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The Greater Sage-Grouse Does Not Warrant Listing Under the Endangered Species Act

A White Paper prepared for the Elko County Commissioners
by Western Range Service on May 12, 2012

Introduction

Numerous petitions to the US Fish and Wildlife Service (FWS) requesting that the greater sage-grouse be listed under the Endangered Species Act (ESA)[1] brought one question to the forefront, should the greater sage-grouse be listed as endangered or threatened? Many believe that the answer is a settled "Yes" based upon the March 23, 2010 FWS Findings[2] which concluded that "listing the greater sage-grouse (rangewide) is warranted, but precluded by higher priority listing actions." See FWS Findings[2], page 13910.

However, a thorough review of all the information presented in the FWS Findings demonstrates that the FWS conclusion that the greater sage-grouse is warranted for listing is not supported by the best scientific and commercial data that was considered in their analysis. The purpose of this paper is to revisit the question in light of all of the data that was presented in the March 23, 2010 FWS Findings.

Should the greater sage-grouse be listed as endangered or threatened?

Any answer to this question must be consistent with the primary purposes of the ESA and its definitions of endangered and threatened species. The ESA states that the primary purposes of the Act are to: 1] "provide a means whereby ecosystems upon which endangered species and threatened species depend may be conserved" and, 2] "provide a program for the conservation of such endangered species and threatened species" (see ESA, Sec. 2(b) Purposes)[1]. Since these purposes apply specifically to "endangered species and threatened species" a finding that a species is either endangered or threatened must occur before a species, or the ecosystem (habitat) upon which it depends, falls under the purview of the Act.

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1 **ESA:** The Endangered Species Act of 1973. See www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/legislation.Par.93179.File.dat/esaall.pdf.

2 **FWS Findings:** Fish and Wildlife Service, 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered. Federal Register / Vol. 75, No. 55 / Tuesday, March 23, 2010 / Proposed Rules. See www.gpo.gov/fdsys/pkg/FR-2010-03-23/pdf/2010-5132.pdf.

By definition under the ESA, an "endangered species" is "any species which is in danger of extinction" and a "threatened species" is "any species which is likely to become an endangered species within the foreseeable future" (see ESA, Definitions, Secs. 3(6) and 3(20))[1]. Thus, under the ESA, a species can only be listed as endangered if it faces imminent extinction, or as threatened if it is at risk of extinction in the foreseeable future.

Given the different definitions for an endangered species and a threatened species under the ESA, the initial question (Should the greater sage-grouse be listed as endangered or threatened?) becomes two distinct questions. First, does the greater sage-grouse face imminent extinction and therefore warrant listing as an endangered species? Second, is the greater sage-grouse at risk for extinction in the foreseeable future and therefore warrant listing as a threatened species?

Does the greater sage-grouse face imminent extinction and therefore warrant listing as an endangered species?

In order to address this question, it is necessary to know the minimum effective population of greater sage-grouse needed to maintain long-term genetic diversity and safeguard the species from the risk of imminent extinction. The US Fish and Wildlife Service's analysis in their March 23, 2010 FWS Findings identified geographically isolated greater sage-grouse populations of fewer than 50 breeding adults as being at short-term risk of extinction, and identified geographically isolated sage-grouse populations of fewer than 500 breeding adults as being at long-term risk of extinction (see FWS Findings, page 13959)[2].

The FWS Findings further reported "a minimum effective population size must be 5,000 individuals to maintain evolutionary minimal viable populations of wildlife" (see FWS Findings, page 13959)[2]. With respect to greater sage-grouse in particular, the FWS Findings reported "up to 5,000 individual sage-grouse may be necessary to maintain an effective population size of 500 birds" because of comparatively low reproductive rates, a highly polygamous mating system, individual male breeding success, and juvenile death rates (see FWS Findings, page 13985)[2].

The current estimated population for greater sage-grouse exceeds 535,000 birds (see FWS Findings, Table 4, page 13921)[2], which is 107 times greater than a minimum effective population of 5,000 birds. The FWS Findings express concern that many greater sage-grouse populations have already fallen well below a population of 5,000 birds, potentially compromising their genetic diversity (see FWS Findings, page 13985)[2]. However, for purposes of determining if greater sage-grouse are endangered, the question is not if there are any geographically isolated populations that fall below 5,000 birds, but rather if there is a geographically connected population (to allow the free exchange of genetic information) that exceeds a minimum effective population of 5,000 birds. If a single geographically connected population exceeding 5,000 birds exists, the species as a whole does not face imminent extinction, and thus does not legally qualify as "endangered" under the ESA.

The FWS Findings identified two strongholds of contiguous sagebrush habitat for greater sage-grouse, the southwest Wyoming Basin (southwest Wyoming and northwest Colorado) and the Great Basin (straddling Idaho, Oregon, and Nevada) (see FWS Findings, pages 13950 and 13962)[2]. These stronghold areas contain high densities of breeding males and sizeable greater sage-grouse populations that have been maintained even under the alleged existing threat factors, and these are expected to remain strongholds in fifty years (see FWS Findings, pages 13962, 13986, 14008, and 14009)[2].

These stronghold areas are each projected to currently support greater sage-grouse populations that are at least 10 times larger than a minimum effective population of 5,000 birds, and are each projected to maintain populations that are at least 5 times larger than the minimum effective population in thirty years if existing and anticipated threat factors continue without constraint. Thus, there are at least two discrete greater sage-grouse populations that currently greatly exceed a minimum effective population of 5,000 interbreeding birds, and they are expected to continue to greatly exceed such a minimum effective population over the next thirty years, so the species does not face imminent extinction and does not legally qualify as "endangered" under the ESA.

Is the greater sage-grouse at risk for extinction in the foreseeable future and therefore warrant listing as a threatened species?

The FWS Findings reported contemporary rates of decline for greater sage-grouse estimated by several sources. Connelly *et al.* 2004 estimated the rate of decline from 1986 to 2003 to average 0.37% per year, and reported that some populations actually increased during that period (see FWS Findings, page 13922)[2]. At that rate of decline, it would take more than 1,260 years for the estimated current greater sage-grouse population to dwindle to a minimum effective population of 5,000 birds rangewide, and it would take more than 1,060 years for each of the stronghold areas to fall below a minimum effective population of 5,000 birds. In contrast, WAFWA 2008 estimated the rate of decline from 1985 to 2007 to be 1.4% per year (see FWS Findings, page 13922)[2]. At that rate of decline, it would take more than 330 years for the estimated current greater sage-grouse population to dwindle to a minimum effective population of 5,000 birds rangewide, and it would take more than 280 years for each of the stronghold areas to fall below a minimum effective population of 5,000 birds.

Speculating about what might occur 280 to 1,260 years from now reaches into the remote future, well beyond the foreseeable future. The greater sage-grouse is not at risk for extinction in the foreseeable future, so is not legally qualified to be listed as "threatened" under the ESA.

The greater sage-grouse is not warranted for listing as endangered or threatened.

As discussed above, the greater sage-grouse is not faced with imminent extinction and is not at risk for extinction in the foreseeable future, so is not legally qualified to be listed as either "endangered" or "threatened" under the ESA.

The FWS Findings' conclusion to the contrary (finding that the greater sage-grouse is warranted for listing rangewide) is not supported by the best scientific and commercial information disclosed therein. The conclusion that listing is warranted also conflicts with subsequent estimates that such a listing would require ESA restrictions to be imposed within the 75% breeding density area which accounts for approximately 400,000 birds within 27% (50 million acres) of the currently occupied greater sage-grouse range (186 million acres) (see Doherty *et al*. 2010, page 2)[3].

If the greater sage-grouse were really rare enough to warrant listing under the ESA, it is unconceivable that its population could be so numerous and widespread that the listing would require protection of more than 400,000 individual birds across a swath of land covering over 50 million acres. Given that greater sage-grouse are so numerous and well distributed, and are projected to persist so far into the future under existing circumstances, it is nonsensical to classify the species as endangered or threatened.

Other Concerns

The FWS Findings attempt to justify their warranted but precluded finding based upon several other concerns, including population trends, habitat fragmentation (primarily due to oil and gas development in the Wyoming Basin and interrelated wildfire and spreading invasive plant communities in the Great Basin), and adequacy of regulatory mechanisms to protect greater sage-grouse. However, the cumulative impact of all of these concerns is addressed in the above described analysis regarding the minimum effective population needed to safeguard the greater sage-grouse from imminent extinction and the risk of extinction in the foreseeable future.

Thus, regardless of the seriousness of these concerns, they do not rise to the level, singularly or in combination, to result in a need to list the greater sage-grouse under the ESA. Since the greater sage-grouse is not legally qualified to be listed as either "endangered" or "threatened" under the ESA, any perceived need to address these concerns regarding sage-grouse management cannot be compelled under the color of the ESA.

Population Trends

The FWS Findings admit that greater sage-grouse "numbers are difficult to estimate due to the large range of the species, physical difficulty in accessing some areas of habitat, the cryptic coloration and behavior of hens (Garton *et al*. in press, p. 6), and survey protocols" and ultimately conclude "since neither presettlement nor current numbers of sage-grouse are accurately known, the actual rate and magnitude of decline since presettlement times is uncertain." See FWS Findings[2], pages 13921 and 13923.

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3 **Doherty:** Doherty et. al., September 24, 2010, *Mapping breeding densities of greater sage-grouse: A tool for range-wide conservation planning, 24 September 2010*. See www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs.Par.46599.File.tmp/GRSG%20Rangewide%20Breeding%20Density.pdf.

Despite the recognition that the rate and magnitude of change in greater sage-grouse populations over time is uncertain, the FWS Findings assume that greater sage-grouse populations have significantly declined from pre-settlement populations based primarily upon conclusions from several sources indicating that "sage-grouse population numbers in the late 1960s and early 1970s were likely two to three times greater than current numbers". See FWS Findings[2], page 13922. Note that the cited high populations in the late 1960s and early 1970s tell us nothing about pre-settlement numbers. The FWS Findings report that "three groups of researchers using different statistical methods (but the same lek count data) concluded that rangewide greater sage-grouse have experienced long-term population declines in the past 43 years, with that decline lessening in the past 22 years." See FWS Findings[2], page 13923. These recent historical observations are consistent with testimony of Nevada residents that have first-hand memories dating back that long ago, or earlier, some as far back as the 1930s. But again, looking back 43 years, or even 80 years, tells us nothing about pre-settlement greater sage-grouse numbers.

The FWS Findings ultimately conclude "(a)lthough the declining population trends have moderated over the past several years, low population sizes and relative lack of any sign of recovery across numerous populations is troubling." See FWS Findings[2], page 13987. But this conclusion is based primarily upon the observed greater sage-grouse population declines from the high numbers in the 1960s to today, which cannot be used to establish how current greater sage-grouse populations compare to pre-settlement populations. Yet, based primarily upon estimated populations at these two points in history, the FWS Findings assume a relatively linear trend line for sage-grouse populations, and thus presume that pre-settlement greater sage-grouse populations were abundant.

The FWS Findings claim that "(e)arly reports suggested the birds were abundant throughout their range" and estimate that historical populations ranged from 1.6 million to 16 million birds. See FWS Findings[2], pages 13920 and 13921. They then look forward in time and forecast that without regulatory intervention, a persistent downward trend will continue into the future, and sage-grouse populations will eventually reach levels near or below the minimum effective population, putting the species at risk for eventual extinction. They seem oblivious to the fact that at the maximum estimated contemporary (1985 to 2007) rate of decline of 1.4% annually (see FWS Findings, page 13922)[2] it would take over 330 years for the estimated current greater sage-grouse population to dwindle to the minimum effective population of 5,000 birds, a time frame that reaches way past the foreseeable future.

The greater sage-grouse population trend assumed by the FWS Findings is depicted graphically by the dashed grey trend line in Figure 1 on page 11 herein. The downward trend between the 1960s and today is assumed to be relatively steep due to rapid agricultural conversion of sagebrush habitat starting in the late 1960s. Except for a period of accelerated decline associated with commercial hunting in the 1930s, the downward trend in greater sage-grouse populations is projected to extend back in time prior to the 1960s at a somewhat slower rate of decline.

Likewise, the downward trend in greater sage-grouse populations is forecast to continue into the foreseeable future, at a slightly slower rate. This forecast leads to the conclusion that greater sage-grouse populations will eventually reach levels near or below the minimum effective population (as high as 5,000 breeding adults), putting the species at risk for eventual extinction. See the dashed grey trend line depicted in Figure 1, pg. 11 herein.

However, we know from documented sources that the assumed higher greater sage-grouse population levels in the early and mid 1800s depicted by the dashed grey trend line are simply wrong, at least with respect to known greater sage-grouse population levels at various points in the recorded history of the Great Basin. Greater sage-grouse within the *Western Region*, particularly the Great Basin, were scarce during the pre-settlement period, much less abundant than today. Ira Hansen, Nevada State Assemblyman, prepared a report (available from Western Range Service upon request) regarding pre-settlement greater sage-grouse populations throughout Nevada and the Great Basin based upon written accounts of early explorers in the region. Those early written accounts indicate that between about 1820 and 1850, greater sage-grouse were uncommon, being observed only rarely by the explorers, and were seldom included in the diets of the Native Americans due to the scarceness of the bird.

Similarly, in Part III of the King Exploration Report (King)[4] based upon field-work from June 1867 to August 1869, Ornithologist Robert Ridgway reported "birds characteristic of the sage-brush are not numerous, either as to species or individuals, but several of them are peculiar to these districts;" including *Centrocercus urophasianus* (greater sage-grouse). See King[4], page 324, underlined emphasis added. Regarding greater sage-grouse, Ridgway reported "(a)lthough this large and well-known Grouse was met with throughout the sage-brush country between the Sierra Nevada and the Wahsatch (sic), we saw it so seldom that little was learned of its habits, particularly during the breeding-season." See King[4], page 600, underlined emphasis added.

Lest anyone assume that sage-grouse were seldom seen during these explorations because the vegetative cover was significantly heavier than it is today, and thus allowed the birds to better hide themselves, consider Ridgway's following characterization of the sagebrush communities under the section titled *Birds of the sage-brush* (see King, page 323)[4]:

> The term "sage-brush" is the western vernacular for that shrubby growth which prevails over the valleys, mesas, and desert mountain slopes of the Great Basin to the utter exclusion of all other vegetation, except in isolated and extremely restricted places. One species, the "everlasting sage-brush" (Artemisia tridentata), composes by far the larger part of that growth, "covering valleys and foot-hills in broad stretches farther than the eye can reach, the growth never so dense as to seriously obstruct the way, but very uniform over large surfaces, very rarely reaching to the saddle-height of a mule, and ordinarily but half that altitude."

4 **King (King Exploration Report):** United States Geological Exploration of the Fortieth Parallel. Clarence King, Geologist-in-charge. Part III. Ornithology. By Robert Ridgway. November 18, 1876. See www.archive.org/details/cu31924000092373.

The forecast that greater sage-grouse populations will continue to significantly decline into the foreseeable future also appears to be wrong based upon recent studies within the Great Basin. Nevada Department of Wildlife Studies report that greater sage-grouse populations increased within the state from 2008 through 2010. A complete picture of Great Basin greater sage-grouse numbers since written records began indicates:

1] pre-settlement populations were low, far less than today, but well scattered;

2] populations dramatically increased between the late 1800s and early 1900s;

3] populations peaked in about 1930 and remained high through the 1960s (perhaps interrupted by a moderate dip due to commercial hunting);

4] populations declined rapidly from the 1970s through about 2000;

and,

5] populations declined more slowly from 2000 through 2010, and have even increased during the last part of this period in certain locations.

Figure 1 on page 11 herein displays these circumstances graphically. All available information regarding estimated Great Basin greater sage-grouse numbers from the early 1800s to present is shown as triangular data points in Figure 1, connected by a smoothed black line. To determine the overall direction of change in Great Basin greater sage-grouse populations over time, a linear trend line[5] for the Great Basin data is depicted in Figure 1 as a solid grey line, which increased over time. This is the exact opposite of the assumed downward trend predicted by the FWS Findings based upon the period between the 1960s and the present. It is unreasonable to base conclusions regarding long-term population trends only upon knowledge regarding population levels at two points in history, 1960 and today, when we have knowledge regarding sage-grouse populations at other times.

When interpreting graphic representations of data like that presented in Figure 1 on page 11 herein, it is helpful to develop biologically relevant explanations for the points where the population curve significantly changes slope or reverses direction. The population trend explanations suggested by the FWS Findings have the potential to explain only two of the deflections shown in Figure 1 for Great Basin greater sage-grouse populations. Commercial hunting could explain the population decline depicted in the 1930s, and agricultural conversions may partially explain the alleged “rapid” population decline beginning in about 1970. However, agricultural conversions were taking place as early as the turn of the century, and Great Basin greater sage-grouse populations were significantly increasing at that time, rather than decreasing. Thus, while agricultural conversions may help explain the population decline beginning in about 1970, they are counter-intuitive when trying to explain the rapid population increases that occurred at the turn of the century.

5 The only purpose for fitting this linear trend line to non-linear data was to determine whether the overall direction of change over time was upward or downward. A calculated linear trend based upon non-linear data is not very useful for any other purpose.

Indeed, human disturbances of all sorts, roads, railways, fences, reservoirs, towns, homesteads, farms, mines, etc. flourished in the early to mid 1900s, and so did the sage-grouse. The mere presence of human activity seems to have little biologically relevant connection to sage-grouse population trends. However, specific human activities appear to correlate positively with greater sage-grouse population trends. Livestock grazing management, with its associated intensive development of meadows, hayfields, and surface water sources increased markedly in the Great Basin in the late 1800s and early 1900s, and greater sage-grouse populations boomed.

During this period, high livestock densities (both sheep and cattle) reduced fine wildfire fuel loads across the Great Basin, and wildfires were relatively rare and small. Higher densities of livestock dung also supplied an abundance of insect activity, particularly in closely grazed meadows and riparian areas, and the close grazing stimulated succulent new herbaceous growth and increased the forb component in these meadows and riparian areas, thereby increasing the quantity and quality of the forage supply for sage-grouse. At the same time, concerted predator control was practiced. In fact, predator control was encouraged, subsidized, and implemented on a vast scale by Federal, State, and County governments, and was conducted by individuals throughout the west.

By the mid 1900s, Federal and State regulations were implemented and all of the grazing management practices discussed above were controlled and moderated. The greater sage-grouse population boom moderated at about the same time. By the late 1960s, livestock numbers and grazing levels were significantly scaled back across the west, and predator control programs were largely curtailed. Fire fuel levels increased, and the incidence of large-scale wildfires rose exponentially. Greater sage-grouse population trends reversed and started to rapidly decline.

Thus, intensive livestock management which diminished the frequency and size of wildfires, and concerted predator control which greatly reduced greater sage-grouse loses to these killers, are management actions in the Great Basin that seem to be highly relevant to the biology of the greater sage-grouse and help explain the trajectory of their populations over time. As shown in Figure 1 on page 11 herein, it is reasonable to assume that a return to effective management to increase livestock grazing levels, reduce fire fuel loads and wildfire impacts, and increase predator control would result in another significant upward trend in greater sage-grouse populations.

Habitat Fragmentation

Proposed greater sage-grouse conservation measures to provide heavier cover levels through further livestock grazing reductions, and the lack of conservation measures to address ever increasing predation levels, are a prescription to assure that greater sage-grouse populations ultimately decline. Heavier cover for greater sage-grouse translates to higher fire fuel loads across the landscape, and substantial fuel loads make large-scale wildfires inevitable in many sagebrush communities, particularly within the Great Basin area. Repeat burns increase the conversion of plant communities to cheatgrass, which increases wildfire frequency and limits the ability of sagebrush communities to re-establish, thereby increasing the fragmentation of greater sage-grouse habitat.

Thus, conservation measures that intend to benefit greater sage-grouse by providing them with more hiding cover will ultimately harm the species by converting significant swaths of existing habitat to annual grasslands that provide no habitat value for greater sage-grouse. This will concentrate the remaining birds in an ever shrinking area, making them more vulnerable to poorly controlled predator populations.

In contrast, returning to the management practices discussed above under the heading "Population Trends" will reduce the risk of large-scale wildfires. This will prevent the habitat fragmentation the occurs as a result of such fires, particularly within the Great Basin area.

Adequacy of Regulatory Mechanisms

The FWS Findings cited a perceived inadequacy of regulatory mechanisms as an important factor in their finding that the greater sage-grouse is warranted for listing under the ESA. However, their analysis completely failed to recognize or discuss the fact that many of the regulatory mechanisms that are thought to benefit greater sage-grouse have already been imposed in the Nation's Wilderness Areas, National Wildlife Refuges, National Parks, and National Conservation Areas.

Less than 1% of the current greater sage-grouse breeding population needs to be conserved to support a minimum effective population as high as 5,000 birds. Because the species is heavily concentrated in high-quality portions of its occupied range (see Doherty, page 2)[3], less than 0.15% of the total acreage in the highest breeding density portions of the occupied range needs to be conserved to support the minimum effective population.[6]

Likely, far more than 5,000 greater sage-grouse, and more than 0.15% of the species high quality breeding habitat, are located within existing Wilderness Areas, National Wildlife Refuges, National Parks, and National Conservation Areas. Thus, these nationally designated areas likely already support more greater sage-grouse than the minimum effective population needed to safeguard the species from extinction. Further, these nationally designated areas are already managed under special regulatory mechanisms that in many instances mirror the proposed mechanisms that current sage-grouse planning strategies recommend for conservation of the species and its habitat.

Such nationally designated areas have the potential to protect a minimum effective population of greater sage-grouse under the type of regulatory mechanisms that the FWS claims will provide them with sufficient protection from human disturbances and development. Thus, analysis of the status of the greater sage-grouse needs to include evaluation of its populations and trends in these nationally designated areas to determine how many greater sage-grouse they contain, and the extent to which their habitats are sufficient to sustain a minimum effective population of 5,000 birds under the regulatory mechanisms that are already in place.

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6 Calculations: 5,000 effective pop. ÷ 535,000 current pop. * 100 = 0.93% of population needed; 3.9% area ÷ (25% / 0.93%) = 0.15% area needed (see Doherty, page 2 which reports that 25% of the known breeding population resides in 3.9% of its occupied range)[3].

If analysis of these nationally designated areas confirms that they currently support more than 5,000 greater sage-grouse, and demonstrates that their populations have been maintained or have increased under the regulatory mechanisms already implemented, then there is no need or justification, legally or biologically, to implement additional conservation measures anywhere else in the bird's occupied range. In such case, the greater sage-grouse does not need to be listed under the ESA because its existence and trend in these nationally designated areas alone is sufficient to safeguard it from extinction.

In contrast, if analysis demonstrates that greater sage-grouse population trends in these nationally designated areas have declined, then the entire line of reasoning regarding the factors responsible for observed greater sage-grouse population trends must be reevaluated. If greater sage-grouse population declines have occurred in these nationally designated areas that received such recognition because of their expansive, wild, undisturbed characteristics, and have been largely protected from human disturbance and development since their designation, then factors other than habitat loss, destruction, and fragmentation due to man's activities must be responsible for the greater sage-grouse population declines. Likewise, if greater sage-grouse populations have declined in these nationally designated areas despite the regulatory/policy mechanisms that constrain their use, all recommendations to implement similar regulatory restrictions across vast additional acreages of the greater sage-grouse range must be rejected entirely.

If regulatory/policy controls to minimize human disturbance have failed to allow greater sage-grouse populations to flourish within the vast wilderness areas and other nationally designated conservation areas, then it is unreasonable to apply such draconian control measures to broad landscapes beyond the boundaries of these areas in the vain hope that such regulations will somehow achieve in other locations what they failed to achieve in areas that are already protected. To implement regulatory mechanisms that are certain to severely interfere with other valid existing uses of the landscape and negatively impact local and regional economies in the face of evidence that such mechanisms did not improve the plight of the greater sage-grouse in these nationally designated areas would be unreasonable, irrational, and counter-productive. Instead, if the minimum effective population of greater sage-grouse necessary to protect the species from extinction cannot be supported within such nationally designated areas, then management practices that were in place when greater sage-grouse populations dramatically increased from the mid 1800s to early 1900s need to be identified and implemented again in other areas, including increased livestock grazing to reduce wildfire fuel loads, and concerted predator control practices.

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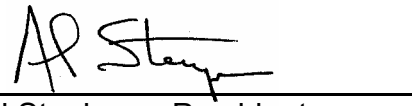
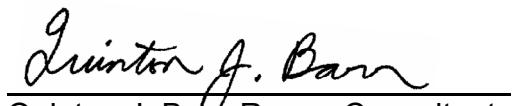


Al Steninger, President



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May 12, 2012

Figure 1. Historic Greater Sage-Grouse Population Trends