DRAFT

To: Dale Hall
From: Renne Lohoeffner
Re: Gunnison sage-grouse

Taxonomy

In response to Julie MacDonald's concerns about whether the AOU taxonomy for Gunnison sage-grouse is correct, we asked Dr. Steve Chambers to look at the question of whether the paper published in the *Wilson Bulletin* (Young, Braun, Oyler-McCance, Hupp, Quinn 2000. A New Species of Sage-Grouse from Southwestern Colorado, *Wilson Bulletin* 112(4): 445-453) was based on good science.

Dr. Chambers is well qualified to conduct this review. He is currently Senior Scientist in the Division of Ecological Services, U. S. Fish and Wildlife Service Southwestern Regional Office, Albuquerque, NM. Dr. Chambers received his Ph.D. in Zoology from the University of Florida. He has published in the area of taxonomy and genetics, including the following:

Chambers, S. M. 1995. Spatial structure, genetic variation, and the neighborhood adjustment to effective population size. *Conservation Biology* 9(5):1312-1315.

Schonewald, C., S. M. Chambers, B. MacBryde, and L. Thomas (eds.). 2004 reprinting of Schonewald-Cox, et al. 1983. *Genetics and Conservation; A Reference for Managing Wild Animal and Plant Populations*. The Blackburn Press, Caldwell, New Jersey.

Chambers, S. M., and J. Bayless. 2004 reprinting of Chambers and Bayless 1983. Systematics, conservation, and the measurement of genetic diversity. Chapter 21 in. C. S. Schonewald et al. 1983.

In addition to reviewing the Wilson Bulletin article, Dr. Chambers examined the literature relied on in that article, including:

American Ornithological Union, 1998, Checklist of North American Birds, 7th ed., p. 119.
American Ornithological Union, 2000, [Checklist Supplement] The Auk 117:847-858.
Hupp and Braun, 1991, Wilson Bulletin 103:255-261.
Kahn, et al., 1999, The Auk 116:819-824.
Oyler-McCance et al., 1999, Molecular Ecology 8:1457-1465.
Oyler-McCance et al., 2005, Journal of Wildlife Management 69:630-637.
Young et al., 1994, Animal Behavior 47:1353-1362.

Dr. Chambers considered both behavior and genetics in his review. He found that the most striking evidence bearing on the taxonomic standing of Gunnison sage-grouse is the unique reproductive display behavior exhibited by Gunnison males. The data on the divergence in courtship display between greater sage-grouse and Gunnison sage-grouse is convincingly presented by Young et al. (1994). This is taxonomically important because of the role of female choice in the lek breeding systems of sage-grouse. It indicates that there is likely no interbreeding between the Gunnison and greater sage-grouse.

In addition the separation between the Gunnison and greater sage-grouse is supported by genetic evidence. The mitochondrial DNA (mtDNA) data of Kahn et al. and Oyler-McCance et al. do not

show the kind of fixed haplotype differences or the "reciprocal monophyly" that some recent workers would demand for recognition of separate species, but they do show that greater sage-grouse and Gunnison sage-grouse have led separate evolutionary histories and not interacted reproductively for some time. The G haplotype is found only in Gunnison sage-grouse, and at a low frequency, evidence there has not been recent reproductive interaction that would have allowed G to spread to greater sage-grouse populations. Further, Dr. Chambers noted that Oyler-McCance et. al.'s (1999) use of analysis of molecular variance (AMOVA) to analyze the mtDNA data is a good way to test the correspondence of genetic variation with various hypotheses of geographic and/or geographic structure. Oyler-McCance et. al. found that 65% of the total variance was accounted for by the level of classification separating greater sage-grouse from Gunnison sage-grouse. According to Dr. Chambers, this is a large component and indicates significant genetic difference despite the lack of fixed haplotype differences between sage-grouse and Gunnison sage grouse.

Dr. Chambers also found that the separation indicated by mtDNA studies was upheld when nuclear DNA samples were analyzed. The analysis and presentation of the microsatellite data by different tree-building methods in the 1999 paper give a consistent picture separating Gunnison sage-grouse from greater sage-grouse.

Dr. Chamber's concludes that from the standpoint of the formal procedures of taxonomy, the formal description of the species by Young et al. (2000) of the Gunnison sage-grouse fully satisfies the requirements of the International Code of Zoological Nomenclature, and provides a convincing review of the supporting evidence.

Status

The Regional and field offices with lead for Gunnison sage-grouse have been working diligently on conservation of the Gunnison sage-grouse.

The Sage-Grouse working group is a local group representing federal, state, and local agencies as well as individuals from environmental and local groups interested in preserving the Gunnison Sage-Grouse. The Group was formed in 1994 and shared a common goal of seeing local Sage-Grouse form stable and healthy populations. Together, individuals in the group formed a conservation plan which was completed in 1998. The challenge facing the partners which signed the Sage-Grouse plan today is the actual implementation of the plan.

Within the Sage-Grouse conservation plan specific conservation goals and objectives are proposed to restore habitat and population numbers of the Sage-Grouse to the Gunnison Basin. In addition, over 50 conservation actions are proposed. Current Actions include lek enhancement, riparian area restoration, nest habitat treatments, improved livestock management, developing Best Management Practices, fund raising, education and information, and nest predator research.

The Colorado Division of Wildlife (CDOW) and the Fish and Wildlife Service (Region 6, Western Colorado field office) completed a draft Candidate Conservation Agreement with Assurances (CCAA) for the Gunnison sage-grouse in April 2005. The purpose of the CCAA is

for the Service to join with the CDOW and participating private landowners to implement habitat protection and/or enhancement for Gunnison sage-grouse on non-Federal land in Colorado, so as to contribute to making it unnecessary to list the species. The Service currently is considering public comments received on the draft CCAA and related documents. Under the CCAA, participating landowners will be covered by assurances that they will not be asked to provide additional conservation beyond their CCAA commitment for the species if it becomes listed under the Endangered Species Act.

The Region hopes to have the CCAA completed this calendar year. After the CCAA is signed and the associated permit is issued under section 10(a)(1)(A) of the ESA, the Service and CDOW will need to sign up enough participating landowners to be able to address enough threats so as have the foundation for a defensible basis to not list the species. Private lands comprise approximately 43 percent of the occupied habitat and are the lands of greatest concern regarding the present or threatened destruction, modification, or curtailment of the habitat and range of the species. It is the program's hope that the species can be conserved without having to list it.

Options for Next Steps

1) Obtain further peer review of the *Wilson Bulletin* article and supporting papers. While this might be desirable, it is not strictly necessary, as the article was published in a respected, peer-reviewed publication.
2) Comply with the court order and propose the species for listing. In the listing package discuss the conservation agreement and encourage landowners to participate in order to conserve the species without having to list it.

Recommendation

I recommend we adopt option 2, and move ahead with a proposal, meanwhile attempting to sign up as many landowners as possible under the CCAA.