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Farming and Livestock

P.O. BOX 12
SMITH, NEVADA 89430

February 10, 2014

Public Comments Processing,
Attn: FWS–R8–ES–2013–0072;
Division of Policy and Directives Management;
U.S. Fish and Wildlife Service;
4401 N. Fairfax Drive,
MS 2042–PDM;
Arlington, VA 22203.

re: FIM Corporation comment regarding the proposed listing of Bi-State DPS of the Greater Sage Grouse in Nevada and adjoining portions of California.

INTRODUCTION

As a family owned and operated ranch we have several motives for submitting comments about proposed listing of Bi-State Sage Grouse DPS under the ESA. These include our personal interest in wildlife which means that we take pleasure in having an abundance and variety of wildlife in the areas where we graze our sheep; we support biologically sound efforts that actually benefit wildlife. Unfortunately, recent actions by federal regulatory officials means that we also must participate in public and regulatory processes in order to have fully exhausted our administrative remedies in the event of future litigation.

Our comments address various items you list as subjects of “Information Requests”. Our comments fully meet the definitions of the best available scientific and commercial data and as such are well supported by literature citations, empirical observations, historical accounts by early explorers of the Great Basin, and other factual information. Portions of our documentation are included with this letter as attachments identified as follows:

Exhibit #1--Remarks Symposium @ CVI (10-30-12)
Exhibit #2--Response to FS Sage Grouse Scoping (1-30-13)
Exhibit #3--Remarks Bi-State Meeting (3-18-13)
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Exhibit #12-Remarks USFWS Meeting (12-3-13)
Exhibit #13-Letter to Governor Sandoval and Council (1-2-14)

As ranch owners we have been involved in Endangered Species Act (ESA) regulations for other species. Our involvement includes the fact that in accordance with ESA we are considered to be federal permit applicants which means we are to be included in any consultation between Bureau of Land Management (BLM) or US Forest Service (USFS) and US Fish and Wildlife Service. We have prepared the following based on our knowledge about the ESA and various federal policies.

Having reviewed the comments concerning Greater Sage Grouse in other portions of Nevada that were prepared by Eureka County Nevada, by the contractors serving the Elko County Sustainable Grazing Coalition, Nevada Cattlemen's Association, and Nevada Woolgrowers Association, and Joe Sicking as Chairman of the Nevada Conservation Commission we consider those documents to be fully a part of our comments by reference. Each of those comment documents are very specific about erroneous technical information, unsupported technical assumptions, and even bad spelling or bad grammar that seems to characterize federal documents.

Errors within the listing proposal include (both) failures to carefully stick to factual information and failures to carefully follow various laws. Once erroneous information is introduced it is repeated in additional sections and that makes stating every place the error occurs impractical. Common sense should indicate that having based your assessment of listing on information that is incomplete, that is no more than conjecture, and that obviously is simply fabricated then the conclusions are clearly in error and the actions will not benefit sage grouse.

Listing justifications including literature references fail to meet the Information Quality Act standards and other standards for objective and factual federal documentation under the ESA and under the Office of Management and Budget (2004) *"Final Information Quality Bulletin for Peer Review"*. Please correct the following within your document and then change your conclusions to fit the revised statements:

1. You fail to clearly state that the goal of your plan is to have more sage grouse in the future. Your plan must state how many sage grouse are present and include statistically sound monitoring to determine how many more sage grouse are present at a future date. In accordance with NEPA, for all actions after listing, if your recovery plan and your regulatory activities fail to result in an increased number of sage grouse it is a bad plan that must be discarded and replaced with a plan that works.

2. You fail to include and the authors fail to base their conclusions on the historic record of sage grouse population changes as provided by eye witness accounts since the early Nineteenth Century. It is well established that sage grouse in the Great Basin of Nevada and California were infrequently observed and not at all abundant prior to 1850. Please review the Journals of the Walker Party as recorded by Zenas Leonard, and other historic records. By 1950 sage grouse were very abundant at locations throughout what is now labeled as Great Basin sage

grouse habitats. Written history and personal testimony shows that the historic high numbers of Sage grouse occurred after settlement brought the establishment of ranches in the Great Basin. Please correct your text to fully accept the series of reports authored by Nevada Assemblyman Ira Hansen and the web site of Nevada Naturalist and Rancher Cliff Gardner http://www.gardnerfiles.com/

3. Based on professional opinions of agency biologists, agency officials have erroneously proclaimed that sage grouse were abundant prior to settlement by Americans and have declined since about 1860. That unsupported assumption is false and must be removed from reference in accordance with federal standards for objective and factual information.

4. History shows that there was a dramatic increase in sage grouse numbers and distribution from 1860 to historic high numbers in about 1960. History then shows there has been a sage grouse decline from historic high numbers since about 1980. This decline in sage grouse numbers (and other wildlife) parallels the federal agency decimation of ranches and livestock numbers. Factual information from Hansen, Gardner, and others has been provided to USFWS, BLM, and USFS repeatedly and is ignored or worse is rejected by the authors of documents such as yours in favor of purely speculative statements about sage grouse numbers and habitat. Please correct your text to indicate that the historic numbers of sage grouse peaked about 1970 not prior to 1860 and base your analysis on that factual data.

5. Your staff glibly reject personal observations as “empirical observations” that are not dependable because the empirical evidence is not found within peer reviewed articles. Authors of each federal document regarding sage grouse conclude that the direct observations of dependable witnesses are not factual --- but a statement printed in some magazine claiming to be a peer reviewed publication are factual by virtue of their existence. Every court in this nation depends on the truthful testimony of witnesses to determine facts and both the USFWS should be willing to do the same. Federal law requires that you seek facts and stick to the truth. Congress instructs agencies to use facts and not conjecture in NEPA documents and when Congress required agencies to use the best available scientific and commercial data for ESA related matters they did not limit the agency officials to peer reviewed articles.

6. We have read many of the articles that agency biologists cite as peer reviewed. Most of what your authors claim as having been subjected to rigorous peer review will not pass the standard for Peer Review as provided by the Office of Management and Budget. Federal standards for peer review must follow the OMB December 2004 Bulletin *“Final Information Quality Bulletin for Peer Review”*. Authors are being dishonest when they reject factual statements of empirical observations as being undependable and even more dishonest when they cite articles claiming the status of peer review that would not be approved under the OMB standards. Please order your employees to return to an objective search for

truthful and factual information because anything less than this will result in analysis and conclusions that are in error.

7. Authors also mischaracterize habitats that are required by sage grouse in order for the birds to thrive and be abundant. Most of the cited authority carelessly fails to identify sagebrush in accordance with standard Botanical taxonomy and fails to adhere to standards of objectively providing the technical details of sagebrush dominated plant communities and other attributes of sage grouse habitat. As a minimum technical standard habitat attributes must by identified relative to NRCS Ecological Site concepts, the technical basis provided by Cooperative Soil Survey, Ecological Site Description, and evaluation of plant communities in terms of Seral Status and State or Transition. Please correct your documents by discarding landscape descriptions that are based on GAP and RE-GAP in favor of ecological sites.

8. Biologists now have arbitrarily declared that certain gross features are essential for sage grouse such as stubble height of more than 4 inches and sagebrush cover values that are never obtained in some sagebrush plant communities. Then the authors invent a story about the entire life history of sage grouse based on these arbitrary conclusions. The statements typically include accusations of anthropogenic fragmentation of habitat or conclusions that habitat needs restoration, with no measure of deterioration in either case.

9. Please remove these stubble height and plant cover criteria from the text on the basis that there is no proof that meeting those criteria is necessary for the sage grouse. It is a matter of record that none of the habitat characteristics that biologists imagine sage grouse require such as stubble height or cover were present during the peak sage grouse populations of roughly 1950-1970. All of the sage grouse habitat was grazed every year and much of it was heavily grazed by domestic livestock. That grazing pressure had no detrimental effect on sage grouse populations. Much greater numbers of livestock than are allowed to be present today did not harm the sage grouse and that intensity of domestic livestock grazing provided beneficial anthropogenic effects.

10. History also tells us that when sage grouse populations peaked in the mid-Twentieth Century there were nearly ten times more sheep and twice as many cattle grazing within sage grouse habitats in the Great Basin.

11. Please state in the text that sage grouse thrived in abundance in the mid-1900s at a time when occupied sage grouse habitat did not provide six inches of herbaceous cover height. All of the sage grouse habitat -- including lek locations, nesting locations, and brood rearing habitat -- in Nevada was grazed by livestock, often at levels which would be considered “heavy” use during the very time that sage grouse populations peaked. Riparian meadows which coincide with the location of water for livestock were generally heavily grazed beginning early each spring. Studies completed by Klebenow, Evans, and others at Sheldon refuge indicates that the sage grouse selected grazed meadows for foraging and avoided

ungrazed meadows which is consistent with the observations from the 1940s through the present that early grazing of meadows is beneficial for sage hens. Grazing either has no effect on the reproduction of sage grouse or was and is a beneficial anthropogenic activity and that should be so stated.

12. Your document fails to clearly state the benefits that sage grouse receive when livestock are grazed on the rangelands that provide sage grouse habitat. If you want sage grouse numbers and abundance that was present in the mid-1900s you will have to arrange for the conditions that correlate with that abundance which was many more livestock grazing within sage grouse habitats in the presence of sage grouse, especially domestic sheep.

13. One issue that is correctly identified is characterization of the invasion of sagebrush dominated plant communities by conifers as a loss of available sage grouse habitat. In the Great Basin those conifers are mostly Singleleaf Pinyon Pine and Utah Juniper with some Western Juniper in the northwest portion of this area. Recent papers indicate that as little as 4% cover by conifers coincides with sage grouse no longer occupying an area.

14. We also concur with being concerned about the threat of catastrophic wildfires that burn very large areas and that have become common in the recent years.

15. Agency biologists have written a document with a built in contradiction in being concerned about wildfire on one hand and stating the unfounded claim that grass stubble height of 6 inches or more along with dense stands of sage brush must be in place for sage grouse. Again there is no clear evidence that the stubble height/cover standards will result in more sage grouse but it certainly will result in more susceptibility to catastrophic wildfires. That federally mandated herbaceous stubble is the fuel that feeds the wildfires.

16. This false statement of sage grouse habitat characteristics, the regulations that are already in place to maximize stubble height are just two of the federal regulations that have put many ranches out of business or at best have resulted in under-utilized rangeland forage. You must analyze the correlation of the loss of numbers of grazing livestock which in turn leaves vast quantities of vegetation available to burn and destroy sage grouse and habitat.

17. You fail to note that predation has a severely limiting effect on sage grouse populations, especially nest success and brood rearing. It is well documented that ravens, coyotes, bobcats, and other predators can greatly reduce the reproductive success and survival of sage grouse within both grazed and ungrazed rangeland habitats. Stubble height and shrub cover have no significant bearing on the rate of depredation. This plan should state that rigorous predator controls are essential if the goal is to have more sage grouse.

18. Agencies such as BLM and USFS probably don't often conduct predator control but this listing discussion is not about NEPA analysis of a predator control

project. A NEPA analysis will be required after listing and NEPA is designed to state a problem, identify the causes of that problem, and determine the solutions that will solve the problem efficiently and effectively. Predation of Sage Grouse is well documented and that means that predator control must be identified in the document. In turn the NEPA analysis must consider if any protection or manipulation of the vegetative portion of habitat will have any effect on sage grouse numbers if predation continues unabated. There is no justification for onerous regulations to protect vegetative cover if there is no correlation between the cover and rate of predation.

19. You fail to put forth an analysis of economic effects that will be the direct result of regulatory decisions that prevent ranches such as ours from accessing and using our existing property rights within federally controlled lands. We own water rights, easements, rights-of-way, and grazing preference within our BLM and USFS grazing allotments. Numerous court decisions now support our property ownership; one recent case in Federal District Court in Reno provides an excellent example. Judge Jones ruled in the favor of rancher Wayne Hage and the Hage Estate that their water rights and easements are theirs to own and use within both BLM and USFS regulated allotment areas. Denial of those rights by regulatory actions will in turn be a denial of due process of law and will be viewed as an unlawful “Taking” under both the Fifth and Fourth Amendment to the U.S. Constitution. The liability for costs of Takings of property must be included in any economic analysis of this listing and the accompanying critical habitat designation.

20. You fail to fully recognize the lawful status of our ranch as an applicant under ESA. Status as an applicant means we will be involved in every consultation between BLM, USFS, and USFWS that pertains to our operation. This document must include discussion of the participants in ESA consultation as a future action.

21. The authors are proposing regulations that in the name of what the Endangered Species Act calls a Distinct Population Segment of Greater Sage Grouse based entirely on the conjecture of biologists who don’t believe they would fly from Washoe County or Churchill County to Lyon County. As federal agencies you are both required to demonstrate that you are in compliance with ESA by documenting that you are using the best available scientific and commercial data and in accordance with the federal standards of discreteness and significance as defined by the ESA policy.. You fail to demonstrate how this Greater Sage Grouse which is arbitrarily called a DPS in one part of Nevada is in fact a discrete and significant population.

22. Historic records show that prior to 1850 there were few or no sage grouse in our portion of the Bi State area which extends from Smith Valley NV to Bridgeport Valley CA. Historic records further show that by 1950 sage grouse were abundant and commonly observed species. This increase occurred after the arrival of settlers and livestock, especially sheep. We have no record of the source of original reproducing sage grouse in the Bi-State area but we know the birds are very mobile and the distance from northern Nevada or central Nevada is not too

great to prevent migration of birds into the area. What ever the source of sage grouse the fact remains that the numbers increased dramatically from being rare or not present to being very abundant within 100 years. This area does not meet the criteria for either discreteness or significance and your document is in error.

23. You make no effort to fulfill the lawful requirement to resolve inconsistencies between local data or plans and this federal proposal through the process of "coordination". FLPMA and NEPA both have clear requirements for federal officials to complete coordination.

24. Listing this bird under ESA would put our entire community under the control of the US Fish and Wildlife Service and by reputation your agency people would write an ESA recovery plan with no regard to local needs. The listing and regulations that follow would be a disaster economically and environmentally to our communities. Everyone would be hurt including livestock production, mining, manufacturing, recreation such as hunting and fishing, and just about every other aspect of our custom and culture. We are facing onerous and destructive regulations which have very little possibility of resulting in more sage grouse. Please edit the document to reflect the items listed above.

DISCUSSION

I am Fred Fulstone from Smith, Nevada and I am submitting these comments on behalf of the F.I.M. Corp. of Smith Nevada. F.I.M. Corp is a family owned and operated sheep ranch with land, existing property rights, and grazing preference within adjudicated range allotments in both Nevada and adjoining areas of California.

The Fulstone family have been agricultural producers in Western Nevada for over 150 years and in that time sage grouse populations grew from none to a great abundance in about 1950 and have now declined in numbers since about 1980. Our ranch history during this time (150) years includes how our livestock, especially our sheep, have greatly benefitted sage grouse.

At this time three generations of our family owns and operates our sheep ranch with headquarters in Nevada and ranch property in both California and Nevada. Our operation includes private property along with Bureau of Land Management and Forest Service grazing allotments in both Nevada and California. Our permits on a number of BLM and Forest Service grazing allotments allow us to graze our sheep by herding them on open range throughout the year. Our range is approximately 100 miles from north to south and 75 miles from east to west.

In order to produce our lambs and wool, we have a working force of 18 people in addition to the immediate family. We have run 1000 head of cattle most of our lives along with the sheep.

The first Fulstone homesteaded in 1854 near Genoa. My grandfather bought our first ranch in Smith Valley in 1903 and my father began running a few sheep in 1910.

My mother, Dr. Mary, was one of the first woman Medical Doctors in Nevada.

My wife, Irene, was a school teacher and also made many thirty mile horse back rides with me to the Sheep Camps.

Now Marianne, my daughter, can run this ranch and we enjoy the help of her son Kris and daughter Danielle.

WHAT NEEDS TO BE DONE IS REALLY FAIRLY SIMPLE

Livestock grazing and predator control are the two most important tools we have to save and enhance the sage hen.

As business owners we have many reasons to be very skeptical about the listing of any species because the ESA has yet to save a single species while spending vast amounts of tax payers' money.

For a very good example of how the ESA works look at what happened in Klamath Falls area after the USFWS listed a sucker fish. This allowed the USFWS to implement their recovery plan and to give all the water in the Klamath Lake to the endangered species. That meant the farmers got no water for their crops even though they and the community businesses faced immediate economic destruction and citizens were forced into personal bankruptcy.

The USFWS was doing everything backwards. After the USFWS took over, about 80% of the sucker fish died. What is the worse part? The National Academy of Science would later rule that the USFWS recovery plan was based on false science.

Without irrigation water 200,000 acres of farm land and 50,000 acres of wildlife refuge habitat dried up. This destruction was the result of the science used to list the sucker fish being corrupt. False data, false assumptions built into models, errors from carelessness or ignorance, and outright fabrication of biology all came to a head when many thousands of the protected fish were killed as a direct result of the federal actions.

Can any rational person expect a different outcome from listing the sage grouse than what occurred in the Klamath Falls area?

Most of the biologists say that their main concern is for the sagebrush as one part of the sage hen habitat. We have plenty of sagebrush. We also note in the sage grouse literature that ideal sage grouse breeding and nesting habitat is sparsely vegetated with sagebrush cover less than 25%. It can also be shown that sage grouse populations were at a peak when grass cover in their nesting and brood

rearing habitat was described as overgrazed by livestock and sage grouse populations decreased following BLM and Forest Service cuts in permitted grazing.

First we must improve sage hen habitat by controlling the predators that destroy the sage hens, their nests, and their chicks. The birds right after hatching are very vulnerable to everything and no amount of cover that occurs naturally in sage hen habitat can protect them. Some reports say that we are losing 50% of our nests today and 70% of that loss is from ravens. (Mark Jensen, Supervisor, Wildlife Services, Reno Nevada).

Wildlife Services is in charge of predator control and they have lost 45% of their work force. At one time we had three trappers here – one in Smith Valley, one in Mason Valley, and one in Carson Valley. Today we have one trapper that has to cover all three valleys plus Fallon and Austin. We also don't have a lion hunter anymore.

<u>THINGS WE NEED TO DO IMMEDIATELY TO SAVE THE SAGE HEN:</u>
During those years from about 1955 to 1980 we had thousands of sage hen in Smith Valley, the Pine Nut Range, and Bodie Hills. Also during those years we had trappers and the use of toxicants and we controlled the numbers of predators very well. During those years we had ten or more times the numbers of gazing animals on the Federal ranges than we now have and we had thousands of sage hen on the same areas. As soon as the grazing permits were cut by the agencies the trappers and toxicant use was cut down and the sage hens started to disappear.

No 1. We must have more trappers to control ravens, coyotes, badgers, bobcats, and other predators.

No 2. We need more open range grazing and more permitted grazing on the ranges. (and less housing development)

No 3. Where open grazing is allowed it accomplishes more than just providing feed for livestock

1. Livestock consumes the fuel that feeds wildfires.
2. Livestock owners improve the water resource and create new water sites
3. Livestock owners use water rights they own to develop irrigated meadows and fields that in turn serve as brood rearing habitat for sage hens.
4. Livestock grazing helps in the natural re-seeding, fertilizing, and cultivating of the grasses, forbs, and brush. This is necessary for the production of the sage hen and other wildlife. Sage grouse follow in the livestock footprints and into the bed grounds (especially sheep). These sage grouse feed on insects and other sources of nutrients left by the animals. It is common to see sage grouse chicks eating the pellets from the lambs which are highly nutritious because it is partially digested milk.

No 4. The livestock generally feed off the tall meadow grasses and forbs in the spring and then as the uplands dry the sage hen com down to the new growth of forbs and short green grasses in early summer. The livestock have to graze the

meadows before the sage hen broods arrive to provide this benefit. The meadows that have been grazed are preferred by the sage hens because the shorter meadow plants enable the sage hens to see any approaching predators. They seem to like open space.

No 5. Livestock on the range offers relief from predation because the predators prey on livestock. When livestock owners kill predators the wildlife benefit along with the sheep.

BACK TO THE SAGE HENS

Sagebrush is not a problem --- we have plenty of it.

In some areas where the sagebrush is tall (3' to 4') and very thick it should be sprayed. That gives the forbs and grasses a chance to come which is very valuable as habitat and forage for the sage hens.

We have done this in cooperation with the BLM in some areas the sage hen has flocked into the sprayed areas.

We need better management of meadow forbs or grasses so forage will be available to sage hen broods when they come off the sage brush onto the meadows in June and July.

We know how to do all of these things which are sound management and it does not require heavy handed regulation.

BY EMAIL /s/ Fred Fulstone

Fred Fulstone
For F.I.M. Corporation
Smith, Nevada

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re: Designation of Critical Habitat for the Bi-State Distinct Population Segment of Greater Sage Grouse

INTRODUCTION

As a family owned and operated ranch we have several reasons for submitting comments about designation of critical habitat for the Bi-State DPS of the Greater Sage Grouse. These include our personal interest in wildlife which means that we take pleasure in having an abundance and variety of wildlife in the areas where we graze our sheep; we support biologically sound efforts that actually benefit wildlife. Unfortunately, recent actions by federal regulatory officials means that we also must participate in public and regulatory processes such as writing this comment in order to have fully exhausted our administrative remedies in the event of future litigation.

Our comments are well supported by literature citations, empirical observations, historical accounts by early explorers of the Great Basin, and other factual information. Portions of our documentation are included with this letter as attachments identified as follows:

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Exhibit #13-Letter to Governor Sandoval and Council (1-2-14)
Exhibit #14-FIM Response to Economics Questionnaire (9-21-07)

As ranch owners we have been involved in Endangered Species Act (ESA) regulations for other species. Our involvement includes the fact that in accordance with ESA we are considered to be federal permit applicants which means we are to be included in any consultation between BLM or USFW and US Fish and Wildlife Service. We have prepared the following based on our knowledge about the ESA, various federal policies, and the physical and biological factors that are essential for conservation of sage grouse based on the conditions that existed when the Bi-State sage grouse population reached its historic high numbers in roughly 1950 to 1980.

We are not able to determine from the Federal Register exactly when you plan to complete the mandatory NEPA analysis and economic analysis. We know you must do both and we are willing to provide some detailed information about the effect of listing and critical habitat on our ranch including economic effects.

Having reviewed the comments concerning the biology and history of greater sage grouse as prepared by Eureka County Nevada, Joe Sicking Chairman of the Nevada Conservation Commission, and by the Elko County Sustainable Grazing Coalition, Nevada Cattlemen's Association, and Nevada Woolgrowers Association we consider those documents to be fully a part of our comments by reference. Each of those comment documents were submitted to BLM and Forest Service and are very specific about erroneous technical information, unsupported technical assumptions, and even bad spelling or bad grammar that seems to characterize federal documents.

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2. You fail to include and the authors fail to base their conclusions on the historic record of sage grouse population changes as provided by eye witness accounts since the early Nineteenth Century. It is well established that sage grouse in the

Great Basin of Nevada and California were infrequently observed and not at all abundant prior to 1850. Please review the Journals of the Walker Party as recorded by Zenas Leonard, and other historic records. By 1950 sage grouse were very abundant at locations throughout what is now labeled as Great Basin sage grouse habitats. Written history and personal testimony shows that the historic high numbers of Sage grouse occurred after settlement brought the establishment of ranches in the Great Basin. Please correct your text to fully accept the series of reports authored by Nevada Assemblyman Ira Hansen and the web site of Nevada Naturalist and Rancher Cliff Gardner http://www.gardnerfiles.com/

3. Based on professional opinions of agency biologists, agency officials have erroneously proclaimed that sage grouse were abundant prior to settlement by Americans and have declined since about 1860. That unsupported assumption is false and must be removed from reference in accordance with federal standards for objective and factual information.

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articles claiming the status of peer review that would not be approved under the OMB standards. Please order your employees to return to an objective search for truthful and factual information because anything less than this will result in analysis and conclusions that are in error.

7. Your authors mischaracterize habitats that are required by sage grouse in order for the birds to thrive and be abundant. Most of the cited authority carelessly fails to identify plants including sagebrush species in accordance with standard Botanical taxonomy and fails to adhere to standards of objectively providing the technical details of sagebrush dominated plant communities and other attributes of sage grouse habitat. Your text includes the description of habitat that then becomes the minimum acceptable when it says:

> *"In general, vegetation characteristics of successful nest sites include sagebrush canopy cover of greater than 15 percent, sagebrush heights of 30 to 80 centimeters (cm) (11.8 to 31.5 in), grass and forb heights of 18 cm (7.1 in), and grass and forb cover of greater than 15 percent"*

As a minimum technical standard, habitat attributes must by identified relative to NRCS Ecological Site concepts, the technical basis provided by Cooperative Soil Survey, Ecological Site Description, and evaluation of plant communities in terms of Seral Status and State or Transition. Please correct your documents by discarding landscape descriptions that are based on GAP and RE-GAP in favor of ecological sites.

8. Biologists now have arbitrarily declared that certain gross features are essential for sage grouse such as grass and forb height of 7 inches (stubble height) and sagebrush cover values that may or may not be realistic due to the soils supporting some sagebrush plant communities. Then the authors invent a story about the entire life history of sage grouse based on these arbitrary conclusions. The statements typically include accusations of anthropogenic fragmentation of habitat or conclusions that habitat needs restoration, with no measure of deterioration in either case.

9. Please remove these stubble height and plant cover criteria from the text on the basis that there is no proof that meeting those criteria is necessary for the sage grouse. It is a matter of record that none of the habitat characteristics that biologists imagine sage grouse require such as stubble height or cover were present during the peak sage grouse populations of roughly 1950-1970. All of the sage grouse habitat was grazed every year and much of it was heavily grazed by domestic livestock. That grazing pressure had no detrimental effect on sage grouse populations. Much greater numbers of livestock than are allowed to be present today did not harm the sage grouse and that intensity of domestic livestock grazing provided beneficial anthropogenic effects.

10. History also tells us that when sage grouse populations peaked in the mid-Twentieth Century there were nearly ten times more sheep and twice as many cattle grazing within sage grouse habitats in the Great Basin. Livestock grazing provides desirable and beneficial anthropogenic effects on sage grouse and is critical for productive sage grouse habitat.

11. Please state in the text that sage grouse thrived in abundance in the mid-1900s at a time when occupied sage grouse habitat did not provide six inches of herbaceous cover height. All of the sage grouse habitat -- including lek locations, nesting locations, and brood rearing habitat -- in Nevada was grazed by livestock, often at levels which would be considered "heavy" use during the very time that sage grouse populations peaked. Riparian meadows which coincide with the location of water for livestock were generally heavily grazed beginning early each spring. Studies completed by Klebenow, Evans, and others at Sheldon refuge indicates that the sage grouse selected grazed meadows for foraging and avoided ungrazed meadows which is consistent with the observations from the 1940s through the present that early grazing of meadows is beneficial for sage hens. Grazing either has no effect on the reproduction of sage grouse or was and is a beneficial anthropogenic activity and that should be so stated.

12. Your document fails to clearly state the benefits that sage grouse receive when livestock are grazed on the rangelands that provide sage grouse habitat. If you want sage grouse numbers and abundance that was present in the mid-1900s you will have to arrange for the conditions that correlate with that abundance which was many more livestock grazing within sage grouse habitats in the presence of sage grouse, especially domestic sheep.

13. One issue that is correctly identified is characterization of the invasion of sagebrush dominated plant communities by conifers as a loss of available sage grouse habitat. In the Great Basin those conifers are mostly Singleleaf Pinyon Pine and Utah Juniper with some Western Juniper in the northwest portion of this area. Recent papers indicate that as little as 4% cover by conifers coincides with sage grouse no longer occupying an area.

14. We also concur with being concerned about the threat of catastrophic wildfires that burn very large areas and that have become common in the recent years.

15. Agency biologists have written a document with a built in contradiction in being concerned about wildfire on one hand and stating the unfounded claim that grass height of 7 inches or more along with dense stands of sage brush must be in place for sage grouse. Again there is no clear evidence that the stubble height/cover standards will result in more sage grouse but it certainly will result in more susceptibility to catastrophic wildfires. That federally mandated herbaceous stubble is the fuel that feeds the wildfires.

16. This false statement of sage grouse habitat characteristics, the regulations that are already in place to maximize stubble height are just two of the federal regulations that have put many ranches out of business or at best have resulted in under-utilized rangeland forage. You must analyze the correlation of the loss of numbers of grazing livestock which in turn leaves vast quantities of vegetation available to burn and destroy sage grouse and habitat.

17. You fail to note that predation has a severely limiting effect on sage grouse populations, especially nest success and brood rearing. It is well documented that ravens, coyotes, bobcats, and other predators can greatly reduce the reproductive success and survival of sage grouse within both grazed and ungrazed rangeland habitats. Stubble height and shrub cover have no significant bearing on the rate of depredation. This plan should state that rigorous predator controls are essential if the goal is to have more sage grouse. .

18. Predation is described in various parts of the text but is discounted as not being a serious effect if the vegetation height and cover are present. When you complete a NEPA analysis predation must be considered in more realistic terms. NEPA is designed to state a problem, identify the causes of that problem, and determine the solutions that will solve the problem efficiently and effectively. Predation of Sage Grouse is well documented and that means that predator control must be identified in the document. In turn the NEPA analysis must consider if any protection or manipulation of the vegetative portion of habitat will have any effect on sage grouse numbers if predation continues unabated. There is no justification for onerous regulations to protect vegetative cover if there is no correlation between the cover and rate of predation.

19. Critical habitat designation requires economic impact analysis for ESA and for NEPA. As you put forth an analysis of economic effects they must include statements that the direct result of regulatory decisions includes preventing ranches such as ours from accessing and using our existing property rights within federally controlled lands. We own water rights, easements, rights-of-way, and grazing preference within our BLM and USFS grazing allotments. Numerous court decisions now support our property ownership; one recent case in Federal District Court in Reno provides an excellent example. Judge Jones ruled in the favor of rancher Wayne Hage and the Hage Estate that their water rights and easements are theirs to own and use within both BLM and USFS regulated allotment areas. Denial of those rights by regulatory actions will in turn be a denial of due process of law and will be viewed as an unlawful “Taking” under both the Fifth and Fourth Amendment to the U.S. Constitution. The liability for costs of Takings of property must be included in any economic analysis of this listing and the accompanying critical habitat designation.

20. Your ESA/NEPA economic analysis must include analysis of economic effects that will be the result of special treatment of sage grouse to the exclusion of other land uses. Our ranch alone employs as many as 20 people and supports three generations of our family. Our ranch operating expenses provides cash that circulates within western Nevada and adjoining parts of California. Based on statements by USFWS biologists, Forest Service and BLM both intend to prohibit grazing which will destroy jobs and local economies so you must state what that effect will be.

21. You fail to fully recognize the lawful status of our ranch as an applicant under ESA. Status as an applicant means we will be involved in every consultation

between BLM, USFS, and USFWS that pertains to our operation. This document must include discussion of the participants in ESA consultation as a future action

22. The authors are proposing regulations that in the name of what the Endangered Species Act calls a Distinct Population Segment of Greater Sage Grouse based entirely on the conjecture of biologists who don't believe they would fly from Washoe County or Churchill County to Lyon County. As federal agencies you are both required to demonstrate that you are in compliance with ESA by documenting that you are using the best available scientific and commercial data and in accordance with the federal standards of discreteness and significance as defined by the ESA policy.. You fail to demonstrate how this Greater Sage Grouse which is arbitrarily called a DPS in one part of Nevada is in fact a discrete and significant population. Failure of the DPS designation will render this critical habitat designation unnecessary even though the critical habitat was proposed before the listing was proposed.

23. Historic records show that prior to 1850 there were few or no sage grouse in our portion of the Bi State area which extends from Smith Valley NV to Bridgeport Valley CA. Historic records further show that by 1950 sage grouse were abundant and commonly observed species. This increase occurred after the arrival of settlers and livestock, especially sheep. We have no record of the source of original reproducing sage grouse in the Bi-State area but we know the birds are very mobile and the distance from northern Nevada or central Nevada is not too great to prevent migration of birds into the area. What ever the source of sage grouse the fact remains that the numbers increased dramatically from being rare or not present to being very abundant within 100 years. This area does not meet the criteria for either discreteness or significance and your document is in error.

24. You fail to specify what if any effort has been or will be completed to fulfill the lawful requirement to resolve inconsistencies between local plans and this federal proposal through the process of "coordination". NEPA requires federal officials to complete coordination.

25. Designation of critical habitat will put our entire community under the control of the US Fish and Wildlife Service and by reputation your agency people would write an ESA recovery plan with no regard to local needs. The listing and regulations that follow would be a disaster economically and environmentally to our communities. Everyone would be hurt including livestock production, mining, manufacturing, recreation such as hunting and fishing, and just about every other aspect of our custom and culture. We are facing onerous and destructive regulations which have very little possibility of resulting in more sage grouse. Please edit the document to reflect the items listed above

DISCUSSION

I am Fred Fulstone from Smith, Nevada and I am submitting these comments on behalf of the F.I.M. Corp. of Smith Nevada. F.I.M. Corp is a family owned and

operated sheep ranch with land, existing property rights, and grazing preference within adjudicated range allotments in both Nevada and adjoining areas of California.

The Fulstone family have been agricultural producers in Western Nevada for over 150 years and in that time sage grouse populations grew from none to a great abundance in about 1950 and have now declined in numbers since about 1980. Our ranch history during this time (150) years includes how our livestock, especially our sheep, have greatly benefitted sage grouse.

At this time three generations of our family owns and operates our sheep ranch with headquarters in Nevada and ranch property in both California and Nevada. Our operation includes private property along with Bureau of Land Management and Forest Service grazing allotments in both Nevada and California. Our permits on a number of BLM and Forest Service grazing allotments allow us to graze our sheep by herding them on open range throughout the year. Our range is approximately 100 miles from north to south and 75 miles from east to west.

In order to produce our lambs and wool, we have a working force of 18 people in addition to the immediate family. We have run 1000 head of cattle most of our lives along with the sheep.

The first Fulstone homesteaded in 1854 near Genoa. My grandfather bought our first ranch in Smith Valley in 1903 and my father began running a few sheep in 1910.

My mother, Dr. Mary, was one of the first woman Medical Doctors in Nevada.

My wife, Irene, was a school teacher and also made many thirty mile horse back rides with me to the Sheep Camps.

Now Marianne, my daughter, can run this ranch and we enjoy the help of her son Kris and daughter Danielle.

WHAT NEEDS TO BE DONE IS REALLY FAIRLY SIMPLE

Livestock grazing and predator control are the two most important tools we have to save and enhance the sage hen.

As business owners we have many reasons to be very skeptical about the listing of any species because the ESA has yet to save a single species while spending vast amounts of tax payers' money.

For a very good example of how the ESA works look at what happened in Klamath Falls area after the USFWS listed a sucker fish. This allowed the USFWS to implement their recovery plan and to give all the water in the Klamath Lake to the endangered species. That meant the farmers got no water for their crops even though they and the community businesses faced immediate economic destruction and citizens were forced into personal bankruptcy.

The USFWS was doing everything backwards. After the USFWS took over, about 80% of the sucker fish died. What is the worse part? The National Academy of Science would later rule that the USFWS recovery plan was based on false science.

Without irrigation water 200,000 acres of farm land and 50,000 acres of wildlife refuge habitat dried up. This destruction was the result of the science used to list the sucker fish being corrupt. False data, false assumptions built into models, errors from carelessness or ignorance, and outright fabrication of biology all came to a head when many thousands of the protected fish were killed as a direct result of the federal actions.

Can any rational person expect a different outcome from listing the sage grouse and designating critical habitat than what occurred with fish in the Klamath Falls area?

Most of the biologists say that their main concern is for the sagebrush as one part of the sage hen habitat. We have plenty of sagebrush. We also note in the sage grouse literature that ideal sage grouse breeding and nesting habitat is sparsely vegetated with sagebrush cover less than 25%. It can also be shown that sage grouse populations were at a peak when grass cover in their nesting and brood rearing habitat was considered to be over-grazed by livestock and sage grouse populations decreased following BLM and Forest Service cuts in permitted grazing.

First we must improve sage hen habitat by controlling the predators that destroy the sage hens, their nests, and their chicks. The birds right after hatching are very vulnerable to everything and no amount of cover that occurs naturally in sage hen habitat can protect them. Some reports say that we are losing 50% of our nests today and 70% of that loss is from ravens. (Mark Jensen, Supervisor, Wildlife Services, Reno Nevada).

Wildlife Services is in charge of predator control and they have lost 45% of their work force. At one time we had three trappers here – one in Smith Valley, one in Mason Valley, and one in Carson Valley. Today we have one trapper that has to cover all three valleys plus Fallon and Austin. We also don't have a lion hunter anymore.

THINGS WE NEED TO DO IMMEDIATELY TO SAVE THE SAGE HEN:
During those years from about 1955 to 1980 we had thousands of sage hen in Smith Valley, the Pine Nut Range, and Bodie Hills. Also during those years we had trappers and the use of toxicants and we controlled the numbers of predators very well. During those years we had ten or more times the numbers of gazing animals on the Federal ranges than we now have and we had thousands of sage hen on the same areas. As soon as the grazing permits were cut by the agencies the trappers and toxicant use was cut down and the sage hens started to disappear.

No 1. We must have more trappers to control ravens, coyotes, badgers, bobcats, and other predators.

No 2. We need more open range grazing and more permitted grazing on the ranges.

(and less housing development)

No 3. Where open grazing is allowed it accomplishes more than just providing feed for livestock

1. Livestock consumes the fuel that feeds wildfires.
2. Livestock owners improve the water resource and create new water sites
3. Livestock owners use water rights they own to develop irrigated meadows and fields that in turn serve as brood rearing habitat for sage hens.
4. Livestock grazing helps in the natural re-seeding, fertilizing, and cultivating of the grasses, forbs, and brush. This is necessary for the production of the sage hen and other wildlife. Sage grouse follow in the livestock footprints and into the bed grounds (especially sheep). These sage grouse feed on insects and other sources of nutrients left by the animals. It is common to see sage grouse chicks eating the pellets from the lambs which are highly nutritious because it is partially digested milk.

No 4. The livestock generally feed off the tall meadow grasses and forbs in the spring and then as the uplands dry the sage hen com down to the new growth of forbs and short green grasses in early summer. The livestock have to graze the meadows before the sage hen broods arrive to provide this benefit. The meadows that have been grazed are preferred by the sage hens because the shorter meadow plants enable the sage hens to see any approaching predators. They seem to like open space.

No 5. Livestock on the range offers relief from predation because the predators prey on livestock. When livestock owners kill predators the wildlife benefit along with the sheep.

BACK TO THE SAGE HENS

Sagebrush is not a problem --- we have plenty of it.

In some areas where the sagebrush is tall (3' to 4') and very thick it should be sprayed. That gives the forbs and grasses a chance to come which is very valuable as habitat and forage for the sage hens.

We have done this in cooperation with the BLM in some areas the sage hen has flocked into the sprayed areas.

We need better management of meadow forbs or grasses so forage will be available to sage hen broods when they come off the sage brush onto the meadows in June and July.

We know how to do all of these things which are sound management and it does not require heavy handed regulation.

BY EMAIL /s/ Fred Fulstone

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Remarks prepared for the Symposium, "Sage-grouse of the Bi-State Area". October 30-31, 2012. Carson Valley Inn Casino Minden, Nevada

By Fred Fulstone
FIM Corporation
Smith Nevada

I am Fred Fulstone from Smith, Nevada. I know you are mostly interested in discussing sage grouse but I would like you to understand that the Fulstone family have been agricultural producers in Western Nevada for over 150 years and in that time sage grouse populations grew from none to a great abundance in about 1950 and have now declined in numbers since about 1980. I would prefer to discuss how our ranch management has developed over a period of 150 years and that includes how our livestock, especially our sheep, benefitted sage grouse.

At this time three generations of our family owns and operates our sheep ranch with headquarters in Nevada and ranch property in both California and Nevada. Our operation includes private property along with Bureau of Land Management and Forest Service grazing allotments in both Nevada and California. Our permits on a number of BLM and Forest Service grazing allotments allow us to graze our sheep by herding them on open range throughout the year. Our range is approximately 100 miles from north to south and 75 miles from east to west.

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Now Marianne, my daughter, can run this ranch and we enjoy the help of her son Kris and daughter Danielle.

LISTING THE SAGE HEN WOULD BE DISASTROUS

Listing the sage hen would be disastrous for all of us here in the Bi-State area. Some people say the ESA protection should be as a Distinct Population Segment of sage grouse and others are trying to prove that the local sage grouse are a different variety. Both of these claims are made without good scientific data to back it up. At least part of the question should be dismissed easily with appropriate nuclear DNA comparisons.

Distinct Population Segments are based on a population being so isolated from any others but the biologists fail to explain how the sage grouse arrived in Smith Valley in the first place if Smith Valley is so far from other flocks that they cannot travel to Western Nevada.

Our Bi-State committee has done a very good job so far, but most of their concerns seem to be limited to sagebrush as one part of the sage hen habitat. We have plenty of sagebrush.

First we must improve sage hen habitat by controlling the predators that destroy the sage hens, their nests, and their chicks. They birds right after hatching are very vulnerable to everything. Some reports say that we are losing 50% of our nests today and 70% of that loss is from ravens. (Mark Jensen, Supervisor, Wildlife Services, Reno Nevada).

Wildlife Services is in charge of predator control and they have lost 45% of their work force. At one time we had three trappers here – one in Smith Valley, one in Mason Valley, and one in Carson Valley. Today we have one trapper that has to cover all three valleys plus Fallon and Austin. We also don't have a lion hunter anymore.

THINGS WE NEED TO DO IMMEDIATELY TO SAVE THE SAGE HEN:

No 1. We must have more trappers to control ravens, coyotes, badgers, bobcats, and other predators.

No 2. We need more open range and more permitted grazing on the ranges. (and less housing development)

No 3. Where open grazing is allowed it accomplishes more than just providing feed for livestock

1. Livestock consumes the fuel that wildfires feeds need to grow.
2. Livestock owners improve the water resource and create new water sites
3. Livestock grazing helps in the natural re-seeding, fertilizing, and cultivating of the grasses, forbs, and brush. This is necessary for the production of the sage hen and other wildlife. Sage grouse follow in the livestock footprints and into the bed grounds (especially sheep). These sage grouse feed on insects and other sources of nutrients left by the animals. It is common to see sage grouse chicks eating the pellets from the lambs which are highly nutritious because it is partially digested milk.

No 4. The livestock generally feed off the tall meadow grasses and forbs in the spring and then as the uplands dry the sage hen com down to the new growth of forbs and short green grasses in early summer. The livestock have to graze the meadows before the sage hen broods arrive to provide this benefit. The meadows that have been grazed are preferred by the sage hens because the shorter meadow plants enable the sage hens to see any approaching predators. They seem to like open space.

No 5. Livestock on the range offers relief from predation because the predators prey on livestock. When livestock owners kill predators the wildlife benefit along with the sheep.

NOW TO KIND OF SUM THINGS UP
Livestock grazing and predator control are the two most important tools we have to save and enhance the sage hen.

During those years from about 1955 to 1980 we had thousands of sage hen in Smith Valley, the Pine Nut Range, and Bodie Hills. Also during those years we had trappers and the use of toxicants and we controlled the numbers of predators very well. During those years we had ten or more times the numbers of gazing animals on the Federal ranges than we now have and we had thousands of sage hen on the same areas. As soon as the grazing permits were cut by the agencies the trappers and toxicant use was cut down and the sage hens started to disappear.

If you want to save the sage hen then contact the Wildlife Services in Reno. They are probably the most important government service to call in order to manage the sage hen.

We must not let this bird be listed under ESA. Our whole area would come under the control of the US Fish and Wildlife Service and those agency people would write an ESA recovery plan with no regard to local needs. The listing and regulations that follow would be a disaster economically and environmentally to our communities. Everyone would be hurt including livestock production, mining, manufacturing, recreation such as hunting and fishing, and just about every other aspect of our custom and culture and there is very little possibility of all that regulation resulting in more sage grouse.

The big problem is that the USFWS uses false science to get what they want and conspire with like minded groups to do that.

For a very good example of how the ESA works look at what happened in Klamath Falls area after the USFWS listed a sucker fish. This allowed the USFWS to implement their recovery plan and to give all the water in the Klamath Lake to the endangered species. That meant the farmers got no water for their crops even

though they and the community businesses faced immediate economic destruction and citizens were forced into personal bankruptcy.

The USFWS was doing everything backwards. After the USFWS took over, about 80% of the sucker fish died.

What is the worse part? The National Academy of Science would later rule that the USFWS recovery plan was based on false science.

Without irrigation water 200,000 acres of farm land and 50,000 acres of wildlife refuge habitat dried up. This destruction was the result of the science used to list the sucker fish was corrupt.

The USFWS has recently done the same thing to me when they listed Sierra Nevada Bighorn Sheep as an endangered Distinct Population Segment. Now they have forced the Forest Service and BLM to cancel five of my grazing permits and I have lost nearly 75,000 acres of summer range. I had paid for these permits for over 65 years and over this time had invested over a Million Dollars in range improvements. Of course the agencies do not want me to recover any of those costs which is clearly an un-Constitutional Taking. And just like the sucker fish in Klamath Falls the very best recovery plan that the biologists could write has not resulted in more bighorn sheep.

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(S) Fred Fulstone
Fred Fulstone
For F.I.M. Corporation
Smith, Nevada

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January 30, 2013

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re: FIM Corporation comment regarding the "Scoping Notice -- Greater Sage-Grouse Bi-State Distinct Population Segment Forest Plan Amendment (EIS)"

INTRODUCTION

Our comments are well supported by literature citations, empirical observations, and other factual information. I have not included those in this letter since it is just a scoping letter that implies your NEPA process will seek detailed information later.

We can demonstrate that your proposals lack the following facts and these must be included in your documents if you are to meet the Information Quality Act standards and other standards for federal documentation under both NEPA and the ESA:

1. Your proposal fails to clearly state that the goal of your plan is to have more sage grouse in the future. Your plan must state how many sage grouse are present and include scientific monitoring to determine how many more sage grouse are present at a future date. In accordance with NEPA, if your plan and your management activities fail to result in an increased number of sage grouse it is a bad plan that must be discarded and replaced with a plan that works.

2. Your proposal fails to clearly state the benefits that sage grouse receive when livestock are grazed on the rangelands that provide sage grouse habitat. If you want sage grouse numbers and abundance that was present in the mid-1900s you will have to arrange for the conditions that correlate with that abundance which was many more livestock grazing within sage grouse habitats.

3. Your proposal fails to note that predation has a severely limiting effect on sage grouse populations, especially nest success and brood rearing. It is well documented that ravens, coyotes, bobcats, can greatly reduce the ability of sage grouse to reproduce and survive. This plan should include rigorous predator controls if the goal is to have more sage grouse.

4. Your proposal fails to put forth an analysis of economic effects that will be the result of special treatment of sage grouse to the exclusion of other land uses. Our

ranch alone employs as many as 20 people and our ranch operating expenses provides cash that circulates within western Nevada and adjoining parts of California. Forest Service and BLM both intend to prohibit grazing which will destroy jobs and local economies so you must state what that effect will be.

5. Your proposal fails states that USDA Forest Service and USDI BLM are planning for management of what the Endangered Species Act calls a Distinct Population Segment. As federal agencies you are both required to demonstrate that you are in compliance with ESA by documenting that you are using the best available scientific and commercial data. You are also required to demonstrate how this bird is a DPS in accordance with the federal standards of discreteness and significance as defined by the ESA and subsequent policy.

DISCUSSION

I am Fred Fulstone from Smith, Nevada and I am submitting these comments on behalf of the F.I.M. Corp. of Smith Nevada. F.I.M. Corp is a family owned and operated sheep ranch with land, existing property rights, and grazing preference within adjudicated range allotments in both Nevada and adjoining areas of California.

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NOW TO KIND OF SUM THINGS UP
Livestock grazing and predator control are the two most important tools we have to save and enhance the sage hen.

During those years from about 1955 to 1980 we had thousands of sage hen in Smith Valley, the Pine Nut Range, and Bodie Hills. Also during those years we had trappers and the use of toxicants and we controlled the numbers of predators very well. During those years we had ten or more times the numbers of gazing animals on the Federal ranges than we now have and we had thousands of sage hen on the same areas. As soon as the grazing permits were cut by the agencies the trappers and toxicant use was cut down and the sage hens started to disappear.

If you want to save the sage hen then contact the Wildlife Services in Reno. They are probably the most important government service to call in order to manage the sage hen.

We must not let this bird be listed under ESA and both the Forest Service and the BLM have the responsibility as federal agencies to show that they have objectively used the best available data to determine what is best for sage grouse. Our whole area, including your agencies, would come under the control of the US Fish and Wildlife Service and those agency people would write an ESA recovery plan with no regard to local needs. The listing and regulations that follow would be a disaster economically and environmentally to our communities. Everyone would be hurt including livestock production, mining, manufacturing, recreation such as hunting and fishing, and just about every other aspect of our custom and culture and there is very little possibility of all that regulation resulting in more sage grouse.

The big problem is that the USFWS uses false science to get what they want and conspire with like minded groups to do that.

For a very good example of how the ESA works look at what happened in Klamath Falls area after the USFWS listed a sucker fish. This allowed the USFWS to implement their recovery plan and to give all the water in the Klamath Lake to the endangered species. That meant the farmers got no water for their crops even though they and the community businesses faced immediate economic destruction and citizens were forced into personal bankruptcy.

The USFWS was doing everything backwards. After the USFWS took over, about 80% of the sucker fish died.

What is the worse part? The National Academy of Science would later rule that the USFWS recovery plan was based on false science.

Without irrigation water 200,000 acres of farm land and 50,000 acres of wildlife refuge habitat dried up. This destruction was the result of the science used to list the sucker fish was corrupt.

The USFWS has recently done the same thing to me when they listed Sierra Nevada Bighorn Sheep as an endangered Distinct Population Segment. Now they have forced the Forest Service and BLM to cancel five of my grazing permits and I have lost nearly 75,000 acres of summer range. I had paid for these permits for over 65 years and over this time had invested over a Million Dollars in range improvements. Of course the agencies do not want me to recover any of those costs which is clearly an un-Constitutional Taking. And just like the sucker fish in Klamath Falls the very best recovery plan that the biologists could write has not resulted in more bighorn sheep.

BACK TO THE SAGE HENS

Sagebrush is not a problem --- we have plenty of it.

In some areas where the sagebrush is tall (3' to 4') and very thick it should be sprayed. That gives the forbs and grasses a chance to come which is very valuable as habitat and forage for the sage hens.

We have done this in cooperation with the BLM in some areas the sage hen has flocked into the sprayed areas.

We need better management of meadow forbs or grasses so forage will be available to sage hen broods when they come off the sage brush onto the meadows in June and July.

We know how to do all of these things which are sound management and it does not require heavy handed regulation.

BY EMAIL /s/ Fred Fulstone

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Remarks for the Bi-State meeting at Smith Valley Library on March 18th, 2013

Listing the sage hen would threaten our homes and our ranches and it would not save the bird. First we must improve sage hen habitat by controlling the predators that destroy the sage hens, their nests, and their chicks. Refer to enclosed article on Ravens. The birds right after hatching are very vulnerable to everything. Some reports say that we are losing 50% of our nests today and 70% of that loss is from ravens. (Mark Jensen, Supervisor, Wildlife Services, Reno Nevada).

Wildlife Services is in charge of predator control and they have lost 45% of their work force. At one time we had three trappers here – one in Smith Valley, one in Mason Valley, and one in Carson Valley. Today we have one trapper that has to cover all three valleys plus Fallon and Austin. We also don't have a lion hunter anymore.

THINGS WE NEED TO DO IMMEDIATELY TO SAVE THE SAGE HEN:
No 1. We must have more trappers to control ravens, coyotes, badgers, bobcats, and other predators.

No 2. We need to protect the grazing of livestock to control fires and enhance the sage hen. Refer to enclosed article on fires.

No 3. Where open grazing is allowed it accomplishes more than just providing feed for livestock

1. Livestock consumes the fuel that wildfires need to grow.
2. Livestock owners improve the water resource and create new water sites
3. Livestock grazing helps in the natural re-seeding, fertilizing, and cultivating of the grasses, forbs, and brush. This is necessary for the production of the sage hen and other wildlife. Sage grouse follow in the livestock footprints and into the bed grounds (especially sheep). These sage grouse feed on insects and other sources of nutrients left by the animals. It is common to see sage grouse chicks eating the pellets from the lambs which are highly nutritious because it is partially digested milk.

No 4. The livestock generally feed off the tall meadow grasses and forbs in the spring and then as the uplands dry the sage hen come down to the new growth of forbs and short green grasses in early summer. The livestock have to graze the meadows before the sage hen broods arrive to provide this benefit. The meadows that have been grazed are preferred by the sage hens.

No 5. You must remember that sage hen get much of their nutrients from the flies and insects which are abundant around livestock. This is not factored into the habitat plan.

No 6. Livestock on the range offers relief from predation because the predators prey on livestock. When livestock owners kill the predators the wildlife benefit along with the sheep and cattle.

NOW TO KIND OF SUM THINGS UP

Livestock grazing and predator control are the two most important tools we have to save and enhance the sage hen.

During those years from about 1955 to 1980 we had thousands of sage hen in Smith Valley, the Pine Nut Range, and Bodie Hills. Also during those years we had many trappers and the use of toxicants and we controlled the numbers of predators very well. During those years we had ten or more times the numbers of gazing animals on the Federal ranges than we now have and we had thousands of sage hen on the same areas. At the time from 1950 to 1980, when we had thousands of sage hen on the ranges, there were plenty of nutriments on the ranges to sustain the many birds so that proves the nutriments are there and the habitat was sufficient. As soon as the grazing permits were cut by the agencies the trappers and toxicant use was cut down and the sage hens started to disappear.

If you want to save the sage hen then contact the Wildlife Services in Reno. They are probably the most important government service to call in order to manage the sage hen.

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Conclusion

Sagebrush is not a problem, we have plenty of it. Nevada is the sagebrush state. To increase the sage hen numbers and save our rural communities, we must perform the following:

1. Don't list the sage hen
2. Control predators
3. Control fires
4. Improve water supplies
5. Increase our grazing area
6. Get DNA of Bi-State Sage Grouse and compare to others so we know what we are doing. We need responsible action.

Submitted by Fred Fulstone
Fred Fulstone
For F.I.M. Corporation
Smith, Nevada

Nevada's airborne irritants

Ravens threaten endangered wildlife, ranches

By Henry Brean
Las Vegas Review-Journal

LAS VEGAS — Never mind the Super Bowl team from Baltimore, who defeated Northern Nevada favorites Colin Kaepernick and the 49ers.

In Nevada, real ravens pose a growing problem for ranchers, wildlife managers and two well-known species struggling to survive.

The clever and adaptable black bird preys on both the desert tortoise and the sage grouse — the former already protected under the Endangered Species Act, the latter on track to join it.

Efforts to save those species could mean death for more ravens. Already, the birds are killed by the thousands in Nevada each year.

Some people think far more ravens need to die. Others believe the wholesale murder of them won't accomplish anything — and it might just make things worse.

But the raven isn't waiting around to learn its fate. It just keeps reproducing, learning new things and expanding its range.

By some estimates, raven populations nationwide have grown by 300 percent in the past 40 years. In Nevada, the increase is thought to be more like 600 percent.

A raven, center left, prepares to take off as other types of birds flock to Apex Landfill north of Las Vegas. A

Humans

The raven succeeds on the spoils of our success. It feeds on our garbage, hunts from our transmission towers and follows our highways to new territory, dining on roadkill along the way.

"We're literally paving the way for ravens to move farther and farther into the desert," Jason Jones, a herpetologist with the Nevada Department of Wildlife, told the Las Vegas Review-Journal.

Common ravens grow to about 25 inches in length and weigh more than 2 pounds. They can live for more than 20 years and survive almost anywhere.

"You find them in Death Valley in the summer and at Prudhoe Bay, Alaska, in the winter," said John Hiatt, longtime conservation chairman for the Red Rock Audubon Society. "They're everywhere there is something to eat."

They're also among the smartest birds around. They solve puzzles, avoid threats and exhibit behavior that resembles play.

Shawn Espinosa, a staff biologist for the Nevada Department of Wildlife, said we should all be glad the birds don't have opposable thumbs.

"They might rule the world," he said with a laugh.

Killing ravens

Almost 20,000 common ravens have been legally killed across Nevada in the past 12 years, according to state figures.

Last year alone, the Department of Wildlife killed 1,997 ravens, three birds shy of the limit set by its U.S. Fish and Wildlife Service permit.

The raven, as it turns out, is a protected species as well. It falls under the Migratory Bird Treaty Act of 1918, which covers more than 80 percent of birds native to the United States. For the time being, state wildlife officials plan to keep killing as many ravens as the law will allow, though they acknowledged that such efforts might well be futile.

There is some research that suggests killing ravens could increase their concentrations — that when a mated pair is killed, two pairs of ravens will take over the open territory, effectively doubling the number of beaks to feed. Even so, the state has spent almost $150,000 to poison 6,850 ravens in 10 Nevada counties since 2007.

Hank Vogler has been running livestock in White Pine County for almost 30 years. He spread in Spring Valley, in the heart of sage grouse country, home to more than 6,000 sheep.

It's also a magnet for ravens which foul his water troughs, steal food from his rams and kill up to 100 of his lambs each year by pecking out their eyes and tearing at their umbilical cords.

"Let me go to the window," Vogler said by phone one recent Thursday. "Yep. Out where the rams were fed this morning, it's absolutely black with crows."

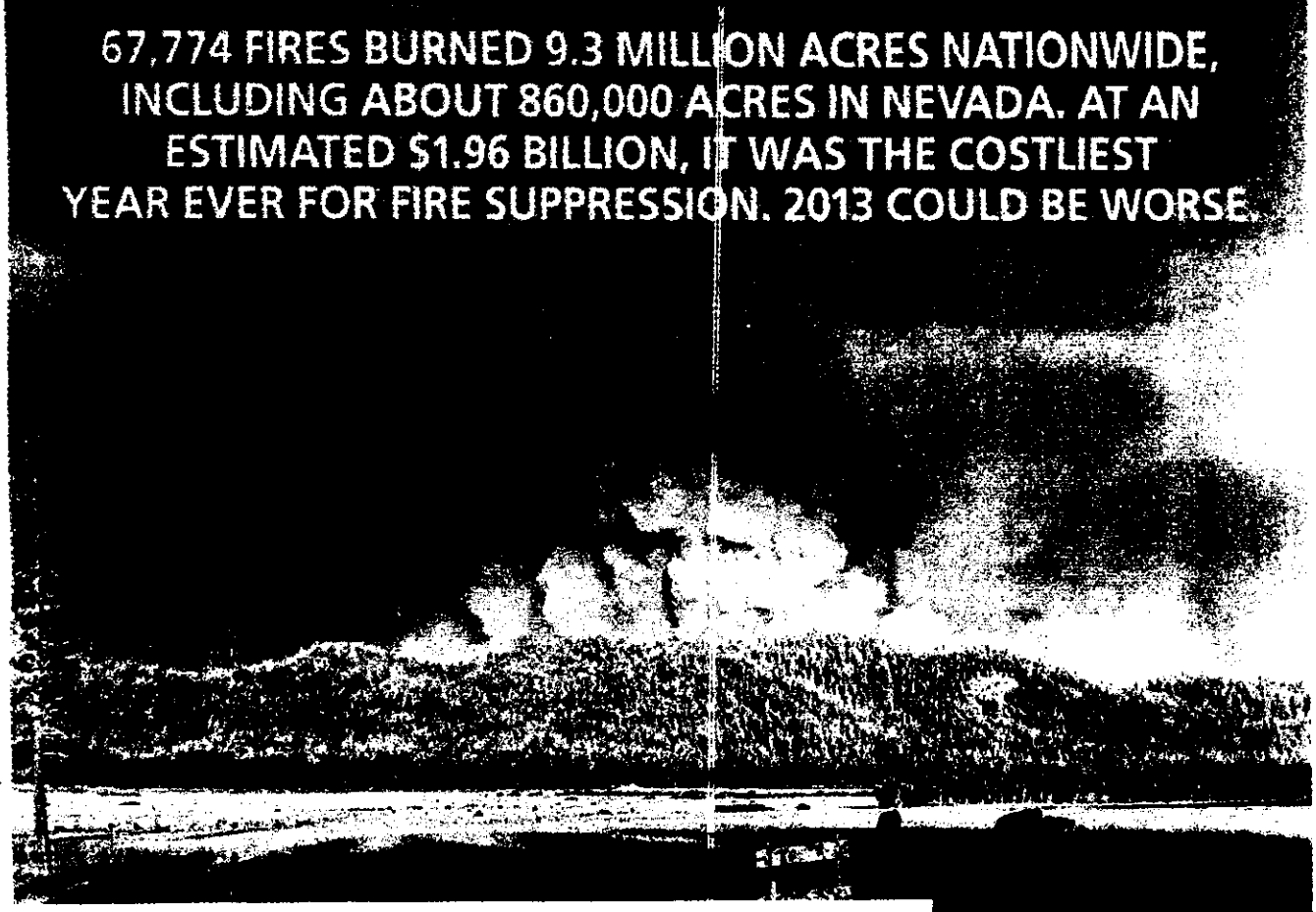
He can go out and blast away at them with a shotgun, but they're smart enough to keep their distance. If they see him with a gun, they will just wait for him to leave and go back to stealing feed.

As far as he is concerned, killing ravens has proven ineffective only because wildlife officials haven't killed enough of them yet.

"Do I want to see every crow on Earth, every raven, die? No," Vogler said. "But do we need 600 percent more of them than we did before? No."

2012 WILDFIRES

67,774 FIRES BURNED 9.3 MILLION ACRES NATIONWIDE, INCLUDING ABOUT 860,000 ACRES IN NEVADA. AT AN ESTIMATED $1.96 BILLION, IT WAS THE COSTLIEST YEAR EVER FOR FIRE SUPPRESSION. 2013 COULD BE WORSE.



By Jeff DeLong
jdelong@rgj.com

The sheer size of the wildfires that burned across a dry nation in 2012 helped drive the cost of quenching flames to an estimated $1.96 billion, making for the costliest year for fire suppression ever, experts said.

Fifty-one fires larger than 40,000 acres – including several that burned vast swathes of range in Northern Nevada – cost more than $580 million to extinguish, according to a summary released by the National Interagency Fire Center.

It's a costly and damaging trend that, with a second dry winter seemingly taking the West in its grip, shows every sign of continuing in 2013.

"It was extensive, among one of the more extensive in recent history," Ken Frederick, spokesman for the Boise-based fire center, said of last year's destructive season.

"It's estimated it will be the most expensive," Frederick said. "Any way you cut it, it's expensive."

Drought conditions in Nevada and across much of the nation combined with warm summer temperatures and often windy days to produce huge wildfires that burned long and charred vast islands of vulnerable terrain, Frederick said.

While the numbers are still preliminary, the estimated $1.96 billion to fight fire on federal land in 2012 would surpass the previous record of $1.92 billion in 2006, Frederick said. The bulk of the cost – $1.5 billion – was spent to battle wildfires on land managed by the U.S. Forest Service. Another $460 million was spent to fight fire on Bureau of Land Manage-

See WILDFIRES, Page 3A

INSIDE

After coming in $400 million over budget last year, the U.S. Forest Service says it might let more fires burn instead of attacking every one of them. 3A

PAST NEVADA FIRE YEARS, ACRES BURNED

2011	417,400
2010	23,800
2009	33,300
2008	71,900
2007	890,100
2006	1.3 million

ABOVE: A plume of smoke from the Chips Fire rises above the Plumas National Forest in Northern California on Aug. 18.

School police could play larger off-campus role

Wildfires

Continued from Page 1A

ment land, much of that in Nevada.

More than 9.3 million acres burned, roughly matching the amount of land charred in 2007 and only surpassed by the 9.8 million acres burned in 2006.

The second-largest fire in the country last year was the lightning-sparked Holloway Fire, which burned more than 460,800 acres in both Nevada and Oregon.

That fire burned for a month and cost more than $9.1 million to suppress, according to the center's summary.

The Holloway Fire and two other large lightning fires that burned in Nevada in August, the Bull Run Complex and the Dallas Canyon Fire, cost nearly $17 million to suppress combined.

In some cases, fires burning in remote locations grew so large in part because firefighting resources were engaged fighting other blazes where lives and neighborhoods were at risk, Frederick said.

"It's very typical those types of fires will get a lower priority than fires that are threatening homes," Frederick said. "We simply don't have the army of resources it takes to combat a large number of fires."

A snowy December left many with high hopes 2013 would produce fire hazards at diminished levels from 2012 but a remarkably dry January and February has largely dissolved such optimism, said Nevada State Forester Pete Anderson.

He predicts another busy fire season for the Silver State and others parts of the country.

"We had a lot of high hopes but unless something turns around, it looks like we're going to be pretty dry," Anderson said. "I know the Forest Service and BLM are both very concerned. You just never know where that fire is going to start and who is going to be impacted."

"I'd say we're looking at something comparable to last year. It's been pretty dry," Frederick agreed. Early season fire danger will be dictated to a large degree by what happens in the spring and how mountain snowpacks melt, he said.

Whatever happens in 2013, studies indicate a warming climate could bring fire seasons of the future that significantly surpass what occurred last year, Frederick said.

"It won't be surprising if we start to see 10- to 12-million acre fire seasons," he said. "It could happen. It may well happen."

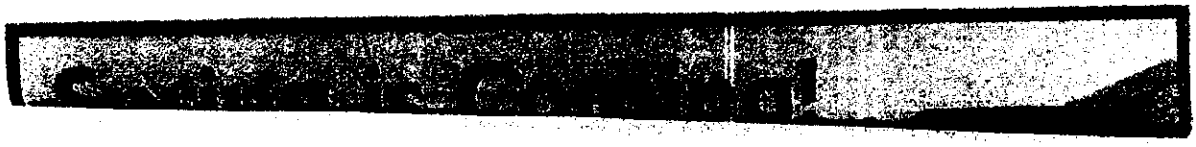


Photo 1. In our tests, any sheep which ran from coyotes usually were pursued and attacked. Coyotes generally select lambs over ewes if they have a choice.

Photo 2. Our coyotes usually attacked by running alongside fleeing sheep and biting them behind and below the ear. Then they braced their feet to stop the sheep from running. In this picture two 2-year-old coyotes are attacking a 90 lb. ewe.

Cover story

How Coyotes Kill Sheep

By Robert M. Timm and
Guy E. Connolly

COYOTE PREDATION is a serious problem for many sheep ranchers in North America, but the act of predation is seldom witnessed under range conditions. Therefore, the sheep-killing behavior of wild coyotes has received little study. In experiments with captive animals, we obtained photographs which illustrate what we believe to be the usual mode of coyote attack on sheep. The resulting wounds are characteristic of coyote predation, even though dogs or other predators may sometime inflict similar wounds.

Photo 5. The throat attack pattern of coyotes leaves characteristic lesions which may or may not be externally visible. This coyote-killed ewe showed few external wounds, but sub-cutaneous examination revealed extensive tissue damage and hemorrhaging in the larynx region. Tooth punctures can often be found in the overlying skin.

The 12 coyotes used in this study were either captured as pups or born in captivity. At the time of these trials, eight of the animals were 2 years old and four were yearlings; none had had previous hunting or prey-killing experience. Nevertheless, five of these coyotes killed and fed upon lambs at the first opportunity. Three more coyotes, which did not attack sheep

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Robert M. Timm is currently Extension wildlife specialist, University of Nebraska, Lincoln; and Guy E. Connolly is wildlife research biologist, U.S. Fish and Wildlife Service, Wildlife Research Station, Twin Falls, Idaho. The research was done when both authors were at the University of California, Davis. The report is a contribution of Western Regional Research Project W-123, "Evaluating Management of Predators in Relation to Domestic Animals". The work was supported in part by the USDA Agricultural Research Service, Western Regional Laboratory. The authors thank D. A. Wade, W. E. Howard, W. M. Longhurst, R. Teranishi, and E. Murphy for advice and support; A. H. Murphy, D. T. Torell, and A. Hulbert for sheep; M. Vann and C. Berry for coyote pups; J. Fammatre for assistance; and M. Beaucage for photograph number 4. Reprinted from RANGEMAN'S JOURNAL, August 1977, by permission of the Society of Range Management.

Photo 3. As soon as the coyotes arrested the flight of the sheep, they shifted their bite toward the sheep's throat. Once a firm grip was secured in the larynx region, the coyote simply held on and waited for the sheep to succumb. This manner of attack appeared to cause death primarily by suffocation, although blood loss and severe tissue damage also occurred. The time from onset of attack to death of the sheep or beginning of feeding, which ever occurred first, averaged 13 minutes. In 24 of the 25 fatal attacks, the neck and throat region was the main point of attack.

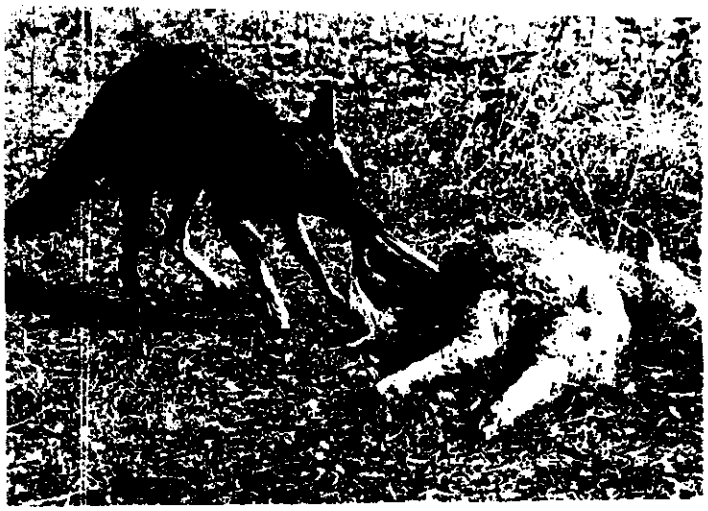

Photo 4. As soon as the sheep stopped struggling, the coyote(s) began feeding. On 9 of 21 kills where feeding was observed, the coyotes entered the body cavity and ate intestines and other viscera. They also fed upon the rump or hind leg (10 cases), the neck (7), front leg and shoulder (7), head (6), and other sites. On the average, each coyote fed for 25 minutes and ate about 4 pounds. Coyotes fed just before tests killed sheep but did not feed on them.

at first, did so in later tests. Of the 11 coyotes which were tested singly against individual 30 to 70-lb. lambs, eight killed the lambs.

In our tests, one to four coyotes were released into a 0.4-acre pen with 1 to 6 sheep, usually for 2 to 5 hours. The coyotes killed one or more sheep in 22 of the 46 tests. For the tests in which a fatal attack occurred, the time from release of coyotes to onset of attack varied from 1 to 154 minutes, with an average of 47 minutes. Of the coyotes tested individually with single lambs, the dominant animals (2-year-old males and the females paired with them) attacked most frequently. Yearling males attacked less frequently, and the two unpaired females did not attack sheep.

While we cannot be sure that wild coyotes will sheep in exactly the manner we observed with captive animals, the wounds resulting from our tests resembled those reported by many workers who studied coyote predation under range conditions. Therefore, we believe that the killing patterns we saw are generally representative of coyote predation on sheep.

On ranges where mountain lion, black bear, and bobcat predation is improbable, tissue damage, tooth marks, and hemorrhage in the larynx region on sheep carcesses is commonly indicative of coyote predation. However, coyotes sometimes attack the hindquarters of sheep. Dog-inflicted wounds seem to be more variable than those caused by coyotes. It is reported that dogs tend to attack the hindquarters, flanks, head, and/or abdomen of the sheep and seldom kill as cleanly as do coyotes. Wounds caused by dogs can usually be recognized as such, but at times they are indistinguishable from those made by coyotes. In such cases, tracks and other evidence at the scene often indicate which species of predator caused the damage.

Photo 6. A coyote consumed about 5 pounds from the rump of this 70 lb. lamb without killing it. We have seen range sheep with similar wounds. Of 25 coyote kills we observed, this was the only case in which the attack was not directed primarily to the neck and throat area of the sheep. Extensive feeding on the rump and hind leg, as shown here, also occurred on about half of the sheep killed with the customary throat hold.

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State of Nevada Assembly

February 25, 2012

"I'm not exaggerating, there were thousands"

THE INTRODUCTION OF AGRICULTURE AND ITS IMPACT ON SAGE GROUSE

By all accounts, sage grouse were rare when Europeans first entered the Great Basin, as I documented in two earlier reports.

However, the populations of sage grouse in Nevada rapidly increased following the introduction of agriculture and livestock in the mid to late 19th century. "Clouds" of birds, creating "thunderous" noise as they concurrently rose into flight, are recorded by the 1880's.

For example, from interviews of "old timers" published by the Northeastern Nevada Historical Society: "Sage chickens (sage grouse) were so plentiful in the 1890's...they clouded the sky...the birds were always thick in the meadows. As I passed by, they would rise up like a bunch of blackbirds...oh they were thick." (George Gruell interview of Syd Tremewan, 1964).

Another: "When we lived on Gance Creek (around 1900) there were lots of sage hens. I have seen them fly up the mountain right behind our house...they sounded like thunder...I am not exaggerating, there were thousands." (George Gruell interview with George Nelson, 1966).

For a more scientific documentation of this huge rise in sage grouse during this time frame, Robert "Bob" McQuivey, a 30 year NDOW biologist, by literally reviewing all of the early newspapers, journals and laws passed in Nevada, has documented this population explosion. I have read some of his extensive research, which I am currently attempting to get published. In a nutshell, it confirms the above observations.

So, what caused this dramatic change, from almost nothing to abundance?
1. Habitat manipulation and expansion, especially meadows and man-made hayfields.
2. The mechanical removal of sagebrush and pinyon/juniper trees for primarily fuel.
3. The introduction of non-native plants, especially common dandelion, alfalfa, and other forbs.
4. Livestock grazing.
5. Stable supplies of water in areas previous dry or intermittent.
6. Predator control.

It should be noted none of the man-made changes were done intentionally to benefit sage grouse. It was simply coincidental.

HABITAT CHANGES. As settlers started to quickly dot the Nevada landscape, one of their first acts was to create a meadow of sorts for their domestic animals. For large ranches it was to primarily grow hay and expand lush grazing areas. Yet even the smallest start-up ranch had horses and generally a milk cow or two. By fencing an existing meadow, finding a level piece of sagebrush covered ground, damming the local spring or stream, and irrigating, meadows were both expanded and created new.

As is well documented, sage grouse have a symbiotic relationship to meadows. They especially relish certain forbs (most of us would call them "weeds"), and insects common on meadows.

However, when meadows are not basically "mowed down", sage grouse avoid them. Livestock usage, by eating the plants, actually increases sage grouse usage. For example, from "The Relationship of Cattle Grazing to Sage Grouse", a thesis done at UNR by Carol Evans in 1986: "Klebenow (1982) found that birds tended to avoid meadow areas of dense rank vegetation, but would use the areas once they were "opened up" by grazing. Oakleaf (1971) reported that heavily grazed meadows...were utilized by sage grouse, while succulent areas of ungrazed meadows...were not used as feeding areas. After cattle grazed and left a meadow, sage grouse were observed to concentrate there in greater numbers than before the grazing..." (DeRoucher, 1980)."

This flies in the face of the common misconception that grazing harms sage grouse. As Evans noted: "During the last three surveys, observed use of grazed meadows was significantly higher than expected."
Why? "Grazing by cattle prior to the cessation of plant growth...increases the quality of the food forb resources for sage grouse. Grazing increases the succulence of forbs by interrupting and delaying maturation. New leaf tissue is higher in crude protein...than mature tissue. Sage grouse appeared to seek sources of succulent forbs by selecting for meadows grazed by cattle."

NEW PLANTS: non-native plants can be harmful, like cheatgrass, or beneficial. Common dandelion, just like the ones you find in your lawn, is not native to Nevada. The good news: sage grouse love to eat it. Food studies of sage grouse show it to be a primary and dominant dietary item today. As Evans noted: "A study of this unique forb (dandelion) might yield important insights into how the environment for sage grouse has changed and how sage grouse have responded...the distribution of dandelion is closely tied to grazing...it increases with grazing and is noticeably less abundant in communities protected for long periods...dandelion unlike other forbs, retained its succulence long after maturation...dandelion is an exotic and not native to sage grouse habitat..."

Other plants introduced include alfalfa, which also is highly attractive to sage grouse; as are the insects these new man-made meadow complexes attracted. All in all, the huge increase in meadows or meadow- like fields and hay producing areas were the primary catalyst for sage grouse expansion, all done together with livestock grazing.

MECHANICAL REMOVAL OF SAGEBRUSH, primarily for fuel, also benefitted sage grouse by removing older less productive plants and allowing younger more succulent plants to grow. As recorded in 1877: "Sagebrush is about the only fuel in this timber-less country and hundreds of thousands of cords of it are annually consumed...like the grand forests of the Sierras, the wild sage of the Great Basin is rapidly disappearing and as it is a plant of exceedingly slow growth, it is not improbable that it may ultimately become extinct..." (from the "Tuscarora Times Review" as quoted in McQuivey's work).

This also helps explain why areas recorded by the early explorers as vast seas of sagebrush were later described as grass dominated by the 1890's. The fear of sagebrush going extinct was obviously grossly exaggerated, and its rapid recovery was a boon for the sagebrush-eating sage grouse, as the younger plants and re-growth were much more productive in the leaves they eat, especially in winter. The removal of Pinyon/Juniper trees over much of Nevada during this same time frame had much of the same effect.

WATER DEVELOPMENT, allowing livestock to graze areas otherwise off limits due to an absence of consistent drinking water, was also a boon for sage grouse. Windmills, stock ponds, spring improvements, earthen dams in strategic spots to catch run-off, and irrigation of formerly sage covered flats converted to hay meadows all greatly expanded habitat availability for sage grouse.

PREDATOR CONTROL also likely boosted sage grouse production. For example, the early Mormons, only two years after arriving in the Great Basin, "...sponsored a contest to kill off the 'wasters and destroyers'. About 800 wolves [coyotes], 400 foxes, 2 wolverines, 2 bears, 2 wildcats, 37 mink and several thousand hawks, owls, eagles and crows were killed in the hunt. One dollar in tithing was offered on a continuing basis for each wolf or fox skin." (From Arrington, "Great Basin Kingdom", page 59). Virtually every cowboy, sheepherder, rancher and ranch boy carried a firearm and shot every predator they crossed. While today condemned to a certain extent, this action likely contributed strongly to the rapid expansion of sage grouse into its newly enhanced habitats.

All in all, agriculture and ranching in the Great Basin was the catalyst for the noted huge increase in sage grouse in Nevada. As the small ranch complexes were slowly eliminated from Nevada by economic conditions as well as the Taylor Grazing Act and other government actions, the smaller man-made meadows dried up as well. Grazing, predator control and maintenance of various related stock water developments also declined.
Declined, yes, but not eliminated entirely. (At least not yet). Much of these agricultural improvements remain that still greatly enhance sage grouse habitat, and although down in number compared to the highs described, sage grouse are still significantly above the historic low numbers noted by the first explorers.

While attending a [Nevada] Governor's Sage Grouse Conservation Team meeting, I asked de-facto leader, Nevada Department of Wildlife (NDOW) biologist Sean Espinosa what in his view is the best sage grouse success story in Nevada since the team was formed in 2000. He stated: "Smith Creek Ranch."

Considering the fact that many government people have made it clear they feel the livestock industry is the cause of the sage grouse decline, the irony is huge. Smith Creek Ranch in central Nevada is a working cattle ranch and has been for almost a century and a half. (Incidentally, I agree wholeheartedly with Espinosa's opinion; Smith Creek Ranch is loaded with sage grouse. I have personally seen several hundred birds there myself.)
The ranch, as so many Nevada ranches once did, has a man-made reservoir and irrigates about 1200 acres – a man-made meadow complex. I have spent a great deal of time there, and seeing several hundred sage grouse on this meadow is not uncommon. NDOW has documented more than 500 sage grouse on this man-made meadow at one time. When the ranch was purchased by the current owner in the late 1990s, the meadow was "dirt". By irrigating, a hay/grazing meadow was soon home to hundreds of sage grouse (and cattle), at a spot you would have been lucky to see a dozen birds a decade or so earlier.

Consider: multiply this creation of a meadow and grazing it (to stimulate plant production; gardeners call this 'pruning'), as early Nevada ranchers did in nearly every canyon with some water starting in the mid 19th century, and you will begin to understand why the populations of sage grouse went from next to nothing to "clouding the sky" in only a few decades. Think of it as Smith Creek Ranch on steroids.
Agriculture and livestock bad for sage grouse? History says otherwise.

Sincerely,
Ira Hansen
Assemblyman District 32

IRA HANSEN
ASSEMBLYMAN
District 32

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"Raven numbers have increased 1500% in areas of the western United States within an approximate 25 year time period." – Idaho State University, 2005

RAVENS AND SAGE GROUSE

July 5th 2012

SAGE GROUSE DECLINE: Populations of sage grouse have been in decline for several decades and "habitat loss" is as a rule blamed. Today they are being seriously considered for placement on the "endangered species" list by the Federal Government. Even in states with excellent habitat available – such as Nevada – bird numbers have shown a similar trend.

As several studies have noted adult sage grouse survival is generally not a problem. Recruitment – how many young birds join existing adult populations – has been documented to be poor. Consequently several recent studies, including two especially pertinent for Nevadans conducted in Elko County by Idaho State University, have attempted to address why.

"Predator control" is today a major topic of debate. The idea of removing predators, once the catch-all answer for downward trends in wildlife populations, is today regarded by college educated wildlife biologists as an anachronism, a holdover of a less educated past. Consequently most modern wildlife biologists seem to go to great lengths to avoid even discussing using predator control as a tool in their management arsenal.

Yet, examples of predators having long term impacts can be substantial and documented. When for example a primary food source is supplied unintentionally by man, secondary food sources can suffer catastrophic declines without a corresponding decline in the predator's population.

The increase in ravens in the western United States has been nothing short of phenomenal. A 300% increase in general has been noted, with 1500% increases documented in certain areas. Much of this increase has come about from man-supplied food sources.

This trend was noted in one of the Elko studies: *"Generalist predators* [such as ravens] *that reach high numbers in human altered habitats are of great concern because they can reduce prey populations* [such as sage grouse] *and these predators have been shown to continue depredating bird nests even at low prey densities."*

In plain English, even when sage grouse decline sharply in numbers because the ravens are eating them, as long as the ravens have other food sources, the raven populations are not affected by the declines in sage grouse.

The impacts ravens have on sage grouse is in truth old news. A 1948 study conducted by the Oregon State Game Commission concluded: *"The greatest single limiting factor of sage grouse is nest predation by ravens. While other predators do contribute to their toll, this study showed that the raven was the single greatest limiting factor and the control of winged predators is an essential element in sage grouse management".*

The 1948 Oregon study, in brief, had a "control" area in quality sage grouse habitat where raven populations were substantially reduced. Another very similar area was left alone with no raven removal. The results: *"Ravens again proved to be the chief limiting factor of sage grouse, and raven control the most feasible management method on increasing grouse populations. Five and five-tenths percent nesting success on an uncontrolled area as compared to a 51.2% success on an area where ravens and other avian predators were controlled is a strong indication of the raven's effect on this species."*

History repeats itself: the 2005 Elko study, conducted by Idaho State University, while couched in more "politically correct" jargon, reached very similar conclusions, again using the control/no control methodology: *"Sage grouse nest failure and observed raven predation of sage grouse nests were associated with indices of raven abundance...our findings should raise some conservation concern considering that raven abundance has increased an estimated 300% in the past 27 years in the United States including reports of 1500% increases within an approximate 25 year period in areas of the western United States".*

Clel Georgetta, writing about the domestic sheep industry in his Western history classic "Golden Fleece in Nevada" made an interesting observation. Written in 1968, he stated *"The crow* [raven] *is a newcomer. He is not a native of the state. It is believed there was not a crow in all Nevada until after the First World War when automobiles began crossing the country. All along the road jackrabbits were killed by cars. The crows followed from one rabbit to the next one, all the way out west. Now Nevada has many thousands of crows and they form one of the greatest pests at lambing time."*

Georgetta is wrong on no ravens in Nevada as their presence was well noted by the early immigrants for similar reasons – they followed the emigrant trail eating dead draft animals and livestock. Nevertheless his observation, from a man native to eastern Nevada, whose father was head of one of the pioneer ranching families of this State, shows they were very scarce.

Interestingly, the time frame he notes for the raven showing up in Nevada, WWI, which ended in 1918, matches almost exactly the date for an overall decline in sage grouse populations in the Oregon study mentioned earlier. They noted a gradual decline beginning in 1919 which continued to the years of their study, 1946-1947.

Incidentally, most people in Nevada, including myself, cannot distinguish a "crow" from a "raven" although they are two distinct species. Thus people like Georgetta lump them together.

STUBBLE HEIGHT AND PREDATION: One of the new theories on protecting sage grouse nests from avian predators is to leave "stubble", i.e. unconsumed grass and weeds, among the sage brush plants sage grouse typically nest under to provide concealment for nests.

While sounding plausible at first, this is probably the worst possible thing we could do, and I highly suspect the motive for pushing this particular pseudo-solution is a back-door attempt to remove livestock from the ranges. It is a terrible idea in that if carried out, the fire danger would increase exponentially; the bulk of the grasses and forbs today are combined with cheatgrass or in reality are totally composed of cheatgrass.

Once you start leaving the recommended minimum height of eight-inch-high dry cheatgrass stubble, you virtually guarantee fire will sweep through that sage brush community, destroying the habitat completely for sage grouse. In short, no sage, no grouse.

It should be noted as well that the peak historic sage grouse populations in Nevada, when descriptions of "clouds of birds" and "thousands of sage hen" were noted was also the time frame of unlimited and totally unrestricted grazing by - no exaggeration here - millions of sheep and hundreds of thousands of cattle and horses. If "stubble height" is so critical for protection, how did they survive and actually prosper in the very same time frame that by all accounts Nevada was so severely overgrazed?

The 2010 Elko study, again conducted by Idaho State University, discovered that increased stubble height actually ***increased predation*** of nests by non-avian predators. "*We also found that badger predation increased at nests with greater visual obstruction.* [After ravens, badgers were found to be the most destructive predator of nests, eggs and young birds]. *Other studies have found negative or no relationships between nest survival and grass height, grass cover, shrub height, canopy cover, understory cover, and species of nesting shrub".*

In truth, not only does stubble increase fire danger, but aids additional predation as well. Hardly a well thought out "solution".

In conclusion the logical steps to help restore sage grouse populations is to reduce raven numbers, by first doing what is practical, i.e. cover or destroy man-provided food

sources; second to use selective predator control in key sage grouse habitat, probably through USDA provided professional trappers; and three, allowing and encouraging shooting and hunting seasons for crows, even possibly a bounty system of some type, while looking to get out of or get variances on the international 1918 Migratory Bird Treaty, which calls for raven protection.

To my recollection, crow hunting as a means of protecting sage grouse started in the 1980s. Idaho was one of the first states to legalize it. The obvious question: how can you tell unprotected crows from protected ravens?

My good friend Mike Meizel, an avid trapper and outdoorsman and former Chief of Buildings and Grounds for the State of Nevada, posed that question to an Idaho Game Warden in the late 1980s. This particular Warden, blessed with good old common sense and aware of the damage ravens were causing, wryly noted "crows are the ones that hit the ground"!

Beware of the simplistic response you will get from certain biologists when raven removal is suggested. "Yes" they will say, "we know ravens eat the eggs and removal helps with that but the *problem* is the *juveniles* that survive past nesting are not surviving to full adulthood. Something in the *habitat* is the problem."
Ok, then what is that *problem* specifically? The tangible discussion typically ends about there and a series of nebulous theories – none of which seem to focus on the likelihood of *additional predation* – takes over. Not a single study I have read has suggested starvation as the cause of juvenile grouse not making it to full adulthood. In fact food studies for sage grouse state the opposite; there is a bit of a mystery why there are not many times more grouse as the studies show they eat only token amounts of their potential food supply. "Habitat" per se is NOT the problem.

Currently thanks to the mental roadblock the words "predator control" causes among most of today's wildlife biologists, virtually every possible scenario, no matter how outlandish or poorly thought out, is placed ahead of predator removal on the "to-do" list. Indeed, several proposals call for removing from the public domain sage grouse population enhancement tools, most notably livestock grazing and agriculture despite strong evidence these greatly increased sage grouse populations in Nevada.

As I have documented in other papers, sage grouse were all but non-existent when white man first arrived in Nevada. Following the introduction of landscape modifying and landscape enhancing changes, especially the introduction of the livestock range industry and all that came with it – including predator control - sage grouse populations exploded.

Based on early explorer journals describing Indian diet and wildlife they observed, two of my earlier reports detailed the fact Nevada had next to no sage grouse comparatively speaking. For additional facts based on Indian diet, I have completed a careful review of Julian Steward's 1938 report on Indian practices, including food sources, before white contact. Taken from interviews Steward did with older Indians in the 1920's and 30's,

and covering virtually all of Nevada, it is a wealth of first hand information from the Indians themselves and the results on sage grouse will be of interest to those seeking facts rather than fables presented by some about the "good old days!"

I will report on that soon. I will also be reporting on the impacts on sage grouse populations caused by crested wheat seedings.
Please feel free to contact me about any aspects of these reports, copies of past reports and feel free to circulate them as you see fit.

In the meantime, we need to give raven removal a strong seat at the "save the sage grouse" table. I strongly believe that not only can we stop the decline in their populations, but using the past as our guide, begin rebuilding. *Nevada could be a model for enhancing sage grouse populations*. We simply need the leadership to boldly experiment and challenge the bureaucratic choke-hold on methodology. Rather than wringing our hands over "saving" some token remnant, why don't we focus on what works? We can expand our sage grouse populations. *The answer is in our own past!*

Sincerely,
Assemblyman Ira Hansen
District 32

IRA HANSEN
ASSEMBLYMAN
District 32

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State of Nevada Assembly

February 21, 2012

LIVESTOCK GRAZING AND WILDFIRE

At our January 27, 2012 Public Lands Committee meeting, a briefing paper by Bob Sommer, Fire Staff Officer for the Humboldt – Toiyabe National Forest, U.S. Forest Service, was read into the record. A single paragraph caught my eye: "...in 2007, the University of Nevada Cooperative Extension Service issued a report titled "Northeastern Nevada Wildfires 2006, part 2 – Can livestock grazing be used to reduce wildfires? They concluded "...livestock grazing is not a panacea for wildfire reduction on Northern Nevada rangelands."

I had read the 2006 UNR report mentioned and recalled a quite different conclusion. In fact, the UNR report reads: "Can livestock grazing reduce the risk of large recurring wildfires? In a word *yes*, but with limitations...In site specific situations, livestock can be used as a tool to lower fire risk by reducing the amount, height and distribution of fuel. Livestock can also be used to manage invasive weeds in some cases and even to improve wildlife habitat. This *under-utilized tool* (emphasis mine)..."

In short, while grazing is not a "panacea", (which means "cure-all") it is a valuable tool and in the opinion of the authors of the 2006 UNR report an "under-utilized" tool as well.

The basic question: how can we reduce the main cause of the million acre fires, the alien cheatgrass? Cheatgrass has been in Nevada since the 1890's at least, yet the catastrophic fires did not start until the year 1999. For over a century the presence of cheatgrass did not result in fires of this magnitude. Why not? What did we do different then than now?

Also to consider is the business end of fires. As James Young, UNR range scientist for 43 years noted, "*Fire suppression [has become] a multi-million dollar business that reaches from the rangelands of Nevada to corporate America. It is not in everyone's interest to biologically suppress the cheatgrass-wildfire cycle on Nevada rangelands.*"

Today hundreds if not thousands are employed in a government funded range fire industry that was a token of what we see today when compared to only a little over a decade ago. The BLM/Forest Service fire budget is now in the hundreds of millions, and a range reseeding/recovery industry has been spawned as well, all relying paradoxically on a continuation of range fires. A conflict of interests exists; the successful long term solving of the

million acre fires means the elimination of employment for this dramatically expanded bureaucracy.

What is the impact of livestock grazing on cheatgrass and hence wildfires? In 2008 at UNR a symposium was held by the leading experts in range management. They published their conclusions in "Great Basin Wildfire Forum: The Search for Solutions." Here are several excerpts.

DR. PAUL TUELLER, professor of range ecology at UNR for 42 years: *"The extreme fire years in the recent past must be due, in part, to the noted reduction in grazing the forage base, resulting in significant fuel buildup. The lower and sometimes upper reaches of the mountain ranges have turned yellow as a result of post-fire cheatgrass establishment...Development of intensive grazing strategies is needed to allow utilization of cheatgrass and reduce future fuel loads. Grazing animals will be the tools that must be used to make desirable changes in vegetation."*
DR. LYNN JAMES, director of the USDA ARS plant research laboratory at Logan, Utah for 35 years: *"Fires depend on adequate fuels-grasses and certain shrubs. The larger the fuel load, the hotter the fire will burn and the more damaging it will be...An economical and efficient way to remove excess grass is with an on-off grazing system. Fuel loads are reduced, while producers benefit from forage consumed by their livestock. Other grazing strategies can aid in preventing or managing wildfires and controlled burns. Fires that do occur burn with reduced intensity and a general upward trend in rangeland condition is sustained."*

DR. KEN SANDERS, professor of rangeland ecology at the University of Idaho for 32 years: *"The third biggest threat is the reduction in grazing on public rangelands. If the proposed sage grouse habitat guideline that recommends leaving a grass stubble height of 18 centimeters is applied, it will not only result in an adverse economic impact on livestock producers ,but it will also result in increased, higher intensity wildfire due to a larger fuel load."*

DR. WAYNE BURKHARDT, UNR professor of range management, emeritus: *"For the past 40 years, the management strategy, at least on public lands, has been to reduce or modify livestock grazing on these annual grasses, presumably to allow the re-establishment of native bunchgrasses. This has proven to be disastrous. Pre-adopted annual grasses* [such as cheatgrass] *can out-compete native bunchgrasses for early spring moisture on arid range sites. Reductions in grazing on these rangelands have not promoted the establishment of native flora, but rather have allowed flammable fuel build-up and increased fire frequency, intensity and spread. These unnatural fires remove the sagebrush overstory, prevent shrub re-establishment and create the conditions for the establishment of monotypic annual grasslands on what should be a shrub/grassland vegetation community.*
Public land grazers have an important role in protecting the resource by reducing fire danger, by managing fuels and improving the health and productivity of the range. Grazing should be firmly established as a necessary tool in reducing fire danger. The public needs to understand that fine fuel reduction and weed control are positive aspects of grazing and that properly managed grazing is good for the land."

DR. SHERM SWANSON, professor, Department of Natural Resources and Environmental Science, UNR: *"The presence of grazing animals on the range should not be viewed as overgrazing, but rather as a valuable tool. When used properly, grazing can help achieve resiliency in desirable plant communities and responsible fire and fuels management."*

In USFS Fire Staff Officer Bob Sommer's briefing paper he also wrote: "After the Murphy fire, the Idaho BLM State Director put together a team from both Nevada and Idaho...The purpose was to look at plant communities and livestock grazing in relation to the Murphy fire. The team concluded that much of the Murphy fire burned under extreme fuel and weather conditions that likely overshadowed livestock grazing as a factor influencing fire extent and fuel consumption."

I bring this up as, while studying this question, I came across this quote from Dr. NEIL RIMBEY, professor and range economist at the University of Idaho. He wrote: *"A tour of Idaho's Murphy Complex fire and the Tongue Complex on Juniper Mountain in the late summer revealed graphic evidence that grazing may reduce fuel loads and even stop fires."*

Clearly, if both men are describing the same fire complex, and I believe they are, they seem to be reaching substantially different conclusions from what I assume are the same observations.

If fires require fuel, and the fuel causing the fires is cheatgrass, the goal to block fires then is to remove as much fuel – cheatgrass – as possible. Less fuel – less fire. And if cheatgrass has been around for over 100 years, and fires were relatively small and uncommon up until 1999, livestock must have been the source of keeping this fuel in check.

So why no giant fires prior to 1999? *This is why I am highly skeptical of the BLM and USFS.* The same "experts" that now assure us they have the solution are the same "experts" that got us into our current mess. Starting in the 1950's, the "experts" came in and told us the "range was over grazed" and the solution was a reduction of livestock. So they began to cut, small at first, huge by the 1980s and 1990s. Between 1982 and 1991, Nevada had a reduction of 180,000 head of cattle. The experts assured us this would reestablish healthy native plant communities and reduce the less desirable shrub species, primarily, ironically now, sagebrush. If you read the literature right up to the time of the massive fires, you will note the livestock industry was highly criticized for an alleged huge increase in sagebrush. Sagebrush and several other native shrubs are largely unpalatable for livestock. Hence, since they are not eaten and the more desirable plants are, they tend to increase in numbers, while the desirable palatable plants decline. This is especially ironic now in light of the fact the decline in sagebrush habitat is the primary reason the "experts" give as the cause to put sage grouse on the endangered list.

Every decade or so in the government land management agencies there is an almost complete turnover of "range scientists", as field personnel move up the management ladder, and a whole new crop of college-educated "experts" take their place. Yet Nevada ranches, most owned by the same families for generations, are "non-experts" totally at the mercy of their federal masters. This is not a put-down per se of all federal land management people, many if not most of which are good hardworking individuals. It is a statement explaining why I am highly skeptical of listening always to the "experts", as their track record in Nevada has been horribly bad.

I have always believed the people who will be most harmed by bad land management practices are the ranchers themselves, hence they have a strong financial incentive to insure the long term health of the ranges they use. It is the ranchers who have been the most vocal critics of the Federal policies, warning of exactly what has come to pass. Yet today, if our most recent meeting is an example, we are shunting aside the "non-experts" who actually live on the ground, and are once again being dictated to by "experts" getting their marching orders from Washington D.C.

Incidentally, I have absolutely no connection with the livestock industry. I am in fact a contractor living in Sparks. But I have a strong interest in the plant communities and wildlife of Nevada and have spent literally years in Nevada's backcountry. I have carefully read everything about these issues I can get my paws on (including the book "Cheatgrass" by Young & Clements. One of the few books, purchased in 2009, my wife teased me about buying. Not exactly on the NY Times best seller list!)

In conclusion, any reasonable person would agree using domestic animals to reduce the quantity and spread of cheatgrass is the best solution currently available. The government required massive reduction in AUMs and livestock turn out time frames must be reversed if we are serious about having a public rangeland composed of native plants. Our current trend insures massive fires almost indefinitely, a huge taxpayer subsidized "range fire" industry, and a future Nevada landscape composed of the dull yellow color of mono-typical stands of cheatgrass. Nevada will be the "Sagebrush State" no more.

Sincerely,

Ira Hansen
Assemblyman District 32

Exhibit #4

FRED FULSTONE, JR.
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SAGEBRUSH ECOSYSTEM COUNCIL
March 27, 2013
Carson City, NV

Predator control has been proven to be the most important tool to save the sage hen. There are many factual, scientific predation management plans based on data that were made by responsible scientists to prove this. Back history of sage hen numbers also proves this.

Nevada at one time had two million (2,000,000) sheep. Today we have about 60,000.

In the past years when there were millions of sheep on the range there were millions of sage hen and deer on the same range. Sage hen numbers increased because of changes to habitat that came with grazing and from predator control by the sheepherders.

The sheepmen started the predation management plan and later had the help of the government, which was called the Wildlife Service. There were thousands of sheep herders with rifles and traps which helped control predators. Also the sheepmen pay a tax of 2 cents per head to help on the program.

The federal government and the state of Nevada have cut their predator control money and work force by two-thirds. Now with fewer sheepherders and fewer government trappers we have fewer sage hen.

Cattle have replaced the sheep on the ranges and with fewer sheep there is less money available from sheepmen alone to control predators; everyone must help with the cost of predator control if we are going to increase the sage hen.

As we discussed at the Bi-State sage hen meeting February 8, 2013:
The Secretary of Interior should take into account the extent to which grazing yields public benefits over and above those accruing to the users of the forage resource for livestock purposes. We need to keep multiple use principles. We want the State and local governments to be able to make decisions on our grazing because they live here and better understand our problems.

April 28, 2004

TO: Director, U.S. Fish and Wildlife Service
Assistant Director, Endangered Species, USFWS
Regional Directors, USFWS

FROM: Assistant Secretary for Fish and Wildlife and Parks

SUBJECT: Endangered Species Guidance Letter No. 2, Critical Habitat

Critical Habitat

A. Generally:

Habitat loss is one of the key factors in the decline of species to threatened or endangered status. Habitat is necessary for species to thrive and survive and not become extinct.

The Endangered Species Act sets up an essentially legal construct called critical habitat. This legal process should not be confused with the creation of actual habitat that can be observed and in which species can live. "Critical habitat" is a legal and administrative exercise that adds very little additional conservation benefit to a listed species. At the same time, it creates a tremendous social and economic disruption to the communities that are affected.

Although there are superior methods by which to conserve habitat for species, the designation of critical habitat must be founded on the best available science, an accurate assessment and characterization of existing management and protection measures, and a sound economic analysis. Where there is no data available, or the available data is flawed, speculation must not be substituted. In light of the limited value of critical habitat designations in conservation terms, and the significant costs to society at large, critical habitat designations must be no greater than the habitat identified as essential to the conservation of the species.

B. Important Points:

"Critical habitat" as defined in the Act, will be designated for each species at the time of the listing, except where not prudent or not determinable.
Habitat, as that term is used in conservation biology, is indispensable to the continued existence of species. But, critical habitat designations are only a small element of our nation's conservation strategy and arguably, the most costly. Accordingly, designations should not detract from other conservation efforts that provide greater species benefits. The Service's critical habitat designations must be based on the best available data and accurate, complete

economic analyses. [Economic analyses must be consistent with OMB guidelines. Further guidance on economic analysis is forthcoming.] Critical habitat designations must not be based on speculation or determinations that lack supporting data.

Do not designate critical habitat where existing management or protection measures adequately conserve essential habitat and those measures are likely to continue for the foreseeable future. Protected lands such as state and national parks, wildlife refuges, national forests, etc., are examples of areas that may not need special management or protection.

Designate unoccupied habitat only when occupied habitat is insufficient to provide the limited additional conservation benefit of critical habitat.

The information provided to the Secretary for the relative benefit assessment provided for under section 4(b) (2) of the Act, must be as rigorous as the biological analysis.

Areas covered by a completed Habitat Conservation Plan generally do not meet the definition of critical habitat in section 3(5) (A) for those species whose habitat is conserved by the HCP, whether or not the species is a "covered species" in the HCP.

Pending HCPs are to be considered for exclusion under section 4(b) (2).

Military lands covered by an Integrated Natural Resources Management Plan (INRMP) are not designated critical habitat if the INRMP provides a benefit for the species for which the critical habitat is proposed.

When considering other military lands for exclusion under section 4(b) (2), defer to the military's analysis of national security and military operational and training needs.

When considering state managed or tribal lands, defer to state and tribal assessment of management and protection measures in the absence of contrary evidence.

Working with landowners, local governments, states, and tribes on a voluntary partnership basis often provides conservation benefits superior to the designation of critical habitat.

The "precautionary principle" is not used as a scientific tool in our critical habitat designations. Policymakers may weigh precautionary approaches in the context of risk-based management decisions.

Complete and accurate administrative records are essential to the process of critical habitat designations.

Detailed guidance is contained in the Draft Interim Critical Habitat Guidance dated April 30, 2004. This guidance compiles, in a single document, instructions that have been applied on an ad hoc basis during the last two years. Staff should relay comments and suggestions through their supervisors as they use the guidance. The guidance will be revised based on staff and other comments, experience, and suggestions after there has been an opportunity to apply the guidance.

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March 27 2013

* See Enclosed 4 pages (last 4 of this Exhibit)

We must give these birds a chance because they are coming back. Everybody is rushing to quick to list them. They have had a tuff time the last few years because of West Nile, fires, and the drought of the last 10 years. Also the predators have not been controlled, especially the ravens. They are robbing the nests. Also the coyotes and hawks have increased. If we list them, we will have less chance to help them because of ESA regulations. I can't see where the USFWS have saved or helped any species they have listed. They have created lots of problems with the economy where ever they have acted first. Just to mention a few, the spotted owl, the desert turtle and the suckerfish at Klamath Lake. They have all been a disaster for the people and the species. Remember farming and livestock is the 3rd largest industry in Nevada. Some of the sage hen plans have been based on false science and false assumptions.

#1. Emphasized too much on tall grass. The birds need the short tender grass

#2. Cut too many AUM's and left millions of acres of rough grass to burn and at the same time burned up the sage hen and other wildlife.

#3. Prior to 1850 biologist assumed lots of sage hen here, wrong, very few. As settlers came the sage hen increased. The settlers developed water and pasture.

#4. When we had more sheep on the range, we had fewer fires and more sage hen.

#5. The livestock people built reservoirs which made more strutting grounds.

#6. If you list the Bird you will be penalizing the very people who created the habitat, controlled the predator, which helped sustain the Bird.

Submitted by Fred Fulstone on 3-27-2013

Fred Fulstone
For F.I.M., Corporation
Smith, Nevada

March 27, 2013
Sagebrush Council

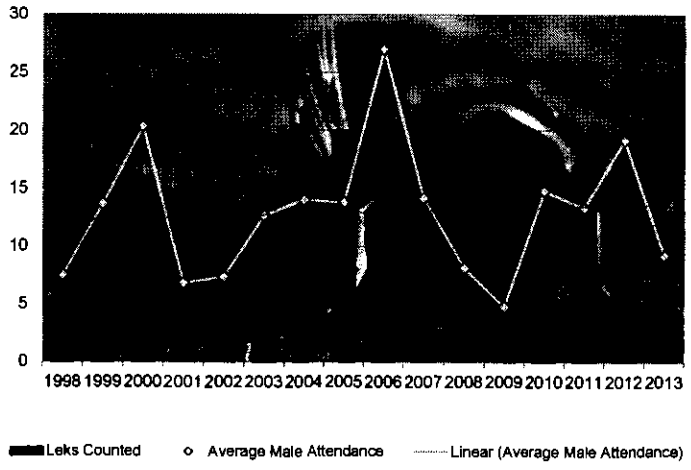
I am Fred Fulstone from Smith Valley, Nevada, and have operated my sheep and cattle operation for over 72 years. Our sheepherders live on the range 24/7/365 with the sage hen, deer, and other wildlife. We certainly have learned all about the wildlife and range areas. As you know the Bi-State sage grouse is considered a different sage hen here in Western Nevada, and adjoining California, from the rest of the sage hen. It has been considered to be listed without listing the rest of the Nevada sage hen population. If the sage hen is listed the livestock ranchers could lose their grazing rights. This has happened to me before with the listing of the bighorn sheep in California. If listed people could be put out of their homes if the bird gets on their property or on their patios.

Listing this sage hen would be disastrous for all of us here in the Bi-State area. Some people say the ESA protection should be as a distinct population segment of sage grouse. Others are trying to prove that the local sage grouse are a different variety. Both of these claims are made without good scientific

data to back it up. At least part of the question could be dismissed easily with appropriate Nuclear DNA comparisons. Distinct population segments are based on a population being isolated from any others. The biologist failed to explain how the sage grouse arrived in Smith Valley in the first place, if Smith Valley is so far from the other flocks that they cannot travel to Western Nevada.

PLANNINGUNIT	PMU_NAME	LEKCOMPLEX	LEKNAME	LEKID	TRENDLEK	LASTSURVEY	ENAD83	NNAD83	2013	2012	2011	2010	2009	2008	2007
Bi-State	Bodie/Mount Grant	Aurora	Aurora Peak	MOGR-012	TRUE	2012	334618	4235349	10	47	52		14	15	
Bi-State	Bodie/Mount Grant	Baldwin	Baldwin Canyon	MOGR-003	FALSE	2012	337318	4255299		0	0	26		0	0
Bi-State	Bodie/Mount Grant	China Camp	China Camp 1	MOGR-006	FALSE	2012	326168	4247499		0	0		0		
Bi-State	Bodie/Mount Grant	China Camp	China Camp 2	MOGR-007	TRUE	2012	326418	4250198		0	9		4	4	12
Bi-State	Desert Creek/Fales	Desert Creek	Desert Creek 01	DCFA-015	FALSE	2011	299259	4286391			42			8	
Bi-State	Desert Creek/Fales	Desert Creek	Desert Creek 02	DCFA-006	TRUE	2012	299588	4284507	7	37	26	23	25	27	49
Bi-State	Desert Creek/Fales	Desert Creek	Desert Creek 03	DCFA-005	FALSE	2009	299224	4285622					0		
Bi-State	Desert Creek/Fales	Desert Creek	Desert Creek 08	DCFA-004	FALSE	1900	297623	4284936							
Bi-State	Desert Creek/Fales	Desert Creek	Desert Creek 09	DCFA-001	FALSE	2003	299237	4283503							
Bi-State	Desert Creek/Fales	Desert Creek	Desert Creek Pasture	DCFA-002	FALSE	2012	299268	4283390		28					
Bi-State	Bodie/Mount Grant	Mt. Grant	Grant 1	MOGR-008	FALSE	2012	342702	4275782	0	12	0		0	0	
Bi-State	Bodie/Mount Grant	Mt. Grant	Grant 2	MOGR-009	FALSE	2012	340038	4269879	30	0	0		0		
Bi-State	Bodie/Mount Grant	Mt. Grant	Grant 3	MOGR-010	FALSE	2012	340419	4269379	2	0	20		0		
Bi-State	Bodie/Mount Grant	Mt. Grant	Grant 4	MOGR-001	FALSE	2012	340118	4268399	0	65	0		0		
Bi-State	Bodie/Mount Grant	Mt. Grant	Lapon	MOGR-011	FALSE	2012	342065	4265975	6	12	0		0		
Bi-State	Bodie/Mount Grant		Masonic	MOGR-034	FALSE	2012	316509	4255253		5					
Bi-State	Bodie/Mount Grant	Mt. Hick	Mt Hick	MOGR-005	FALSE	2012	342803	4237315		0					
Bi-State	Bodie/Mount Grant		Mudspring	MOGR-004	FALSE	2011	339219	4248199			0				
Bi-State	Bodie/Mount Grant	Baldwin	Nine Mile Flat	MOGR-002	FALSE	2012	335632	4253932		52	13				0
Bi-State	Bodie/Mount Grant	Baldwin	Nine Mile Flat 2	MOGR-032	FALSE	2011	333675	4253979	27		16	25			
Bi-State	Bodie/Mount Grant	China Camp	Rough Creek	MOGR-033	FALSE	2012	325152	4253694		27					
Bi-State	Desert Creek/Fales	Sweetwater	Sweetwater 1	DCFA-014	FALSE	2012	305801	4267899		0		3			
Bi-State	Desert Creek/Fales	Sweetwater	Sweetwater 1 (Sat)	DCFA-013	FALSE	2004	305731	4263886							
Bi-State	Desert Creek/Fales	Sweetwater	Sweetwater 2	DCFA-003	TRUE	2010	306791	4262321	0			0	4	3	17
Bi-State	Desert Creek/Fales	Desert Creek	Taylor	DCFA-021	FALSE	2012	303294	4283127	5	24					
Bi-State	Desert Creek/Fales	Wichman Bluff #1	Wichman Bluff 1	DCFA-016	FALSE	1900	325095	4270466							
Bi-State	Desert Creek/Fales	Wiley Ditch	Wiley Ditch 1	DCFA-019	FALSE	2012	305946	4269333		0	8	7	0		5
Bi-State	Desert Creek/Fales	Wiley Ditch	Wiley Ditch 2	DCFA-010	FALSE	2012	304237	4268888	18	55	33	23	14		
Bi-State	Desert Creek/Fales	Wiley Ditch	Wiley Ditch 3	DCFA-011	FALSE	2012	305959	4268085	5	19	7	17	6		16
Bi-State	Desert Creek/Fales	Sweetwater	Wiley Ditch west	DCFA-020	FALSE	2010	306182	4268777				9			
								Number of Leks Counted:	12	20	17	9	14	7	7
								Average attendance:	9.2	19.2	13.3	14.8	4.8	8.1	14.1

Bi-State Lek Attendance (Nevada Portion)



Year	Avg Attendance	# of Leks
1998	7.5	2
1999	13.7	3
2000	20.3	6
2001	6.8	11
2002	7.4	11
2003	12.6	14
2004	14.0	12
2005	13.8	20
2006	27.0	11
2007	14.1	7
2008	8.1	7
2009	4.8	14
2010	14.8	9
2011	13.3	17
2012	19.2	20
2013	9.2	12

2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987
94	23		0	0	0														
	3	2	14	0	4	16	6								11		19	32	
0	0	0	0	0	2										2		5	7	
46	43	23	29	23	4														
			4																
48	51	57	49	26	22	19	20	13			24	27	0	26	30	31	25	4	12
	20		5	0	0	3		2											
			26																
	5	0	5																
8	0																		
3	15																		
	0																		
6	3																		
16	0																		
	0																		
	0																		
	37	21																	
	0	0	5	0	0														
		0																	
30	31	27	15	14	11	29						22	0	24	12	23	19	13	36
	9	0	0	0	3		15				10	10	0	12	6	9	7	9	26
3	20	26	11	5	0	16													
43	16	12	14	13	29	39													
11	20	12	14	11	11	6	3	2	0	0	2	3	3	3	5	3	5	5	3
27.0	13.8	14.0	12.6	7.4	6.8	20.3	13.7	7.5	#DIV/0!	#DIV/0!	17.0	19.7	0.0	20.7	12.2	21.0	15.0	13.0	24.7

1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970
												0	10	6 23	14	
										0		12	8			
12	11	19	13	17	45	26	31	26	28	17	26	26	24	0	26	
													8	9		
										16	17	18	18	27		
																0
28	60	60	61	54	58	29	32	26	26	34	70	51	57	0	17	
25																
3	2	2	2	2	2	2	2	2	2	4	3	5	6	6	3	
21.7	35.5	39.5	37.0	35.5	51.5	27.5	31.5	26.0	27.0	16.8	37.7	21.4	20.8	10.8	19.0	

1998	7.5	2
1999	13.7	3
2000	20.3	6
2001	6.8	11
2002	7.4	11
2003	12.6	14
2004	14.0	12
2005	13.8	20
2006	27.0	11
2007	14.1	7
2008	8.1	7
2009	4.8	14
2010	14.8	9
2011	13.3	17
2012	19.2	20
2013	10.3	6

FRED FULSTONE, JR.
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Fax: 775-465-1200
fimcorporation@gmail.com

F.I.M., CORP.
Farming and Livestock

P.O. BOX 12
SMITH, NEVADA 89430

Exhibit #5.

(#5)

Bi-State LAWG Meeting
June 11, 2013
Smith Valley Library
Comments by Fred Fulstone

Agriculture is our No. 3 industry and it supports sage hen and wildlife more than anyone. Grazing is a big business. Grazing lands in the US amounts to some 770 million acres and are used by 100 million head of domestic livestock. Grazing is the foundation for an industry that generates $40 billion in Ag income annually. The special interest and extreme environmentalist are suing the USFWS because they haven't listed the sage hen. Grazing lands are in the best shape in over 100 years scientists report. Our family has been working very close with all agencies.

Where is the scientific evidence and commercial data that the sage hen are dying from malnutrition or poor habitat? The Livestock Permittees, the Forest Service and the BLM have been working together for the last 70 years to improve the habitat for livestock and wildlife, and they have done it. (See article #1**pass out) The livestock people are on the range 24/7 and I don't think they have ever seen a sage hen dead from starvation.

There is no scientific evidence or facts that the sage hens are dying from starvation. This is all supposition used by some agencies and extreme environmentalist. (**article attached) If the sage hen is listed it will cause an adverse economic impact on the agricultural people. (Read Scalia Supreme Court Decision)

To increase the sage hen we must control the hawks, ravens, coyotes, and rabbits in areas of livestock grazing.

If the sage hen is listed the Forest Service and BLM will be forced to interfere with our grazing cycle, possibly close some areas and put us out of business which would certainly affect the community.

We must concentrate to keep our allotments open with good managed grazing which we have now.

In order to increase sage hen numbers, we should consider transplanting some of the Bi-State Birds into new areas where there is good habitat.

There are millions of acres of good sage hen habitat out east of Walker Lake just clean up the predators first.

I don't think it is good policy for the national welfare of the people to destroy the livestock industry to think they are keeping the sage hen. This is not true.

Are we the people so rich and elegant, that we can destroy the whole livestock industry here in the west just to look at this bird? We must find a way to save both. It is there.

As I have worked with and watched this committee from its very first day in Yerington, Nevada many years ago. I would hope that this committee does not target livestock grazing as a major concern to save the sage hen. I don't know for sure, I would hope everyone on this committee will vote against listing the sage hen. If the bird is listed it will be more difficult to manage due to the ESA regulations. Very few listings have ever helped the species.

The Forest Service and BLM are already panicking. I don't think they want to stop all grazing. They are not sure what is going to happen. Neither are the permittees. The permittees and the grazing agencies should be given more time to work together and figure out a plan to enhance the sage hen and save the livestock operators.

Number 1 is to control the predator by getting more money to the Wildlife Service. There is 75000 acres of good sage brush and grass habitat right next to the Desert Creek lek that should take care of lots of sage hen if we can keep them from the predators.

I want to give you one more example why I know we should control predators.

In the years 1950 to about 1975 we had 100's of pheasants on our ranches here in Smith Valley.

Dr. Mary Fulstone would have her Lyon County Annual Doctors meeting and Pheasant hunt every year for about 20 years. There were hundreds of pheasants everywhere; it didn't take long to get their limits.

Then in the 70's the government stopped the toxicant program for coyotes and birds disappeared.

Also the Fish and Game tried to plant some more pheasant but they all died.

My son-in-law, a dentist here in Smith valley raises about 300 pheasants every year and plants them on the ranch. We are trying to get them going on their own by planting a little wheat, but the hawks generally finishes them off. We see the hawks killing them, feathers everywhere. This is the same for the sage hen.

My last word is that you can't enhance the sage hen by discontinuing grazing; you would probably make it worse.

article # 1 (2 Pages)

4-7

IWGA members seen out and about...

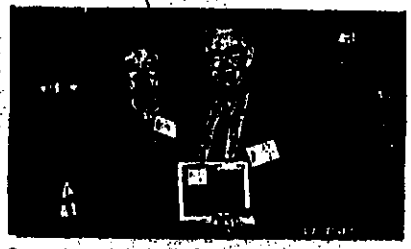
Convention 2002, Sun Valley, Idaho

Convention Banquet. Mr. & Mrs. John Ochoa, Connie & Spence Rule, and Jeff Siddoway.

Lucille Wilson, Hammett, and family after receiving a lifetime achievement award from the industry.

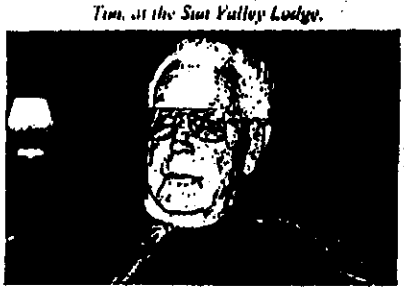
Spence Rule, Mike Guerry, and Ron Cole discuss the current lamb market.

Secretary Commissioner Dr. Barry Dueke with son, Tim, at the Sun Valley Lodge.

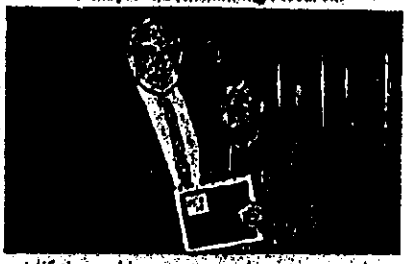


Dr. and Mrs. Al Ward, Caldwell, upon receiving an award for his outstanding research.

Brian Bean, San Francisco, listens to a speaker at the banquet in the Lodge Dining Room.



Lance Mennum, Utah, a wool buyer for Russell Wool, talks back and converses with members.



A lifetime achievement award was presented to John & Jodi Faulkner, Gooding at the President's Banquet.

Classified Ad's

Free to a good home. One 4 yr. male gilded llama. Not suitable for packing, but could guard. Reliable owners, Call Pat at 208-846-8700

Wanted

Interested in buying an old sheep wagon. Jon Cates 817-304-1999

Grazing lands are in best shape in over 100 years, scientists report

by Mark Steele

An issue paper by a prestigious group of science organizations and individuals may put the emotional topic of livestock grazing on public lands into perspective for both livestock owners and environmental advocates, and those who make public policy in the future.

The "Environmental Impacts of Livestock on U.S. Grazing Lands" was released last month by CAST – the Council for Agricultural Science and Technology, which is a nonprofit organization composed of 37 scientific societies, along with many others.

The conclusion of the task force was that properly managed grazing lands provide positive environmental benefits. They point to clean water supplies, the capacity to sequester or tie up carbon and carbon dioxide that can help the "Greenhouse Effect," and that grazing has the potential to maintain biodiversity.

This reports is not a rubber stamp for the livestock industry, it clearly points out the negative effects on soil and water quality, riparian areas, biodiversity, and invasive plants if not managed properly.

"Livestock grazing, however, is one of the few tools available to natural resource managers for developing and maintaining desirable plant community structure, decreasing fuel loads to decrease wildfire risks, and regulating nutrient cycling in the ecosystem," the report stated.

The scientists summarized that the environmental impacts of livestock grazing can be prevented or controlled by when grazing is done, how long, and the intensity that livestock graze. The key, they said, to sustainable grazing is managing the vegetation cover, not just for livestock, but to hold the soil in place, filter water, and to recycle nutrients.

Grazing is a big business. Grazing lands in the U.S. amount to some 770 million acres and are used by 100 million head of domestic livestock. Grazing is the foundation for an industry that generates $40 billion in ag income annually.

The report points out grazing animals are a natural and important component of most of the grassland ecosystems and included the large animals such as bison, elk, deer, antelope, and even prairie dogs, grasshoppers and mice.

"Domestic livestock have displaced

(continued on next page)

5-7

(continued from previous page)

certain native grazers (and) humans have assumed the role of land and forage managers, often deciding which grazers should use the forage and to what extent," the issue paper stated.

Another point made was in many ecosystems more grazing occurs below the soil surface than above it by soil insects, nematodes, and other organisms.

Grazing can be used as a tool to change the vegetation to reach management objectives, such as decreasing the grasses and increasing shrub growth. Some Fish and Game biologists have noted that the decrease in numbers of domestic sheep in the West and the decrease of brush fires, coincides very closely with the fall in numbers of mule deer. They wonder if a slow change in habitat has favored gazing animals such as elk over mule deer, antelope, and even sage grouse.

The CAST scientists note poor grazing practices that lead to overgrazing can accelerate soil erosion, but if properly managed, increases in soil organic matter may be greater in grazed lands than ungrazed lands.

One of the more important observations made about grazing in the report may be the role grazing lands will play in sequestering or typing up carbon dioxide than the shrub lands that most people believed were more efficient.

"Grazing lands may be used in the future to influence the global carbon cycle and to take up more CO2 from the atmosphere," the task force stated.

The report pointed out several negatives from improper grazing, including overwidening of streams and shallow areas that can increase water temperatures.

Another area of concern was heavy grazing in riparian or wetland zones that can significantly effect surface and ground water quality, with significant impacts on aquatic life.

The researchers said that excluding grazing animals from ecosystems that evolved with grazing may actually decrease biodiversity through dominant competition by other plants.

In the report...the conclusion by the task force was that the overall condition of grazing lands was much better than 100 years ago.

Reprinted from the Caribou County Sun, Vol. 11, No. 5

2002 Resolutions

[illegible] RESOLUTIONS
[illegible] members and [illegible] at the General Session.

WOOL CONTAMINATION

WHEREAS, contamination of wool by unscourable paint and paint that bleeds out during the scouring process is a problem to the textile manufacturers which costs the sheep industry in both reputation and monetary returns, and

WHEREAS, contamination of wool by polypropylene (plastic twine) also remains a significant problem,

NOW THEREFORE, be it resolved that the IWGA urges all wool growers to follow the manufacturers recommendations for the use of sheep paint, not altering the branding paint in any way, and IWGA urges wool producers and paint manufacturers to be aware of polypropylene contamination and to take those steps necessary to assure that wool clips are free from this type of contamination.

PACKER CONCENTRATION

WHEREAS, the concentration in the meat packing industry has dramatically increased, and

WHEREAS, this concentration has taken the form of vertical as well as the more traditional horizontal concentration, and

WHEREAS, this concentration certainly inhibits and stifles the free market in a very detrimental manner to sheep producers, and

WHEREAS, the Attorney General of Idaho has joined with regional and national associations of attorneys general to address packer concentration,

NOW THEREFORE, be it resolved that the IWGA supports investigation and urges appropriate action be taken to insure that the products of the sheep industry have access to fair markets.

NAFTA/GATT AGREEMENTS

WHEREAS, the North American Free Trade Agreements and the General Agreements on Tariffs and Trade have caused innumerable financial difficulties for Idaho Farmers,

[illegible]

U OF I RESEARCH & EXTENSION

WHEREAS, the College of Agriculture, University of Idaho, is responsible for providing the Idaho agricultural industry and rural communities with new technology and education programs to assist with problem solving so that the industries and communities can remain competitive and viable, and

WHEREAS, the U of I Caine Veterinary Research and Teaching Center, Caldwell, Idaho, is part of the College of Agriculture and has proved to be invaluable to Idaho's livestock industry, and

NOW THEREFORE, be it resolved that the IWGA supports the Agricultural Research and Extension Budget, of which the U of I Caine Veterinary Research and Teaching Center is part of, and urges the Idaho Legislature to approve a budget for the Research and Extension programs of the College of Agriculture that provides an increase in funding for services and programs being provided by the U of I Caine Veterinary Research and Teaching Center.

CAINE CENTER FUNDING

WHEREAS, the UI Caine Center has been a valuable resource to Idaho's livestock industries, and

WHEREAS, the Center has also proven invaluable for disease research concerning Idaho's wildlife resources, and

WHEREAS, funding is a critical concern for the Center,

NOW THEREFORE, be it resolved that the IWGA support the continuation of the $100,000 to the Center for livestock/wildlife disease research,

NOW THEREFORE, be it further resolved that IWGA supports efforts to develop an animal health laboratory that consolidates the ISDA Animal Health Laboratory, the IDF&G Wildlife Laboratory and the Caine Veterinary Teaching and Research Laboratory into a single expanded laboratory that will serve the needs of Idaho animal industries and wildlife for animal health laboratory services.

ADC PROGRAM SUPPORT

WHEREAS, the Wildlife Services (ADC) program is of extreme importance to Idaho's agricultural industries, particularly the sheep industry, and

WHEREAS, Idaho's livestock industry is continuing to realize substantial losses due to increasing predator populations, and

WHEREAS, wolf recovery has increased costs to ADC,

NOW THEREFORE, be it resolved that the IWGA strongly urges all cooperators in the program, including county, state and federal levels, to support the program so it may

PATRICIA PEAK KLINTBERG, Farm Journal Washington Editor

To cut taxes or not to cut

USDA analysis shows farmers pay capital gains taxes three times more often than other taxpayers and estate taxes six times more often

Paying for cuts is the kicker

The new found civility between Republicans and Democrats will be sorely tested by the debate about tax cuts and how to pay for them. Both parties acknowledge that estate and capital gains taxes create economic distortions in agriculture.

A USDA analysis shows farmers pay capital gains taxes three times more often than other taxpayers and estate taxes six times more often. Yet the administration proposes capital gains tax relief for home sales only—which is more gesture than substance since strategies already exist to avoid capital gains taxes on homes. Likewise, the proposed estate tax change just gives heirs extra time to pay off Uncle Sam.

However, there is increasing interest in a solution that both parties may embrace: indexing the estate tax exemption and capital gains taxes for inflation.

Consider that the $600,000 estate tax exemption, effective since 1987, would be $1 million today if it had been indexed. Look at what happens to the capital gains tax on an acre of land purchased in 1966 for $158 and sold in 1996 for $890: if indexed, the tax is $47/acre, if not, it's $205/acre, says USDA Chief Economist Keith Collins.

Indexing won't fly unless Congress can pay for it. Since discretionary federal spending amounts to about one-third of the total budget, it will be tough to scrape up enough to offset tax cuts. That's why there is talk of "correcting" the Consumer Price Index (CPI), thought to overstate inflation by 1.1%. Used to set cost-of-living increases, a mere 1% cut in the CPI saves $141 billion over five years.

Civil rights gripes breed more bureaucracy

It is hard to believe that a farmer seeking information about programs could be denied timely help at the county level. For farmers to whom this has happened, it is even harder to prove.

After listening to minority and low-income producers, Agriculture Secretary Dan Glickman is convinced "the structure by which we implement agricultural programs is not accountable." Yet his solution to federalize Farm Service Agency (FSA) employees so they are no longer accountable to farmer-elected county committees promises more bureaucracy, not more accountability.

He would appoint two members of each county committee to reflect racial and sexual diversity, and create civil rights complaint offices in every agency.

Meantime, USDA's own inspector general found the present civil rights office far from a model. It had 241 complaints backlogged. Of the 151 cases dealing with credit, 73 complain of being denied loans due to discrimination. Yet producers were dealing with then-federal Farmer's Home Administration employees.

Property rights victory

In a major victory for property rights advocates, the U.S. Supreme Court handed down a unanimous decision that landowners have the right to contest enforcement of the Environmental Species Act (ESA) if it causes adverse economic impact.

The case involved a group of Oregon farmers and ranchers who sued the U.S. Fish and Wildlife Service after the agency diverted irrigation water to maintain minimum water levels for two species of fish, causing the farmers and ranchers to sustain crop and livestock losses. The Ninth Circuit Court of Appeals ruled against the landowners.

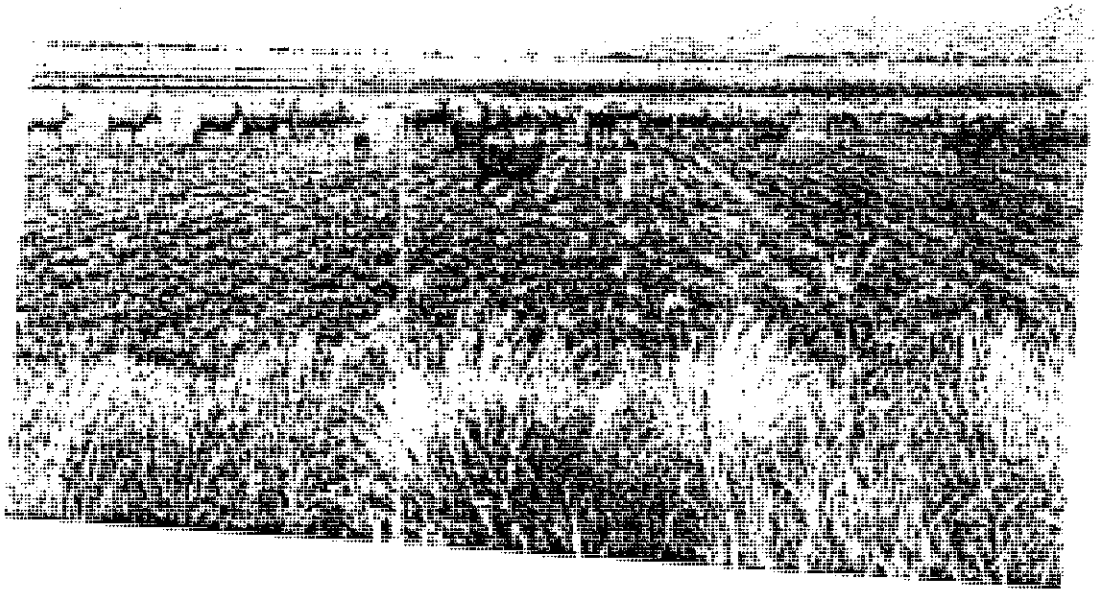
In the Supreme Court decision, Judge Antonin Scalia writes: "The obvious purpose of the requirement that each agency 'use the best scientific and commercial data available' is to ensure that the ESA not be implemented haphazardly on the basis of speculation or surmise. While this no doubt serves to advance the ESA's overall goal of species preservation, we think it readily apparent that another objective...is to avoid needless economic dislocation produced by agency officials zealously but unintelligently pursing their environmental objectives."

Limited CRP extension?

Rep. Jerry Moran (R., Kan.) proposed legislation to allow current Conservation Reserve Program (CRP) contractors who bid and are denied entry into the new CRP a one-year extension. He reasons that if producers don't know if they are in or out until June, preparing grass for wheat planting in September will be difficult.

USDA acknowledges the problem but may support an extension shorter than one year for winter crops only. The new lower rental rates would apply. *FJ*

Attachment 13



Deer in Fred's alfalfa field
1-9-91

registration process in order to use these important tools.

It's Official, Bi-State Sage Grouse Proposed For Threatened Listing: The federal register notices that we knew were coming have been published and have launched the system process for dealing with the Bi-State Sage Grouse as a proposed "Threatened Species" under the Endangered Species Act. Two very important information meetings will be held on November 6 and 7. We can't stress enough the critical nature of local citizens to turn out to these meetings.

November 5, 2013
4 to 6 p.m.
Tri-County Fairgrounds, Home Economics Building
Sierra Street and Fair Drive
Bishop, CA 93514

November 6, 2013
1 to 3 p.m.
Smith Valley Community Center
2783 State Route 208
Wellington, NV 89444

We also hope to soon have the details for plans to hold a Bi-State Local Working Group meeting. So far the encouragement we've been doing hasn't yielded an actual meeting time, location, etc.

More Exciting News Coming On Sage Grouse: Thanks to our very well-connected friends who share their news details, we can report that the Bureau of Land Management is releasing their proposed management plans for greater Sage Grouse in a November 1 Federal Register Notice (good thing we have Friday's for publishing these fantastic reports - last Friday was the day for publishing the Federal Register Notice on the Bi-State Sage Grouse listing).

The newsletter report we saw says that the latest proposals include three draft environmental impact statements covering 31 million acres of Sage Grouse habitat on BLM and Forest Service lands in Idaho, Nevada and Utah, along with parts of California. With the publication, this process kicks off a 90-day public comment period for all three ending proposals. The end date for public comment will be January 29, 2014, said Mitch Snow, a BLM spokesman in Washington, D.C.

The draft statements propose amending resource management plans (RMPs) in the five states. The three draft EISs are among 15 separate environmental impact statements that are being conducted as part of the Obama administration's ongoing effort to develop a "National Greater Sage-Grouse Planning Strategy" that would stretch across 10 Western states and cover the estimated 47 million acres of Sage Grouse habitat under BLM control. That national effort includes

Gmail

Note that the Harry Reid thinks it is a great idea.

It is not too late for the County and State to step up and stop this listing.

Las Vegas Review-Journal – Saturday, October 26, 2013

Feds seek threatened status for some sage grouse

By JASON DEAREN
THE ASSOCIATED PRESS

SAN FRANCISCO— Federal wildlife officials on Friday proposed to list as threatened populations of greater sage grouse in Nevadaand Californiain an effort to save the struggling species, a decision that promises to have wide-ranging effects on mineral and energy development in the West.

The U.S. Fish and Wildlife Service found that invasive species and energy development in the desert have had a devastating effect on the large, ground-dwelling bird's populations, said Ted Koch, Nevadastate supervisor for the service.

"It's not the 11th hour for sage grouse here, but it is maybe the 10th hour," Koch said. "And that's good news. It means we have some time and space to turn things around."

The service found multiple threats facing this specific sub-population of the sage grouse. a chicken-size bird whose males have a large white tuft of feathers around their necks.

The service estimates there are only about 5,000 of the birds left.

Non-native pinyon pine and juniper trees introduced to the habitat, coupled with the power lines that crisscross through the area have given low-to-the-ground perches for raptors, which eat the grouse, Koch said.

The service also found that an invasive grass from Asia that burns easily has helped decimate sagebrush, which is key to the grouse's survival. The cheat grass rebounds after wildfires much quicker than sagebrush.

The final decision on the service's proposal will occur next year, and the public will have 60 days to comment and there will be two public meetings to discuss the findings, one in Bishop, Calif. and the other in Smith Valley, Nev.

U.S. Senate Majority Leader Harry Reid of Nevada said the decision will have"major ramifications" on the way of life in parts of Nevadaand California.

Ranchers, miners and energy developers who use the mostly public lands that serve as the sage grouse's habitat have opposed the listing, saying it would have a deep economic impact in the rural West.

"This listing is further proof that we need to work together to protect sensitive species before they get to such a dismal point and negatively affect our rural economies," Reid said in a statement.

Friday's proposed listing comes as the service is also determining whether the entire western sage grouse population should be protected under the Endangered Species.

The Center for Biological Diversity, which sued the service to protect the sage grouse, said the decision was long overdue.

"The sage grouse we have here in Nevada and Californiais a true symbol of all that is wild — what a relief that it's finally getting the protection it needs to survive," Rob Mrowka, a Nevada -based center ecologist, said in a statement.

News Link: http://www.reviewjournal.com/news/feds-seek-threatened-status-some-sage-grouse

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February 25, 2012

"I'm not exaggerating, there were thousands"

THE INTRODUCTION OF AGRICULTURE AND ITS IMPACT ON SAGE GROUSE

By all accounts, sage grouse were rare when Europeans first entered the Great Basin, as I documented in two earlier reports.

However, the populations of sage grouse in Nevada rapidly increased following the introduction of agriculture and livestock in the mid to late 19th century. "Clouds" of birds, creating "thunderous" noise as they concurrently rose into flight, are recorded by the 1880's.

For example, from interviews of "old timers" published by the Northeastern Nevada Historical Society: "Sage chickens (sage grouse) were so plentiful in the 1890's...they clouded the sky...the birds were always thick in the meadows. As I passed by, they would rise up like a bunch of blackbirds...oh they were thick." (George Gruell interview of Syd Tremewan, 1964).

Another: "When we lived on Gance Creek (around 1900) there were lots of sage hens. I have seen them fly up the mountain right behind our house...they sounded like thunder...I am not exaggerating, there were thousands." (George Gruell interview with George Nelson, 1966).

For a more scientific documentation of this huge rise in sage grouse during this time frame, Robert "Bob" McQuivey, a 30 year NDOW biologist, by literally reviewing all of the early newspapers, journals and laws passed in Nevada, has documented this population explosion. I have read some of his extensive research, which I am currently attempting to get published. In a nutshell, it confirms the above observations.

So, what caused this dramatic change, from almost nothing to abundance?
1. Habitat manipulation and expansion, especially meadows and man-made hayfields.
2. The mechanical removal of sagebrush and pinyon/juniper trees for primarily fuel.
3. The introduction of non-native plants, especially common dandelion, alfalfa, and other forbs.
4. Livestock grazing.
5. Stable supplies of water in areas previous dry or intermittent.
6. Predator control.

It should be noted none of the man-made changes were done intentionally to benefit sage grouse. It was simply coincidental.

HABITAT CHANGES. As settlers started to quickly dot the Nevada landscape, one of their first acts was to create a meadow of sorts for their domestic animals. For large ranches it was to primarily grow hay and expand lush grazing areas. Yet even the smallest start-up ranch had horses and generally a milk cow or two. By fencing an existing meadow, finding a level piece of sagebrush covered ground, damming the local spring or stream, and irrigating, meadows were both expanded and created new.

As is well documented, sage grouse have a symbiotic relationship to meadows. They especially relish certain forbs (most of us would call them "weeds"), and insects common on meadows.

However, when meadows are not basically "mowed down", sage grouse avoid them. Livestock usage, by eating the plants, actually increases sage grouse usage. For example, from "The Relationship of Cattle Grazing to Sage Grouse", a thesis done at UNR by Carol Evans in 1986: "Klebenow (1982) found that birds tended to avoid meadow areas of dense rank vegetation, but would use the areas once they were "opened up" by grazing. Oakleaf (1971) reported that heavily grazed meadows...were utilized by sage grouse, while succulent areas of ungrazed meadows...were not used as feeding areas. After cattle grazed and left a meadow, sage grouse were observed to concentrate there in greater numbers than before the grazing..." (DeRoucher, 1980)."

This flies in the face of the common misconception that grazing harms sage grouse. As Evans noted: "During the last three surveys, observed use of grazed meadows was significantly higher than expected."
Why? "Grazing by cattle prior to the cessation of plant growth...increases the quality of the food forb resources for sage grouse. Grazing increases the succulence of forbs by interrupting and delaying maturation. New leaf tissue is higher in crude protein...than mature tissue. Sage grouse appeared to seek sources of succulent forbs by selecting for meadows grazed by cattle."

NEW PLANTS: non-native plants can be harmful, like cheatgrass, or beneficial. Common dandelion, just like the ones you find in your lawn, is not native to Nevada. The good news: sage grouse love to eat it. Food studies of sage grouse show it to be a primary and dominant dietary item today. As Evans noted: "A study of this unique forb (dandelion) might yield important insights into how the environment for sage grouse has changed and how sage grouse have responded...the distribution of dandelion is closely tied to grazing...it increases with grazing and is noticeably less abundant in communities protected for long periods...dandelion unlike other forbs, retained its succulence long after maturation...dandelion is an exotic and not native to sage grouse habitat..."

Other plants introduced include alfalfa, which also is highly attractive to sage grouse; as are the insects these new man-made meadow complexes attracted. All in all, the huge increase in meadows or meadow- like fields and hay producing areas were the primary catalyst for sage grouse expansion, all done together with livestock grazing.

MECHANICAL REMOVAL OF SAGEBRUSH, primarily for fuel, also benefitted sage grouse by removing older less productive plants and allowing younger more succulent plants to grow. As recorded in 1877: "Sagebrush is about the only fuel in this timber-less country and hundreds of thousands of cords of it are annually consumed...like the grand forests of the Sierras, the wild sage of the Great Basin is rapidly disappearing and as it is a plant of exceedingly slow growth, it is not improbable that it may ultimately become extinct..." (from the "Tuscarora Times Review" as quoted in McQuivey's work).

This also helps explain why areas recorded by the early explorers as vast seas of sagebrush were later described as grass dominated by the 1890's. The fear of sagebrush going extinct was obviously grossly exaggerated, and its rapid recovery was a boon for the sagebrush-eating sage grouse, as the younger plants and re-growth were much more productive in the leaves they eat, especially in winter. The removal of Pinyon/Juniper trees over much of Nevada during this same time frame had much of the same effect.

WATER DEVELOPMENT, allowing livestock to graze areas otherwise off limits due to an absence of consistent drinking water, was also a boon for sage grouse. Windmills, stock ponds, spring improvements, earthen dams in strategic spots to catch run-off, and irrigation of formerly sage covered flats converted to hay meadows all greatly expanded habitat availability for sage grouse.

PREDATOR CONTROL also likely boosted sage grouse production. For example, the early Mormons, only two years after arriving in the Great Basin, "...sponsored a contest to kill off the 'wasters and destroyers'. About 800 wolves [coyotes], 400 foxes, 2 wolverines, 2 bears, 2 wildcats, 37 mink and several thousand hawks, owls, eagles and crows were killed in the hunt. One dollar in tithing was offered on a continuing basis for each wolf or fox skin." (From Arrington, "Great Basin Kingdom", page 59). Virtually every cowboy, sheepherder, rancher and ranch boy carried a firearm and shot every predator they crossed. While today condemned to a certain extent, this action likely contributed strongly to the rapid expansion of sage grouse into its newly enhanced habitats.

All in all, agriculture and ranching in the Great Basin was the catalyst for the noted huge increase in sage grouse in Nevada. As the small ranch complexes were slowly eliminated from Nevada by economic conditions as well as the Taylor Grazing Act and other government actions, the smaller man-made meadows dried up as well. Grazing, predator control and maintenance of various related stock water developments also declined.
Declined, yes, but not eliminated entirely. (At least not yet). Much of these agricultural improvements remain that still greatly enhance sage grouse habitat, and although down in number compared to the highs described, sage grouse are still significantly above the historic low numbers noted by the first explorers.

While attending a [Nevada] Governor's Sage Grouse Conservation Team meeting, I asked de-facto leader, Nevada Department of Wildlife (NDOW) biologist Sean Espinosa what in his view is the best sage grouse success story in Nevada since the team was formed in 2000. He stated: "Smith Creek Ranch."

Considering the fact that many government people have made it clear they feel the livestock industry is the cause of the sage grouse decline, the irony is huge. Smith Creek Ranch in central Nevada is a working cattle ranch and has been for almost a century and a half. (Incidentally, I agree wholeheartedly with Espinosa's opinion; Smith Creek Ranch is loaded with sage grouse. I have personally seen several hundred birds there myself.)
The ranch, as so many Nevada ranches once did, has a man-made reservoir and irrigates about 1200 acres – a man-made meadow complex. I have spent a great deal of time there, and seeing several hundred sage grouse on this meadow is not uncommon. NDOW has documented more than 500 sage grouse on this man-made meadow at one time. When the ranch was purchased by the current owner in the late 1990s, the meadow was "dirt". By irrigating, a hay/grazing meadow was soon home to hundreds of sage grouse (and cattle), at a spot you would have been lucky to see a dozen birds a decade or so earlier.

Consider: multiply this creation of a meadow and grazing it (to stimulate plant production; gardeners call this 'pruning'), as early Nevada ranchers did in nearly every canyon with some water starting in the mid 19th century, and you will begin to understand why the populations of sage grouse went from next to nothing to "clouding the sky" in only a few decades. Think of it as Smith Creek Ranch on steroids.
Agriculture and livestock bad for sage grouse? History says otherwise.

Sincerely,
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Assemblyman District 32

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Remarks prepared for the Sagebrush Ecosystem Council
July 30, 2013

By Fred Fulstone
FIM Corporation
Smith Nevada

I am Fred Fulstone from Smith, Nevada. I know you are mostly interested in discussing sage grouse but I would like you to understand that the Fulstone family has been agricultural producers in Western Nevada for over 150 years. At this time three generations of our family owns and operates our sheep ranch with headquarters in Nevada and ranch property in both California and Nevada. Our operation includes private property along with Bureau of Land Management and Forest Service grazing allotments in both Nevada and California.

We graze our sheep by herding them on open range throughout the year. In effect our sheep, our family members, and our employees live and work within sage grouse habitats and sagebrush ecosystems year round. For years we have observed and studied our land and wildlife. Sage hen populations have grown from none in the 1800s to a great abundance in about 1950 and have now declined in numbers since about 1980. The decline of sage hens is the result of federal grazing regulations and the decline parallels declining numbers of livestock on federal ranges, especially sheep.

Our ranch history has developed over a period of more than 150 years. History illustrates the fact that the presence of our sheep greatly benefits sage grouse. As our sheep operation increased following the Depression, sage grouse numbers also increased in the federal and private lands where we grazed. Our sheep are herded on open range which has required several forms of range developments. An example of our management in the Bodie Hills includes development of water for sheep that also became important sage grouse water and strutting areas. We have also sprayed old-aged dense stands of sagebrush which became important brood rearing and winter sage grouse habitats with many more birds than before treatment. Our sheep require protection from predators, especially coyotes, and the sage hens benefit from our predator control. Often sage grouse broods travel right along with our bands of sheep.

FIM Corp has provided both this Governor's Committee and the BiState Sage Grouse Committee with well documented observations and data that we can only hope will be incorporated into your documents. Some of our reports are included in your minutes from previous meetings and if any are missing we will provide replacements.

Today I have brought three articles that illustrate the ideas you should incorporate into your reports.

First is an article by Rob Hooper, Executive Director of the Northern Nevada Development Authority, "Agriculture – Nevada's hidden economic engine". Hooper correctly describes the importance of agriculture production in the economy of Nevada which included $665 Million dollars in annual revenues in 2011. What Hooper didn't discuss is the catastrophic economic loss to every community in the state that has resulted from federal grazing permit reductions that have caused sheep numbers to drop from over one million to less than 80,000 and cattle numbers have dropped by about 250,000. Floyd Rathbun, in his letter to the Nevada Association of Counties illustrates that just returning range livestock numbers to the levels that we know the rangelands can support would bring well over $200 million into the state's economy every year. We also know from history that re-stocking those federal rangelands would result in a great increase in sage grouse. Both the economy and the wildlife would benefit.

Second is an article by Amy Trinidad entitled "Creative Thinking Helps Predator Control Programs". Trinidad explains that in Utah, South Dakota, and other states the cost of predator control had been paid almost entirely by livestock producers for years. Everyone benefitted including both agriculture and sportsmen. However, the costs of controlling predators to some acceptable level has increased and certain federal programs have lost funding so the exam. Both states used increased hunting license fees to raise money for predator control and that money was divided between private predator control through payment of bounties, .the state Fish and Game agencies, and US Wildlife Services, Nevada took a step in this direction several years ago but the Nevada program is not working as well so we should use the examples provided by the other states.

Ben Granholm, as a student, met with Fred in 2009 and heard what business is like under the regulation of the Endangered Species Act listing of the Sierra Nevada Bighorn Sheep. Ben wrote the article "Destruction of the American Sheep Industry" and described how the biologists themselves knew that the real risks to the bighorn sheep were due to deficiencies of natural rangelands where they had been transplanted. In spite of what the agency biologists knew to be the facts about bighorn sheep biology, they used an unproven accusation that disease from domestic sheep meant that domestic sheep must be prohibited. Now the Forest Service allotments have very few bighorn sheep and they are no longer contributing to the local economy. If a student could spot the fallacies built into agency biology that was tailored to support ESA regulation then just think how much better this committee should be able to sift the facts from fiction of sage grouse biology and sagebrush ecosystem management.

Sunday, December 18, 2011

SIERRA REGIONAL

Economic News

VOLUME 52 THE PEAKS, HILLS AND VALLEYS OF THE FRONT RANGE OF THE SIERRA NEVADA

DECEMBER 18, 2011 WHERE THE CLIMATE FOR BUSINESS IS PERFECT

Agriculture – Nevada's hidden economic engine

Rob Hooper
Executive Director, NNDA

With Nevada leading the Nation in unemployment and foreclosures, we hear a lot of rhetoric about the need to follow the example of other states or import the experts who can tell you what is wrong and how to fix our plight. Once in a while, however, it pays to look right under our own noses for answers that have been there all along. We just have not taken full advantage of them. One of these "low hanging fruits" to get Nevada's attention is agriculture. Agriculture could hold the cards for our region's future, both in direct production as well as related manufacturing and processing.

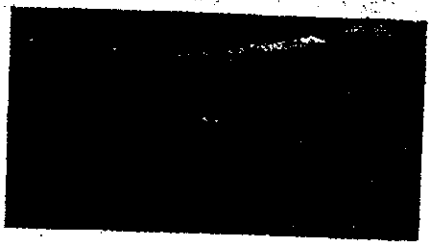
The Ag scene has been in Nevada for a long time. Even in the worst of economic times Nevada Ag has continued to be a reliable and stable contributor to our economy. The total Ag business in the state accounts for for more than $665 million in annual revenues producing a net profit within the state of $137 million. Nevada's top Ag products are cattle and calves, alfalfa and hay, dairy products, onions, and potatoes — in that order. Much of our alfalfa and Timothy hay is sent to California and abroad because of its high quality. With nearly 5,000 farm operators on 3,000 farms and ranches in Nevada, 4,500 workers are employed by farm operators while many Ag-related industries employ thousands more, thus making Nevada Ag an important and vibrant industry.

Nationally, Ag exports are a bright spot in the economy with a net export surplus for nearly 50 years. This is the second consecutive record-setting Ag export year with nearly $138 billion in exports and $42 billion in net export surplus. Nevada Ag continues to be a major source of export revenue for Nevada, bringing $555 million into our economy every year and that number keeps growing.

According to Clint Koble, state executive director of USDA's Farm Service Agency, "The potential for Nevada Ag products and exports is unlimited. Global population growth means we must increase agricultural production by 70 percent by 2050 in order to feed the 9 billion people that will inhabit the earth. In 1940 a farmer fed 19 people; today that farmer feeds 150 people. Demands for Ag products will continue as our population continues to grow. American Ag technology and innovation that has made America the envy of the world must continue nationally, as well as here in Nevada, to keep America competitive and provide local jobs. Plain and simple, Ag has been a big "economic driver" in Nevada and it will continue."

For the Sierra, Ag is even more important as three of our Northern counties (Lyon, Humboldt and Churchill) are in the top counties for agriculture which produces 45 percent of the Ag products in the state directly contributing $232 million annually to the economy. There are several Ag projects planned for the region that could dramatically impact these local economies.

The numbers only tell one side of the story. Nevada Ag holds the promise for a more diversified future for the State. Agriculture in the U.S. is moving into a greater focus by the federal government and states alike. It is the source for new "science-based technologies" and in a world where food shortages are predicted to become the norm, the ability to produce and deliver food is going to be the best business bet for the next several decades. This not only includes the direct production of agriculture products, but also the use of the products



in added-value processing to manufacture a wide variety of products. In addition, the manufacturing of tools and equipment used in Ag provides additional opportunities for job expansion and revenue production for the state.

NNDA is increasing its focus and support of Ag in the Sierra Region and strongly believes this sector holds great promise for our region's future. In the coming months you will hear more about efforts in this area. This Christmas season, and throughout the year, make sure you enjoy some Nevada beef, Winnemucca spuds and Tahoe Ridge Wine. Oh yes, don't forget some Latin Farm's jams on your rolls made from Nevada wheat and local milk... Get the picture?

For more information about NNDA, please call 775-883-4413 or email us at nnda@nnda.org. ■

NNDA

Creative Thinking Helps Predator Control Programs

AMY TRINIDAD
Sheep Industry News Editor

"In recent years, there has been a growing feeling that we need to be more aggressive in finding additional funding to meet the predator demands."

Sterling Brown, Vice President of Public Policy for the Utah Farm Bureau Federation

Within the past year, two state governments passed legislation to assist livestock producers and sportsmen alike with predator issues – mainly with coyotes. Like many states, funding was the leading concern when it came to the predator damage control programs in Utah and South Dakota; however, state legislators teamed up with state agencies and producer groups in a grass roots effort to increase permanent, ongoing funding for these vital programs.

For a number of years, Utah has had a unique partnership with a number of local, county, state and federal agencies to ensure that the livestock industries as well as sportsmen have had adequate predator control. This partnership was between the U.S. Department of Agriculture's (USDA) Wildlife Services (WS), the Utah Department of Agriculture and Food, the Utah Division of Wildlife Resources (DWR) as well as a number of land owners.

"Through this partnership, funding has been the limiting factor," explains Sterling Brown, vice president of public policy for the Utah Farm Bureau Federation. "It is constantly a push-pull battle to gain additional funding for our state's growing demand."

With no to little increases from federal and state appropriations for predator control programs, the private sector was forced to contribute more money; however, it was not enough to meet the demand of the programs.

"In recent years, there has been a growing feeling that we need to be more aggressive in finding additional funding to meet the predator demands," says Brown, explaining that several rural Utah Farm Bureau members got together and developed an idea of increasing Utah hunting permits to raise more money for predator control programs. Over time, Utah Farm Bureau, sportsman groups and the legislature agreed to a $5 increase.

"Hunters obviously have a lot at stake when it comes to predators. The deer population in recent years has declined for a number of reasons. One of those reasons is the increase in predators, particularly that of coyotes on the fawn populations," explains Brown. "The hunting community has been scrambling to find the best options to reduce predators and let the deer population increase."

This idea of increasing big game hunting permits gained traction in 2012 when Sen. David Hinkins from Orangeville sponsored S.B. 87 Predator Control Funding. This bill called for an additional $5 to be added to hunting licenses specifically for the Predator Control Restrict Account and used by the DWR to fund a predator control program of predatory animals. This fee is expected to generate $600,000 for the coyote bounty program.

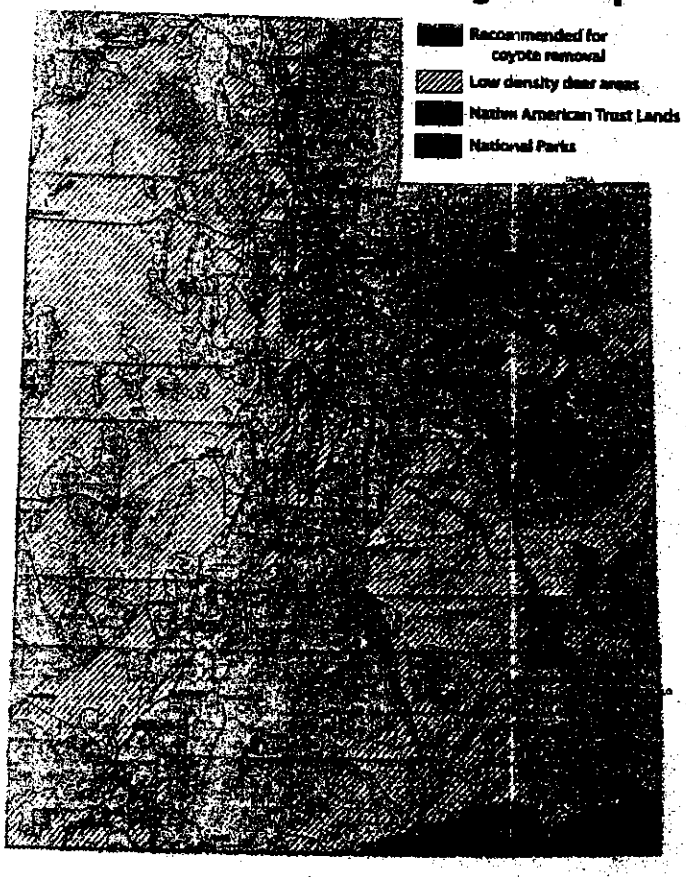
At the same time, another piece of legislation was passed by the Utah state legislature – S.B. 245 or the Mule Deer Protection Act – which allocates a total of $750,000 of ongoing funding for the state's predator control programs. As part of this funding, the DWR implemented a new predator control program that provides incentives for members of the public to remove coyotes. Participants in this program can receive $50 for each properly documented coyote that is killed in Utah. Although this program is designed to benefit mule deer populations by targeting coyotes, it comes as a benefit to the livestock industry as livestock and deer share many of the same lands in Utah.

Sponsored by Sen. Ralph Okerlund of Monroe, Utah, this bill allocates $250,000 to the DWR to combat predators that prey specifically on deer herds, $250,000 to USDA/WS for aerial predator control and the remaining $250,000 will be allocated to the Utah Department of Agricultural and Food to increase funding for the existing coyote bounty program.

According to John Shivik, mammals coordinator with the DWR, 6,724 coyotes have been turned in from September (the date when the agency starting payments) until mid-May which he says is in line with the DWR's expectations.

"Based on the sheer magnitude of the number of coy-

Utah's Predator Control Program map



otes checked in, the program is running rather smoothly," says Shivik, explaining that it is too early to tell if the program is having any impact. The DWR will be looking at the locations of where the coyotes were killed and comparing that data with mule deer populations to see if progress is being made; however, Shivik says that will take a few years to sort out.

Talking about all the new funding for the state's predator control programs, Brown says, "We feel like 2012 was a banner year to help sportsmen and livestock producers combat predators. So far we fill optimistic that we are on the right footing here and setting the stage of a brighter future for these groups."

Those at the Utah Wool Growers Association concur. Matt Mickel, treasurer of the organization says, "The Utah Wool Growers are thankful that the state legislature stepped up in good faith to help with our depredation issues from coyotes. We are thrilled to hear that many coyotes are being taken."

Further to the northeast, members of the South Dakota state legislature this year passed an act to increase the surcharge on certain hunting licenses for predator control purposes, approve temporary funding provisions relating to predator control and to declare depredation an emergency.

Rep. Betty Olson, South Dakota

"We are just being run over by coyotes and our predator boards were just flat out of money," relays Rep. Betty Olson of Prairie City, who operates a ranch with her husband and introduced the legislation.

In South Dakota, a combination of county government, state and USDA funds, in addition to private funds collected through predator districts, are used to help manage depredation. According to Max Matthews, president of the South Dakota Sheep Growers Association, funding for the animal damage control program in South Dakota was cut in 2007 which lead to the elimination of the aerial hunting program and a couple trappers. "This reduction to the animal damage control program could not have come at a worse time," he explains. "The mange that had been hitting the coyotes was on the decline. As a result, the coyote numbers across the state were increasing at an alarming rate. The state trappers had too much area to cover and not enough time allocated to the program to be able to manage the coyote population."

In the past few years, aerial hunting has returned to South Dakota through WS and although this has helped manage the coyote population, Matthews says their numbers are still increasing resulting in more dollars lost to the livestock industry.

This new legislation to help manage the coyote population, which was signed into law on March 25, went into effect on July 1 and increases the surcharge on certain hunting licenses from $5 to $6, in other words, raises the fee of hunting licenses by $1. Olson

explains that the original $5 fee is deposited in a special fund known as the South Dakota sportsmens access and landowner depredation fund which deals with situations like deer in hay fields and geese in corn fields. However, the additional dollar will only be used for animal damage control programs such as increasing aerial hunting and reimbursing trappers.

"Although the legislation was scheduled to go into effect July 1, livestock producers needed the help immediately so we wrote a cash transfer clause into the bill. We borrowed $160,000 from the Department of Game, Fish and Parks to fill in the time gap," Olson explains.

These funds will be repaid with interest based on the cash flow fund rate no later than June 30, 2014.

"We figured with the new revenue coming in, it should more than cover the loan by next year in addition to funding the program," Olson relays, saying the program should bring in around $200,000 a year.

"The increase in funding should return the animal damage control program back to where it was six years ago," explains Matthews. "Controlling the coyote population to a manageable number can only be done through the funding of an effective animal damage control program. Without the funding, the predation to livestock and wildlife cannot be controlled."

As was the case in Utah, this legislation was seen as favorable by a majority of the sportsmen's groups. South Dakota had also seen a decrease in wildlife due to the number of predators.

Olson worked on a number of pieces of legislation to assist livestock producers this year including:

- S.B. 205 adds the wolf to a list of predators in South Dakota as soon as they are taken off the endangered species list. Olson explains that the wolf is considered endangered in the western side of the state, but not in the eastern side. The Missouri River marks the dividing line. Therefore, as of July 1, wolves were considered predators on the east side of the Missouri River; however, they remain protected until delisted on the western side of the river.
- Due to the fact that local predator control districts are strapped for cash, H.B 1168 authorizes county commissions to increase their predator-control levies on sheep and cattle; however, Olson says this legislation must be passed by 51 percent of the livestock producers in the district in order to take effect.
- H.B. 1167 restructures the policy advisory committee for animal damage control. As it stands currently only the animal damage control supervisor, the secretary of Game, Fish and Parks and the secretary of agriculture are the only three on this committee, which hadn't been active since 2010. This bill that was passed adds a member from USDA/WS, the South Dakota Sheep Growers Association, the South Dakota Cattlemen Association, the South Dakota Stock Growers Association, the South Dakota Farmers Union, the South Dakota Farm Bureau and the South Dakota Wildlife Federation and requires the group to meet at least once per year.

Destruction of the American Sheep Industry

Ben Granholm
Nevada Union FFA
January 26, 2009

Stepping out of the school van, I noticed the tumbleweeds roll past the shearing barns - barns that looked as though they had stood for an eternity against the forces of nature and yet stood strong, sound, and solid. I was soon to discover that, like those barns, the inhabitants of the ranch had learned to meet the challenges head on, to exist and even prosper against all odds. Suddenly, a tall, thin, elderly man with a weather worn face and hands rounded the corner of the barn. I knew instantly that our host for the day was the type of man whose hands could at one moment be constructing a barbed wire fence, and the next be gently pushing a newborn lamb towards its first meal. He greeted our group with a smile and these welcome words:

"Good morning, I am Fred Fulstone. Thank you for coming and including our sheep ranch on your ag production tour. Our ranch has been in operation over a period of 150 years. The first Fulstone homesteaded in 1854, followed by my grandfather that bought our first ranch in Smith Valley in 1903. "

I was captured by his words and curious how such a desolate area could support a ranch with 10,000 ewes.

Mr. Fulstone continued, "Our ranch employs eighteen people in addition to immediate family including myself, my daughter and my grandson. Our ranch includes private property as well as Bureau of Land Management and Forest Service Grazing allotments, allowing us to graze our sheep by herding them on open range throughout the year. The range is about 100 miles from north to south and 75 miles from east to west."

The Fulstone ranch is real, with a real threat to their economic survival through the elimination of public grazing lands based on hotly debated scientific findings and the Endangered Species Act, the ESA, protecting the Sierra Bighorn Sheep (Knowles). Today, I will outline how the Forest Service has used the Endangered Species Act to eliminate domestic sheep

from public lands grazing allotments and how ultimately the American sheep industry is endangered and could face extinction.

In 1984 the California Fish and Game and the National Park Service decided to establish a herd of Bighorn Sheep in the Lee Vining Canyon area of California, bordering the Fulstone ranch's summer grazing allotments (Fulstone). From the beginning of establishing the Bighorn Sheep, the ranch was promised their grazing lease allotments would never be affected by any migrating Bighorn Sheep (Fulstone). Mr. Fulstone retained all the guarantees in the letters he received from the Forest Service and continued to care for the summer range, as if it was his own property. Unfortunately, everything changed with the severe winter die-off of the Bighorn in 1995 and 1998. Suddenly, because of their decreasing numbers, the Bighorn Sheep were listed as an endangered population (Knowles).

The worse was yet to come. Due to continued severe winter die-offs, the numbers of the Bighorn dwindled to a mere three head (Knowles). Instead of the Forest Service moving the remaining Bighorns to a range that would protect and support them from predators and the winter weather, the domestic sheep were blamed. The Forest Service knew, because of the endangered listing with the ESA, if they could show a threat from domestic sheep, the sheep would have to be removed from the allotments. The Forest Service never acknowledged their mistakes in managing the Bighorn, but instead claimed the die-offs were caused by co-mingling and nose-to-nose contact with domestic sheep, leading to a fatal form of pneumonia (Fulstone).

In the lab environment, the wildlife biologists "proved," through nose-to-nose contact that domestic sheep transmitted the Pasteurella disease to Bighorns (Knowles). But the question still remained: would the lab findings translate into the real world? The most thoroughly studied disease outbreak of Bighorn Sheep was in Hells Canyon in 1995-96. Three hundred twenty-

seven Bighorn Sheep died in that epidemic (Rathburn). Ninety-seven head were cultured with twenty-two different strains of Pasteurella isolated; however, this was not indicative of a single point source (Rathburn). What does that all mean? The Pasteurella bacteria species is an opportunistic disease, most likely triggered by environmental stress, not the six domestic sheep found on a nearby ranch (United States Sheep Industry). Mixing of Bighorn and domestic sheep usually only happens during breeding season and only if the ratio of male to female Bighorn's are out of proportion (United States Sheep Industry). Regardless of what veterinarians have proven in field trials, the Forest Service wildlife biologists continue to insist their agency handbooks and lab findings are the only sources of correct information regarding disease transmission (United States Sheep Industry).

The issue involves not just if the literature points to domestic sheep infecting the Bighorn, but what the real risk to Bighorn Sheep are, due to natural range conditions. Laboratory conditions cannot simulate the miles of rangeland and the management techniques applied by range sheep operations to prevent contact between domestic sheep and wildlife (Fulstone). Laboratory conditions cannot simulate naturally occurring environmental hurdles for Bighorn recovery: feed availability, predation, severe weather, human impact, in addition to stress from re-introduction (Fulstone). Measures to control Pasteurella prior to establishing known risks and contamination sources have damaged local ranch families and their local economic stability (Rathburn).

The bottom line is Mr. Fulstone has spent $400,000 over the last twenty years appealing agency decisions and buying additional allotment permits, both public and private (Fulstone). The ranch has lost over 7000 animal units per month, meaning the Fulstone sheep herds have been cut by 35,000 head (Fulstone). The sheep industry is being squeezed out by special interest

groups, environmentalists, and our very own Forest Service in the name of the Endangered Species Act. Abraham Lincoln once said, "It is much the duty of government to render prompt justice against itself, in favor of citizens, as it is to administer the same between private individuals." If the agencies involved in canceling grazing allotments from the Fulstone Ranch fail to accept peer reviewed science and find solutions that work for everyone involved, public and private alike, they may soon find a golf course and condominiums in what was once the home of true environmental stewards, the Fulstone family. Today, the American sheep industry is fading from the record high of fifty-six million head nationwide in 1942 to a mere six million today (The National Academies of Sciences).

As my class loaded up in the van and I said goodbye, Mr. Fulstone shook my hand and said, "Please, continue our fight, young man, and understand how important it is for America, for all of us, to keep the American sheep industry viable and productive for all generations to come." Mr. Fultsone, you have my word.

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PRESENTATION BY FRED FULSTONE
SAGEBRUSH ECOSYSTEM COUNCIL
September 12, 2013

The biggest problem with the sage hen today is that we have had unproductive and unsuccessful sage hen management by the Fish and Game biologists since about 1980. Sage hen numbers started going down when agency biologist numbers started going up.

From 1950 to 1980 we had thousands and thousands of sage hen along with other wildlife. That was due to the very successful predator programs. During those years since 1980 the Fish and Game took in monstrous amounts of money from the hunters, but did not put it back to sage hen and deer management. They just kept issuing permits to make money instead of slowing the hunting permits to protect the sage hen. This was the same with the deer.

Now all of a sudden Fish and Game says there are no sage hens and we have to list the sage grouse under the ESA. They claim domestic livestock has caused the problem.

Fish and Game people don't remember that from 1950 to 1980 we had 10 times more domestic sheep and nearly twice as many cattle on the range. These were the years we had a very effective predator program. At the same time we had the greatest numbers of all wildlife, sage hens included, than at any other time in our history.

I was at the sage grouse EOC meeting in Reno on Sept 5, 2013. They have prepared a budget of about $45 MILLION but they did not have any money posted for predator control or for wild horse control in spite of the fact that those two are the most important items for helping the sage grouse.

Senator Harry Reid has put up $7MILLION which he stated must be used for habitat and predator control and the EOC committee did not include the money for predator control in their budget.

The most important items to help the sage grouse today, if having more sage grouse is the goal, are the following:

1. Predator Control including more trappers
2. Wild Horse control in accordance with the Wild Horses and Burros Act
3. Improve water sources
4. More grazing by sheep
5. Hope for rain
6. Don't list them

Predator control has traditionally been funded by the ranchers for the benefit of livestock production but that also benefitted the wildlife populations. In about 1926 government funded trapping programs were started using money from producers. One direct result of reduced predator populations was an abundance of sage hens, mule deer, bighorn sheep, and other wildlife all of which was funded by agricultural producers. State and Federal trappers (Wildlife Services) have been cut by over one half in the past few years. In the past month our Lyon County (Smith Valley) trapper has been laid off for one month on account of the sequestration. Loss of the government trappers has directly hurt the sage hen. Now trapping by anyone has been outlawed in California which removes the most effective control for coyotes. There has been no government trapping or aerial gunning in Mono County for about 10 years. That means that the sage hens in the Bodie Hills are only protected by the predator control that is carried out by the ranchers while we are grazing there and any private citizens who hunt coyotes. If the goal of this committee is to have more sage grouse then this committee must endorse predator control that is more systematic and that occurs throughout the year.

Wild horses protected by the Wild Horses and Burros Act have just about annihilated the vegetation in two of my allotments. There are about 500 wild horses under BLM management and they are on the allotments every month of the year. That is the equivalent of grazing 4,000 sheep for 12 months even though the BLM management only allows 2,000 sheep for two months in these areas. Horses are not kept at thriving natural ecological balance in accordance with the law and everything including wildlife suffers.

Water developments by ranchers have directly benefitted wildlife throughout the west. Recent years have included drought and about ¾ of the streams have dried up in our area. Constructed water developments are more important than ever for both livestock and wildlife.

Every indication is that the vegetative component of sage grouse habitat is more than ample, even abundant, on upland areas. Those upland areas are the winter habitats of sage hens and are mostly found on federally controlled lands. Our ranges include large areas of black sagebrush and low sagebrush that clearly are more vigorous and productive in the locations where we graze our sheep. However the summer habitats of sage hen broods depend on meadow areas, many of which are on private lands and are the product of irrigation by the owners. Drought has reduced our ability to

irrigate and water consumed by Pinyon-Juniper and Willows has made the effects of drought much worse. Control of Pinyon-Juniper on the uplands is already proposed and is a very good idea. Control of riparian species such as willows is also needed to protect the sage hen summer habitat --- the meadows.

Our allotments in the Bodie Hills provide examples of how sheep benefit the sage grouse habitat. Our sheep browse some of the sagebrush which stimulates a given bush to be more productive. Our sheep also graze the meadows each spring and more on to higher elevations in May or June which leaves the grazed meadows in ideal condition for the sage grouse broods.

Originally the ranchers built their own range improvements. When the Forest Service and BLM came into existence a system of paying grazing fees to the agencies was developed so half of the fees were placed in a trust account for range development such as water sources and one quarter was given to the states for the same purpose. These range improvement funds are a portion of the fees paid by the ranchers and specified by law for construction of range improvements but I have not seen any of the legally required range improvements in the last twenty years. That money has now accumulated in agency controlled trust funds and should be available for range development projects that will greatly help the sage hen.

Once the sage grouse are listed the US Forest Service and BLM will say they can only do those things that the US Fish and Wildlife Service and State Fish and Game give them permission to do. History of ESA regulations show us that the first thing the agencies will decide is to prohibit grazing in the name of critical habitat or some other excuse. ESA regulations will always be written in such a way that private enterprise becomes impossible even if the regulation harms the very species they claim to protect.

The agencies are predictable. First they will have consultation and that will include the livestock permittee on the basis that the ESA requires a federal applicant to be included in the consultation. The process is followed at a great cost of time and money to both the ranch and the taxpayers. Consultation will result in the Forest Service and BLM being forced by the USFWS to apply very strict regulations on grazing --- no grazing will be allowed in some areas.

Next the USFWS will hire sage grouse science experts who will work closely with the agency while they claim to be independent or even objective. They will claim to have conducted scientific experiments that prove that grazing is "problematic" for the sage grouse. Then the USFWS will be able to say that their experts have provided the best available scientific data.

At this time alleged experts funded by the US Department of Interior are conducting sage grouse studies and claiming to follow the ethical standards of scientific investigation. The problem for Nevada is that these people work for the federal agencies and the biographical statements of these experts indicate their bias against

most productive uses of rangelands including grazing. In other words the USFWS is accumulating data that gives the appearance of scientific support for their documents They appear to be limiting reports to only that data that supports the federal agencies goals. Their work is being completed by scientists who have a vested interest in justifying their jobs in budgets far into the future by making sure the sage grouse is listed under ESA; those include both federal and Nevada employees. This Sagebrush Council, with its duty to represent the State of Nevada, has failed to obtain our own set of data that would very likely contradict the federal agency stories.

Please advise the Governor that we need independent research, independent analysis and comparison of sage grouse nuclear DNA from both the bi-state sage hens and from the greater sage grouse populations, and independent review and analysis of such material as USGS DNA analysis and agency model design. If our Governor is going to be able to defend Nevada from federal agency regulations that must start with the State having claim to the best available scientific and commercial data.

I was involved with the listed Sierra Nevada Bighorn Sheep and this same process was applied under ESA. My ranch lost the use of five grazing allotments and no longer can graze over 5,000 sheep which harms my family greatly. This SNBS program has cost the taxpayers hundreds of Millions of Dollars so far and the federal government will probably spend over one Billion dollars soon. Mono County lost the revenues and prosperity produced by some 25,000 sheep in the Mono Basin.

I lost my ranges that provided forage from 100,000 acres. Over the past 70 years I have constructed the range improvements and infrastructure that has benefitted livestock, wildlife, and recreation alike at a personal cost of over $1Million. As of now, due to the ESA regulation my business and my Million Dollar investment have both been taken away by the government.

ESA regulation has cost everyone a lot of money and caused problems throughout several communities but did not result in more bighorn sheep. Today there is only a fraction of the number of bighorn sheep that have been transplanted into the Sierras near Lee Vining California that are still alive.

Scientist and agency people can say anything they want to say and everybody is supposed to believe them.

There is a lot of faulty science put forth by agencies that is selected to justify the end results that they want.

I would hope that this Sagebrush Council would study this sage grouse situation and recommend a solution that is fair to grazing, mining, and all concerned.

Wacko environmentalists and other special interests are using the ESA to get control of our land, water, and minerals; there is no evidence that they care one bit about

the sage grouse. Our local agencies are getting their directions from Washington D.C.

The livestock industry is a dominant component in this whole sage grouse issue that has now taken on the characteristics of a crisis. I think that livestock producers should be included in all the plans at this time and all the plans should include safe guards to keep our livestock operations intact.

As producers we should be aware of what is happening every day and be able to respond. Agency biologists have said that facts can only come from their style of scientific investigation as driven by the policies of their employers. As a producer I have been told by agency officials that my direct observations of sage hens are not factual because the very things I have seen are not a product of a government experiment. In other words they quickly call ranchers liars when our observations contradict an agency position. Even in the face of this type of hostility every rancher, miner, and federal lands user must continue to speak up for the truth about sage hens.

My family owns a large ranch and livestock operation that is wholly dependent on forage from the adjoining BLM and US Forest Service allotments (see the enclosed map). Loss of a single portion of any allotment causes losses throughout our entire operation.

Please tell Governor Sandoval that the facts about sage grouse include the eye witness accounts of ranchers, sheep herders, and sportsmen who spend their time and live in the sage grouse habitats. What a citizen is willing to testify to under oath is just as factual as any form of data from scientific experiments. As discussed above, the reputation of ESA is one of faulty and often fraudulent statements that are called science because they justify the regulatory actions of the agencies. Only factual information based on dependable testimony and ethical scientific investigation should be allowed within the boundaries of the state of Nevada.

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PRESENTATION BY FRED FULSTONE
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September 12, 2013

ATTACHMENTS

1. FIM Allotments with sage grouse habitat (Map)
2. FIM Bodie Hills Allotment (Map)
3. Drawing --- F.I.M. against the government
4. Capital Press article on fire management
5. Rangeland Scientist article about sagebrush
6. Muley Crazy article about predation
7. Wildlife Services (APHIS) newsletter May 2012

FIM Allotments and Sage Grouse Habitat

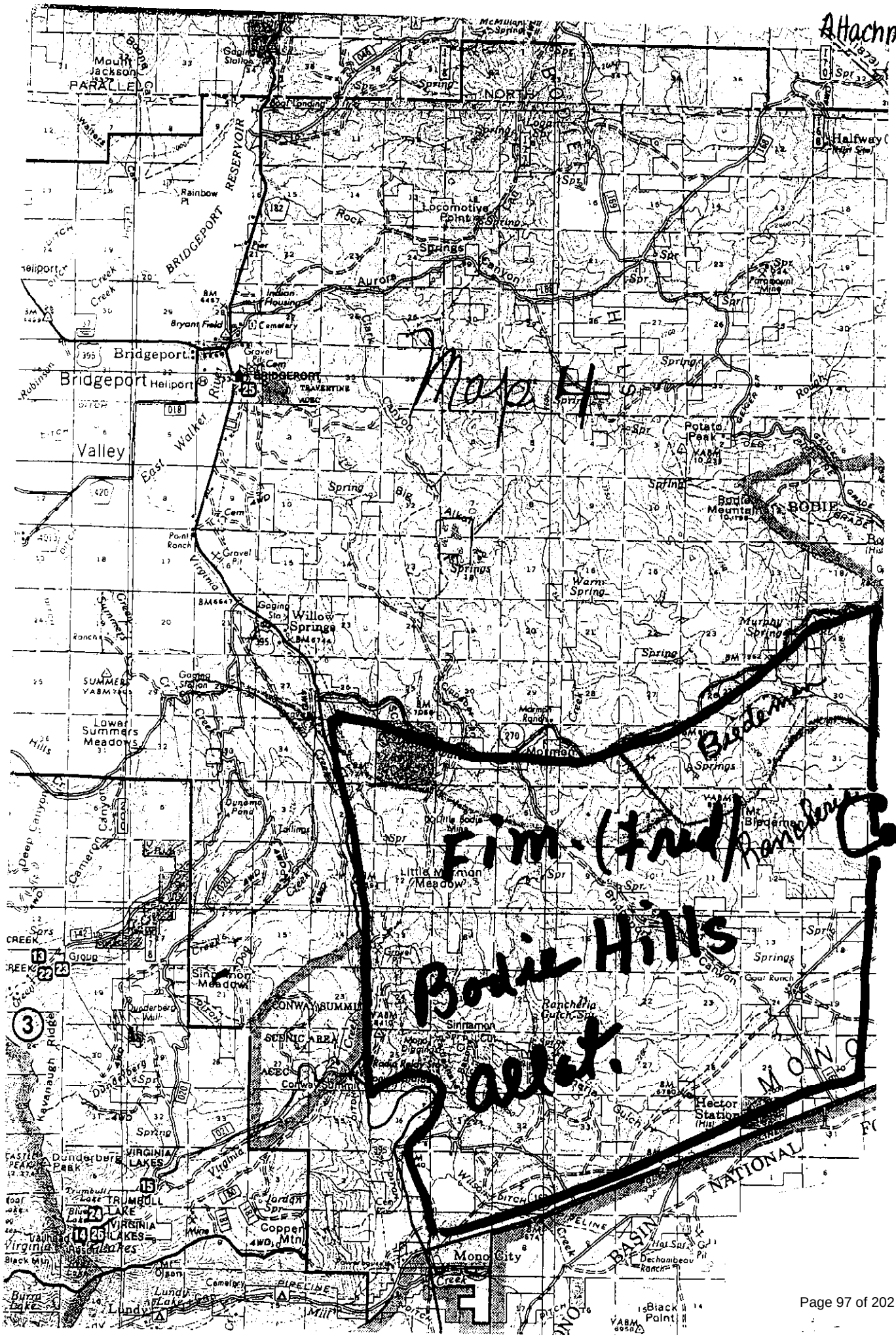
Attachment #1

FIM Allotments

BiState Habitat

DistrictBoundary

Attachment #2
C.



Attachment #3

Attachment #4

Capital Press
The West's Ag Weekly

FRIDAY, SEPTEMBER 6, 2013 ★★ VOLUME 86, NUMBER 36 WWW.CAPITALPRESS.COM $2.0

Fires call for more management

Editorial

This year's Western wildfires have burned thousands of acres of national forest and Bureau of Land Management grazing allotments, leaving cattle and sheep ranchers scrambling to save herds on summer ranges and find alternative feed.

While wildfires are a fact of life in the West, many ranchers blame the intensity of this year's blazes on federal land management policies and environmental lawsuits that have allowed large fuel loads to build up more quickly, fueling fires that burn larger and hotter.

"It's not rocket science," Steve Damele, and Idaho rancher who has lost as much as half of his grazing land to fire this year, said. "We all knew it was going to happen sooner or later."

Hardly rocket science.

Since the fire that burned 794,000 acres of Yellowstone National Park in 1988, even the most casual observers have been aware of the dangers of the accumulated fuel load in our forests' understory.

Fire is a natural and important component in forest ecology. Before European settlement, natural fires would regularly clear out the fuel load — the dead wood and the scrub — and make room for new growth.

Throughout much of the last century it became federal policy to fight fires in order to preserve the national forests for their intended purpose — to provide the nation with lumber. With regular logging, thinning and grazing, the fuel load was kept at bay.

In recent years, human activity on a great deal of federal land has been restricted to keep habitat of endangered species intact. Environmentalists have filed numerous lawsuits in an attempt to prevent logging and grazing on thousands of acres not already set aside.

Without active management, fuel loads have grown and fires have become larger and more destructive. Last month the Forest Service ran out of money to fight the 50 active fires burning on federal lands.

The intensity of this year's fires prompted U.S. Sen. Ron Wyden, D-Ore., and Idaho Republican Sens. Jim Risch and Mike Crapo to promise an effort this fall to pass a forest management plan that includes more thinning of overgrown forest stands and proper grazing.

In the House of Representatives, Rep. Doc Hastings, R-Wash., is advancing the Restoring Healthy Forests for Healthy Communities Act, which aims to re-establish a priority for actively managing federal lands through timber production and other measures.

These efforts have been tried before by legislators eager to combat the staggering unemployment caused in many rural Western regions when the timber harvests stopped.

We hope fresh images of the destruction, and the memory of the firefighters killed this summer in Arizona, will sway Congress to adopt a more active management plan.

Rangeland scientist at home in sagebrush

Acclaimed researcher works to improve sage brush habitat

By MITCH LIES
Capital Press

BURNS, Ore. — Agricultural Research Service rangeland scientist Kirk Davies is at home in the sagebrush steppe of southeastern Oregon.

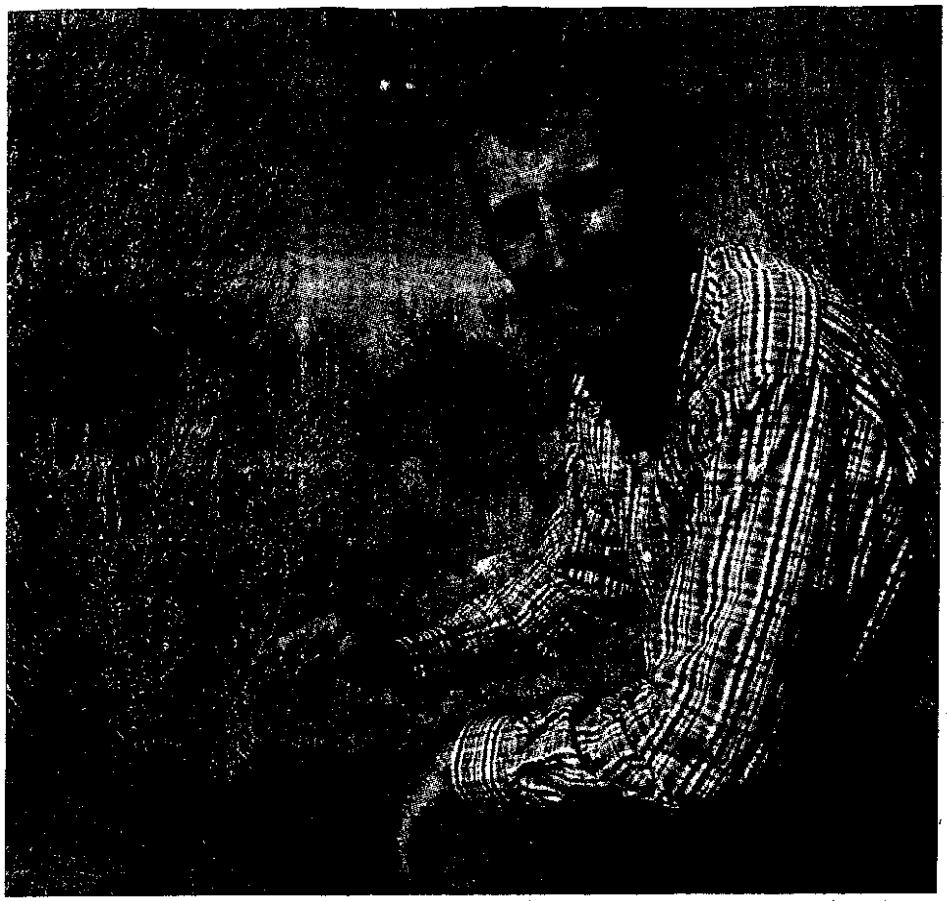
Other than the years he spent at Oregon State University in Corvallis, the 32-year-old adjunct professor has spent his entire life in the remote desert.

Davies was raised about an hour's drive from the Eastern Oregon Agricultural Research Center in Burns, where he now works.

In 1999, while an undergraduate, he started working at the center as a summer technician. Today he is a celebrated rangeland scientist.

Davies this year won the Society for Range Management's Outstanding Young Range Professional Award. The award is given annually to a scientist under the age of 40 who exhibits superior performance and leadership in rangeland science.

Davies also previously received the Outstanding Paper Award from the Weed Science Society of America for work on weed prevention. A research paper on the interaction between managed and natural disturbance in plant communities was accepted for publication in Ecological Applications, an international journal on applied ecology.



Mitch Lies/Capital Press

USDA Agricultural Research Service scientist Kirk Davies has become a recognized leader in the study of sage grouse habitat from his post at the Eastern Oregon Agricultural Research Center in Burns, Ore.

Davies' work in sagebrush steppe has become increasingly important in recent years as state and federal agencies and private landowners work to protect habitat for the sage grouse.

The U.S. Fish and Wildlife Service in March of this year determined the sage grouse warranted protection under the Endangered Species Act, but didn't list the bird because other species were deemed in greater need of protection.

Environmental groups in June filed a complaint in U.S. District Court in Idaho, seeking to force a listing.

Research conducted by Davies often finds its way into management techniques used by federal land managers, who manage the sagebrush steppe that the sage grouse depends on for its habitat.

The research typically starts with a theory, he said.

For example, scientists have theorized that grazing is beneficial to sagebrush that falls prey to fire.

Initial findings show the theory is correct.

"Our research showed that over the long term, excluding grazing could be very devastating to the plant community," Davies said. "We saw that when it burned, where it had been grazed versus where it had seven years without grazing, the ungrazed burned area went to cheatgrass and the other one really didn't have that problem."

Davies subsequently "dove into it deeper and really looked at the numbers."

"There is about threefold more amount of fuel sitting on top of the perennial bunch grasses when they haven't been grazed," he said.

Davies in the near future plans to vary the experiment: in one case, going four years without grazing before burning; in another, going two years.

"We're trying to see what kind of window we're looking at," Davies said. "Does it matter if you just don't graze one year? Probably not. But what happens two, three, four years down the road if you really start building up the dry fuel on the crown of the plant?"

Davies also is looking into planting protective barriers for weed control to slow infestations of perennial bunch grasses.

He is trying to determine if there are benefits in burning conifers that encroach on sage brush plant communities.

"If you burn them, you are bound to burn some sagebrush and reduce some sage grouse habitat in the short term," he said. "But in the long term, by burning the conifers out of the sagebrush, you can have that habitat back in the future in a much larger area."

Davies said he hopes the federal government doesn't list the sage grouse, primarily because doing so would limit his ability to improve its habitat.

"My concern with listing it would be that it would limit stuff we could do to save them," he said. "There are a lot of things we can do that in the short term will reduce some of their habitat but in the long term will improve it."

Emmy awards, and she was named one of the most influential people of the year by Time magazine.

For more information about the event, call the OCA at 503-361-8941.

— Mateusz Perkowski

OAN show set to expand

The annual Yard, Garden & Patio Show is expanding.

"In terms of sheer garden space alone, this will be the biggest show we've held to date," said Allan Niemi, events director for the Oregon Association of Nurseries.

The 2011 show, scheduled Feb. 18-20 at the Oregon Convention Center, will include seven display gardens covering 18,000 square feet, a 20 percent increase over last year, and 11 garden vignettes.

In all, the show will include more than 250 exhibitors and 23,000 square feet of gardens.

The 2011 show also will feature 45 hours of free seminars. The show's guest speaker is award-winning horticulture and gardening author Amy Stewart. Stewart has several books on the New York Times nonfiction bestsellers list.

The Oregon Convention Center is at 777 NE Martin Luther King Jr. Blvd., in Portland.

—Mitch Lies

Commodity panels seek help

Seven Oregon agricultural commodity commissions are seeking nominations for

Attachment #5

Attachment #6

MuleyCrazy Magazine

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And just that quick, another hunting season has already begun. Although only taken a few days before printing this issue, I couldn't resist placing friend, Garth Jenson, on the cover of this September/October issue! Talk about doing it right. Garth's diligence in scouting was awesome, but his execution was even better! In fact, it was so good that his hunt was over just a few minutes into opening day. Garth...you look sharp all decked out in Max-1 camo, a little war paint, and a million dollar smile. I sure appreciate you writing your story on short, (one day), notice!

Are you as tired as I am with the political bureaucrats and messed up agencies that continue to squander and mismanage our resources? Take a look at page 23. Cecil Fredi, like many of us today, is also sick and tired of the way our state agencies are becoming more crooked each day. My rage about all of this has been going for a while now, but when a good friend sent in a copy of the Sacramento newspaper with a multiple page read about predators in Nevada, I was blown away! The contents of the article claimed that despite killing predators in Nevada for many years the mule deer populations are still dwindling. So, those dumb brainiacs came to the conclusion that predators are not the reason for the decline. In fact, the article stated that all those cute little critters were killed in vain. Oh yes they did! They said that millions of coyotes should have never been killed as "coyotes do not eat mule deer." What the hell is this world coming to.

I will tell you one funny story on the coyote subject before I quit. A story that will further explain the sheer ludicrousness of who and what is managing our wildlife. Recently, we had an incredible trail camera photo submitted showing a coyote walking by the camera with a dead fawn in its mouth. The gentleman that got the photo was excited to show his local biologist this great shot. As he commented on it's rarity, he was shocked when the biologist replied, "Yeah, you're right, that is rare.....it's rare that a coyote will eat a fawn!" As is becoming more and more common from all of these dingbat biologists, he then went on to tell the gentleman who had gotten the photo, that predators have nothing to do with low fawn survival; "in fact," he said, "poor survival rates are related to poor habitat conditions." This comment literally makes my blood boil! At what point are these guys going to wake up and smell the rotting flesh of unglates killed by lions, wolves, and coyotes!

In this issue I see a bunch of familiar faces, in fact several of these guys are good friends of mine. Without going through the entire list of names, I simply want to say thanks to each of you for sharing your stories with MuleyCrazy. I do, however, want to give a great shout out to page 43; a story written by Ron Hulse. Many of you may remember Ron's name as he worked with MuleyCrazy as the Advertising Director for several years. Ron and his wife, Cheryl, are dear friends of mine that have both worked hard to help with the success of MuleyCrazy Magazine. Still to this day, Ron is a great ambassador for us and I'm very glad I left that trail camera unlocked so Ron could sneak a peek of his buck...after all, that's what MuleyCrazy friends are for!

Nevada's Deer Herds...

The definition of fraud is to misrepresent the truth, to take money away from a person or persons. With that being said, that is exactly what it appears that the **Nevada Department of Wildlife** has been doing for decades to the deer hunters of the Silver State!

BY CECIL FREDI

Using statistics provided by the Nevada Department of Wildlife (NDOW), in 1988 there were 250,000 mule deer in Nevada. Today, NDOW's estimates are 105,000 deer, (although many qualified individuals believe that the real number is much lower). While one might be curious to know what has, or hasn't happened during the past 23 years to cause such a drastic decline in deer numbers...the more important question is what exactly is being done to fix the problem?

Currently, a reputable outside independent agency, (with two PH.Ds on staff), is doing a study on the overwhelming decline of deer in Nevada. This project has had many setbacks; among them, NDOW refused to provide them with the deer data they needed to do their study. In fact, it took the Wildlife Commission, (Jim Gibbons' good appointees), using the freedom of information act, on two separate occasions, to obtain the needed information. Why was this necessary? What are they hiding? What is NDOW afraid of? If they were doing their jobs, and not cooking the books on deer numbers, they should have nothing to hide, right? In fact, one would think that they would welcome and help this review so that they can put all of the speculation to rest.

But NDOW, and specifically director Ken Mayer, have been anything but helpful. Truth be told, because of their stonewalling, the project has been set back over a year. And as if that wasn't bad enough, being uncooperative isn't the only tactic that NDOW and their associates are opposed to playing. At a recent Wildlife Commission meeting, Paul Dixon—Chairman of Clark Counry Advisory Board to Manage Wildlife, threatened to sue the independent contractor if there was anything negative stated in their study about NDOW's science. Apparently, Mr. Dixon doesn't care about the truth and he isn't opposed to using scare tactics to prevent it from coming about!

~ You Can't Handle The Truth ~

For over two decades, NDOW has used 15 different excuses for Nevada's mule deer decline. Although some of them have shown merit, others have been nearly laughable. But currently, the number one excuse that NDOW is using is habitat. And why wouldn't they choose such a broad spectrum to blame for the plight of mule deer...it can be used for several more decades, or at least until their retirements kick in.

In all honesty, I do not disagree that habitat is a very key component in the recovery of Nevada's mule deer. In fact, I think you would be hard-pressed to find anyone to argue that fact. However, it certainly is not the one and only factor responsible for such a huge deficit. In fact, it seems hard to blame only habitat when both elk and deer occupy the same areas, but elk numbers have increased dramatically during the same time that deer numbers have drastically declined. So again, let me reiterate that while I whole-heartedly agree that

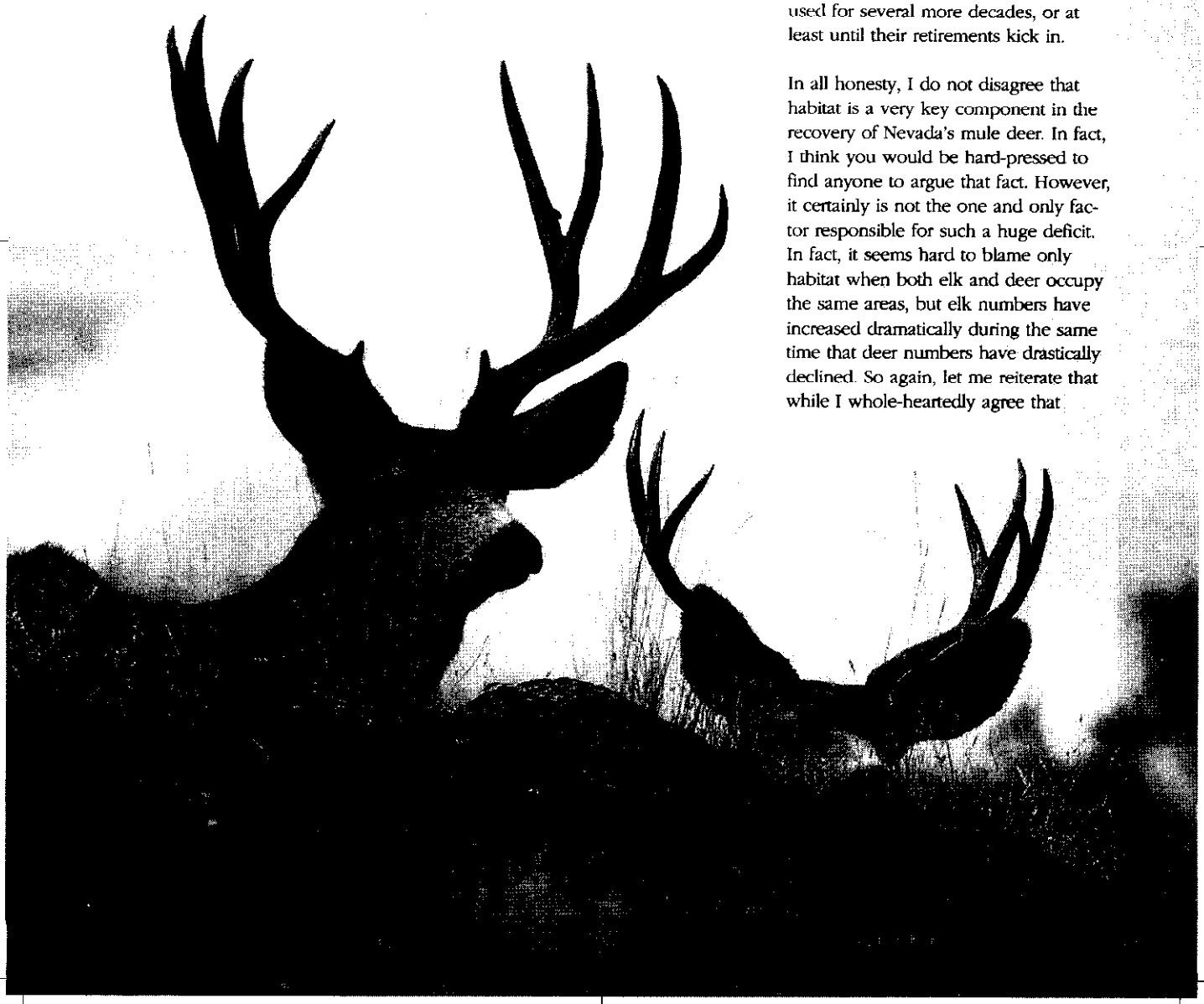


Photo - ImagesOnTheWildside

So just how bad is the lion problem in Nevada? In hunt unit 014, which is one of the smallest units in the state, Wildlife Services removed 40 mountain lions in three years; roughly equating to 480 deer and/or bighorn sheep still alive and kicking because of this action!

habitat is extremely crucial in sustaining and growing a strong and healthy number of deer...the loss of habitat is a far cry from the real reason why Nevada's deer herds continue to plummet in number. The truth of the matter is that this decline stems more from the fact that the icon of the West—mule deer, are the main food source for the predator of the West—the mountain lion.

Most biologists believe, (but not NDOWs), that a lion will eat a deer a week. However, NDOW refuses to acknowledge that Nevada even has a predator problem! You might be shocked to learn that it took two sportsmen's organizations—Hunters Alert and Nevada Hunters Association—to get a bill passed in 2001 in order to fund predator control. But that is not the only news flash...you will be further shocked to learn that this work was done by Wildlife Services, as NDOW has stated that they are not going to, and never has done, any predator control work!

Heritage Funds are generated from the auctioning of big game tags. This amounts to about $400,000 a year. This money is to be used for enhancement of game birds, game animals, and game fish. One provision of this statute is that the money can be used "for the management and control of predatory wildlife in the state of Nevada". The Wildlife commissioners, not NDOW, select the projects to be funded. For years, NDOW's top request, (i.e. spending the most money), was for transplanting bighorn sheep. NDOW believes it is more important to focus on the 280 people who hunt sheep than on the 51,011 hunters who used to hunt deer. The use of Heritage Funds for predator control work was never considered until Jim Gibbons appointed commissioners who recognized its importance in saving the deer herds as well as other species.

These Wildlife Commissioners then approved three predator control projects. One of which was submitted by 'Hunter's Alert' for mule deer restoration. Pat Laughlin, of 'Nevada Alliance 4 Wildlife', submitted a proposal for mule deer enhancement and sage grouse recovery. Mike Stremler, a rancher and lion hunter, submitted a proposal for deer enhancement by removing lions in a particular area. The only way NDOW would approve Stremler's proposal was if it was done as a research project. During Stremler's initial presentation, director Ken Mayer, stated that his biologists told him there were no lions in the Stillwater Mountain area. Well, it didn't take long at all for Stremler to take one lion and he was even quicker to report that there were six others. Stremler's total in a little over a one-year period, was the removal of eleven lions and there are at least three more in that area...all of this in a 12 mile radius!

In the course of one week, 139 coyotes were removed in unit 031 on the Hunter's Alert project with this money. Pat Laughlin's project was

In the course of one week, 139 coyotes were removed in unit 031 on a project that Hunter's Alert submitted. Even more amazing was the Nevada Alliance 4 Wildlife project which killed 239 coyotes in less than three days in Elko County! All the coyotes removed were in wintering deer areas and many were shot off freshly killed deer. Amazingly, NDOW stands firm in it's belief that the Silver State does not have a predator problem!

responsible for removing 239 coyotes in less than three days in Elko County. All the coyotes removed were in wintering deer areas and many were shot off a freshly killed deer. Director Mayer fought against all of these proposals. Now I ask you...does this sound like someone who wants to enhance game birds and animals? These initial predator control programs with Heritage Fund money were extremely effective! Sadly, however, it has been made very clear that with Governor Sandoval's Wildlife Commissioners, this money will never again be used for predator control.

~ The Root of All Evil ~

Okay, so let's prove why NDOW Director, Ken Mayer, and Governor Sandoval's appointments to the Wildlife Commission led by Chairman, Mike McBeath, will not do anything about not only deer, but all big game of the Silver State.

In August of 2008, the wolf was declared a big game animal in the state of Nevada. This was done by Governor Kenny Guinn's appointees led by Wildlife Commission chairman, Clint Bentley, and NDOW director, Ken Mayer. Now, most everyone knows that the re-introduction of wolves in Idaho, Montana, and Wyoming, has nearly decimated their big game herds. In fact, one area in Idaho has lost 90% of its elk because of wolves. Having said that, it is safe to say that most sportsmen view wolves as anything but healthy to our western big game populations. Feeling the same way, Jim Gibbons' good Wildlife Commissioners, (6 of 9), instructed Ken Mayer that if there was never any evidence of wolf packs in Nevada, the wolf was to be deleted from the big game animal classification. Ken Mayer refused to do this and at the December 3rd, 2011 Wildlife Commission meeting, led by Chairman, Mike McBeath, the Commission voted to keep the wolf as a big game animal.

Currently, the wolf is a federally protected species. However, at some point, the control of wolves will be the right of each state. If proven that there were no wolves in Nevada, it could then be classified as an unprotected predator.

As an example to how detrimental Director Mayer's and the Commission's action have the potential to being, let me give you a little history about the black bear in Nevada. In 1929, the black bear in Nevada was classified as a big game animal. But it was not until 2011, 82 years later, that a season and quota was set. All of this, of course, was under the objection of Director Mayer. Judging from this past history, it is apparent that there will never be a season set on wolves...that is until all species of big game have been depleted in Nevada. With leadership like this, not only will the deer never return, but like other states, all big game will be decimated. When this occurs, be sure to thank Clint Bentley, Ken Mayer, Mike McBeath, and

the rest of Governor Sandoval's appointees to the commission.

Wildlife Commissioner, Scott Raine, worked long and hard on a new Mule Deer Management Guidelines, (Policy 28). It was a 13-point program necessary to preserve, protect, manage, and restore wildlife and its habitat. The committee was composed of people like Cliff Gardner and John Carpenter who had witnessed the Ruby Valley deer migration which numbered in the thousands in the 1950s and 1960s. (Sadly, today the migrations are all but gone because there are no deer.) At the December 2011 meeting, led by Chairman McBeath and Director Mayer, the complete policy was deleted. So much for deer restoration in the Silver State.

When former governor, Jim Gibbons, hired Ken Mayer, he instructed the new director to implement one of his major objectives, to bring back Nevada's mule deer. After doing nothing for four years about this serious problem, Gibbons fired him. Mayer obviously had no intention of doing anything about the mule deer problem. For decades, NDOW has been a bighorn sheep oriented agency. With the reappointment of Mayer and the newly appointed commissioners by Governor Sandoval, it will return to a sheep only wildlife agency. Deer enhancement will never be considered.

Photo - ImagesOnTheWildside/Tony Bynum

The sad reality is that it doesn't matter how big of a predator problem Nevada has, it doesn't matter how poor the habitat is, in fact, it doesn't really matter what the negative factors are. In the end, it comes down to a deep-rooted corruption within the ranks of NDOW, that will continue to suppress one of Nevada's most precious and valued big game resources...the mule deer!

~ Doomed For Failure ~

In summary, I feel that there are three reasons why Nevada's deer will never return. 1) Director Ken Mayer has no interest in doing anything about the mule deer. This has been proven by his first four years of doing nothing; 2) It will take some serious predator control to reduce lions and coyotes. This is not going to happen with Governor Sandoval's Wildlife Commission appointees and Ken Mayer's past performance on predator control; 3) NDOW has over-inflated deer numbers so badly that the deer really have no legitimate chance at recovery. How can you manage anything in the right direction, when it is made up of speculative and bogus data?

When the initial findings from the independent study are released, a peer review should be initiated. The collected data should be sent to many specialists for their findings, akin to a doctor's second or third opinion. Rest assured that Ken Mayer will fight all of this. However, if by the grace of God, there happens to be a peer review, and the results prove that NDOW has inflated deer numbers, then heads should definitely start to roll. Start at the top with Director Mayer and go right on down to all of the biologists who have been providing the bogus information for decades. Fraud is a serious charge and when it is a multi-million dollar fraud, it deserves serious attention. But when it goes on for decades it is shameful and inexcusable. Someone needs to be held accountable.

At the February 2007 Wildlife Commission meeting, I was there to testify about another audit that NDOW had failed. During this time, then Chairman, Chris McKenzie, asked me what I wanted. I answered him direct by stating that I wanted two things...keep the corruption out of NDOW and bring back our deer. Five years later, NDOW has proven they can't do either.

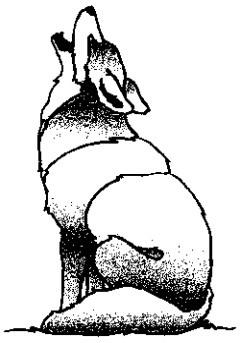
Editor's Notes:

Cecil Fredi is president of HUNTER'S ALERT and has lived in Las Vegas for 69 years. He created HUNTER'S ALERT 23 years ago with the intent to aware hunters and sportsmen of the corruption and misuse of the public's resources and funding by the Nevada Department of Wildlife. From exposing fraudulent and abusive actions on how NDOW has conducted their tag draws, to sponsoring bills to audit NDOW funding, HUNTER'S ALERT has been, and will continue to be, dedicated to keeping the sportsman informed of factual information regarding unjust management of wildlife and money trails from organizations. For more info, go to www.huntersalert.org.

USDA APHIS

Attachment #7

USDA-APHIS-WS
8775 Technology Way
Reno, NV 89521



May 2012

The Trapline

United States Department of Agriculture

Animal & Plant Health Inspection Service

Wildlife Services

Cooperating with:

Nevada Department of Agriculture

Division of Resource Protection

Mission Statement

The Nevada Wildlife Services Program (WS) is a collaborative program involving the Nevada Department of Agriculture's Division of Resource Protection (State) and the USDA-APHIS-Wildlife Services Program (federal), whose mission is to protect agriculture, natural resources, property, and the human health and safety of the citizens of Nevada from the threat of injury, damage, or resource loss due to wildlife.

Introduction

During May, wildlife damage management work was conducted on an estimated **5.1** million acres of land under agreement. On these lands, WS personnel helped Nevada's farmers and ranchers protect over **$51** million in agricultural resources such as cattle, sheep, and livestock feed; and over **$48** million in natural resources. Additionally, WS assisted **201** persons and entities with technical assistance which involves providing information or equipment to cooperators so they can resolve problems themselves. Cooperators reported **$6,250** in damage and WS Specialists verified another **$3,600** in damage to other agricultural resources. These losses would be much higher without an effective wildlife damage management program. During May, coyotes accounted for **$13,600** in verified losses, mostly to livestock, and **286** coyotes were taken with a variety of management methods to resolve these and other ongoing complaints. WS routinely collects blood samples or oral swabs from species taken or handled during normal control activities for monitoring the presence of plague, avian influenza, and other diseases. In May, **118** samples were processed.

The following excerpts are a selection of activities and events of this program which occurred during the month of May, 2012.

Resource Protection

State Office

During May, 2012, the State Office trap loaning program checked out **9** cage traps. The species distribution for the traps loaned out were: raccoons **(2),** ground squirrels **(3),** striped skunks **(1),** wood rats **(1)** and marmots **(2).** Information regarding baits to use, trap placement tactics, handling of trapped animals and safety precautions to take when working with the wildlife species were provided for all equipment loaned.

East District

On May 1st, Wildlife Specialist (WS) Nathan Fowler confirmed the loss of two adult ewes and three yearling sheep to coyote predation. The value of the five sheep was placed at $1,250. After providing technical assistance in the form of non lethal recommendations, WS Fowler set several pieces of equipment in an effort to stop the predation. WS Fowler also requested the assistance of the Elko plane. On May 2nd, the Elko plane responded to the location in northern Elko County. Two adult coyotes were removed as they fed on a yearling sheep they had just killed. Three additional coyotes were also removed near the kill site. WS Fowler removed two other coyotes utilizing ground equipment, bringing the damage to an end. The sheep producer was very pleased with the help provided by Wildlife Services.

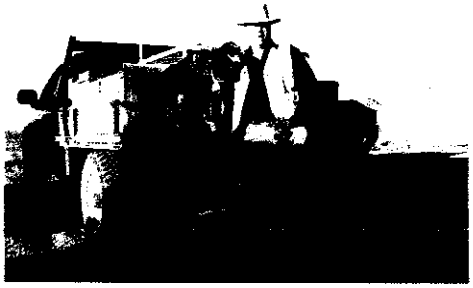
On May 1st, WS Matt Spires confirmed the loss of four lambs to coyote predation. The lambs were valued at $800. WS Spires and his well trained decoy dog were able to locate and remove two adult coyotes near the kill site. A necropsy of both coyotes revealed that they had lamb in their stomachs. Knowing that several other coyotes were involved in the predation, WS Spires requested the assistance of the Ely plane. On May 2nd, the Ely plane responded to the location in northern White Pine County, removing three additional adult coyotes near the kill site. WS Spires provided technical assistance in the form of non lethal recommendation to help prevent future predation issues. Many of the recommendation were already in place including: guard dogs, carcass removal and night penning. The sheep producer expressed his appreciation to the East District Supervisor for all the help provided by WS Spires and the Ely plane.

On May 4th, District Supervisor (DS) Joe Bennett received a call concerning a problem with ravens. A sheep producer west of Ely, NV reported that ravens had pecked the eyes out of four newborn lambs and injured several others. The value of the four dead lambs was placed at $800. The producer reported that he had already exhausted several non lethal methods including carcass removal and harassment/hazing but was still experiencing damage. The sheep producer reported that he had just observed ten ravens kill a baby lamb before he could frighten the birds away. On Saturday, May 5th, DS Bennett traveled to the ranch and confirmed the damage. DS Bennett observed more than twenty ravens in the area. DS Bennett placed out eggs treated with DRC 1339. On Monday, May 7th, DS Bennett confirmed that all the treated eggs were gone and only observed two ravens in the area. The sheep producer was very pleased with the assistance provided by Wildlife Services. DS Bennett will continue to monitor the area for possible predation. Technical assistance in the form of more non lethal recommendations was also provided to the sheep producer.

On May 5th, Mountain Lion Specialist (MLS) Jim Buhler was contacted by a sheep producer in White Pine County concerning a problem with a

mountain lion. The producer reported that a lion had killed two ewe sheep and seven lambs, valued at $1,900. MLS Buhler traveled to the location and confirmed that a lion had indeed killed the sheep. MLS Buhler utilized his well trained tracking hounds to remove an adult female lion that weighed about 90 pounds. MLS Buhler noted that the sheep producer was currently using more than a dozen guard dogs, night penning the sheep and utilizing six sheep herders but the lion still killed the sheep.

On May 10th, WS Mac Crome confirmed the loss of one lamb valued at $200 to raven predation. WS Crome reported seeing several ravens attacking and harassing newborn lambs over the course of several days. On May 15th, WS Crome treated the location with hard boiled chicken eggs treated with DRC-1339. After conducting a pre and post treatment inspection, WS Crome estimated that 24 ravens had been removed, bringing an end to the damage. Before treating the area, WS Crome also provided technical assistance in the form of nonlethal recommendations. Many nonlethal techniques were already in place during the depredation including: carcass removal, herding and hazing of the ravens. No further losses have been reported.



On May 23rd, WS Scott Little was checking in with sheep herders in his assigned area when he was informed about a problem with coyotes. The herder reported that coyotes had killed several lambs on a remote mountain nearby. WS Little rode his horse into the location and confirmed the loss of the lambs, valued at $800. WS Little used calling and his well trained coyote decoy dogs to remove two large adult coyotes. A necropsy of the coyotes confirmed that they both had lamb in their stomachs. No further losses have been reported from this band of sheep and the sheep producer was very pleased with the prompt response. WS Little's fast action no doubt saved the lives of many more lambs that would have been lost to these coyotes. Technical assistance in the form of nonlethal recommendations was also provided. Many of these non lethal recommendations including night penning and guard dogs, were already in use at the time of the losses.

WS Derril Fry had a very busy month of May. WS Fry received reports concerning the loss of 13 lambs valued at $2,600, during the month. WS Fry was able to remove three adult coyotes and three dens near the location of the losses. WS Fry also assisted the Elko plane in the removal of several other coyotes near the kills, bringing the damage under control. WS Fry provided technical assistance in the form of non lethal recommendations to help prevent future predation issues from occurring.

During May, WS Virgil Fullerton was busy protecting several bands of sheep in his assigned area. Although no losses were reported, during the month, WS Fullerton was busy checking in with sheep herders and providing technical assistance in an effort to prevent predation from taking place. WS Fullerton's cooperators are very pleased with his hard work and dedication, which greatly reduce the losses in his assigned area.

May was a very busy month for both the Ely and the Elko planes. Both planes were instrumental in solving several predation issues on sheep that were lambing in their assigned areas. Without an ef-

fective aerial program, many producers have commented that they could not stay in the sheep business in eastern Nevada.

West District

On May 2nd, Pilot Wes Gossard and Crew Member (CM) Brandon VanderMay conducted aerial operations around several sheep producers in Washoe County. During the flight, a total of three coyotes were removed. WS Doug Koepke provided ground support during the aerial work.

On Saturday May 5th, WS Koepke received a call about a calf kill (valued at $500) in Lyon County. WS Koepke inspected the ranch and removed three coyotes and placed equipment in the vicinity of the livestock damage. Upon equipment re-inspection, WS Koepke removed 10 coyotes with trail snares and shooting. No further livestock losses have occurred.

On May 8th, Pilot Gossard and CM VanderMay conducted aerial operations around several sheep bands in Lyon County. During the flight, a total of four coyotes were removed, including a pair that was taken in one pass. WS Nick Smith provided ground support.

During the week of May 7th thru May 11th, WS George Hansen spent the week trapping on eight sheep lamb bands and one goat band in Lander County. During the week, WS Hansen removed nine coyotes by utilizing leghold traps and also removed two coyote dens. WS Hansen will continue to provide livestock protection efforts in this area.

On May 14th, WS John Peter removed a 140 pound lion from hunt unit 031, with the use of a call box assisted snare. The lion was removed to protect mule deer; however the area was going to have two bands of domestic sheep in the same area, so the lion removal effort had dual benefits. WS Peter will continue to protect both mule deer and livestock in hunt unit 031.

On May 15th, Pilot Gossard and CM VanderMay conducted aerial operations around several sheep producers in Washoe County. During the flight, a total of six coyotes were removed. The aerial crew also located one coyote den and reported its location to WS Koepke.

On May 24th, Pilot Gossard and CM VanderMay conducted aerial operations on two lamb bands, in Humboldt County. During the flight, a total of eight coyotes were removed. The aerial crew also located two coyote dens for WS Peter who was providing ground support during the operation.

During the month of May, WS Smith was busy placing equipment around several different sheep producers, in Lyon County. WS Smith has been running his equipment by horseback into remote country. During the month, WS Smith removed 28 coyotes with a variety of methods. WS Smith has also assisted a rancher with a damming beaver complaint. WS Smith utilized snares and promptly removed seven beavers. WS Smith will continue to protect livestock in Lyon and Douglas County.

The West District has been busy throughout May, placing out DRC-1339 treated egg baits to target ravens around several sage grouse leks in Washoe and Humboldt Counties, as requested by the Nevada Department of Wildlife (NDOW). Nevada boasts a high population of ravens and the West District annually removes ravens to help with isolated sage grouse nesting locations. Sage grouse

chicks usually hatch out between the middle and end of May. In a mere two weeks after hatching, sage grouse chicks can fly.

During the week of May 21st thru May 25th, DS Jack Spencer received numerous calls about coyotes killing pets and acting aggressive toward citizens in the Reno/Sparks area. An NDOW game warden also recently reported problem coyotes. On Saturday May 26th, DS Spencer visited a location near a school where a pair of coyotes was starting to act aggressively around young school kids. DS Spencer released his decoy dog in the area and let out two voice howls and in five minutes removed a pair of coyotes utilizing shooting.

During the month of May, Staff Biologist (SB) Jack Sengl completed the NDOW Mason Valley project 23. The intent of the project was to protect wild pheasants, turkeys and their nests from being raided by nest predators: mainly ravens, coyotes, raccoons and skunks. To that end, SB Sengl removed an additional 12 coyotes, two striped skunks, one raccoon and one badger from the management area, with ground equipment.

On May 22nd, State Director (SD) Mark Jensen conducted a field inspection on SB Sengl while he was closing out NDOW project 23. Field inspections are a great way for Directors to stay in tune with their employees as well as what is happening out in the field. The assistance was greatly appreciated by SB Sengl.

During the month of May, Wildlife Biologist (WB) Bowers continued conducting a Wildlife Hazard Assessment (WHA) at a military installation in Northern NV. The WHA involves conducting structured surveys on the airfield and the surrounding area, as well as general observations. This data is collected for a 12 month period in order to determine seasonal and spatial trends of wildlife usage on the airfield and surrounding area. Once this is complete, recommendations can be made regarding species management, habitat alterations, and agricultural management practices. While conducting the assessment WB Bowers also participates in direct control of wildlife when necessary to minimize direct threats to aviation safety. During the reporting period, WB Bowers noticed sign of badgers on and around the airfield. As a result, one badger was removed from the area to reduce the threat of a badger versus aircraft incident. WB Bowers hopes to conduct some black-tail jackrabbit projects in the near future in order to reduce the attractiveness of the airfield to coyotes, badgers and red-tailed hawks.

Also during the month of May, a positive ID was received from the Smithsonian for a bird strike that occurred on a helicopter night op. WB Bowers had previously entered the strike into the safety system database and submitted a feather to the Smithsonian for possible identification. The feather was positively identified as a Vesper sparrow. This is very interesting information, as WB Bowers had not considered, or seen evidence of sparrows being a nocturnal group in the area.

During the month of May, WB Luke Barto continued protection efforts at a local airport, which included: trapping and translocation of a Red-tailed hawk; gull egg oiling at two different gull colonies that were impeding aviation safety; and predator prey base removal.

On May 29th, WB Barto assisted DS Bennett with sage-grouse protection between Austin and Fallon. DS Bennett has been conducting the work in the past, but he offered to hand the project over to WB Barto, providing him with excellent development and experience in the process. During the day, DRC-1339 treated egg baits were placed outside of the leks for the ravens, and WB Barto sight shot one badger that was on its way to the lek. WB Barto will close out this project the second week of June.

FRED FULSTONE, JR.
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F.L.M., CORP.
Farming and Livestock

P.O. BOX 12
SMITH, NEVADA 89430

September 18, 2013

Nevada Sagebrush Ecosystem Council
Attn: JJ Goicoechea, Chairman

Subject: **Response** to what I heard during the **Sagebrush Ecosystem Council Meeting 9-12-13**

I am Fred Fulstone from Smith, Nevada. Please understand that the Fulstone family has been agricultural producers in Western Nevada for over 150 years. At this time three generations of my family own and operate our sheep ranch with property and grazing preference in both Nevada and California. Our operation includes private lands as well as grazing within Bureau of Land Management and Forest Service grazing allotments. In the terms of the Endangered Species Act we have unique standing for consultation because we are federal permit applicants.

My family and I have gone to considerable effort to participate and be heard in sage grouse meetings at the local and the state level. Please read the documents and written comments that we have provided to your committee at various meetings and the two attachments to this letter. We have provided you with facts about sage hens based on our years of contact with these birds in every season. We have paid close attention to what is being said and written by members of what was first the Governor's Sage Grouse committee and is now the Sagebrush Ecosystem Council. Many of your conclusions are in error.

As federal permittees within the Bi-State Sage Grouse unit, we are in a dangerous situation and our family business could be wiped out.

This danger is easily seen in the Nevada Sage Grouse plan and in the proceedings of the Sagebrush Ecosystem Council. Did you hear Jim Winfrey say that the Forest Service may prohibit grazing within 4 miles of a lek?

The situation is that all the government agencies are working for the sage hen without too much consideration for the livestock permittee or grazier. It seems like the sage hen comes first before the humans who are citizens of our communities. The government has hired many scientific experts who are working on the problem. I can't afford to hire all the experts to protect our grazing interest in these matters. This is not equality. This is discrimination or profiling against permittees and people in the Bi-State area. As Mr. Gardner and Mr. Koch both explained, this is a violation of due process of law and amounts to both Federal and Nevada government employees choosing to act in violation of the federal and state Administrative Procedures Acts.

We need a responsible independent agency to help us in order to save grazing, grazing permits, and the economic benefits of livestock production. We need an agency or someone to protect us from arbitrary regulations, to save agriculture, and especially save us from the environmental activists. We need to be on the same playing field with equal arms.

Craig Manson, who was an Assistant Secretary of Interior over USFWS, once said "You should never put animals before people." Then he was gone before the policy could be implemented. At a recent sage hen meeting I was talking with a scientist who is a scientific consultant on the sage hen project and he said that I can't just say something and expect him as an agency biologist to believe it. He said I have to provide what he considers to be scientific proof. I prefer to just tell the truth.

This agency scientist wants to put a GPS and camera on our sheepherder's burro so that he could document its actions and that will show if what I said is true. I'm not sure if a video of one my burros would convince the scientist of anything but I seem to remember that a burro spoke to a Prophet in the Bible and that changed history for the better. Your scientist sent out a report on the Pinenut area which stated that he had seen a band of sheep and that the area around Mt. Siegal had been overgrazed. He wrote this under the "*PREDATORS*" heading in his report. I asked him when he collected this data and where the data was collected but he said he didn't know because he was not there but his assistants were.

Many of the papers that the fish and game agencies have used for references recently are similar to this one. The scientific team claimed to be taking scientific data related to sage hens and did not take any data related to grazing utilization. Then the authors could not resist making a politically motivated statement against grazing even though grazing was a topic they did not study.

We don't have all the scientific facts that are needed to make a decision to benefit sage hens. For example, we need a variety of samples for an independent nuclear DNA analysis. Much of the information being used in recent scientific papers is coming from articles written 10 to 15 years ago and include analysis that was not done according to today's standards.

I would like to hear someone at the USFWS say a few things to encourage the grazing people, clarify what will happen to us if the sage hen are listed, and clarify what will happen to the sage hen if grazing is eliminated like it was up North on the Sheldon Refuge. We are grazing all of our sheep in the Bi-State area and a listing could wipe us out if their recovery plan is anti-grazing. Sometimes government gets out of hand and acts prematurely and the results cost a lot of money and cause even more environmental problems.

Sincerely,

(S) Fred Fulstone
Fred Fulstone

51 3

Then & Now

The Endangered Species Act is broken

Those massive fires last summer and fall certainly have gathered the attention of folks up the line.

It shouldn't have to happen this way.

The former California Superior Court Judge, Craig Manson, who also, by the way, served six years as general council for the California Department of Fish and Game and now is assistant Secretary of Interior, told a Los Angeles Times conclave that the "Endangered Species Act" is broken and should no longer be used to give endangered plants and animals priority over human needs. Speaking in Santa Barbara, CA to a group celebrating the 13th Anniversary of the Endangered Species Act, he brought up the point that how could our government, in good conscience, spend $100 million dollars to save species that "nature can't take care of."

That's a good question, Mr. Secretary and one that should have been asked years and years ago.

by PATRICK K. GOGGINS

I have, over the years, flown over the western Montana, Idaho and Washington forests where there has been evidence of massive clear cutting and strip cutting and reseeding projects of trees from 40-50 and 60 years ago. It's unbelievable, when you fly at low altitudes over these areas and notice how many of these trees, that were reseeded, are in a harvestable position and this is a situation that could go on forever just like farming the ground for crops. It's a renewable situation at each and every turn.

If people think it's fine to farm our lands to grow grains and crops and grass and hay, why then wouldn't it be just as important or feasible to "farm" our nation's forests? You know, if we had these timber roads in strategic areas put in, and if we had sheep and cattle grazing on many of these areas, we'd not only be growing a replaceable product called timber but we'd be using this grass to advantage. The sheep and the cattle could also use those roads just as firefighters can use those roads, just as backpackers and tourists could use those roads - they're enjoying it.

I think it's important to let everyone at all levels use these public lands to their advantage, and yes, to the advantage of America.

Yes, Assistant Secretary of Interior Craig Manson is right when he says the Endangered Species Act is "broken" and should no longer be used to give endangered plants and animals priority over human needs. And as Manson said, as discussed above, "is it in the interest of humanity to spend $100 million dollars a year to save some species that nature can't take care of herself?"

We've seen some things happening already that indicate there is going to be some definite changes in this Endangered Species Act as well as the handling of America's forests.

The massive and devastating fires of late summer and fall that happened in the west and in particular in California has brought the attention of forests and public lands to the front, and it certainly is apparent that the "healthy forests" movement is going to get going full bore.

If you notice the wood products and forest industry have been spending massive amounts of funds and effort in promoting this idea, as they should.

I've noted an almost equally void of dollars and time and effort being spent by the livestock and agriculture community in order to mend some of these laws that have been discretionary against livestock.

I'm speaking particularly of grazing of sheep and cattle on forest lands to clean up many of these valleys and canyons where undergrowth is prevalent, where grass is abundant. To just simply allow the timber industry to go in and cut wood and thin them, I don't think is totally going to do the job.

Nothing is going to clear so much of those problems as would sheep and cattle.

And remember, the sheepmen and cattlemen are going to pay grazing fees to go on to these lands. It isn't like it's going to be a total cost to the government. They will reap good rewards and at the same time help out on fire problems.

C O M M E M O R A T I O N

On the 50th Anniversary of the

TAYLOR GRAZING ACT

the United States Department of the Interior and the
Bureau of Land Management recognize the contribution of

FRED M. FULSTONE, JR.

for assisting and supporting the orderly use, improvement
and development of the Nevada public lands

JULY 26, 1984
DATE

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

STATE DIRECTOR

DISTRICT MANAGER

JUNE 28, 1934 JUNE 28, 1984

IRA HANSEN
ASSEMBLYMAN
District 32

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Judiciary
Natural Resources, Agriculture & Mining
INTERIM COMMITTEES
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State of Nevada Assembly

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February 25, 2012

"I'm not exaggerating, there were thousands"

THE INTRODUCTION OF AGRICULTURE AND ITS IMPACT ON SAGE GROUSE

By all accounts, sage grouse were rare when Europeans first entered the Great Basin, as I documented in two earlier reports.

However, the populations of sage grouse in Nevada rapidly increased following the introduction of agriculture and livestock in the mid to late 19th century. "Clouds" of birds, creating "thunderous" noise as they concurrently rose into flight, are recorded by the 1880's.

For example, from interviews of "old timers" published by the Northeastern Nevada Historical Society: "Sage chickens (sage grouse) were so plentiful in the 1890's...they clouded the sky...the birds were always thick in the meadows. As I passed by, they would rise up like a bunch of blackbirds...oh they were thick." (George Gruell interview of Syd Tremewan, 1964).

Another: "When we lived on Gance Creek (around 1900) there were lots of sage hens. I have seen them fly up the mountain right behind our house...they sounded like thunder...I am not exaggerating, there were thousands." (George Gruell interview with George Nelson, 1966).

For a more scientific documentation of this huge rise in sage grouse during this time frame, Robert "Bob" McQuivey, a 30 year NDOW biologist, by literally reviewing all of the early newspapers, journals and laws passed in Nevada, has documented this population explosion. I have read some of his extensive research, which I am currently attempting to get published. In a nutshell, it confirms the above observations.

So, what caused this dramatic change, from almost nothing to abundance?
1. Habitat manipulation and expansion, especially meadows and man-made hayfields.
2. The mechanical removal of sagebrush and pinyon/juniper trees for primarily fuel.
3. The introduction of non-native plants, especially common dandelion, alfalfa, and other forbs.
4. Livestock grazing.
5. Stable supplies of water in areas previous dry or intermittent.
6. Predator control.

It should be noted none of the man-made changes were done intentionally to benefit sage grouse. It was simply coincidental.

HABITAT CHANGES. As settlers started to quickly dot the Nevada landscape, one of their first acts was to create a meadow of sorts for their domestic animals. For large ranches it was to primarily grow hay and expand lush grazing areas. Yet even the smallest start-up ranch had horses and generally a milk cow or two. By fencing an existing meadow, finding a level piece of sagebrush covered ground, damming the local spring or stream, and irrigating, meadows were both expanded and created new.

As is well documented, sage grouse have a symbiotic relationship to meadows. They especially relish certain forbs (most of us would call them "weeds"), and insects common on meadows.

However, when meadows are not basically "mowed down", sage grouse avoid them. Livestock usage, by eating the plants, actually increases sage grouse usage. For example, from "The Relationship of Cattle Grazing to Sage Grouse", a thesis done at UNR by Carol Evans in 1986: "Klebenow (1982) found that birds tended to avoid meadow areas of dense rank vegetation, but would use the areas once they were "opened up" by grazing. Oakleaf (1971) reported that heavily grazed meadows...were utilized by sage grouse, while succulent areas of ungrazed meadows...were not used as feeding areas. After cattle grazed and left a meadow, sage grouse were observed to concentrate there in greater numbers than before the grazing..." (DeRoucher, 1980)."

This flies in the face of the common misconception that grazing harms sage grouse. As Evans noted: "During the last three surveys, observed use of grazed meadows was significantly higher than expected."
Why? "Grazing by cattle prior to the cessation of plant growth...increases the quality of the food forb resources for sage grouse. Grazing increases the succulence of forbs by interrupting and delaying maturation. New leaf tissue is higher in crude protein...than mature tissue. Sage grouse appeared to seek sources of succulent forbs by selecting for meadows grazed by cattle."

NEW PLANTS: non-native plants can be harmful, like cheatgrass, or beneficial. Common dandelion, just like the ones you find in your lawn, is not native to Nevada. The good news: sage grouse love to eat it. Food studies of sage grouse show it to be a primary and dominant dietary item today. As Evans noted: "A study of this unique forb (dandelion) might yield important insights into how the environment for sage grouse has changed and how sage grouse have responded...the distribution of dandelion is closely tied to grazing...it increases with grazing and is noticeably less abundant in communities protected for long periods...dandelion unlike other forbs, retained its succulence long after maturation...dandelion is an exotic and not native to sage grouse habitat..."

Other plants introduced include alfalfa, which also is highly attractive to sage grouse; as are the insects these new man-made meadow complexes attracted. All in all, the huge increase in meadows or meadow- like fields and hay producing areas were the primary catalyst for sage grouse expansion, all done together with livestock grazing.

MECHANICAL REMOVAL OF SAGEBRUSH, primarily for fuel, also benefitted sage grouse by removing older less productive plants and allowing younger more succulent plants to grow. As recorded in 1877: "Sagebrush is about the only fuel in this timber-less country and hundreds of thousands of cords of it are annually consumed...like the grand forests of the Sierras, the wild sage of the Great Basin is rapidly disappearing and as it is a plant of exceedingly slow growth, it is not improbable that it may ultimately become extinct..." (from the "Tuscarora Times Review" as quoted in McQuivey's work).

This also helps explain why areas recorded by the early explorers as vast seas of sagebrush were later described as grass dominated by the 1890's. The fear of sagebrush going extinct was obviously grossly exaggerated, and its rapid recovery was a boon for the sagebrush-eating sage grouse, as the younger plants and re-growth were much more productive in the leaves they eat, especially in winter. The removal of Pinyon/Juniper trees over much of Nevada during this same time frame had much of the same effect.

WATER DEVELOPMENT, allowing livestock to graze areas otherwise off limits due to an absence of consistent drinking water, was also a boon for sage grouse. Windmills, stock ponds, spring improvements, earthen dams in strategic spots to catch run-off, and irrigation of formerly sage covered flats converted to hay meadows all greatly expanded habitat availability for sage grouse.

PREDATOR CONTROL also likely boosted sage grouse production. For example, the early Mormons, only two years after arriving in the Great Basin, "...sponsored a contest to kill off the 'wasters and destroyers'. About 800 wolves [coyotes], 400 foxes, 2 wolverines, 2 bears, 2 wildcats, 37 mink and several thousand hawks, owls, eagles and crows were killed in the hunt. One dollar in tithing was offered on a continuing basis for each wolf or fox skin." (From Arrington, "Great Basin Kingdom", page 59). Virtually every cowboy, sheepherder, rancher and ranch boy carried a firearm and shot every predator they crossed. While today condemned to a certain extent, this action likely contributed strongly to the rapid expansion of sage grouse into its newly enhanced habitats.

All in all, agriculture and ranching in the Great Basin was the catalyst for the noted huge increase in sage grouse in Nevada. As the small ranch complexes were slowly eliminated from Nevada by economic conditions as well as the Taylor Grazing Act and other government actions, the smaller man-made meadows dried up as well. Grazing, predator control and maintenance of various related stock water developments also declined.
Declined, yes, but not eliminated entirely. (At least not yet). Much of these agricultural improvements remain that still greatly enhance sage grouse habitat, and although down in number compared to the highs described, sage grouse are still significantly above the historic low numbers noted by the first explorers.

While attending a [Nevada] Governor's Sage Grouse Conservation Team meeting, I asked de-facto leader, Nevada Department of Wildlife (NDOW) biologist Sean Espinosa what in his view is the best sage grouse success story in Nevada since the team was formed in 2000. He stated: "Smith Creek Ranch."

Considering the fact that many government people have made it clear they feel the livestock industry is the cause of the sage grouse decline, the irony is huge. Smith Creek Ranch in central Nevada is a working cattle ranch and has been for almost a century and a half. (Incidentally, I agree wholeheartedly with Espinosa's opinion; Smith Creek Ranch is loaded with sage grouse. I have personally seen several hundred birds there myself.)
The ranch, as so many Nevada ranches once did, has a man-made reservoir and irrigates about 1200 acres – a man-made meadow complex. I have spent a great deal of time there, and seeing several hundred sage grouse on this meadow is not uncommon. NDOW has documented more than 500 sage grouse on this man-made meadow at one time. When the ranch was purchased by the current owner in the late 1990s, the meadow was "dirt". By irrigating, a hay/grazing meadow was soon home to hundreds of sage grouse (and cattle), at a spot you would have been lucky to see a dozen birds a decade or so earlier.

Consider: multiply this creation of a meadow and grazing it (to stimulate plant production; gardeners call this 'pruning'), as early Nevada ranchers did in nearly every canyon with some water starting in the mid 19th century, and you will begin to understand why the populations of sage grouse went from next to nothing to "clouding the sky" in only a few decades. Think of it as Smith Creek Ranch on steroids.
Agriculture and livestock bad for sage grouse? History says otherwise.

Sincerely,
Ira Hansen
Assemblyman District 32

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Exhibit #9.

November 12, 2013
Lyon Co. Public Lands Management Advisory Board Meeting
Yerington, NV 89447
Submitted by Fred Fulstone

The ESA is being used by many groups of radical environmentalist causing court orders to list the sage hen. The main agenda of powerful environmental groups is to remove all access to public lands.

Things we have to do to create Sage Hen numbers:

1. We must control predators, which take 50% of the sage hen today.
2. Don't list the sage hen. DANGEROUS. Management by the Fish and Game will be restricted by all the regulations to follow.
3. Need to keep proper grazing to control wild fires which will destroy wildlife and habitat.
4. Control invasive species to improve water supply.[pinion, juniper, willows]
5. Get nuclear DNA of Bi-State sage hen and compare to surrounding populations, so we know what we are doing.
6. Use proper grazing techniques to benefit sage grouse habitat.

Fred Fulstone

Fred Fulstone
FIM Corp
P.O. Box 12
Smith, NV 89430

April 28, 2004

TO: Director, U.S. Fish and Wildlife Service
Assistant Director, Endangered Species, USFWS
Regional Directors, USFWS

FROM: Assistant Secretary for Fish and Wildlife and Parks

SUBJECT: Endangered Species Guidance Letter No. 2, Critical Habitat

Critical Habitat

A. Generally:

Habitat loss is one of the key factors in the decline of species to threatened or endangered status. Habitat is necessary for species to thrive and survive and not become extinct.

The Endangered Species Act sets up an essentially legal construct called critical habitat. This legal process should not be confused with the creation of actual habitat that can be observed and in which species can live. "Critical habitat" is a legal and administrative exercise that adds very little additional conservation benefit to a listed species. At the same time, it creates a tremendous social and economic disruption to the communities that are affected.

Although there are superior methods by which to conserve habitat for species, the designation of critical habitat must be founded on the best available science, an accurate assessment and characterization of existing management and protection measures, and a sound economic analysis. Where there is no data available, or the available data is flawed, speculation must not be substituted. In light of the limited value of critical habitat designations in conservation terms, and the significant costs to society at large, critical habitat designations must be no greater than the habitat identified as essential to the conservation of the species.

B. Important Points:

"Critical habitat" as defined in the Act, will be designated for each species at the time of the listing, except where not prudent or not determinable.
Habitat, as that term is used in conservation biology, is indispensable to the continued existence of species. But, critical habitat designations are only a small element of our nation's conservation strategy and arguably, the most costly. Accordingly, designations should not detract from other conservation efforts that provide greater species benefits. The Service's critical habitat designations must be based on the best available data and accurate, complete

economic analyses. [Economic analyses must be consistent with OMB guidelines. Further guidance on economic analysis is forthcoming.] Critical habitat designations must not be based on speculation or determinations that lack supporting data.

Do not designate critical habitat where existing management or protection measures adequately conserve essential habitat and those measures are likely to continue for the foreseeable future. Protected lands such as state and national parks, wildlife refuges, national forests, etc., are examples of areas that may not need special management or protection.

Designate unoccupied habitat only when occupied habitat is insufficient to provide the limited additional conservation benefit of critical habitat.

The information provided to the Secretary for the relative benefit assessment provided for under section 4(b) (2) of the Act, must be as rigorous as the biological analysis.

Areas covered by a completed Habitat Conservation Plan generally do not meet the definition of critical habitat in section 3(5) (A) for those species whose habitat is conserved by the HCP, whether or not the species is a "covered species" in the HCP.

Pending HCPs are to be considered for exclusion under section 4(b) (2).

Military lands covered by an Integrated Natural Resources Management Plan (INRMP) are not designated critical habitat if the INRMP provides a benefit for the species for which the critical habitat is proposed.

When considering other military lands for exclusion under section 4(b) (2), defer to the military's analysis of national security and military operational and training needs.

When considering state managed or tribal lands, defer to state and tribal assessment of management and protection measures in the absence of contrary evidence.

Working with landowners, local governments, states, and tribes on a voluntary partnership basis often provides conservation benefits superior to the designation of critical habitat.

The "precautionary principle" is not used as a scientific tool in our critical habitat designations. Policymakers may weigh precautionary approaches in the context of risk-based management decisions.

Complete and accurate administrative records are essential to the process of critical habitat designations.

Detailed guidance is contained in the Draft Interim Critical Habitat Guidance dated April 30, 2004. This guidance compiles, in a single document, instructions that have been applied on an ad hoc basis during the last two years. Staff should relay comments and suggestions through their supervisors as they use the guidance. The guidance will be revised based on staff and other comments, experience, and suggestions after there has been an opportunity to apply the guidance.

Supreme Court Decision by: Judge Scalia

Washington

PATRICIA PEAK KLINTBERG, Farm Journal Washington Editor

To cut taxes or not to cut

USDA analysis shows farmers pay capital gains taxes three times more often than other taxpayers and estate taxes six times more often

Paying for cuts is the kicker

The new found civility between Republicans and Democrats will be sorely tested by the debate about tax cuts and how to pay for them. Both parties acknowledge that estate and capital gains taxes create economic distortions in agriculture.

A USDA analysis shows farmers pay capital gains taxes three times more often than other taxpayers and estate taxes six times more often. Yet the administration proposes capital gains tax relief for home sales only—which is more gesture than substance since strategies already exist to avoid capital gains taxes on homes. Likewise, the proposed estate tax change just gives heirs extra time to pay off Uncle Sam.

However, there is increasing interest in a solution that both parties may embrace: indexing the estate tax exemption and capital gains taxes for inflation.

Consider that the $600,000 estate tax exemption, effective since 1987, would be $1 million today if it had been indexed. Look at what happens to the capital gains tax on an acre of land purchased in 1966 for $158 and sold in 1996 for $890: if indexed, the tax is $47/acre, if not, it's $205/acre, says USDA Chief Economist Keith Collins.

Indexing won't fly unless Congress can pay for it. Since discretionary federal spending amounts to about one-third of the total budget, it will be tough to scrape up enough to offset tax cuts. That's why there is talk of "correcting" the Consumer Price Index (CPI), thought to overstate inflation by 1.1%. Used to set cost-of-living increases, a mere 1% cut in the CPI saves $141 billion over five years.

Civil rights gripes breed more bureaucracy

It is hard to believe that a farmer seeking information about programs could be denied timely help at the county level. For farmers to whom this has happened, it is even harder to prove.

After listening to minority and low-income producers, Agriculture Secretary Dan Glickman is convinced "the structure by which we implement agricultural programs is not accountable." Yet his solution to federalize Farm Service Agency (FSA) employees so they are no longer accountable to farmer-elected county committees promises more bureaucracy, not more accountability.

He would appoint two members of each county committee to reflect racial and sexual diversity, and create civil rights complaint offices in every agency.

Meantime, USDA's own inspector general found the present civil rights office far from a model. It had 241 complaints backlogged. Of the 151 cases dealing with credit, 73 complain of being denied loans due to discrimination. Yet producers were dealing with then-federal Farmer's Home Administration employees.

Property rights victory

In a major victory for property rights advocates, the U.S. Supreme Court handed down a unanimous decision that landowners have the right to contest enforcement of the Environmental Species Act (ESA) if it causes adverse economic impact.

The case involved a group of Oregon farmers and ranchers who sued the U.S. Fish and Wildlife Service after the agency diverted irrigation water to maintain minimum water levels for two species of fish, causing the farmers and ranchers to sustain crop and livestock losses. The Ninth Circuit Court of Appeals ruled against the landowners.

READ THIS

In the Supreme Court decision, Judge Antonin Scalia writes: "The obvious purpose of the requirement that each agency 'use the best scientific and commercial data available' is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise. While this no doubt serves to advance the ESA's overall goal of species preservation, we think it readily apparent that another objective. . .is to avoid needless economic dislocation produced by agency officials zealously but unintelligently pursing their environmental objectives."

Limited CRP extension?

Rep. Jerry Moran (R., Kan.) proposed legislation to allow current Conservation Reserve Program (CRP) contractors who bid and are denied entry into the new CRP a one-year extension. He reasons that if producers don't know if they are in or out until June, preparing grass for wheat planting in September will be difficult.

USDA acknowledges the problem but may support an extension shorter than one year for winter crops only. The new lower rental rates would apply. *FJ*

and the finding is to be published promptly in the Federal Register. If we find that substantial information was presented, we are required to promptly commence a review of the status of the species involved, if one has not already been initiated under our internal candidate assessment process.

The processing of this petition conforms with our Listing Priority Guidance published in the Federal Register on October 22, 1999 (64 FR 57114). The guidance clarifies the order in which we will process rulemakings. The highest priority is processing emergency listing rules for any species determined to face a significant and imminent risk to its well-being. Second priority is processing final determinations on proposed additions to the lists of endangered and threatened wildlife and plants. Third priority is processing new proposals to add species to the lists. The processing of administrative petition findings (petitions filed under section 4 of the Act) is the fourth priority. The processing of this 90-day petition finding is a fourth priority, and is being completed in accordance with the current Listing Priority Guidance.

We have made a 90-day finding on a petition to list the western sage grouse (*Centrocercus urophasianus phaios*) in Washington. The petition, dated May 14, 1999, was submitted by the Northwest Ecosystem Alliance and the Biodiversity Legal Foundation, and was received by us on May 28, 1999. The petition requested the listing of western sage grouse in Washington as threatened or endangered. The letter clearly identified itself as a petition and contained the names, signatures, and addresses of the petitioners. Accompanying the petition was supporting information relating to the taxonomy, ecology, and past and present distribution of the species, as well as the threats faced by the western sage grouse in Washington.

The petitioners requested listing for the Washington population of western sage grouse and not the species rangewide. We consider this request appropriate because, although we do not base listing decisions on political subdivisions except international boundaries, we can consider a population of a vertebrate species or subspecies as a listable entity under the Act if the population is recognized as a distinct population segment (DPS) (61 FR 4722). We can also expand the scope of our review of petitions to the species rangewide, should expansion be appropriate based on our knowledge of the available information.

The information regarding the description and natural history of sage grouse, below, has been condensed from the following sources: Aldrich 1963, Johnsgard 1973, Connelly *et al.* 1988, Fischer *et al.* 1993, Drut 1994, Washington Department of Fish and Wildlife (WDFW) 1995, Washington Sage and Columbian Sage Grouse Workshop (WSCSGW) 1996 and 1998, and Schroeder *et al.* 1999a.

Sage grouse, also known as sage fowl, spine-tailed grouse, fool hen, cock-of-the-plains, and sage chicken, are gallinaceous (chicken-like, ground-nesting) birds, and are the largest North American grouse species. Adult males range in size from 66 to 76 centimeters (cm) (26 to 30 inches (in)) and weigh between 2 and 3 kilograms (kg) (4 and 7 pounds (lb)); adult females range in size from 48 to 58 cm (19 to 23 in) and weigh between 1 and 2 kg (2 and 4 lb). Males and females have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark-green toes. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers around the neck and upper belly forming a ruff. During breeding displays, males also exhibit olive-green apteria (fleshy bare patches of skin) on their breasts.

Sage grouse depend on a variety of shrub steppe habitats throughout their life cycle, and are particularly tied to several species of sagebrush (*Artemesia* spp). Adult sage grouse rely on sagebrush throughout much of the year to provide roosting cover and food, and depend almost exclusively on sagebrush for food during the winter. If shrub cover is not available, they will roost in snow burrows. While average dispersal movements are generally less than 35 kilometers (km) (21 miles (mi)), sage grouse may disperse up to 160 km (100 mi) between seasonal use areas. Sage grouse also exhibit strong site fidelity (loyalty to a particular area), and are capable of dispersing over areas of unsuitable habitat.

A wide variety of forb (any herb plant that is not a grass) species are used as forage by adult sage grouse from spring to early fall, and hens require an abundance of forbs for pre-laying and nesting periods. An assortment of forb and insect species form important nutritional components for chicks during the early stages of development. Sage grouse typically seek out more mesic (moist) habitats that provide greater amounts of succulent forbs and insects during the summer and early fall. Winter habitat use varies based upon snow accumulations and elevational gradients, and sage grouse likely choose winter habitats based upon forage availability.

During the spring breeding season, male sage grouse gather together and perform courtship displays on areas called leks, primarily during the morning hours just after dawn. Leks consist of patches of bare soil, short grass steppe, windswept ridges, exposed knolls, or other relatively open sites, and they are often surrounded by more dense shrub steppe cover, which is used for roosting or predator evasion during the breeding season. Leks range in size from less than 0.4 hectare (ha) (1 acre (ac)) to over 40 ha (100 ac), contain several to hundreds of males, and are usually situated in areas of high female use. Leks used over many consecutive years (historic leks) are typically larger than, and often surrounded by, smaller and less stable satellite leks. Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females for mating. Relatively few, dominant males account for the majority of breeding on a given lek.

After mating, females may move a maximum distance of 36 km (22 mi) depending on the availability of suitable nesting habitat, and typically select nest sites under sagebrush cover. Nests are relatively simple and consist of scrapes on the ground, which are sometimes lined with feathers and vegetation. Clutch sizes range from 6 to 13 eggs, and nest success ranges from 10 to 63 percent. Chicks begin to fly at 2 to 3 weeks of age, and broods remain together for up to 12 weeks. Most juvenile mortality occurs during nesting and the chicks' flightless stage, and is due primarily to predation or severe weather conditions. Shrub canopy and grass cover provide concealment for sage grouse nests and young, and may be critical for reproductive success.

Sage grouse typically live between 1 and 4 years and have an annual mortality rate of roughly 50 to 55 percent, with females generally having a higher survival rate than males. Up to 50 percent of all sage grouse mortality is caused by predation, from both avian (*e.g.*, hawks, eagles, and ravens) and ground (*e.g.*, coyotes, badgers, and ground squirrels) predators.

Prior to European expansion into western North America, sage grouse (*Centrocercus urophasianus*) were believed to occur in 16 States and 3 Canadian provinces (Schroeder *et al.* 1999a), although their historic status in Kansas and Arizona is unclear (Colorado Sage Grouse Working Group

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Exhibit #10.

To: The Governor's Sagebrush Council
November 18, 2013
Submitted by Fred Fulstone

All the agencies are planning for management of what the Endangered Species act calls a Distinct Population Segment. As federal agencies, you are required to demonstrate that you are in compliance with the ESA by documenting that you are using the best available scientific and commercial data. You are also required to demonstrate how this bird is a DPS in accordance with the federal standards of discreteness and significance as defined by the ESA and subsequent policy. No proof of this. USFWS must do a nuclear DNA to clean this.

This bird is not endangered; there are thousands of them all over the Western United States. They are trying to make a big political deal out of this bird, just like they did by listing the Bighorn Sheep in the Sierras and removed all access to public lands. The sage grouse has already cost us four hundred million dollars and will cost us a billion or more.

Just think what good is this bird? It doesn't provide any of the basic needs of mankind.

All we have to do is to turn this sage hen situation over to the Wildlife Service, who would control the predators which would increase sage grouse numbers. It's been proven.

Please look at the Federal Register paper included here (dated August 24, 2000, third column underlined) page No. 51579. The following is what USFWS said about predators on sage grouse in the year 2000. It is still true today. Most juvenile mortality occurs during nesting and the flightless chick stage, and is due primarily to predation or severe weather conditions. Sage grouse typically lives between 1 and 4 years and have an annual mortality rate of roughly 50 to 55 percent with females generally having a higher survival rate than males. Up to 50 percent of all sage grouse mortality is caused by predation from both avian (e.g.

Hawks eagles and ravens) and ground (e.g. coyotes, badgers, and ground squirrels) predators.

A couple of days ago I was questioning a few of the people who live within a few feet of the big leks on the Desert Creek Area. They told me every spring, about hatching time the ravens and other avian predators swarm in by the hundreds for the big fiesta. They are flying over their houses morning and afternoon. Most of the people think the birds (sage grouse) are just holding their own, but need protection from predators. Some said the birds (sage grouse) come right into their patios and back yards. They think they are trying to get away from predators. They said they could hear their funny noises when they were matting on the leks. One girl said when her father lived there back in the 1970's there was thousands of sage hen. That was the time when we had good predator control, also we didn't have too many raven then.

If we list these birds it will be committing economical suicide for the west, 90 percent if public lands are located in 10 Western States.

If Ted Kock is forced to list the bird in the Bi-State area it will be destroying agriculture, mining, energy, and recreation in this area. This is discrimination and illegal. This whole thing is ridiculous, spending billions of dollars and time over a bird that gives no benefit to mankind. The Endangered Species Act must be repealed or amended or it will destroy the USA.

It was just said that Obama will have a National listing of Sage Hen of all 11 Western States.

and the finding is to be published promptly in the **Federal Register**. If we find that substantial information was presented, we are required to promptly commence a review of the status of the species involved, if one has not already been initiated under our internal candidate assessment process.

The processing of this petition conforms with our Listing Priority Guidance published in the **Federal Register** on October 22, 1999 (64 FR 57114). The guidance clarifies the order in which we will process rulemakings. The highest priority is processing emergency listing rules for any species determined to face a significant and imminent risk to its well-being. Second priority is processing final determinations on proposed additions to the lists of endangered and threatened wildlife and plants. Third priority is processing new proposals to add species to the lists. The processing of administrative petition findings (petitions filed under section 4 of the Act) is the fourth priority. The processing of this 90-day petition finding is a fourth priority, and is being completed in accordance with the current Listing Priority Guidance.

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The petitioners requested listing for the Washington population of western sage grouse and not the species rangewide. We consider this request appropriate because, although we do not base listing decisions on political subdivisions except international boundaries, we can consider a population of a vertebrate species or subspecies as a listable entity under the Act if the population is recognized as a distinct population segment (DPS) (61 FR 4722). We can also expand the scope of our review of petitions to the species rangewide, should expansion be appropriate based on our knowledge of the available information.

The information regarding the description and natural history of sage grouse, below, has been condensed from the following sources: Aldrich 1963, Johnsgard 1973, Connelly *et al.* 1988, Fischer *et al.* 1993, Drut 1994, Washington Department of Fish and Wildlife (WDFW) 1995, Washington State Council Columbian Sage Grouse Workshop (WSCSGW) 1996 and 1998, and Schroeder *et al.* 1999a.

Sage grouse, also known as sage fowl, spine-tailed grouse, fool hen, cock-of-the-plains, and sage chicken, are gallinaceous (chicken-like, ground-nesting) birds, and are the largest North American grouse species. Adult males range in size from 66 to 76 centimeters (cm) (26 to 30 inches (in)) and weigh between 2 and 3 kilograms (kg) (4 and 7 pounds (lb)); adult females range in size from 48 to 58 cm (19 to 23 in) and weigh between 1 and 2 kg (2 and 4 lb). Males and females have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark-green toes. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers around the neck and upper belly forming a ruff. During breeding displays, males also exhibit olive-green apteria (fleshy bare patches of skin) on their breasts.

Sage grouse depend on a variety of shrub steppe habitats throughout their life cycle, and are particularly tied to several species of sagebrush (*Artemesia* spp). Adult sage grouse rely on sagebrush throughout much of the year to provide roosting cover and food, and depend almost exclusively on sagebrush for food during the winter. If shrub cover is not available, they will roost in snow burrows. While average dispersal movements are generally less than 35 kilometers (km) (21 miles (mi)), sage grouse may disperse up to 160 km (100 mi) between seasonal use areas. Sage grouse also exhibit strong site fidelity (loyalty to a particular area), and are capable of dispersing over areas of unsuitable habitat.

A wide variety of forb (any herb plant that is not a grass) species are used as forage by adult sage grouse from spring to early fall, and hens require an abundance of forbs for pre-laying and nesting periods. An assortment of forb and insect species form important nutritional components for chicks during the early stages of development. Sage grouse typically seek out more mesic (moist) habitats that provide greater amounts of succulent forbs and insects during the summer and early fall. Winter habitat use varies based upon snow accumulations and elevational gradients, and sage grouse likely choose winter habitats based upon forage availability.

During the spring breeding season, male sage grouse gather together and perform courtship displays on areas called leks, primarily during the morning hours just after dawn. Leks consist of patches of bare soil, short grass steppe, windswept ridges, exposed knolls, or other relatively open sites, and they are often surrounded by more dense shrub steppe cover, which is used for roosting or predator evasion during the breeding season. Leks range in size from less than 0.4 hectare (ha) (1 acre (ac)) to over 40 ha (100 ac), contain several to hundreds of males, and are usually situated in areas of high female use. Leks used over many consecutive years (historic leks) are typically larger than, and often surrounded by, smaller and less stable satellite leks. Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females for mating. Relatively few, dominant males account for the majority of breeding on a given lek.

After mating, females may move a maximum distance of 36 km (22 mi) depending on the availability of suitable nesting habitat, and typically select nest sites under sagebrush cover. Nests are relatively simple and consist of scrapes on the ground, which are sometimes lined with feathers and vegetation. Clutch sizes range from 6 to 13 eggs, and nest success ranges from 10 to 63 percent. Chicks begin to fly at 2 to 3 weeks of age, and broods remain together for up to 12 weeks. Most juvenile mortality occurs during nesting and the chicks' flightless stage, and is due primarily to predation or severe weather conditions. Shrub canopy and grass cover provide concealment for sage grouse nests and young, and may be critical for reproductive success.

Sage grouse typically live between 1 and 4 years and have an annual mortality rate of roughly 50 to 55 percent, with females generally having a higher survival rate than males. Up to 50 percent of all sage grouse mortality is caused by predation, from both avian (*e.g.*, hawks, eagles, and ravens) and ground (*e.g.*, coyotes, badgers, and ground squirrels) predators.

Prior to European expansion into western North America, sage grouse (*Centrocercus urophasianus*) were believed to occur in 16 States and 3 Canadian provinces (Schroeder *et al.* 1999a), although their historic status in Kansas and Arizona is unclear (Colorado Sage Grouse Working Group

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Exhibit #11.

Fred Fulstone speech to Bi-State Sage Grouse Council – AM Meeting
Bridgeport, California
December 3, 2013

The best management plan to sustain and improve sage grouse numbers and also save the farming communities is the following.

1. Don't list the sage grouse [DANGEROUS]
2. Protect the sage grouse from the hostile environment, mainly the animals and birds that destroy them. You don't have to necessarily destroy these predators. There are many ways to protect the sage hen.
3. There should be wildlife herders on the range all the time, night and day, to protect the wildlife and find out what is needed to protect them. New ideas. It can be done and you don't have to stop grazing of livestock, which has been in use for over 100 years and we still have wildlife.
4. Peter Coates is doing that very thing today to find out what animals, birds, and weather is destroying the sage hen. He has people on the range night and day. Read Peter Coates study on the Virginia Hills. He has found in this study that wildlife is destroying 82.5% of nests and non-fly days of the bird.
5. There can be structures and water facilities built on the range to protect the sage grouse. The sage grouse will work with us. They are tame birds.
6. Those billions of dollars used to stop grazing of livestock should be used to protect and sustain the grouse on the range.

The farmers and livestock people, trappers and miners, opened up the west by cultivating the land and putting water on it, and by creating habitat everywhere, which created wildlife everywhere .The hundreds of trappers took care of the predators which started the great wildlife communities in the early days. One small example of these accomplishments is the Walker

River Irrigation district. The farmers built two beautiful reservoirs. The Bridgeport reservoir and the Topaz reservoir, which are both considered two of the best fisheries and bird refuges in the west.

Today you see Harry Reid, Fish and Game, and radical environmentalist using OUR money, to buy up the land and water rights and taking the land out of production. Our government is making thousands of crazy regulations and forcing the farmers and livestock off the land. Just wait and you will see the whole scenario affect our food supplies someday .Then it will be too late. Just like Russia, when Stalin shot all the farmers, and their food supply has not recovered yet.

People you better wake up before our government destroys our civilization. Nikita Sergey Khruschev, Russia's Premier from 1958-1964, predicted this. Thru regulations, excuses, and the endangered species act, the government is forcing the FS and BLM to take livestock off the ranges. It's all based on false data, unsupported assumptions, and bad modeling.

The government has done nothing on invasive plants and trees through the years. The FS and BLM have put severe regulations on riparian areas and allowed willows, trees and other invasive species to dominate our rivers and streams. The willows and trees are taking over and cause water to back up and create more willows. This is also causing the quaking aspen to take over all the meadows. I think the PHD's are trying to create a rain forest or jungle, here, which will eventually deplete our water supply, water sheds, and no pasture for our livestock, also no food for our people. This is a revolting situation happening right before our eyes and the people are paying the environmental groups [Sierra Club, Biodiversity, Western Watershed], and many others to destroy our country.

Coates - Virginia Hills report 9-2013

Articles

Greater Sage-grouse Nest Predators in the Virginia Mountains of Northwestern Nevada

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Abstract

Greater sage-grouse (*Centrocercus urophasianus*; hereafter, sage-grouse) populations have declined across their range due to the loss, degradation, and fragmentation of habitat. Habitat

alterations can lead not only to vegetative changes, but to shifts in animal behavior and predator composition that may influence population vital rates such as nest success. For example, common ravens (*Corvus corax*) are sage-grouse nest predators and raven abundance is positively associated with human-caused habitat alterations. Because nest success is a central component to sage-grouse population persistence, research that identifies factors influencing nest success will better inform conservation efforts. We used videography to unequivocally identify sage-grouse nest predators within the Virginia Mountains of northwestern Nevada, USA from 2009 – 2011 and used maximum likelihood to calculate daily probability of nest survival. In the Virginia Mountains, fires, energy exploration, and other anthropogenic activities have altered historic sage-grouse habitat. We monitored 71 sage-grouse nests during the study, placing video cameras at 39 nests. Cumulative nest survival for all nests was 22.4 % (95% CI, 13.0% – 33.4%), a survival rate that was significantly lower than other published results for sage-grouse in the Great Basin. Depredation was the primary cause for nest failure in our study (82.5%), and common ravens (*Corvus corax*) were the most frequent sage-grouse nest predator accounting for 46.7% of nest depredations. We also successfully documented a suite of mammalian and reptilian species depredating sage-grouse nests, including some predators never previously confirmed in the literature to be sage-grouse nest predators (i.e., bobcat and weasel). Our results indicate that, within the high elevation, disturbed habitat of the Virginia Mountains, sage-grouse nest success may limit the sage-grouse population. We recommend that management actions for the Virginia Mountains be designed to restore habitat to increase sage-grouse nest success and decrease anthropogenic subsidies of ravens.

Keywords: *Centrocercus urophasianus*, common raven, nest survival, Nevada, sage-grouse, video-monitoring

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55 Short title: Greater Sage-grouse Nest Predators
56
57 **Introduction**
58 Range-wide declines in greater sage-grouse (*Centrocercus urophasianus*; hereafter, sage-grouse)
59 populations (US Fish and Wildlife Service 2010) point to a need to better understand sage-grouse
60 reproduction and factors that influence reproductive rates. Nest survival is a central component
61 of reproduction, and nest failure may limit sage-grouse populations (Bergerud 1988; Schroeder
62 1997; Schroeder and Baydack 2001). Nest survival explains more variation in sage-grouse
63 population growth rates than any other vital rate (Taylor et al. 2012). Nest depredation represents
64 approximately 94% of sage-grouse nest failures (Moynahan et al. 2007), which suggests that
65 variation in abundance and species of nest predators among areas influences sage-grouse
66 population size (Bergerud 1988; Schroeder and Baydack 2001; Beck et al. 2006).
67 Identification of sage-grouse nest predators based on diagnostic remains at the nest
68 (Holloran and Anderson 2003; Moynahan et al. 2007) and direct identification (Coates et al.
69 2008) indicate that sage-grouse nests are subject to a wide range of nest predators. Unfortunately,

predator identification based on nest and egg remains following nest depredation is subject to considerable error (Marini and Melo 1998; Larivière 1999; Coates et al. 2008). Use of continuous video monitoring (Coates et al. 2008; Bell 2011) and remote digital cameras (Holloran and Anderson 2003) have increased our understanding of sage-grouse nest predators. Video-recordings of sage-grouse nest depredation indicate that female sage-grouse do not defend nests successfully upon discovery by meso-predators (i.e., badgers, skunks, ravens), the only type of predator so far unambiguously identified depredating sage-grouse nests (Coates et al. 2008; Bell 2011). Video-recordings of sage-grouse nest depredations have also clarified previous hypotheses regarding identity of sage-grouse nest predators originally formed from observations of nest remains. Research that identifies sage-grouse nest predators and estimates the timing and occurrence of nest depredation could contribute substantially to management and conservation decisions for sage-grouse populations. For example, the probability of a predator detecting a sage-grouse nest is often influenced by the quantity and quality of concealment cover around the nest (Schroeder and Baydack 2001; Coates and Delehanty 2010; Hagen 2011). Implementing targeted habitat management to improve concealment cover for nesting sage-grouse will be significantly more effective if managers know what the predator types are, when depredations occur, and at what frequency they occur.

Range-wide, sage-grouse populations are exposed to a suite of predator communities, the composition of which varies among regions. Our goal was to use video-monitoring to identify sage-grouse nest predators on the western edge of sage-grouse distribution where western Great Basin and eastern Sierra Nevada ecosystems meet and where habitat features and predator communities differ from the interior of the Great Basin. We deployed continuous video-recording systems at sage-grouse nests from 2009 – 2011 in the Virginia Mountains of

93 northwestern Nevada, an area with a sage-grouse population that breeds at relatively high
94 elevation and occupies the eastern flank of the Sierra Nevada mountains on the western edge of
95 historic sage-grouse range,

96 **Study Area**

97 This study area consisted of a topographically complex sagebrush-steppe ecosystem in the
98 Virginia Mountains of northwestern Nevada, USA (Figure 1), an area encompassing
99 approximately 676 km² with elevations ranging from 1218 – 2683 m. Mean annual precipitation
100 was 18.8 cm and temperatures ranged from 6.8 – 18.2°C from 2009 – 2011 (Western Regional
101 Climate Center). The U. S. Department of Interior, Bureau of Land Management (BLM)
102 administered the majority of land (588 km²) in the study area with the remaining portion owned
103 privately (88 km²). The Pyramid Lake Reservation borders the eastern portion of the Virginia
104 Mountains and California borders to the west. A sage-grouse hunting season existed until 2005,
105 after which the season was discontinued by the Nevada Department of Wildlife (NDOW) due to
106 declining sage-grouse numbers in the region. Cattle grazing occurred within sage-grouse nesting
107 areas during the latter part of the nesting season each year.

108 The vegetation community within the study area reflected a response to a fire (Fish Fire)
109 that occurred in 1999 and resulted in reduced shrub abundance and increased stands of
110 cheatgrass (*Bromus tectorum*). Lower elevation shrub communities were dominated by
111 sagebrush (*Artemisia* spp.) with overstory primarily consisting of big sagebrush (*A. tridentata*
112 spp.), Bailey's greasewood (*Sarcobatus baileyi*), horsebrush (*Tetradymia* spp.), and several
113 species of rabbitbrush (*Chrysothamnus* spp.). Higher elevation communities consisted of
114 montane shrub complexes with big sagebrush, Saskatoon serviceberry (*Amelanchier alnifolia*),
115 snowberry (*Symphoricarpos albus*), and antelope bitterbrush (*Purshia tridentata*) comprising the

116 common woody overstory species. Woolly mule's ear (*Wyethia mollis*), lupine (*Lupinus* spp.),
117 and arrowleaf balsamroot (*Balsamorhiza sagittata*) dominated the forb communities. Dominant
118 grass species included bluebunch wheatgrass (*Pseudorogeneria cristatum*), crested wheatgrass
119 (*Agropyron cristatum*), basin wildrye (*Leymus cinereus*), needle-and-thread grass (*Hesperostipa*
120 *comata*), Indian ricegrass (*Achnatherum hymenoides*), and cheat grass. Scattered stands of
121 pinyon-juniper woodlands consisting of singleleaf pinyon (*Pinus monophylla*) and Utah juniper
122 (*Juniperus osteosperma*) were found throughout the study area.
123 Over the course of this study, we observed several potential sage-grouse nest predators
124 including: common ravens (*Corvus corax*), American crows (*C. brachyrhynchos*), black-billed
125 magpies (*Pica hudsonia*), American badgers (*Taxidea taxus*), gopher-snakes (*Pituophis*
126 *catenifer*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), kit foxes (*Vulpes macrotis*), striped
127 skunks (*Mephitis mephitis*), and long-tailed weasels (*M. frenata*).

128 **Methods**

129 **Capture and Telemetry**

130 We captured female sage-grouse (n = 72) at nocturnal roosting locations using spotlights in
131 concert with handheld nets attached to 3-m extension handles (Giesen et al. 1982; Wakkinen et
132 al. 1992), and handheld net launching devices (SuperTalon®, Advanced Weapons Technology,
133 La Quinta, CA) during the spring and fall of 2008 – 2011. We equipped captured grouse with 18
134 – 22 g (< 3% body mass; Schroeder et al. 1999) necklace-style, battery-powered radio-
135 transmitters with 22-cm antennas bent back along the contour of the body to reduce interference
136 with flight (Advanced Telemetry Systems, Isanti, Minnesota). All grouse were captured and
137 handled under the auspices of the U. S. Geological Survey (USGS). We classified captured
138 grouse as adult or yearling based on plumage characteristics of the 9th and 10th primaries (Eng

1955; Dalke 1963). Sage-grouse were held for less than 30 min and were released at point of capture.

We relocated sage-grouse via telemetry using 3-element Yagi antennas and handheld receivers (Communication Specialist Inc. Orange, CA; Advanced Telemetry Systems, Isanti, MN). We circled sage-grouse while maintaining a 30 – 50 m buffer between the grouse and the observer to minimize disturbance to grouse except when female grouse were approached more closely during our efforts to locate nests of females. We recorded sage-grouse locations as UTM data derived from handheld global positioning system (GPS) devices. We attempted to relocate all female sage-grouse ≥ 2 times per week. Nests were located by visual searches after females were found in the same location on two consecutive relocation observations. Subsequent nest visits occurred every 3 – 4 days for the duration of that nest. Upon completion of a nest, we classified them as successful if ≥ 1 egg hatched (Rearden 1951) as determined by visual assessment of eggshell remains or observing ≥ 1 chick in the nest bowl (Table S1, *Supplemental Material*). Nests were considered to be unsuccessful when the entire clutch failed to hatch. We recorded depredated nests as partial depredation when ≥ 1 intact whole egg remained in the nest bowl or as complete depredation when all eggs were destroyed or missing from the nest bowl. Following depredation, we recorded scene characteristics including nest bowl disturbance, vegetation disturbance, eggshell and egg membrane remains, and any other pertinent evidence potentially implicating predator type.

Video-monitoring of Nests

Sage-grouse nesting behavior was monitored and nest predators were identified through the use of continuous video-recording systems and camouflaged day-night micro bullet true color cameras (Model ENC-100, EZ-Spy Cam, Los Angeles, CA). The cameras were equipped with

eight light-emitting diodes producing 950-nm wavelength infrared illumination, which is beyond the visible light spectrum for most vertebrates and sufficient for infrared-sensitive digital recording. Cameras were placed 0.5 – 1.0 m from the nest bowl and attached to existing vegetation when available or a camouflaged steel stake when vegetation was insufficient. Care was taken during camera placement to ensure that the entire nest was visible in the camera's field of view while avoiding disturbance to the nest and surrounding vegetation. Cameras were connected to single channel micro digital video recording devices (DVR; Model MDVR14, SuperCircuits, Austin, TX) placed approximately 30 m from the nest. Cables were buried 3 – 5 cm in the ground. The camera and recorder were powered by two marine grade deep cycle 12 V batteries. Batteries, DVR, and associated components were housed in weatherproof camouflaged boxes concealed under the canopy of a nearby shrub, approximately 30 m from the nest. Continuous images were recorded onto memory cards (16 – 32 GB) via digital video recorders (DVR) that were set to record 3 – 4 frames/sec. Frequency of our visits to nests was limited by battery life, not data storage. We approached each video-monitored nest every 3 – 4 days to replace batteries prior to depletion and also replaced memory cards. Nests that were not monitored with videography were also visited every 3 – 4 days (control) from approximately 30 m away to document nesting status and reduce bias in nest failure rate that could have resulted from a disparity between the number of nest visits for video and non-video monitored nests. Because the frequency of nest visits by researchers was every 3 – 4 days, the time between nest depredation and nest visits varied from a few hours to as much as four days. During camera installations and nest visits, we wore rubber gloves, rubber boots, and used scent masking sprays to reduce the possibility of attracting or deterring predators (Whelan et al. 1994). We used vegetation mimicking that of the associated shrub-steppe microhabitat to camouflage camera and

185 the storage box containing the DVR, batteries, and other components. Researchers diligently
186 watched for any potential predators during camera installations and nest visits. If any predators
187 were detected, we postponed approaching nests to avoid drawing attention to sage-grouse nests
188 that may influence probability of depredation (Vander Haegen et al. 2002).

189 We placed video systems at nests ($n = 39$; Table S1, *Supplemental Material*) based on
190 fewest estimated days of incubation from the nest initiation date, postponing installation until ≥ 3
191 days of incubation to reduce risk of female abandonment (Renfrew and Ribic 2003). Nest
192 initiation date was estimated based on radio-telemetry monitoring. We installed cameras at all
193 qualifying nests until all camera systems were deployed. Camera systems were moved to the
194 next qualifying nest following nest cessation due to hatch or failure. Nests receiving cameras
195 were randomly chosen and not selected based on nest accessibility. We were unable to install
196 camera systems quickly enough during early dawn when females take a brief recess from
197 incubation. Grouse were incubating when we approached to install cameras and we usually
198 caused grouse to flush. To reduce risks of abandonment and egg mortality, we refrained from
199 camera installations during inclement weather (i.e., extreme ambient temperatures, precipitation,
200 and/or high winds). On average, we spent 25 – 30 min completing camera installations before
201 vacating the nest site. Following nest fate (i.e., successful, abandoned, or depredated), we
202 continued to video monitor nests for up to 24 h to document any additional female behaviors or
203 animal encounters at the nest site.

204 **Data Analysis**

205 We estimated daily survival rate (DSR) and cumulative survival rate (CSR) using the RMark
206 package (R Version 2.13, www.r-project.org; Laake and Rexstad 2007; Table S1, *Supplemental*
207 *Material*) that implements Program MARK (White and Burnham 1999). We conducted the data

208 analysis in three steps. First, we examined variation in DSR explained by year. We compared a
209 model that included year as a group level factor to an intercept-only model. The most
210 parsimonious model was used as a base model for subsequent analysis. If these data supported
211 year as a group level factor, then we included this factor as an additive effect in successive
212 models which also included other factors of interest. Second, we compared a model that
213 consisted of a factor variable for first and second nests against the base model. The rationale for
214 this step was to pool nest attempts if we did not find evidence of a difference or restrict the data
215 set to first attempts only if a difference was supported. Third, we estimated differences between
216 nests with and without cameras. In this analysis, we compared a model with group-level factor of
217 camera to the base model. Because we postponed camera installation until ≥ 3 days of incubation
218 to reduce risk of female abandonment, we similarly excluded non-video monitored nests ($n = 15$)
219 under the same criterion until ≥ 3 days of incubation were achieved (Table S1, *Supplemental*
220 *Material*). In other words, nests that failed between first and second nest visits (3 – 4 days) did
221 not meet the standard for camera installation and we did not include these nests relative to
222 measuring any camera effect. To do so would have imposed bias because video-monitored nests,
223 by design, could not have failed during early incubation. Nests without cameras that met the
224 same criteria for nests with cameras ($n = 17$; (Table S1, *Supplemental Material*)) served as
225 controls. We calculated Akaike's Information Criterion (AIC; Akaike 1973) with second-order
226 bias correction for small sample size (c; Anderson 2008) to evaluate support for each model.
227 Model uncertainty was quantified by calculating differences between model AIC_c values (ΔAIC_c)
228 and by comparing model weights (w_i).

229 **Results**

230 Video-monitoring identified ravens, American badgers, coyotes, long-tailed weasels, Great Basin
231 gopher snakes, multiple rodent species, and a bobcat visiting sage-grouse nests, although not all
232 of these species consumed eggs. Video-monitoring also allowed us to observe total clutch
233 depredation, partial clutch depredation, as well as successful hatches.
234 We monitored a total of 71 nests (n = 18, 2009; n = 20, 2010; n = 33, 2011; Table S1,
235 *Supplemental Material*) from 2009 – 2011. A total of 61 (n = 15, 2009; n = 18, 2010; n = 28,
236 2011; Table S1, *Supplemental Material*) nests were first attempts, and 10 nests (n = 3, 2009; n =
237 2, 2010; n = 5, 2011; Table S1, *Supplemental Material*) were second nesting attempts. Cameras
238 were installed on 39 nests (n = 6, 2009; n = 16, 2010; n = 17, 2011; Table S1, *Supplemental*
239 *Material*). Of these, 30 were first nest attempts (n = 3, 2009; n = 14, 2010; n = 13, 2011; Table
240 S1, *Supplemental Material*) and 9 were second attempts (n = 3, 2009; n = 2, 2010; n = 4; 2011;
241 Table S1, *Supplemental Material*). Nest abandonment occurred on 7 (9.9%) occasions. Nest
242 survival across all nests was 22.4% (95% CI, 13.0% –33.4%) as follows: 2009, 7.4% (95% CI,
243 1.2% – 21.6%); 2010, 13.2% (95% CI, 3.1% – 31.1%); 2011, 41.8% (95% CI, 22.3% – 60.3).
244 Nest initiation rate across all radio-marked females and years was 88.8% ± 0.10. Mean clutch
245 size was 7.19 ± 0.95 with mean clutch size for first and second nest attempts 7.13 ± 1.02 and
246 7.11 ± 2.37, respectively.
247 We recorded approximately 11,800 hours of female incubation, an average of 12.6 (SE =
248 2.02) days of video monitoring for each video-monitored nest. Predators were recorded at 17
249 nests. Fifteen (88.2%) of these nests were depredated and failed while two (11.8%) nests were
250 partially depredated and one or more eggs hatched following partial depredation. Successful
251 hatching was recorded at 21 nests. Equipment failure occurred on three occasions and nest fate
252 was not recorded. Camera installation at nests did not cause nest abandonment insofar as

253 recorded females returned to nests and resumed incubation in all cases following camera
254 placement.

255 In step one of the analysis, we found year accounted for more variation in DSR (Table 1;
256 AIC_c $\omega = 0.93$) compared to the intercept only survival model (Table 1; AIC_c $\omega = 0.07$).
257 Therefore, year was included in all models as a fixed effect to account for inter-annual variation
258 (Table 1). Also, the base model for steps two and three consisted of the factor year. In step two,
259 model analysis did not support a difference in DSR between first and second nest attempts
260 (Table 1; $\Delta AIC_c = 1.90$) and, thus, we pooled first and second nest attempts in our analysis to
261 evaluate camera effects. In step three, we did not find support for an effect of camera presence
262 ($\Delta AIC_c = 1.79$). The base model ($\omega = 0.71$) was 2.4 times more likely to describe DSR compared
263 to the model including camera presence (AIC_c $\omega = 0.29$). Estimated cumulative nest survival for
264 nests with cameras was 38.2% (95% CI, 21.7 – 54.6%) and without cameras was 36.3% (95%
265 CI, 12.1 – 61.8%). The difference in variability between nest survival estimates for nests with
266 and without cameras results from the added precision obtained from videography on exactly
267 when a hatch or depredation occurred. Conversely, we were unable to determine the exact day
268 that a hatch or depredation took place for nests without cameras and we therefore selected the
269 midpoint between nest visits (3 – 4 days) which increased variation in survival estimates.
270 Estimated cumulative nest survival for all nests, which included 15 nests not available for
271 camera analysis, was 22.4% (95% CI, 13.0% – 33.4%).

272 **Video-Recorded Ravens**

273 Ravens ($n = 7$ incidents of ravens at sage-grouse nests) were the most frequent nest predator
274 identified by video-monitoring in our study and caused partial ($n = 3$) and full ($n = 4$) nest
275 depredation. Ravens were the only nest predator for which we observed complete egg removal

276 with no eggshell fragments or other remains left in the nest. In these cases, ravens carried away
277 whole eggs. Following partial clutch depredations by ravens, grouse returned to their nests and
278 on one occasion resumed incubation. Ultimately, all females abandoned the remaining eggs
279 following partial depredation by ravens. We did not observe female grouse defending nests
280 following discovery by ravens, although the camera view was limited to the nest bowl and areas
281 immediately adjacent to it. One raven depredation occurred while the female was absent from the
282 nest. The remaining depredations involved ravens flushing the incubating female from the nest.
283 In one situation, a raven violently struck an incubating female and continued to harass the female
284 beyond the nest bowl before removing eggs (Figure 2). We could not determine conclusively if
285 raven depredations occurred from one or multiple ravens, but the rate of egg removal in some
286 cases suggested that more than one raven was involved in the depredation. Timing of raven
287 depredation occurred from 07:06 – 18:31 hours (i.e., during daylight hours).

288 **Video-Recorded Coyotes**

289 Depredations by coyotes (Figure 3A) occurred on three occasions, each resulting in complete
290 nest failure. All coyote depredations were nocturnal, taking place from 21:31 – 23:50 hours. In
291 each case, incubating females flushed from the nest, escaping capture by coyotes, and did not
292 attempt to defend nests. In two coyote depredations, eggshells were left mostly intact except for
293 large holes in the sides of the shells and shells were scattered within a 10-m radius of the nest
294 bowl. The third coyote depredation left two empty eggshells with holes in the sides, and the
295 fragments of crushed eggs within 5 m of the nest. Based on remains, it appeared that a few eggs
296 were either consumed entirely or were carried away from the nest site. Egg contents were
297 removed in all cases where egg remains were located.

298 **Video-Recorded Badgers**

299 We documented two badger nest depredations (Figure 3B) and both resulted in complete nest
300 clutch loss. Incubating females flushed from the nests at 04:45 and 05:44 hours, respectively, did
301 not attempt to defend nests, and were not captured by the badger. One badger depredation left
302 three crushed eggshells partially buried in the nest bowl and five eggshells with large holes in the
303 sides or tips and shells were scattered within 5 m of the nest bowl. In the other badger
304 depredation, the badger consumed all but one egg during the night and then returned at 08:04 in
305 the morning and removed the remaining whole egg from the nest bowl. One empty eggshell with
306 a large hole in the side was found within a meter of the nest in addition to a crushed eggshell and
307 eggshell fragments from other eggs. In both cases, numerous badger digs were located around
308 the periphery of the nest bowl, but no cached eggs were located.

309 **Video-Recorded Bobcat**

310 One nest was depredated by a bobcat (Figure 3C). At 02:04 hours, the incubating grouse flushed
311 from the nest. The grouse did not defend the nest and was not captured by the bobcat. The bobcat
312 cautiously entered the view of the camera shortly after the grouse flushed and meticulously
313 consumed the contents of all eggs ($n = 8$). After approximately 21 minutes, the bobcat left a neat,
314 clean pile of crushed eggshell fragments inside the nest bowl. The nest bowl and surrounding
315 vegetation were negligibly disturbed.

316 **Video-Recorded Long-Tailed Weasels**

317 Long-tailed weasels were recorded at two sage grouse nests sites, both of which led to partial
318 depredations. At 07:51 a weasel entered the camera view of one nest (Figure 4) and the
319 incubating grouse stood, but did not leave the nest bowl area. The female appeared to be
320 defending her nest, but during the encounter one egg from the clutch was moved beyond the
321 camera field of view. We could not determine whether the egg rolled out during the interaction

or if the weasel removed the egg. No egg remains were located near the nest site. The female resumed incubation following the encounter and continued to incubate for 18 more days before the nest failed due to depredation by an unknown predator.

The second weasel depredation occurred at 05:06 as eggs were hatching. The grouse stood but did not flush and appeared to defend her nest. During the encounter, the weasel was clearly visible, but we could not determine what, if anything, the weasel took from the nest. Ultimately, the female left the nest and our subsequent examination of nest remains identified one eggshell from a hatched egg and eggshell fragments from crushed eggshells. Subsequently, we located the female and found her brooding one chick. The remaining unhatched eggs in the nest were destroyed, perhaps trampled by the female sage-grouse during the encounter between the grouse and the weasel. This was a successful nest because ≥ 1 egg hatched (Rearden 1951) despite the partial depredation.

Video-Recorded Snakes

On two occasions Great Basin gopher snakes (*Pituophis catenifer deserticola*) entered sage-grouse nest bowls. On the first occasion (Figure 5A), during an incubation recess, a gopher snake of approximately 1 m length entered the nest bowl at 13:20 hours and attempted to consume eggs (Figure 5B and C) for approximately 1 hour, repeatedly mouthing eggs but not extending its gape over the eggs. Ultimately, the snake did not consume any eggs. After the snake left the nest, the grouse returned 2 hours later and resumed incubation. Ultimately, the female abandoned the nest approximately 7 hours after the initial encounter and no eggs hatched. The second gopher snake encounter occurred at 11:11 hours following the hatching of four chicks. The female sage-grouse was incubating the remaining single egg prior to the arrival of a snake of approximately 1 m in length (Figure 6A). During the interaction, the snake captured a chick (Figure 6B and C),

345 constricting the chick while fighting with the defending female grouse (Figure 6B and C). The
346 female struck and pecked at the snake numerous times. The snake made strikes directed at the
347 grouse and the snake did not retreat. Eventually, the female left the nest bowl with the remaining
348 three chicks (Figure 6D). The snake consumed the constricted chick (Figure 6D) in the nest bowl
349 then attempted to consume the unhatched egg. The remaining three chicks left the nest bowl area
350 with the female. The snake was unsuccessful in consuming the unhatched egg, seemingly due to
351 insufficient gape width.

352 **Video Recorded Rodents**

353 Many small rodents were documented visiting sage-grouse nests including California ground
354 squirrels (*Spermophilus beecheyi*), least chipmunks (*Tamias minimus*), Great Basin pocket mice
355 (*Perognathus parvus*), kangaroo rats (*Dipodomys* spp.), and other encounters with mice and
356 voles that could not be identified to species via videography. Rodents were recorded at nest
357 locations only while the female was absent from the nest during an incubation recess or after nest
358 termination. Most encounters involved a quick dash through the nest bowl. Occasionally small
359 rodents fed on broken eggshells that remained in nest bowls after depredation or hatch. On two
360 occasions, California ground squirrels visited nests following partial depredations where whole
361 eggs were left in the nest bowl. These ground squirrels were adept at manipulating sage-grouse
362 eggs (Figure 7A), but were unable to bite into whole eggs (Figure 7B and C), presumably due to
363 a limited gape width. On rare occasion, these ground squirrels appeared capable of removing
364 eggs from the nest bowl. One ground squirrel did access an egg after dropping the egg and
365 breaking the shell. We did not document any complete destruction of nest remains by a rodent
366 following a hatch or depredation that would have caused researchers to misclassify the fate of the
367 nest. In all cases of successful nests we were still able to find egg remains that clearly indicated a

368 successful hatch, even after rodents had visited the nest post hatch. However, for nests without
369 cameras we did not always know the precise number of hatched vs. depredated eggs if some of
370 the egg remains were crushed or destroyed. No rodents were documented flushing female sage-
371 grouse from sage-grouse nests.

372 **Discussion**

373 Depredation was the primary cause of sage-grouse nest failure and we observed avian,
374 mammalian, and reptilian predators taking eggs or chicks at the nest. Ravens were the most
375 frequent sage-grouse nest predator in the Virginia Mountains accounting for 46.7% of nest
376 depredations. Raven population size, density, and distribution have increased substantially across
377 the western U. S. as a result of habitat conversion and human activities that act to subsidize
378 ravens with food and nesting opportunities (Sauer et al. 2004; Kristan and Boarman 2007; Rui et
379 al. 2010; Howe 2012). For example, historically the sagebrush-steppe ecosystem likely had
380 relatively low raven population densities (Leu et al. 2008), but currently this ecosystem supports
381 higher numbers of ravens because of increased vertical perching and nesting substrates (e.g.,
382 electrical power line towers and other structures), as well as human-related food sources (e.g.,
383 road kill and refuse; Boarman 1993; Sauer et al. 2004). The increase in raven numbers within the
384 sagebrush-steppe is an important change because sage-grouse rely on visual concealment for
385 nesting while ravens rely on visual detection for hunting (Gregg et al. 1994; Conover et al.
386 2010). Ravens are common in the Virginia Mountains and our findings indicate that ravens
387 regularly are detecting and depredating sage-grouse nests.

388 The Virginia Mountains have been subject to disturbances from fire, agricultural
389 practices, and renewable energy exploration that have led to a reduction in extent and quality of
390 sagebrush habitat for nesting sage-grouse. The impacts of predators on prey populations may be

391 elevated when the quality and/or quantity of habitat are degraded (Hagen 2011). This habitat
392 degradation coupled with the presence of ravens may explain why ravens were the most frequent
393 sage-grouse nest predator and the low overall nest survival (22.4%) in this area. In Wyoming,
394 raven densities were highest near sage-grouse nesting areas and areas with human activity (Bui et
395 al. 2010). In northeastern Nevada, the probability of a sage-grouse nest being depredated by a
396 raven increased with less shrub canopy cover in the vicinity of the nest (Coates and Delehanty
397 2010). Furthermore, an increase in one raven per 10 km was associated with a 7.4% increase in
398 probability of nest failure (Coates and Delehanty 2010). In the Arco Desert of southeastern
399 Idaho, raven occurrence and raven nesting were strongly associated with the presence of artificial
400 structures such as power line towers (Howe 2012).
401 Ravens are not universally implicated as a major predator of sage-grouse nests. Some
402 studies using direct identification of nest predators have not found ravens to be a significant
403 factor (Holloran and Anderson 2003; Bell 2011). Differences in raven effects among sage-grouse
404 populations could be the result of geographic location, behavioral plasticity of ravens or sage-
405 grouse, prey abundance, habitat characteristics, or monitoring techniques. Further research is
406 needed to understand variation in sage-grouse nest depredation rates by ravens, but the variation
407 that has been documented helps to understand local dynamics when considering management
408 intervention.
409 Coyotes (20.0%) and badgers (13.3%) also were nest predators, occurring at frequencies
410 similar to other published reports (Holloran and Anderson 2003; Coates et al. 2008; Bell 2011).
411 Sage-grouse have been hypothesized to select nest sites with greater concealment from visual
412 predators (birds) and not from olfactory predators (mammals) though rates of nest depredation
413 by visual and olfactory predators were equal (Conover et al. 2010). Coyotes and badgers

consistently are identified as sage-grouse nest predators across studies, but at rates lower than other nest predators which may not warrant management concern.

This study represents the first confirmed bobcat depredation of sage-grouse nests. Bobcat depredations of sage-grouse nests likely occur at low frequencies although bobcats are known to take sage-grouse chicks and adults (Nelson 1955; Hartzler 1974), and may leave diagnostic sign at nest sites (Holloran et al. 2005). During our study, we documented one case of nest depredation that also resulted in female mortality adjacent to the nest bowl. Conspicuous bobcat tracks in the snow near the nest suggested that a bobcat killed the adult grouse and in this way was indirectly associated with clutch loss.

Weasel interactions differed from interactions with other predatory mammals in that incubating females actively defended their nests against weasel intrusion. One female was able to resume incubation and the other female departed with at least one hatched chick after taking initial defensive actions against the weasel. These results, coupled with aggression directed towards weasels at the nest, indicate that female sage-grouse can actively defend nests against some nest predators. There is little doubt that weasels are adept at taking young sage-grouse chicks, but these may be opportunistic depredations considering weasels' primary prey consists of voles and mice (DeVan 1982).

Although multiple rodent species were observed visiting sage-grouse nests, we did not observe a rodent flush an incubating grouse nor did we observe a rodent capable of biting open an intact sage-grouse egg. These results are consistent with previous findings from camera or video recordings involving rodents at sage-grouse nests (Holloran and Anderson 2003; Coates et al. 2008; Bell 2011). Rodents appeared to be unable to access intact sage-grouse eggs through biting, probably limited by their gape width (Michener 2005). On this basis, rodent sign at sage-

437 grouse nests does not demonstrate that rodents caused nest failure, especially given the
438 propensity of rodents to scavenge at previously depredated nests. California ground squirrels are
439 relatively large with forelimb dexterity that allowed them to lift sage-grouse eggs, but even the
440 California ground squirrels appeared to be unable to bite into intact eggs. Similar to rodents,
441 gopher snakes were unsuccessful at consuming intact sage-grouse eggs seemingly because of
442 inadequate gape width. Inability of snakes to consume sage-grouse eggs has been observed
443 previously in two other sage-grouse populations within the Great Basin (Coates et al. 2008; Bell
444 2011).

445 We did not detect an effect of camera presence on DSR for sage-grouse nests in the
446 Virginia Mountains. These results closely follow the results found by Coates et al. (2008) in
447 northeastern Nevada using similar techniques. Cumulative nest survival was higher for
448 monitored nests (video-monitored, 38.2%; and non-video monitored, 36.3%) considered in this
449 analysis compared to cumulative nest survival for all nests (22.4%). But to be a monitored nest
450 meant that the nest had to survive ≥ 3 days of incubation. Fifteen nests were located but did not
451 survive to 3 days of incubation, the starting point for comparing video-monitored and non-video
452 monitored nests.

453 In summary, we positively identified a suite of sage-grouse nest predators within a high
454 elevation population of sage-grouse occupying the Virginia Mountains on the eastern flank of the
455 Sierra Nevada by using continuous videography over a 3-year period. These results were the first
456 to confirm bobcats and weasels as sage-grouse nest predators as previously suspected (Schroeder
457 et al. 1999; Holloran and Anderson 2003; Hagen 2011; Kaczor et al. 2011). Rodent and snake
458 species appear to be limited by gape width and evidence of these species as predators remains
459 unsubstantiated. Besides unambiguous predator identification, we were able to determine the

460 relative frequency at which depredations by predator type occur within our study area, which
461 provide reasonable and valuable insight to which predator species are effective. Undoubtedly,
462 our estimates are subject to some degree of unintended bias, yet they provide a basis for future
463 comparisons as our understanding of sage-grouse nest failure grows. Unequivocal documentation
464 of the predator identity is especially useful given that the population under study experienced an
465 estimated cumulative nest survival rate of 22.4%, a rate lower than published maximum
466 likelihood estimates within the Great Basin (43%, Kolada et al. 2009; 36%, Rebholz et al. 2009;
467 42%, Coates and Delehanty 2010, respectively). Of the 40 nests that failed in our study, 33
468 (82.5%) were confirmed to have been caused by predators. Efforts to curb high rates of nest
469 depredation may be desirable, but one potentially effective practice of predator management
470 might be to restore and manage vegetation cover and reduce anthropogenic resource subsidies
471 (i.e., road kill and tall structures) that support predators like ravens. Further research that
472 identifies the circumstances in which depredation occurs will best guide these types of
473 management decisions.

474 **Supplemental Material**

475 **Table S1.** Data table containing the encounter history of sage-grouse nests in the Virginia
476 Mountains, NV from 2009 – 2011 that was analyzed with the RMark package (R Version 2.13,
477 www.r-project.org) that implements Program MARK for estimating daily survival rate (DSR)
478 and cumulative survival rate (CSR) for nests. nest = unique nest identification number,
479 FirstFound = day nest was first detected, LastPresent = last day the nest was known to be
480 present, LastChecked = last day the nest was checked, Fate = the fate of the nest (0 means nest
481 was successful; 1 means nest was unsuccessful), Freq = the number of nests that had this history,
482 yr = the calendar year that the nest existed, camera = whether a nest was monitored with a

483 camera or not (0 means a camera was present; 1 means no camera was present), n1 = whether a
484 nest was a first nest attempt or a second nest attempt (0 means the nest was a first attempt; 1
485 means the nest was a re-nest attempt). Individual covariates for year, presence of a camera, and
486 nest attempt were included in addition to encounter history to test for effects of these factors on
487 DSR and CSR for sage-grouse nests.
488 Found a DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S1 (15 KB XLSX)
489 **Video S1.** <badger caption>
490 Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S2
491 **Video S2.** <bobcat caption>
492 Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S3
493 **Video S3.** <raven caption>
494 Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S4
495 **Video S4.** <snake caption>
496 Found at DOI: http://dx.doi.org/10.3996/122012-JFWM-110R1.S5
497 **Video S5.** <squirrel caption>
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Acknowledgments

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Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

530

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USFWS Meeting of 12-3-13 - PM Meeting
Bridgeport, California
Fred Fulstone presentation

The one thing I have noticed at all of the Sagebrush Ecosystem Council, BLM, FS, and Bi-State meetings, is there is practically nothing said about predation on sage hen or predation and prey. Understanding the real depredation on sage hen is the most important [No.1} issue that should be considered and studied, if you are going to increase the sage hen numbers. Today we have coyotes, badgers, ground squirrels, hawks, eagles and ravens that will eat sage hen . Except in the years from1950 to 1980 when we had an abundant use of trappers and a predation program that controlled the predators on the wildlife. Those years we had thousands of sage hen, deer, and other wildlife everywhere. Just look at NDOW's records. The U.S. Governments "Wildlife Service" in co-ordination with the State Government and sheep permittes, was the most important agency which controlled the predators [avian and ground], from 1950 to 1980, which in turn created thousands of wildlife during those years. The sheep producers were taxed then and are taxed now to help control the predators. At that time, I might mention, that there were many more livestock on the Federal ranges, and still ample habitat for the wildlife especially the sage hen. In 1972 government trappers were cut, and severe regulations were put on trapping. From 1980 up to now, sage hen numbers have leveled off. Government trappers just lately have been cut in half. This is counterproductive. Please look at the Federal Register paper included here number 51579. The following is what USFWS said about

predators in the year 2000. [Look at 51579 bottom right.] Most juvenile mortality occurs during nesting and the flightless chick stage, and is due primarily to predation, or severe weather conditions. Sage grouse typically live between 1 and 4 years and have an annual mortality rate of roughly 50 to 55%, with females generally having a higher survival rate than males. Up to 50% of all sage grouse mortality is caused by predation, from both avian [e.g. hawks, eagles, and ravens,] and ground [e.g., coyotes, badgers, and ground squirrels] predators. Improving all the meadows and habitat won't do any good because you won't have baby chicks to put there if you don't control predators, both avian and ground. I've noticed in the fish and game hatcheries that they have a wire netting cover over the bird hatchery until they can fly. They want to save the eggs and young birds from avian predators. On the open range predator removal is the most efficient management strategy to increase sage grouse numbers. Also, hunting permits should not be issued if the USFWS thinks they are at risk. Cal. And Nev. Fish and Game have continued to issue hunting permits even though they have said the birds[sage grouse] numbers were on the downward side.

Fred Fulstone

Fred Fulstone

and the finding is to be published promptly in the Federal Register. If we find that substantial information was presented, we are required to promptly commence a review of the status of the species involved, if one has not already been initiated under our internal candidate assessment process.

The processing of this petition conforms with our Listing Priority Guidance published in the Federal Register on October 22, 1999 (64 FR 57114). The guidance clarifies the order in which we will process rulemakings. The highest priority is processing emergency listing rules for any species determined to face a significant and imminent risk to its well-being. Second priority is processing final determinations on proposed additions to the lists of endangered and threatened wildlife and plants. Third priority is processing new proposals to add species to the lists. The processing of administrative petition findings (petitions filed under section 4 of the Act) is the fourth priority. The processing of this 90-day petition finding is a fourth priority, and is being completed in accordance with the current Listing Priority Guidance.

We have made a 90-day finding on a petition to list the western sage grouse (*Centrocercus urophasianus phaios*) in Washington. The petition, dated May 14, 1999, was submitted by the Northwest Ecosystem Alliance and the Biodiversity Legal Foundation, and was received by us on May 28, 1999. The petition requested the listing of western sage grouse in Washington as threatened or endangered. The letter clearly identified itself as a petition and contained the names, signatures, and addresses of the petitioners. Accompanying the petition was supporting information relating to the taxonomy, ecology, and past and present distribution of the species, as well as the threats faced by the western sage grouse in Washington.

The petitioners requested listing for the Washington population of western sage grouse and not the species rangewide. We consider this request appropriate because, although we do not base listing decisions on political subdivisions except international boundaries, we can consider a population of a vertebrate species or subspecies as a listable entity under the Act if the population is recognized as a distinct population segment (DPS) (61 FR 4722). We can also expand the scope of our review of petitions to the species rangewide, should expansion be appropriate based on our knowledge of the available information.

The information regarding the description and natural history of sage grouse, below, has been condensed from the following sources: Aldrich 1963, Johnsgard 1973, Connelly *et al.* 1988, Fischer *et al.* 1993, Drut 1994, Washington Department of Fish and Wildlife (WDFW) 1995, Washington Sage and Columbian Sage Grouse Workshop (WSCSGW) 1996 and 1998, and Schroeder *et al.* 1999a.

Sage grouse, also known as sage fowl, spine-tailed grouse, fool hen, cock-of-the-plains, and sage chicken, are gallinaceous (chicken-like, ground-nesting) birds, and are the largest North American grouse species. Adult males range in size from 66 to 76 centimeters (cm) (26 to 30 inches (in)) and weigh between 2 and 3 kilograms (kg) (4 and 7 pounds (lb)); adult females range in size from 48 to 58 cm (19 to 23 in) and weigh between 1 and 2 kg (2 and 4 lb). Males and females have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark-green toes. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers around the neck and upper belly forming a ruff. During breeding displays, males also exhibit olive-green apteria (fleshy bare patches of skin) on their breasts.

Sage grouse depend on a variety of shrub steppe habitats throughout their life cycle, and are particularly tied to several species of sagebrush (*Artemesia* spp). Adult sage grouse rely on sagebrush throughout much of the year to provide roosting cover and food, and depend almost exclusively on sagebrush for food during the winter. If shrub cover is not available, they will roost in snow burrows. While average dispersal movements are generally less than 35 kilometers (km) (21 miles (mi)), sage grouse may disperse up to 160 km (100 mi) between seasonal use areas. Sage grouse also exhibit strong site fidelity (loyalty to a particular area), and are capable of dispersing over areas of unsuitable habitat.

A wide variety of forb (any herb plant that is not a grass) species are used as forage by adult sage grouse from spring to early fall, and hens require an abundance of forbs for pre-laying and nesting periods. An assortment of forb and insect species form important nutritional components for chicks during the early stages of development. Sage grouse typically seek out more mesic (moist) habitats that provide greater amounts of succulent forbs and insects during the summer and early fall. Winter habitat use varies based upon snow accumulations and elevational gradients, and sage grouse likely choose winter habitats based upon forage availability.

During the spring breeding season, male sage grouse gather together and perform courtship displays on areas called leks, primarily during the morning hours just after dawn. Leks consist of patches of bare soil, short grass steppe, windswept ridges, exposed knolls, or other relatively open sites, and they are often surrounded by more dense shrub steppe cover, which is used for roosting or predator evasion during the breeding season. Leks range in size from less than 0.4 hectare (ha) (1 acre (ac)) to over 40 ha (100 ac), contain several to hundreds of males, and are usually situated in areas of high female use. Leks used over many consecutive years (historic leks) are typically larger than, and often surrounded by, smaller and less stable satellite leks. Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females for mating. Relatively few, dominant males account for the majority of breeding on a given lek.

After mating, females may move a maximum distance of 36 km (22 mi) depending on the availability of suitable nesting habitat, and typically select nest sites under sagebrush cover. Nests are relatively simple and consist of scrapes on the ground, which are sometimes lined with feathers and vegetation. Clutch sizes range from 6 to 13 eggs, and nest success ranges from 10 to 63 percent. Chicks begin to fly at 2 to 3 weeks of age, and broods remain together for up to 12 weeks. Most juvenile mortality occurs during nesting and the chicks' flightless stage, and is due primarily to predation or severe weather conditions. Shrub canopy and grass cover provide concealment for sage grouse nests and young, and may be critical for reproductive success.

Sage grouse typically live between 1 and 4 years and have an annual mortality rate of roughly 50 to 55 percent, with females generally having a higher survival rate than males. Up to 50 percent of all sage grouse mortality is caused by predation, from both avian (*e.g.*, hawks, eagles, and ravens) and ground (*e.g.*, coyotes, badgers, and ground squirrels) predators.

Prior to European expansion into western North America, sage grouse (*Centrocercus urophasianus*) were believed to occur in 16 States and 3 Canadian provinces (Schroeder *et al.* 1999a), although their historic status in Kansas and Arizona is unclear (Colorado Sage Grouse Working Group

13

Exhibit #13

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January 2, 2014

TO: Governor Brian Sandoval and Sagebrush Ecosystem Council

CC: Ted Koch, US Fish and Wildlife Service,
Lyon County Commission,
Mono County Supervisors

SUBJECT:

1. Response to Ted Koch remarks of Dec.3, 1013
2. Response to Sagebrush Ecosystem Council meeting of Dec. 18, 2013

It comes as quite a shock to the whole agriculture and livestock community of Nevada, that the USFWS went against all of their own words and assurances to us regarding the greater sage grouse, and decided to propose a listing of the Bi-State DPS of Sage grouse as "threatened".

They told all of us what we wanted to hear, and went behind our backs and did what they wanted. The USFWS State director Ted Koch, said that the Bi-State working group plan was the best he had seen. He applauded the Bi-State working group for all their work and for the implementation of programs of the last 10 years on the sage grouse preservation. The programs put in place with the cooperation of NRCS, the over 16,000 acres of re-furbished pinion/juniper land, the conservation easements that have been secured, and all the hard work and sweat put forth to protect the sage grouse. Yet it all seems to be MOOT.

Agency biologists now say that the sage grouse in the Lyon/Mono county region is a separate kind of greater sage grouse than the other sage grouse in the rest of Nevada with a different DNA. The mtDNA [from the female side], is definitely from the Greater Sage Grouse in Nevada and linked to Canada and Washington, but some studies seem to indicate that the nuclear DNA is distinct to this area population.

In a document accepted and published in 2005 by the Blackwell Publishing LTD. Entitled " A MULTILOCUS POPULATION GENETIC SURVEY OF THE GREATER SAGE GROUSE ACROSS THE RANGE, POPULATION GENETICS OF THE GREATER SAGE GROUSE, by S.E. Taylor, S.J.Oyler,-McCance , and T.W. Quinn, { USGS Fort Collins Science Center, Rocky

Mountain Center for Conservation Genetics and Systematics, Dept. of Biological Sciences, and University of Denver, Denver, Colorado.], Benedict [et,al] [2003] "it is noted that the Lyon/Mono population represents separation by "ALLOPATRIC FRAGMENTATION".

Allopatric fragmentation means, according to Biology 413{ZOOGEOGRPHY}, " the separation of a population into two or more geographically isolated populations." Allopatric fragmentation is considered one of the prime, if not major processes, that promotes "evolutionary diversification." This document also states on page [1307] enclosed, "The Bi-State [Lyon/Mono] population is distinct in a way that could be significant in that genetic variation is relevant and necessary to the health and viability of populations, and should be monitored as a MANAGEMENT UNIT [MU]. As reported, the Lyon/Mono population is significant with divergent alleles of nuclear micro DNA but the mtDNA [female], control region types are not reciprocally [present on both sides] monophyletic [developed from a single ancestral type] greater sage grouse despite most newly arisen DNA within this population. Although the Lyon/Mono population could and would be considered a M.U.{ Management Unit] as defined by Moritz [1994], it would NOT be considered an Evolutionary Significant Unit [ESU]. ESU status is necessary for listing under the ESA and the so-called Bi-State sage grouse is just another population of greater sage grouse.

In a lek breeding species such as the greater sage grouse where only a few males do most of the mating, sexual selection can act to influence morphological and behavioral traits at a rate much faster than can be tracked genetically. The nuclear DNA can undergo more of a bottleneck relative to mtDNA [female] inherited in most species. Preliminary comparisons of gross morphology [how they look] and the behavior between the surrounding greater sage grouse populations have revealed little or no differences. S.E. Taylor [unpublished], Young et al [2000].

The distinct population segment is a term used by the USFWS under Endangered Species Act regulations. BLM, FS, and environmental groups whole heartedly endorse the use of DPS in this case to set apart a small group of Greater Sage Grouse, to lock up 1.9 million acres of land for a bird they say hasn't traveled more than a hundred miles in its thousand years history. They base their conclusion on their strongest feelings called professional opinions and not on known facts including the lack of reported sage grouse observations by explorers prior to 1850.

Where did logic and science come from in this case? Not from the "best scientific or commercial data" available. They need to read more and see the WHOLE report, not just the pieces to fit their agenda.

The State director of the USFWS stated at the December 3, 2013 meeting of the Bi-State working group , in Bridgeport, California, that the Governors Sagebrush Ecosystem Council, had NO say in the Bi-State sage grouse issue. The Governor's bill AB461, created a council to oversee ALL the greater sage grouse in Nevada, but according to Mr. Koch, did not apply to or have anything to do with the decisions, processes or consultations regarding the Bi-State DPS of sage grouse. I hereby challenge all the Governor's AB461 council [Sagebrush Ecosystem Council], to read said bill and all its amendments, and discuss it again. It clearly states on page 4 of the document that "The State of Nevada has authority to manage ALL wildlife belonging to

the State that is not listed pursuant to the Endangered Species Act.. That can only mean that it is the duty of the sworn public officials who make up the Sagebrush Ecosystem Council to assemble the best available scientific and commercial data then use that data and the authority of the State to tell the USFWS that any federal data that contradicts the data of Nevada is wrong. USFWS cannot lawfully list the sage grouse until they prove that the data officially held by the State of Nevada is wrong and the federal data is somehow correct.

On July 31, 2012, The Greater Sage Grouse Advisory Committee was created by Executive Order 2012-19, to develop a state specific strategy to conserve the greater sage grouse. It also states on page 4 of Bill AB461, " Whereas, It is in the interest of this State to bring stakeholders and relevant agency experts together on an ongoing basis to guide the implementation of conservation measures sufficient to preclude the need to list the greater sage grouse, the Bi-State sage grouse, and other species that inhabit sagebrush ecosystems within the state."

How can anyone, who knows how to read, not see what this statement says and determine that the council IS required by Nevada law to address the Bi-State Sage grouse issues. They took an OATH of Office to follow and protect the Constitution of Nevada when they oversee the sage hen and other all wildlife species and to that includes protection of Nevada and its people from harm regarding federal regulation of the sage hen [all species]. When a law is broken, there are consequences and those consequences may be even more severe for public officials because they have also violated their oath of office. This council can clearly see that the sage grouse in Nevada are ALL Greater Sage Grouse, no matter what part of the state they live in. None are physically separated by geography, even the ones you call a DISTINCT POPULATION SEGMENT. They are still in Nevada, and are still Greater sage grouse, no matter how you decide to look at them. In reality, it does not matter what I believe or you believe, the reality is you are obligated by LAW to do EVERYTHING in your power to protect this bird and the people of Nevada. That starts with the Governor and goes down to the lowest Nevada employee and committee appointee. You are here for Us.

Further the Governor and the respective County Commissioners need to read the "Endangered Species Act of 1973, and see that in Section 4 under the heading of "Determination of Endangered Species and Threatened Species category , letter C, it states, The Secretary of the Interior shall by regulation promulgated in accordance with subsection [b] determine whether a species is an endangered or threatened species because of any or all of the following factors, [c] disease or PREDATION. As for Mr. Koch, of the USFWS, and the Department of the Interior, who propose to list the Bi-State population and possibly the entire greater sage grouse population, they clearly understand the predator control is a responsibility of the State. Yet the Governor's council changed the original plan that showed predation as a major threat at the top of the list to a threat at the bottom of the list because you did not want to deal with the environmental groups that oppose killing any species to save another. Right or wrong, you are obligated under the law to do just that. Federal agencies have a scientist, Dr. Peter Coates, who wrote in his report, that over 80% of the loss of nesting and chick loss was due to predation. Yet NDOW and the Governor choose not to address the situation because of it's political challenges. It also states under the same heading and under [b] Basis of Determination

[1]]a], "The Secretary shall make determination required by subsection [a][1] solely on the basis of the best scientific and commercial data available to him after the review of the status of the species and after taking into accounts those efforts, if any, being made by any State or foreign nation, or any political subdivision of any state or foreign nation, to PROTECT SUCH SPECIES, WHETHER BY PREDATOR CONTROL, PROTECTION OF HABITAT OR FOOD SUPPLY, OR OTHER CONSERVATION PRACTICES, WITHIN ANY AREAS UNDER IT'S JURISDICTION, OR ON THE HIGH SEAS. It is especially important for all parties involved, to read all of Section 4, for it clearly lays out the guidelines which must be followed for a lawful determination of "threatened or endangered species". If you are going use the Endangered Species Act for your ulterior motives, then you must abide by the WHOLE Act, not just pieces to suit your agenda. You ALL must be held accountable to the people of Nevada and to the other 11 states which also face the determination on Greater sage grouse It is not too late for Nevada's Governor to develop a predator control program under the Division of Conservation that would meet the requirements of adequacy and deprive the federal officials of one excuse for listing the sage hen.

Do what is right. Fight for Nevada and against the abusive ESA listing of the Greater Sage Grouse including the Bi-State sage grouse populations.

Please.

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A multilocus population genetic survey of the greater sage-grouse across their range

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Abstract

The distribution and abundance of the greater sage-grouse (*Centrocercus urophasianus*) have declined dramatically, and as a result the species has become the focus of conservation efforts. We conducted a range-wide genetic survey of the species which included 46 populations and over 1000 individuals using both mitochondrial sequence data and data from seven nuclear microsatellites. Nested clade and STRUCTURE analyses revealed that, in general, the greater sage-grouse populations follow an isolation-by-distance model of restricted gene flow. This suggests that movements of the greater sage-grouse are typically among neighbouring populations and not across the species, range. This may have important implications if management is considering translocations as they should involve neighbouring rather than distant populations to preserve any effects of local adaptation. We identified two populations in Washington with low levels of genetic variation that reflect severe habitat loss and dramatic population decline. Managers of these populations may consider augmentation from geographically close populations. One population (Lyon/Mono) on the southwestern edge of the species' range appears to have been isolated from all other greater sage-grouse populations. This population is sufficiently genetically distinct that it warrants protection and management as a separate unit. The genetic data presented here, in conjunction with large-scale demographic and habitat data, will provide an integrated approach to conservation efforts for the greater sage-grouse.

Keywords: gene flow, genetic diversity, greater sage-grouse, microsatellites, mtDNA, nested clade analysis

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Introduction

The range of the greater sage-grouse (*Centrocercus urophasianus*) historically spanned 12 western US states and three Canadian provinces (Schroeder *et al.* 2004), yet this species currently occupies only 56% of its historic (pre-European period) range (Fig. 1) with extirpations in at least one state and one province (Connelly & Braun 1997; Schroeder *et al.* 2004). Regional population declines have been dramatic, ranging from 17% to 47% (Connelly & Braun 1997). These declines are likely linked to the loss, fragmentation, and degradation of sagebrush (*Artemisia* spp.) habitat (Braun 1998), resulting in the isolation of small populations from larger populations existing in more contiguous habitat (Fig. 1). Consequently, the greater sage-grouse have become a species of conservation concern and petitions have been filed to list them for protection under the US Endangered Species Act.

Management of the greater sage-grouse has previously been based on information from studies of demographic rates and habitat requirements that have focused on local populations (reviewed in Connelly *et al.* 2000). The distribution of genetic variation among populations across the entire range of the greater sage-grouse has been unknown despite increasing pressure on managers to make difficult decisions about which populations may be more 'important' than others. The identification of any genetically discrete groups of the greater sage-grouse is paramount to the development of greater sage-grouse management plans. In addition, faced with an increasingly fragmented distribution with small and isolated populations, it is important to determine the relative amount of genetic diversity contained in each population. Populations with relatively low

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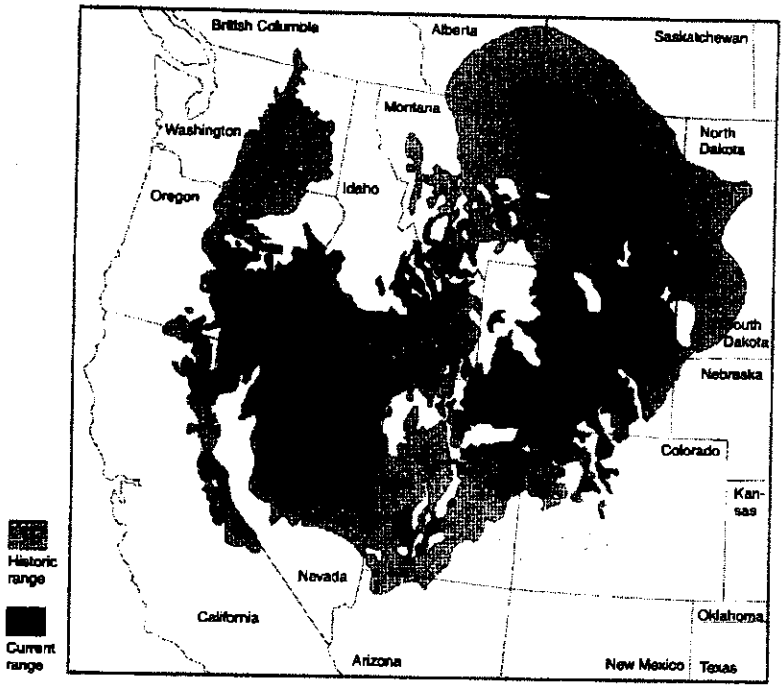

Fig. 1 Historic and current distribution of the greater sage-grouse (from Schroeder *et al.* 2004).

levels of genetic diversity can suffer from inbreeding effects and can be more susceptible to parasitic agents and disease. Genetic data can provide information relevant to an understanding of gene flow, isolation, genetic diversity, and the evolutionary history of a species. Further, it can facilitate a cohesive management strategy that takes genetic distinctiveness into account, based in part on a clear picture of the entire 'genetic landscape' of a species. This increases the efficiency of management decisions and adds to their scientific foundation.

Previous population genetic studies of sage-grouse have focused on assessing taxonomic status. Kahn *et al.* (1999) and Oyler-McCance *et al.* (1999) used mitochondrial and nuclear markers to document the genetic distinctiveness of sage-grouse in southwestern Colorado. This, combined with morphological (Hupp & Braun 1991) and behavioural (Young *et al.* 1994) information led to the recognition of a new species of sage-grouse (Young *et al.* 2000), the Gunnison sage-grouse (*Centrocercus minimus*). Benedict *et al.* (2003) investigated whether or not genetic data supported a subspecific taxonomic delineation in the western part of the greater sage-grouse range that had long been questioned. These studies provided useful taxonomic information and knowledge of the distribution of genetic variation locally, yet they lacked the range-wide perspective necessary to make management decisions regarding the greater sage-grouse at the species level. Here we greatly extend the sampling range and density of previous studies to provide a comprehensive examination of the distribution of genetic variation across the entire range of the greater sage-grouse using both mitochondrial DNA (mtDNA) sequence data and data from nuclear microsatellites.

Materials and methods

Tissue collection and DNA extraction

Forty-six populations from all US states with populations of the greater sage-grouse (11) and one Canadian province (Alberta) were included in this study. The Owyhee, Oregon population was included solely in the microsatellite analysis and the Converse, Wyoming population was only included in the mtDNA analysis. We collected approximately 20 samples per population. Blood samples were collected from the Alberta, Lyon/Mono, South Dakota, Strawberry Valley, and Yakima populations. Feather samples were collected from the Douglass/Grant population. For all other populations, including most samples from Lyon/Mono and South Dakota, muscle tissue was obtained from the wings of hunter-killed birds. As in Benedict *et al.* (2003), most population names correspond to hunt units. DNA was extracted from most samples using either a phenol–chloroform method (Kahn *et al.* 1999) or the Wizard Genomic DNA Purification System (Promega) following the manufacturer's instructions. Some blood samples were later re-extracted using the GenomicPrep Blood DNA Isolation Kit (Amersham Biosciences) using the modifications of Oyler-McCance *et al.* (In press).

Mitochondrial sequencing

A 146-base pair portion of hypervariable control region I was amplified using polymerase chain reaction (PCR) and sequenced using a dye terminator cycle sequencing reaction (Beckman Coulter CEQ8000) as described by Benedict *et al.* (2003). This region was used because it was known to contain approximately 92% of the variable sites in a larger 380-base pair region spanning control region I (Kahn *et al.* 1999).

Microsatellite fragment analysis

Seven nuclear microsatellite loci (*LLST1*, *SGCA5*, *SGCA9*, *SGCA11*, *LLSD3*, *LLSD8*, and *ADL0230*) were screened using the methods described in Oyler-McCance *et al.* (in press). Briefly, PCRs were performed using a dye-labelled forward primer and amplified products were then run on the CEQ 8000 Genetic Analysis System (Beckman Coulter).

Data analysis

All mtDNA sequences were edited and aligned using SEQUENCHER version 4.1.4 and haplotypes were identified using programs MACDNASIS PRO version 2.0 (Hitachi) and GENETOOL. Maximum-parsimony analysis of all haplotypes was conducted using PAUP* version 4.1 (Swofford 2003). Blue grouse (*Dendragapus obscurus*) was used as an outgroup because it has been confirmed by molecular work (Ellsworth *et al.* 1996; Lucchini *et al.* 2001) to be the closest extant relative to sage-grouse. An heuristic analysis was conducted keeping best trees only, with maxtrees set at 100. The starting tree was obtained by stepwise addition with swapping on the best tree when multiple starting trees exist. The addition sequence was simple, with the outgroup used as the reference taxon. Five hundred trees were held at each step. Branch swapping was carried out with the tree-bisection–reconnection (TBR) algorithm, saving multiple trees and swapping on the best trees only. This analysis was followed by an heuristic bootstrap analyis using the default settings but with 1000 replicates. We used nested clade analysis (NCA) to differentiate patterns of population history and gene flow. This was performed by generating an unrooted haplotype cladogram using the statistical parsimony software TCS version 1.13 (Clement *et al.* 2000). The cladogram was constructed following the algorithm of Templeton *et al.* (1992) with ambiguities resolved following Crandall & Templeton (1993) and Crandall *et al.* (1994). The resulting cladogram was then nested using procedures from Templeton *et al.* (1987) and input along with geographical coordinates of all populations in the software program GEODIS version 2.2 (Posada *et al.* 2000). The program GEODIS calculates the clade distance (D_c), nested clade distance (D_n), and the average interior distances minus the average tip distances (I-T)$_c$ and (I-T)$_n$. These four statistics were used in conjunction with the key provided by Templeton (1998) and subsequently updated in Templeton (2004) to examine if the observed clade structure provided information about biological processes such as restricted gene flow, allopatric fragmentation, or long-distance migration events.

We calculated the total number of microsatellite alleles per locus and the mean number of alleles for each population. Microsatellite loci were tested (by population) for departures from Hardy–Weinberg equilibrium (HWE) (Guo & Thompson 1992) using the computer program ARLEQUIN 2.001 (Schneider *et al.* 2001). A test for linkage disequilibrium (LD) among pairs of loci within each population was performed using GENEPOP (http://wbiomed.curtin.edu.au/genepop/) on the Web (Markov chain parameters: 5000 dememorization steps, 500 batches, 5000 iterations per batch) (Raymond & Rousset 1995).

Pairwise population genetic distances (R_{ST}, Slatkin 1995) were calculated in ARLEQUIN (Schneider *et al.* 2001). The R_{ST} values were used to construct a neighbour-joining (NJ) tree using PHYLIP 3.57 (Felsenstein 1989) that was viewed using TREEVIEW 1.6.6 (Page 1996).

R_{ST} values were used to perform an analysis of molecular variance (AMOVA) (Excoffier *et al.* 1992) in ARLEQUIN. AMOVA partitions the molecular variance (microsatellite allele size) into three categories: between groups, among populations, and among individuals within populations. We tested for population bottlenecks using the software BOTTLENECK (Cornuet & Luikart 1997) and the Wilcoxon test under the TPM model with 1000 replications. Population structure was also examined using STRUCTURE 2.00 software (Pritchard *et al.* 2000). In this program, individuals were grouped into clusters without regard to the assigned population using a model-based clustering analysis. The number of 'populations' (K) was initially estimated by conducting five independent runs each of K = 1–45 with 100 000 Markov chain Monte Carlo (MCMC) repetitions and a 100 000 burn-in period using the model with admixture, correlated allele frequencies, and no prior information. An additional set of five independent runs was then conducted with K = 5–15 with 500 000 MCMC repetitions and a 500 000 burn-in period using the above model. A Mantel (1967) test was used to look for a correlation between genetic distance and geographical distance using the software ZT (Bonnet & Van de Peer 2002).

Results

Mitochondrial analysis

We sequenced a portion of the mitochondrial control region I in 614 individuals, adding to the 466 individuals that had been sequenced previously (Kahn *et al.* 1999; Benedict *et al.* 2003). Of the 1080 total individuals sequenced over the course of this study and our previous work, 80 unique

Table 1 Haplotype frequencies for all populations. Haplotypes in clade I are represented first in normal text. Haplotypes in clade II are shown in italics

(a) Haplotypes in clade I

Population	N	Proportion in clade I	Proportion in clade II	Number of haplotypes	Haplotypes A	DT	D	DR	AA	AG	BM	BL	AC	AZ	AU	EF	EL	DB	E	F	CH	DQ	EC	ED	EM	ET	EV	L	BB	BX	DA	DC	DD	FA	FB
Blue Mt., Colorado	21	0.36	0.64	11	1		1		1				1																					
Cold Springs, Colorado	25	0.57	0.43	7	3		1						1														2							
Eagle, Colorado	26	0.40	0.60	5	2		4																											
Middle Park, Colorado	21	0.33	0.67	6			2													1														
North Park, Colorado	23	0.38	0.63	8	4		3													2														
Box Elder, Utah	28	0.71	0.29	7	10	2			1	1												1												
Wayne, Utah	25	0.50	0.50	8	6	4			1				1																					
Rich, Utah	26	0.64	0.36	9	3	5			1				1										1										1	1
Diamond, Utah	26	0.56	0.44	9	9	1			1				2			1																		
Blue Mt. Utah	18	0.60	0.40	5					1				2			1																		
Strawberry Valley, Utah	23	0.25	0.75	4				15																										
Kemmerer, Wyoming	18	0.43	0.57	7		2			2							1																		
Fossil, Wyoming	25	0.40	0.60	5	2		1																											
Rawlins, Wyoming	20	0.40	0.60	5									1													2								
Bighorn, Wyoming	20	0.00	1.00	4																														
Weston, Wyoming	20	0.10	0.90	10	4																													
Converse, Wyoming	13	0.08	0.92	6	1																													
Rosebud, Montana	23	0.00	1.00	4																														
Beaverhead, Montana	22	0.29	0.71	7	1																						2							
Valley, Montana	26	0.17	0.83	6			2																											
Phillips, Montana	18	0.22	0.78	9	1																				1									
Fergus, Montana	23	0.00	1.00	4																														
Harding, South Dakota	21	0.17	0.83	6		1																												
Slope, North Dakota	36	0.20	0.80	5													3																	
Bowman, North Dakota	22	0.17	0.83	6														1																
Alberta	29	0.25	0.75	8	1																				1									

Table 1 *Continued*

(a)

Population	N	Proportion in clade I	Proportion in clade II	Number of haplotypes	Haplotypes																																
					A	DT	D	DR	AA	AG	BM	BL	AC	AZ	AU	EF	EL	DB	E	F	CH	DQ	EC	ED	EM	ET	EV	L	BB	BX	DA	DC	DD	FA	FB
Riddle, Idaho	44	0.36	0.64	11	17		1		2	2																											
Curlew Valley, Idaho	19	0.50	0.50	8	1	3			1															1													
Medicine Lodge, Idaho	20	0.20	0.80	5	7																																
Magic Valley, Idaho	49	0.54	0.46	13	8	2			2	7						1							1	1													
Whitehorse, Oregon	33	0.14	0.86	7	14																																
Steens, Oregon	21	0.29	0.71	7	5															1																	
Warner, Oregon	19	0.38	0.63	8	4	1														1														1			
Wagontire, Oregon	19	0.38	0.63	8	6															1	1																
Beatys Butte, Oregon	21	0.25	0.75	8	4																2																
Churchill, Nevada	18	0.17	0.83	6										1																							
Washoe, Nevada	20	0.38	0.63	8	6									1															1								
Elko, Nevada	20	0.63	0.38	8	3					1					4															1	1						
Humboldt, Nevada	21	0.33	0.67	6	10													4																			
Sheldon, Nevada	19	0.29	0.71	7	2																							1									
Nye, Nevada	20	0.50	0.50	6						1				4														1									
Lassen, California	22	0.14	0.86	7	5																																
Lyon/Mono, NV/CA	54	0.40	0.60	10	1						10	9										3															
Yakima, Washington	25	0.00	1.00	1																																	
Douglass, Washington	18	0.33	0.67	3		3																															
Total – Clade I	1080				141	23	16	15	13	12	10	9	9	6	4	4	4	4	3	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	

Table 1 *Continued*

(b) Haplotypes in clade II

Population	B	C	X	EJ	T	EH	Q	EP	BJ	BK	W	S	AL	AV	U	AD	H	Z	CJ	CN	EB	DH	CR	DM	DS
Blue Mt., Colorado	8	1										1				1		3							
Cold Springs, Colorado	7	10																1							
Eagle, Colorado	2	15															3								
Middle Park, Colorado	7	9											1				1								
North Park, Colorado	5	6	1														1								
Box Elder, Utah	12																								
Wayne, Utah	7										4	1													
Rich, Utah	6	4									4	1													
Diamond, Utah	6	2			1							3													
Blue Mt. Utah	11	3																							
Strawberry Valley, Utah	3	4									1														
Kemmerer, Wyoming	9	1										2		1											
Farson, Wyoming	13	8										1													
Rawlins, Wyoming	9	6																							
Bighorn, Wyoming	2	11		5									2												
Weston, Wyoming	2	5		1		1										1									
Converse, Wyoming	4	3				2	2																		
Rosebud, Montana		9		12				1																	
Beaverhead, Montana	13	2	1	1									2												
Valley, Montana		13		7		1		2																	
Phillips, Montana		4		4		2		1														2			
Fergus, Montana		10		8				4					1												
Harding, South Dakota		3		9		6																			1
Slope,		7		21		3																			2

Population	EI	ES	AE	AF	EE	EK	EN	EQ	EU	EX	O	AM	BD	BF	BO	CK	DL	BQ	DP	EA	EO	ER	EW	EZ
Blue Mt., Colorado			2	1																				
Cold Springs, Colorado																								
Eagle, Colorado																								
Middle Park, Colorado																								
North Park, Colorado												1												
Box Elder, Utah										1														
Wayne, Utah										1														
Rich, Utah																								
Diamond, Utah																								
Blue Mt. Utah																								
Strawberry Valley, Utah																								
Kemmerer, Wyoming																								
Farson, Wyoming																								
Rawlins, Wyoming									2															
Bighorn, Wyoming																								
Weston, Wyoming		3		1	1																1			
Converse, Wyoming					1																			
Rosebud, Montana							1																	
Beaverhead, Montana																								
Valley, Montana							1																	
Phillips, Montana						2														1				
Fergus, Montana																								
Harding, South Dakota																							1	
Slope,																								

Table 1 *Continued*

(b)

Population	Haplotypes																																																
	B	*C*	*X*	*EJ*	*T*	*EH*	*Q*	*EP*	*BJ*	*BK*	*W*	*S*	*AL*	*AV*	*U*	*AD*	*H*	*Z*	*CJ*	*CN*	*EB*	*DH*	*CR*	*DM*	*DS*	*EI*	*ES*	*AE*	*AF*	*EE*	*EK*	*EN*	*EQ*	*EU*	*EX*	*O*	*AM*	*BD*	*BF*	*BO*	*CK*	*DL*	*BQ*	*DP*	*EA*	*EO*	*ER*	*EW*	*EZ*
North Dakota																																																		
Bowman, North Dakota	1	5		9		5																								1																			
Alberta		5		6		5		9					1																																					
Riddle, Idaho	5	2	8		4		1						1																																1					
Curlew Valley, Idaho	8	1	1													3																																		
Medicine Lodge, Idaho	8	1	1																		3																													
Magic Valley, Idaho	9	6	7		1										1						1								2																				
Whitehorse, Oregon	1		2		10		1								4				1																														
Steens, Oregon	1		4		8		1																	1																										
Warner, Oregon			5		2		2													1			2																											
Waguntire, Oregon			1		2		4								1					3																														
Beattys Butte, Oregon			6				1							4					2				1																				1						
Churchill, Nevada	2		8		5																																	1	1											
Washoe, Nevada			6				3								1				1																						1									
Elko, Nevada	3		5											2																																				
Humboldt, Nevada	2		3		1		1																																										
Sheldon, Nevada			6		6		2								1																						1												
Nye, Nevada	4		9		1																																												
Lassen, California			8				4							1								1		2																				1						
Lyon/Mono, NV/CA			2				1		16	10																																			1	1				
Yakima, Washington			25																																														
Douglass, Washington			12																						3																								
Total-Clade II	170	156	121	83	41	25	23	17	16	10	9	9	8	8	7	6	5	4	4	4	4	3	3	3	3	3	3	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1

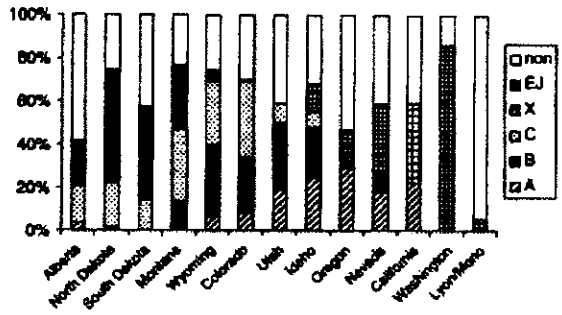

Fig. 2 Proportion of individuals in each state with common haplotypes (non represents haplotypes that are not common). The haplotypes EJ, X, C, B, and A were the most common haplotypes found in the study. Each bar represents the proportion of each of these common haplotypes for every state.

mtDNA haplotypes were identified (Table 1). Of these 80 haplotypes, 28 are newly described here (Accession nos AY850036–AY850062, and AY846747). Parsimony analysis distributed all haplotypes into one of two distinct monophyletic clades (31 in clade I, 49 in clade II). Of the 100 trees of shortest length (124 steps) that were retained, all maintained monophyly of those two clades. Bootstrap support was 91% for clade I and 88% for clade II. The maximum DNA sequence difference between the two clades was 18.4% and the minimum difference between any greater sage-grouse haplotype and the outgroup sequence was 23.4%. Along the 146-base pair sequence, 60 sites were variable with 39 transitions, 18 transversions, and 8 insertions/deletions. Five of those sites were both transitions and transversions.

The average number of haplotypes per population was 6.9 with a high of 13 haplotypes in Magic Valley and a low of one in Yakima (Table 1). Five haplotypes (A, B, C, X, and EJ) were common and widespread representing 62% of all individuals sequenced. Haplotype A was found virtually everywhere with the exception of Washington, North and South Dakota, and parts of Wyoming and Montana. (Fig. 2). Haplotype B was present in most populations except in areas of Montana, South Dakota, Oregon, California, and Washington while haplotype C was widespread except in Oregon, Nevada, California, and Washington (Fig. 2). Haplotype X was more localized spanning Idaho, Oregon, Nevada, California, and Washington as was haplotype EJ, which is found primarily in Wyoming, Montana, North and South Dakota, and Alberta (Fig. 2). The Lyon/Mono population (Fig. 2) has an extremely low percentage of individuals with common haplotypes (5%). Of the 54 individuals from the Lyon/Mono population, 50 are characterized by haplotypes unique to that population.

In the NCA, statistical parsimony revealed five separate networks, three that were composed of only one haplotype (haplotypes CJ, BX, or DC). The two networks that represented the remaining 77 haplotypes corresponded to the two distinct clades described previously (Kahn *et al.* 1999; Benedict *et al.* 2003). The 95% plausible set of both networks was comprised of many haplotypes and each contained several ambiguous connections that were resolved using the frequency and topology criterion. The two networks were nested resulting in a final network (Fig. 3). Because the three other networks contained only one haplotype per network, they were not used in subsequent analyses.

We rejected the null hypothesis of no relationship between the mitochondrial haplotype genealogy and the geographical distribution of haplotypes for 29 of the 39 clades in the analysis (Table 2). Eighteen of those 29 clades were uninformative, categorized variously as inconclusive, insufficient genetic resolution, or inadequate genetic sampling (Table 2) using the updated key by Templeton (2004). Eleven clades,

Table 2 Characteristics of each clade described using nested clade analysis

Continuous range expansion	Allopatric fragmentation	Restricted gene flow with isolation by distance	Inadequate geographic sampling	Insufficient genetic resolution	Inconclusive	No relationship
2-3	1-3	1-5	1-1	1-9	1-18	1-2
2-4	1-8	1-13	1-4	1-22	1-19	1-11
		1-20		1-32	1-30	1-14
		2-1			1-31	1-15
		2-8			2-6	1-25
		3-4			2-7	1-26
		3-5			2-9	1-27
					2-11	2-2
					2-13	2-10
					3-1	3-3
					3-2	
					4-1	
					4-2	

(8)

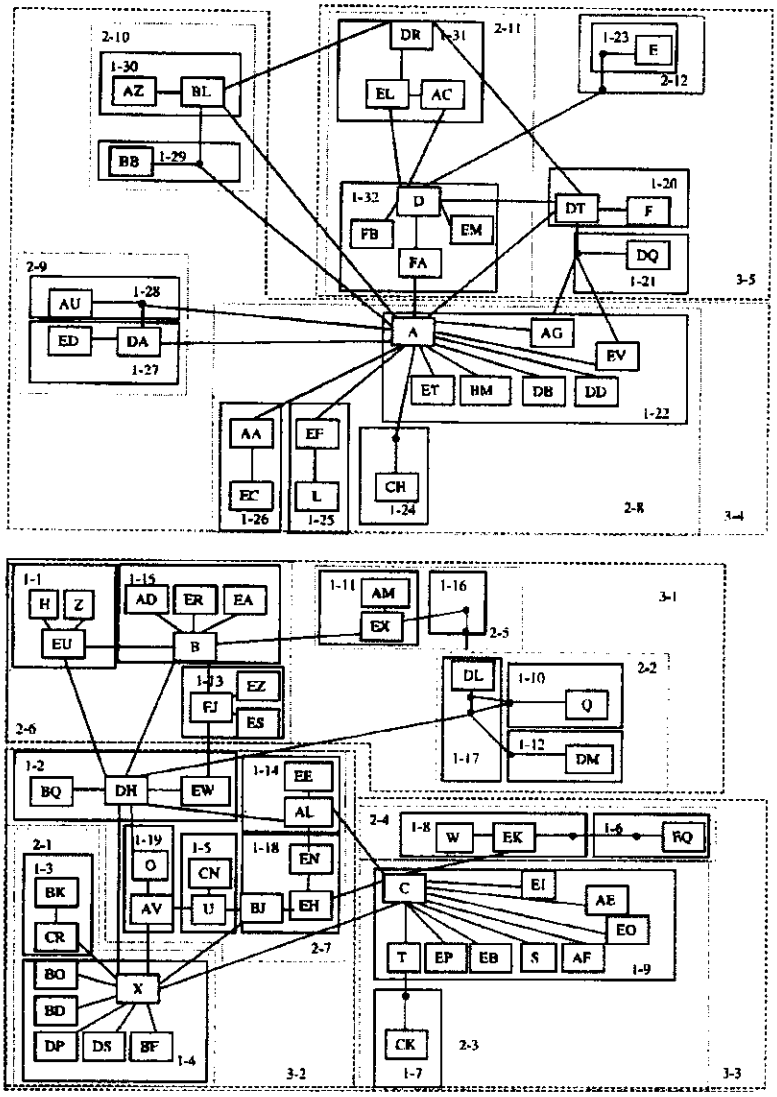

Fig. 3 Unrooted estimated 95% parsimony cladogram of 80 haplotyopes detected in the greater sage-grouse. Haplotypes are represented by letters. Lines represent single mutational events, dots represent intermediate haplotypes not found in our sample but necessary to link haplotypes that were found. Numbers represent the level of nesting in the analysis. Most haplotypes fell into one of two distinct clades (previously described by Kahn *et al.* 1999 and Benedict *et al.* 2003). The placement for connection of these two clades could not be determined so they are represented separately as clade I (top) and clade II (bottom). Three haplotypes could not be connected with confidence to either clade or each other and thus are not included here.

however, did provide insight into the biogeographical history of the greater sage-grouse. Clades 2-3 and 2-4 were characterized as continuous range expansion and two clades (1-3 and 1-8) represented patterns associated with allopatric fragmentation. The pattern of restricted gene flow with isolation by distance was the most prominent being characterized by seven clades (1-5, 1-13, 1-20, 2-1, 2-8, 3-4, and 3-5).

Microsatellite analysis

The number of microsatellite alleles per locus across all populations ranged from five (*LLST1*) to 31 (*SGCA9*). The mean number of alleles per population across all seven loci ranged from 3.1 alleles in Douglass/Grant to 7.1 alleles in Alberta (Table 3). One population, Strawberry Valley, was shown to have undergone a recent population bottleneck ($P = 0.0078$). There were 27 significant departures from HWE ($P < 0.05$) among the 315 possible combinations of population and loci. Because of the large number of combinations (multiple tests), it is possible that some departures were caused by chance. To correct for multiple tests, the P value was lowered to 0.00016 (Bonferroni method) and only one population/locus comparison was significant ($P < 0.00016$). The significant departure was in the Eagle population at the *SGCA9* locus. The test for LD examined each pair of loci in each population for a total of 945 possible comparisons. Using the Bonferroni correction, the P value was

Table 3 Sample population names, locations, sample size, expected heterozygosity (H_E) and allelic richness for each locus, mean number of alleles and assigned cluster (identified by STRUCTURE analysis) for each population

			LLST1		*SGCA5*		*SGCA9*		*SGCA11*		*LLSD3*		*LLSD8*		*ADL0230*			
Population	State/ Province	*N*	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	Mean no. of alleles	Assigned cluster
Blue Mountain-CO	Colorado	25	0.26	2	0.83	8	0.84	7	0.82	7	0.63	5	0.65	5	0.8	6	5.71	3
Cold Springs	Colorado	30	0.36	2	0.84	9	0.75	7	0.84	8	0.6	5	0.69	4	0.77	8	6.14	3
Eagle	Colorado	26	0.39	2	0.8	9	0.84	8	0.8	8	0.71	4	0.64	3	0.77	6	5.71	5
Middle Park	Colorado	21	0.52	4	0.87	9	0.85	8	0.83	7	0.65	5	0.57	3	0.71	4	5.71	5
North Park	Colorado	22	0.42	3	0.79	8	0.77	11	0.89	10	0.58	6	0.64	3	0.61	4	6.43	5
Box Elder	Utah	31	0.3	2	0.82	8	0.81	15	0.74	5	0.68	6	0.6	6	0.75	6	6.86	8
Wayne	Utah	27	0.14	2	0.59	5	0.83	10	0.68	4	0.53	4	0.49	4	0.7	6	5	7
Rich	Utah	31	0.48	3	0.82	9	0.82	11	0.81	9	0.64	5	0.67	6	0.61	4	6.71	3
Diamond	Utah	27	0.42	3	0.79	8	0.87	11	0.81	7	0.66	5	0.58	3	0.7	5	6	3
Blue Mountain-UT	Utah	18	0.43	2	0.55	7	0.72	8	0.69	4	0.45	5	0.57	3	0.62	5	4.86	3
Strawberry Valley	Utah	23	—	1	0.77	6	0.77	7	0.77	5	0.29	2	0.57	3	0.58	3	3.86	7
Kemmerer	Wyoming	21	0.52	3	0.84	8	0.8	8	0.86	6	0.5	4	0.7	5	0.7	6	5.71	3
Farson	Wyoming	25	0.41	2	0.87	9	0.8	9	0.81	9	0.67	4	0.64	3	0.81	6	6	3
Rawlins	Wyoming	20	0.56	2	0.85	10	0.84	10	0.85	8	0.67	5	0.73	6	0.74	6	6.71	3
Bighorn	Wyoming	20	0.41	2	0.77	7	0.61	6	0.81	8	0.23	3	0.68	4	0.83	6	5.14	8
Weston	Wyoming	20	0.35	2	0.7	7	0.84	15	0.78	7	0.44	3	0.78	5	0.78	5	6.29	9
Rosebud	Montana	25	0.43	2	0.78	8	0.9	12	0.7	9	0.48	5	0.73	6	0.71	5	6.71	1
Beaverhead	Montana	19	0.26	3	0.88	8	0.87	10	0.81	8	0.46	4	0.75	5	0.73	4	6	4
Valley	Montana	29	0.33	2	0.66	6	0.91	17	0.76	9	0.53	5	0.76	5	0.72	4	6.86	1
Phillips	Montana	19	0.37	2	0.8	7	0.93	14	0.73	7	0.45	4	0.73	5	0.74	4	6.14	1
Fergus	Montana	30	0.38	2	0.76	8	0.88	13	0.77	8	0.53	3	0.78	6	0.72	4	6.29	1
Harding	South Dakota	26	0.43	2	0.54	4	0.88	15	0.64	6	0.12	3	0.78	5	0.69	4	5.57	9
Slope	North Dakota	36	0.49	2	0.66	5	0.88	11	0.61	5	0.26	3	0.71	4	0.69	4	4.86	9
Bowman	North Dakota	24	0.5	2	0.69	5	0.87	12	0.57	5	0.32	3	0.79	5	0.75	6	5.43	9
Alberta	Alberta	36	0.38	2	0.77	8	0.91	13	0.85	12	0.51	5	0.67	5	0.69	5	7.14	1
Riddle	Idaho	25	0.5	4	0.78	6	0.72	9	0.77	5	0.65	4	0.69	5	0.76	5	5.43	2
Curlew Valley	Idaho	19	0.46	3	0.87	7	0.78	10	0.84	7	0.64	5	0.75	7	0.7	5	6.29	8
Medicine Lodge	Idaho	36	0.43	4	0.85	9	0.86	17	0.84	10	0.62	4	0.73	6	0.72	6	8	4
Magic Valley	Idaho	31	0.46	3	0.76	7	0.76	13	0.77	7	0.61	6	0.71	6	0.78	7	7	8

Table 3 *continued*

Population	State/ Province	*N*	*LLSTI*		*SGCA5*		*SGCA9*		*SGCA11*		*LLSD3*		*LLSD8*		*ADL0230*			
			H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	H_E	Allelic richness	Mean no. of alleles	Assigned cluster
Whitehorse	Oregon	18	0.26	4	0.81	7	0.74	7	0.8	7	0.69	5	0.75	7	0.74	5	6	8
Steens	Oregon	22	0.6	3	0.79	7	0.73	10	0.81	7	0.73	4	0.78	5	0.8	6	6	2
Warner	Oregon	22	0.44	3	0.83	7	0.28	4	0.79	7	0.71	4	0.77	5	0.83	7	5.29	2
Wagontire	Oregon	22	0.52	3	0.85	8	0.49	6	0.84	8	0.72	3	0.76	6	0.78	5	5.57	2
Beatys Butte	Oregon	24	0.46	3	0.75	6	0.74	7	0.84	7	0.69	4	0.77	7	0.79	6	5.71	2
Owyhee	Oregon	25	0.5	3	0.78	6	0.69	9	0.78	7	0.73	6	0.67	6	0.84	8	6.43	8
Churchill	Nevada	19	0.45	4	0.79	6	0.63	7	0.75	6	0.6	6	0.65	5	0.69	5	5.57	8
Washoe	Nevada	22	0.42	3	0.81	6	0.64	7	0.69	7	0.74	5	0.75	7	0.7	5	5.71	2
Elko	Nevada	22	0.56	4	0.85	8	0.85	12	0.85	7	0.61	4	0.75	7	0.81	7	7	8
Humboldt	Nevada	24	0.41	4	0.8	8	0.73	10	0.77	7	0.7	5	0.71	6	0.79	5	6.43	8
Sheldon	Nevada	23	0.41	3	0.81	6	0.72	7	0.84	7	0.65	4	0.68	4	0.81	6	5.29	2
Nye	Nevada	23	0.4	4	0.79	6	0.81	10	0.83	7	0.66	4	0.71	7	0.67	6	6.29	8
Lyon/Mono	Nevada/ California	68	0.51	3	0.78	6	0.42	5	0.32	7	0.71	7	0.69	6	0.68	6	5.71	10
Lassen	California	55	0.51	3	0.74	5	0.64	11	0.67	8	0.66	6	0.79	7	0.74	5	6.43	2
Yakima	Washington	29	0.43	2	0.07	2	0.62	4	0.4	4	0.61	3	0.41	4	0.58	4	3.29	6
Douglass/ Grant	Washington	21	0.29	2	0.07	2	0.58	4	0.74	5	0.7	3	0.09	2	0.73	4	3.14	6

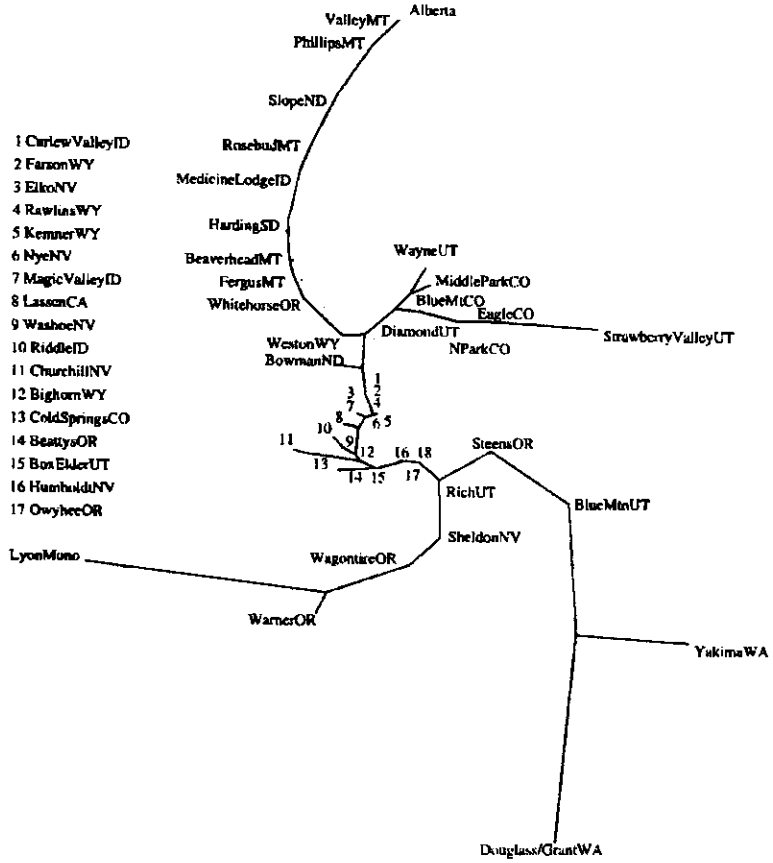

Fig. 4 Neighbour-join tree constructed using the genetic distance R_{ST} for 45 populations of the greater sage-grouse. Population names are represented followed by a two-letter abbreviation of the corresponding state. Samples from the Canadian province Alberta are labelled Alberta. The Lyon/Mono population, which spans the border of Nevada and California, is labelled LyonMono.

lowered to 0.00005. There was only one significant comparison, the *SGCA9* and *SGCA11* loci in the Eagle population.

Of the 990 population pairwise (R_{ST}) genetic distances, 194 were significant ($P = 0.00005$, Bonferroni corrected). Most notably, the Lyon/Mono population was significantly different from all other populations except Steens, Wagontire, Warner, Sheldon, and Box Elder. The Douglass/Grant, Yakima, and Alberta populations differed significantly from 27, 32, and 25 other populations, respectively.

The R_{ST} genetic distance tree also indicated that the Douglass/Grant and Yakima populations and the Lyon/Mono population were genetically distant from each other and from all other populations (Fig. 4). When the population groups suggested by the R_{ST} values (Douglass/Grant and Yakima, Lyon/Mono, Alberta) were tested against all other populations and each other (four total groups), the AMOVA based on the R_{ST} distances revealed that most of the variation in the two categories of interest was explained by the among groups (9.93%) category, rather than the among populations within groups category (6.71%) (Table 4a).

STRUCTURE assigned each individual a probability of belonging to each of 10 clusters. Each population was assigned to the appropriate cluster based on the largest number of individuals with a certain cluster assignment (Table 3, Fig. 5). The number of populations assigned to clusters ranged from 1 (Lyon/Mono, cluster 10) to 10 (various populations from Nevada, Idaho, Wyoming, Utah, and Oregon, cluster 8). R_{ST} genetic distances were recalculated based on the STRUCTURE clusters. An AMOVA based on the 10 clusters indicated that, relative to the AMOVA based on four groups (Table 4a), the proportion of among-group variation remained nearly the same (8.91%) while the among-populations–within-groups variation was reduced (1.86%) (Table 4b). The Mantel test revealed that there was a positive correlation between genetic distance and geographical distance ($r = 0.4312$, $P = 0.00001$) (Fig. 6).

Discussion

The 80 mtDNA haplotypes fell into one of two monophyletic clades as described by Kahn *et al.* (1999) and Benedict *et al.* (2003). The two clades are not separated geographically. In fact, all but four populations contain individuals with haplotypes from both clades. Kahn *et al.* (1999) and Benedict *et al.* (2003) have previously argued that these two clades may have resulted from the

(12)

Table 4 Analysis of molecular variance using seven microsatellite loci

(a) Forty-five populations, four groups. Group 1, Lyon/Mono; group 2, Alberta; group 3, Douglass/Grant, Yakima; group 4, all other populations

Source of variation	d.f.	Sum of squares	Variance components	Percentage of variation
Among groups	3	5712	7.53	9.93
Among populations within groups	41	13024.15	5.06	6.71
Within populations	2317	146534.18	63.24	83.36

(b) Forty-five populations, 10 groups. Groups are the 10 clusters identified in the STRUCTURE analysis (see Table 3)

Source of variation	d.f.	Sum of squares	Variance components	Percentage of variation
Among groups	9	14229.92	6.32	8.91
Among populations within groups	35	4506.23	1.32	1.86
Within populations	2317	146534.18	63.24	89.23

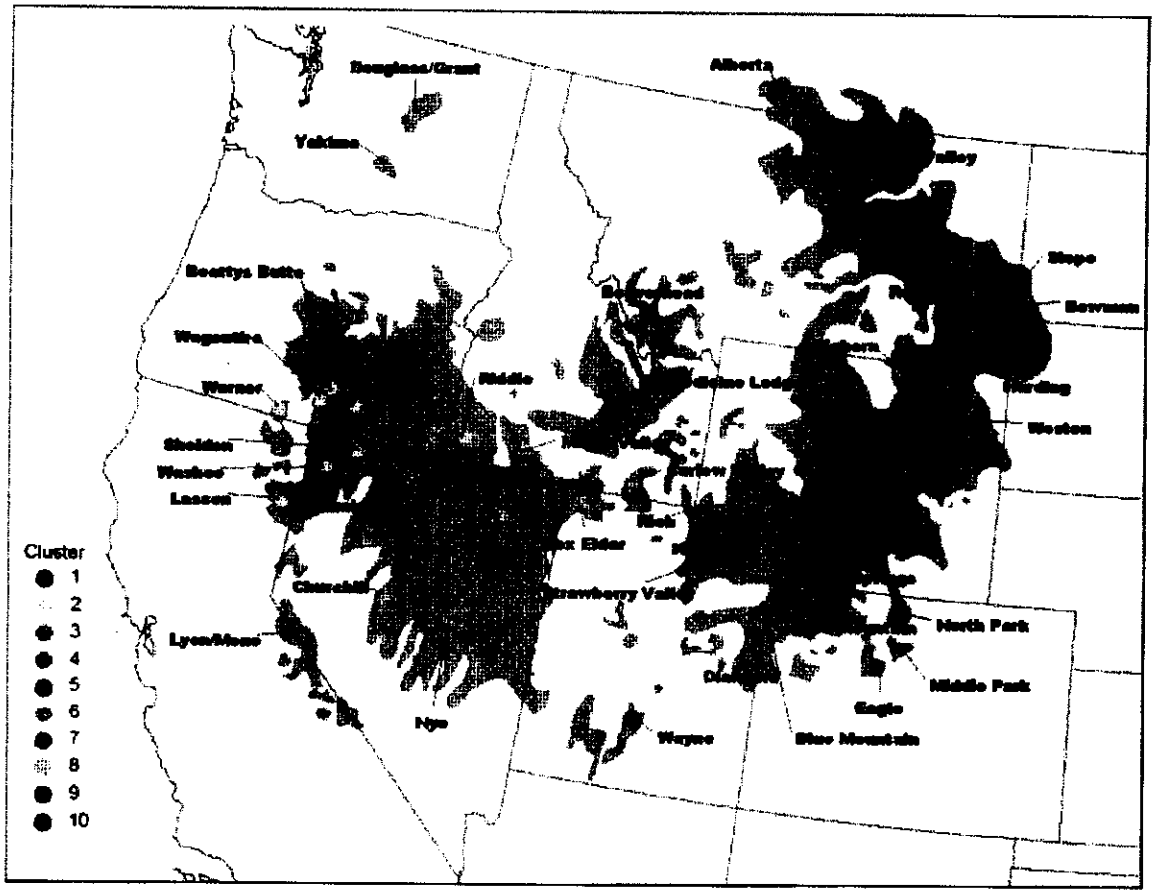

Fig. 5 Map of sampling sites for the microsatellite analysis colour coded by the cluster each population has been assigned to using STRUCTURE analysis.

separation of sage-grouse into two allopatric groups approximately 850 000 BP, perhaps in association with the patchy distribution of sagebrush habitat during the Pleistocene epoch.

In each population the percentage of individuals in each clade shifted across the range with many populations in the north (particularly the northeast) containing few or no haplotypes from clade I (Table 1). This may suggest a

(13)

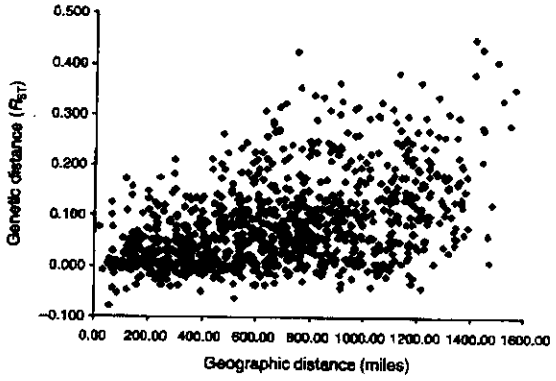

Fig. 6 Relationship between the genetic distance R_{ST} and geographical distance for all pairs of populations of the greater sage-grouse.

range expansion to the north and northeast following the Pleistocene epoch. Fossil records have documented sage-grouse during the Pleistocene in the south-central and southeastern part of their current range (Shufeldt 1913; Howard & Miller 1933; Howard 1952; Miller 1963, 1965; McDonald & Anderson 1975; Grayson 1976; Emslie 1985, 2004; Emslie & Heaton 1987) and more recently (6000 BP) in western portions of the range (Miller 1963; Grayson 1976), yet sage-grouse have not been recorded during this period in the northern part of their current range.

Results from our NCA suggest continuous range expansion in two of our nested clades (2-3 and 2-4). Populations in clade 2-3 are found throughout most of the range, yet populations in clade 2-4 occur only in the central and northeastern part of the range, in Utah, Wyoming, Montana, and North Dakota. More recent evidence suggests that the range expansion, particularly in the northeast, has continued to present day. Schroeder *et al.* (2004) provided a pre-European period distribution of the greater sage-grouse that they developed by examining early written observations of sage-grouse. Although some ambiguities exist, they propose that the distribution of sage-grouse was following a northward and eastward transition into areas not originally occupied in the early 1800s (Schroeder *et al.* 2004). Our data are consistent with this observation and provide support for the idea that shifts in sagebrush habitat distribution may have provided the greater sage-grouse an opportunity for range expansion, particularly in the northeastern part of their range.

The distribution of genetic variation shows a gradual shift across the range in both mitochondrial and nuclear data sets. An examination of the distribution of the most common mtDNA haplotypes demonstrates this phenomenon (Fig. 2). Haplotype A is the most widespread occurring in all but North Dakota, South Dakota, and Washington. Haplotype X is found primarily in the western part of the range, while haplotypes B and C are found in the central and eastern part of the range. Haplotype EJ is found only in the northeastern part of the range in Alberta, Montana, North and South Dakota, and Wyoming. This pattern suggests localized gene flow with isolation by distance (i.e. movement among neighbouring populations yet not across the range).

Results from the NCA confirm this finding with seven clades characterized by restricted gene flow with isolation by distance (1-5, 1-13, 1-20, 2-1, 2-8, 3-4, and 3-5). The lower order (more localized) clades (1-5, 1-13, 1-20) represented smaller portions of the range, yet the higher order (regional) clades (2-1, 2-8, 3-4, 3-5) represented most of the range. This suggests that restricted gene flow with isolation by distance is a range-wide phenomenon.

Analysis of our microsatellite data showed a similar pattern. The Mantel test showed a positive correlation between genetic distance and geographical distance suggesting an isolation-by-distance phenomenon (Fig. 6). In addition, the STRUCTURE analysis best grouped our data into 10 clusters (Fig. 5). All clusters were made up of populations geographically adjacent suggesting again patterns of localized gene flow and isolation by distance. The smaller, more fragmented populations on the periphery of the range (North Park, Middle Park, and Eagle in Colorado, Strawberry Valley and Wayne in Utah, Lyon/Mono in Nevada/California, and Douglass/Grant and Yakima in Washington) made up their own clusters suggesting lower amounts of gene flow in these areas.

Direct knowledge of the dispersal distances of the greater sage-grouse is limited. In one Colorado study, the respective median natal dispersal distances for 12 males and 12 females was 7.4 km and 8.8 km, respectively (Dunn & Braun 1985), distances more apt to be between neighbouring leks than between non-neighbouring populations. Some greater sage-grouse have been documented to move seasonally between summer and winter ranges. One study in Idaho estimated the average distance of these movements to be 13.1 km (Connelly *et al.* 1988). Our data are consistent with these studies suggesting that gene flow is likely limited to the movement of individuals between neighbouring populations and not likely the result of long-distance movements of individuals (across large portions of the range). This information is important because conservation efforts often consider translocations and augmentation of existing populations using animals from outside populations. Our data suggest linkages among neighbouring populations and differences among distant populations, raising the possibility that local adaptations may exist and that translocations should involve neighbouring populations rather than geographically distant populations.

Levels of genetic variation differed among populations (Tables 1 and 3). The highest level was found in Magic

genetic marker

Valley in the mtDNA data set with 13 haplotypes per population and in Alberta in the microsatellite data set with an average of 7.14 alleles. In both mtDNA and micrsosatellite data sets, the least amount of genetic diversity (Tables 1 and 3) was in the two Washington populations, Yakima and Douglass/Grant, with one and three mtDNA haplotypes per population and an average of 3.29 and 3.14 microsatellite alleles per population, respectively.

Pairwise population R_{ST} tests also showed that Douglass/Grant and Yakima were significantly different from most populations (27, 32). Our NJ tree constructed using R_{ST} genetic distances (Fig. 4) showed that the two Washington populations were among the populations with the longest branches. The significant results of R_{ST} genetic distance comparisons are largely a reflection of the small number of alleles found in both populations.

Interestingly, the two Washington populations did not show signs of a recent population bottleneck as was found in Strawberry Valley, which had been documented to have had a severe population decline because of predation problems within the last 10 years (Utah Division of Wildlife, unpublished). The test for population bottlenecks, however, only detects recent bottlenecks on the order of 0.2–4.0 generations (Luikart & Cornuet 1998). Population declines in Washington have been estimated to be at least 77% between 1960 and 1999 (Schroeder *et al.* 2000) suggesting that declines have been ongoing and significant for 40 years. The lack of genetic diversity in the Washington populations is not surprising given their small population size and isolation (Fig. 1) and the fact that they currently occupy only 8% of their historic range (Schroeder *et al.* 2000).

While the importance of maintaining substantial levels of genetic variation in a population has been the topic of considerable debate, most agree that genetic variation is relevant to the health and viability of populations and that it must be addressed and monitored in management plans (O'Brien & Evermann 1988; Quattro & Vrijenhoek 1989). Bouzat *et al.* (1998) and Westemeier *et al.* (1998) showed that fertility and hatching success of greater prairie chickens *(Tympanuchus cupido)* were reduced because of a bottleneck caused by habitat loss. The Washington populations of the greater sage-grouse, a close relative of the greater prairie chicken (both are members of Tetraoninae), have experienced similar isolation and reduction in population size resulting from loss of habitat and likely have the same potential for inbreeding effects. Further, genetically depauperate populations face enhanced susceptibility to parasitic agents or infectious disease such as West Nile virus, which has been shown to be a significant threat in the greater sage-grouse (Naugle *et al.* 2004). Management strategies for these populations have included the consideration of translocations from other populations since natural gene flow appears unlikely given the geographical isolation of these populations. Our genetic data suggest that any translocations or augmentations of the Washington populations should involve populations that are geographically close.

Using mtDNA sequence data, Benedict *et al.* (2003) previously noted that the Lyon/Mono population was genetically unique compared to other populations in California, Nevada, Oregon, and Washington. Our study substantiates their findings. While an additional 24 populations were added by our data set, the observation remains that Lyon/Mono contains mostly novel haplotypes not found elsewhere across the range (Table 1). In fact, 93% of individuals from Lyon/Mono had novel haplotypes, while the average percentage of novel haplotypes among all other populations was 8.37. The genetic diversity present in Lyon/Mono is comparable to (if not higher than) most other populations (11 haplotypes) suggesting that the differences are not caused by a genetic bottleneck or founder event.

This pattern was found as well in the nuclear data set. Pairwise population R_{ST} tests revealed that although there were many population pairs (194 of 990) that were significantly different, Lyon/Mono were significantly different from almost all other populations, reinforcing its genetic distinctiveness. Further, in the STRUCTURE analysis, the Lyon/Mono population was the only population forming its own cluster, which again supports the idea that this population is genetically distinct.

Benedict *et al.* (2003) suggested that the Lyon/Mono population has been isolated from other greater sage-grouse populations for thousands or perhaps tens of thousands of years, noting that most members of the population carry mitochondrial haplotypes that are not found elsewhere across the species range. In total, there are seven novel haplotypes of 10 found in the population, and 48 of the 54 individuals from Lyon/Mono carry one of those seven. The results of our NCA support the theory of Benedict *et al.* (2003) as one of our clades (1-3) representing the Lyon/Mono separation was characterized by allopatric fragmentation.

The concept of evolutionary significant units (ESUs) is increasingly used to set management goals for populations or groups of populations below the species level (e.g. Parker *et al.* 1999). Although the most appropriate definition of an ESU is currently being debated, the general concept is that a population that has diverged a significant amount genetically is evolutionarily independent from other populations. The debate involves the question of how much genetic differentiation is significant and the strictest definition incorporates the phylogenetic species concept. According to Moritz (1994), an ESU should 'be reciprocally monophyletic for mtDNA alleles and show significant divergence of allele frequencies at nuclear loci', whereas a management unit (MU) would require 'significant divergence of alleles at nuclear or mitochondrial loci'.

We have demonstrated that Lyon/Mono has significant divergent allele frequencies of nuclear microsatellite loci,

Evolutionary Significant Unit - ESU

(15)

but the mtDNA control region haplotypes are not reciprocally monophyletic despite most being newly arisen within this population. Although the Lyon/Mono population would be considered an MU as defined by Moritz (1994), it would not be considered an ESU. We believe, however, that Moritz's (1994) restrictive definition of ESU should not be applied without careful consideration of several aspects of the breeding biology of the species under consideration. In some cases, reciprocal monophyly may appear long after complete and irreversible isolating mechanisms are in place. Further, the time it takes to reach reciprocal monophyly in mitochondria is dependent upon such factors as effective population size of females, and population dynamics related to expanding vs. contracting populations. In a lek-breeding species such as the greater sage-grouse where a few males do most of the mating, sexual selection can act to influence morphological and behavioural traits at a rate much faster than can be tracked genetically. Also, as a consequence of that breeding biology, the nuclear genome may undergo more of a bottleneck relative to the maternally inherited mitochondrial genome than it would in most species. In essence, this would delay the time that it takes the mitochondrial genome to reach reciprocal monophyly relative to the amount of differentiation that is simultaneously occurring in the nuclear genome.

Surprisingly, the Lyon/Mono population is at least as divergent from other populations of the greater sage-grouse as Gunnison sage-grouse are from the greater sage-grouse by virtue of the large number of new haplotypes unique to that population. Gunnison sage-grouse were recognized as a new species of sage-grouse based on morphological, behavioural, and genetic data (Young *et al.* 2000). Preliminary comparisons of gross morphology and behaviour between Lyon/Mono and surrounding greater sage-grouse populations, however, have revealed little or no differences (S. E. Taylor, unpublished). This suggests that while Lyon/Mono may have been isolated for an amount of time similar to the isolation of Gunnison sage-grouse, they have not experienced a significant divergence in morphology or behavioural characteristics as has been documented in Gunnison sage-grouse (Young *et al.* 2000), which ultimately led to their reproductive isolation.

Because Lyon/Mono is so genetically different, however, they deserve special attention. They certainly qualify as a distinct population segment from a genetic standpoint and may even warrant consideration as a new subspecies based on our genetic data. However, more comprehensive morphological and behavioural comparisons should be performed before a change in taxonomic status should be considered. Regardless of the label placed on this population, it should be managed separately and protected because of its genetic distinctiveness as it may contain genetic variation that may be important to the survival of the species over large timescales.

Our study documented the distribution of genetic variation across the entire range of the greater sage-grouse, determining that the Lyon/Mono population has a unique history of isolation distinct from all other populations and that two populations in Washington have low levels of genetic diversity. Further, we found that isolation by distance has left in imprint on greater sage-grouse gene pools, and that local adaptation is a realistic possibility for the species and should be considered in decisions involving translocations. This genetic data used in conjunction with large-scale demographic and habitat data will provide an integrated approach to conservation efforts for the greater sage-grouse.

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Evaluation of the eastern (*Centrocercus urophasianus urophasianus*) and western (*Centrocercus urophasianus phaios*) subspecies of Sage-grouse using mitochondrial control-region sequence data

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Abstract

The status of Sage-grouse (*Centrocercus urophasianus*) is of increasing concern, as populations throughout its range have contracted as a result of habitat loss and degradation. Historically, Sage-grouse were classified into two subspecies: eastern (*C. u. urophasianus*) and western Sage-grouse (*C. u. phaios*) based on slight differences in coloration noted among eight individuals sampled from Washington, Oregon, and California. We sequenced a rapidly evolving portion of the mitochondrial control region in 332 birds from 16 populations. Although our sampling area covers the proposed boundary between the eastern and western subspecies, no genetic evidence to support the delineation of these subspecies was found. However, a population straddling southwestern Nevada and eastern California was found to contain an unusually high proportion of unique haplotypes, consistent with its genetic isolation from other Sage-grouse populations. Of additional interest was the lack of diversity in the two populations sampled from Washington, one of which contained only a single haplotype. We suggest that multiple lines of evidence are valuable for the formulation of conservation strategies and hence the southwestern Nevada/eastern California population merits further morphological, behavioral, and molecular investigation.

Introduction

The status of Sage-grouse (*Centrocercus urophasianus*) is of increasing concern, as populations throughout its range have been negatively impacted by habitat loss and degradation (Braun 1998). This has resulted in their extirpation from five U.S. states and one Canadian province (Johnsgard 1973; Braun 1998). Remaining populations often become isolated and contain small numbers of individuals (Braun 1995) (Figure 1).

Historically, Sage-grouse were classified into two subspecies: eastern (*C. u. urophasianus*) and western Sage-grouse (*C. u. phaios*) based on slight color differences in eight individuals collected from Washington, Oregon and California (Aldrich 1946). Western Sage-grouse presumably occurred in southern British Columbia, central Washington, east-central Oregon, and northeastern California (Aldrich 1946). Populations in other areas of the range are considered to be eastern Sage-grouse. The validity of this taxonomic distinction has since been questioned (Johnsgard 1983).

While this species has recently been the target of extensive conservation efforts, the taxonomic/genetic relationships between populations/subspecies remain poorly understood. At the southeastern edge of their range, Sage-grouse from southwestern Colorado and

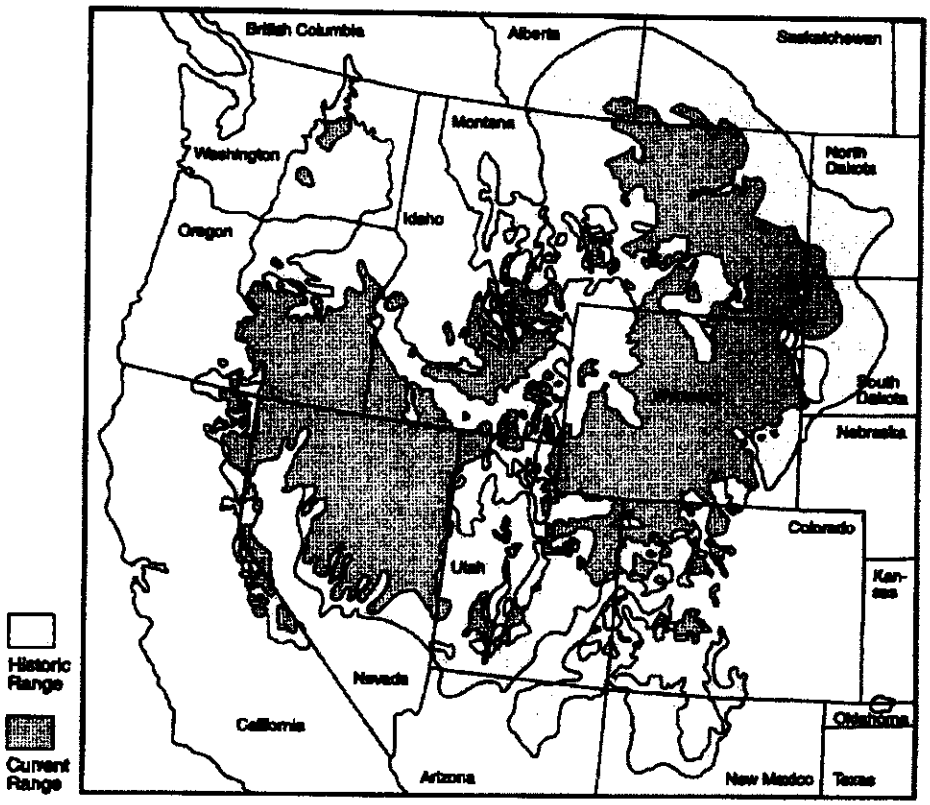

Figure 1. Historic (early 1900s) and current distribution of Sage-grouse in western North America.

southeastern Utah have recently been described as a new species known as Gunnison Sage-grouse (*C. minimus*) (Young et al. 2000), based on morphological (Hupp and Braun 1991), behavioral (Young et al. 1994), and genetic (Kahn et al. 1999; Oyler-McCance et al. 1999) data. For the genetic studies, Oyler-McCance et al. (1999) and Kahn et al. (1999) sequenced a rapidly evolving portion of the control region of mitochondrial DNA (mtDNA) from nine populations of Sage-grouse in Colorado, spanning the boundary between the commonly found Sage-grouse and the Gunnison Sage-grouse. Both these data and additional data from nuclear microsatellites (Oyler-McCance et al. 1999) suggests a lack of gene flow between these groups.

Because the distinction between the eastern and western subspecies has been questioned (Johnsgard 1983), our objective was to use the methods of Kahn et al. (1999) and Oyler-McCance et al. (1999) to determine whether there was evidence at the genetic level to support designation of the western subspecies. While genetic data alone can only support or not support a subspecies distinction, we believe that, as in Young et al. (2000), morphological, behavioral, and genetic data when used in conjunction, can help clarify such taxonomic questions. In addition, we were interested in providing information relevant to an understanding of gene flow, genetic diversity, and evolutionary history among Sage-grouse populations in Washington, Oregon, Nevada, and California. This type of information can often be used in the development of cohesive management strategies that take genetic distinctiveness into account.

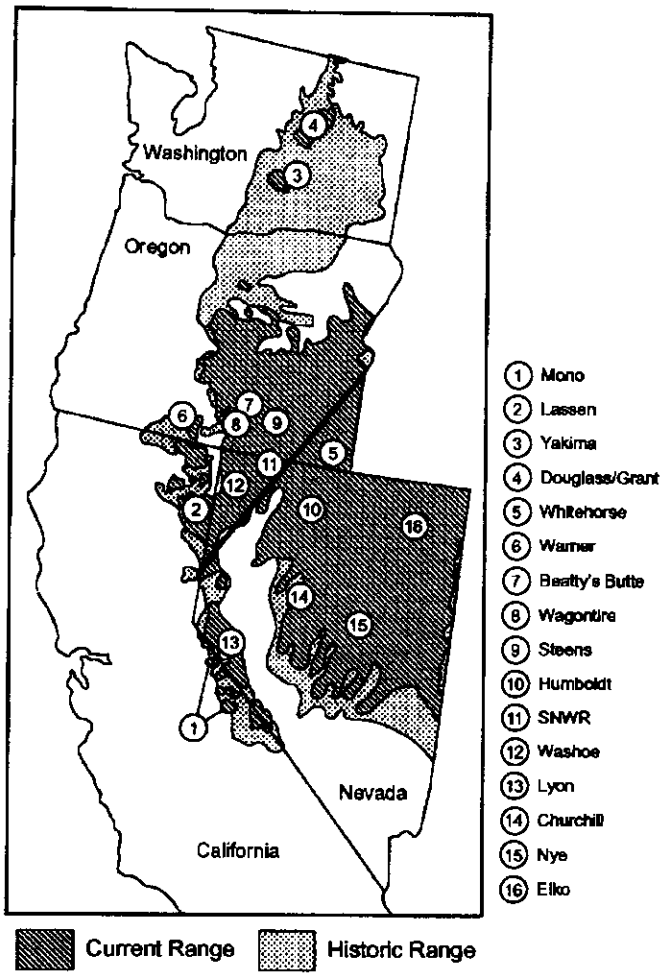

Figure 2. Location of study populations. The solid line denotes the delineation between the eastern and western subspecies as proposed by Aldrich (1946).

Methods

Sage-grouse tissue samples were collected from 16 populations in California, Nevada, Oregon, and Washington (Figure 2), crossing the boundary separating the eastern and western subspecies as described by Aldrich (1946, 1963). Approximately 20 birds were sampled from each population (Table 1). Most tissue samples consisted of muscle obtained from wings of hunter-killed birds. Consequently, these wings were collected by hunt unit, which we are loosely referring to as "populations". These units were delineated by the wildlife professionals most familiar with these birds and the geographic regions in which they reside. These biologists further suggest the Lyon (NV) and Mono (CA) populations are more appropriately considered as a single contiguous population that happens to cross a state boundary (D.S. Blankenship, pers. comm.; S.J. Stiver, pers. comm.; C.E. Braun, pers. comm.; J.R. Young, pers. comm.). To minimize the concern

Table 1. Individuals sampled, by population and haplotype.
Haplotypes underlined and in italics are from clade I, while those in bold are from clade II.
α = represents proportion of haplotypes from clade I.
N* = number of individuals sequenced.
Bottom two rows show the Lyon/Mono population vs. all others

	N*	α	*A*	B	*F*	O	Q	T	U	X	*AG*	*AU*	AV	*AZ*	*BB*	BD	BF	BO	*BX*	*CH*	CJ	CK	CN	CR	*DA*	*DB*	*DC*	*DD*	DH	DL	DM	DS	*DT*	BJ	BK	*BL*	*BM*	BQ	DP	*DQ*
Yakima WA	18	0.00								18																															
Douglas/Grant WA	18	0.11								13																															
Whitehorse OR	33	0.42	14	1			1	10	4	2											1											3	2							
Sierra OR	21	0.29	5	1	1		1	8		4																					1									
Warner OR	19	0.37	4		1		2	2		5													1	2				1					1						
Wagontire OR	19	0.42	6		1		4	2	1	1										1			3																
Beatty's OR	21	0.29	4				1			6			4							2	2	1		1															
Churchill NV	18	0.06		2				5		8				1		1	1																						
Washoe NV	20	0.40	6				3		1	6				1				1	1		1																		
Elko NV	20	0.50	3	3						5	1	4	2												1		1												
Humboldt NV	21	0.67	10	2			1	1		3																4													
Sheldon NWR NV	19	0.16	2			1	2	6	1	6					3																								
Nye NV	20	0.30		4				1		9	1			4	1																								
Lyon NV	20	0.20					1																											5	9	3	1	1		
Mono CA	23	0.65																																7		4	8		1	3
Lassen CA	22	0.23	5				4			8			1															1	1	2									

			A	B	*F*	O	Q	T	U	X	*AG*	*AU*	AV	*AZ*	*BB*	BD	BF	BO	*BX*	*CH*	CJ	CK	CN	CR	*DA*	*DB*	*DC*	*DD*	DH	DL	DM	DS	*DT*	BJ	BK	*BL*	*BM*	BQ	DP	*DQ*
Others	289	0.31	59	13	3	1	19	35	7	94	2	4	7	6	2	1	1	1	1	3	4	1	4	3	1	4	1	1	1	1	3	3	3							
Lyon/Mono	43	0.44					1																											12	9	7	9	1	1	3

of over-sampling from single broods, primarily adult (86%) females (87%) were sampled after they had already left their lek sites.

The only populations in this study that are no longer hunted are those in Washington. Samples from these birds consisted of either blood or feathers and were provided by M. A. Schroeder of the Washington Department of Fish and Wildlife. These birds were trapped following the methods of Giesen et al. (1982) and blood was collected as described by Oyler-McCance et al. (1999).

In most cases DNA was extracted using a phenol-chloroform based extraction as described by Kahn et al. (1999). All other samples were extracted using either a chelex-based method (Walsh et al. 1991) or the Wizard Genomic DNA Purification System (Promega), following the manufacturer's instructions.

The Polymerase Chain Reaction (PCR) amplification and manual sequencing was performed following the protocol and using the primers outlined by Kahn et al. (1999), in approximately two-thirds of the cases. All reactions were performed using previously described primers, 16775L (Quinn 1992), 521H (Quinn and Wilson 1993), and 418H (Quinn and Mindell 1996). In their study, Kahn et al. (1999) found that 92% of the variation contained in a 380 bp region of the highly variable mitochondrial control region I, was within a 141 bp region. It was this 141 bp hyper-variable region that was sequenced in our study. The remaining one-third of our samples were sequenced using a dye terminator cycle sequencing reaction (Beckman Coulter CEQ2000), using the same primer sets. In these instances, double-stranded PCR products were cleaned using either QIAquick spin columns (Qiagen) or Amicon Microcon-PCR Centrifugal Filter Devices (Millipore), following the manufacturers instructions. The cycle sequencing and subsequent purification of the dye-labeled products was performed using the manufacturer's protocol. These samples were then run on the CEQ2000 automated sequencer (Beckman Coulter).

All sequences were aligned manually and haplotypes were identified using the program MacDNAsis Pro Version 2.0 (Hitachi). Nei's minimum distance (Nei 1972), Roger's distance (Rogers 1972), and Wright's modification of Roger's distance (Wright 1978) were calculated using the software TFPGA (Miller 1997). Neighbor-Joining trees were constructed using the Phylip software package (Felsenstein 1989). A maximum parsimony analysis was performed using the heuristic search algorithm in the software package PAUP*4.0b4a (Swofford 1999), as was done in Kahn et al. (1999). Evaluation of F-statistics was performed using the TFPGA software package (Miller 1997).

To determine whether there was genetic support for the subspecies distinction, we used a randomization test (Manly 1991). In this test, the six populations belonging to the eastern subspecies were pooled as were the nine belonging to the western subspecies. The frequency of each haplotype was calculated for each subspecies, using the following statistic:

$$x = \sum_{i=1}^{38} \frac{(fw_i - fe_i)^2}{\left(\frac{(fw_i + fe_i)}{2}\right)}$$

where fw is the frequency of haplotype i in the western subspecies and fe is the frequency of haplotype i in the eastern subspecies. To compare these frequency differences to those generated with randomized groupings, six populations were randomly assign to the eastern subspecies and nine populations to the western subspecies. The test statistic x was then recalculated. This process was repeated 30,000 times. Our original statistic was then compared to the distribution of the 30,000 randomly generated statistics to determine P values. This procedure was also modified to test whether the Lyon/Mono population and Washington populations were statistically different from all other populations.

Results

Thirty-eight haplotypes were identified among the 332 birds assayed (Table 1). Collectively across all haplotypes, 40 sites were variable. These sites contained 27 transitions, 12 transversions, 7 deletions, 4 insertions, and one site containing both a transition and a transversion. Twenty of these sites were informative for parsimony analysis. All haplotypes fell into one of the two distinct monophyletic clades (Clade I and Clade II) described in Kahn et al. (1999) (Figure 3). Of these 38 haplotypes, 33 had not been described in previous studies by our lab (genbank accession numbers AF543863–AF543895). Labeling of haplotypes by our lab has progressed alphabetically as they have been identified. An evaluation of the distribution of haplotypes revealed that five of the previously identified and widespread haplotypes (A, B, Q, T, and X), were found in at least 6 and as many as 14

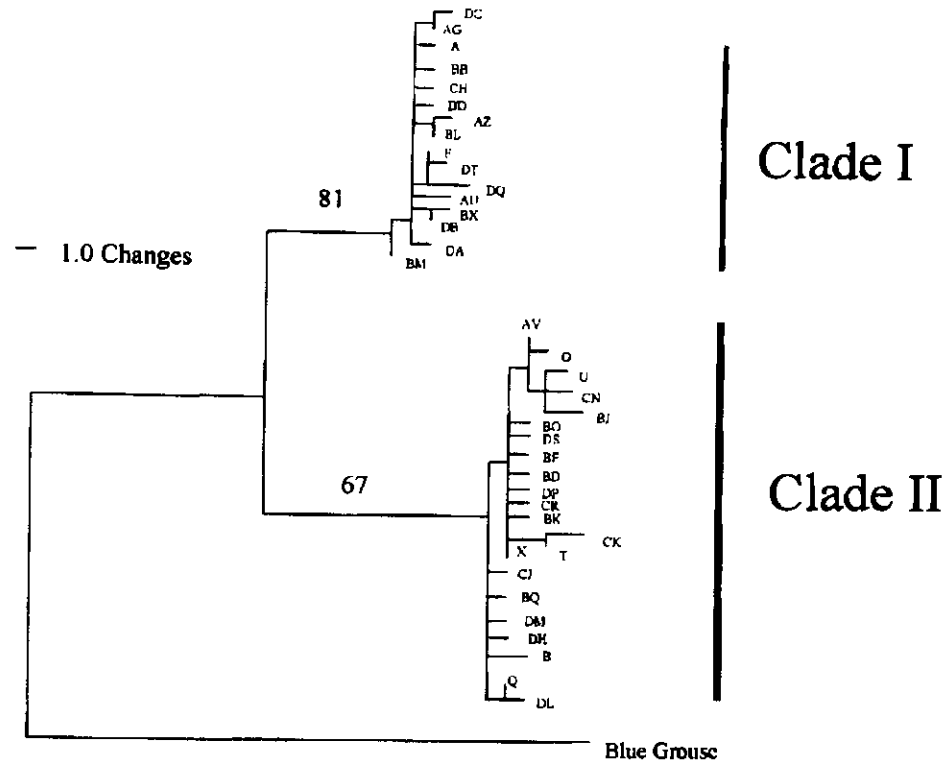

Figure 3. Phylogram of the strict-consensus tree of all haplotypes presented. The tree has a consistency index of 0.882, a retention index of 0.970 and a rescaled consistency index of 0.856. Bootstrap values > 50 are presented on the branches of the tree.

of the populations sampled. Of the birds sampled, 221 (66.6%) had one of these five haplotypes. The X haplotype was found in all populations sampled except the Lyon/Mono population. This widespread haplotype was the only one found in the Yakima (WA) population and constituted the majority of the haplotypes in Douglass/Grant (WA) birds.

Of the 29 newly identified haplotypes, 17 are unique to single populations. Of the remaining 12, only three are present in more than two populations. The most abundant and widespread haplotypes encountered in this study (A through X) are also found in eastern Sage-grouse as far away as Colorado. When these common haplotypes are removed from our data set, only 11 haplotypes that are shared among two or more populations remain.

Since all multiple neighbor-joining trees suggested similar partitioning, a single representative tree is presented (Figure 4). There is no partitioning of the populations representing the eastern and western subspecies. However, the Lyon/Mono and Washington populations do segregate from the other populations.

The distribution of novel haplotypes was evaluated, as was the proportion of novel haplotypes among groups. The frequency with which these novel haplotypes are found in their respective groups ranged from 0 (Whitehorse, Wagontire, Beattys, Steens, Sheldon NWR, and Nye), to a high of 97.7% (Lyon/Mono) (Figure 5). With the exception of Lyon/Mono, no population had more than 30% of its individuals comprised of these novel haplotypes. The F-statistics provided no support for the subspecies distinction (Fst = 0.0356, $p > 0.05$).

The randomization test showed no genetic support for the subspecies distinction ($x = 1.49$, $P > 0.05$). In contrast, the distribution of haplotypes in

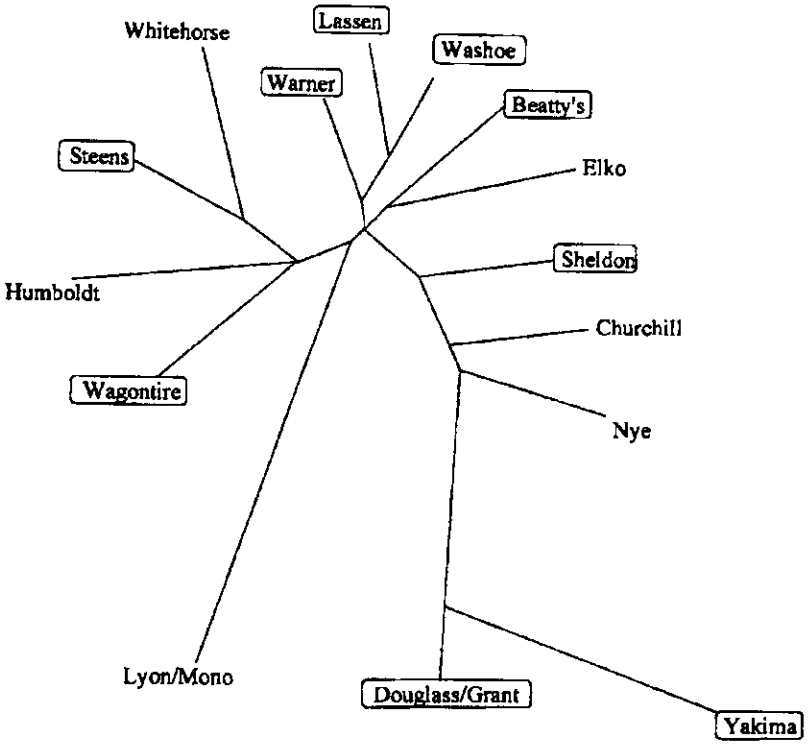

Figure 4. Neighbor-Joining tree constructed using Wright's (1978) modification of Roger's genetic distance (Boxed populations represent the western subspecies, while unboxed populations represent the eastern subspecies).

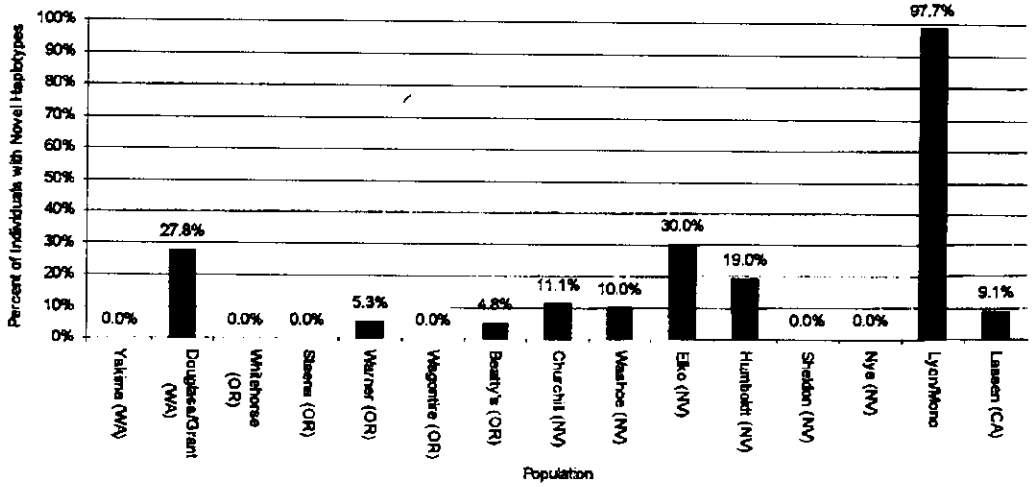

Figure 5. Proportion of individuals per population with novel haplotypes.

Lyon/Mono was statistically different from all other populations ($x = 3.86$, $P < 0.001$). The Washington populations were also statistically different from all other populations ($x = 2.61$, $P < 0.05$).

Discussion

Fossil records from the Pleistocene document Sage-grouse in Colorado, Nevada, New Mexico, Utah, Wyoming, and Idaho (Shufeldt 1913; Howard and Miller 1933; Howard 1952; Miller 1963; Miller 1965; McDonald and Anderson 1975; Grayson 1976; Emslie 1985; Emslie and Heaton 1987; Emslie 2001). By 6,000 years ago Sage-grouse were also documented in northern California (Miller 1963; Grayson 1976). Pollen records suggest that the requisite sagebrush (*Artemisia* spp.) habitat was patchily distributed throughout the southwestern United States during the Pleistocene (Van Devender and King 1971; Wright et al. 1973; Madsen and Currey 1979; Emslie 1986; Nowak et al. 1994; Hall and Valastro 1995; Koehler and Anderson 1995). It would follow that Sage-grouse were limited to these patchily distributed refugia during this Epoch. This may explain the two distinct monophyletic haplotype clades described by Kahn et al. (1999). These two clades are thought to have begun diverging approximately 850,000 years ago in two geographically isolated populations of Sage-grouse. Under this hypothesis the two clades subsequently intermixed as these populations re-converged.

Analysis of Molecular Variance (AMOVA) is often used for the analysis of sequence based population data in part because it can weight allelic/haplotypic differences according to the number of base substitutions between them. However, in this case, the largest differences between haplotypes come in comparisons between members of Clade I and Clade II. It is the considerable sequence divergence between these two haplotype clades that pose unique difficulties in performing conventional molecular analyses (Figure 3). These differences actually relate to biogeographic conditions that no longer exist (see above) and hence weighting haplotypes according to those differences adds more noise than signal to the analysis. The subtle molecular differences among the modern populations that we have sampled are found in the relatively shallow branches of the respective clades and become obscured when haplotypes of its divergent sister clade are included. All populations, except Yakima (WA), contain multiple haplotypes from both clades. Furthermore, since neither clade is predominant in all populations, neither can be independently evaluated in our molecular analyses, as we would thus encounter unacceptably low sample sizes. Consequently, our analyses focused primarily on the distribution of haplotypes among our populations, rather than on haplotype distances. It is specifically because of these difficulties that statistical tests such as AMOVA were forsaken for the frequency based randomization test previously described.

The number of haplotypes per population ranged from one (Yakima, WA) to nine (Warner, OR), with an average of 6.4. Most populations had a combination of common, rare, and novel haplotypes. The distribution of widespread, common haplotypes showed there was no obvious genetic subdivision between the eastern and western subspecies. In addition, 42% of birds in this study share five haplotypes (A, B, F, X, AG) with populations from Colorado and Utah (Kahn et al. 1999). The Washington populations and the Lyon/Mono population are obvious exceptions to this overall pattern.

Ten of sixteen populations sampled contain novel haplotypes that, to date, are unique to those populations. Typically, these haplotypes vary from those previously described by a single base change (Figure 3). They occur in low frequency in most populations, typically fewer than 10% of the individuals. In stark contrast, 87.5% of the haplotypes found in the Lyon/Mono population are novel, constituting 97.7% of the birds sampled (Figure 5). The only shared haplotype is from a single individual possessing the widespread Q haplotype. Further, the Lyon/Mono population does not contain the ubiquitous X haplotype that has been found in every other population sampled in this study. This high proportion of novel haplotypes coupled with the lack of the X haplotype suggest the Lyon/Mono population has been isolated from neighboring populations for a considerable amount of time. Further, since novel haplotypes closely related to both of the divergent Sage-grouse mitochondrial clades can be found, it is likely that the isolation of this population occurred after the intermixing of historic populations representing the two major haplotype clades. Over thousands and perhaps tens of thousands of years, factors such as mutation, genetic drift, and the fixation of rare haplotypes have resulted in the significant divergence of the Lyon/Mono population from other Sage-grouse populations.

The Washington populations contain the lowest level of haplotype diversity observed. Although two

haplotypes are unique to the Douglass/Grant population, a single haplotype (X) is found in the majority of individuals (86.1%). Low allelic diversity is expected in populations that have recently experienced severe bottlenecks (Hoelzel et al. 1993; Zink 1994; Bouzat et al. 1998; Le Page et al. 2000). Given that these populations now occupy between 8 and 10% of their original range (Friedman and Carlton 1999), such a bottleneck is plausible. Nonetheless, these results could also be explained by the founder effect as the species' range expanded into its northwestern edge during relatively recent postglacial periods.

The neighbor-joining tree shows a lack of dichotomy between the populations representing the eastern and western subspecies (Figure 4). The long branch length of the Lyon/Mono population is attributable to the unique allelic composition of these birds, as evidenced by both their high proportion of novel haplotypes as well as the lack of the widespread X haplotype. Conversely, the long branch representing the Washington populations can be explained by their relative low level of haplotype diversity. This lack of genetic diversity, rather than their unique allelic composition, sets the Washington birds apart.

Using mtDNA sequence data, we found no evidence to support the subspecies delineation proposed by Aldrich (1946). These data, however, did uncover the distinctiveness of the Washington and Lyon/Mono populations. The low genetic diversity in the Washington populations is likely a reflection of population declines (Schroeder et al. 2000). The probable loss of genetic variation caused by this bottleneck and its potentially long-term adverse impact (Bouzat et al. 1998; Le Page et al. 2000) should be addressed as management strategies are developed for these populations. Active management, such as translocation of birds, may be justified to ensure their continued persistence. Preservation of genetic diversity represented by the unique allelic composition of the Lyon/Mono population is also of particular importance for conservation. Given the likelihood that the distinctiveness of neutral genetic markers extends to genes under adaptive selection, this population should be managed independently to avoid the translocation of other Sage-grouse into this area.

Studies in our lab are ongoing to further evaluate populations of Sage-grouse throughout their range, using nuclear microsatellite markers. Meanwhile, it will be critical that additional morphological and behavioral studies of the Lyon/Mono population be undertaken to address taxonomic questions. Sound conservation strategies require that multiple and mutually supportive lines of evidence be used to make prudent delineations at the species and subspecies level.

Acknowledgements

We thank the Colorado Division of Wildlife, Nevada Division of Wildlife, Western Association of Fish and Wildlife Agencies, National Fish and Wildlife Foundation, USDA/Forest Service, and USDI/Bureau of Land Management for funding in support of this and ongoing research. We thank D. S. Blankenship of the California Department of Fish and Game, K. R. Durbin and E. V. Rickerson of the Oregon Department of Fish and Wildlife, S. J. Stiver of the Nevada Department of Wildlife, and D. L. Mitchell of the Utah Division of Wildlife Resources for providing Sage-grouse wings and location information. We also thank the many other wildlife managers who coordinated sample collection and hunters who cooperated with those managers. C. A. Wassell and C. Marander of Colorado State University edited the distribution map which was provided to us by M. A. Schroeder of the Washington Department of Wildlife. Statistical review and comments were provided by K. P. Burnham and J. C. Fogleman. Supporting instrumentation was available through the National Science Foundation grant 9977691.

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September 21, 2007

Brett M. Baden, Ph.D., Senior Associate
Industrial Economics, Inc. (IEc)
2067 Massachusetts Avenue
Cambridge, MA 02140-1337

RE: F.I.M. Corporation response to MEMO dated 8/24/2007; "Grazing Questions Concerning the Sierra Nevada Bighorn Mountain (sic) Sheep"

Dear Mr. Baden:

Introduction:
In preparation for writing this reply to Dr. Baden's letter we reviewed several economics papers that are specific to grazing livestock on federal lands under the federal grazing permit system. Most papers of this type have focused on cattle production and sales, with very little detailed evaluation of modern sheep production. *(Attachment 1)*

It would be more convenient to be able to refer to academic reports or papers, but the best we can do is depend on our own records offer some rough estimates based on our experience. We would suggest that about three to four sheep produce the same value of products (lambs and wool) as one cow produces each year. That is a ewe provides a $10 fleece and a $100 lamb where a cow provides a $400 calf so as a really rough estimate, 3½ sheep represent the economic return to a ranch that one cow provides when her calf is sold. Another perspective is provided when you consider that our sheep weigh about 150 pounds, so about seven of our sheep (each nursing a lamb) require the same amount of forage by weight as a 1,000 pound cow (nursing a calf). The amount of forage consumed by a 1,000 pound cow with a calf is called an "Animal Unit Month" or "AUM". It is our assumption that the economic return of an AUM of forage eaten by sheep is at least twice that provided by a cow/calf pair. On the other hand, as illustrated below, the costs of producing the lambs and wool is considerably higher per AUM than the costs of producing calves. There is much greater expense in producing sheep.

Following are three good papers, neither this nor the others we reviewed provided much detail concerning the effects of sheep ranch annual sales on local economies.

These authors concentrated on beef production, so we have included some comparisons between sheep and cattle in an attempt to use the data in these papers as a basis for discussing our sheep ranch:

A. ANALYSIS OF IMPACTS OF PUBLIC LAND GRAZING ON THE ELKO COUNTY ECONOMY AND MOUNTAIN CITY MANAGEMENT AREA: ECONOMIC IMPACTS OF FEDERAL GRAZING IN ELKO COUNTY
Jonathan Alevy, Elizabeth Fadali, and Thomas R. Harris
TECHNICAL REPORT, UCED 2006/07-03
University of Nevada Reno, May, 2006

B. ECONOMIC IMPORTANCE OF LIVESTOCK IN NEVADA'S COW COUNTIES.
A.L. "Tony" Lesperance, 6/1/05,
Liberty Land and Livestock, Paradise Valley, Nevada

C. PROPERTY RIGHTS ON WESTERN RANCHES:
FEDERAL RANGELAND POLICY AND A MODEL FOR VALUATION
Angus P. McIntosh. December 2002
Ph.D. dissertation at New Mexico State University, Las Cruces NM

The Alevy paper calculates that one AUM from federal grazing land in Elko County could be associated with as much as $84 in value of cattle production. That means that ranch production total economic impacts from one AUM of federal grazing are associated with as much as $148 of total economic activity, $30 of labor earnings and 0.0014 jobs. Please let us know if you would like an electronic copy of this paper.

The Lesperance paper (attached) notes that the costs of producing a calf for market average $350 of cash outlays each year per calf. That money is spent within the local community for labor, supplies, equipment, veterinary services, attending government required meetings, etc. In northeastern Nevada it can be assumed that each cow utilized about six to eight AUMs of forage from federal grazing permits and spent the balance of the year on private lands.

McIntosh discusses the legal background of federal land grazing permits and the nature of property law as developed in Western States with regard to rights-of-way, easements, water rights, and other property rights issues. He then developed a model to calculate the value of the Pine Creek Ranch using each of several valuation techniques. Of particular interest is the fact that water rights law in the Western states is based on the doctrine of prior appropriation and beneficial use as opposed to riparian water rights law traditionally applied in the Eastern states.

Please note that a ranch has to own a cow for the entire year in order to produce and sell a seven month old calf just as a sheep ranch has to own and feed the sheep all year in order to produce and sell an annual lamb crop.

If the assumptions we began to describe above are close, then the expenses of sheep production (cash spent in the local community) is at least double the above costs for cattle production. Sheep ranches and cattle ranches have one unfortunate thing in common, we both operate on a very slim margin of profit. In good years our profit may be 4%. Nearly all of the proceeds from sale of our products are spent within several Nevada and California Counties.

Here are some examples of why more money is circulated within the local economy when sheep are raised than for similar herds of cattle, and why sheep production is an important part of the local economy in several counties:

1. Labor expenses. F.I.M. Corporation employs at least 18 people and supports three generations of our family as owner/operators of this ranch enterprise.
2. Sheepherders expense. Sheep have to be herded with a Shepherd present 24 hours per day, all year round.
3. Shearing expense. Sheep have to be sheared by a large crew of specially equipped, contract sheep shearers. The shearing crew travels from ranch to ranch and shear sheep at a cost of about $3.50 per head. The wool then requires the expense of shipping by truck to one of several wool buyers in Utah, California, or other locations. In recent years, our wool has been shipped to China which requires our loading the wool into shipping containers.
4. Predator control expense. Cash is paid for trappers, lion hunters, and aerial shooting of coyotes. Often our employees defend the bands of sheep (and the sheepherders) from bears and lions.
5. Camptender expense. A band of sheep has to have a Camptender to supply food, water, medicine, and other supplies to the sheepherder every few days. Our Camptenders also provide direction to each herder about where to pasture and water his sheep every day. This involves pick-ups for transportation; including fuel, tires, repairs, and maintenance.
6. Operating expenses. We are stalwart customers of the equipment companies in our community, spending thousands of dollars each year. Farm equipment such as tractors costs over $100,000, and other equipment such as bailers and swathers are repaired or replaced each year in order to produce hay needed for the sheep during each winter. Sheepherders, Camptenders and all of the family members require transportation, equipment, and supplies needed for each of a several sheepherders and bands of sheep. Each band of sheep is grazed within specific rangeland areas and during the summer they are located a long ways from the headquarters and from each other. During the last couple of years we have had to cut down on our production operating expenses due to the extra costs of lawyers, consultants, and requirements of the agencies in order to continue our operation during this time of increasing regulation.
7. Fewer sheep and they can't be replaced. Our sheep husbandry has resulted in selected traits of sheep that are uniquely suited to herded grazing on open range. We have to select sheep for breeding that possess the necessary traits and then

use our own ewe lambs to replace the older sheep. Sheep like ours can't be purchased, so it takes years to build the numbers of sheep that have then be sold due to unpredictable agency regulation efforts.

8. Fewer sheep but increased expenses for everyone. Our sheep numbers have been reduced greatly in the past few years due to the bighorn sheep, and that means that the bighorn regulations have negatively affected both the income of the ranch and the economies of our local rural communities. At the time our regulatory expenses have increased and our operating expenses/overhead has remained about the same, but the ability to pay for the expenses has been greatly reduced. It should be noted that the government has already spent over Thirty-five Million Dollars on the bighorn program but cannot claim that the money caused us to have more bighorn sheep. Most of the money was spent at other locations, colleges, etc. and did not benefit the economies of Lyon and Mono Counties. In fact the loss of livestock means that the money spent by agencies cost our local economies many millions of dollars. If we learn anything from this bighorn sheep effort we should realize that our society needs policies that will protect our agricultural producers, that endangered species biologists are not productive members of society, and that the indiscriminate distribution (transplanting) of bighorn sheep has gone too far (bighorn sheep transplanted into the areas north of Mammoth Lakes have failed to thrive).
9. Costs of Critical Habitat. Impact of bighorn sheep critical habitat will be extremely damaging to our communities. As proposed, the critical habitat designation and proposed taxonomic change will be used to prohibit domestic sheep grazing, many forms of recreation, and access to water and other natural resources. All of this damage the local economies, but the proposed actions will not benefit the bighorn sheep in the northern recovery area.
10. Fifth Amendment Takings. F.I.M. Corporation has, for over seventy years, invested money, time, and labor in the development and management of these grazing allotments. Based on our history of purchasing grazing allotments, using and developing the infrastructure needed for proper management, and the nature of property rights laws we would project a substantial payment from the federal government for the Takings of our property rights and interests. That money will provide a short term benefit to FIM, but the long term cost to the Counties becomes enormous as the annual increments of cash spent to produce sheep (cash for jobs, equipment, supplies, travel, taxes, etc.) comes to an abrupt end and no longer exists far into the future.

RESPONSES TO DR. BADEN'S QUESTIONAIRE:

Following are answers or responses to your questions with numbers that correspond to the item numbers in the 24 August Memo. We have included additional information as requested in the Memo. Our sheep graze in various Allotments within herd units 1 & 2.

#1. Please note that the grazing allotments owned by F.I.M. Corporation provide summer forage for each of several bands of sheep each summer. Those sheep graze within other Forest Service Allotments, Bureau of Land Management Allotments, private lands, and County or State lands during other months or seasons of the year. There is no alternative source of summer forage for these sheep so the loss of a summer grazing permit usually will mean that the entire band of sheep will be sold. We must have a dependable source of forage for every day of the year. Loss of a summer permit in the Sierras damages the local economies in several Counties in both Nevada and California.

We have been grazing sheep in the following Forest Service Allotments for 61 years:
900 sheep with lambs in Dunderberg Allotment
900 sheep with lambs in Cameron Canyon Allotment
900 sheep with lambs in Tamarack Allotment
1000 sheep with lambs in Bloody Canyon Allotment

F.I.M. also owns property rights within the Federal Allotments that are a part of our investment based expectations for ownership and operation of this sheep ranch. We have spent both time and money to develop roads, corrals, and other infrastructure. Purchase of the allotment permits from our predecessors included purchase of all range improvements, rights of way, water rights and appurtenant forage use. Our water rights holding are extensive, for the beneficial uses of both livestock water and irrigation water. Our livestock have exclusive use of all the water within the four allotments listed above. Please refer to Dr. McIntosh's thesis above for detailed discussion of a typical federal lands allotment.

As an example of the base value of the livestock water rights, the 3,700 sheep listed above and their 4,600 lambs would consume about three gallons of water per day per head. In the four months they are present, the sheep would consume 2,988,000 gallons of water or 9.2 acre-feet of water (@325,851 gallons per acre foot). However, the water in the allotment is a property available for the FIM livestock at any time during the year, so the water available to these numbers of sheep amounts to 28 acre feet per year. At the current prices of water-rights in nearby urban areas, in excess of $40,000 per acre foot, the value of the livestock water in just these four allotments is $360,000 to $1,120,000. Prohibiting the beneficial use of the water rights is a Taking that requires compensation from the government. Similarly the value of rights of ways and range improvements must be considered for future costs to agencies who complete regulatory takings by prohibiting sheep grazing.

#2. Each of the allotments have about 6,000 acres. Due to ESA listing of the SNBS, grazing has been prohibited in Bloody Canyon Allotment since 2001. Grazing has been denied in 2005 and again in 2007 in Dunderberg Allotment. Grazing has been prohibited in about one-half of the area of both the Cameron Canyon and Tamarack Allotments at the upper-most elevations (above 10,000 feet in elevation). Sheep numbers have been further reduced in the remaining areas

with permitted grazing from 1,800 sheep with lambs in two bands to about 1,000 in a single band for all of Tamarack and Cameron Canyon Allotments.

We have to presume that your question concerning "what is the price paid to graze the allotment?" means how much do we pay directly to the Forest Service. Our direct payment to the FS is about $1,000 to use each allotment each summer or about $3,000 for the Dunderberg, Cameron Canyon, and Tamarack. Please keep in mind that the payment for use of the allotment is the administrative fee based on a calculated cost per Animal Unit Month of forage also referred to as the charge per "head-month" in present Forest Service verbiage. As indicated in our records and in a number of published reports, the price paid as a grazing fee is a small part of the overall cost of grazing on federal lands. Our annual costs, just for grazing permits, amount to well over $20 per AUM (for every five sheep per month), and has gone up even more in recent years as permitted sheep numbers are reduced because of bighorns. Fixed costs have stayed the same or increased, and there are now fewer sheep to pay the costs.

#3. "Do rules concerning the bighorn sheep affect when you can graze?" Yes, substantially

"…does the timing of when you are allowed to graze affect how much feed" is obtained. Again, yes very substantially. These allotments can only be grazed during the summer. The number of sheep in each band is already established before the bands arrive at the allotment. It is not possible to increase the number of sheep when the grazing season is shortened unexpectedly, so reducing the length of time that grazing is allowed reduces the amount of forage consumed. We are only allowed about 1/3 of the time those range allotments would have been used. For example on Dunderberg Allotment we were only allowed to graze 36 days out of the regular 90 day grazing season. No grazing was allowed in Dunderberg in 2007.

At this time in Cameron Canyon and Tamarack Allotments we have 1025 ewes with lambs from 19 June to 21 September (95 days), and 1,650 ewes from 1 October to 15 October. Before the bighorns were transplanted and released next to us, we had 1,800 ewes & Lambs from 1 July to 30 September and 1,650 ewes from 1 October to 15 October.

But at least one-half of our range was cut off for bighorn, everything above 10,000 feet elevation which does not allow us enough pasture for our sheep for the full permitted grazing period. We must meet the Forest Service grazing standards on a smaller area of rangeland.

#4 Our primary contact is with the US Forest Service (USFS) District Ranger in Bridgeport California, Bridgeport Ranger District, HC 62 Box 1000, Bridgeport, CA 93517. Phone 760-932-7070, FAX 760-932-5899. That office is the regulatory office that issues our grazing operating instructions. They are directed by the US

Fish and Wildlife Service (USFWS) offices in both Ventura California and in Reno Nevada. The FS is also directed by the biologists with the California Department of Fish and Game (CDFG) in Bishop CA. Other agencies involved include the Bureau of Land Management (BLM) in Bishop CA, Mono County CA including Supervisors and Sheriff, California State Parks, US National Park Service, Nevada Department of Agriculture, University of Nevada Reno, University of California at Davis, and probably several more that we will think of later. Each agency expects F.I.M. to be provide substantial amounts of time, often with very little advanced notice.

Question number four includes a peculiar phrase that asks about agencies involved our "obtaining grazing rights" which implies that grazing rights are obtained new each year. Please note that "grazing rights" were established by the earliest settlers in this area and are not somehow re-obtained. However, under the grazing permit system with the federal agencies the use of long owned grazing rights are often curtailed or even prohibited by regulatory actions that are possible under the grazing permit contract. The right to use forage as a necessary appurtenance to the ownership of vested water rights was established under Mexico's laws long before the US Forest Service was created and those traditional property rights were retained following the Mexican cession, by Kearney's Code, the Treaty of Guadalupe Hidalgo, and the 1866 mining act among others.

#5 asks similar questions concerning two different topics. In the first part, FIM has been working with the bighorn situation since 1984, when the bighorn sheep were first transplanted and turned loose (by the California Fish and Game) adjacent to our sheep. At that time the USFS and CDFG both gave F.I.M. letters stating that they would never let the presence of the bighorn in the F.I.M. allotments interfere with or be a cause to cancel the permits.

Then in 2000 the USFWS irrationally and illegally listed this bighorn sheep as an endangered distinct population segment under the Endangered Species Act. From then on we have been continually negotiating with the USFS, the CDFG, the USFWS, and others as to the bighorn sheep that are or may be in or near our allotments.

Four of us work at least two (2) hours every day on our bighorn problems. Then there are many days when we work the whole day on bighorn issues. We have hired three lawyers and one Biologist/Range Ecologist to work with us continually. This effort has to be done at the expense of not getting other important work completed at the ranch.

We work with Dr. Anette Rink, DVM, Ph.D., Lab Director for Nevada Department of Agriculture Veterinary Lab. Dr. Rink has been invaluable in providing the scientific work on bighorn sheep taxonomy, and disease. We also work with Dean David Thawley, Dr. Hudson Glimp, Dr. David Thane all of University of Nevada Reno. All are experts on interactions of domestic sheep and bighorn sheep and like Dr. Rink

are experts in microbiology, epidemiology, and veterinary sciences. The costs of services from these experts isn't known, but if each devoted three weeks of work time at a cost of $200 per hour, then 480 hours is worth about $96,000. Dr. Nancy East, UCDavis Veterinary Department is a member of the SNBS Recovery Team and is a highly qualified Veterinarian. Of all the members of the Recovery Team, Dr. East's voice is the lone voice demanding sound scientific protocol and objective procedures.

In the last seven (7) years we have spent about $200,000 working within the administrative matrix/processes of the USFS, USFWS, CDFG, etc. We have driven or flown thousands of miles looking at range and negotiating with all these agencies. Destinations have been as close as Bridgeport or as far as Washington DC, Phoenix, San Antonio, and other locations where the leadership of these agencies could spare some time to hear our story. We estimate that at least five hours of work per day are specific to bighorn sheep issues by one of five principle FIM staff members. By Kris's calculation that amounts to about 1,680 hours per year lost to bighorn sheep regulatory issues that should have been spent on productive activities at the ranch. We would assign a cost of at least $80 per hour in wages, overhead, and lost productivity or $134,400 costs per year within the ranch. We have also spent between $25,000 and $40,000 per year for attorney and consultant fees. It is not an exaggeration to say that the hours of labor required for bighorn sheep related administration is added to our work days. Fred, for example, is often working at 3:00 am in order to complete letters and research needed for bighorn sheep issues and then goes on to the normal supervision of some 18 ranch employees. The financial burden is just one part of the hardship imposed by bighorn sheep regulation, but how do you place a dollar value on the loss of quality and increased stress of both business and personal lives?

Due to the cuts in our range permits we have had to spend over $30,000 per year to lease new pasture to protect ourselves and continue our operation. We have been forced to buy additional permits at a cost of approximately $300,000.

#6. We have had to hire an extra Camptender and provide a pick-up at a cost of about $3,000 per month plus the extra gas and travel costs. Due to the agency employees requiring that they directly count our sheep, we have traveled many miles to haul and assemble portable corrals so the agency people could watch us count our sheep. This was required so the agency biologists could try to count the sheep one by one through a chute. Agency requirements for additional guard dogs costs us about $300 per month extra.

We have attached the list of extra measures, called minimizing or mitigating measures, that we have to abide by at great additional costs for us and great difficulty for our employees the Sheepherders. Of particular concern, our sheepherders have to put in a great many extra hours of work that often interferes

with time he should be resting, cooking, or completing other necessary tasks. *(Attachments 2 and 3)*

The second question deals with contingency plans. The answer is Yes. The contingency plans include an "Escape" protocol that the ranch, our employees, and the agencies have all agreed to follow. We helped design these procedures before the biologists demanded "trigger lines" as something different from both the Allotment Boundary lines and the grazing management lines that were already in place. Please note that the so-called "trigger lines" are an artificial construct required by agency biologists with no practical or biological basis for them. However, regardless of the arbitrary nature of their lines on the maps, these lines are a part of the regulations imposed on us.

#7. Yes there are penalties for failing to meet the grazing rules. Paying fines like the fines paid by criminals that are based on the severity of the crimes is not an option for grazing permittees. Which is too bad because it would be less expensive. The regulatory actions are more likely to put the rancher out of business based on minor infractions, which is substantially different from the question about paying fines being part of the "cost of doing business." Our permits could be cut, also a permit could be cancelled entirely if we don't follow the annual grazing instructions. Please note that the USFS generally causes much greater economic damage and distress than would be caused by a cash fine when they cut the permitted number of animals. A 25% cut in a permit (their standard amount) may often cost us tens of thousands of dollars in lost productivity while the costs of the operation stay the same but for fewer producing animals. USFS administrative cuts may be initiated for a rule infraction even when there is no problem that can be demonstrated on the ground. Both the definition of an infraction and the discovery or accusation of an infraction is often left to people who have no practical experience or realistic knowledge about successfully running a sheep operation. Their administrative actions and penalties are often unexpected and unpredictable, making this one of the greatest economic risks of our business.

Strictly enforced USFS grazing policies continue with or without bighorn sheep, but the enforcement is even more onerous when bighorn sheep biologists become involved. For example, we have been instructed to feed only 30% of the range. It requires very intense management, micro-management, in order to comply with all regulations; much more time and work beyond the actual care of our sheep. The above statements are partly based on personal experience since we have been cut a small percentage on a couple of years, but in our case the AUMs are given back in a year or two.

Each year we now travel through the allotments with the FS Range specialists to consult as to whether we have fed 30% or 25%. The USFS has been counting hoof marks to determine this percentage. This means we have to hire a Range

Consultant who goes up in the mountains to look at the areas of concern with the USFS, which requires more work and expense.

It is an art to correctly herd sheep in the steep Sierra Nevada Mountains. We employ expert Journeyman level Shepherds who can understand the movements and needs of the sheep, select good areas with nutritious feed, protect the sheep from predators -- all while they live in tents with their band of sheep. There is no comparison with pasturing sheep on tame, fenced pastures. Now we also have to train our sheepherders to comply with new regulations imposed in the name of bighorn sheep.

Generally the grazing rules are made up by inexperienced people who don't understand on-the-ground herding and management of herded sheep on open range. Some of the government employees are willing to study and learn what they need to know in order to make rational decisions, and some depend on the authority of their office to be the basis for issuing orders to civilians.

There are a number of examples of this latter attitude, for example we have asked the agencies to provide radio receivers and frequencies of radio telemetry collars that have been placed on their bighorns so that our employees can help monitor the movements of bighorn sheep. Agency biologists refuse to accept our offer to help with their work.

At one FWS stakeholder meeting the FWS biologist yelled at Fred for speaking during the meeting and for having too many people present who supported sheep ranching and questioned the scientific merit of the FWS statements. We have even been expelled from meetings by the USFWS when we tried to explain to fifteen "scientists" on the "Science Team" how sheep should be herded in the mountains. Most of these people have never been in the mountains and actually seen a band of sheep being herded. In this instance the biologists called the police who wouldn't come to their rescue, the police had the common sense to realize that there is no law against attending a government meeting.

We are always courteous, factual, and completely open in our presentation to the agency employees, but they still won't admit that Fred knows what he is talking about. He has been running a successful sheep business and herding sheep for 70 years on open range. F.I.M. is the only large sheep operation remaining in Western Nevada.

#8. Yes, at our expense we have completed trial vaccination programs, cooperated with radio telemetry studies, and we were the source of most of the individual minimizing measures on the attached list. These measures were presented by the USFS in their Biological Assessment and repeated in the USFWS Biological Opinion before being included in our annual operating instructions each year. Even with our cooperation, the USFS biologists invented what they called Trigger Lines that we

strenuously objected to on the basis that they are neither scientifically sound nor practical. If we had not recommended the minimizing measures and provided the documentation that supports them, then the USFS would simply have cancelled our permits. F.I.M. joined with the USFS and UNR to conduct the Scientific Roundtable Discussion held in February 2005 for the purpose of examining both the disease transmission issue and taxonomy of the bighorn sheep. FIM paid for the professional recording service that video taped the sessions. FIM costs for the Scientific Roundtable included $2,500 for recording service, five employees present for an entire day at $50 per hour for 10 hours or $500, travel costs of >$250, Attorney costs of $1,000, consulting biologist costs of $400. Costs of testing and vaccination of sheep included Vaccine at $1,500, labor at (four people two days each of two years) $1,600, corrals and preparation $800. Note that the costs of many of the minimizing measures are already accounted for in the cost of additional dogs and Camptenders.

We have continually worked with researchers in Universities and with private researchers to improve our sheep operation. When we find a better way to operate, we do it. We have worked with the FS all our lives to find better ways to run our sheep including studying under Forest Service range management experts such as Gus Hormay. Our sheepherders are with their bands 24-7's (24 hours a day and seven days a week). They are often present in these mountains when no one else is nearby, especially the agency biologists. That is why we suggested to the agencies that by providing telemetry tracking equipment the sheepherder would be the first to discover if a collared bighorn had moved to a location near our sheep.

We have also searched for and studied other areas for the potential of supporting the bands of sheep presently threatened by bighorn sheep regulation. In particular we asked to be transferred to the vacant sheep allotments in the Iceberg portion of the Carson City Ranger District and were informally told by the FS that they did not want to consider such a move.

#9. No

#10. Yes, including both private lands and FS allotments next to our allotments.

#11. Yes. We don't know what their costs are.

#12. Several things that have caused reduced productivity of our lambs including the use of a substitute but inferior allotment when grazing was denied in Dunderberg Allotment, substantially restricted movement that is tightly controlled herding, and the severe restrictions that have been placed on allowed grazing use areas within allotments. In earlier years, the USFS worked hard to find alternative grazing areas (other allotments) when they denied the use of Dunderberg but they did not do that in 2007. FIM prefers to allow the sheep to select the most nutritious forages through a process of more open herding. Within a given allotment, weather patterns and

other factors result in differences in the quality and quantity of forage, and the bighorn restrictions interfere with F.I.M. sheepherders moving the sheep to the areas with the greatest nutritional advantage. This issue is important because F.I.M. lambs that are 10 to 20 pounds lighter in weight than the long term average mean that the gross income, opportunity for profit, and reputation in the eyes of the lamb buyers are greatly reduced. Failure to gain ten pounds per lamb prior to shipping means that 5,000 lambs weigh 50,000 pounds less than they should and we have lost the opportunity to receive $50,000 for that entire year's work.

F.I.M. has given up access to higher elevation ranges in our effort to cooperate with the biologists. The agency concerns included their feelings that the higher elevations are potential bighorn habitats. F.I.M. has agreed not to graze these areas even when there are no bighorn sheep present or nearby. This alleged conflict with bighorn habitat really only results in less feed for our lambs to grow.

Grazing patterns within allotments have been developed through years of practical experience, and have now been changed or disrupted from the "normal" patterns of previous years. F.I.M. had developed grazing patterns which are based on sound range management and livestock husbandry and are designed to:

1. Increase viability and productivity of the range
2. Grow lambs with the greatest results while creating a system or pattern that makes sense to the herder.
3. Make the most efficient use of the range available from year to year. Not all conditions of the range are the same every year so flexibility is needed to properly manage grazing. The opportunity for flexibility has been lost.

Among the grazing operation requirements are a series of actions to be taken if a bighorn sheep is too close to the F.I.M. sheep. These actions are part of the Escape Plan that require abnormal movement of bands of sheep due to bighorn proximity or bighorn crossing a trigger line. There has not been any bighorn sheep near our bands of sheep, but if the escape procedures are ever initiated a band of sheep must be forced by the herder away from the location of the bighorn to a lower elevation in the allotment or more likely off the allotment. The gains of the lambs will be severely diminished by such disruptive movement. Drought years like 2007, will have an even greater effect on the lambs because the areas they will move to at lower elevations have been affected by drought more than the upper elevations with corresponding lack of forage quality and quantity.

Abnormal patterns of movement have also been caused by the need to count the sheep on and off the allotments, and while they are on the allotments. This mitigation measure requires unnecessary trailing to and from corrals set up with a chute to facilitate the counting by federal officials at a cost of four employees' time plus travel or about $1,500 cash costs twice each year. Unnecessary trailing results in loss of the pounds that were gained while grazing the previous allotment so we enter the next allotment with a larger than normal loss in weight. The increased loss

of weight on the lambs is evident when the lambs come off of the range to sell and we suspect that the lowered nutritional status of the ewes in August or September may interfere with breeding in October.

There is a decreased efficiency of grazing because of the requirement to count the marker sheep two or three times a day. It disrupts the daily grazing pattern which decreases the lambs best chances of increasing their weights. This interruption to count markers requires at least an hour of time the animals should have been grazing.

There is this one last point that I would like to make. There are many infectious diseases that the bighorn sheep can carry which can put our domestic sheep at risk. If you designate the critical habitat, this will greatly increase the area, *(Attachment 4)* of the bighorn and subject domestic livestock to infectious diseases which would be an economic disaster. Cost would be astronomical for livestock operators to control the disease and also death loses.
To mention a few of those diseased are: 1. IBR Infectious Bovine Rhino, 2. PI3 Para Influenza, 3. BVD Bovine Virus Disease, 4. Ibex. This is just to list a few. The USFWS should control their bighorn in their areas of habitat.

As the dollars place themselves, we must pay less attention to the survival of the bighorn and concentrate more on the survival of our commodities and economy. These are the numbers that are so important. With the way sheep numbers are going down today, we will not continue to be so opulent.

I hope I have given you enough dollar figures to show you the economic impact to the Western Range sheep operations and how they are disappearing.

Sincerely,

_____	_____
Fred Fulstone	**Marianne F. Leinassar**
F.I.M. Corporation	**F.I.M. Corporation**