1] (the "Buffer Report"). The Buffer Report compiles and summarizes various Greater Sage-Grouse ("GRSG") related studies evaluating the impacts of six types of disturbances to its habitat including: cumulative surface disturbance, linear features, energy development, tall structures, low structures, and activities without habitat loss (noise).

The Buffer Report was disseminated by the Bureau of Land Management ("BLM") in citation in Land Use Plan Amendments for GRSG and by USGS.[2] A number of serious flaws exist with the Buffer Report that, if implemented, will have enormous social and economic

[1] Manier, D.J., Bowen, Z.H., Brooks, M.L., Casazza, M.L., Coates, P.S., Deibert, P.A., Hanser, S.E., and Johnson, D.H., 2014, Conservation buffer distance estimates for Greater Sage-Grouse—A review: U.S. Geological Survey Open-File Report 2014–1239, 14 p., http://dx.doi.org/10.3133/ofr20141239

[2] Final Environmental Impact Statements were released for California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah and Wyoming. Available at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse/final_eiss.html.

consequences to Petitioners and the West without commensurate benefits to GRSG populations and habitat.

This Challenge is submitted pursuant to the U.S. Department of the Interior ("DOI") Federal Information Quality Act (44 U.S.C. § 3516) ("Data Quality Act," or "DQA"), and the "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information disseminated by Federal Agencies" issued by the Office of Management and Budget (67 Fed. Reg. 8452 (Feb. 22, 2002) ("OMB Guidelines")), as well as the "Information Quality Guidelines" of the U.S. Department of the Interior (67 Fed. Reg. 50687 (Aug. 5, 2002) ("DOI Guidelines")), and Presidential memoranda and secretarial orders on scientific integrity and transparency as discussed below.

The Petitioners have reviewed the Buffer Report and found it to be based in error and opinion rather than reproducible data and methodology, and is therefore unreliable and in violation of the DQA and the Guidelines. The DQA, Section 515 of the Treasury and General Government Appropriations Act of FY 2001 (Public Law 106-554) requires federal agencies to ensure and maximize the quality, objectivity, utility, and integrity of information, including statistical information disseminated by federal agencies on or after October 1, 2002.

Therefore, Petitioners request DOI retract the Buffer Report and all reliance thereon in existing and subsequent agency land use plans and amendments, decisions on permits, authorizations, and the listed status of GRSG under the Endangered Species Act ("ESA"). Alternatively, DOI could issue an amended Buffer Report that uses sound analytical methods and the best data available, including specifically the information omitted in the current Report and referenced herein, ensuring transparency and objectivity in the information disseminated.

The information disseminated should be corrected upon consideration of the most recent or thorough information from stakeholders, the public and the scientific community. This challenge constitutes the most recent and thorough information such that DOI should retract or amend the Buffer Report accordingly.

II. The Buffer Report Violates the Quality, Objectivity, Utility and Integrity Standards of the DQA and its Guidelines

OMB Guidelines implement § 3504(d)(1) of the Paperwork Reduction Act ("PRA"). 44 U.S.C. § 3516. Section 3504 (d)(1) requires that "with respect to information dissemination, the [OMB] director shall develop and oversee the implementation of policies, principles, standards, and guidelines to apply to Federal agency dissemination of public information, regardless of the form or format in which such information is disseminated...."[3]

For conservation actions to be effective for GRSG, prescriptive buffers are not the answer. Instead, threats must be distilled into their basic cause and effect mechanisms and then addressed through specific measures (Ramey *et al.* 2011). The studies contained in the Buffer Report did not test buffers, rather they documented use by male GRSG at 8 km (5 mi), or distance from lek to nesting habitat 5 km (3.1 mi). There is no evidence that this range of buffer distances will result in quantifiable population level benefits to GRSG. As with all buffer distances, they are based on the frequently repeated and erroneous assumption that avoidance or decline in male lek attendance equates to population declines. Moreover, the authors failed to consider that regional climate and weather variation is the primary driver leading to population changes rather than human disturbance (*see* Blomberg *et al.* 2012, and Guttery *et al.* 2013).

[3] 44 U.S.C. § 3504(d)(1).

Both the DQA and the Guidelines require agencies to "ensure and maximize" the quality, objectivity, utility, and integrity" of information disseminated by federal agencies.[4] "Utility" refers to "the usefulness of the information to its intended users, including the public."[5] For the reasons discussed herein, the Buffer Report fails to meet quality, objectivity, utility and integrity standards of the DQA, the Guidelines and the additional authorities cited herein.

The Buffer Report was prepared at the request of BLM in order to inform land managers and others interested in including buffer distances as part of their conservation efforts. It is organized by disturbance type with a short discussion and summary of the minimum and maximum observed effect for each disturbance category. Table 1 depicts the lek buffer estimates made by the authors of the Buffer Report and the minimum and maximum values for observed effects to GRSG found in the literature (i.e. "literary minimum or maximum") reviewed by the authors of the Buffer Report, and then provides the authors' "interpreted" buffer range.

The Buffer Report: (1) was developed with unsound research methods including failure to disclose how the "interpreted range" of buffers was reached, and is therefore not reproducible; (2) ignores scientific studies that do not support its conclusions; (3) reaches conclusions that are pure conjecture; and (4) disseminates information that is neither objective nor reliable and that lacks scientific integrity.

There was no hypothesis testing whatsoever. Instead, the authors relied on subjective post-hoc interpretation of results. Three of the key studies used to delineate the minimum and maximum distances (Johnson *et al.*, Blickley *et al.*, and Holloran and Anderson 2005) contain serious technical and statistical flaws, and misleading conclusions. *See* Exhibit A. Further, research designs were chosen to yield desired outcomes rather than objectively test alternative

[4] DQA §515(a), OMB Guidelines, § 11(2), 67 Fed. Reg. at 8458.
[5] OMB Guidelines V(2). 67 Fed. Reg. at 8459.

hypotheses, and ranged from the use of misrepresentation of results (Holloran and Anderson 2005), to using smoothing in order search for patterns in the data that do not have any statistical significance (i.e. Johnson *et al.*), to using inadequate equipment (Blickley *et al.*), discussed in more detail below. *See also* Exhibit A.

For all of the reasons discussed herein, the Buffer Report fails to meet quality, objectivity, utility and integrity standards of the DQA, the Guidelines and the additional authorities cited herein. Accordingly, Petitioners ask DOI to correct, retract or supplement information referenced in the Buffer Report and also seeks to ensure that all information disseminated by DOI meets the requirements of the DQA and the Guidelines.

A. The Buffer Report is Not Transparent

The OMB Guidelines require a high degree of transparency for influential information such as the Buffer Report. Transparency equates to disclosure of the "data and methods of analysis" such that replication of results could be achieved.[6] Peer review of original and supporting data and results "does not necessarily imply that the results are transparent and replicable."[7]

Here, neither the Petitioners nor the public have access to information that is integral to the underlying studies and the models upon which they depend.

B. The Buffer Report is Not Reproducible

OMB explained in its February 22, 2002, agency-wide guidelines that the "general standard" for robustness checks is "that the information is capable of being substantially reproduced, subject to an acceptable degree of imprecision."[8] The more important the

[6] OMB Guidelines V(3)(b)(ii).
[7] OMB, Guidelines *for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, http://www.whitehouse.gov/omb/fedreg_reproducible.
[8] 67 Fed. Reg. 8452, 8457 (Feb. 22, 2002).

information disseminated, the more rigorous the standard.[9] Since the underlying data from which the Buffer Report is based is not disclosed, and the authors of the Buffer Report do not explain how the "interpreted buffer range" was delineated for each of the categories of disturbance, the conclusions in the Buffer Report are not reproducible.

As an example, the data used in Holloran and Anderson 2005 are not public so their results are not reproducible. Additionally, Holloran and Anderson 2005, and Holloran 2005, which is referred to for additional detail, did not identify any of the leks by name or identifier that could be used to trace their locations through the State of Wyoming's GRSG database. Moreover, the only source of information on leks, Figure 1 of Holloran 2005, only portrays 21 leks on a map at low resolution. It is never explained how both Holloran 2005 and Holloran and Anderson 2005 claim that female GRSG were captured from "30 relatively undisturbed leks throughout central and western Wyoming" but not provide any further information on the name and approximate location of leks. One can only wonder where the other nine study leks were located. Thus, the location of leks where females were captured, when they were captured, the habitat they were captured and nested in, the proximity to other leks, and GRSG density, are all undisclosed precluding any replication of results. These facts render the results of Holloran and Anderson 2005 irreproducible.

The Buffer Report is highly influential, in that it "will have or does have a clear and substantial impact on important public policies or important private sector decisions."[10] The Buffer Report is controversial with significant interagency interest from FWS, BLM and United

[9] OMB Guidelines V10.
[10] *See* OMB Guidelines V(9).

States Forest Service ("USFS").[11] BLM and USFS have adopted the recommendations found in the Buffer Report into several of their GRSG land use plan amendments.[12]

C. The Buffer Report Lacks Objectivity

OMB guidelines state that information will generally be presumed to be objective if data and analytic results have been subjected to formal, independent peer review; however, this presumption is rebuttable "based on a persuasive showing by a petitioner in a particular instance."[13] DOI's Information Quality Mission Statement provides, in pertinent part:

> "In order to ensure the accuracy and integrity of its published scientific information, DOI follows a robust peer review process wherein the information undergoes internal peer review and is subject to public scrutiny. DOI, its bureaus and offices, and the National Invasive Species Council maintain the highest standards possible for published information to ensure integrity and transparency."[14]

Peer review of the Buffer Report was not subject to any public scrutiny whatsoever. DOI Guidelines require not only that information be consistent with the Guidelines, but that the agency maintain an administrative record of review proceedings.[15] For influential information, DOI commits to provide "more rigorous review of the conclusions than the review performed by the originating office."[16] USGS has not issued any such records for the Buffer Report and has certainly provided no evidence of the rigorous review required.[17]

Government-wide guidance to peer review of government science is established in the "*Final Information Quality Bulletin for Peer Review*" issued by the Office of Management and

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[11] U.S. Office of Management and Budget, *Final Information Quality Bulletin for Peer Review*, at 23 (2004) (hereinafter *OMB Bulletin*) *available at* http://www.whitehouse.gov/sites/default/files/omb/assets/omb/memoranda/fy2005/m05-03.pdf.

[12] Final Environmental Impact Statements were released for California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah and Wyoming. Available at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse/final_eiss.html.

[13] 67 Fed. Reg. 8452, 8454 (Feb. 22, 2002).

[14] Chief Information Officer, DOI Information Quality Mission Statement, http://www.doi.gov/archive/ocio/iq.html (last updated Oct. 21, 2010).

[15] DOI Guidelines II.5.

[16] *Id*.

[17] *See*, USGS Peer Review Agenda, available at: www.usgs.gov/peer_review (last visited August 27, 2015).

Budget ("OMB") of the Executive Office of the President (the "OMB Peer Review Bulletin").[18] The OMB Peer Review Bulletin provides detailed guidelines for peer review of influential scientific information and applies more stringent peer review requirements to highly influential scientific assessments. It includes guidance on what information is subject to peer review, the selection of appropriate peer reviewers, opportunities for public participation and related issues. Such is clearly applicable to the Buffer Report.

The USGS Manual defines scientific assessments as, "[E]valuation of a body of scientific or technical knowledge which typically synthesizes multiple factual inputs, data, models, assumptions, and/or implies best professional judgment to bridge uncertainties in the available information."[19] The Buffer Report clearly qualifies as a highly influential scientific assessment. As such, USGS is to provide a peer review agenda for such information.[20]

In violation of the DQA, the OMB Peer Review Bulletin, the Guidelines and the USGS Manual, we find no reference to the Buffer Report or to USGS papers relied upon within the Buffer Report on the USGS Peer Review Agenda.[21]

Where USGS disseminates influential scientific information or highly influential scientific assessments, OMB Peer Review Bulletin requirements must be met.[22] Such was not the case here. Information adopted and disseminated by USGS allegedly, "passes through many quality assurance reviews, including rigorous peer review, prior to approval and release to ensure the reliability, objectivity, and integrity of the information."[23] Such was not the case with the Buffer Report.

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[18] DOI Guidelines II.5.
[19] http://www.usgs.gov/usgs-manual/500/500-25.html.
[20] *See*, USGS Peer Review Agenda, available at: www.usgs.gov/peer_review (last visited August 27, 2015).
[21] *Id*.
[22] USGS Manual 502.3.4.E.
[23] USGS Guidelines III.3.

In reference to its peer review planning process requirements, DOI directs readers to links to its agencies' websites. Notably, the USGS peer review link contains absolutely no reference to peer review on the Buffer Report.[24] On a related note, we question whether USGS demonstrated in a Paperwork Reduction Act submission to OMB that the proposed collection of information in the Buffer Report was collected, maintained and used consistent with the DQA Guidelines.[25]

Chapter 502.3 of the USGS Manual, "Fundamental Science Practices: Peer Review" was established on December 16, 2011, by the Office of Science Quality and Integrity.[26] The purpose and scope of Chapter 502.3 of the USGS Manual provides:

> Peer review, as a cornerstone of scientific practice, validates and ensures the quality of published USGS science. This policy updates the Fundamental Science Practices (FSP) requirements for peer review of USGS information products and applies to all USGS scientific and technical information, whether published by the USGS or an outside entity.[27]

These provisions clearly apply to the Buffer Report. The Buffer Report, however, was compiled of only a limited variety of sources and without adherence to established peer review standards, as described herein, the required safeguards were totally lacking.[28]

D. The Buffer Report is Not Based on the Best Available Science

The Buffer Report failed to meet DQA standards for the best available data. Agencies are directed[29] to adopt congressional standards of scientific integrity stemming from the Safe Drinking Water Act ("SDWA");[30] for agency action based on science, the SDWA standards must entail:

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[24] USGS Peer Review Agenda, available at: www.usgs.gov/peer_review (last visited August 27, 2015).
[25] DOI Guidelines VI.
[26] *See*, http://www.usgs.gov/usgs-manual/500/502-3.html.
[27] *Id.*
[28] *See*, USGS Manual 502.3.5.C.
[29] OMB Guidelines V3.b.ii.B.ii.C.

> (i) the best available, peer-reviewed science and supporting studies conducted in accordance with sound and objective scientific practices; and (ii) data collected by accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies use of the data).[31]

The Buffer Report and the studies cited therein fail to meet the best available science standards, discussed in detail herein. Significant uncertainties are ignored and conjecture and opinion are presented as facts. Generally, the Buffer Report is speculative in terms of effectiveness, based on subjective interpretation of results, selective citation of information, contains misuse of citations, relies on opinion rather than the scientific method, lacks peer review and a lack of reproducibility, and does not address the primary cause and effect mechanisms limiting GRSG, and will likely do nothing for the GRSG by promoting passive rather than active management, discussed in detail below. *See also* Exhibit A.

Executive Order 13562 also requires that regulations "must be based on the best available science" and that costs of regulation are clearly justified by the benefits.[32] In this case, USGS cannot possibly justify the alleged benefits of the buffer range recommended in the Buffer Report, (discussed in detail below and in the attached Exhibit) against the dramatic societal costs they would entail. USGS is directed to select approaches that impose the least burden on society and to identify alternatives to direct regulation. Here, USGS did not even attempt to do so.

Unfortunately, the Buffer Report does not qualify as a comprehensive review of all of the available scientific literature about conservation of the species. Instead, it provides a limited and selective review of the scientific literature and subjective post-hoc interpretations of analytical results. No hypothesis testing occurred. As a result, outdated information and beliefs are

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[30] 42 U.S.C. § 300g-1(b)(3)(A).
[31] Available at: http://www.whitehouse.gov/omb/fedreg_reproducible.
[32] Federal Register, Vol. 76, No. 14 (January 21, 2011) at 3821. Executive Order 13563: Improving Regulation and Regulatory Review, http://www.gpo.gov/fdsys/pkg/FR-2011-01-21/pdf/2011-1385.pdf.

perpetuated in the Buffer Report, and all resulting agency reliance thereon by BLM, USFS and FWS are in violation of the DQA, the Guidelines and this presidential direction to the agencies.

Table 1 lists the minimum and maximum distances where observed effects to GRSG were reported in the literature, along with the authors' interpreted range of possible buffer distances "based on multiple sources" (*see* Buffer Report at 14). However, the interpreted buffer distances in Table 1 are not cited nor is the methodology described at how these distances were reached. Only the section on cumulative surface disturbance described how the authors arrived at the interpreted range of buffers, leaving the reader to guess how the rest of the distances were "interpreted." A lack of a clearly defined, repeatable methodology for interpreting buffer distances is a major failing of the Buffer Report.

Regardless of how the authors of the Buffer Report reached their "interpreted range," as with all buffer distances, they are based on the frequently repeated and erroneous assumption that avoidance or decline in male lek attendance equates to population decline.

Further, limitations in the underlying studies was not addressed in the Buffer Report, which is concerning because significant statistical, technical, and methodological flaws exist in three of the key studies cited in the Buffer Report, discussed in detail below. For example, Blickley *et al.* 2012, which was cited for the minimum effect distance for linear features and activities without habitat loss in Table 1, was found to be lacking in design and execution with methodological bias and substandard equipment and methodologies.[33] Furthermore, no population-level effect was documented by the researchers.

[33] This study was reviewed as part of DQA Challenges alleging that the USGS Sage-grouse Monograph, FWS COT Report, and BLM NTT Report were compromised by bias, selectivity, and conflicts of interest, among other issues.[33] The DQA Challenges are incorporated herein by reference. (*See* NTT DQA Challenge at 2-4).

The use of the studies described herein to delineate minimum and maximum effect size is thus, inappropriate and compromises the quality, integrity, utility and objectivity of the Buffer Report. The remaining studies to delineate minimum and maximum buffers are discussed below.

1. The Buffer Report Perpetuates Subjective Interpretation of Results

Much like BLM's National Technical Team Report ("NTT Report"), and the U.S. Fish and Wildlife Service's ("FWS") Conservation Objectives Team Report ("COT Report"), the Buffer Report perpetuates subjective interpretation of results. The studies cited in the Buffer Report did not test buffers; rather they attempted to quantify male GRSG habitat use at 8 km (5 mi), or by the distance from leks to nesting habitat 5 km (3.1 mi). However, as discussed in greater detail below, many of the results reported were not statistically significant but interpreted as if they were. Rather, the authors simply stated their opinions about buffer distances, and are cited in subsequent documents as if they were results. There was no evidence that this range of buffer distances would result in any quantifiable population-level benefit to GRSG.

While the authors of the Buffer Report discuss the effects of disturbance types and report a wide range of minimum and maximum distances, the "interpreted range" for three of the six categories appears to be based upon two principal factors: 1) the potential effect area at 5 km (3.1 mi); and 2) the potential distribution of male habitat use at 8 km (5 mi). Selection of these categories was driven by non-scientific considerations rather than data-driven hypothesis testing and statistically significant results.

A major failure of the Buffer Report is that the authors recognize that variation in habitat and other factors exist across the range, thus a one-size-fits-all distance is inappropriate (Buffer Report at 1), but then recommend the use of buffers anyway. This is a major failure because buffers, regardless of their size, fail to account for non-uniform habitat conditions such as

naturally fragmented habitats. Northwest Colorado and other areas provide many examples where GRSG habitat is naturally fragmented by geological features like cliffs and canyons, and ecological features such as non-habitat areas of large stands of Aspen or coniferous dominated ecosystems. In instances like these, a lek may be separated by a 3,000 foot drop in elevation from the potential disturbance but still fall within the no surface occupancy buffer range.

2. The Buffer Report is Misleading

There are at least four instances where the authors of the Buffer Report mischaracterize/misrepresent the conclusions of the cited studies. Therefore, these papers cannot be relied upon as the basis for management decisions or recommendations in the Buffer Report without violating the DQA.

Stiver *et al.* 2006 is cited in the discussion of linear features and the impacts of linear features, specifically roads on GRSG. Importantly, it appears that Stiver *et al.* 2006 has been misrepresented in the Buffer Report. The authors state in the Buffer Report:

> "Regional assessments (sage-grouse management zones, MZs; see Stiver and others 2006) indicated downward trends in northern Great Basin (MZ4 and a portion of MZ5) populations when road density within 5-km (3.1 mi) radius of a lek exceeded 30 km (18.6 mi)."

However, Stiver *et al.* 2006 do not discuss population trends related to road density at all.

Another example of the Buffer Report misrepresenting the findings of cited studies relates to the discussion of tall structures, stating "according to estimates, the greatest potential impact to GRSG nests occurs within 570 m (0.35 mi) of structures," citing Howe *et al.* 2014.

However, the above statement does not adequately represent the findings of Howe *et al.* 2014. Howe *et al.* 2014 conducted a resource selection analysis to study the effects of anthropogenic structures and landscape vegetation characteristics on probability of raven nest site selection, and measured variables at three spatial scales based on movements of breeding

ravens: 570 m (average distance ravens travel from nest, Boarman and Heinrich 1999); 6.6 km^2 (home range, Smith and Murphy 1973); 40 km^2 (territory size for breeding ravens, Bruggers 1988). Each spatial extent was buffered consisting of 570 m; 1,450 m; and 3,590 m centered on each raven nest monitored creating surface areas of 102.1; 660.5; and 4048.9 ha, respectively. With respect to the 570 m buffered area the authors found that an increase in 1 km of edge within the 570 m buffered area (i.e. 102.1 ha) increased the probability of raven nesting by 49 percent.

While the Howe *et al.* 2014 indicates that ravens are more likely to select nest sites closer to transmission lines and closer to edges of different land cover types, the authors did not discuss GRSG related variables such as presence/absence, nesting habitat, fate of GRSG nests, or lek information. Therefore the statement made in the Buffer Report that the greatest potential impact to GRSG nests occurs within 570 m (0.35 mi) of structures is misleading because no GRSG data were included in the study.

Yet another example relates to the discussion on low structures. The maximum literary distance listed in Table 1 is 5.1 km (3.2 mi) citing Stevens *et al.* 2012. However, Stevens *et al.* 2012 does not support the distance listed in Table 1.

Stevens *et al.* 2012 studied GRSG fence collision in breeding habitat and modeled relationships between fence collisions, biological, topographic, and technical features at multiple scales. Site-scale modeling suggested collision may be influenced by technical attributes of fences, and broad-scale modeling suggested relative probability of collision was influenced by region, a terrain ruggedness index (TRI), and fence density per square km. The number of collisions was also influenced by distance to the nearest active lek. Based on the modeling conducted by Stevens *et al.* 2012, mitigation such as fence marking, moving or changing materials to those that are more easily visible to flying GRSG should occur in areas with

moderate-high fence densities (>1 km/km2), within 2 km of active leks, and with flat to gently rolling terrain, which is consistent with the interpreted lower buffer distance listed in Table 1 (albeit not cited).

However both the interpreted maximum buffer and the cited literary maximum of 5.1 km (3.2 mi) do not appear to be supported by Stevens *et al.* 2012, especially in light of the fact that fence marking has been shown to be a highly effective mitigation measure.

Importantly, Table 1 cites Holloran and Anderson 2005 for the literary minimum distance at which negative effects were observed for cumulative surface disturbance at 3.2 km (2 mi), at which adverse effects were observed. Specifically, Holloran and Anderson 2005 use the results of statistical tests involving data gathered on GRSG lek-to-nest distances, nest-to-nest distances, and nest success, to justify a number of sweeping management recommendations that are unrelated to the few statistically significant results, discussed in detail throughout.

According to the authors, the study was carried out in areas "free of large scale habitat conversions" and "areas fragmented by oil and gas development were removed from consideration." Therefore, the recommendations made concerning buffers from human disturbance/activity are nothing more than unsupported opinions. This is important because the authors of the Buffer Report make the following statement:

> The smallest effect distance (3.2 km [2 mi] from a lek) described by Naugle and others (2011) was **previously described and tested in field research by Holloran and Anderson (2005)** and Walker and others (2007); **these studies were designed to evaluate the effectiveness of existing stipulations** (Buffer Report at 5, emphasis in bold).

Holloran and Anderson 2005 did nothing of the sort. According to Holloran and Anderson 2005 areas fragmented by oil and gas were not considered in the study, and the study area was located in area free of large scale disturbances. Holloran and Anderson cannot be used to

delineate the minimum effect size because they did not measure the effect of disturbance or explain how a buffer would prevent adverse impacts to GRSG. Rather the authors measured the density of nests within a specified area and documented nest fate, then made unsubstantiated recommendations based on misrepresentation of their own results.

The Buffer Report does not represent the best available science and is in violation of the DQA because it misrepresents the findings of the above studies. USGS must correct these misrepresentations accordingly.

Petitioners find these mischaracterizations concerning. Adding to this concern is the reliance on Holloran and Anderson 2005 because Holloran and Anderson 2005 presented their results in the discussion in a way that suggest they represented trends, and supported hypotheses, despite their obvious lack of statistical significance. *See* Exhibit A. For example, the authors present statistically insignificant results as if they represented a biologically significant tendency.

For the reasons described herein the Buffer Report must be corrected and the above mischaracterizations removed, otherwise the Buffer Report fails to meet the standards of the DQA.

3. Conclusions are Not Supported

The underlying studies to the Buffer Report contain methodological and/or statistical flaws, were not reproducible (because the data is not public), were mischaracterized in citations (discussed above), or have limited applicability (*See* NTT Report and COT Report DQA Challenges Exhibit B at 1, 13, and 20-21).[34] For example, with respect to population persistence, the results of Aldridge *et al.* 2008 are extremely limited and suggest that fringe populations are more at risk of extirpation than core populations. However, the loss of fringe populations has not

[34] Available at: http://www.westernenergyalliance.org/knowledge-center/wildlife/greater-sage-grouse/DQA-Challenge.

been shown to have any overall impact on the persistence of GRSG range-wide. Furthermore, more recent genetic research by Bush 2009 demonstrates even fringe populations have been sustaining. The assumption that the loss of a fringe population will adversely impact the species as a whole is erroneous.

4. Poorly Understood Populations

Poorly understood populations are assumed to require the same buffer protections based on unsupported and speculative generalizations. The authors of the Buffer Report note that "[t]he need for protection of populations that are not well understood requires some generalization…" (Buffer Report at 4), however, they fail to recognize such generalizations are simply untested conjecture and speculation.

Notwithstanding this data gap, or the variability in habitat quality and GRSG density across the west, the authors were still able to reach an "interpreted range." In four of the disturbance categories (cumulative surface disturbance, linear features, energy development, tall structures) the rationale for the "interpreted" range of 5 km (3.1 mi) to 8 km (5 mi) surrounding leks is based on research suggesting most movements occurred within this range. The underlying assumption with using those as buffers is that protecting 90-95 percent of the birds within this range will result in population-level benefits even though they do not protect against any specific threat. There is no evidence that the range of buffer distances will result in quantifiable population-level benefits to GRSG, nor is there evidence that these buffers will result in detectable benefits like increased survivorship or reproduction to the populations they are applied to. As previously discussed, the need for buffers is based on the frequently repeated and erroneous assumption that avoidance or decline in male lek attendance equates to population decline.

5. Fundamental Flaws in Statistical Inference

The primary studies cited in the Buffer Report have serious statistical issues and/or misleading results. For example, Johnson *et al.* 2011 is cited in Table 1 for establishing the maximum distance of observed effect for cumulative surface disturbance, linear features, energy development, and tall structures.

However, Johnson *et al.* 2011 utilized extremely weak statistical inference such that its results and recommendations are not statistically reliable. Reliability was further compounded by the fact that 37 percent of the lek counts used by Johnson *et al.* 2011 had only four years of data associated with them. As a result, Johnson *et al.* 2011 is an example of a poorly planned "data-fishing expedition" that utilized an extremely weak, and arguably invalid approach to statistical inference. Possible conflicts of interest were also noted in the DQA challenges.[35]

Johnson *et al.* 2011 was reviewed as part of DQA Challenges alleging that the USGS Sage-grouse Monograph, FWS COT Report, and BLM NTT Report were compromised by bias, selectivity, and conflicts of interest, among other issues.[36] As an example, note that Johnson was a co-author on the Buffer Report. The DQA Challenges are incorporated herein by reference.

In addition, Holloran and Anderson is cited in Table1for establishing the minimum distance of observed effect for cumulative surface disturbance**.** However, multiple comparisons are not corrected for, thus invalidating the reported statistical significance. Holloran and Anderson 2005 did not employ even the most basic statistical procedure to correct their threshold of statistical significance based on the number of comparisons (17 comparisons with tests of

[35] *See* NTT Report Data Quality Act Challenge, Exhibit B at 13. *See also*, Monograph DQA Challenge, Exhibit B at 93-95.
[36] Available at: http://www.westernenergyalliance.org/knowledge-center/wildlife/greater-sage-grouse/DQA-Challenge.

significance and 6 correlations without tests of significance), and many of these involved multiple uses of the same variable across multiple tests.

Minimally, if Holloran and Anderson 2005 had adjusted for statistical significance, at least two of their five reported significant comparisons would have evaporated, as they were at or close to the $p<0.05$ significance threshold.

The reason to perform corrections for multiple comparisons, (using procedures such as the Bonferroni or Bonferroni-Holms corrections (Holm 1979) in the case of independent tests and the Benjamini–Hochberg–Yekutieli procedure (Benjamini and Yekutieli 2001) in the case of dependent tests where all or a portion of data are shared across multiple tests) is to minimize the Type-1 error or false discovery rate associated with performing multiple tests. This minimizes the chance of reporting erroneous statistical significance that would be expected to increase as more tests are performed. This is done by adjusting the threshold value of significance to be more stringent, thus minimizing the chance of reporting erroneous statistical significance that was the result of chance alone.

In the case of Holloran and Anderson 2005, applying the Bonferroni procedure would have rendered all of their p-values non-significant, and if only minimally applied to cases of shared data (e.g. lek to nest distances), only two tests would remain significant: the number of nests vs. distance from lek in all 0.5 km bands within 3 km, and distance to next year's nest after unsuccessful vs. successful. Those negative results would leave virtually little or nothing interesting for Holloran and Anderson 2005 to write about, and further refutes their extensive discussion of a 5 km buffer and similar management recommendations.

III. The Recommended Buffer Distances are Contrary to DQA

The Buffer Report is organized by disturbance type with a short discussion and summary of the minimum and maximum observed effect for each disturbance category. Table 1 depicts the lek buffer estimates made by the authors of the Buffer Report and the minimum and maximum values for observed effects to GRSG found in the literature (i.e. "literary minimum or maximum") reviewed by the authors of the Buffer Report, and then provides the authors' "interpreted" buffer range.

It is unclear how the authors arrived at an 8 km (5 mi) maximum buffer distance; however it is likely related to the assumption that by protecting 90-95 percent of the birds from surface disturbing activities (as described in Coates *et al.* 2013) that GRSG will respond positively. This assumption is flawed because it fails to account for regional climate and weather patterns as the primary factors influencing population level impacts to GRSG. Interestingly, another USGS report authored by Manier describes the influence of climate as an important ecological influence on GRSG population dynamics.[37] Adding credence to this issue, the Western Association of Fish and Wildlife Agencies reported an astounding 63-percent increase in male attendance at leks from 2013 to 2015.[38] Notably, these population gains occurred without implementation of buffers recommended in the Buffer Report.

Accordingly, the buffer distances recommended in the Buffer Report are unnecessarily restrictive, are not supported by scientific information, and do not address specific cause and

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[37] *See* Manier, D.J., Wood, D.J.A., Bowen, Z.H., Donovan, R.M., Holloran, M.J., Juliusson, L.M., Mayne, K.S., OylerMcCance, S.J., Quamen, F.R., Saher, D.J., and Titolo, A.J., 2013, Summary of science, activities, programs, and policies that influence the rangewide conservation of Greater Sage-Grouse (Centrocercus urophasianus): U.S. Geological Survey Open-File Report 2013–1098, 170 p. at 101, 106. Available at: http://pubs.usgs.gov/of/2013/1098/

[38] Available at: http://www.wafwa.org/Documents%20and%20Settings/37/Site%20Documents/News/Lek%20Trend%20Analysis%20final%208-14-15.pdf.

effect mechanisms that are known to be deleterious to GRSG. These recommendations were made without any tracking and testing of their effectiveness.

A. Cumulative Surface Disturbance

The discussion on cumulative surface disturbance relates to the "collective influence" of the human footprint reported as decline in lek attendance (Johnson *et al*. 2011), lek persistence (Knick and Hanser 2011) and/or population persistence (Aldridge *et al.* 2008, Wisdom *et al.* 2011). However, "collective influence" was not adequately described due to the reliance of the underlying studies identified above, or in a way that would to allow for any quantitative comparisons. The collective influence or cumulative impact described in the Buffer Report is based upon studies which have been shown to contain methodological and statistical flaws, or limited applicability (*See* NTT Report and COT Report Challenges Exhibit B at 1, 13, and 20-21), described herein, and should not form the basis of policy or management as is the case in the Buffer Report.

Ultimately the "interpreted range" of 5 km (3.1 mi) to 8 km (5 mi) made by the authors of the Buffer Report for cumulative "surface disturbance" is based purely on the subjective opinion that protecting nesting habitat and the area that encompasses most of the movements of male GRSG will have a positive impact on the population as whole. There was no reproducible methodology used to establish interpreted range; it was merely based on subjective opinions of the authors.

Table 1 cites Holloran and Anderson 2005 for the literary minimum distance at which negative effects were observed at 3.2 km (2 mi), and Johnson *et al.* 2011 for the literary maximum distance at which adverse effects were observed at 20 km (12.4 mi). As previously

discussed, Johnson *et al.* 2011 contains serious statistical flaws and should not be relied upon as basis for management decision.

Review of Holloran and Anderson 2005 has revealed numerous flaws including statistical flaws (as discussed above), opinion substituted in place of actual data, and misrepresentation of results, described in detail below. Therefore the Holloran and Anderson 2005 cannot be relied upon as the basis for management decisions or recommendations in the Buffer Report without violating the DQA.

1. Management Recommendations of Holloran and Anderson 2005 are Opinions

This paper use the results of statistical tests involving data gathered on GRSG lek-to-nest distances, nest-to-nest distances, and nest success as the fundamental justification for a number of sweeping management recommendations that are unrelated to the few statistically significant results. The authors appear to have a preconceived notion that a 5 km buffer surrounding leks is needed to "protect" GRSG nests. However, their study did not quantify any anthropogenic threats or explain why the proposed buffer would protect them. Moreover, according to the authors, the study was carried out in areas "free of large scale habitat conversions" and "areas fragmented by oil and gas development were removed from consideration." If the study purposefully avoided areas with oil and natural gas development, how does it then purport to claim that buffers are necessary so that oil and natural gas development as well as other activities cannot occur if they have not even studied the effects of development, or development with mitigation? Therefore, the recommendations made concerning buffers from human disturbance/activity are nothing more than unsupported opinions. To that end, the use of Holloran and Anderson 2005 in the Buffer Report does not constitute the best available science and is contrary to the DQA.

2. The Selection of 5 km Distance Threshold for Buffers is Arbitrary

It was simply an arbitrary threshold, in the authors' opinion, that "suggested that a 5 km buffer around a lek was needed to encompass a relative majority of nests" (in this case 64-percent of nests). And as noted above, all the leks and nests included in the study were in areas unaffected by human disturbance and habitat alterations. Holloran and Anderson 2005 was not conducted to understand what buffers should be in something other than a nearly pristine landscape of continuous sagebrush, or what effect buffers or a lack of them would have on a population as a whole. Thus, the use of Holloran and Anderson 2005 in the Buffer Report to describe cumulative surface disturbance (collective influence) is wholly inappropriate and is contrary to the DQA. Furthermore, buffers do not address any specific cause and effect mechanism associated with identified threats.

3. Unsupported Results

Holloran and Anderson 2005 use linguistics to make statistically insignificant results sound as if they represented actual trends rather than negative results. Statistical inference is simple and straightforward--either the result is statistically significant or it is not. Holloran and Anderson 2005 present two non-significant results in the abstract as if they represented a biologically significant tendency:

> "Closest known lek-to-nest distance was greater for successfully hatched compared to destroyed nests, and closely spaced nests tended to experience lower success and have higher probabilities of both nests experiencing the same fate compared to isolated nests, suggesting that a mechanism of enhanced prey detection occurred at higher nest densities."

However, those reported results were not statistically significant, and therefore, do not suggest anything of the sort. The only potential explanations are: no relationship or a lack of resolution in the data, both of which are presently indistinguishable. From Holloran and

Anderson 2005 Results:

> However, nests located <1 km from another known nest (n = 58) **tended to have lower than expected probability of success** (cumulative 28%; X2 = 3.5; p = 0.06), and the probability of both nests (n = 38 pairs) experiencing the same fate (cumulative 71%) **tended to be greater than expected by chance** (X2 = 3.0; p = 0.08). (emphasis added in bold).

From Holloran and Anderson 2005 Discussion:

> Additionally, nests located within 1 km of another known nest **tended to have lower success probabilities**, suggesting that increased nest densities could negatively influence the probability of a successful hatch. (emphasis added in bold).

The minimum threshold for statistical significance typically used in statistical inference is $p < 0.05$, and was used by Holloran and Anderson 2005, with no mention of any alternative interpretations of non-significant results. Inexplicably, however, the results from p values of statistical tests exceeding that threshold, (i.e. p = 0.06 and 0.08), were referred to as "*tended*," which misleads readers into believing the results are significant. It is difficult to describe this as something other than a misreporting or misrepresentation of results. Results that were clearly not statistically significant should have been reported as such.

Unfortunately, as a result of the misrepresentation associated with Holloran and Anderson 2005, the quality of Buffer Report has been compromised and fails to meet the standards of the DQA.

4. Use of Non-significant Results

Non-significant results were used in Holloran and Anderson 2005 to "support" hypotheses-- a practice that places their conclusions outside the realm of science. Therefore use of this study in the Buffer Report is troubling and contrary to the DQA. Perhaps more disturbing than the example above, was Holloran and Anderson's use of those same insignificant results to "support" various hypotheses and suggest several biologically significant phenomena. For

example:

> Our results suggest that Greater Sage-Grouse nests located relatively near (within 1 km) another known nest **tended** to be less likely to successfully hatch, **supporting** this hypothesis. (emphasis in bold).

> Pairs of nests spaced relatively closely within 8.5 km of a lek **tended** to experience the same fate more frequently than was expected by chance, **suggesting** predators concentrated search effort in specific areas (Niemuth and Boyce 1995), and **supporting** the idea of behavioral changes by predators. Our results **suggest** that a mechanism of enhanced prey detection occurs at higher nest concentrations, and that increased nest densities could result in increased nest depredation. (emphasis in bold).

In both cases, the results were not statistically significant, therefore, the results do not have any tendency that can be distinguished from chance alone. *See* Exhibit A. Reliance on Holloran and Anderson 2005 in the Buffer Report, then, is misplaced and contrary to the DQA.

B. Linear Features

The discussion of linear features in the Buffer Report deals primarily with roads. The authors of the Buffer Report concede these issues are far from settled. The Buffer Report cites studies for both aversion (Blickley *et al.* 2012) and affinity (Carpenter *et al.* 2010; Dinkins *et al.* 2014) behaviors by GRSG related to the presence of roads. The discussion on linear features also cites Johnson *et al.* 2011 (for decline in lek attendance), Connelly *et al.* 2004 (for decline in lek attendance), Hanser *et al.* 2011, and Stiver *et al*. 2006 (for declines in lek trends).

The authors attempt to explain factors that may have contributed to the positive behavioral response observed in Carpenter *et al*. 2010 and Dinkins *et al*. 2014 as a result of study design and quality of habitat (*See* Buffer Report at 6-7), in what appears to be an attempt to marginalize their findings (by questioning study design), because the results of these studies suggest that GRSG are not always adversely impacted by the presence of linear features. However, the authors are silent as to how these same factors may have influenced the

conclusions in Blickley *et al.* 2012, Johnson *et al.* 2011, Hanser *et al.* 2011, Connelly *et al.* 2004, and Stiver *et al.* 2006. It is interesting that the authors of the Buffer Report found it necessary to "explain away" results that undermine the need for buffers, while blatantly ignoring the significant flaws of the above cited studies described herein. *See also*, Petitioners' previous DQA challenges.[39] This suggests the authors of the Buffer Report were less than objective in evaluating the need for buffers related to linear features.

The authors do note however, that not all roads have the same effect, citing Carpenter *et al.* 2010 and Dinkins *et al.* 2014. The authors also recognize that the ability to discriminate the effects of linear features from each other when they are co-located (e.g. roads and transmission or distribution lines) is difficult (*See* Buffer Report at 6), and ultimately recognize that a clear interpretation, and definitive buffer ranges for linear features are "challenging" (*See* Buffer Report at 7).

Table 1 cites Blickley *et al.* 2012 for the minimum effect distance of 400 m (0.25 mi) and Johnson *et al.* 2011 for the maximum effect distance of 18 km (11.2 mi) observed related to roads. However, the authors settled on 5 km (3.1 miles) and 8 km (5 mi) as the interpreted minimum/maximum range. It is unclear how the authors settled on the final buffer range for linear features, which speaks to how subjective the entire buffer concept is.

Further the recommended buffer range does not adequately account for factors that might influence GRSG behavior such as class of road, density of roads, volume of traffic, quality of habitat, and environmental factors such as topography, therefore any benefit to GRSG is purely speculative.

[39] Available at: http://www.westernenergyalliance.org/knowledge-center/wildlife/greater-sage-grouse/DQA-Challenge.

Both Johnson *et al.* 2011 and Stiver *et al.* 2006 are cited for adverse effects at 5 km (3.1 mi); Connelly *et al.* 2004 is cited for declining lek attendance within 7.5 km (4.7 mi) of I-80. These studies have limited application, because Johnson *et al.* 2011, Hanser *et al.* 2011, and Connelly *et al.* 2004 each studied the effects associated with Federal and State highways/interstates, which would not be expected to have the same impacts as secondary or tertiary roads.

In other words, applying a buffer based on the impacts associated with an interstate highway to a two-track service road would be inappropriate because the impacts of these types of roads on GRSG are different. Therefore, the findings of these studies only apply to interstate/state highways, and should not inform management associated with other classes of roads.

As previously discussed, Stiver *et al.* 2006 appears to have been represented in the Buffer Report, and therefore cannot be used to inform the discussion on linear features.

C. Energy Development

The Buffer Report authors do not establish population level impacts to GRSG from energy development. Naugle *et al.* 2011 is cited in Table 1 to establish the literary minimum distance at which impacts to GRSG were observed. However, as stated in the Buffer Report, Naugle *et al.* 2011 only <u>estimated</u> potential direct and indirect impacts to GRSG (*see* Buffer Report at 7).

Petitioners have documented extensively how Naugle *et al.* 2011 is not an impartial review of the literature but rather, it misrepresents previous research and forms conclusions based upon selective review of some studies and selective exclusion of others (*see* Monograph Challenge Exhibit B at 115-116).

While various studies may have documented impacts to GRSG from energy development resulting in declining lek attendance (Johnson *et al.* 2011), avoidance (Blickley *et al.* 2012), or a negative relationship to well density and certain seasonal habitat selection (Fedy *et al.* 2014), these behaviors do not necessarily equate to population declines. None of the studies above found evidence of population decline; they only found that disturbance can result in avoidance or displacement, which is not necessarily permanent.

Despite the minimum and maximum distances noted in the literature, the authors of the Buffer Report subjectively chose 5 km (3.1 mi) and 8 km (5 mi) as the interpreted minimum/maximum buffer distances. Based on the discussion of energy development it appears that the 5 km minimum distance is based upon the findings of Johnson *et al.* 2011 where population trends decreased when density of wells was greater than eight within this distance of a lek. However, these findings describe impacts from intensive energy development and fail to consider other recent publications such as Ramey, Brown and Blackgoat 2011, Kirol *et al.* 2014,[40] and Applegate and Owens 2014,[41] which demonstrate that with improved technological advances, resource management, and best management practices/enhanced mitigation, GRSG have responded positively (including increased nest success) to mitigation and other conservation efforts, without utilizing buffers.

D. Tall Structures

The section on tall structures opens with the disclaimer that the effect of tall structures to GRSG "remains debated" and that determining the effects of tall structures has "remained difficult due to limited research and confounding effects…" (Buffer Report at 8). The discussion

[40] Kirol C.P., A.L. Sutphin, L. Bond, M.R. Fuller, T.L. Maechtle. 2015. Mitigation effectiveness for improving nesting success of greater sage-grouse influenced by energy development. Journal of Wildlife Biology 21(2):98-109.
[41] Applegate D., N. Owens. 2014. Oil and gas impacts on Wyoming's sage-grouse: summarizing the past and predicting the foreseeable future. Human–Wildlife Interactions 8(2):284–290

on tall structures cites Wallestad and Schladweiler 1974 for the literary minimum distance at which impacts were observed at 1 km (0.6 mi), and is based upon movements of male GRSG in relation to a lek. However, Table 1 cites Howe *et al.* 2014 as the 1 km literary minimum. These inconsistencies underscore the arbitrary nature of the interpreted distances in the Buffer Report.

As previously discussed, Howe *et al.* 2014 did not include GRSG variables in their study, so the impact to GRSG of tall structures based on this study is purely speculative and should not be used to base management decisions on for GRSG.

Johnson *et al.* 2011 is listed as the maximum distance for tall structures in Table 1. As previously discussed, Johnson *et al.* 2011 is based on weak statistical inference and should not be relied upon in the Buffer Report. Ultimately, the authors of the Buffer Report settle on a buffer range of 3.3 km (2 mi) to 8 km (5 mi) for tall structures. It is not clear how the authors arrived at the interpreted range, or whether the reasoning for it is related to foraging behaviors of ravens, nesting behavior and average movements of ravens (Howe *et al.* 2014), or GRSG variables. At any rate, applying buffers based on reports that lack data related to GRSG is in appropriate.

E. Low Structures

The discussion on low structures is described in the context of avoidance behavior (Connelly *et al.* 2004, Rogers 1964); fence collision (Beck *et al.* 2006, Stevens *et al.* 2012a,b); and potential risk associated with forage behavior of ravens (Coates *et al.* 2014a). The literary minimum distance at which impacts to GRSG were observed is based on a review of literature by Connelly *et al.* 2004 that describes the findings of Rogers 1964 which found that only 5 percent of leks were found within 200 m (0.12 mi) of a building. The maximum literary distance listed in Table 1 is 5.1 km (3.2 mi) citing Stevens *et al.* 2012. However, as previously discussed Stevens *et al.* 2012 does not support this distance.

The authors of the Buffer Report appear to be unaware of a 2012 NRCS report, *Applying the Sage-Grouse CEAP Conservation Insight Fence Collision Risk Tool to Reduce Bird Strikes*.[42] The NRCS report deals with specific conservation measures that address bird strikes rather than the Buffer Report's "interpreted" buffer distances that will do nothing to reduce bird strikes, and thus do not constitute the best available science in violation of the DQA. Rather than recommending arbitrary buffers that lack supporting scientific evidence, effective measures could be implemented that actually have been shown to protect GRSG.

F. Activities Without Habitat Loss

The discussion on activities without habitat loss primarily focuses on the effects of noise on GRSG. The authors of the Buffer Report rely on Blickley *et al.* 2012 to delineate both the literary and interpreted minimum buffer distance. As previously discussed, Blickley *et al.* 2012 used substandard equipment and procedures when conducting their study. While it is obvious that GRSG can be disturbed by loud distorted noise, Blickley *et al.* 2012 failed to demonstrate any effect on the population, particularly when the birds returned to use the lek the following year. As such, Blickley *et al.* 2012 fails to meet the quality standards of the DQA, and should not be relied upon as the basis for decision-making.

The Buffer Report authors list the Nevada Governor's Sage-Grouse Conservation Team 2010 (Nevada Report) for both the literary and interpreted maximum buffer distance of 4.8 km (3 mi). The Nevada Report focuses on renewable energy infrastructure, and is also a compilation of studies used to justify buffers. The 4.8 km (3mi) buffer was arbitrarily chosen by the Nevada group and is based upon the findings of Johnson *et al.* 2011 and Walker *et al.* 2007 which describe decline in lek attendance and lek persistence related to development (*See* Nevada

[42] Available at: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1049415.pdf.

Report at 9-11). Again, declines in lek attendance or lek persistence do not equate to a decline in population, but the Buffer Report implicitly assumes that they do.

As previously discussed, Johnson *et al.* 2011 is statistically flawed and should not be relied upon. In addition, Walker *et al.* 2007 modeled GRSG response in lek attendance in terms of distance(s) from potential sources of disturbance. The modeling procedures used by Walker *et al.* 2007 are not statistically reliable because they used nine predictor variables with just nine years of data to compare 19 different models in an attempt to identify combinations of predictor variables that would potentially explain patterns in the data. However, for model selection to work properly, the number of predictor variables must be smaller in comparison to the number of observations, in this case, the number of years of data. Because Walker *et al.* 2007 failed this basic rule of modeling, the report is a data fishing exercise and not a scientifically defensible study with clear testing of hypotheses.

Finally, the results of Walker *et al.* 2007 were obviously confounded by the location of at least nine out of 35 inactive leks immediately adjacent to Highway 14, Highway 16, and Interstate 90. The adjacency to active highways produced a confounding effect on the nine or more leks for which the authors failed to control. Therefore, reliance on Walker *et al.* 2007 as a basis for very precise predictions about GRSG population responses is not scientifically sound.

IV. The Buffer Report Does Not Comply with Other Federal Standards

While scientific integrity and transparency in agency decision making are enumerated priorities for this administration and fundamental to the mission and vision of USGS, the Buffer Report falls far short of these goals, as discussed throughout this challenge.

On March 9, 2009, President Obama issued a Memorandum setting forth principles "for ensuring the highest level of integrity in all aspects of the executive branch's involvement with

scientific and technological processes."[43] When scientific or technological information is considered in policy decisions, the information is to be subject to well-established scientific processes, including peer review where appropriate.

President Obama reaffirmed his commitment to scientific integrity as part of his second term's scientific agenda in 2012.[44] Furthermore, "only by ensuring that scientific data is never distorted or concealed to serve a political agenda, making scientific decisions based on facts, not ideology, and including the public in our decision making process will we harness the power of science to achieve our goals – to preserve our environment and protect our national security; to create the jobs of the future, and live longer, healthier lives."[45]

In contravention to this presidential direction, the Buffer Report presents a distorted and biased view of threats to the GRSG and mechanisms proposed to protect them. It is riddled with misrepresentation, misuse of citations, and reliance on opinion rather than the scientific method.

The Buffer Report also runs afoul of DOI direction on scientific integrity. The DOI Manual that implemented secretarial order: Integrity of Scientific and Scholarly Activities (effective Jan. 28, 2011) defines "scientific and scholarly integrity" to mean, "[t]he condition resulting from adherence to professional values and practices, when conducting and applying the results of science and scholarship, that ensures objectively, clarity, reproducibility, and utility."[46] On December 16, 2014, DOI updated and strengthened the policy to "ensure that all Interior employees and contractors uphold the principles of scientific integrity."[47] Interior Secretary Sally Jewell stated that "the Department must lead federal efforts to ensure robust scientific

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[43] 74 Fed. Reg. 10671, 10671 (March 11, 2009).
[44] *See* Barack Obama, Science Debate 2012, http://www.sciencedebate.org/debate12/ at No. 11 (Sept. 4, 2012).
[45] *Id.*
[46] DOI Manual, *Available at:* http://elips.doi.gov/elips/browse.aspx.
[47] U.S. Department of the Interior, *Press Release: Interior Department Announces Strengthened Scientific Integrity Policy for Employees and Contractors*, http://www.doi.gov/news/pressreleases/interior-department-announces-strengthened-scientific-integrity-policy-for-employees-and-contractors.cfm.

integrity policies because science is the very foundation of [their] mission."[48] Decision making: "must be robust, of the highest quality, and the result of as rigorous scientific and scholarly processes as can be achieved. Most importantly, it must be trustworthy."[49]

The USGS has also failed to meet its charge in OMB Circular A-130, "[A]gencies should inform the public as to the limitations inherent in the information dissemination product (e.g., possibility of errors, degree of reliability, and validity) so that users are fully aware of the quality and integrity of the information."[50] The Buffer Report has clearly glossed over limitations and error inherent in the report and the studies cited therein.

Accordingly, the Buffer Report falls short of these standards as it relies on a subjective interpretation of results which is a clear departure from the scientific method. It started with preferred conservation measures and then sought to justify them to reverse-engineer the recommendations.

V. DQA Applies to the Buffer Report

The DQA clearly applies to the Buffer Report. The USGS Guidelines apply to all USGS information disseminated to the public on or after October 1, 2002.[51] The USGS Guidelines expressly state that the DOI and OMB Guidelines including the standards and definitions therein also apply to the USGS Guidelines.[52]

A. Information Dissemination Product

Here, the OMB and DOI Guidelines apply to the Buffer Report as it was disseminated by USGS and by BLM in its GRSG land use plan amendments. Accordingly, it meets the definition

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[48] DOI, *Integrity of Scientific and Scholarly Activities*, http://www.doi.gov/scientificintegrity/index.cfm?renderforprint=1&

[49] DOI, Departmental Manual: *305 DM 3*, http://www.fws.gov/science/pdf/DOIScientificIntegrityPolicyManual.pdf (January 28, 2011).

[50] OMB, Memorandum for Heads of Executive Departments and Establishments (Circular No. A-130) http://www.whitehouse.gov/omb/circulars_a130 (Feb. 8, 1996).

[51] USGS Guidelines, I.

[52] *Id.*

of "information dissemination product" under the Guidelines. The Buffer Report was disseminated by USGS through publication on its website.[53] The Buffer Report was prepared at the request of the DOI in order to inform land managers and others interested in including buffer distances as part of their conservation efforts. Neither the authors of the Buffer Report nor DOI or its agencies have disclaimed that the Buffer Report is not information subject to correction or retraction under the DQA.

B. The DQA Applies Notwithstanding Draft Land Use Plan Amendments

The Buffer Report was prepared "to provide a convenient reference for land managers and others who are working to develop biologically relevant and socioeconomically practical buffer distances around sage-grouse habitats" (Buffer Report at 1). While the application of the buffers recommended in the Buffer Report may be subject to public comment through BLM's dissemination of the Buffer Report in its GRSG land use plan amendments, USGS is not excused from compliance with the DQA and the Guidelines.

Moreover, a DQA challenge may be undertaken separate from the challenger's comments in a rulemaking.[54] The agency has a duty to respond to comments under the Administrative Procedures Act ("APA")[55] and a duty to respond to challenges filed by any person under the DQA.[56] Challenges may arrive before, during, or after an agency disseminates the information.[57]

As discussed at length herein, the Buffer Report, if left uncorrected, will cause substantial actual harm to the Petitioners by implementing unduly restrictive regulatory measures, predominantly based upon irreproducible, biased and speculative reports. Reliance on

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[53] http://pubs.usgs.gov/sir/2013/5167/
[54] James T. O'Reilly, The 411 on 515: *How OIRA's Expanded Information Roles in 2002 Will Impact Rulemaking and Agency Publicity Actions*, Section 54:2, Admin. L. Rev. 835 (2002).
[55] 5 U.S.C.A. § 551 *et. seq*. (1946).
[56] *Id.* at 836.
[57] *Id*. at 847.

undocumented or scientifically unreasonable error and uncertainties, biases, and misrepresentations in the Buffer Report will dramatically alter the use of millions of acres of public lands without offering protection to the GRSG.

To avoid actual but unnecessary harm to the Petitioners, the western states, local governments, private landowners and stakeholders, USGS must timely respond to this DQA challenge and retract statements and conclusions based on undocumented or scientifically unreasonable error and uncertainties, biases, and misrepresentations in the disseminated information. The flaws contained in the Buffer Report are so numerous and severe, corrective action in this case must include a retraction of the Buffer Report and its proposed buffer distances.

Further, because the recommendations in the Buffer Report are intended to be used by others, the recommendations may not be subject to public comment in other situations, therefore USGS must comply with the DQA and the Guidelines in order to prevent unnecessary harm resulting from implementation of the flawed recommendations in the Buffer Report.

C. Highly Influential Information

OMB Guidelines define "influential" requests for correction as those of a substantive nature, which sought "something more than a straightforward webpage or data fix." "Influential" also indicates "that the agency can reasonably determine that dissemination of the information will have or does have a clear and substantial impact on important public policies or important private sector decisions."[58]

The information disseminated in the Buffer Report is information of extreme importance. It qualifies under the Guidelines as substantive notices, policy documents, studies and guidance relied upon by the agency to make decisions that could affect multiple federal and state agencies,

[58] *Id*. at 8455.

local governments, tribes and private individuals in 11 western states, and on tens of millions of acres of public lands. The buffers in Land Use Plan Amendments were largely derived from the Buffer Report.

This information is clearly "influential scientific, financial, or statistical information" that crosses state and agency boundaries and affects private and public decisions under the DQA and the Guidelines.

VI. The Petitioners

Petitioners have a direct interest in the quality and integrity of agency science and decision making, to ensure effective conservation. The Petitioners engage in ranching, grazing, mining, and energy development on multiple-use federal, state and private lands throughout the West, or are counties that rely on these activities for their economic and social viability. The Petitioners are particularly attuned to how the Buffer Report affects management of public lands in the West. The management restrictions, regulatory measures, and closures recommended in the Buffer Report will negatively impact the economy, the future viability of countless communities, local governments, small businesses, family farms and ranches, mining enterprises, electricity and oil and natural gas development in the West. There will be a profound and particularized impact on the Petitioners, as:

- Counties:
  - Colorado: Garfield County, Grand County, Jackson County, Mesa County, Moffat County, Rio Blanco County
  - Montana: Carter County, Fallon County, Fergus County, McCone County, Musselshell County, Phillips County, Prairie County, Richland County, Toole County, Yellowstone County
  - Nevada: Elko County, Eureka County
  - Utah: Duchesne County, Uintah County

- Western Energy Alliance (the "Alliance") represents more than 450 companies engaged in all aspects of environmentally responsible exploration and production of oil and natural gas across the West. The Alliance represents independents, the majority of which

are small businesses with an average of fifteen employees.

- American Exploration & Mining Association is a 120 year old, 2,500 member, non-profit, non-partisan trade association based in Washington. AEMA members reside in 42 states and are actively involved in prospecting, exploring, mining, and reclamation closure activities on federally administered lands, especially in the West. Our diverse membership includes every facet of the mining and represents a true cross-section of the American mining community from small miners and exploration geologists to junior and large companies. Most of our members are individual citizens or small businesses.

- Colorado Mining Association is an industry association, founded in 1876, whose more than 1,000 members include individuals and organizations engaged in the exploration, development and production of coal, metals, agricultural and industrial minerals throughout Colorado, the west and the world. CMA's membership also includes persons and enterprises providing support, services and supplies to the mining industry.

- Colorado Wool Growers Association was founded in 1926. It is premier legislative, regulatory, and policy management organization for the Colorado sheep industry.

- Independent Petroleum Association of America (IPAA) represents the thousands of independent oil and natural gas producers and service companies across the United States. Independent producers develop 95 percent of domestic oil and gas wells, produce 54 percent of domestic oil and produce 85 percent of domestic natural gas. IPAA members are dedicated to meeting environmental requirements while economically developing and supplying energy resources for consumers.

- The International Association of Drilling Contractors (IADC) is a leading oil and gas trade association and it is considered the authoritative body in the drilling space. Headquartered in Houston, Texas, IADC represents the interest of drilling contractors operating throughout the world including all oil and gas producing areas of the United States.

- Montana Association of Oil, Gas & Coal Counties is a non-profit corporation providing leadership on energy issues and promoting responsible energy development for the future of Montana. There are 34 counties that belong to the Association.

- The Montana Association of State Grazing Districts is a non-profit membership organization representing ranchers and farmers who raise livestock. Montana's statutory network of State Grazing Districts are cooperative areas of diverse ownership that allow for the greatest use of range forage while conserving our natural resources.

- The Montana Petroleum Association is a voluntary, non-profit trade association, whose members include oil and natural gas producers, gathering and pipeline companies, petroleum refineries and service providers and consultants.

- The Nevada Mining Association (NvMA) is a statewide trade organization formed over 100 years ago to address issues facing the mining industry in Nevada. The association has hundreds of members representing mine operators, the exploration community and vendors.

- The Petroleum Association of Wyoming (PAW) is Wyoming's largest and oldest oil and gas organization dedicated to the betterment of the state's oil and gas industry and public welfare. PAW members, ranging from independent operators to integrated companies, account for approximately ninety percent of the natural gas and eighty percent of the crude oil produced in Wyoming.

- The Public Lands Council (PLC), headquartered in Washington, D.C., represents ranchers who use public lands, manage the natural resources and preserve the unique heritage of the West. PLC is a Colorado nonprofit corporation. PLC represents state and national cattle, sheep and grasslands associations. PLC works to maintain a stable business environment in which livestock producers can conserve the natural resources of the West while producing food and fiber for the nation and the world.

- Utah Multiple Use Coalition: Recognizing Utah is a public lands state, eighteen organizations relying on access for natural resources, grazing, recreation and jobs banded together for a single united voice. Through prudent application of multiple-use management principles, precious recourses such as timber, wildlife, forage, minerals, energy, water and recreation can co-exist with Utah's unique and sensitive environments. Coalition members include the Utah Farm Bureau, Utah Mining Association, Utah Woolgrowers, Utah Rural Electric Association, and Western Counties Alliance.

The Petitioners primary representatives can be reached at the following addresses:

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A. Petitioners are "Affected Persons" Qualified to Bring a DQA Challenge

Petitioners are "affected persons" within the meaning of the DQA and the Guidelines.[59] Petitioners and their members or constituents rely upon public and private lands within the range of the GRSG for the production of natural resources, agricultural goods and products, recreation,

[59] 67 Fed. Reg. at 8452.

wildlife conservation, and for revenues distributed to the states and local governments. Petitioners have a reasonable likelihood of suffering actual harm from dissemination of the Buffer Report unless DOI resolves this complaint prior to the final agency actions and information products at issue herein. There is no separate process or mechanism by which the Petitioners can raise these issues or seek redress regarding the fatal flaws and shortcomings of the Buffer Report.

VII. Conclusion

The Buffer Report is a highly influential document, as DOI agencies are using it and citing it for substantial land use decisions across nearly 60 million acres of public lands throughout 11 western states.[60] As such, DOI must adhere to the standards of quality, integrity, objectivity and utility under the Data Quality Act as well as administration standards of scientific integrity and transparency. Unfortunately, the Buffer Report fails to meet these requirements.

The Buffer Report violates the Data Quality Act, the Guidelines and the additional authorities cited herein as it is not presented in an accurate, reliable and unbiased manner. The errors contained in the Buffer Report are improperly influencing BLM decision-making about management of the public lands. Reliance on this biased and faulty information has and will continue to harm the Petitioners. In addition to the damage to the Petitioners, the public, GRSG and the economy will be negatively impacted based upon these errors.

The Petitioners respectfully requests that DOI retract the Buffer Report and all reliance thereon in existing and subsequent Land Use Plans Amendments, as well as decisions on permits and authorizations. Alternatively, DOI could, as required by the DQA and the Guidelines, issue

[60] Final Environmental Impact Statements were released for California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah and Wyoming. Available at: http://www.blm.gov/wo/st/en/prog/more/sagegrouse/final_eiss.html.

an amended Buffer Report that uses sound analytical methods and the best data available while ensuring transparency and objectivity.

Respectfully submitted this 14th day of September, 2015.

Holsinger Law, LLC

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Exhibit A: Studies Cited in the Buffer Report
Fail DQA Standards

<u>Johnson *et al.* 2011</u>

This paper seeks to determine whether specific activities are correlated with population level declines in sage grouse, as determined from lek count trend data. The idea is to identify quantifiable threats to sage grouse populations.

The authors examined 62 different variables (Table 1) using only 11 years of lek count data for the response variable in seven different management zones. This study is an example of an extremely weak approach to statistical inference and a poorly planned data-fishing expedition. There are simply not enough years of data to support inferences with single variables, much less several variables. By chance alone, several variables should show correlations with lek count trends. The problem is compounded by the fact that many of the lek counts had *only four years of data* associated with them.

From the "Conservation Implications" section at the end of this paper you would not know that lek counts have generally increased over the 10-year period that this study looked at (Figure 2), although the authors have several convenient caveats to explain this away.

Basically, the figures tell the story, that there are no significant correlations between predictor and response variables. These are essentially random clouds of points. The authors resort to loess smoothing to search for patterns in the data that do not have obvious statistical significance. Despite this, the authors report on "trends" and discuss the potential importance of these in the paper.

Consequently, the resolution of the data and the methods applied to them is extremely limited. The authors admission of limitations and caveats is not enough to salvage the results or redeem weak inferences based on them. Had this paper undergone a rigorous and independent peer-review, it would have almost certainly been rejected. It is doubtful that this paper would be considered publishable in most reputable scientific journals.

The authors used data from 9,844 leks but *"only the 3,679 leks with at least four annual counts during the 11-yr period were included* [in analyses]." In comparison, Garton et al. (Chapter 16 used data from 9,780 leks. The reason for the difference between two studies using the same data, in the same monograph, with many of the same coauthors is not explained.

In the last lines of the paper, the authors voice a number platitudes that are consistent with the message of other papers in this monograph: *"No single factor is responsible for declining sage-grouse populations, and no single action may be sufficient to restore them. Conservation of the species will initially require a recognition of the intrinsic value of sagebrush-dominated landscapes, followed by the development of a comprehensive approach to sagebrush habitat conservation that involves commitments and partnerships among state and federal agencies, academia, industry, private organizations, and landowners; Knick et al. (2003:627) affirm that*

only through this concerted effort and commitment can we afford to be optimistic about the future of sagebrush ecosystems and their avifauna."

Blickley *et al.* 2012

This study reported a population decline in lek attendance when projected sound from recordings at the edges of leks, which were as high as the noise levels occurring within 200m of a busy freeway (as measured across an open field with traffic loads of greater than 50,000 cars per day, or 55-70 decibels as shown in Figure 2 of Reijnen et al. 1995). The subsequent avoidance was then assumed to lead to have a negative effect on the population (i.e. contribute to their decline). Below, is a relevant excerpt from Blickley et al.:

> Drilling-noise recordings were broadcast on experimental leks at an equivalent sound level (L_{eq}) of 71.4±1.7 dBF (unweighted decibels) SPL re 20 μPa (56.1±0.5 dBA [A-weighted decibels]) as measured at 16 meters; on road-noise leks, where the amplitude of the noise varied with the simulated passing of vehicles, noise was broadcast at an L_{max} (maximum RMS amplitude) of 67.6±2.0 dBF SPL (51.7±0.8 dBA).

The fact that authors broadcast such high levels of noise in such close proximity to leks biased the results, an error of omission by the authors and the Buffer Report that cites them and proposed regulations based upon their recommendations.

The Buffer Report cannot have it both ways, claiming a negative effect on sage grouse populations but admitting that there was "low statistical support for a cumulative effect of noise over time" in the study by Blickley *et al*. As noted above, there are no data showing a long-term cumulative decline in the sage grouse population in the Pinedale Planning Area.

The cited research was an amateurish attempt to reproduce the sounds of oil and gas development using substandard equipment that was wholly unsuited to the task of accurately recording and playing back traffic and sounds from oil and gas operations. Deficiencies in Blickley et al.'s equipment are detailed below.

Microphone: According to the manufacturer (http://en-us.sennheiser.com/k6-microphone-system), "the ME 62 [microphone used by Blickley et al.] is an omni-directional microphone head suitable for K6 and K6P powering modules. It can be used for reporting, discussions and interviews. The ME 62 is particularly suitable for good reproduction of 'room' ambience and 'spaced omni' stereo recording. Matt black, anodized, scratch-resistant finish."

Recorder: The Marantz model PMD670 used by Blickley et al. does not offer high-resolution (88.2 or 96 KS/s) sampling rates, its metering characteristics are unknown, and it is limited to 16/48 recording and thus is not considered a high-resolution recorder. It retails online for $700.

Playback speakers: The speakers used in the study were standard outdoor speakers camouflaged as rocks and designed for background music playing in home, hotel, and amusement park applications. They were not designed for accurately reproducing industrial sounds. The specifications for the speakers may be found on the manufacturer’s website:
http://www.ticcorp.com/specifications_tfs14.pdf.

The speakers were powered by 12 volt car batteries rather than 120 volt AC power and a car stereo amplifier of unknown make and model was used to boost the output. Packed into each simulated rock speaker housing was a 10" woofer with an injection molded cone, a 5.5" midrange cone, and 2" soft dome tweeter. The size and quality of the speakers, and the small speaker housing, severely limits the physical capability of the system to accurately reproduce either low or high frequency sound produced by oil and gas operations or traffic.

As a result of substandard equipment and lack of expertise in sound recording and reproduction, Blickley *et al.* resorted to placing their speakers at the edge of leks and to playing their systems at high levels in order to elicit a behavioral response. This is a biased approach to obtain a preferred result. The BLM cannot rely on biased research in its decision-making.

The recommended noise levels are not based upon any standardized, repeatable data collection, or accepted methods of sound measurement. The methods used by Blickley *et al.* and reported results did not contain any credible, professional analysis of local ambient sound levels or oil and gas noise (e.g. the type, duration, frequencies, sound pressure levels, and power of sound produced by different oil and gas drilling or production operations; equipment being recorded); or employ the use of professionally accepted standards, such as International Organization for Standardization (ISO) standards for quantifying industrial and traffic noise (http://www.iso.org/iso/home/standards.htm).

The standards not followed by the cited studies include, but are not limited to: ISO 1996-1:2003 Acoustics -- Description, measurement and assessment of environmental noise -- Part 1: Basic quantities and assessment procedures; ISO 9613-2:1996 Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation; ISO 4871:1996 Acoustics -- Declaration and verification of noise emission values of machinery and equipment; ISO 532:1975 Acoustics -- Method for calculating loudness level; ISO 7196:1995. Acoustics -- Frequency-weighting characteristic for infrasound measurements; ISO 8297:1994 Acoustics -- Determination of sound power levels of multisource industrial plants for evaluation of sound pressure levels in the environment -- Engineering method; and IEC 61672-1:2002(E) - Electroacoustics, Sound level meters -- Part 1: Specifications).

Blickley *et al.* did not employ any sound propagation models in their study to quantify the confounding effect of temperature, relative humidity, topography, ground cover and surface porosity, wind direction, the direction noise was generated from, the geographic extent of the noise, its duration, frequency of occurrence, or permanence, (Attenborough 2007). Nor did they provide any correlation of their playbacks compared to the industrial and traffic sources they had attempted to duplicate. Furthermore, no graphic equalizer was used which would have allowed for the adjustment of sound pressures in different frequency ranges (at standardized 1/3 octave band frequencies), and no measurement of sound pressure levels was taken in front of playback speakers, which together would have allowed for the accurate reproduction of the sound at the same frequencies and sound pressure levels as the original noise. Therefore, BLM cannot base regulations upon no data and results based upon arbitrary methods that are not compliant with accepted professional standards in the noise control industry (i.e. Bies and Hansen 2009; ISO).

Holloran and Anderson 2005

1) Management recommendations of Holloran and Anderson (2005) are opinions.

This paper use the results of statistical tests involving data gathered on sage grouse lek-to-nest distances, nest-to-nest distances, and nest success, as a bully pulpit to justify a number of sweeping management recommendations that are unrelated to the few statistically significant results. The authors appear to have a preconceived notion that a five km buffer surrounding leks is needed to "protect" sage grouse nests, however, their study did not quantify any anthropogenic threats or explain why the proposed buffer would protect them. Moreover, according to the authors, the study was carried out in areas "free of large scale habitat conversions" and "areas fragmented by oil and gas development were removed from consideration." Therefore, the recommendations made concerning buffers from human disturbance/activity are nothing more than unsupported opinions.

2) The selection of 5 km distance threshold for buffers is arbitrary.
It was simply an arbitrary threshold, in the authors' opinion, that "suggested that a 5 km buffer around a lek was needed to encompass a relative majority of nests" (in this case 64% of nests). And as noted above, all those leks and nests were in areas chosen to be unaffected by human disturbance and habitat alterations. No study was conducted to understand what buffers should be in something other than a nearly pristine landscape of continuous sagebrush, or what effect buffers or a lack of them would have on a population as a whole. Furthermore, buffers do not address any specific cause and effect mechanism associated with identified threats.

3) Data used in analyses by Holloran and Anderson 2005 are not public, rendering their results irreproducible.
The data used in Holloran and Anderson (2005) are not public so their results are not reproducible. Additionally, Holloran and Anderson (2005), and Holloran (2005, that they refer to for additional detail), did not identify any of the leks by name or identifier that could be used to trace their location through the State of Wyoming's sage grouse database. Moreover, the only source of information on leks, Figure 1 of Holloran (2005), only portrays 21 leks on a map at low resolution. It is never explained how both Holloran (2005) and Holloran and Anderson (2005) claim that female sage grouse were captured from "30 relatively undisturbed leks throughout central and western Wyoming" but not provide any further information on the name and approximate location of leks. One can only wonder where the other 9 study leks were located. Thus, the location of leks where females were captured, when they were captured, the habitat they were captured and nested in, the proximity to other leks, and sage grouse density, are all undisclosed precluding any replication of results. These facts render the results of Holloran and Anderson (2005) as irreproducible.

4) Holloran and Anderson (2005) use linguistics to make statistically insignificant results sound as if they represented actual trends rather than negative results.
Statistical inference is simple and straightforward: either the result is statistically significant or it isn't. Holloran and Anderson (2005) however, presented results in the discussion in a way that suggest these represented trends, despite their obvious lack of statistical significance. A lack of statistical significance did not appear to stop these researchers from finding the answer they were looking for.

For example, in the abstract of Holloran and Anderson (2005), two non-significant results were presented as if they represented a biologically significant tendency.

"Closest known lek-to-nest distance was greater for successfully hatched compared to destroyed nests, and closely spaced nests tended to experience lower success and have higher probabilities of both nests experiencing the same fate compared to isolated nests, suggesting that a mechanism of enhanced prey detection occurred at higher nest densities."

However, those reported results were not statistically significant, and therefore, do not suggest anything of the sort. The only potential explanations are: no relationship or a lack of resolution in the data, both of which are presently indistinguishable.

From Holloran and Anderson (2005) Results (emphasis added in bold):

"However, nests located <1 km from another known nest (n = 58) ***tended to have lower than expected probability of success*** *(cumulative 28%; X2 = 3.5; p = 0.06), and the probability of both nests (n = 38 pairs) experiencing the same fate (cumulative 71%)* ***tended to be greater than expected by chance*** *(X2 = 3.0; p = 0.08)."*

From Holloran and Anderson (2005) Discussion:

Additionally, nests located within 1 km of another known nest **tended to have lower success probabilities**, suggesting that increased nest densities could negatively influence the probability of a successful hatch.

The minimum threshold for statistical significance typically used in statistical inference is $p < 0.05$, and this was also the level of statistical significance used by Holloran and Anderson (2005): *"statistical significance was assumed at $p < 0.05$."* No mention was made by those authors of any alternative interpretations of non-significant results. Inexplicably, however, the results from p values of statistical tests exceeding that threshold, (i.e. $p = 0.06$ and 0.08), were referred to as *"tended."* It is difficult to describe this as something other than a misreporting or misrepresentation of results. Results that were clearly not statistically significant should have been reported as something else.

5) Non-significant results were used in Holloran and Anderson (2005) to "support" hypotheses: a practice that places their conclusions outside the realm of science.

Perhaps more disturbing than the example above, was Holloran and Anderson's (2005) use of those same insignificant results to "support" various hypotheses and suggest several biologically-significant phenomena. Examples are provided below:

"Our results suggest that Greater Sage-Grouse nests located relatively near (within 1 km) another known nest ***tended*** *to be less likely to successfully hatch,* ***supporting*** *this hypothesis."*

"Pairs of nests spaced relatively closely within 8.5 km of a lek ***tended*** *to experience the same fate more frequently than was expected by chance,* ***suggesting*** *predators concentrated search effort in specific areas (Niemuth and Boyce 1995), and* ***supporting*** *the idea of behavioral changes by predators. Our results* ***suggest*** *that a mechanism of enhanced prey detection occurs at higher nest concentrations, and that increased nest densities could result in increased nest depredation."*

In both cases, the results were not statistically significant, therefore, the results do not have any tendency that can be distinguished from chance alone.

5) Multiple comparisons not corrected for, thus invalidating the reported statistical significance.

In addition to the issue above is the fact that Holloran and Anderson (2005) did not employ even the most basic statistical procedure to correct their threshold of statistical significance based on the number of comparisons (17 comparisons with tests of significance and 6 correlations without tests of significance), and many of these involved multiple uses of the same variable across multiple tests. Minimally, if Holloran and Anderson (2005) had adjusted for statistical significance, at least two of their five reported significant comparisons would have evaporated, as they were at or close to the $p<0.05$ significance threshold.

The reason to perform corrections for multiple comparisons, (using procedures such as the Bonferroni or Bonferroni-Holms corrections (Holm 1979) in the case of independent tests and the Benjamini–Hochberg–Yekutieli procedure (Benjamini and Yekutieli 2001) in the case of dependent tests where all or a portion of data are shared across multiple tests), is to minimize the Type-1 error or false discovery rate associated with performing multiple tests. This minimizes the chance of reporting erroneous statistical significance that would be expected to increase as more tests are performed). This is done by adjusting the threshold value of significance to be more stringent, thus minimizing the chance of reporting erroneous statistical significance that was the result of chance alone.

In the case of Holloran and Anderson (2005), applying the Bonferroni procedure would have rendered all of their the p-values non-significant, and if only minimally applied to cases of shared data (e.g. lek to nest distances), only two tests would remain significant: the number of nests vs. distance from lek in all 0.5 km bands within 3 km, and distance to next years nest after unsuccessful vs. successful. Those results would leave virtually little or nothing interesting for Holloran and Anderson (2005) to write about, and further refutes their extensive discussion of a 5 km buffer and similar management recommendations.