Laurence ("Laird") J. Lucas (ISB # 4733)
llucas@advocateswest.org
Todd C. Tucci (ISB # 6526)
ttucci@advocateswest.org
Sarah Stellberg (ISB #10538)
sstellberg@advocateswest.org
Advocates for the West
P.O. Box 1612
Boise, ID 83701
(208) 342-7024
(208) 342-8286 (fax)

Attorneys for Plaintiffs

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF IDAHO

WESTERN WATERSHEDS PROJECT, WILDEARTH GUARDIANS, CENTER FOR BIOLOGICAL DIVERSITY, and PRAIRIE HILLS AUDUBON SOCIETY,

Plaintiffs,

v.

DAVID BERNHARDT, Secretary of Interior; JOSEPH R. BALASH*, Assistant Secretary of Interior; BUREAU OF LAND MANAGEMENT; and U.S. FOREST SERVICE,

Defendants.

** Official Defendant automatically substituted per Fed. R. Civ. P. 25(d)*

Case No. 1:16-cv-00083-BLW

DECLARATION OF DR. JOHN W. CONNELLY

I, Dr. John W. Connelly, declare as follows:

1. My name is John W. ("Jack") Connelly and I reside in Blackfoot, Idaho. This declaration is based on my personal and professional knowledge, and if called as a witness I would and could truthfully testify to the matters stated herein.

Summary of Work Performed

2. I have been asked to review the Bureau of Land Management's (BLM) Idaho Sage-Grouse Record of Decision and Approved Resource Management Plan Amendments (March 2019) (2019 Idaho Plan Amendment) and BLM's Wyoming Greater Sage-Grouse Approved Resource Management Plan Amendment and Record of Decision (March 2019) (2019 Wyoming Plan Amendments); and make a professional judgment on the impacts of these two land management plan amendments on greater sage-grouse populations and habitat. I have also been asked to compare the 2019 Idaho and Wyoming Plan Amendments with the best available scientific information on sage-grouse populations and habitat, including the conservation measures in BLM's own National Technical Team Report (December 21, 2011)(NTT Report), U.S. Fish and Wildlife Service. 2013. Greater Sage-grouse Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February 2013 (COT Report), and the Idaho Governor's sage grouse conservation plan.

3. Wildfire, invasive species, drought, grazing management, and energy development are the most serious and ubiquitous threats to sage-grouse throughout much of the species' range (Connelly et al 2011). However, the relative seriousness of these threats to sage-grouse can vary among states. For example, wildfire and invasive species are considered serious threats in Idaho while invasive species and energy development are serious threats in Wyoming (Connelly et al. 2011). Thus, I also reviewed the 2019 Idaho and Wyoming Plan Amendments to assess the relative efficacy of these plans for successfully addressing these threats in each state. Additionally, I examined the likely success of these plans to meet the NTT and COT reports for conserving populations and habitat.

4. In preparing this declaration, I have reviewed in detail the 2019 Idaho and Wyoming Plan Amendments and relevant exhibits, as well as BLM's 2015 sage-grouse resource management plans, the NTT and COT Reports, and all the scientific citations cite herein.

Short Conclusion

5. Based on my review, I conclude that the 2019 Idaho and Wyoming Plan Amendments fail to adhere to the extensive scientific evidence and best available science for managing sage-grouse populations and habitat. In fact, the 2019 Idaho and Wyoming Plan Amendments do not adequately address the primary threats of wildfire and invasive species in Idaho, and the threats from invasive and energy development in Wyoming.

6. Based on my education, training and experience, I can say with a reasonable degree of scientific certainty that implementation of the 2019 Idaho and Wyoming Plan Amendments will harm sage grouse populations and habitat, including by eliminating or weakening protective measures for General Habitat Areas in Idaho and Wyoming; reducing lek buffers in Idaho; maintaining biologically untenable lek buffers in Wyoming; weakening disturbance and density caps in Idaho and Wyoming; removal of required mitigation and elimination of the so-called "net conservation standard," and loosening restrictions on oil and gas leasing and development in Wyoming and Idaho.

7. In my 40+ years of experience researching greater sage-grouse, it is my firm conclusion that arresting the decline in habitat degradation is necessary to protect, conserve and enhance greater sage-grouse populations moving forward. Unfortunately, in my professional judgment 2019 Idaho and Wyoming Plan Amendments fail to achieve this goal, and will further imperil sage-grouse populations and habitat. For this reason, enjoining the application of 2019

Idaho and Wyoming Plan Amendments is important to protect, conserve and enhance greater sage-grouse populations and habitat.

Qualifications and Experience

8. I have a B.S. in Wildlife and Fisheries Management from the University of Idaho, a M.S. in Wildlife Biology from Washington State University, and Ph.D. in Zoology from Washington State University.

9. I am a Certified Wildlife Biologist and Wildlife Society Fellow.

10. I spent over 30 years employed as a biologist for the Idaho Department of Fish and Game. The majority of my work focused on research and management of sage-grouse populations and habitat.

11. I have been an adjunct or affiliate faculty member at the University of Idaho, Idaho State University, Boise State University, University of Montana, Montana State University, and Utah State University. I taught classes in upland game bird management and ethics of wildlife exploitation.

12. I have been involved in research and management of sage-grouse and sagebrush habitats for 42 years.

13. I have lectured widely on sage-grouse and sagebrush throughout North America and Europe.

14. I am the senior author of "Guidelines to manage sage-grouse populations and habitats" and "Conservation Assessment of greater sage-grouse and sagebrush habitats." *See* Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats (Connelly *et al*., 2004); Connelly *et al.,* Guidelines to Manage Sage Grouse Populations and Habitats, Wildlife Society Bulletin 2000 (28(4): 967-985.

15. In addition to the above, I have authored or co-authored roughly 100 scholarly publications and books on sage-grouse and sagebrush habitat. *See* Exh. 1 (attached hereto) (curriculum vitae and list of publications).

16. I was a member of the United States Fish and Wildlife Service's Conservation Objectives Team, and I also helped develop the Idaho Governor's plan for conservation of greater sage-grouse.

17. I have received numerous awards for my work on sage-grouse and sagebrush including the Patterson Award, Hamerstrom Award, Einarson Award, Idaho Department of Fish and Game Employee of the Year Award (twice), the University of Idaho Honor Alumni Award, and Western Association of Fish and Wildlife Agencies Outstanding Contributor Award.

18. I began research on sage-grouse in Idaho's mid-1970s. I have also spent considerable time working with biologists in other states on sage-grouse management issues.

19. I was detailed to work for the Western Association of Fish and Wildlife Agencies on range-wide sage-grouse conservation issues for roughly two years. Thus, I am intimately familiar with greater sage-grouse populations and habitat throughout most of the species' range.

SUMMARY OF BLM'S RESOURCE MANAGEMENT PLAN AMENDMENTS

20. The Bureau of Land Management recently released Record of Decisions (RODs) and Approved Resource Management Plan Amendments to support the Bureau of Land Management RMPs in Idaho, Wyoming and other states (2019 Plan Amendments). In its 2019 Plan Amendment, BLM claims that it refined some of the decisions from the 2015 planning effort related to greater sage-grouse habitat management, and leaves in place the majority of the decisions from 2015. *See* 2019 Idaho Plan Amendment at p. 1-3 ("With the publication of these Records of Decision (RODs) and Approved Resource Management Plan Amendments

(ARMPAs) the BLM is concluding a planning effort focused on furthering cooperation with western states by ensuring greater consistency between individual state plans for managing the greater sage-grouse as a wildlife species and the BLM's multiple-use mission for managing public land resources, including wildlife habitat."); 2019 Wyoming Plan Amendment at p. 4 ("The ARMP Amendment refines some of the decisions from the 2015 planning effort related to Greater Sage-Grouse habitat management and leaves in place the majority of the decisions from 2014 and 2015. These amendments build on the work that was completed in 2015 to respond to the deteriorating health of the sagebrush landscapes of the American West and the declining population of the Greater Sage-Grouse, ...").

21. A careful reading of the 2019 Idaho and Wyoming Plan Amendments establish that BLM has significantly revised and weakened the 2015 sage-grouse management plans, including by eliminating or weakening protective measures for General Habitat Areas in Idaho and Wyoming; reducing lek buffers in Idaho; weakening disturbance and density caps in Idaho and Wyoming; removal of required mitigation and elimination of the so-called "net conservation standard," and loosening restrictions on oil and gas leasing and development in Wyoming and Idaho.

22. The 2019 Idaho and Wyoming Plan Amendments also fail to adhere to the best scientific information on the conservation needs for greater sage-grouse, and the 2019 Plan Amendments are inconsistent with BLM's own NTT Report and COT Report, and the 2019 Idaho Plan Amendment is also at odds with the State of Idaho's Sage Grouse Plan. In short, the 2019 Idaho and Wyoming Plan Amendments considerably weaken conservation plans for sage-grouse and will very likely lead to continual loss and degradation of sage-grouse habitat.

Mitigation of Adverse Impacts to Sage-Grouse Populations and Habitat

23. In its 2019 Idaho and Wyoming Plan Amendments, BLM has abandoned the requirement that it fully mitigate adverse impacts to greater sage-grouse habitat and populations, and similarly abandoned BLM's so-called "net conservation gain" for sage-grouse. Indeed, in its 2019 Idaho and Wyoming Plan Amendments BLM has determined that mitigation for damage to sage-grouse habitat must be voluntary. In Idaho, for example, mitigation will depend on a future state plan for mitigating habitat loss. However, in Idaho, BLM will allow ROW, energy, and locatable mineral development and extraction within Priority Habitat Management Areas with stipulations in some cases. Moreover, they will also allow wind and solar and salable mineral development within Important Habitat Management Areas. Thus, under the 2019 Idaho Plan Amendments Idaho sage-grouse habitat will continue to be lost and degraded with no assurance that any mitigation will be required. Given that and the wildfires certain to occur in the near future, it is impossible for BLM to retain no net loss of sage-grouse habitat under their current plan.

24. The 2019 Wyoming Plan Amendments suffers this same defect. In Wyoming, the revised RMP prioritizes oil and gas leasing (with some modest restrictions) even within the most important sage-grouse habitat. *See* 2019 Wyoming Plan Amendments at 6 (adopting a "management priority" within PHMA that "open[s]" this critical habitat to oil and gas leasing). At this same time, BLM claims that the new plans will avoid disturbance to sage-grouse and their habitat, and minimize impacts to key habitats where all impacts cannot be avoided. BLM fails to identify how, when or through what mechanism it will mitigate these anticipated impacts to sage-grouse within important sage-grouse habitat., though it appears BLM is relying on an unstated and uncertain Wyoming-state mitigation plan.

25. In my judgment, relying on largely untested mitigation measures to off-set the real and direct adverse impacts from oil and gas development will fail to conserve, protect and enhance sage-grouse populations and habitat in Wyoming; and, instead, sage-grouse habitat in Wyoming will continue to be lost and degraded because of increased energy development with no assurance that any effective mitigation will be required. Given that and the wildfires and invasive species problems certain to occur in the near future, it is not possible for BLM to retain no net loss of sage-grouse habitat under their current plan.

Elimination of Sage-Grouse Lek Buffers

26. The 2019 Idaho and Wyoming Plan Amendments also weakened development buffers around sage-grouse leks relative to the 2015 RMPs, which were designed to protect fragile sage-grouse habitat from anthropogenic impacts (including energy development, range developments and infrastructure).

27. In the 2019 Idaho Plan Amendments, BLM retained the 2-3.1-mile lek buffers in PHMA (while reducing the acreage in PHMA's subject to this buffer) but reduced the buffer in Important Habitat Management Areas (IHMA) and General Habitat Management Areas (GHMA) to as low as 0.25 miles. The 2019 Wyoming Plan Amendments maintained a greatly reduced lek buffer limited to 0.6 miles in PHMA and 0.25 miles for areas outside PHMA despite strong evidence and BLM's own admission that these buffers offer inadequate protection for sage-grouse breeding habitat (Walker et al. 2007, Walker 2008).

28. These reduced buffers are flatly inconsistent with the best available scientific information, will fail to arrest the decline in sage-grouse habitat conditions within the most important and fragile habitat, and the difference between lek buffers in Idaho and Wyoming suggest BLM has permitted politics to inform its sage-grouse protective measures. Additionally,

the 2019 Wyoming Plan Amendments cites research establishing that impacts to sage-grouse leks associated largely with infrastructure and energy development are detectible far outside the lek buffers adopted in the plan amendments – i.e., at least 4 miles away. 2019 Wyoming Plan Amendments at Appx. C, Page 11 (*citing* Walker et al. 2007, Walker 2008). Indeed, this report shows that many leks within this radius have been extirpated as a direct result of development. *Id.* Connelly et al. (2000b) also suggested using an 11-mile radius as an appropriate analytical buffer to evaluate impacts to habitats and sage-grouse populations from "large" projects. Connelly *et al.* suggest that this extended analytical lek buffer may be needed to consider all seasonal habitats that may be affected for birds that use the habitats associated with the proposal during some portion of the life-cycle of seasonally migratory sage-grouse. *Id.*

29. BLM's reduced lek buffers are also inconsistent with BLM's own National Technical Team Report, which concluded:

> Past BLM conservation measures have focused on 0.25 mile No Surface Occupancy (NSO) buffers around leks, and timing stipulations applied to 0.6 mile buffers around leks to protect both breeding and nesting activities. Given impacts of large scale disturbances described above that occur across seasons and impact all demographic rates, applying NSO or other buffers around leks at any distance is unlikely to be effective. Even if this approach were to be continued, it should be noted that protecting even 75 to >80% of nesting hens would require a 4-mile radius buffer ….. Even a 4-mile NSO buffer would not be large enough to offset all the impacts reviewed above." NTT Report at 20-21.

30. In its 2019 Wyoming Plan Amendments, BLM fails to even cite or acknowledge the NTT report; in the 2019 Idaho Plan Amendments, BLM cites the NTT Report once, and on a separate issue. 2019 Idaho Plan Amendments at Appx. C-11.

31. Moreover, in adopting different lek buffers in Idaho and Wyoming, it appears BLM believes that the biology of sage-grouse changes between and within states. I am unaware of any data – anywhere – that supports the assumption that sage-grouse leks in Wyoming are

sufficiently protected by a 0.25-0.6-mile buffer, whereas sage-grouse leks in Idaho are sufficiently protected by a 0.6-3.0-mile buffer. BLM provides no data to support this assumption.

32. Importantly, the biology of sage-grouse does not change because of a somewhat artificial habitat designation (e.g., PHMA, IHMA) or a geopolitical boundary. Regardless of landscape designation, sage-grouse respond negatively to anthropogenic disturbance. Thus, it makes no biological sense to decrease buffer distances around leks for IHMA compared to PHMA nor can different size buffers between states be justified given the existing science. Indeed, such action is likely to result in further degradation of IHMA until it is reduced to GHMA or non-habitat.

33. Finally, BLM's decision to exempt from the lek buffers "range improvements that provide a conservation benefit to greater Sage-Grouse, such as fences for protecting seasonal habitats" is particularly troublesome in this context. The best available science shows that sage-grouse injure and kill themselves by flying into fences. Fences in and around sage-grouse habitat also provide roosting areas for sage-grouse predators, thus further harming sage grouse. In general, the construction of fences in inconsistent with the protection and enhancement of sage-grouse habitat. (Stevens et al. 2012a,b).

Vegetation Management

34. The best available scientific information on greater sage-grouse establishes that prescribed fire harms both sage-grouse populations and sage-grouse habitat (Connelly et al. 2000a; Beck et al.2009,2012; Pederson et al. 2003; Nelle et al. 2000). Indeed, Connelly *et al.* (2011) admonishes,

> The continued interest in prescribed burning and other forms of sagebrush reduction …… despite a large body of evidence documenting the negative effects

of these actions on sage-grouse, may continue to degrade and fragment sage-grouse habitats.

35. Further, sagebrush and vegetation manipulation efforts – including mechanized methods using aerator with seeding, harrow or chain with seeding, drill seeding, hand planting plugs, and aerial seeding – are generally harmful to sage-grouse populations, with only weak evidence (at best) suggesting some treatments might be helpful (Dahlgren et al. 2015).

36. Despite this scientific information, the 2019 Idaho and Wyoming Plan Amendments permit prescribed burns and other sagebrush treatments as acceptable vegetation management practices in sage-grouse habitat. The 2019 Idaho Plan Amendments specifically allows these sagebrush manipulation and eradication methods, noting "[w]here desirable perennial bunchgrasses or forbs are deficient in existing sagebrush stands, use appropriate mechanical, aerial, or other techniques to reestablish them (e.g., a Lawson aerator with seeding, harrow or chain with seeding, drill seeding, hand planting plugs, aerial seeding, or other appropriate techniques)." 2019 Idaho Plan Amendments at Appx. C-7.

37. BLM's approved these vegetation treatment methods despite the fact that little evidence demonstrates benefits of mechanical treatments of sagebrush for sage-grouse (Beck et al. 2012). In my expert judgment, these practices will only continue to destroy or degrade sage-grouse habitat, with limited or no benefit to sage-grouse populations and habitat.

38. The adverse impacts flowing from BLM's vegetation treatment projects will be further exacerbated by BLM's plans for fuels management activities. According to the 2019 Idaho and Wyoming Plan Amendments, fuels management activities – including construction of firebreaks; prescribed fire; and mechanical, chemical and biological fuels management –are specifically exempted from any disturbance limitations in sage-grouse habitat. In fact, these fuels management treatments may occur within the lek buffers in key sage grouse habitat.

39. BLM's fuels treatment activities are inconsistent with the best available scientific information on sage-grouse habitat and populations, and BLM provides no sound scientific supports for its actions. Instead, BLM outright misrepresents leading research on this topic, including Connelly *et al.* (2000b), Connelly *et al.* (2003) and Hagen *et al*. (2007), in an apparent effort to manufacture a scintilla of scientific evidence supporting its activities. For example, in the 2019 Wyoming Plan Amendments, BLM justifies a robust vegetation treatment regime by claiming that a desired condition for sage-grouse breeding and nesting habitat includes 5-25% sagebrush canopy cover. *See* 2019 Wyoming Plan Amendments at 22, Table 0-1 (*citing* Connelly *et al*. (2000), and others). But none of these published articles support BLM's proposition in any respect. Instead, Connelly *et al.* (2000) clearly indicated the desired condition for sagebrush canopy cover in sage-grouse habitat should not fall below 15%, and is best at 15-25% in breeding/nesting habitat. For its part, Hagen et al. (2007) affirmed Connnelly *et al.* (2000b), recommending 15-25% sagebrush cover. Finally, Connelly *et al*. (2003) described methods for measuring vegetation but did not provide recommendations for vegetation condition.

40. Absent these gross mischaracterizations, BLM lacks any scientific evidence supporting its decision allowing 5% sagebrush cover as a "desired condition," and compelling evidence indicates 5% canopy coverage is far too low for sage-grouse nesting habitat. *See* Connelly *et al.* 2000b, Connelly *et al.* 2003. In my judgment, managing sagebrush landscapes for a 5% sagebrush cover will harm sage-grouse populations and habitat, under the guise of restoring or improving both.

41. Finally, in the 2019 Idaho Plan Amendments BLM reasonably limited mechanized anthropogenic disturbance in nesting habitat during the nesting season and in wintering habitat during the winter season. 2019 Idaho Plan Amendment at Appx. C-2. But

BLM then emasculates the importance of this reasonable and necessary conservation measure by exempting fuels and vegetation treatments "specifically designed to improve or protect Greater Sage-Grouse habitat." *Id.* BLM cites no scientific authority supporting this exemption, and in my experience any activity that disturbs nesting hens is likely to result in nest abandonment and /or increased nest predation. Thus, BLM must prohibit all mechanized anthropogenic disturbance in breeding and winter habitat during the breeding and winter season.

Inconsistencies with the COT and NTT Reports

42. BLM's 2019 Idaho and Wyoming Plan Amendments are inconsistent with both the COT Report and the NTT Report, and BLM never explains, examines or discusses these inconsistencies in its RMPs.

43. More specifically, in the COT Report, the United States Fish and Wildlife Service's first general conservation objective was to "*Stop population declines and habitat loss*," noting that "[t]here is an urgent need to 'stop the bleeding' of continued population declines and habitat losses by acting immediately to eliminate or reduce the impacts contributing to population declines and range erosion. There are no populations within the range of sage-grouse that are immune to the threat of habitat loss and fragmentation." COT at 31-32. The COT further explains that "Achieving this objective requires eliminating activities known to negatively impact sage-grouse and their habitats, or re-designing these activities to achieve the same goal." *Id*. at 32.

44. In adopting a strong conservation objective, the COT report supported the BLM's NTT Report (2011), which noted, "[t]here is strong evidence from the literature to support that surface-disturbing energy or mineral development within priority sage-grouse habitats is not consistent with a goal to maintain or increase populations or distribution. None of the published

science reports a positive influence of development on sage-grouse populations or habitats. Breeding populations are severely reduced at well pad densities commonly permitted (Holloran 2005, Walker et al. 2007a). Magnitude of losses varies from one field to another, but findings suggest that impacts are universally negative and typically severe." NTT at 19.

45. The NTT Report (2011) also concluded that the conservation strategy most likely to meet the objective of maintaining or increasing sage-grouse distribution and abundance is to exclude energy development and other large scale disturbances from priority habitats, and where valid existing rights exist, minimize those impacts by keeping disturbances to 1 per section with direct surface disturbance impacts held to 3% of the area or less.

46. In spite of reports and recommendations, both the 2019 Idaho and Wyoming Plan Amendments call for increasing energy and mineral development in important sage-grouse habitat, including within PHMA. For example, the 2019 Idaho Plan Amendments state, "[a]reas in PHMA and IHMA will be open to mineral leasing and development and geophysical exploration, subject to no surface occupancy with a limited exception (MD MR 3). GHMA will be open to mineral leasing and development and geophysical exploration . . . ." 2019 Idaho Plan Amendment at 2-9—2-10. The 2019 Wyoming Plan Amendments similarly states "[t]ogether, the amended plans retain the priority habitat designation (PHMA) for 29 million acres of BLM-administered sagebrush-steppe, where the management priority is: to open to oil and gas leasing, but with restrictions; to exclude or avoid disturbance to sage-grouse and their habitat; and to minimize impacts to PHMA where they cannot be avoided. Another 23 million acres retain identification as general habitat (GHMA), where avoidance and minimization are applied flexibly, …." 2019 Wyoming Plan Amendment at 6.

47. The 2019 Idaho and Wyoming Plan Amendments also adopt lek buffers that are not supported by best available science, COT Report and NTT Report, as discussed above. In my professional judgment, adoption and implementation of these lek buffers will likely lead to further loss and degradation of sage-grouse habitat.

48. No state or federal agency has developed an effective means of eliminating wildfire or controlling invasive species. Thus, these constraints on sage-grouse populations and habitat will persist for the foreseeable future. Agencies can greatly reduce or eliminate anthropogenic threats to sage-grouse while applying appropriate conservation actions (including fire management, protection of existing PHMA). Unfortunately, BLM's 2019 Idaho and Wyoming Plan Amendments approve actions that are not supported by best available science and largely ignore recommendations made by numerous scientists and managers (Pyke 2011, Connelly et al. 2011).

49. Based on my scientific experience and education, in my review of the 2019 Idaho and Wyoming Plan Amendments, I can imagine no set of circumstances where implementation of these 2019 Plan Amendments will adhere to the COT's primary objective of arresting sage-grouse population declines and habitat loss.

October 2017 Scientists Letter

50. Almost 18 months before BLM adopted the 2019 Plan Amendments, 17 leading sage-grouse experts, researchers, and scientists submitted a letter to Secretary Zinke concerning BLM's proposed amendment of the 2015 sage grouse plans. *See* Exh. 2 (attached hereto) (Scientists' Letter). In this letter, the scientists expressed "concern[] that the current focus on amending the [2015 sage-grouse land use plans] will detract from the critical task of building

from those plans to realize enhanced conditions in currently designated priority and general habitats and stabilized or increasing sage-grouse populations." *Id.* at 1.

51. The authors identified three concerns with BLM's plan to modify the 2015 sage grouse plans, including the possibility that any plan amendment may "result in fewer acres of priority and general sage-grouse habitat[,]" may "limit the ability of managers to effectively manage anthropogenic aspects of the sagebrush biome[,]" and may "limit the ability of managers to effectively manage vegetation aspects of the sagebrush biome." *Id.*

52. Regarding the possibility that BLM would reduce acres protected as priority and general habitat, the authors also warned that "it is vital that we at least maintain the amount of habitat under greater protection established in the [existing land use] plans while also moving to increase habitat quality in these areas by improving sagebrush range health through enhancement and restoration." *Id.* at 3.

53. Regarding any changes to sage-grouse conservation measures designed to reduce anthropogenic impacts, the authors "recommend[ed] maintaining current oil and gas infrastructure density and avoidance stipulations in priority habitats as the objective in priority habitats range-wide, and only considering changing these objectives in defined areas where site-specific sage-grouse data empirically and rigorously suggest these stipulations can be modified without negatively impacting habitat use, fecundity or population growth rate of the local sage-grouse population. It is important to note that changes to these objectives should be considered in both directions—e.g., increases to NSO distances and decreases to density thresholds should also be considered on a site-by-site basis based on local data." *Id.* at 3-4.

54. Ultimately, the authors expressed concern that BLM's plan amendments "will lead to an overall loss of sage-grouse habitat quantity and quality which in turn may result in

additional population declines." *Id.* at 6. Ultimately, the authors concluded,

> It is our opinion that now is not the time to look backwards and challenge the work done by countless stakeholders in support of sage-grouse conservation. Now is the time to build on the momentum and allow the process to mature and evolve from the foundation provided by the LUPs to realize the sustained conservation of sagebrush landscapes and the wildlife and people dependent thereon. *Id.*

55. Unfortunately, in my professional judgment, BLM has ignored the warnings included in the Scientists' Letter, and the 2019 Idaho and Wyoming Plan Amendments have undermined sage-grouse conservation across the American West.

Recent Fires in Sage Grouse Habitat

56. I have reviewed the Declaration of Amy Haak regarding the incidences of wildfire across the sagebrush biome from 2015-2018. *See* Declaration of Amy Haak, ¶¶ 48-51, 55-56, Figures 7, 10, and Table 5. The data presented in the Haak declaration on recent wildfires is consistent with my own understanding of the recent incidences of wildfire across the sage-grouse landscape.

57. Indeed, the BLM data that I have reviewed indicate that a total of 2,457,858 acres of sage-grouse habitat burned from 2016-2018. Of this total, in 2018 alone, 244,171 acres of habitat burned on BLM-managed lands while a total of 426,718 acres burned on all greater sage-grouse habitat in the state. In Wyoming, 78,047 of sage-grouse habitat burned on BLM-managed lands while a total of 91.788 burned on all greater sage-grouse habitat in the state.

58. In my professional judgment, this incident and rate of wildfire across sage-grouse habitat requires further analysis and examination to better understand the ecological impacts on sage-grouse of eliminating 2.5 million acres of sage-grouse habitat. I could not find an analysis of the impacts of these wildfires on sage-grouse populations and habitat in the 2019 Idaho and Wyoming Plan Amendments.

59. Additionally, in spite of this substantial loss of habitat to fire, the 2019 Idaho and Wyoming Plan Amendments promote prescribed burning of sage-grouse habitat. In 2000, three co-authors and I published a paper documenting a 90% sage-grouse population decline attributed to prescribed fire and drought (Connelly et al. 2000a). We recommended that resource managers refrain from burning in low-precipitation sagebrush habitats used by breeding sage-grouse. Following this publication, scientists assessed recovery of habitats in the same study area and concluded that the sagebrush did not recover in magnitude or variability to pre-burn levels 14 years after fire. They encouraged managers to avoid burning Wyoming big sagebrush to enhance sage-grouse habitat (Beck et al. 2009).

60. Baker (2006) stated that prescribed burning is unwarranted or inadvisable if conservation of sagebrush landscapes and sagebrush-dependent species is the goal. Similarly, in a study of Montana sagebrush landscapes, researchers concluded prescribed fire is not a desirable management option in stands of Wyoming or basin big sagebrush (Lessica et al. 2007). The authors in both of these studies highlighted the loss of the sagebrush resource and recovery periods of more than 35 years after a prescribed fire.

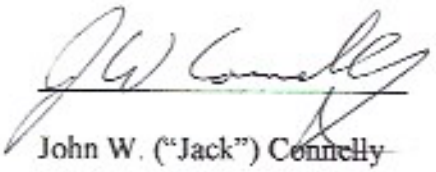
61. In my professional judgment, BLM should refrain from prescribed fires across sage-grouse habitat to benefit and conserve sage-grouse populations and habitat.

Conclusion

62. Based on my education, experience and expertise, I can state to a high degree of scientific certainty that implementing the 2019 Idaho and Wyoming Plan Amendments will cause direct and indirect immediate harm to greater sage-grouse populations and habitat, and I find no evidence to support BLM's assertion that its 2019 Idaho and Wyoming Plan Amendments "promote positive conservation outcomes for Greater Sage-Grouse and incorporate

new information that is considered the best available science and is rooted in on-the-ground experience." 2019 Idaho Plan Amendments at 1-3, 2019 Wyoming Plan Amendments at 5.

I declare under penalty of perjury pursuant to the laws of the United States that to the best of my knowledge the foregoing is true and correct. Executed this 17th day of April, 2019 in Blackfoot, Idaho.



John W. ("Jack") Connelly

Literature Cited

Baker, W.L. 2006. Fire and restoration of sagebrush ecosystems. Wildlife Society Bulletin 34:177-185.

Beck, J. L., J. W. Connelly, K. P. Reese. 2009. Recovery of greater sage-grouse habitat features in xeric sagebrush communities following prescribed fire. Restoration Ecology: 17:393-403.

Beck, J. L., J. W. Connelly, and C. L. Wambolt. 2012. Consequences of treating Wyoming big sagebrush to enhance wildlife habitats. Rangeland Ecology and Management. 65:444-455.

Connelly, J. W., S. T. Knick, C. E. Braun, W. L. Baker, E. A. Beever, T. J. Christiansen, K. E. Doherty, E. O. Garton, S. E. Hanser, D. H. Johnson, M. Leu, R. F. Miller, D. E. Naugle, S. J. Oyler-McCance, D. A. Pyke, K. P. Reese, M. A. Schroeder, S. J. Stiver, B. L. Walker, and M. J. Wisdom. 2011. Conservation of greater sage-grouse: a synthesis of current trends and future management. Studies in Avian Biology 38: 549-564.

Connelly, J. W., K. P. Reese, R. A. Fischer, and W. L. Wakkinen. 2000a. Response of a sage grouse breeding population to fire in southeast- ern Idaho. Wildlife Society Bulletin 28:90–96.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Dahlgren, D. K., R. T. Larsen, R. Danvir, G. Wilson,E. T. Thacker, T. A. Black, D.e. Naugle, J. W. Connelly, and T. A. Messmer. 2015. Greater sage-grouse and range management: insights from a 25-year case study in Utah and Wyoming. Rangeland Ecology and Management 68:375-382.

Doherty, K. E., D. E. Naugle, and B. L. Walker. 2009. Greater sage-grouse nesting habitat: the importance of managing at multiple scales. Journal of Wildlife Management 74:1544-1553.

Hagen, C. A., J. W. Connelly, and M. A. Schroeder. 2007. A meta-analysis of sage grouse *Centrocercus urophaisanus* nesting and brood rearing habitats. Wildlife Biology. 13:42-50.

Lessica, P. S. V. Cooper, and G. Kudray. 2007. Recovery of big sagebrush following fire in southwest Montana. Rangeland Ecology and Management 60:261-269.

Nelle, P. J., K. P. Reese, and J. W. Connelly. 2000. Long- term effects of fire on sage grouse nesting and brood-rearing habitats in southeast Idaho. Journal of Range Management 53:586-591.

NTT Report. 2011. A Report on National Greater Sage-Grouse Conservation Measures. BLM Sage-Grouse national Technical Team, Washington, DC.

Otter, C. L. 2012. Federal alternative of C. L. "Butch" Otter for greater sage-grouse management in Idaho. Governor's Office, Boise, Idaho.

Pederson, E. K., J. W. Connelly, J. Hendrickson, and W. E. Grant. 2003. Effect of sheep grazing and fire on sage grouse populations in southeastern Idaho. Ecological Modeling 165:23-47.

Pyke, D. A. 2011. Restoring and rehabilitating sagebrush habitats. Studies in Avian Biology 38:531-548.

Stevens, B. S., K. P. Reese, J. W. Connelly, and D. D. Musil. 2012. Greater sage-grouse and fences: does marking reduce collisions? Wildlife Society Bulletin. 36:297-303.

Stevens, B. S., J. W. Connelly, and K. P. Reese. 2012. Multi-scale assessment of greater sage-grouse fence collision as a function of site and broad scale factors. Journal of Wildlife Management. 76:1370-1380.

U.S. Department of the Interior, Fish and Wildlife Service. 2013. Greater Sage-Grouse (*Centrocercus urophasianus*) conservation objectives: Final report. U.S. Fish and Wildlife Service, Denver, CO.

Walker, B. L. 2008. Greater Sage-Grouse response to coal-bed natural gas development and west Nile virus in the Powder River Basin, Montana and Wyoming, USA. Dissertation, University of Montana, Missoula, MT. USA.

Walker, B. L., D. E. Naugle, and K. E. Doherty. 2007. Greater sage-grouse population response to energy development and habitat loss. Journal of Wildlife Management 71:2644–2654.

CURRICULUM VITAE

John William Connelly

EDUCATION

Washington State University, Pullman, WA	Ph.D. Zoology	1981
Washington State University, Pullman, WA	M.S. Wildlife	1977
University of Idaho, Moscow, ID	B.S. Wildlife	1974
Paul Smiths College, Paul Smiths, NY	A.S. Forestry	1972

CERTIFICATION

Certified Wildlife Biologist

EMPLOYMENT

Date	Position
July 2004-January 2015	Principal Wildlife Research Biologist Idaho Department Fish and Game
March 2003-July 2004	Chief Scientist Western Association of Fish and Wildlife Agencies Sage-grouse Conservation Assessment Project
December 1985-February 2003	Principal Wildlife Research Biologist Idaho Department Fish and Game
August 1984-December 1985	Regional Wildlife Biologist Idaho Department Fish and Game
August 1982-August 1984	Scientist (Wildlife Biologist) Earth and Life Sciences
October 1980-August 1982	Biological Technician U.S. Fish and Wildlife Service

PUBLICATIONS

Peer-reviewed

Connelly, J. W., Jr. 1978. Trends in blue-winged and cinnamon teal populations in eastern Washington. Murrelet 59:2-6.

Connelly, J. W., W. J. Arthur, and O. D. Markham. 1981. Sage grouse leks on recently disturbed sites. Journal of Range Management 34:153-154.

Connelly, J. W., and R. J. Gates. 1981. First record of a black-legged kittiwake in Idaho. Condor 83:272-273.

Connelly, J. W., and O. D. Markham. 1983. Movements and radionuclide concentrationsof sage grouse in southeastern Idaho. Journal of Wildlife Management 47:169-177.

Connelly, J. W., and I. J. Ball. 1984. Comparisons of aspects of breeding blue-winged and cinnamon teal in eastern Washington. Wilson Bulletin 96:626-633.

Browers, H. W., and **J. W. Connelly**. 1986. Capturing sage grouse with mist nets. Prairie Naturalist 18:185-188.

Reynolds, T. D., **J. W. Connelly**, D. K. Halford, and W. J. Arthur. 1986. Vertebrate fauna of the Idaho National Environmental Research Park. Great Basin Naturalist 46:513-527.

Connelly, J. W., H. W. Browers, and R. J. Gates. 1988. Seasonal movements of sage grouse in southeastern Idaho. Journal of Wildlife Management 52:116-122.

Craig, T. H., **J. W. Connelly**, E. H. Craig, and T. L. Parker. 1990. Lead concentrations in golden and bald eagles in Idaho. Wilson Bulletin 102:130-133.

Connelly, J. W., W. L. Wakkinen, A. D. Apa, and K. P. Reese. 1991. Sage grouse use of nest sites in southeastern Idaho. Journal of Wildlife Management 56:381-383.

Meints, D. R., **J. W. Connelly**, K. P. Reese, A. R. Sands, and T. P. Hemker. 1992. Habitat suitability index procedure for Columbian sharp-tailed grouse. Idaho Forestry, Wildlife and Range Experiment Station Bulletin Number 55. University of Idaho, Moscow. 27pp.

Wakkinen, W. L., K. P. Reese, and **J. W. Connelly**. 1992. Sage grouse nest locations in relation to leks. Journal of Wildlife Management 56:381-383.

Wakkinen, W. L., K. P. Reese, **J. W. Connelly**, and R. A. Fisher. 1992. An improved

spotlighting technique for capturing sage grouse. Wildlife Society Bulletin 20:425-426.

Musil, D. D., **J. W. Connelly**, and K. P. Reese. 1993. Dispersal, survival and reproduction of sage grouse translocated into central Idaho. Journal of Wildlife Management 57:85-91.

Connelly, J. W. 1993. Trends in the editorial process for publications of The Wildlife Society. Wildlife Society Bulletin 21:194-199.

Connelly, J. W., R. A. Fischer, A. D. Apa, K. P. Reese, and W. L. Wakkinen. 1993. Renesting by sage grouse in southeastern Idaho. Condor 95:1041-1043.

Fischer, R. A., A. D. Apa, W. L. Wakkinen, K. P. Reese, and **J. W. Connelly**. 1993. Nesting-area fidelity of sage grouse in southeastern Idaho. Condor 95:1038-1041.

Giesen, K. M., and **J. W. Connelly**. 1993. Guidelines for management of Columbian sharp-tailed grouse habitats. Wildlife Society Bulletin 21:325-333.

Church, K. E., **J. W. Connelly**, and J. W. Enck. 1994. The role of non-governmental organizations in gamebird conservation. Transactions of the North American Wildlife and Natural Resource Conference 59:488-493.

Musil, D. D., K. P. Reese, and **J. W. Connelly**. 1994. Nesting and summer habitat use by sage grouse translocated to central Idaho. Great Basin Naturalist 54:228-233.

Fischer, R. A., K. P. Reese, and **J. W. Connelly**. 1996. An investigation on fire effects within xeric sage grouse brood habitat. Journal of Range Management 49:194-198.

Fischer, R. A., K. P. Reese, and **J. W. Connelly**. 1996. Influence of vegetal moisture content and nest fate on timing of female sage grouse migration. Condor 98:868-872.

Fischer, R. A., K. P. Reese, and **J. W. Connelly**. 1997. Effects of prescribed fire on movements of female sage grouse from breeding to summer ranges. Wilson Bulletin 109:82-91.

Connelly, J. W., and C. E. Braun. 1997. A review of long- term changes in sage grouse populations in western North America. Wildlife Biology 3:123-128.

Reese, K. P., and **J. W. Connelly**. 1997. Translocations of sage grouse in North America. Wildlife Biology 3:87-93.

Connelly, J. W., M. W. Gratson, and K. P. Reese. 1998. Sharp-tailed grouse

(*Tympanuchus phasianellus*). *In* The Birds of North America, No. 354 (A. Poole and F. Gill eds.). The Birds of North America, Inc., Philadelphia, PA.

Edelmann, F. B., M. J. Ulliman, M. J. Wisdom, K. P. Reese, and **J. W. Connelly**. 1998. Assessing habitat quality using population fitness parameters: a remote sensing/GIS based habitat explicit model for sage grouse. Idaho Forestry, Wildlife, and Range Experiment Station Technical Report Number 25. University of Idaho, Moscow. 33 pages.

Connelly, J. W., K. P. Reese, R. A. Fischer, and W. L. Wakkinen. 2000. Response of a sage grouse breeding population to fire in southeastern Idaho. Wildlife Society Bulletin 28:90-96.

Connelly, J. W., A. D. Apa, R. B. Smith, and K. P. Reese. 2000. Effects of predation and hunting on adult sage grouse *Centrocercus urophasianus* in Idaho. Wildlife Biology 6:227-232.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Leonard, K. M., K. P. Reese, and **J. W. Connelly**. 2000. Distribution, movements, and habitats of sage grouse *Centrocercus urophasianus* on the Upper Snake River Plain of Idaho: changes from the 1950's to the 1990's. Wildlife Biology 6:265-270.

Nelle, P. J., K. P. Reese, and **J. W. Connelly**. 2000. Long- term effects of fire on sage grouse nesting and brood-rearing habitats in southeast Idaho. Journal of Range Management 53:586-591.

Burkepile, N. J., **J. W. Connelly**, D. W. Stanley, and K. P. Reese. 2002. Attaching radio transmitters to day-old sage grouse chicks. Wildlife Society Bulletin 30: 93-96.

Gazda, R. J., R. R. Meidinger, I. J. Ball, and **J. W. Connelly**. 2002. Relationships between Russian olive and duck nest success in southeastern Idaho. Wildlife Society Bulletin 30: 337-344.

Wambolt, C. L., A. J. Harp, B. L. Welch, N. Shaw, **J. W. Connelly**, K. P. Reese, C. E. Braun, D. A. Klebenow, E. D. McArther, J. G. Thompson, L. A. Torell, and J. A. Tanaka. 2002. Conservation of greater sage-grouse on public lands in the western U.S.: implications of recovery and management policies. Policy Analysis Center for Western Public Lands. Policy Paper SG-02-02. Caldwell, ID.

Connelly, J. W., K. P. Reese, E. O. Garton, and M. L. Commons-Kemner. 2003. Response of greater sage grouse *Centrocercus urophasianus* to different levels of exploitation in Idaho, USA. Wildlife Biology 9:335-340.

Pederson, E. K., **J. W. Connelly**, J. Hendrickson, and W. E. Grant. 2003. Effect of sheep grazing and fire on sage grouse populations in southeastern Idaho. Ecological Modeling 165:23-47.

Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin 80. Moscow, ID.

Schroeder, M. A., C. L. Aldridge, A. D. Apa, J. R. Bohne, C. E. Braun, S. D. Bunnell, **J. W. Connelly**, P. A. Deibert, S. C. Gardner, M. A. Hilliard, G. D. Kobriger, S. M. McAdam, C. W. McCarthy, J. J. McCarthy, D. L. Mitchell, E. V. Rickerson, and S. J. Stiver. 2004. Distribution of sage-grouse in North America. Condor 106:363-376.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies, Cheyenne, WY.

Reese, K. P., **J. W Connelly**, E. O. Garton, and M. L. Commons-Kemner. 2005. Exploitation and greater sage-grouse *Centrocercus urophasianus*: a response to Sedinger and Rotella. Wildlife Biology 11:377-381.

Beck, J. L., K. P. Reese, **J. W. Connelly**, and M. B. Lucia. 2006. Movements and survival of juvenile greater sage-grouse in southeastern Idaho. Wildlife Society Bulletin 34:1070-1078.

Schroeder, M. A., **J. W. Connelly**, C. L. Wambolt, C. E. Braun, C. A. Hagen, and M. R. Frisina. 2006. Society for Range Management issue paper: Ecology and management of sage-grouse—a reply. Rangelands 28:3-7.

Connelly, J. W., C. E. Braun, M. A. Schroeder, and C. A. Hagen. 2007. Setting the record straight: a response to "Sage-grouse at the crossroads". Rangelands 29:35-39.

Connelly, J. W. and M. A. Schroeder. 2007. Historical and current approaches to monitoring greater sage-grouse. Pages 3-9 *in* K. P. Reese and R. T. Bowyer, editors, Monitoring populations of greater sage-grouse. University of Idaho, College of Natural Resources Experiment Station Bulletin 88. Moscow, ID.

Garton, E. O., D. D. Musil, K. P. Reese, **J. W. Connelly**, and C. L. Anderson. 2007. Sentinel lek routes: an integrated sampling approach to estimate greater sage-grouse population characteristics. Pages 31-42 *in* K. P. Reese and R. T. Bowyer, editors, Monitoring populations of greater sage-grouse. University of Idaho, College of Natural Resources Experiment Station Bulletin 88. Moscow, ID.

Hagen, C. A., **J. W. Connelly**, and M. A. Schroeder. 2007. A meta-analysis of sage-grouse *Centrocercus urophaisanus* nesting and brood rearing habitats. Wildlife Biology. 13 (Supplement 1):42-50.

Aldridge, C. L., S. E. Nielson, H. L. Beyer, M. S. Boyce, **J. W. Connelly**, S. T. Knick, and M. A. Schroeder. 2008. Range-wide patterns of greater sage-grouse persistence. Diversity and Distributions 14:983-994.

Coates, P. S., **J. W. Connelly**, D. J. Delehanty. 2008. Predators of greater sage-grouse nests identified by video monitoring. Journal of Field Ornithology 79:421-428.

Beck, J. L., **J. W. Connelly**, K. P. Reese. 2009. Recovery of greater sage-grouse habitat features in xeric sagebrush communities following prescribed fire. Restoration Ecology: 17:393-403.

Lowe, B. S., D. J. Delehanty, and **J. W. Connelly**. 2009. Greater sage-grouse *Centrocercus urophasianus* use of threetip sagebrush in south-central Idaho. Wildlife Biology 15:229-236.

Musil, D. D. and **J. W. Connelly**. 2009. Survival and reproduction of pen-reared vs translocated wild pheasants *Phasianus colchicus*. Wildlife Biology 15:80-88.

Connelly, J. W., C. A. Hagen, and M. A. Schroeder. 2011. Characteristics and dynamics of greater sage-grouse populations. Studies in Avian Biology 38: 53-68.

Connelly, J. W., S. T. Knick, C. E. Braun, W. L. Baker, E. A. Beever, T. J. Christiansen, K. E. Doherty, E. O. Garton, S. E. Hanser, D. H. Johnson, M. Leu, R. F. Miller, D. E. Naugle, S. J. Oyler-McCance, D. A. Pyke, K. P. Reese, M. A. Schroeder, S. J. Stiver, B. L. Walker, and M. J. Wisdom. 2011. Conservation of greater sage-grouse: a synthesis of current trends and future management. Studies in Avian Biology 38: 549-564.

Connelly, J. W., E. T. Rinkes, and C. E. Braun. 2011. Characteristics of greater sage-grouse habitats: a landscape species at micro and macro scales. Studies in Avian Biology 38: 69-84.

Garton, E. O., **J. W. Connelly**, J. S. Horne, C. A. Hagen, A. Moser, and M. A. Schroeder. 2011. Greater sage-grouse population dynamics and probability of persistence. Studies in Avian Biology 38: 293-382.

Johnson, D. H., M. J. Holloran, **J. W. Connelly**, S. E. Hanser, C. L. Amundson, and S. T. Knick. 2011. Influences of environmental and anthropogenic features on greater sage-grouse populations, 1997-2007. Studies in Avian Biology 38: 407-450.

Knick, S. T., and **J. W. Connelly**. 2011. Greater sage-grouse and sagebrush: an introduction to the landscape. Studies in Avian Biology 38: 1-9.

Reese, K. P., and J. W. Connelly. 2011. Harvest management for greater sage-grouse: a changing paradigm for game bird management. Studies in Avian Biology 38: 101-112.

Shepherd, J. F., **J. W. Connelly**, and K. P. Reese. 2011. Modeling landscape-scale greater sage-grouse nesting and brood-rearing habitat. Studies in Avian Biology. 39:137-150.

Shepherd, J. F., K. P. Reese and **J. W. Connelly**. 2011. Effects of landscape fragmentation on non-breeding greater sage-grouse. Studies in Avian Biology. 39:77-88.

Stevens, B. S., K. P. Reese, and **J. W. Connelly**. 2011. Factors influencing survival and detectability bias of avian fence collision surveys in sagebrush steppe. Journal of Wildlife Management 75: 437-449.

Xu, J-L., Z-W. Zhang, Y. Wang, and **J. W. Connelly**. 2011. Spatio-temporal responses of male Reeve's pheasants *Syrmaticus reevesii* to forest edges in the Dabie Mountains, central China. Wildlife Biology 17:16-24.

Beck, J. L., **J. W. Connelly**, and C. L. Wambolt. 2012. Consequences of treating Wyoming big sagebrush to enhance wildlife habitats. Rangeland Ecology and Management. 65:444-455.

Stevens, B. S., K. P. Reese, **J. W. Connelly**, and D. D. Musil. 2012. Greater sage-grouse and fences: does marking reduce collisions? Wildlife Society Bulletin. 36:297-303.

Stevens, B. S., **J. W. Connelly**, and K. P. Reese. 2012. Multi-scale assessment of greater sage-grouse fence collision as a function of site and broad scale factors. Journal of Wildlife Management. 76:1370-1380.

Troy, R. J., P. S. Coates, **J. W. Connelly**, G. Gillette, and D. J. Delehanty. 2012. Recapturing mountain quail using a modified night-netting technique. Wildlife Society Bulletin. 36:578-581.

Baumgart, J. A., C. S. Goldberg, K. P. Reese, **J. W. Connelly**, D. D. Musil, E. O. Garton and L. P. Waits. 2013. A method for estimating population sex ratio for sage-grouse using noninvasive genetic samples. Molecular Ecology 13:393-402.

Frye, G., **J. W. Connelly**, D. D. Musil, and J. S. Forbey. 2013. Phytochemistry predicts habitat selection by an avian herbivore at multiple spatial scales. Ecology 94:308-314.

Guttery, M. R., D. K. Dahlgren, T. A. Messmer, **J. W. Connelly**, K. P. Reese, P. A. Terletzky, N. Burkepile, and D. N. Koons. 2013. Effects of landscape-scale environmental variation on greater sage-grouse chick survival. PLoS ONE 8(6):e65582.

Sokos, C. K., P. K. Birtsas, **J. W. Connelly**, and K. G. Papaspyropoulos. 2013. Hunting of migratory birds: disturbance intolerant or harvest tolerant? Wildlife Biology 19:113-125.

Stevens, B. S., D. E. Naugle, B. Dennis, **J. W. Connelly**, T. Griffiths, and K. P. Reese. 2013. Mapping Sage-Grouse Fence-Collision Risk: Spatially-Explicit Models for Targeting Conservation Implementation. Wildlife Society Bulletin. 37:409-415.

Forbey, J. S., N. L. Wiggins, G. G. Frye, and **J. W. Connelly**. 2013. Hungry grouse in a warming world: emerging risks from plant chemical defenses and climate change. Wildlife Biology. 19:374-381.

Frye, G. G., **J. W. Connelly**, D. D. Musil, R. Berkley, M. Commons-Kemner, C. Cardinal, L. Cross, and J. S. Forbey. 2014. Do necklace-style radiotransmitters influence flushing behavior of greater sage-grouse? Wildlife Society Bulletin 38: in press.

Dahlgren, D. K., R. T. Larsen, R. Danvir, G. Wilson,E. T. Thacker, T. A. Black, D.e. Naugle, **J. W. Connelly**, and T. A. Messmer. 2015. Greater sage-grouse and range management: insights from a 25-year case study in Utah and Wyoming. Rangeland Ecology and Management 68:375-382

Kohl, K. D., J. W. Connelly, M. D. Dearing and J. S. Forbey. 2016. Microbial detoxification in the gut of a specialist herbivore, the Greater Sage-Grouse. Microbiology letters 363:1-6.

Books and Book Chapters

Connelly, J. W., J. Gammonley, and J. M. Peek. 2005. Harvest management. Pages 658-690 in C. E. Braun, editor, Techniques for Wildlife Investigation and Management. Sixth edition. The Wildlife Society, Bethesda, M.D.

Flake, L. D., **J. W. Connelly**, T.R. Kirschenmann, and A.J. Lindbloom. 2010. Grouse of plains and mountains: the South Dakota story. South Dakota Department of Game, Fish and Parks, Pierre.

Knick, S. T. and **J. W. Connelly** (editors). 2011. Greater sage-grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology No. 38. University of California Press, Berkeley, CA.

Hardaswick, V., K. L. Christopher, and **J. W. Connelly**. 2011. Sage grouse at the crossroads: a plea for conservation. Pages 213-228 *in* V. Hardaswick and K. L. Christopher, High flying gyrfalcons: the guided development program. Western Sporting, Sheridan, WY, USA.

Connelly, J. W., J. Gammonley, and T. W. Keegan. 2012. Harvest management. Pages 202-231 in N. Silvy, editor, Techniques for Wildlife Investigation and Management. Seventh edition. The Wildlife Society, Bethesda, MD.

Dahlgren, D. K., D. Elmore, E. B. Arnett, D. A. Smith, A. Hurt, and **J. W. Connelly**. 2012. Use of dogs in wildlife research and management. Pages 140-153 in N. Silvy, editor, Techniques for Wildlife Investigation and Management. Seventh edition. The Wildlife Society, Bethesda, MD.

Connelly, J. W., J. Gammonley, and T. W. Keegan. 2020. *In press*. Harvest management. N. Silvy, editor, Techniques for Wildlife Investigation and Management. Eighth edition. The Wildlife Society, Bethesda, MD.

Other

Ball, I. J., **J. W. Connelly**, K. W. Fletcher, G. L. Oakerman, and L. M. Sams. 1977. Wetlands in Grant County: location, characteristics, and wildlife values. Pages 199-300 *in* Wetland surveys of Skagit and Gran counties, Washington; inventory, wildlife values, and owner attitudes. Washington Water Research Center Report Number 290.

Connelly, J. W., and I. J. Ball. 1978. The ecology of sage grouse on the Idaho National Engineering Laboratory Site. Pages 224-235 *in* O. D. Markham, editor, Ecological studies on the Idaho National Engineering Laboratory Site, 1978 Progress Report IDO-12087. National Technical Information Service, Springfield, VA.

Connelly, J. W., and I. J. Ball. 1979. A preliminary report on the ecology of sage grouse on the Idaho National Engineering Laboratory Site. Pages 41-42 *in* O. D. Markham and W. J. Arthur, editors, Proceedings of the symposium on the Idaho National Engineering Laboratory ecology programs IDO-12088. National Technical Information Service, Springfield, VA.

Connelly, J. W., and I. J. Ball. 1983. Sage grouse census methods and populations in southeastern Idaho. Pages 325-337 *in* O. D. Markham, editor, Idaho National Engineering Laboratory radioecology and ecology programs, 1983 Progress Report DOE/ID-12098. National Technical Information Service, Springfield, VA.

Connelly, J. W., and I. J. Ball. 1983. Sage grouse on Idaho's National Environmental Research Park. Pages 347-356 *in* O. D. Markham, editor, Idaho National Engineering Laboratory radioecology and ecology programs, 1983 Progress Report DOE/ID-12098. National Technical Information Service, Springfield, VA.

Arthur, W. J., **J. W. Connelly**, D. K. Halford, and T. D. Reynolds. 1984. Vertebrates of the Idaho National Engineering Laboratory. DOE/ID-12099. U.S. Department of Energy, Idaho Falls, ID.

Howard, R. P., B. L. Keller, F. L. Rose, **J. Connelly, Jr.**, and J. Hupp. 1985. Impacts of the Tincup Loop transmission line on cranes in Caribou County Idaho. Pages 140-144 *in* Proceedings, 1984 Crane Workshop.

Connelly, J. W. 1988. Sage-grouse and fire: a complex issue for resource management. Idaho Wildlife 8(5):20-21.

Connelly, J. W. 1989. Book review: Adaptive Strategies and Population ecology of northern grouse. Journal of Wildlife Management 53:857-858.

Connelly, J. W., and L. M. Doughty. 1990. Sage-grouse use of water developments in southeastern Idaho. Pages 167-173 *in* G. K. Tsukomoto and S. J. Stiver, editors. Wildlife water development. Nevada Department of Fish and Game, Reno.

Connelly, J. W., and L. J. Blus. 1991. Effects of pesticides on upland game: a review of herbicides and organophosphate and carbamate insecticides. Pages 92-97 *in* M. Marsh, editor. Proceedings of the conference: pesticides in natural systems - how can their effects be monitored? U. S. Environmental Protection Agency, Region 10. Seattle WA.

Blus, L. J., and **J. W. Connelly**. 1998. Radiotelemetry to determine exposure and effects of organophosphorus insecticides on sage grouse. Pages 21-29 *in* L. W. Brewer and K. A. Fagerstone (eds.) Radiotelemetry applications for wildlife toxicology field studies. Society for Environmental Toxicology and Chemistry.

Connelly, J. W. 2001. Sagebrush on fire: fighting dogma to save an ecosystem. Sage Notes. Spring Issue.

Braun, C. E., **J. W. Connelly**, and M. A. Schroeder. 2002. Seasonal habitat requirements or sage grouse: spring, summer, fall and winter. *In*: Monsen, Stephen B.; Shaw, Nancy L.; Pellant, Mike, comps. Sage grouse habitat restoration symposium; 2001 July 4-7; Boise, ID. Proceedings RMRS-P-00. Odgen, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Gutierez, R. and **J. W. Connelly**. 2003. Sage-grouse listing petitions. Grouse News 25:10-12.

Manes, R., S. Harmon, B. Obermyer, R. Appelgate, and **J. Connelly**. 2003. Windswept prairies: last stand for prairie grouse, or will wind sweep the prairies clean? Grouse Partnership News 4:16-19.

Connelly, J. 2003. Sage grouse conservation: planning to save a species. Grouse Partnership News 4:27-30.

Connelly, J. W. 2004. Book review: Grassland grouse and their conservation. Great Plains Research 14:149-150.

Connelly, J. W. and S. J. Stiver. 2004. Greater sage-grouse conservation part II: a history lesson and roadmap to the future. Grouse Partnership News 5:8-11.

Connelly, J. 2005. Challenging dogma – changing paradigms: sage-grouse harvest management in the United States. Grouse News 29:7-11.

Connelly, J. W. and C. E. Braun. 2007. Measuring success of sage-grouse conservation plans. Grouse News 33:4-6.

Stevens, B. S., K. P. Reese, and **J. W. Connelly**. 2009. Estimating greater sage-grouse fence collision rates in breeding areas: preliminary results. Grouse News 38:24-29.

Forbey, J. S., G. Frye, Xi. Pu, and **J. W. Connelly**. 2011. Toxic Scat: A mechanism to prevent overdosing on plant chemicals by grouse. Grouse News 42:24-29.

Connelly, J. W. 2013. Book review: Essential Readings in Wildlife Management and Conservation. Wildlife Biology 19: 19:496.

Connelly, J. W., A. Moser, and D. Kemner. 2013. Greater sage-grouse breeding habitats: landscape-based comparisons. Grouse News 45:5-8.

Connelly, J. W. 2014. Federal Agency Responses to Greater Sage-grouse and the ESA: Getting Nowhere Fast. Northwest Science 88:61-64.

Thesis and Dissertation

Connelly, J. W., Jr. 1977. A comparative study of blue- winged and cinnamon teal breeding in eastern Washington. M. S. Thesis, Washington State University, Pullman. 40pp.

Connelly, J. W., Jr. 1982. An ecological study of sage grouse in southeastern Idaho. Ph.D. Dissertation, Washington State University, Pullman. 84pp.

PROFESSIONAL ACTIVITIES

The Wildlife Society

Past-President, Northwest Section, 2001-2003
President, Northwest Section, 1999-2001
President-elect, Northwest Section 1998-99

President, Idaho Chapter, 1988-92
Publications Committee, 1984-86, 1995-96
Publications Award Committee, 1992-93
Symposia Committee, 1991-1992
Einarson Award Committee, 1989-93
Chair, Einarson Award Committee 1990-91
Northwest Section Nominations Committee 1989-92
Chair, Nominations Committee 1989-1991
Working Group on Sustainable Use of Ecosystem Resources, 1993-1998
Vice-Chair, Working Group on Sustainable Use of Ecosystem Resources, 1993-94
Reviewer, Journal of Wildlife Management, 1982-present
Reviewer, Wildlife Society Bulletin, 1982-present
Chairman and principal organizer, Symposium on sage grouse at the 2001 meeting of The Wildlife Society, Reno, NV
Northwest Section Representative to Council, 2010-2013

Other Professional Activities

Chairman, Lymine-Richwine Chapter, Society for Range Management, 1989.

State representative to the Western Sage and Columbian Sharp-tailed Grouse Workshop, 1985-2010.
Chairman, Western Sage and Columbian Sharp-tailed Grouse Workshop, 1989-91 and 2008-2010.

State Representative, National Sage Grouse Framework Team, 2000-2004.

Environmental Protection Agency's Pesticides Advisory Monitoring Panel, 1990-96.

State representative, Prairie Grouse Technical Council, 1990-present.

U.S. representative, IUCN Grouse Specialist Group, 1996-present.

Reviewer: *Auk, Birds of North America species accounts, Biological Conservation, Condor, Ecological Applications, Forest Ecology, Journal of Field Ornithology, Journal of Rangeland Ecology and Management, Northwest Science, Oryx, Southwest Naturalist, Western North American Naturalist, Wilson Journal of Ornithology, Wildlife Biology.*

Upland Game Bird Planning Team, Bureau of Land Management, Fish and Wildlife 2000, 1991-1992.

Consultant: *Oregon Department Fish and Wildlife, Utah Division of Wildlife, U.S. Forest Service, Deseret Land and Livestock, U.S. Bureau of Land Management, Policy Center for Western Public Lands*.

Instructor: *Shrubland fire ecology*, The Washington Institute, 2006-present.

Chairman and principal organizer, Workshop on sage grouse populations, January 2002, Tucson, AZ.

Scientific Committee, 9th International Grouse Symposium, Beijing, China

Scientific Committee, 10th International Grouse Symposium, Luchon, France

Associate Editor, Wildlife Biology (*current*)

Member, National Wind Coordinating Committee, Grassland Species Group

Instructor, NRCS sage-grouse training, December 2011

Member, USFWS conservation Objectives Team 2012

Advisor, Governor's Sage-grouse Task Force

RECENT INVITED LECTURES

The evolution of game bird management in the 20th Century. University of Idaho, Moscow. 2000.

Sage grouse ecology. South Dakota State University. Brookings. 2000.

Sage grouse and fire. South Dakota State University, Brookings. 2001.

Dogma and its role in management of upland game, University of Alaska, Fairbanks. 2002.

Sage grouse and the Endangered Species Act: politics and pollution in resource management. University of Alaska, Fairbanks. 2002.

Prairie grouse and elevated structures. National Wind Coordinating Committee. 2004.

Hunting, predation, translocation: the silver bullets? National sage-grouse local working group meeting. Reno, NV. 2005.

Challenging dogma, changing paradigms: game bird harvest management in the U.S. University of Idaho. 2006.

Voodoo science and the conservation of greater sage-grouse. Idaho State University. 2007.

Greater sage-grouse conservation. Idaho State Senate Natural Resources Committee.

2008.

Long term sage-grouse research: a look behind the scenes. Idaho Chapter, The Wildlife Society, Moscow, ID. 2009.

Sage-grouse and fire: Smokey the Bear was a good guy. Restoring the West Conference, Logan, UT. 2009.

Energy and wildlife: conflict or compromise? Idaho Wildlife Federation, Boise, ID. 2010.

Good fences make good neighbors – or do they: impacts of elevated structures on sage-grouse. Gunnison Sage-Grouse symposium, Gunnison, CO. 2011.

Sage-grouse: biology vs. bio-politics, business as usual in sagebrush country? Boise State University. 2011

Sage-grouse and sagebrush steppe: ecological science for the Idaho alternative. Idaho Governor's Sage-grouse Task Force Meeting. 2012.

OUTREACH

Presentations

Connelly, J. W. 1992. Wildlife in the Blackfoot area. Wappello Grade School, July 22, Blackfoot, ID.

Connelly, J. W. 1993. Idaho's desert grouse. Idaho Bird Hunters, September 23, Boise, ID.

Connelly, J. W. 1994. Sage grouse. American Falls Lions Club, January 25, American Falls, ID.

Connelly, J. W. 1994. Predators and prey. Blackfoot Middle School, May 31, Blackfoot, ID.

Connelly, J. W. 1996. Idaho Wildlife. Wapello Grade School, January 26, Blackfoot, ID.

Connelly, J. W. 1996. Idaho pheasants. Blackfoot Kiwanis Club, March 28, Blackfoot, ID.

Connelly, J. W. 1996. Fire and sage grouse. Blackfoot Rotary Club, October 29, Blackfoot, ID.

Connelly, J. W. 1997. Long-term changes in sage grouse populations in western North America. Presented at the summer meeting of the Washington Sportsmen's Association. July 29. Washington Depot, CT.

Connelly, J. W. 1999. The ecology and management of sage grouse in Idaho. Presented at the Upper Snake sage grouse local working group meeting. Feb. 1. Mud Lake, ID.

Connelly, J. W. 1999. The ecology and management of sage grouse in Idaho. Presented at the Statewide sage grouse local working group meeting. July 24. Twin Falls, ID.

Connelly, J. W. 1999. Effects of predation and hunting on adult sage-grouse Centrocercus urophasianus in Idaho. Presented at the Upper Snake sage grouse local working group meeting. Aug. 18. Mud Lake, ID.

Connelly, J. W. 1999. Rare grouse of the world with special emphasis on North America. Portneuf Audubon Society, Dec. 16. Pocatello, ID.

Connelly, J. W. 2000. Sage grouse population trends and management guidelines in Idaho. Presented at the monthly meeting of the Idaho Bird Hunters. Feb. 24. Boise, ID.

Connelly, J. W. 2000. Sage grouse conservation for the 21st century. Brown Bag seminar at the Idaho National Engineering and Environmental Laboratory. Nov. 8. Idaho Falls, ID.

Connelly J. W. 2000. Status of sage grouse and the Endangered Species Act. Presented to the Idaho National Engineering and Environmental Laboratory Project Management Team. Nov. 8 Idaho Falls, ID.

Connelly, J. W. 2005. Range-wide conservation assessment: greater sage-grouse and sagebrush habitats. Presented at Dubois Grouse Days, Apr. 8. Dubois, ID

Connelly, J. W. 2007. Greater sage-grouse: biology and politics in sagebrush country. August, Wyoming Science Center, Grand Teton National Park.

Connelly, J. W. 2010. Energy and wildlife: conflict or compromise? Idaho Wildlife Federation, Boise, ID.

Connelly, J. W. 2010. Sage-grouse research: approach and a summary of current and future work. West central Local Working Group meeting, July 20, Midvale, ID.

Connelly, J. W. 2012. The status and conservation of sage-grouse. Public Presentation, Idaho Farm Bureau, Blackfoot.

Connelly, J. W. 2013. Sage-grouse on the Blackfoot River drainage. Report to the Eastern Idaho Grazing Association. March 2013.

Activities

Member, IDFG greater sage-grouse threat assessment team

Lecturer, adviser for NRCS sage-grouse training

Sage-grouse surveys on the Blackfoot River drainage for the Eastern Idaho Uplands Local Working Group

Provided summary and synthesis remarks for Gunnison Sage-Grouse Symposium, Gunnison, CO

Panelist, Discussion of Idaho Governors Alternative, Idaho Cattlemen Meeting, Twin Falls.

Advisor, Theodore Roosevelt Conservation Partnership

Member, IDFG review team for BLM greater sage-grouse DEIS

AWARDS

1987 - Idaho Department of Fish and Game, Region 5 Merit Award.
1992 - Idaho Chapter, The Wildlife Society, Wildlife Professional of the Year Award.
1992 - Idaho Department of Fish and Game, Outstanding Technical/Professional Employee Award.
1993 - Idaho Chapter, The Wildlife Society, Ted Trueblood Communication Award.
1995 - USFS Technology Transfer and Research Award.
1998 - Idaho Chapter, The Wildlife Society, Ted Trueblood Communication Award.
2000 - Idaho Department of Fish and Game, Region 5 Special Recognition Award.
2001 - Idaho Department of Fish and Game, Outstanding Achievement in Research Award.
2004 - Idaho Department of Fish and Game, Department Special Recognition Award
2005 – Western Association of Fish and Wildlife Agencies Special Recognition Award
2005 - Idaho Department of Fish and Game, Department Image Enhancement Award
2005 – Western Association of Fish and Wildlife Agencies Special Contribution Award
2006—Idaho Chapter, The Wildlife Society, Special Recognition Award
2006—Northwest Section, The Wildlife Society, Einarson Award
2007—Fellow, The Wildlife Society
2008—Honor Alumni Award, College of Natural Resources, University of Idaho
2010—Patterson Award, Western Sage and Columbian Sharp-tailed Grouse Technical Committee
2011—Hamerstrom Award, Prairie Grouse Technical Committee
2012—The Wildlife Society, Publications Award for Edited Book

October 13, 2017

The Honorable Ryan K. Zinke
Secretary of the Interior
United States Department of the Interior
1849 C Street, NW
Room 6612
Washington, DC 20240

Dear Interior Secretary Mr. Zinke,

The purpose of this letter is to express our concerns regarding the *Report in Response to Secretarial Order 3353* (Report) and the October 11 Notice of Intent to reopen to amendment the Bureau and Land Management (BLM) and U.S. Forest Service's (USFS) Land Use Plans (LUPs). As scientists who have spent decades studying greater sage-grouse (sage-grouse) and sagebrush habitats, we assisted in the BLM and USFS efforts to revise and amend applicable LUPs to effectively conserve this important species. We are concerned that many of the specifics outlined in the Report as well as the decision to take public comment on possible amendments to the plans may weaken approaches in place to conserve sage-grouse populations before the measures established have been fully implemented or assessed. We want to emphasize that the science community continues to be available to provide ongoing consultation about how science can help inform strategies to sustain the conservation of sage-grouse on our federal public lands.

Our concerns stem from three basic observations about the Report:

1) Many recommendations have the potential to result in fewer acres of priority and general sage-grouse habitat limiting management options for the species;
2) Many recommendations have the potential to limit the ability of managers to effectively manage anthropogenic aspects of the sagebrush biome; and
3) Many recommendations have the potential to limit the ability of managers to effectively manage vegetative aspects of the sagebrush biome.

We recognize that the Report does not change policy, and we applaud several of the recommendations made in the Report. We fully support the collaborative approach being pursued, especially the full engagement of the States from the initiation of the LUP review and engagement with the Western Association of Fish and Wildlife Agencies (WAFWA). We also support the focus placed on improving coordination, increasing data sharing, initiating monitoring and research, and prioritizing staff and funding to implement on-the-ground conservation and restoration actions (Report pp. 1-4). We recognize that not everything is known, especially in regards to managing sagebrush ecosystems to improve the quality of those habitats for sage-grouse. Thus, a consistently applied and rigorous approach to plan implementation, management direction, evaluation and adaptation is critical moving forward. The LUPs were developed considering the best available science with the short-term goal of stabilizing populations by conserving key habitats throughout the sage-grouse range. The habitat preservation framework provided by the LUPs is critical as a foundation for realizing the long-term goal of increasing sage-grouse populations by restoring and enhancing sagebrush habitats. Given the uncertainty surrounding proactive management of sagebrush habitats coupled with the need to pursue innovative management approaches to achieve landscape-scale conservation of sage-grouse, the process of how the LUPs are implemented and evolve is as important as the actual management actions outlined in the plans. We are concerned that the current focus on amending the LUPs will detract from the critical task of building from those plans to realize enhanced conditions in currently designated priority and general habitats and stabilized or increasing sage-grouse populations.

Exhibit 2

An unprecedented level of collaboration among States, Federal agencies, and other stakeholders was required to amend and revise BLM and USFS LUPs to address sage-grouse populations and habitats. Those revising the LUPs considered the consistency, adequacy and durability of conservation measures relative to recommendations provided through the National Technical Team (BLM) and Conservation Objectives Team (USFWS) sage-grouse reports, ensuring that recommendations from the foremost sage-grouse experts were taken into account through the revision process. Further, decades of extensive published literature on sage-grouse and sagebrush habitats helped frame the BLM and USFS's management strategies. This literature is summarized in volume 38 of Studies in Avian Biology (*Greater sage-grouse: ecology and conservation of a landscape species and its habitats* edited by Dr. S. T. Knick and Dr. J. W. Connelly) as well as the USGS's Summary of Science report: *Summary of science, activities, programs, and policies that influence the rangewide conservation of Greater sage-grouse* (Manier et al. 2013).

It is worth noting that the Policy to Evaluate Conservation Efforts (PECE) (68 FR 15100) was used heavily as part of the September 2015 decision when considering the overall efforts of the States, private landowners, and the Federal LUPs. The PECE policy provides regulatory flexibility and is used by the USFWS to ensure regulatory certainty of conservation measures that have yet to be fully manifested. But the requirements of certainty of implementation and effectiveness of the plans must be met for those assurances to develop and support the USFWS' not warranted decision for sage-grouse in the future. Thus, the successful implementation of the LUPs is necessary to maintain the not warranted listing decision through interim reviews by the USFWS.

The sage-grouse is an indicator species for the health of the interior West's sagebrush steppe ecosystem, and healthy sagebrush habitats not only support over 350 plant and animal species including some of America's most iconic species of wildlife, but are essential for the economic sustainability of human communities in the western U.S. Today, sage-grouse are present in just over half their historical range, and the number of males counted each spring for the majority of populations across the range of the species has declined since the 1960s. A recent analysis by WAFWA suggested a long-term decline of approximately 1% annually from 1965 to 2015 (http://www.wafwa.org/). Declining populations and reduced distribution led the USFWS to conclude that the sage-grouse warranted protection under the Endangered Species Act, but this decision was overturned largely because of the regulatory certainty established by the amended and revised LUPs in combination with State conservation plans and efforts on private lands across the West.

In the following sections we elaborate on our three primary concerns and address some miscellaneous issues we identified in the Report.

1) Priority and General Habitat Management Areas

The Report makes several recommendations that could influence the amount of habitat being managed for sage-grouse. The DOI Sage-grouse Review Team (DOI Team) identified the need for flexibility to modify priority (PPH) and general (PGH) habitat management areas, including a potential plan amendment to "develop criteria for making future adjustments to habitat management area boundaries" (Report Appendix A, p. 17). Further, the DOI Team recommended potential plan amendments to consider eliminating general habitat management areas in Utah (Report Appendix A, p. 18) and removing Sagebrush Focal Area (SFA) designation (Report Appendix A, p. 17). Priority and general habitat designations were based on distributional patterns of nesting females from breeding areas (leks) in combination with the number of sage-grouse breeding on those leks and, in most instances, include the diversity of habitats required to sustain populations from lek complexes through their annual life-cycle. Sage-grouse are considered a landscape-scale species as populations generally inhabit large, interconnected expanses of sagebrush. Within this landscape, sage-grouse rely on habitats with a diversity of species and subspecies of sagebrush interspersed with a variety of other habitats (e.g., riparian

meadows, agricultural lands, grasslands). Habitats not dominated by sagebrush are usually intermixed with stands of sagebrush and are used by sage-grouse during certain times of the year (e.g., summer) or during certain years (e.g., severe drought). The research is unequivocal that those developing management approaches should view the landscape holistically from the need to provide large, functional, connected habitat patches that include the diversity of resources sage-grouse require seasonally and annually.

Approximately 30% of the area identified as the sage-grouse conservation area delineated in the Conservation Assessment of Greater Sage-grouse (2004) is designated habitat (i.e., PPH plus PGH), with approximately 14% of this area being designated as priority habitat. Further, approximately 42% of the current distribution of the species is designated as priority habitat. It is worth noting that because development is still allowed in PPH and, to a greater extent, PGH, degradation of designated habitats will continue to occur over time. Therefore, it is vital that we at least maintain the amount of habitat under greater protection established in the plans while also moving to increase habitat quality in these areas by improving sagebrush range health through enhancement and restoration.

We recommend that any modifications to sage-grouse habitat management boundaries consider the extent and diversity of habitats required by the species. The total amount of land currently identified as priority and general habitat should, at a minimum, not be reduced as a result of boundary modifications, and any areas meant to replace PPH or PGH lost as a result of boundary modifications should provide the species with high quality, diverse sagebrush habitats. SFAs should not be necessary if the quantity (at a minimum) and quality of priority habitats are maintained and managed appropriately.

2) Anthropogenic Considerations

The Report makes several recommendations meant to facilitate and promote the development of oil and gas reserves in sage-grouse habitats. The DOI Team recommends considering a potential plan amendment to rescind agency guidance on prioritizing leasing outside of important habitats, emphasizing to staff that all habitats are open for leasing (Report Appendix A, p. 2), and investigating "opportunities to provide additional waivers, modifications, and exceptions through policy or potential plan amendments" for leasing (Report p. 5) and "accommodating the need for mineral material sales" (sand and gravel) in priority habitat management areas (Report Appendix A, p. 13). The DOI Team further recommends evaluating potential plan amendments "to consider adjusting lek buffers" (Report Appendix A, p. 16), to "clarify disturbance and density requirements" (Report Appendix A, p. 2), and to "determine if a controlled surface use (CSU) stipulation could be changed" (Report Appendix A, p. 1). Although the DOI Team did not elaborate, no surface occupancy (NSO) stipulations in priority habitat management areas were also identified as an issue (Report Appendix A, p. 1). Surface disturbance thresholds and avoidance measures established in the LUPs are based on a substantial amount of data resulting from more than 25 investigations of the response of sage-grouse to energy development. All of the studies investigating the response of sage-grouse to oil and gas development report negative impacts of development on sage-grouse and no studies identify a positive influence of development on individuals, populations or habitats. Sage-grouse population-level declines in response to energy development result from avoidance of infrastructure during one or more seasons and reduced recruitment, productivity, and/or survival. Population declines have consistently been reported when well pad densities exceed 1 pad/square mile. Impacts to sage-grouse are most severe if the infrastructure associated with energy development occurs near sagebrush habitats, but population-level effects remain consistently discernible out to a distance of approximately 4 miles and impacts to 11 miles on trends in the number of males counted on leks range-wide have been reported.

We recommend maintaining current oil and gas infrastructure density and avoidance stipulations in priority habitats as the objective in priority habitats range-wide, and only considering changing these objectives in defined areas where site-specific sage-grouse data empirically and rigorously suggest these

stipulations can be modified without negatively impacting habitat use, fecundity or population growth-rate of the local sage-grouse population. It is important to note that changes to these objectives should be considered in both directions—e.g., increases to NSO distances and decreases to density thresholds should also be considered on a site-by-site basis based on local data.

With the intention of increasing flexibility to develop in priority habitats, the DOI Team recommends considering "changes to the Federal compensatory mitigation standard" (Report pp. 6-7) and a "potential plan amendment to change the net conservation gain standard" (Report Appendix A, p. 3). Compensatory mitigation is used to compensate for unavoidable impacts that remain after all appropriate avoidance and minimization measures have been applied, and is accomplished by replacing or providing substitute resources or environments through the restoration, creation, or enhancement of resources and their values, services, and functions. However, the literature suggests that a tremendous amount of uncertainty exists as to the vegetative and sage-grouse population outcomes of manipulations intended to restore, create or enhance sagebrush habitats. As such, compensatory mitigation measures should balance the spatial and temporal risk associated with mitigation projects and the predicted long-term effects. This should not be interpreted as discouraging high risk projects where substantial conservation gain is possible; in many respects, innovation in new mitigation strategies and practices need to be considered and explored to advance our understanding and ability to achieve landscape-scale conservation of sagebrush habitats. A net conservation gain standard is necessary to allay the inherent spatial and temporal risk associated with compensatory mitigation projects meant to create, enhance or restore sagebrush habitats.

We recommend strictly adhering to the mitigation hierarchy of avoidance, minimization, and compensation for unavoidable impacts. We additionally recommend maintaining a net conservation gain standard to balance the spatial and temporal risk associated with sagebrush habitat management. To achieve long-term success, it will also be necessary to strictly adhere to adaptive management principles when managing sagebrush habitats for sage-grouse. Following these principles will inherently facilitate the application and advancement of the LUPs and the conservation principles described therein and increase the likelihood of attaining net conservation gain long-term across the sage-grouse range. Further, it is important to ensure any measure of mitigation success be evaluated in biological and functional terms for sage-grouse.

3) Vegetation Management

The Report makes several recommendations that could limit the effectiveness of vegetation management, including livestock grazing, in sage-grouse habitats. The DOI Team recommends "a potential plan amendment to revise the habitat objectives tables" included in the LUPs (Report p. 7). The DOI Team further recommends clarifying "existing policy and regulations that allow animal unit months (AUMs) to increase based on forage availability" (Report Appendix A, p. 10). As with the scientific evidence supporting the energy development stipulations, the habitat objectives established in the LUPs are based on extensive published literature. These habitat objectives were established to provide sage-grouse with quality habitat conditions across seasons, and represent one of the few places in the LUPs where the underlying issue with sage-grouse of prevalent vegetative degradation across the sagebrush biome is directly addressed. Livestock grazing is the most widespread land use across the sagebrush biome. The long-term effects of grazing the sagebrush system are primarily seen as shifts in the state of the vegetation from native understory grasses and forbs to plant species more tolerant of grazing; this shift occurred in much of the West over a relatively short time-period of extensive overgrazing during drought conditions in the early 1900s. Because of historic impacts of livestock on plant species composition combined with successional change in sagebrush ecosystems, reduced numbers of livestock in the modern era has not reduced effects of grazing, but rather slowed the rate of vegetative degradation.

We recommend that vegetation goals are established relative to the ecological site paradigm and management strives towards restoring and maintaining vegetative conditions in the reference state. In

situations where results from the rigorous evaluation of site-specific data are not available, we recommend that the guidelines established for vegetation structure, cover, and composition in the LUPs be maintained as the objective in priority habitats. Because the values included in the habitat objectives tables were based on vegetative conditions measured at sage-grouse seasonal use locations throughout the species' range that were, in virtually all cases, grazed by livestock, we emphasize that areas where it is empirically demonstrated that site potential does not allow for the vegetative guidelines to be met will be infrequent and small (e.g., soil inclusions).

Miscellaneous Issues

1. The DOI Team recommended that "new captive breeding [of sage-grouse] efforts continue to be investigated" (Report p. 10). The scientific literature is conclusive in establishing that the captive-rearing of wildlife in general should be used sparingly and as a last resort when other conservation alternatives are unavailable or have been exhausted. The most extensive research on raising sage-grouse in captivity is from Colorado, where the brood augmentation approach pursued was met with limited success recruiting individuals into wild populations. The Attwater's Prairie-Chicken, a species similar to sage-grouse, has been bred in captivity since 1992, yet this program has yet to result in a self-sustaining wild population. Therefore, we recommend that the current focus remain on conserving and restoring the habitats sage-grouse depend on, and that resources that could help habitat efforts not be diverted to investigate a management alternative that is currently unnecessary.

2. The DOI Team recommended investigating "options for corvid control, including streamlining approval and reporting requirements" (Report p. 11). Limited information suggests predator control may benefit some game bird populations short-term in small areas with degraded and fragmented habitat. However, there is no evidence supporting the implementation of predator control programs long-term over large areas as an effective sage-grouse conservation tool. We recommend that the focus of sage-grouse management remain on habitat quantity and quality except in isolated cases where the empirical and rigorous assessment of site-specific data establishes that predation is limiting a population. In these isolated cases, the cause of the problem (e.g., habitat fragmentation) needs to be addressed concomitantly with the implementation of predator control.

3. The DOI Team recommends pursuing "statewide or range-wide population objectives or targets" (Report p. 11). Although we do not disagree with setting population objectives, we want to emphasize that a focus on populations cannot come at the expense of a focus on habitats. We agree with the DOI Team in that "the best method for determining sage-grouse viability is to assess a combination of habitat availability [and quality] and populations [assuming reliable population data], which are inseparable" (Report p. 11).

LUP Implementation

Ultimately, all conservation and management must occur at the local level. To be accomplished effectively and sustainably, conservation needs to be an integral facet of a community's identity—it needs to reflect the values of the community and meet the needs of its individuals. Given the commitment established in the Report of continuing "to work with partners to prioritize staff and funding to implement on-the-ground actions to conserve and restore sage-grouse habitats" (Report p. 1), partnership building and coordination needs to occur at all management and conservation levels (i.e., Federal, State, regional and local). Science-based, community-level programs built on a regional framework and conducted across the sagebrush ecosystem are the most efficient way we can successfully and sustainably engage in proactive conservation of this system. We recommend putting more thought into the bullet list included in Section IV d of the Report (p. 12), and developing the cross-scale coordination suggested by the narrative in this Section into a holistic science-based conservation program that benefits the wildlife and people reliant on sagebrush ecosystems across the West.

We are concerned that following many of the Reports' recommendations will lead to an overall loss of sage-grouse habitat quantity and quality which in turn may result in additional population declines. We are further concerned that the Federal focus on altering the current status could derail developing efforts that will progress our ability to effectively manage the sagebrush ecosystem—for example: WAFWA's Sagebrush Conservation Strategy; NRCS' Sage-Grouse Initiative; the Southern Rockies and Great Northern LCC Green River Basin LCD project; multiple local-scale collaborations between conservation, industry and agricultural interests; etc. It is our opinion that now is not the time to look backwards and challenge the work done by countless stakeholders in support of sage-grouse conservation. Now is the time to build on the momentum and allow the process to mature and evolve from the foundation provided by the LUPs to realize the sustained conservation of sagebrush landscapes and the wildlife and people dependent thereon.

To reiterate, the science community is available to meet with you and your staff and provide ongoing consultation about the available science as well as how we can collectively move forward with a science-based approach to managing and conserving sage-grouse and sagebrush habitats on our federal public lands. We thank you for your consideration of our points and recommendations.

Respectfully,

Matt J. Holloran, PhD
William L. Baker, PhD
Joseph R. Bohne
Clait E. Braun, PhD
John W. Connelly, PhD
Edward O. Garton, PhD
Angela L. Hild, PhD
Alison G. Lyon-Holloran
Kerry P. Reese, PhD
Terry Z. Riley, PhD
E. Thomas Rinkes
Alan R. Sands PhD
James S. Sedinger, PhD
Steven J. Slater, PhD
Rollin D. Sparrowe, PhD
Carl L. Wambolt, PhD
Gary C. White, PhD

Cc: BLM Staff – J. Ruhs; K. Benedetto; C. Younger; L Thurn; I Yates; J. Munson; J. Karuzas; J. Perez; B. Clayton; G. Shoop; A Wilhelm; T. Murphy; M. Magaletti; M. Todd; J. Carlson; J. Raby; M. Anthony; J. Connell; Q. Bahr; E. Roberson; E. Husse; M. Rugwell.