



File Code: 1300/2230

Date:

JUL 06 2009

Mr. Kent Holsinger, Laura L. Chartrand  
Attorneys for Petitioners  
Holsinger Law, LLC  
104 Broadway, 3rd Floor  
Denver, CO 80203

Dear Mr. Holsinger and Ms. Chartrand,

This letter acknowledges receipt of your letter dated June 11, 2009, and which we received on June 11, 2009 via email. On behalf of the Colorado Wool Grower's Association (CWGA) you have submitted a Request for Reconsideration to your original Data Challenge request and the Forest Service response. The CWGA desires to have the Forest Service retract the Forest Service Bighorn Report, General Technical Report, RMRS-GTR-209, and all reliance thereon in existing and subsequent forest plans and forest plan amendments, as well as decisions on grazing permits and grazing permit renewals.

We are in the process of reviewing your Request for Reconsideration. In accordance with the United States Department of Agriculture (USDA) guidelines, agencies will respond to all requests for appeals within 60 calendar days of receipt. If the request requires more than 60 calendar days to resolve, the agency will inform the complainant that more time is required and indicate the reason why and an estimated decision date.

If you have any administrative questions, please contact the Quality Information Officer, George Vargas, at 202-205-0444 or send an email to [gvargas@fs.fed.us](mailto:gvargas@fs.fed.us)

Sincerely,

LORRIE S. PARKER  
Acting Director, Office of Regulatory and Management Services

cc: Chris Iverson, Eugene J DeGayner





File Code: 1300/2230

Date: AUG - 7 2009

Mr. Kent Holsinger and Ms. Laura L. Chartrand  
Attorneys for the Petitioners  
Holsinger Law, LLC  
104 Broadway, 3rd Floor  
Denver, CO 80203

Dear Mr. Holsinger and Ms. Chartrand:

This letter is in response to your June 11, 2009, Request for Reconsideration (RFR) of your February 23, 2009, petition for correction of information. It also addresses your July 8, 2009, addendum to your June 11, 2009, RFR. On behalf of the Colorado Wool Growers Association, you submitted a RFR to your original Data Challenge request and the Forest Service response. In addition, you requested that the Forest Service "retract the USFS Bighorn Report, General Technical Report and all reliance thereon in existing and subsequent forest plans and forest plan amendments, as well as decisions on grazing permits and grazing permit renewals."

Your appended RFR references the July 1, 2009, Idaho District Court decision where Judge Winmill ruled that the Forest Service, Payette National Forest, violated Federal Advisory Committee Act (FACA) in the establishment of the "Payette Principles Committee." Judge Winmill ruled that this committee was subject to FACA requirements and the process used to form the committee did not follow FACA framework. Since the development of the Payette Principles Committee was flawed, Judge Winmill ruled that the Forest Service is not to rely on findings and/or conclusions developed by the Committee in future decision making. This committee of scientists from the livestock and wildlife disease community produced a set of eight agreed upon 'principles' that are included in the GTR-209.

Since GTR-209 includes findings and recommendations developed by the Payette Principles Committee, it would not be appropriate for the Forest Service to use GTR-209 in agency decisions or policy development. Given these circumstances, I am retracting GTR-209. Your argument related to the Idaho District Court decision provided a reasonable rationale to retract the GTR-209 without additional analysis of your other concerns included in your request for reconsideration.

Please note that Judge Winmill's decision did not rule on the merits of the science used to develop the Payette principles. Judge Winmill simply ruled on the administrative processes used to develop the Committee. The ruling should not be simultaneously interpreted as an endorsement of Plaintiffs' position on disease transmission between domestic and bighorn sheep.

In conclusion, the information you provided was carefully considered and we are retracting the GTR-209. This completes the correction of information options available under the United States Department of Agriculture Information Quality Guidelines.





If you should have administrative procedural questions, please contact George Vargas, Forest Service Quality of Information Officer, at (202) 205-0444 or [gvargas@fs.fed.us](mailto:gvargas@fs.fed.us).

Sincerely,

  
for CHARLES L. MYERS  
Deputy Chief for Business Operations

cc: Chris Iverson, Eugene J DeGayner

**BEFORE THE UNITED STATES DEPARTMENT OF AGRICULTURE,  
FOREST SERVICE DATA QUALITY OFFICIAL**

COLORADO WOOL GROWERS ASSOC.,	)	<b>Data Quality Act Challenge</b>
AMERICAN SHEEP INDUSTRY ASSOC.,	)	<b>to U.S. Department of Agriculture</b>
ARIZONA CATTLE GROWERS' ASSOC.,	)	<b>Dissemination of Information</b>
ARIZONA WOOL PRODUCERS ASSOC.,	)	<b>Presented in "A Review of Disease</b>
CALIFORNIA CATTLEMEN'S ASSOC.,	)	<b>Related Conflicts Between</b>
CALIFORNIA WOOL GROWERS ASSOC.,	)	<b>Domestic Sheep and Goats and</b>
COLORADO CATTLEMEN'S ASSOC.,	)	<b>Bighorn Sheep,"</b>
COLORADO FARM BUREAU,	)	<b>General Technical Report</b>
COLORADO PUBLIC LANDS COUNCIL,	)	<b>RMRS-GTR-209</b>
F.I.M. CORPORATION,		
IDAHO FARM BUREAU FEDERATION,		
IDAHO WOOL GROWERS ASSOC.,		
IDAHO CATTLE ASSOC.,		
MONTANA ASS'N OF ST. GRAZING DIST'S,		
MONTANA PUBLIC LANDS COUNCIL,		
MONTANA STOCKGROWERS ASSOC.,		
MONTANA FARM BUREAU FED.,		
MONTANA WOOL GROWERS ASSOC.,		
NATIONAL CATTLEMEN'S BEEF ASSOC.,		
NEVADA FARM BUREAU FED.,		
NEVADA WOOL GROWERS ASSOC.,		
NEW MEXICO FEDERAL LANDS COUNCIL,		
NEW MEXICO STOCKGROWERS' ASSOC.,		
NEW MEXICO WOOLGROWERS ASSOC.,		
NORTH DAKOTA LAMB & WOOL PROD. ASSOC.,		
OREGON SHEEP GROWERS ASSOC.,		
PUBLIC LANDS COUNCIL,		
SOUTH DAKOTA SHEEP GROWERS ASSOC.,		
TEXAS SHEEP & GOAT RAISERS' ASSOC.,		
UTAH FARM BUREAU FED.,		
UTAH WOOL GROWERS ASSOC.,		
WASHINGTON STATE SHEEP PRODUCERS,		
WYOMING FARM BUREAU,		
WYOMING STOCK GROWERS ASSOC., and		
WYOMING WOOL GROWERS ASSOC.,		

Petitioners

v.

U.S. DEPARTMENT OF  
AGRICULTURE,

Agency.



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**CHALLENGE OF COLORADO WOOL GROWERS ASSOCIATION, ET AL.  
PURSUANT TO THE DATA QUALITY ACT**

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To: USDA Forest Service  
Attention: Data Quality Official  
Mail Stop 1143  
1400 Independence Ave. SW  
Washington, D.C. 20250-1143  
*Electronic Mail: ritamorgan@fs.fed.us*

**I. Request and Petitioner**

The Colorado Wool Growers Association, *et al.* (“Petitioners”) hereby submit this Challenge for Correction of Information pursuant to the Federal Information Quality Act, (44 U.S.C. § 3516) (“Data Quality Act” or “DQA”), the “Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information disseminated by Federal Agencies” issued by the Office of Management and Budget (67 Fed. Reg. 8452 (Feb. 22, 2002) (“OMB Guidelines”)), as well as the United States Department of Agriculture’s (“USDA”) Information Quality Guidelines available at [http://www.ocio.usda.gov/qi\\_guide/index.html](http://www.ocio.usda.gov/qi_guide/index.html).

In May of 2008, the United States Forest Service (“USFS”) published *A Review of Disease Related Conflicts Between Domestic Sheep and Goats and Bighorn Sheep* by Timothy J. Schommer and Melanie M. Woolever, General Technical Report RMRS-GTR-209 (“USFS Bighorn Report”). As outlined below, Petitioners have reviewed the Bighorn Sheep Report and found it to be inaccurate, unreliable, and biased. Therefore, Petitioners request the USFS retract the USFS Bighorn Report and all reliance thereon in existing and subsequent forest plans and forest plan amendments, as well as decisions on grazing permits and grazing permit renewals. Alternatively, the USFS could issue an amended USFS Bighorn Report that uses sound

analytical methods and the best data available, ensuring transparency and objectivity in the information disseminated.

## **II. Petitioners Contact Information**

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

Bonnie Brown, Executive Director  
Colorado Wool Growers Association  
8833 Ralston Rd., Ste. 200  
Arvada, CO 80002  
(303) 431-8310  
cwgawool@aol.com

Kent Holsinger  
Laura L. Chartrand  
Holsinger Law, LLC  
104 Broadway, 3<sup>rd</sup> Floor  
Denver, CO 80203  
(303) 722-2828  
[kholsinger@holsingerlaw.com](mailto:kholsinger@holsingerlaw.com)  
[lchartrand@holsingerlaw.com](mailto:lchartrand@holsingerlaw.com)  
*Attorneys for Petitioners*

## **III. Description of Information to Correct**

### **A. Background on the USFS Bighorn Report**

In July 2003, the Southwest Idaho Ecogroup Land and Resource Management Plan's Final Environmental Impact Statement ("FEIS") and Record of Decision were issued. The Intermountain Region Forester received five appeals of the decision to continue to allow the grazing of domestic sheep within or near the range of bighorn sheep in the Payette National Forest. The appellants claimed that this decision threatened the viability of bighorn sheep through disease transmission from the domestic sheep to the bighorn sheep. On March 9, 2005, the Chief of the Forest Service concurred that the FEIS did not adequately address bighorn viability in the analyses and cumulative effects discussions and instructed the Regional Forester to reanalyze bighorn sheep viability in the Payette National Forest, to amend the FEIS accordingly, and, if necessary, to make changes to the Forest Plans.

As part of this reanalysis, the USFS conducted reviews of the potential for disease transmission from domestic sheep to bighorn sheep. In February 2006, the USFS published a

*Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest* and in 2008, published the USFS Bighorn Report. The Draft Supplemental Environmental Impact Statement (“DSEIS”) that re-analyzes the effects of current and proposed management on bighorn sheep viability within the Payette National Forest was issued in September 2008. See Payette National Forest DSEIS, Background, page ix.

**B. Corrections Needed for the USFS Bighorn Report**

The USFS Bighorn Report states that its purposes are “to: 1) review the science related to disease, particularly respiratory disease, in sympatric populations of domestic sheep (*Ovis aries*) and goats (*Capra hircus*) and bighorn sheep (*Ovis canadensis*) and 2) provide scientific foundation for the development of agency policy.” Schommer at 1. The USFS Bighorn Report then purports to summarize the “experimental methods and evidence relative to the hypothesis that bighorn sheep have a high likelihood of contracting fatal respiratory disease following contact with domestic sheep, characterized as the ‘contact hypothesis’” and address other hypothesis that are “refinements of the contact hypotheses.” Schommer at 3.

The Petitioners are concerned that the USFS Bighorn Report: (1) was developed with unsound research methods; (2) ignores studies that do not support its thesis; (3) jumps to conclusions that are not scientifically supported but are pure conjecture; and (4) disseminates information that is not objective or reliable and that lacks basic scientific integrity. Therefore, the utility of this information is questionable, and the Petitioners request the USFS retract the USFS Bighorn Report and all management decisions based upon the USFS Bighorn Report in forest plans, forest plan amendments, and grazing permits. Alternatively, the USFS could issue an amended USFS Bighorn Report that incorporates sound analytical methods and the best data available, ensuring transparency and objectivity in the information disseminated.



#### **IV. Noncompliance with OMB and / or USDA Information Quality Guidelines**

##### **A. Data Quality Act and OMB Guidelines**

The DQA, Section 515 of the Treasury and General Government Appropriations Act of FY 2001 (Public Law 106-554), requires Federal agencies to ensure and maximize the quality, objectivity, utility, and integrity of information, including statistical information, disseminated by Federal agencies on or after October 1, 2002. Agencies are required to review the quality of information before its dissemination and treat information quality as integral to every step. If an agency continues to disseminate information on or after October 1, 2002, that was first disseminated before this date, this information is also to be subject to the DQA.

The OMB government-wide guidelines impose three core responsibilities on the agencies:

- First, the agencies must embrace a basic standard of “quality” as a performance goal, and agencies must incorporate quality into their information dissemination practices. OMB’s guidelines explain that “quality” encompasses “utility” (usefulness to its intended users), “integrity” (security), and “objectivity.” “Objectivity” focuses on whether the disseminated information is accurate, reliable, and unbiased as a matter of presentation and substance.
- Second, the agencies must develop information quality assurance procedures that are applied before information is disseminated.
- Third, the OMB government-wide guidelines require that each agency develop an administrative mechanism whereby affected parties can request that agencies correct poor quality information that has been or is being disseminated. If one is dissatisfied with the initial agency response to a correction request he or she may file an administrative appeal.

##### **B. USDA Information Quality Guidelines**

USDA Information Quality Guidelines for Regulatory Information (“USDA Guidelines for Regulatory Information”) apply to “[s]cientific analyses (meaning natural sciences – plant

pathology, animal physiology, etc.) and risk assessments prepared in support of agency rulemaking efforts as well as risk assessments of a non-regulatory nature.” (USDA Guidelines for Regulatory Information 1). Since one of the purposes of the USFS Bighorn Report is to “provide scientific foundation for the development of agency policy,” (Schommer 1) the USFS Bighorn Report clearly falls under the USDA Guidelines for Regulatory Information. The USFS has disseminated the USFS Bighorn Report by posting it on its website at [http://www.fs.fed.us/rm/pubs/rmrs\\_gtr209.html](http://www.fs.fed.us/rm/pubs/rmrs_gtr209.html).

The USDA Guidelines for Regulatory Information require USDA agencies, like USFS, to do the following:

**C. Objectivity of Regulatory Information**

- Use sound analytical methods in carrying out scientific and economic analyses and in preparing risk assessments.
- Use reasonably reliable and reasonably timely data and information (e.g., collected data such as from surveys, compiled information, and/or expert opinion).
- When using the best available data obtained from or provided by third parties, ensure transparency in its dissemination by identifying known sources of error and limitations in the data.
- Evaluate data quality and, where practicable, validate the data against other information when using or combining data from different sources.
- Ensure transparency of the analysis, to the extent possible, consistent with confidentiality protections, by
  - Presenting a clear explanation of the analysis to the intended audience.
  - Providing transparent documentation of data sources, methodology, assumptions, limitations, uncertainty, computations, and constraints.
  - Explaining the rationale for using certain data over other data in the analyses.
  - Presenting the model or analysis logically so that the conclusions and recommendations are well supported.
- Clearly identify sources of uncertainty affecting data quality.

- For quantitative assessments, clearly state the uncertainty of final estimates to the extent practicable. Data and data collection systems should, as far as possible, be of sufficient quality and precision that uncertainty in the final estimates is appropriately characterized.
- For qualitative assessments, provide an explanation of the nature of uncertainty in the analysis.

#### **D. Utility of Regulatory Information**

- Clearly state the purpose of the exercise and the intended recipients.
- Ensure, to the extent practicable, that the final product meets the needs of the intended recipients.

#### **E. Integrity of the Regulatory Information**

- Ensure that the information is secure and protected from manipulation and/or falsification.
- Protect against unauthorized internal and external access to the information.
- Protect the confidentiality of individually identifiable information, in accordance with statutory requirements and Departmental directives.

#### **V. The USFS Bighorn Report Lacks Objectivity**

The USFS Bighorn Report fails to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased. Since the USFS Bighorn Report fails to provide objective information, the Report's utility to its intended users – those creating management plans for grazing of domestic sheep in National Forests – is questionable. The intended users include USFS, domestic sheep producers, forest managers, and the general public.

The USFS Bighorn Report demonstrates immediate bias against domestic sheep when it states:

Although efforts to identify organisms causing pneumonia in bighorn sheep following contact with domestic sheep **have identified multiple bacteria species**, the complete range of mechanisms/causal agents leading to epizootic disease events are not completely understood. (Emphasis added) (Schommer i).



The USFS Bighorn Report, thus, leads a reader to assume that “multiple bacteria strains” from domestic sheep have been identified as the cause for pneumonia in bighorn sheep. Yet, the same USFS Bighorn Report acknowledges that “the complete range of mechanisms/causal agents leading to epizootic disease events **are not completely understood.**” (Emphasis added) Schommer at i.

The inference that science has proven that domestic sheep transfer fatal diseases to bighorn sheep comes into direct conflict with the findings of the Council for Agricultural Science and Technology (“CAST”) report entitled *Pasteurellosis Transmission Risks between Domestic and Wild Sheep* (“CAST Report”) published in August 2008. After a complete review of all literature and science regarding disease transmission between the two species, the CAST scientific committee and its reviewers found that:

Indeed, a common Pasteurellaceae strain or other agent directly linking bighorn epidemics to either domestic sheep interactions or to emergence of endemic pathogens **has not been demonstrated to date, and thus unequivocal evidence for either process remains elusive.** (Emphasis added) Miller *et al.* at 4.

After more than 80 years of research, scientists have never documented the transmission of disease from domestic sheep to bighorn sheep in the wild. The CAST Report states:

[R]elationships between the onset of some pneumonia epidemics in wild sheep and the concurrent presence of domestic sheep on bighorn ranges have been described (George *et al.* 2008; Monello, Murray, and Cassirer 2001). Whether introduced Pasteurellaceae strains, introduced virulence factors, or other introduced pathogens contribute to precipitating these epidemics **remains unclear** (Besser *et al.* 2008; George *et al.* 2008; Kelley *et al.* 2008). (Emphasis added) *Id.*

The USFS Bighorn Report states that “[t]he following is a review and summary of the experimental methods and evidence relative to the hypothesis that bighorn sheep have a high likelihood of contracting fatal respiratory disease following contact with domestic sheep.” (Schommer). The science, however, does not support this hypothesis. To quote Marie S. Bulgin

DVM, Dip ACVM, MBA, Coordinator, University of Idaho, Caine Veterinary Teaching and Research Center, “There is just **NO** scientific basis for this premise.” She then states in her comment concerning the *Risk Analysis of Domestic Sheep and Bighorn Sheep on the Payette National Forest* that:

Myth, defined as a notion based more on tradition or convenience than on fact, (American Heritage Dictionary) seems to fit the Wildlife Biologists’ clinging to the notion that contact with or the nearby presence of domestic sheep on the range will automatically result in the demise of bighorn sheep. Seventeen years plus of research by numerous researchers has not been able to prove that such is the case. Bulgin, *Comment Concerning the Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payatte National Forest*, (2006).<sup>1</sup>

The USFS Bighorn Report relies upon earlier studies that are mostly outdated, including an evaluation of the importance of different factors contributing to bighorn sheep disease by Monello, Murray, and Cassierer. (*Ecological correlates of pneumonia epizootics in bighorn sheep herds. Can. J. Zool.* 2001; 79: 1423-1432.) . The Monello, Murray, and Cassierer report states that herds found in proximity to domestic sheep **tended** to be more susceptible to die-off. Monello R.J.; Murray D.L.; Cassirer E.F., Canadian Journal of Zoology, Volume 79, Number 8, 1423-1432(10) (2001). However, the most striking finding of their analysis is not discussed by the USFS Bighorn Report. The Monello, Murray, and Cassierer report found that 88% of pneumonia-induced die-offs occurred at or within three (3) years of peak population numbers. This finding suggests that density-dependent forces such as food shortage or stress are a principal contribution to bighorn sheep susceptibility to pneumonia. This information does not appear in the USFS Bighorn Report. Rather, the data presented in the USFS Bighorn Report has been cherry-picked to support the questionable hypothesis proposed – that “bighorn sheep have a high likelihood of contracting fatal respiratory disease following contact with domestic sheep.”

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<sup>1</sup> Submitted to Pattie Soucek, Forest Planner, Payette National Forest.

The USFS Bighorn Report fails to comply with both OMB and USDA Regulatory Information Guidelines. Nowhere does the USFS Bighorn Report explain the rationale for selecting certain data and deciding not to refer to other data, such as that referenced herein, in the analyses. In fact the existence of significant data highlighting the uncertainty of USFS Bighorn Report's hypothesis is not even mentioned. The USFS Bighorn Report does not ensure transparency in its dissemination of information by identifying known sources of error and limitations in the data. The statement that multiple bacteria species from domestic sheep have been identified as causing pneumonia in bighorn sheep is wrongfully presented as fact. The limitations of this data, as evidenced by multiple other studies, is not identified. The USFS Bighorn Report, thus, lacks transparency and objectivity.

#### **A. Scabies**

The information disseminated regarding scabies does not comply with the Data Quality Act, OMB Guidelines, or USDA Guidelines for Regulatory Information. All scientific documentation contradicts the assertion that domestic sheep transfer scabies to bighorn sheep. The USFS Bighorn Report relies upon mere speculation by some researchers decades ago that scabies outbreaks in bighorn sheep may have followed the introduction of domestic sheep. The USFS Bighorn Report states:

[T]he first large-scale population losses in the nineteenth century were principally attributed to scabies introduced by domestic sheep. This conclusion was based largely on clinical evidence of scabies in bighorn sheep during die-offs and the fact that these scabies outbreaks closely followed the introduction of domestic sheep (Buechner 1960; Honess and Frost 1942; Jones 1950; Smith 1954). (Schommer 2).

The only quantified and reviewed scientific study involving the transmission of scabies between domestic and bighorn sheep was conducted in 1980 and 1981. Scientists found that the



scabies mite found on bighorn sheep was host specific. F.C. Wright, F.S. Guillot, and W.P. Meleney in their paper, *Transmission of Psoroptic Mites from Bighorn Sheep (Ovis Canadensis mexicana) to Domestic Sheep, Cattle and Rabbits* [Journal of Wildlife Disease Vol. 17, No. 3, July 1981] concluded:

The length of the outer opisthosomal setae suggested that these psoroptic mites from bighorn sheep are *P. ovis*, but our transmission studies indicate that these mites **are not adapted to cattle or domestic sheep** and could transfer to cattle only with great difficulty. (Emphasis added).

This study has been presented to the authors of the USFS Bighorn Report; however, they chose to ignore it and instead perpetuate the falsehood that domestic sheep can transmit scabies to bighorn sheep. The USFS Bighorn Report states:

Although respiratory disease resulting in pneumonia is the most serious and devastating disease at a population level that is shared by domestic and bighorn sheep, other diseases and parasites, including but not limited to scabies, anaplasma, babesia, ovine parapox (contagious ecthyma), and infectious keratoconjunctivitis (pink eye), may be communicable (Jessup and Boyce 1993). Schommer at 3.

In addition to ignoring transmission studies involving scabies, the USFS Bighorn Report ignores the fact that scabies is not present in any domestic sheep in the United States. Scabies was eradicated in domestic sheep in the United States in 1973 [Journal of Medical Entomology Vol. 13, pages 629-658, 1977, *Eradication Programmes for Arthropod Parasites of Livestock*, O.H. Graham and J.L. Hourrigan]. The USFS Bighorn Report's discussion of scabies is misleading, not accurate, and not reliable. The USFS Bighorn Report wrongfully suggests that domestic sheep infest bighorn sheep with a mite that is host specific and with a disease that has not been present in the United States for more than thirty years! Thus, the objectivity of the USFS Bighorn Report is questionable when it contains and disseminates this type of false information.

## B. Unplanned Pen Experiments

The USFS Bighorn Report purports to “1) review the science related to disease, particularly respiratory disease, in sympatric populations of domestic sheep (*Ovis aries*) and goats (*Capra hircus*) and bighorn sheep (*Ovis canadensis*) and 2) provide scientific foundation for the development of agency policy” Schommer at 1. Yet, the “Unplanned Pen Experiment” discussed on pages 3 - 4 lacks experimental design and scientific evidence. The USFS Bighorn Report relies on the 1982 Foreyt and Jessup paper which Dr. C. S. Ward of the Caine Veterinary, Research and Teaching Center discusses in depth in his comments regarding the 2006 USFS *Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest*. In his comments, Dr. Ward states:

One of the most frequently cited articles (cited in the Risk Analysis document and other publications concerning respiratory disease in bighorn sheep) used to support the concept that die-offs in bighorn sheep populations is because of transmission of *Pasteurella* sp from domestic sheep is that of Foreyt and Jessup (1982). In that article it is clearly stated that the assumption of transmission was based on circumstantial evidence. No bacteria were isolated from the bighorn sheep that died in the Washington group of bighorn sheep discussed in that article and *Pasteurella multocida* was isolated from one and a nonspecieated *Pasteurella* organism was isolated from another of the California bighorn sheep that died in that enclosure. The authors did not indicate that tests of samples from any of the domestic sheep had been done and provided no scientific evidence that the domestic sheep were the source of those bacteria. In addition, *P. multocida* strains are ubiquitous in both wild and domestic animal populations; (including mule deer [Jaworski et al., 1998; and pronghorn [Dunbar et al., 2000]), therefore it is naive to assume that isolation from lung, bronchial lymph node and serum of one bighorn sheep resulted from presence of domestic sheep. Such a claim was not and cannot be substantiated. (Emphasis is that of the author) Ward, *Comments from Alton C. S. Ward regarding the 2006 Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest* (2006).<sup>2</sup>

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<sup>2</sup> Submitted to Pattie Soucek, Forest Planner, Payette National Forest.

The USFS Bighorn Report also fails to discuss incidences where penned bighorn sheep encountered die-offs without exposure to domestic sheep. Dr. Marie Bulgin in her 2006 comments on the Payette National Forest Risk analysis cites three of these examples:

Furthermore, there are many documentations of pneumonia and die-offs in [bighorn sheep] that have no reported contact with domestic sheep. Attempts to confine bighorns, even in large areas, have not been particularly successful as disease appears to cause large losses. For example, 18 of 20 desert [bighorn sheep] were lost within a 3 month period in 1971 in the Black Gap area in Texas from severe pneumonia. No domestic sheep contact was reported. (Hailey, Marburger, Robinson and Clark. Disease Losses in desert bighorn sheep in the Black Gap Area, *Desert Bighorn Council, 1972 Transactions*).

In Nevada, The Dutch Creek enclosure was established in 1967-1968 to hold desert [bighorn sheep] for the purpose of providing progeny for transplanting. Sheep numbers in the enclosure did not increased [sic] despite additions to the original stocking. Most losses were considered to be caused by disease. No contact with domestic sheep was reported. (Taylor, Disease losses in Nevada Bighorn, *Desert bighorn Council Transactions 1973*).

California bighorns were returned to the lava beds of California. Two rams and 8 ewes were introduced in 1972 and increased to 22 head by 1975. Then the herd was suddenly reduced to 15 due to bluetongue virus (and most likely *Pasteurella*, a squeala of Bluetongue) that fall. No contact with domestic sheep was reported. (Blaisdell, Lava Beds Bighorn Project—So who Worries?, *Desert Bighorn Council Transactions, 1976*).

The USDA Regulatory Information Guidelines require USFS to use the best data available and ensure transparency “by identifying known sources of error and limitations in the data.” Yet, the underlying information on unplanned pen experiments was based purely on circumstantial rather than scientific evidence, and the limitations of relying upon circumstantial evidence are not addressed in the USFS Bighorn Report.

### **C. Planned Pen Experiments**

The planned pen experiments reviewed in the USFS Bighorn Report lacked the scientific tools necessary to evaluate the organisms present within the animal or the possibility of transmission to bighorn sheep. Again Dr. C. S. Ward of the Caine Veterinary, Research and



Teaching Center discusses the Foyet 1989, Onderka and Wishart 1988 and the Callan 1991 studies cited in depth by the USFS in this section. In his comments regarding the *USFS Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest* (July 14, 2006), Dr. Ward states:

Experimental exposure of bighorn sheep to domestic and exotic sheep breeds and inoculation of bighorn sheep with *Pasteurella* strains isolated from domestic sheep have been reported to result in respiratory disease and death of bighorn sheep (Foreyt, 1989; Onderka and Wishart, 1988; Onderka et al., 1988; Callan et al., 1991). In some of those studies it was concluded that the bighorn sheep used in the experiments were free of *Pasteurella* because cultures conducted on nasal swab samples were negative for those organisms. Nasal swab samples have been demonstrated to be less reliable for detection of *Pasteurella* species than oropharyngeal swab samples. Another common cause for failing to isolate *Pasteurella* species from nasal samples is excessive ageing of the samples prior to inoculation of bacterial culture media. In another of the studies a beta-hemolytic *P. haemolytica* biotype T (currently identified as *P. trehalosi*) was isolated from tissues of a bighorn that died after contact with domestic sheep. Like organisms were subsequently isolated from tonsil samples of domestic sheep which had not tested positive for these organisms prior to contact with the bighorn sheep. Considering that information, it could have been concluded that the beta hemolytic strain was transmitted from the bighorn to the domestic sheep. However it was concluded that transmission from domestic sheep to bighorn sheep had occurred although it was not scientifically validated.

We have also isolated beta-hemolytic *P. trehalosi*, like that described by Onderka and Wishart (1988), from samples collected from free-ranging bighorn sheep in central Idaho. Using biochemical utilization and DNA fingerprinting test procedures it was demonstrated that the organism isolated from transtracheal samples collected from caesarian derived lambs that developed pneumonia following exposure to their dams was identical to that previously isolated from adult sheep at the time of capture (Jaworski et al., 1993). *Pasteurella trehalosi* with the identical biochemical and DNA fingerprints have subsequently been isolated from samples collected a decade later from bighorn sheep in Central Idaho (unpublished laboratory records) and bighorn sheep in Hells Canyon (Rudolph et al., in print). It is this kind of testing based on genetic markers that is required for scientific validation of transmission. (Emphasis is that of the author) Ward, *supra*.

In summary, some of the advances in bighorn sheep research noted by Dr. Ward include the following:

- It was demonstrated that oropharyngeal swab or tissue samples were superior to nasal swab samples for detection of Pasteurellaceae organisms (Dunbar et al., 1990; Wild and Miller, 1991; Queen et al., 1994).
- It was recognized that Pasteurellaceae organisms were quite fastidious and viability was rapidly lost when samples were exposed to temperatures below or above the tolerable range. This was confirmed by Wild and Miller (1991).
- It was also recognized that the viability of Pasteurellaceae organisms were markedly reduced as samples aged and that the type of collection system and transport medium was critical (Ward et al., 1990; Wild and Miller, 1991; Ward et al., 1997).
- Evidence was accumulated indicating that *Pasteurella* species can be isolated from essential 100% of appropriate samples collected from the upper respiratory tract of bighorn sheep and guidelines for sample collection and submission were distributed.
- Since multiple genera of bacteria colonize upper respiratory mucosa, some of which are inhibitory to the growth of Pasteurellaceae, different types of media were developed, tested and finally adopted to enhance isolation of these organisms from the upper respiratory tract (Ward et al., 1986; Jaworski et al., 1998).
- Serotyping procedures previously used to identify and differentiate types of Pasteurellaceae, e.g. *Pasteurella haemolytica* and *P. trehalosi* from domestic livestock were found to be inadequate for differentiation of most isolates from wild ruminants (Ward et al., 1990, Ward et al., 1997).
- Procedures were developed and applied to differentiate isolates by biochemical utilization procedures into >100 different biovariants thus greatly increasing the ability of other test systems, such as serotyping, to detect differences between and similarities of isolates (Jaworski et al., 1998).
- In addition DNA fingerprinting procedures used in human epidemiological studies were developed and applied to detect transmission of specific strains of *Pasteurella* species (Snipes et al., 1992; Jaworski et al., 1993; Ward et al., 1997; Rudolph et al., 2003; Weiser et al., 2003).

The studies reviewed and noted in the USFS Bighorn Report did not utilize these advances and did not, then, reflect the best available data. Moreover, the best available data concludes that transmission of disease from domestic sheep to bighorn sheep in the natural environment has not been scientifically proven. The USFS Bighorn Report does not clearly identify sources of uncertainty affecting data quality, i.e., the failure to employ scientific

advances in sample collection and disease identification, but instead bases its conclusion that domestic sheep can transmit disease to bighorn sheep upon unsound science used in the planned pen experiments study.

#### **D. Planned Pen Experiments With Other Species**

The USFS Bighorn Report states:

Recently, however domestic goats have been implicated in fatal disease transmission to bighorn sheep. Some goats carry *Mannheimia* and *Pasteurella* species that have been identified in bighorn disease events. DNA analysis conducted during a 1995 to 1996 Hells Canyon bighorn die-off revealed that a feral goat and two bighorn sheep shared a genetically identical *P. multocida* and *M. haemolytica*.

This statement biases the reader into believing this goat caused the bighorn sheep die-off. In the paper *Microorganisms Associated with a Pneumonic Epizootic in Rocky Mountain Bighorn Sheep (Ovis Canadensis Canadensis)* by Rudolph, Hunter, Rimler, Cassirer, Foreyt, DeLong, Weiser and Ward, *Journal of Zoo and Wildlife Medicine* 38(4), pages 548-558, 2007, the authors conclude that “this epizootic resulted from a complex of factors including multiple potential respiratory pathogens, none of which were identified as a primary pathogen and possible stress factors.”

In their six month scientific evaluation of 92 bighorn sheep involved in the die-off, forty (40) head had scabies and four (4) had serious horn fractures. The researchers found 14 biovariants of *P. haemolytica*, three biovariants of *P. trehalosi*, and five biovariants of *P. multocida*. In terms of viruses, they found eighteen (18) bighorn sheep with BRS, fourteen (14) with BVD, eleven (11) with IBR, and nineteen (19) bighorn sheep with PI-3. Any one of these organisms could have caused disease and death in the Hells Canyon bighorn sheep herd. The researchers also concluded that:

Between 1971 and 1995, 22 translocations of 329 bighorn sheep were conducted to augment the Hells Canyon bighorn sheep population. The bighorn sheep were translocated from nine different areas including sites in Canada, Colorado, Idaho, Montana, Washington, and Wyoming. The bighorn sheep from each of those sites would have carried distinct biological packages that could have included multiple bacteria strains, viruses and parasites with the potential to compromise the health of the translocated and/or resident bighorn sheep at the release site.

While the goat and two of the bighorn sheep carried the same *P. multocida* and *P. haemolytica* organism, this was not determined to be the organism causing the large-scale die-off, and transmission of the organism was not demonstrated in the research (Ward Payette Comments 1996, Weiss et. al., 2008). The USFS Bighorn Report focuses upon the presence of the goat near the bighorn sheep prior to the die-off and ignores the actual scientific findings. Once again the USFS Bighorn Report demonstrates a bias against domestic sheep and goats and cherry-picks the information presented to support its hypothesis.

#### **E. Inoculation Experiments**

The inoculation experiments discussed in the USFS Bighorn Report serve no utility other than to bias the reader. In the CAST Study, the reviewers found that:

Wild sheep experience high morbidity and mortality after being intratracheally or intradermally inoculated with relative high doses (10<sup>4</sup><sup>th</sup> organisms) of field strains or attenuated strains of *M. haemolytica* from domestic sheep or cattle, or with *B. trehalosi* strains originating from other wild sheep (Foreyt, Silflow and Lagerquist 1996, Foreyt, Snipes and Kasten 1994; Onderka, Rawluk, and Wishart 1998). The resulting pathology from experimental inoculations of wild sheep varied among strains used, but all strains caused some form of pneumonia. Miller, *et al.* at 3.

The CAST Study found that early inoculation studies by Foreyt, Onderka and others used doses 10,000 or more times the levels needed to cause disease not only in bighorn sheep but cattle and other species as well. The peer reviewed and published CAST Study also found that ALL strains of *haemolytica* including those originating from wild sheep caused some form of pneumonia, in direct contrast to the USFS Bighorn Report.

Dr. Anette Rink in her comment regarding the Payette National Forest risk analysis came to same conclusion as CAST about the inoculation studies cited by the USFS. Dr. Rink states:

One of the most frequently cited studies on disease transmission in most papers (Foreyt et al., 1994) used  $5.3 \times 10(8)$  to  $8.6 \times 10(11)$  colony forming units to inoculate [bighorn sheep]. Seven of eight inoculated bighorn sheep died from acute pneumonia within 48 hr of inoculation. The infectious dose for the majority of bacterial pathogens lies somewhere in the order of  $1 \times 10(1)$  to  $10(4)$ .

In other words, Dr. Foreyt inoculated the bighorn sheep with colonies of *Pasteurella* 10,000 to 10,000,000 times the level necessary to cause disease. Death was inevitable.

#### **F. Microbial Transmissibility**

The USFS Bighorn Report states that domestic sheep and bighorn sheep did not co-evolve together; therefore, bighorn have a reduced capacity to kill bacteria compared to domestic sheep. In his 2006 comment discussing the Payette National Forest risk analysis, Dr. Glenn Weiss addresses similar comments as follows:

I conducted a PubMed (the National Institutes of Health scientific publication service) search of the referenced scientific literature using the key words “sheep pneumonia *Pasteurella*.” There were 136 journal articles in the PubMed database, 21 dealing with bighorn sheep, leaving 115 dealing with domestic sheep pneumonia *Pasteurella*. Fifty-eight (58%) of these 115 journal articles were published from 1990 to present. Therefore, respiratory disease in domestic sheep has apparently not demonstrated many resistances or the need for these scientific studies would not exist. Weiss, *Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest* (2006).<sup>3</sup>

The USFS Bighorn Report downplays the effects of respiratory disease in domestic sheep to support its hypothesis that contact with domestic sheep devastate bighorn sheep.

#### **G. Demographic**

The USFS Bighorn Report notes that Gross and Clifford quantitatively evaluated the degree of risk between domestic and bighorn sheep for Sierra Nevada bighorn and found

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<sup>3</sup> Submitted to Pattie Soucek, Forest Planner, Payette National Forest.

proximity of domestic sheep a major negative factor bighorn restoration. What the USFS Bighorn Report fails to discuss is the fact that domestic and Sierra Nevada sheep have grazed the same region for 300 years, and no study has documented a respiratory related die-off in these bighorn sheep to date.

The USFS Bighorn Report also states that the authors have not found any published reports where fenced or free-ranging bighorn sheep herds remained healthy with domestic sheep in the region. This is false. The study by Ward AC, Hunter DL, Jaworski MD, Benolkin PJ, Dobel MP, Jeffress JB, Tanner GA (1997) *Pasteurella spp. in sympatric bighorn and domestic sheep*. Journal of Wildlife Diseases, 33(3): pages 544-57, reviewed several instances where the presence of domestic sheep did not adversely affect bighorn sheep. For example, in October 1992 a single castrated male lamb that commingled and stayed with bighorn sheep on the Granite Range did not cause a die-off of the bighorn sheep. The entire bighorn herd and the domestic lamb were captured and tested for pasteurella. Although the bighorn and domestic sheep tested positive for Biotype 3 P organisms, the bighorn herd has increased rather than dying-off. In fact the herd has tripled in size. A similar event in the Desatoya Range was documented in 1992. Contact among a domestic ewe, her lamb, and a bighorn herd was witnessed. The entire bighorn herd and the domestic sheep were tested and found to have Biotype 3 pasteurella organisms. The bighorn herd, however, has continued to thrive.

Current studies are looking at over 300 desert bighorn in Arizona that have co-mingled for generations without ill-effect. The suggestion in the USFS Bighorn Report that bighorn sheep will not remain healthy after contact with domestic sheep is not supported by the evidence. Yet, it is presented in the USFS Bighorn Report as a fact supporting “the hypothesis that bighorn

sheep have a high likelihood on contracting fatal respiratory disease following contact with domestic sheep.” Schommer at 3.

## **VI. Conclusion**

The USFS Bighorn Report clearly violates the Data Quality Act of 2002, the OMB Guidelines, and the USDA Regulatory Information Guidelines. Much of what the USFS Bighorn Report presents as “science” has no basis in scientific design or scientific evidence. According to both the OMB Guidelines and the USDA Regulatory Information Guidelines, the term “objectivity” includes whether disseminated information is presented in an accurate, reliable and unbiased manner. This also involves whether the information is presented within a proper context. The USFS Bighorn Report clearly fails on these points. The USFS Bighorn Report cherry-picked what scientific papers it wished to discuss, presented misleading information, and presented some information out of context.

There is no scientific evidence that the severity of wild sheep die-offs are more pronounced after association with domestic sheep. Only in captive studies did bighorn sheep react more severely, and much of this severity can be explained by the extremely high doses of bacteria used in the inoculations and with the stress of confinement itself.

“Objectivity” also focuses on the information cited within the document. These sources also need to be accurate, reliable and unbiased. Much of the information contained in the USFS Bighorn Report is not accurate, not reliable, and not unbiased. The USFS Bighorn Report fails to address the limitations of the data used to reach its conclusions and fails to acknowledge that circumstantial evidence rather than scientific evidence underlies most of the information presented.



According to the USDA Regulatory Information Guidelines, the USFS Bighorn Report should rely upon the “best available data,” yet studies using advanced scientific sampling and disease identification techniques were not included in the USFS Bighorn Report. Because the information disseminated in the USFS Bighorn Report is not objective, it also fails to have any utility for those persons making management decisions regarding grazing of domestic sheep and goats in National Forests.

## **VI. Effect of the Aforementioned Errors**

The errors contained in the USFS Bighorn Report are mistakenly influencing the USFS’s decisions about management of domestic sheep in all national forests. Moreover, reliance on this biased and faulty information in the USFS on forest plans or amendments thereto, as well as modifications or cancellations of grazing permits, has and will continue to harm the Petitioners and their members. The Petitioners and their membership have been negatively impacted by the dissemination of this false information regarding domestic sheep’s capabilities to spread numerous diseases, including scabies, anaplasma, and babesia.

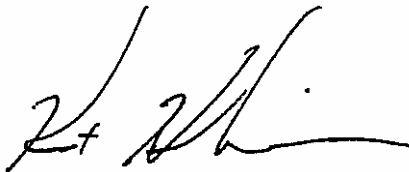
The Petitioners cannot adequately assess the USFS’s justifications or rationale for proposing changes to management plans when based upon this misinformation. The Petitioners and their members will continue to be harmed if management decisions are based upon this unreliable, inaccurate, and biased information. In addition to the damage to the Petitioners and their members if there are reductions or changes to grazing permits based upon the false information in the USFS Bighorn Report, the local economies will negatively impacted, as well as hurting the local social and economic stability of these areas by reducing or removing sheep producers.

## **VII. Recommendation and Justification for How the Information Should Be Corrected**

The Petitioners respectfully request the USFS retract the USFS Bighorn Report, General Technical Report RMRS-GTR-209, and all reliance thereon in existing and subsequent forest plans and forest plan amendments, as well as decisions on grazing permits and grazing permit renewals. Alternatively, the USFS could, as required by the OMB Guidelines, and the USDA Regulatory Information Guidelines, issue an amended USFS Bighorn Report that uses sound analytical methods and the best data available and ensures transparency and objectivity. An amended USFS Bighorn Report should incorporate all reliable information, not just the data supporting its false hypothesis; should identify the limitations of data used; should not state assumptions as fact; and should include the best available data as discussed herein.

Respectfully submitted this 23rd day of January, 2009.

Holsinger Law, LLC

Handwritten signatures of Kent Holsinger and Laura L. Chartrand.

Kent Holsinger, No. 33907  
Laura L. Chartrand, No. 39220  
*Attorneys for Petitioners*



United States  
Department of  
Agriculture

Forest  
Service

Washington  
Office

1400 Independence Avenue, SW  
Washington, DC 20250

File Code: 2600/4200

Date:

MAY 01 2009

Kent Holsinger and □ □ Laura L. Chartrand  
Attorneys for Petitioners  
Holsinger Law, LLC  
104 Broadway, 3rd Floor  
Denver, CO 80203

Dear Mr. Holsinger and Ms. Chartrand,

This letter and enclosure is in response to your January 23, 2009 petition for correction of information, which was received by this office on February 5, 2009. This data challenge against the Rocky Mountain Research Station (RMRS) General Technical Review (GTR)-209 was submitted by you in accordance with the United States Department of Agriculture (USDA) Information Quality Act (IQA); Public Law 106-554-&515 and the USDA Information Quality (IQ) Guidelines. The petition was filed under the USDA Guidelines for Regulatory Information and receipt was acknowledged via our letter dated February 17, 2009.

We have addressed each of your concerns in the enclosed synthesis from our independent reviewers. Based on that review we have denied your data challenge.

If you are dissatisfied with this response, you may submit a Request for Reconsideration (RFR). The RFR must be postmarked, shipped by an overnight delivery service, faxed, or sent by e-mail within 45 days after the date of this letter transmitting our decision on your original request for correction. An RFR filed after the 45-day deadline may be denied as untimely. The RFR should reference this letter and its enclosure. Additional requirements and information for an RFR are listed in the USDA correction of information website:  
[http://www.ocio.usda.gov/qi\\_guide/corrections.html](http://www.ocio.usda.gov/qi_guide/corrections.html). An RFR may be submitted to the following street address, facsimile, or email address:

USDA Forest Service  
Attn: George Vargas/Data Quality Officer  
Mail Stop 1113, 1SW Yates Building  
1400 Independence Ave, SW  
Washington, DC, 20250  
Fax: 202-260-3245  
[gvargas@fs.fed.us](mailto:gvargas@fs.fed.us)

Sincerely,

for THELMA J. STRONG  
Director, Office of Regulatory and Management Services

Enclosures



**Colorado Woolgrowers, et.al. Data Quality Act Petition: “A Review of Disease Related Conflicts Between Domestic Sheep and Goats and Bighorn Sheep.” General Technical Report RMRS-GTR-209, by Timothy J. Schommer and Melanie M. Woolever, September, 2008.** (hereafter, this document is referred to as ‘GTR-209’ or Schommer and Woolever (2008)).

### **Request and Petitioner (P 2)**

The Petition was submitted January 23, 2009, by Kent Holsinger and Laura L. Chartrand, Attorneys for the Colorado Woolgrowers, et al. (“petitioners”) filed under United States Department of Agriculture (USDA) Quality of Information (QOI) and USDA QOI Guidelines for Regulatory Information. The Petition was accepted and an acknowledgement letter sent February 17, 2009.

Petitioners have challenged a U.S. Forest Service Rocky Mountain Research Station (RMRS) General Technical Report (GTR) entitled *A Review of Disease related Conflicts Between Domestic Sheep and Goats and Bighorn Sheep*, RMRS-GTR-209 (May 2008) (“GTR 209”) on several grounds. In general, petitioners have asserted that GTR 209 is both biased and inaccurate.

### **Description of Information to Correct (P. 3)**

The petition states that corrections are needed for the Bighorn RMRS-GTR-209 first published in May, 2008 and that it is inaccurate, unreliable, biased. The petition alleges the Bighorn Report: “(1) was developed with unsound research methods; (2) ignores studies that do not support its thesis; (3) jumps to conclusions that are not scientifically supported but are pure conjecture; (4) disseminates information that is not objective or reliable and lacks basic scientific integrity; (5) Therefore, the utility of this information is questionable.

Petitioners request that the USDA Forest Service (FS) retract the Bighorn Report and all reliance thereon in existing and subsequent forest plans, forest plan amendments, as well as decisions on grazing permits and grazing permit renewals. Alternatively, the petitioners request that the U.S. Forest Service issue an amended Bighorn Report that uses sound analytical methods and the best data available ensuring transparency and objectivity in the information disseminated. (P.3-4).

For this responsive document, complaints within the petition have been synthesized into 1 general contention and 16 specific contentions.

### **Background on the USFS Bighorn Report (P.3)**

The purpose of GTR 209 was to provide a review of existing scientific literature concerning the potential for disease transmission from domestic sheep and goats to bighorn sheep which may lead to significant die-offs of bighorn sheep. The authors of GTR 209 did not report on any original scientific studies or research conductions by the authors. Rather, GTR 209 identifies numerous studies on the subject, and briefly summarizes the methods used in those studies and the results obtained. The scope of GTR-209 did not include critiquing the studies cited,

evaluating the methods used, or suggesting alternative conclusions or hypotheses that could have been reached.

GTR-209 was first released May, 2008 and during the publication review process it was revised, reprinted and disseminated in September, 2008. It is available on the RMRS web site and was attached to the petition. No other supporting documents were attached to the petition. Several of the arguments in the petition were submitted in response to Payette Risk Analysis when it was open to public comment in 2006. The Payette National Forest is currently engaged in preparing a Forest Plan Supplemental Environmental Impact Statement on Bighorn Sheep.

#### **IV. Noncompliance with OMB and/or USDA Information Quality Guidelines (P.5-7)**

- A. Data Quality Act and OMB Guidelines**
- B. USDA Information Quality Guidelines**
- C. Objectivity of Regulatory Information**
- D. Utility of Regulatory Information**
- E. Integrity of the Regulatory Information**

**Review Findings:** Section IV. A-E is basically a duplication of the USDA/OMB QOI Guidelines. No comment is necessary.

#### **General Contention:**

General Technical Report (**GTR 209**) (1) was developed with unsound research methods; (2) ignores studies that do not support its thesis; (3) jumps to conclusions that are not scientifically supported but are pure conjecture; (4) disseminates information that is not objective or reliable and lacks basic scientific integrity; (5) therefore, the utility of this information is questionable.

#### **Discussion:**

The manuscript was submitted to the USDA Forest Service Rocky Mountain Research Station (RMRS) to be considered to be published as a General Technical Report. The RMRS role was to oversee the blind review process, specifically to select reviewers, solicit their reviews and ensure that the manuscript was scientifically creditable, defensible and met Research and Development Quality Control and Quality Assurance guidelines.

The RMRS contacted potential reviewers and eventually received four reviews. All reviewers were senior wildlife specialists and experts with over 80 years of collective experience, including bighorn sheep. Identities of the reviewers were held anonymous, known only to the RMRS. Reviews were transmitted to the authors with direction to address the comments.

The authors in collaboration with the National Forest System Washington Office, Watershed, Fish, and Wildlife staff addressed the review comments and revised the manuscript. The RMRS reviewed the revision, focusing on the adequacy of responsiveness of addressing review comments, found the manuscript to be satisfactory, approved it for publication, and forwarded it to the RMRS Station Editor for publication.

**Review Findings:** The U.S. Forest Service undertook a blind peer review process designed to guard against bias and ensure a scientifically defensible report. The blind peer review conducted on GTR-209 met scientific peer review standards established by the U.S. Forest Research and Development for General Technical Report publications. The peer review meets the criteria stated in the USDA Quality Guidelines for Objectivity of Scientific Research and Regulatory Information that require a high level of quality and objective peer review. Therefore, the information within GTR-209 is deemed to be credible.

### **Specific Contentions in the Petition**

Each contention discussed in the petition is treated separately below, with the contention displayed, discussed, and followed by a review finding.

#### **1. Issue: The USFS Bighorn Sheep Report Lacks Objectivity (1) - Abstract Shows Immediate Bias (P. 7-9).**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contend that GTR-209 demonstrated immediate bias against domestic sheep when it stated:

“Although efforts to identify organisms causing pneumonia in bighorn sheep following contact with domestic sheep have identified multiple bacteria species, the complete range of mechanisms/causal agents leading to epizootic disease events are not completely understood.” (Schommer and Woolever 2008:i).

“The USFS Bighorn Report, thus, leads a reader to assume that “multiple bacteria strains” from domestic sheep have been identified as the cause for pneumonia in bighorn sheep. Yet, the same USFS Bighorn Report acknowledges that “the complete range of mechanisms/causal agents leading to epizootic disease events **are not completely understood.**” (Emphasis added by petitioners) Schommer at i.”

The petitioners indicate that GTR-209 leads readers to assume that “multiple bacteria strains” from domestic sheep have been identified as the cause for pneumonia in bighorn sheep. They then contend that this statement leads to the inference that scientific research has proven that domestic sheep transfer fatal diseases to bighorn sheep. The petitioners cite the opinion expressed in Miller and others (2008) that a common *Pasteurellaceae* strain or other agent directly linking bighorn epidemics to either domestic sheep interactions has not been demonstrated unequivocally to date.

**Discussion:** This contention is one of semantics rather than interpretation of science. Following a careful reading, it can be seen that the quote from GTR-209 does not assert that “multiple bacteria strains” from domestic sheep have been identified as the cause for pneumonia in bighorn sheep. Rather, it says that during efforts to identify the organisms that caused pneumonia in bighorn sheep, multiple species of bacteria were identified. The reference to domestic sheep in this statement only provided the context that the pneumonia in bighorn sheep that was being investigated occurred after contact with domestic sheep.

In addition, as an abstract, this statement is intended to provide an extremely brief overview into the authors' review of the literature and their conclusions. Authors are necessarily limited in the amount of detail they can include in an abstract.

**Review Finding:** The petitioners have not demonstrated that GTR-209 lacked objectivity in the factors.

## **2. Issue: The USFS Bighorn Sheep Report Lacks Objectivity (2) - Contact Hypothesis (P. 8)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that the hypothesis referred to in the following statement from RMRS- GTR-209 is not supported by the results of scientific investigations (P. 8):

The following is a review and summary of the experimental methods and evidence relative to the hypothesis that bighorn sheep have a high likelihood of contracting fatal respiratory disease following contact with domestic sheep, characterized as the "contact hypothesis" (Wehausen and others in prep). [From GTR-209:3].

**Discussion:** The USDA QOI guidelines instruct authors to "Use sound analytical methods in carrying out scientific and economic analyses and in preparing risk assessments". Conducting a literature review, as the authors of the GTR-209 have done, is the accepted standard in the field for bringing together a body of knowledge on an issue. Upon reading the GTR-209, Schommer and Woolever did a thorough job of assembling and reviewing the scientific literature. The literature they reviewed supports the hypothesis that bighorn sheep have a high likelihood of contracting fatal respiratory disease following contact with domestic sheep.

The hypothesis that bighorn sheep have a high likelihood of contracting fatal respiratory disease following contact with domestic sheep has been the basis for research on determining the causes of fatal respiratory disease epidemics in bighorn sheep population for many years (Callan and others 1991; Foreyt 1989, 1990, 1994; Onderka and Wishart 1988). The petitioners contend that science findings do not support this hypothesis quoting Marie S. Bulgin's opinion that "There is just NO scientific basis for this premise." However, careful reading of the statement in question reveals that Schommer and Woolever (2008:3) did not assert that the hypothesis was correct but only that they intended to review and summarize scientific studies that explored the hypothesis.

In addition, Dr. Bulgin's letter of comment to the Payette National Forest is not appropriate for use in a scientific review of the literature on bighorn sheep disease issues. Dr. Bulgin's letter has not undergone peer review, and so should not be included in a literature review.

**Review Finding:** The petitioners have not demonstrated that GTR-209 lacked objectivity in the statement quoted. They acted appropriately in conducting a review of published research and in forming conclusions that are supported by the scientific literature.

### 3. Issue: The USFS Bighorn Sheep Report Lacks Objectivity – Inclusion of the Monello (2001) article (P.7).

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that GTR-209 did not fully report the findings presented by Monello and others (2001). It is the petitioners' opinion that the data presented in GTR-209 had been "cherry-picked" to support the contact hypothesis (P. 9). The petitioners specifically state:

The Monello, Murray, and Cassierer report found that 88% of pneumonia-induced die-offs occurred at or within three (3) years of peak population numbers. This finding suggests that density-dependent forces such as food shortage or stress are a principal contribution to bighorn sheep susceptibility to pneumonia. This information does not appear in the USFS Bighorn Report. (P. 9).

**Discussion:** Monello and others (2001) reported on an analysis of records of bighorn population attributes obtained from herds found across the species' range, to compare the biological and environmental factors associated with populations that had experienced a die-off induced by pneumonia versus those that had not experienced a die-off.

Specifically, they aimed to test the following predictions: (i) contact with domestic sheep is a principal mode of infection with pneumonia causing strains of *Pasteurella* spp. and thus outbreaks occur in proximity to domestic sheep grazing areas; (ii) density dependent forces (i.e., food limitation, stress, competition) predispose bighorns to pneumonia outbreaks and thus herds experience die-offs at or near population peaks; (iii) inclement weather predisposes bighorns to pneumonia outbreaks and thus herds experience die-offs during periods of abnormal temperature or precipitation. Their results implied that density-dependent forces and proximity to domestic sheep both contribute importantly to pneumonia epizootics in bighorns and these two factors may act either sequentially or in concert to promote disease outbreaks. As Monello and others (2001) state:

"Alternatively, pneumonia outbreaks may occur during population peaks because of the effects of high density on movement and dispersal. Indeed, it is plausible that bighorn herds occupy larger ranges during population peaks, and thus may be more likely to contract *Pasteurella* spp. from other bighorn herds or even from domestic sheep herds." p. 1429, Monello and others (2001:1429).

These two mechanisms **are not mutually exclusive**. The evidence of one mechanism does not disprove the other. Ultimately, Monello and others (2001) conclude:

"Our finding that herds in the pneumonia-induced-dieoff category were located significantly closer to domestic sheep grazing areas than herds in the non-dieoff category supports the contention that domestic sheep are a common source of infection with lethal strains of *Pasteurella* spp. (see also Goodson 1982)" (Monello and others 2001:1429).

Schommer and Woolever (2008:2) cite the Monello and others (2001) publication in GTR-209 to support their statement that "...herds found at peak population or in close proximity to domestic sheep tend to be more susceptible to die-offs..." They also included the following statement



“Finally, Monello and others (2001) concluded that bighorn herds are rendered vulnerable to pneumonia transmission of *Pasteurella* spp. from domestic sheep serving as reservoir hosts” (Schommer and Woolever 2008:3).

are more susceptible to die-offs they did not discuss the details of why that may have occurred (i.e., density dependent forces such as food limitation, stress, and/or competition). One of the stated purposes of GTR-209 was to “...review the science related to disease, particularly respiratory disease, in sympatric populations of domestic sheep (*Ovis aries*) and goats (*Capra hircus*) and bighorn sheep (*Ovis canadensis*)...” (Schommer and Woolever 2008:1). Monello and others (2001) results suggested that bighorn herds are rendered vulnerable to pneumonia partially through density-dependent factors. Reporting and discussing this finding would have been within the stated purpose of GTR-209 and would have provided a more complete review of the science relating to disease in bighorn sheep.

**Review Finding:** The petitioners have not demonstrated that GTR-209 lacked objectivity in the statement quoted, rather they focused their discussion on factors affecting disease in bighorn sheep. Furthermore, the GTR-209 authors did not “cherry-pick” or selectively represent the Monello and others (2001) article. In contrast, the GTR-209 and the Monello and others (2001) article have the same main conclusion: that domestic sheep appear to be a source of infection of *Pasteurella* spp. Second, the GTR-209 authors do state that the environment plays a role in disease outbreaks, saying:

“Although malnutrition, harsh weather, and other stressors may exacerbate susceptibility to disease, viruses, parasites, and bacteria can weaken or kill bighorn sheep”. (GTR P.7)

#### **4. Issue: Inclusion of the CAST Report. (P. 8)**

**Contention:** On page 8, the petitioners state that:

“The inference that science has proven that domestic sheep transfer fatal diseases to bighorn sheep comes into direct conflict with the findings of the Council for Agricultural Science and Technology (“CAST”) report entitled Pasteurellosis Transmission Risks between Domestic and Wild Sheep (“CAST Report”) published in August 2008”.

**Discussion:** There are two important responses to this claim: first, GTR-209 was first published in May 2008, before the CAST Report was published (GTR-209 was edited and printed into its final form in September 2008). The USDA Guidelines on the Objectivity of Regulatory Information states that agencies and offices must use “the best available data”. The CAST Report was published *after* the date of first publication of this GTR, and therefore was not available to the authors. The CAST report is not in conformance with the USDA/OMB QOI Guidelines and should not be accepted or considered as part of the petition.

The second response to this claim is that reading the CAST Report leads to similar conclusions as the GTR-209. Both documents present on the “Payette Science Panel Findings” (USDA Forest Service 2006) and the Western Association of Fish and Wildlife Agency Findings (WAFWA 2007). For example, on page 4 of the CAST Report, the authors state that,

“Available data suggest that interactions between wild and domestic sheep carry some inherent risk of precipitating pneumonia in wild sheep under range conditions (USDA–FS 2006). Given the limitations of today’s tools, the most practical approaches identified thus far for minimizing this risk involve simply preventing interspecies interactions that could result in respiratory pathogen transmission between wild and domestic sheep (WAFWA 2007).”

Finally, in the Conclusion of the CAST report, the authors state that,

“Preventing contact between wild and domestic sheep, better monitoring of exchanges and interactions between wild sheep populations, and managing population and habitat quality all have some value in improving and maintaining the overall health of wild sheep populations and preventing pneumonia epidemics”.

**Review Finding:** The petitioners claim that the conclusions of GTR-209 conflict with the CAST Report is not true. The CAST Report and GTR-209 have similar conclusions regarding the complexity and incomplete knowledge about the epidemiology contributing to the risk of interspecies transmission and the need for special and temporal separation under very difficult open range conditions. Although, of course, Schommer and Woolever would not have had access to a publication that was published after their document was at the printer.

#### **5. Issue: USFS Bighorn Report fails to comply with both OMB and USDA Regulatory Information Guidelines (P 10)**

**Contention:** The petitioners state that the GTR-209 does not identify known sources of error and limitations in the data, and therefore falls short of the OMB and USDA Regulatory Information Guidelines and requirements for objectivity. The petitioners state:

“The USFS Bighorn Report fails to comply with both OMB and USDA Regulatory Information Guidelines. Nowhere does the USFS Bighorn Report explain the rationale for selecting certain data and deciding not to refer to other data, such as that referenced herein, in the analyses. In fact the existence of significant data highlighting the uncertainty of USFS Bighorn Report’s hypothesis is not even mentioned. The USFS Bighorn Report does not ensure transparency in its dissemination of information by identifying known sources of error and limitations in the data”

**Discussion:** The GTR-209 was subjected to a formal, independent, external peer review, which ensured the document’s objectivity, following the USDA Regulatory Information Guidelines. The guidelines state:

“Where appropriate, subject the analysis to formal, independent, external peer review to ensure its objectivity. If analytic results have been subjected to such a review, the information may generally be presumed to be of acceptable objectivity. However, in accordance with the OMB standard, this presumption is rebuttable based on a persuasive showing by a petitioner in a particular instance, although the burden of proof is on the complainant.”

The independent, external peer review of the GTR-209 was coordinated by the Rocky Mountain Research Station of the USDA Forest Service. Four independent scientists individually reviewed the GTR-209 and their comments were incorporated. In addition, the authors of the GTR-209 do

discuss limitations in the studies compiled throughout the GTR-209. For example, when presenting the unplanned pen experiments in the GTR-209, the authors state that these early "contact hypothesis" experiments "were accidental in nature and, therefore, lacked any experimental design. However, because of the information garnered from those captivity situations, they still serve as tests of the contact hypothesis." (GTR-209 P. 3)

**Review Finding:** Given the independent, external peer review of the GTR-209 and the authors' discussion of the limitations of different studies, the GTR-209 is considered to be objective and meets OMB and USDA Guidelines for Regulatory Information.

## **6. Issue: The Bighorn Sheep Report Lacks Objectivity - Scabies (P. 10-11)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of scabies is misleading, not accurate, and not reliable. The petitioners specifically state:

The USFS Bighorn Report wrongfully suggests that domestic sheep infest bighorn sheep with a mite that is host specific and with a disease that has not been present in the United States for more than thirty years! (P. 11).

**Discussion:** Schommer and Woolever's (2008:2-3) discussion of scabies in GTR-209 is limited to historical accounts of large-scale population losses in the nineteenth century that were principally attributed to scabies introduced by domestic sheep and to a summary statement that included scabies in a list of diseases shared by domestic and bighorn sheep.

Researchers reporting on population declines in bighorn sheep concluded that the initial declines were principally attributed to scabies introduced by domestic sheep (Buechner 1960; Honess and Frost 1942; Jones 1950; Smith 1954). This conclusion was based largely on clinical evidence of scabies in bighorn sheep during die-offs and the fact that these scabies outbreaks closely followed the introduction of domestic sheep. More recent research supports the hypothesis that the scabies mite is not host specific and is not native to North America (Ramey and others 2000). In addition, scabies continues to be present in domestic livestock, other wildlife in the United States and is of concern to bighorn sheep managers.

Also, while it is generally acknowledged that scabies was eradicated from domestic sheep in the United States in the early 1970s, domestic sheep are still routinely treated to ensure they remain free of infestations. This is necessary because scabies infestations continue in domestic cattle (Gates and Wescott 2000) in the United States, which could lead to re-infestations of domestic sheep.

**Review Finding:** The petitioners have not demonstrated that Schommer and Woolever (2008) lacked objectivity in the statement quoted, rather that they did not qualify their statements with the fact that scabies has not been reported in domestic sheep since the 1970s.

## **7. Issue: The USFS Bighorn Sheep Report Lacks Objectivity - Unplanned Pen Experiments (P.12-13)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of observations from unplanned pen experiments is misleading, not accurate, and not reliable. The petitioners specifically state:

The USDA Regulatory Information Guidelines require U.S. Forest Service to use the best data available and ensure transparency "by identifying known sources of error and limitations in the data." Yet, the underlying information on unplanned pen experiments was based purely on circumstantial rather than scientific evidence, and the limitations of relying upon circumstantial evidence are not addressed in the USFS Bighorn Report. (P. 13)

**Discussion:** Schommer and Woolever (2008:3-4) discussed the published results of unplanned contact between domestic sheep and confined bighorn sheep because they provided information relevant to the contact hypothesis. When discussing the unplanned pen experiments the GTR-209 states:

"The contact hypothesis has been tested numerous times in captive situations. Two tests were accidental in nature and, therefore, lacked any experimental design. However, because of the information garnered from those captivity situations, they still serve as tests of the contact hypothesis." (GTR-209, P. 3)

Therefore, the GTR-209 states that these initial accidental encounters were unplanned. Although these initial reports were observational in nature, these encounters represent the start of a line of research inquiry that has grown and developed over the past 25 years. The authors of GTR-209 present all the planned pen experiments and inoculation research that occurred after these initial observations, in order to present the full picture of research in this subject area. These initial observational studies are not presented as conclusive proof, but rather serve to set the stage for consecutive studies.

The petitioners cited Hailey and others (1972), Taylor (1973), and Blaisdell (1976) (all published in gray literature) as reports of incidences where penned bighorn sheep encountered die-offs without exposure to domestic sheep. The bighorn sheep deaths reported by Blaisdell (1976) were not attributed to pneumonia. Some of the bighorn sheep deaths reported by Hailey and others (1972) and Taylor (1973) were attributed to pneumonia. However, it should be noted that these results were anecdotal observations without experimental design. There was limited control of the timing and observation of the animals that died. It could not be established that there was not contact with domestic sheep prior to infection.

**Review Finding:** The petitioners have not demonstrated that GTR-209 lacked objectivity in their discussion of observations from unplanned pen experiments. Schommer and Woolever (2008:3) acknowledged that the findings in the publication they referenced in this section were accidental and were not based on studies with experimental designs. The findings they reported had been

published in a peer-reviewed journal article and provided information relevant to the objectives

#### **8. The USFS Bighorn Sheep Report Lacks Objectivity – Unplanned Penned bighorn sheep deaths without contact with domestic sheep (P. 13-16)**

**Contention:** On page 13 of the Petition, the petitioners state that the USFS Bighorn Report does not “discuss instances where penned bighorn sheep encountered die-offs without exposure to domestic sheep”. The petitioners then go on to list several examples from Dr. Marie Bulgin’s opinion letter to the Payette National Forest.

**Discussion:** First, Dr. Bulgin’s letter is not valid for inclusion in a literature review. Second, the examples listed are not valid examples of penned bighorn sheep encountering die-offs without exposure to domestic sheep.

Dr. Bulgin’s letter of comment to the Payette National Forest is not appropriate for use in a scientific review of the literature on bighorn sheep disease issues. Conducting a literature review, as the authors of the GTR-209 have done, is the accepted standard in the field for bringing together a body of knowledge on an issue. Dr. Bulgin’s letter to a National Forest has not undergone peer review, and is not appropriate to be included in a literature review.

In addition, in these three examples of bighorn sheep listed from the *Desert Bighorn Council Transactions*, the original literature does not describe the relationship between penned animals and domestic stock. It is unclear to what degree these animals associated with domestic sheep. For example, in the Hailey and others (1972) report the bighorn sheep were initially translocated from a different state. There is no discussion of domestic livestock interactions before, during, and after translocation.

The second example cited, Taylor and others (1973) reported on one dead animal from the Dutch Creek enclosure (the penned enclosure mentioned in Dr. Bulgin’s letter), and suggested that poisonous plants might have killed the animal:

“Since only 1 animal from Dutch Creek was examined, the disease problems there is not known. Because of the liver pathology observed in that animal, an examination of the enclosure for poisonous plants will be done by a plant specialist.” (Taylor and others 1973:50).

The third example cited, Blaisdell and others (1976), also does not provide any information about interactions with domestic livestock, although the article does state the animals had at various points escaped from the pen.

Essentially, these three examples listed are brief notes published in the 1970s, as experiments with pneumonia disease transmission with domestic sheep were first starting to be discussed in the literature, which may explain why there is insufficient discussion of the role of domestic animals. Regardless, these notes are not directly relevant to the disease transmission discussed in the GTR-209, and it is unclear why they have been chosen for inclusion in the Petition. They do not represent the best science or data available.

**Review findings:** The authors of the GTR-209 were objective and did not incorrectly omit any instances where penned bighorn sheep encountered die-offs without exposure to domestic sheep. The examples put forth, from Dr. Bulgin's letter, are not directly relevant to the GTR-209 and do not really discuss bighorn and domestic sheep interaction.

#### **9. Issue: The USFS Bighorn Sheep Report Lacks Objectivity -Planned Pen Experiments (P. 13-16)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of observations from planned pen experiments is misleading, not accurate, and not reliable. The petitioners specifically state:

The studies reviewed and noted in the USFS Bighorn Report did not utilize these advances and did not, then, reflect the best available data. Moreover, the best available data concludes that transmission of disease from domestic sheep to bighorn sheep in the natural environment has not been scientifically proven. The USFS Bighorn Report does not clearly identify sources of uncertainty affecting data quality, i.e., the failure to employ scientific advances in sample collection and disease identification, but instead bases its conclusion that domestic sheep can transmit disease to bighorn sheep upon unsound science used in the planned pen experiments study. (P. 15-16).

The planned pen experiments reviewed in the USFS Bighorn Report lacked the scientific tools necessary to evaluate the organisms present within the animal or the possibility of transmission to bighorn sheep. (P. 13)

The petitioners cited the opinions of C. S. Ward from his comments on the document: "USFS Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest" dated 14 July 2006. In Ward's opinion the research reported in the published articles cited by Schommer and Woolever (2008:4) in their discussion of planned pen experiments was not completed using recent technical advances. Therefore, in Ward's opinion, the results presented in those published papers are not valid.

**Discussion:** As stated above, letters of comment to the Payette National Forest are not appropriate for use in a scientific review of the literature on bighorn sheep disease issues. Conducting a literature review, as the authors of the GTR-209 have done, is the accepted standard in the field for bringing together a body of knowledge on an issue. As Dr. Ward's letter to a National Forest has not undergone peer review, it is not appropriate to be included in a literature review

Schommer and Woolever (2008:3) reported the results of the 10 experiments reported in five research articles, three of which were published in peer-review journals and two in the gray literature. They did not interpret the results of these studies but only summarized their findings. Since we do not have complete citations to the articles Ward referenced in his opinion piece it is difficult to evaluate the technical advances noted by him. However, it appears that most of the techniques he discussed were published after the research on the planned pen experiments was



experiments have not been completed using these technical advances so it is not possible to evaluate whether the results may be different with their use.

The points made by the petitioners, that diagnostic veterinary techniques have improved over time, especially with the advent of the use of genetic data, is true, but does not negate earlier research findings. Researchers can only use the best techniques available to them at the time, and acceptance in peer reviewed journal should ensure that only acceptable techniques are used. In addition, with the best practices for disease research, researchers are more likely to accurately detect the presence of *Pasteurellaceae* organisms. For example, incidences of *Pasteurellaceae* organisms may have gone up in Ward and others' (1997) study, due to:

“in part, from eliminating prolonged periods between collection and culturing of samples that occurred in the earlier study”

Therefore, earlier studies would have tended to **underestimate** the presence of *Pasteurellaceae* organisms, not overestimate it. Finally, the data summarized and presented in the GTR-209 from the planned pen experiments do not deal with incidence of *Pasteurellaceae* organisms, but rather, report that all the animals died of respiratory disease.

“All 23 bighorn sheep tested in these 10 trials died of respiratory disease following contact with domestic sheep or were euthanized when close to death. In every case, all the domestic and hybrid sheep remained healthy.” p 4, GTR-209.

**Review Finding:** The petitioners have not demonstrated that GTR-209 lacked objectivity in their discussion of research results from planned pen experiments. The authors of GTR-209 appropriately conducted a literature review, including the most recent studies and previous studies. The development of newer genetic techniques does not invalidate or contradict the results of older studies.

#### **10. Issue: The USFS Bighorn Sheep Report Lacks Objectivity - Planned Pen Experiments With Other Species. (P. 16-17)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of observations from planned pen experiments with other species is misleading, not accurate, and not reliable. The petitioners specifically state:

“The USFS Bighorn Report focuses upon the presence of the goat near the bighorn sheep prior to the die-off and ignores the actual scientific findings. Once again the USFS Bighorn Report demonstrates a bias against domestic sheep and goats and cherry-picks the information presented to support its hypothesis.”(P. 17).

**Discussion:** Schommer and Woolever (2008:4-5) discussed the published results of three studies of planned contact between confined bighorn sheep and species other than domestic sheep that were conducted to test the stress hypothesis. They also reviewed three published studies that reported interactions between domestic goats and bighorn sheep.

The petitioners contend that the results of a study (Rudolph and others 2007) were misrepresented by Schommer and Woolever (2008). Schommer and Woolever (2008:4) stated:

Recently, however, domestic goats have been implicated in fatal disease transmission to bighorn sheep. Some goats carry *Mannheimia* and *Pasteurella* species that have been identified in bighorn sheep disease events. DNA analysis conducted during a 1995 to 1996 Hells Canyon bighorn die-off revealed that a feral goat and two bighorn sheep shared a genetically identical *P. multocida* and *M. haemolytica* (Rudolph and others 2003; Weiser and others 2003).

This statement by Schommer and Woolever (2008:4) accurately reflected the published findings of Rudolph and others (2003) and Weiser and others (2003). Rudolph and others (2003:897) stated:

It was concluded that identical *Pasteurella* strains were shared by the goats and bighorn sheep. Although the direction of transmission could not be established, evidence suggests transmission of strains from goats to bighorn sheep. Goats may serve as a reservoir of *Pasteurella* strains that may be virulent in bighorn sheep; therefore, goats in bighorn sheep habitat should be managed to prevent contact with bighorn sheep.

Weiser and others (2003:542) stated:

The most notable suggestive evidence of transmission includes that of the dermonecrotogenic strain isolated from the feral goat and one of the bighorn sheep found in close proximity. Because this strain was not isolated from any of the other bighorn sheep in the study, it appears that the goat was the most probable source.

Rudolph and others (2007) was not cited by Schommer and Woolever (2008) in their discussion of domestic goats and bighorn sheep.

**Review Finding:** Reading the conclusions of the original article makes it clear that the authors' assertion in the GTR-209 (that goats have been implicated in disease transmission to bighorn sheep) is appropriate. Therefore, the GTR-209 represents the conclusions of the original papers, Rudolph and others (2003) without bias. Furthermore, since the publication (Rudolph and others 2007) cited by the petitioners as being misrepresented by Schommer and Woolever (2008) was not cited in this section their contention is moot.

#### **11. Issue: The USFS Bighorn Sheep Report Lacks Objectivity -Inoculation Experiments (P. 17-18)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of published results of inoculation experiments is misleading, not accurate, and not reliable. The petitioners suggest that the inoculation experiments reported in Foreyt and others (1994) were invalid because the inoculation experiments used from 10,000 to 10,000,000 times the level necessary to cause disease. The petitioners specifically state:

The inoculation experiments discussed in the USFS Bighorn Report serve no utility other than to bias the reader. (P. 17).



The peer reviewed and published CAST Study also found that ALL strains of *haemolytica* including those originating from wild sheep caused some form of pneumonia, in direct contrast to the USFS Bighorn Report. (P. 17)

**Discussion:** Schommer and Woolever (2008:4-5) discussed the published results of six studies that reported on inoculations of bighorn sheep to test the hypothesis that specific strains of pneumophilic bacteria frequently carried by healthy domestic sheep are the cause of fatal pneumonia in bighorn sheep following contact between these species.

The petitioners contend that a similar review (Miller and others 2008) conducted after Schommer and Woolever (2008) completed their review reached different conclusions. Specifically, Schommer and Woolever (2008:5) reported the results of studies (Foreyt and Silflow 1996; Onderka and others 1988) in which the source of the *M. haemolytica* inoculum was from healthy bighorn sheep. The three bighorn sheep used in the two trials showed no clinical signs of disease after the inoculations, nor did the seven domestic sheep similarly inoculated. Whereas Miller and others (2008) reported that the resulting pathology from experimental inoculations of wild sheep varied among strains used, but all strains caused some form of pneumonia.

Foreyt and Silflow (1996) stated “Based on our results the cytotoxic and noncytotoxic strains of *P. haemolytica* A11 used in these experiments were not lethal in bighorn sheep when administered intratracheally...” supporting the summary statement from Schommer and Woolever (2008). However, Miller and others (2008) did not cite the Foreyt and Silflow (1996) publication in their review.

Onderka and others (1988) reported that clinical signs of infection were not observed following inoculation. The inoculated bighorn sheep was euthanized 10 days post inoculation. Necropsy of the animal showed evidence of infection.

Foreyt and others (1994) discussed the relatively high level of bacteria used in inoculations in the discussion of their original article:

“Although the numbers of bacteria used in these experiments may not accurately reflect a natural exposure, nevertheless, one contact control bighorn sheep died within six days after its penmates received the inocula, and healthy domestic sheep inoculated with equal or greater numbers of bacteria remained healthy after inoculation indicating greater susceptibility of bighorn sheep to infection and fatal pneumonia. Because *P. haemolytica* A2 is a common isolate in domestic sheep, the likelihood of transmission from domestic sheep to bighorn sheep would be significant in contact situations. Based on these and previously reported data, all contact between bighorn sheep and domestic sheep should be avoided to prevent transmission of pathogenic strains of *P. haemolytica* of domestic sheep origin that cause pneumonia in bighorn sheep.” (Foreyt and others 1994:144).

The **relative** response to inoculation by bighorn and domestic sheep is a valid scientific comparison which led the authors to the conclusion held throughout this scientific body of literature, namely, bighorn and domestic sheep contact should be avoided.

**Review Finding:** The articles cited by Schommer and Woolever (2008) support their statement and not that of the petitioners or Miller and others (2008). The methods in the Foreyt and others (1994) article were appropriate. The Miller and others (2008) publication was not likely available to the GTR authors and did not cite the informative Foreyt and Silflow (1996) publication in their review. The petitioners have not demonstrated that Schommer and Woolever (2008) lacked objectivity in their discussion of inoculation experiments.

## **12. Issue: The USFS Bighorn Sheep Report Lacks Objectivity - Microbial Transmissibility. (P.18)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of published results of transmissibility of microbes is misleading, not accurate, and not reliable. The petitioners specifically state:

“The USFS Bighorn Report downplays the effects of respiratory disease in domestic sheep to support its hypothesis that contact with domestic sheep devastate bighorn sheep.” (P. 18).

The petitioners supported their contention by quoting a portion of the 2006 commentary Glenn Weiss provided on the “Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest.” The Weiss commentary documented that numerous studies have been done since 1990 on respiratory diseases in domestic sheep. This led him to the conclusion that domestic sheep have apparently not demonstrated many resistances to respiratory diseases or the need for these scientific studies would not exist. The petitioners state:

“In his 2006 comment discussing the Payette National Forest risk analysis, Dr. Glenn Weiss addresses similar comments as follows: I conducted a PubMed (the National Institutes of Health scientific publication service) search of the referenced scientific literature using the key words “sheep pneumonia Pasteurella.” There were 136 journal articles in the PubMed database, 21 dealing with bighorn sheep, leaving 115 dealing with domestic sheep pneumonia Pasteurella. Fifty-eight (58%) of these 115 journal articles were published from 1990 to present. Therefore, respiratory disease in domestic sheep has apparently not demonstrated many resistances or the need for these scientific studies would not exist. Weiss, Risk Analysis of Disease Transmission Between Domestic Sheep and Bighorn Sheep on the Payette National Forest (2006).<sup>3</sup>” (P. 18)

**Discussion:** This comment and literature search are irrelevant to the GTR-209. First, as stated above, the use of non-peer reviewed literature such as a comment to a forest planner is not appropriate to use in a literature review. Therefore, Dr. Weiss's comments should not be incorporated in the petition. Second, sheep are a commercially important species and it is unsurprising that there are more publications on respiratory disease in domestic sheep than in bighorn sheep. That fact in no way disproves the assertion that bighorn are more susceptible to bacterial infection. This point is well supported by scientific evidence (from peer-reviewed literature) in the GTR-209.

Schommer and Woolever (2008:7-8) discussed the published results of numerous studies that reported on the transmissibility of microbes. Relative to the point of contention, they wrote:

Bighorn sheep appear to be more susceptible to respiratory disease than are domestic sheep. Dubay and others (2002) and Miller (2001) suggested that bighorn sheep did not co-evolve with the same set of pathogens as domestic sheep because of an evolutionary distance between them. Hiendleder and others (2002) estimated this distance at 5.63 million years. In addition, bighorn sheep immune response cells have a reduced capacity to kill bacteria compared to domestic sheep immune function (Dubay and others 2002; Frank and others 2004; Silflow and others 1993). This observation provides a very plausible reason why bighorn sheep may die of bacterial respiratory disease and pneumonia when in contact with domestic sheep while the domestics show no signs of disease.

Schommer and Woolever (2008) did not assert that domestic sheep do not have susceptibility to respiratory diseases, only that bighorn sheep are much more susceptible to respiratory diseases than domestic sheep. There is ample scientific evidence to support this.

**Review Finding:** The petitioners have not demonstrated that Schommer and Woolever (2008) lacked objectivity in their discussion of the transmissibility of microbes. The GTR-209 did not downplay the effects of respiratory disease in domestic sheep. The results of the database search Dr. Weiss describes are unsurprising and irrelevant.

### **13. Issue: The USFS Bighorn Sheep Report Lacks Objectivity - Demographics 1**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of published results of demographics associated with disease in bighorn sheep is misleading, not accurate, and not reliable. The petitioners specifically state:

The USFS Bighorn Report notes that Gross and Clifford quantitatively evaluated the degree of risk between domestic and bighorn sheep for Sierra Nevada bighorn and found proximity of domestic sheep a major negative factor bighorn restoration [sic]. What the USFS Bighorn Report fails to discuss is the fact that domestic and Sierra Nevada sheep have grazed the same region for 300 years, and no study has documented a respiratory related die-off in these bighorn sheep to date. (P. 18-19).

**Discussion:** Schommer and Woolever (2008:7-8) reported that published models have predicted that disease originating from domestic sheep and goats is a problem for mountain sheep.

Relative to the point of contention, they wrote:

Proximity of domestic sheep as a factor in the dynamics of mountain sheep populations is a major consideration in the models constructed by Gross and others (1997, 2000).

Clifford and others (2007) quantitatively evaluated the degree of risk between domestic and bighorn sheep for Sierra Nevada bighorn sheep (*Ovis canadensis californiana*).

The petitioners did not provide support for their contention or evidence for their statement that "...domestic and Sierra Nevada sheep have grazed the same region for 300 years, and no study has documented a respiratory related die-off in these bighorn sheep to date."

Gross and others (1997) derived age-specific mortality and fecundity rates from observations of 143 radio-collared bighorn sheep that were captured in or near Canyonlands National Park in southeastern Utah. Gross and others (2000) estimated model parameters from studies of bighorn sheep in Badlands National Park (South Dakota) and from published information on other bighorn populations. Both studies modeled the demographic consequences of epizootics on the survival of bighorn sheep using information in the published literature and using unpublished information for radio marked animals in the Beaver Creek subpopulation (Dinosaur National Monument metapopulation, Colorado) before, during, and after an active epizootic, and information on marked animals in the infected Needles and South San Juan subpopulations in Utah. These studies did not address populations of bighorn sheep in the Sierra Nevada and are not relevant to the petitioners' contention.

Clifford and others (2007) used spatial, demographic, and disease data to assess the risk and impact of a respiratory disease outbreak in Sierra Nevada bighorn sheep resulting from contact with domestic sheep. This information was needed because endangered Sierra Nevada bighorn sheep number fewer than 400 individuals. They believed that pathogens present in domestic sheep grazing in public and private areas located within or adjacent to Sierra Nevada bighorn sheep populations may threaten the recovery and persistence of this unique subspecies, but that the degree of risk has not been quantitatively evaluated. These authors noted that although direct contact between Sierra Nevada bighorn sheep and domestic sheep has not been documented in the past 30 years (possibly as a result of the limited distribution and low numbers of bighorn), bighorn sheep have been documented traveling into domestic sheep grazing allotments in recent years, and probability of contact will increase as the Sierra Nevada bighorn sheep numbers increase and the populations expand their geographic range.

Despite the petitioners' statement that "...no study has documented a respiratory related die-off in these bighorn sheep..." the US Fish and Wildlife Service considers transmission of disease to the endangered Sierra Nevada population of bighorn sheep from domestic sheep to be one of the primary risks facing this population (US Fish and Wildlife Service 2003).

Although the petitioners asserted that domestic sheep have been present in the Sierra Nevada for 300 years, published accounts of the history of domestic grazing in this area indicate that domestic sheep were initially introduced in the 1860s (Allen-Diaz and others 1999).

**Review Finding:** The petitioners have not demonstrated that GRR-209 lacked objectivity in this aspect of their discussion of published results of demographics associated with disease in bighorn sheep.

#### **14. Issue: The USFS Bighorn Sheep Report Lacks Objectivity -Demographics 2. (P. 19)**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not accurate, not reliable, and not unbiased (P. 7). The petitioners assert that the authors of the GTR-209 did not accurately report examples of bighorn sheep remaining healthy after contact with domestic sheep. They contended that Schommer's and Woolever's (2008) discussion of

published results of demographics associated with disease in bighorn sheep is misleading, not accurate, and not reliable. The petitioners specifically state:

“The USFS Bighorn Report also states that the authors have not found any published reports where fenced or free-ranging bighorn sheep herds remained healthy with domestic sheep in the region. This is false. The study by Ward AC, Hunter DL, Jaworski MD, Benolkin PJ, Dobel MP, Jeffress JB, Tanner GA (1997) *Pasteurella* spp. in sympatric bighorn and domestic sheep. *Journal of Wildlife Diseases*, 33(3): pages 544-57, reviewed several instances where the presence of domestic sheep did not adversely affect bighorn sheep. (P. 19).

**Discussion:** Schommer and Woolever (2008:9) specifically reported the following:

No published reports could be found that document fenced or free-ranging bighorn sheep herds remaining healthy when living directly with domestic sheep herds.

A review of Ward and others (1997) showed that the instances where the authors found domestic sheep to intermingle with bighorn sheep were not well documented. On the Tobin Range and the East Range, contact was deemed probable but unknown. On the Desatoya and Granite Ranges, domestic sheep were seen with bighorns but the amount of contact was unknown. As stated by Ward and others (1997):

“The length of time that the domestic sheep were on the various ranges was not known. It is estimated that domestic sheep trespassed on the Tobin Range for 2 to 4 wk during the 1991 grazing season. Interaction of domestic sheep and bighorn sheep on the Tobin Range was probable but the duration of contact is unknown. Those on the East Range were removed approximately 2 wk after they were first observed in close proximity to the water sources for bighorns in the fall of 1991. Interactions of bighorn sheep with domestic sheep was very probable since they would have shared a common water source. The domestic ewe and her undocked lamb were observed with bighorns prior to their removal from the Desatoya Range in the fall of 1992. A domestic castrated male sighted with bighorn sheep on the Granite Range was judged to have been there for approximately 2 wk prior to removal in October of 1992.” (Ward and others 1997:545)

Although, domestic sheep were observed with or in proximity to bighorn sheep in this study, physical contact between the species was not observed. Bighorn sheep populations were subsequently extirpated on two of the ranges where domestic sheep were observed while increasing on the other two.

**Review Finding:** The petitioners have not demonstrated that Schommer and Woolever (2008) lacked objectivity in this aspect of their discussion of published results of demographics associated with disease in bighorn sheep. The encounters between domestic and bighorn sheep in this paper are unclear, and the results of these encounters is also unclear. Additional consideration of this incident does not change the overall conclusions of the GTR, however.

### **15. Issue: The USFS Bighorn Sheep Report Lacks Objectivity -Demographics 3**

**Contention:** The petitioners claimed the GTR-209 failed to comply with OMB and USDA Guidelines for Regulatory Information by presenting non-objective information that is not

accurate, not reliable, and not unbiased (P. 7). They contended that Schommer's and Woolever's (2008) discussion of published results of demographics associated with disease in bighorn sheep is misleading, not accurate, and not reliable. The petitioners specifically state:

Current studies are looking at over 300 desert bighorn in Arizona that have co-mingled for generations without ill-effect. The suggestion in the USFS Bighorn Report that bighorn sheep will not remain healthy after contact with domestic sheep is not supported by the evidence. Yet, it is presented in the USFS Bighorn Report as a fact supporting "the hypothesis that bighorn sheep have a high likelihood on contracting fatal respiratory disease following contact with domestic sheep." Schommer at 3. (P. 19-20)

**Discussion:** The petitioners did not cite the source of the information presented in this contention.

Since the source of the information presented in this contention was not revealed, it cannot be evaluated or verified. Therefore it does not provide any apparent support to this contention.

**Reviewer's Finding:** The petitioners have not demonstrated that Schommer and Woolever (2008) lacked objectivity in this aspect of their discussion of published results of demographics associated with disease in bighorn sheep.

## **16. Issue VI. Effect of the Aforementioned Errors (P.21)**

**Contention:** The petitioners and their members" will be negatively impacted by the dissemination of this false information regarding domestic sheep's capabilities to spread numerous diseases, including scabies, anaplasma, and babesia." Damage from "reductions or changes to grazing permits based on the false information in the USFS Bighorn Report.", and "the local economies will negatively impacted, as well as hurting the local social and economic stability of these areas by reducing or removing sheep producers."

**Reviewer's Finding:** Although the potential negative impact of this information to the industry may be an important factor to consider in management decisions, the potential future impact of the information is not relevant to the task of evaluating the scientific credibility of GTR 209 and whether it is an objective and unbiased review of published scientific information.

## **Conclusion**

GTR 209, first released in May 2008, is a review and synopsis of then-existing peer-reviewed scientific studies concerning the potential for disease transmission from domestic sheep and goats to bighorn sheep. In essence, petitioners claim the report lacks objectivity and is inaccurate. However, as demonstrated in the above discussion in response to petitioners' specific allegations, GTR 209 is unbiased, accurate and fully complies with the Data Quality Act and applicable agency guidelines. The report ensured transparency by providing a clear explanation of the purpose and scope of the review, identifying clearly the sources and literature reviewed, and describing their limitations. GTR 209 explains the sources of uncertainty regarding the precise mechanisms for disease transmission, microbiological organisms that may cause mortality and factors that cause die-offs to occur. In addition, the Forest Service



undertook a blind peer review process designed to guard against bias and ensure a scientifically defensible report. The report is objective.

Petitioners also allege that GTR 209 is inaccurate in its characterizations of the studies discussed in the report and failed to discuss alternative conclusions that could have been reached based on the data and other factors. As clearly stated in the report, the purpose of GTR 209 was not to critique the studies cited, evaluate the methods used, or suggest alternative conclusions or hypotheses that could have been reached. Instead, the report is a review of peer reviewed literature in which the authors briefly summarized the study methods used and the results obtained. The discussion of studies cited in GTR 209 is accurate in its portrayal of the studies and methodologies used, and did not improperly exclude relevant, conflicting scientific studies or data.

The petitioners' request that GTR 209 be retracted or that the Forest Service issue an amended report is denied.