



**Comments on the**

**Shoshone National Forest**

**Risk Analysis of Disease Transmission between Domestic**  
**Sheep and Goats and Rocky Mountain Bighorn Sheep**

**and**

**Supplemental Draft Environmental Impact Statement for**  
**Use of Domestic Sheep, Goats and Pack Goats**

Submitted by:

**North American Packgoat Association**

**August 9, 2017**

## TABLE OF CONTENTS

I.	Introduction to Comments .....	3
II.	Legal Background for the Comments.....	3
A.	NEPA Prohibits Uninformed Agency Action.....	3
B.	Review Under the APA .....	4
III.	Comments on the RADT Report and SDEIS .....	5
A.	Collaborative Effort to Develop Additional Potential Reasonable Alternative ..	5
1.	The Shoshone NF Should Grant NAPgA’s Request for an Extension of the Comment Deadline and Should Consider and Analyze the Additional Potential Reasonable Alternative as Part of the SDEIS, When Submitted. 5	
B.	Comments on the RADT Report.....	6
2.	The RADT Report Does Not Indicate If and How James Wilder, Wildlife Biologist, and Andrew Pils, Wildlife Biologist, are Qualified to Prepare a Risk Analysis of Disease Transmission between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep. ....	6
3.	The Shoshone NF Must Consult the Agricultural Research Service, within the United States Department of Agriculture, Before Preparing the Final SEIS and Record of Decision. ....	6
4.	In Violation of the Stipulated Settlement Agreement, the Shoshone NF Has Failed to Separately Analyze the Potential for Disease Transmission Between Domestic Sheep, Domestic Goats and Packgoats. ....	7
5.	The Shoshone NF Fails to Ensure the Scientific Integrity of the RADT Report and SDEIS and Must Correct and/or Remove Unsupported Statements Concerning Domestic Goats and Packgoats from the RADT Report and SDEIS. ....	8
a.	The Shoshone NF Has Failed to Provide the Public with Copies of References from the RADT Report and Fails to Support Statements Concerning M. ovi, as they Pertain to Domestic Goats. ....	9

b.	The Shoshone NF Does Not Provide Any Valid Scientific Information Indicating a Risk of Disease Transmission from Domestic Goats, Including Packgoats. ....	9
c.	The Shoshone NF Fails to Document the “Central Role” of Domestic Goats in Bighorn Sheep Exposure to Pathogens. ..	13
d.	The Shoshone NF Misrepresents the Literature Concerning Bighorn Sheep Die-offs in the Wild and Controlled Experiments with Bighorn Sheep, as it Pertains to Domestic Goats. ....	14
e.	The Shoshone NF Presents No Scientific Evidence that Bighorn Sheep and Domestic Goats are Attracted to Each Other. ....	15
f.	Rather than Misrepresenting the Findings of the Sells et al. (2015) Study, the Shoshone NF Should Properly Report the Findings and Correctly Apply them to the Situation on the Shoshone NF. ....	15
g.	The Shoshone NF Should Correct its Discussion of Miller et al. (2011), so that it is Accurate. ....	17
h.	The Shoshone NF Indicates that Contact Between Cattle and Bighorn Sheep, and Subsequent Disease Transmission, is More Likely than Contact and Subsequent Disease Transmission Between Domestic Goats and Bighorn Sheep. This Finding Must be Presented and Discussed in the RADT Report and SDEIS, and the Shoshone NF Must Take Action to Limit Contact and Subsequent Disease Transmission Between Cattle and Bighorn Sheep on the Shoshone NF. ....	17
i.	The Shoshone NF’s Statements Concerning Domestic Goats in the “Experiments” Section of the RADT Report are Unsupported and Do Not Take into Account Recent Scientific Research Indicating Packgoats Do Not Commonly Carry Disease-Causing Organisms.....	20
j.	The Shoshone NF’s Statements in the Section on “Field Evidence of Large-scale, Rapid, All-age Die-offs as They Relate to Domestic Goats Must be Corrected or Removed as the Statements are Unsupported and/or Inaccurate.....	21
6.	The Shoshone NF Must Correct the Numerous False, Misleading and Unsupported Statements in the Section of the RADT Report on	

“Evidence for Disease Transmission from Domestic Goats.” .....22

a. The Shoshone NF Provides No Support that There is an “Abundance” of Connected Evidence that Domestic Goats are a Vector. 22

b. There is No Scientific Support Provided by the Shoshone NF to Implicate Domestic Goats in Wild Bighorn Sheep Die-offs. 22

c. The Shoshone NF Should Provide Information on the Likelihood of Packgoats Approaching Bighorn Sheep in the Wild. ....22

d. The Shoshone NF Does Not Provide Any Information on “All-age” “Die-offs” Following Contact with Domestic Goats. ....23

e. The Shoshone NF Misrepresents the Findings of Rulolph et al. (2003) and Fails to Provide Support that Literature Exists Implicating Domestic Sheep in Disease Transmission and Die-offs in Bighorn Sheep Populations. ....23

f. The Shoshone NF Relies Upon Outdated and Irrelevant Science and Should Instead Rely on the Current Best Available Science. 24

g. The Shoshone NF Should Acknowledge that the Heinse et al. (2016) Is Not Directly Applicable to Packgoats, but Supports the Best Available Science Showing that Packgoats Do Not Often Carry Pathogens Linked with Disease Transmission to Bighorn Sheep. ....26

h. The Shoshone NF’s Reliance on the Abstract of a Presentation as Science in the RADT Report is Improper. ....26

i. The Shoshone NF Misrepresents the Findings of Cassirer et al. (2016). 27

j. If the Shoshone NF is Going to Randomly Report on Other Disease Organisms Carried by Domestic Goats, It Must Also Do the Same For Domestic Sheep, Cattle and All Other Animals on the Forest that Carry Other Disease Organisms to Which Bighorn Sheep May be Susceptible. ....28

k. The Shoshone NF’s Discussion of Other Disease Organisms Does Not Implicate Domestic Goats in Disease Transmission and Subsequent Bighorn Sheep Die-offs. The Discussion

	Appears Irrelevant to the Issue of Transmission of Respiratory Disease to Bighorn Sheep. ....	28
7.	The Shoshone NF Misrepresents the Viability of Vaccines and Fails to Consider the Vaccination and Removal of <i>M. ovi</i> from Domestic Ruminants as a Strategy for Reducing Potential Disease Transmission to Bighorn Sheep. ....	30
8.	The Shoshone NF’s Discussion of Forays is Inapplicable on the Shoshone NF. The Shoshone NF Should Use the Available Data from Bighorn Sheep Herds on the Shoshone NF.....	31
9.	The Shoshone NF Should Consider the Extent, Magnitude and Characteristics of Packgoat Use on the Shoshone NF. ....	32
10.	The Shoshone NF Fails to Account for the Important Differences Between Packgoats and Herd Domestic Goats and Domestic Sheep.....	32
11.	The Shoshone NF’s Closure of the Forest to Goatpacking Has Not Been “Temporary” and Has Thus Been Implemented Unlawfully. ....	34
12.	The Shoshone NF’s Proposed Management of the Whiskey Mountain Herd Appears to Contradict Recommended Management Practices and Should be Reconsidered Based on Best Available Science. ....	35
13.	The Shoshone NF Does Not Analyze or Discuss the Effects of the Whiskey Mountain Herd Living With and Transmitting Disease.....	35
14.	The Risk Assessment and Viability Analysis Outlined by the Shoshone NF in the RADT Report Is Not Applicable To Domestic Goats and is Misrepresented by the Shoshone NF. ....	36
15.	The Shoshone NF Has the Necessary Data and the Issue of Disease Transmission is Sufficiently Complex on the Forest to Warrant a Quantitative Bighorn Sheep Viability Analysis.....	37
16.	The Shoshone NF Does Not Indicate Whether the Preparers of the Risk Assessment Were Knowledgeable and Experienced with Issues Concerning Disease Transmission.....	38
17.	The Shoshone NF’s Sequence of Events by Which Contact and Disease Transmission Between Bighorn Sheep and Packgoats Might Occur Is Incomplete and Uninformed.....	38

18.	The Risk of Contact Tool Used by the Shoshone NF Has No Applicability to Packgoat Use on the Forest and the Assumptions Inherent in the Tool Likewise Do Not Apply to Packgoats.....	38
19.	The Shoshone NF’s Assumptions Concerning Contact Between Bighorn Sheep and Packgoats on the Forest are Unsupported and Unrealistic....	39
20.	The Risk of Contact Tool Can and Should be Used to Model Contact Between Bighorn Sheep and Cattle on the Shoshone NF.....	40
21.	The Shoshone NF Should Use Actual Data on Forays by Bighorn Sheep on the Forest.	40
22.	The Shoshone NF’s Assumptions Concerning Contact and Risk of Disease Transmission Contradict the Best Available Science. ....	41
23.	The Shoshone NF’s Assumptions that Contact Between Bighorn Sheep and Packgoats Would Occur on the Forest Have No Basis in Science or Reality.	42
24.	The Shoshone NF Fails to Consider Other Available Management Tools for Minimizing Pneumonia Outbreaks.....	42
25.	The Shoshone NF Fails to Adequately Consider Mitigation Measures for Packgoats and Improperly Dismisses the Feasibility of Such Measures....	43
26.	The Shoshone NF’s Statements in the “Summary” to the RADT Report are Unsupported as They Apply to Domestic Goats. ....	48
27.	The Shoshone NF’s Statements About the Likelihood of Contact are Incorrect and Should be Revised. ....	50
28.	The Shoshone NF Does Not Discuss Mitigation Measures to Reduce Cumulative Effects. ....	50
29.	The Shoshone NF Misrepresents the Best Available Science on Disease Transmission Between Domestic Goats and Packgoats and Bighorn Sheep.	50
30.	The Shoshone NF Must Analyze and Consider the Fact that Packgoats Rarely Carry Disease-Causing Pathogens and Do Not Pose a Significant Risk of Disease Transmission to Bighorn Sheep on the Forest.....	53

31.	The Shoshone NF Does Not Adequately Consider or Discuss the Degree of Scientific Uncertainty in the RADT Report. ....	53
32.	The Shoshone NF’s Statements Concerning “Behavioral” and “Mutual” Attraction are Not Supported.....	53
33.	The Shoshone NF Has the Modeling Tools and Science Available Concerning Disease Transmission to Better Determine the Probability of Contact, Disease Transmission and a Subsequent Mortality Event on the Forest. ....	55
C.	Comments on the SDEIS .....	55
34.	NAPgA Objects to the Shoshone NF’s Choice of Alternative 2 as the Preferred Alternative.....	55
35.	The Shoshone NF’s Choice of Alternative 2 as the Preferred Alternative Would Violate the Multiple-Use Sustained-Yield Act and the National Forest Management Act.....	56
36.	The Shoshone NF’s Statements in the SDEIS Concerning “Risk” and “Potential Impacts” to Bighorn Sheep Do Not Apply to Domestic Goats. ....	57
37.	The Shoshone NF Violates the Stipulated Settlement Agreement By Failing to Separately Analyze Disease Transmission Between Domestic Sheep, Domestic Goats and Packgoats.....	57
38.	The SDEIS is Inadequate Because the Shoshone NF Fails to Examine Additional Reasonable Alternatives. ....	58
39.	The Shoshone NF Must Evaluate Alternatives that Consider Strengthening Bighorn Sheep Immunity to Disease .....	59
40.	The Purpose and Need Provided by the Shoshone NF are Too Narrow and Fail to Accurately Capture the Actual Purpose and Need for the Proposed Action, Which is to Maintain the Viability of Bighorn Sheep Populations on the Shoshone NF. ....	60
41.	NAPgA Disagrees with the Shoshone NF’s Proposed Action and Requests Further Explanation as to the Need for the Action and as to What is Meant by “Core Native Bighorn Sheep Herds” or “Ranges” as Such Terms Are Not Defined in the SDEIS. ....	61

42.	The Shoshone NF Misidentifies the “Significant Issues” To Be Considered in Its NEPA Review. ....	62
43.	The Shoshone NF Fails to Consider an Alternative that Would Reduce the Risk of Domestic Sheep Grazing on the Forest.....	62
44.	The Shoshone NF Should Consider Variations of Alternative 3 as Part of Its Analysis of Reasonable Alternatives. ....	62
45.	There Are Additional Alternatives that Have Been Identified and Which Should be Considered by the Shoshone NF in the SDEIS. ....	63
46.	The Shoshone NF’s “Comparison of Alternatives” Is Inaccurate and Fails to Account for a Number of Important Factors Affecting the Alternatives.....	64
47.	The Shoshone Must Consider the Impacts of Disease and Disease Transmission Within and From the Whiskey Mountain Herd. ....	65
48.	The Shoshone Is Required to Consider and Use the Best Available Scientific Data on the Whiskey Mountain Herd, Including Relevant Foray, Telemetry and Observation Data. ....	65
49.	The Shoshone NF Improperly Implicates Domestic Goats in Disease Transmission and Misidentifies the Issue of Greatest Concern for Bighorn Sheep Conservation. ....	67
50.	The Shoshone NF Fails to Identify Any Science Linking Domestic Goats with Bighorn Sheep Die-offs in the Wild or High Mortality Rates Following Controlled Experiments. ....	67
51.	The References Provided by the Shoshone NF in the SDEIS Do Not Support the Shoshone NF’s Conclusions Concerning Disease Transmission from Domestic Goats to Bighorn Sheep. ....	68
52.	The Shoshone NF Provides No Basis for Concluding that There Would be Overlap Between Packgoats and Bighorn Sheep on the Forest.....	68
53.	The Shoshone NF Fails to Explain What is Meant by “Risk” in the SDEIS..	69
54.	The Shoshone NF’s Analysis of the Mitigation Measures Under Alternative 3 is Unsupported and Improperly Biased. ....	69



55.	The Shoshone NF Should Discuss Options for Avoiding and Minimizing Cumulative Effects in the SDEIS. ....	70
56.	The Shoshone NF’s Cumulative Effects Analysis in the SDEIS is Inadequate.....	70
57.	The Shoshone NF Wrongly States that There “Would” Be Overlap Between Packgoats and Bighorn Sheep on the Forest. ....	73
58.	Under Alternative 3, There Would Be Little to No Risk of Contact Between Packgoats and Bighorn Sheep on the Forest. ....	73
59.	The Shoshone NF’s Analysis of the Effects of Closing the Forest to Packgoat Use is Inadequate and Improperly Minimizes the Effects. ....	73
60.	The Shoshone NF’s Discussion of Cumulative Effects is Uninformed and Inadequate.....	75
61.	There Are No Differences in the Commitments of Resources Under any of the Alternatives. ....	75
62.	Epidemiological Modeling is Needed to Understand How a Range of Factors Affect the Dynamics of Disease Spread Under Various Management Alternatives. ....	76
63.	The Shoshone NF Fails to Consider the Most Important Aspects of the Problem in the DEIS.....	76
64.	The SDEIS Does Not Properly Address the Relevance of Unavailable or Incomplete Scientific Information.....	77
65.	The Shoshone NF must Obtain Additional Information for the SDEIS. ....	79

**VIA ELECTRONIC SUBMITTAL AND U.S. MAIL**

**RE: Comments on the Shoshone National Forest Risk Analysis of Disease Transmission between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep and Supplement Draft Environmental Impact Statement for Use of Domestic Sheep, Goats and Pack Goats**

To: Casey McQuiston, Resource Staff Officer  
Shoshone National Forest  
808 Meadow Lane Avenue  
Cody, WY 82414  
Electronic Submittal: [comments-rocky-mountain-shoshone@fs.fed.us](mailto:comments-rocky-mountain-shoshone@fs.fed.us)

From: Andrew A. Irvine  
of Andrew A. Irvine, P.C.  
P.O. Box 3221  
Jackson, WY 83001  
Phone: (307) 690-8383  
Email: [andy@andrewirvinelaw.com](mailto:andy@andrewirvinelaw.com)

On behalf of: North American Packgoat Association  
Attn: Charles Jennings, President  
P.O. Box 170166  
Boise, ID 83717  
Phone: (435) 764-1111  
Email: [vigilguy@gmail.com](mailto:vigilguy@gmail.com)

On behalf of the North American Packgoat Association, I hereby timely submit these Comments on the Shoshone National Forest Risk Analysis of Disease Transmission between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep (“RADT Report”) and Supplement Draft Environmental Impact Statement for Use of Domestic Sheep, Goats and Pack Goats (“SDEIS”). If you have any questions concerning these comments or need further information, you may contact NAPgA or Andrew Irvine at the emails and phone numbers indicated above.

Date: August 9, 2017

---

Andrew A. Irvine

of Andrew A. Irvine, P.C.

## **I. Introduction to Comments**

The North American Packgoat Association (“NAPgA”) timely submits comments on the Shoshone National Forest Risk Analysis of Disease Transmission between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep (“RADT Report”) and Supplement Draft Environmental Impact Statement for Use of Domestic Sheep, Goats and Pack Goats (“SDEIS”). *See* 82 Fed. Reg. 22,142 (May 12, 2017) (Notice of Availability). Comments on the RADT Report and SDEIS were requested by the Shoshone National Forest (“Shoshone NF”) as required by 40 C.F.R. §§ 1502.9, 1503.1. *See id.*; *see also* Shoshone NF, Supplemental Draft Environmental Impact Statement Legal Notice, *available at* [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd541818.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd541818.pdf) (last visited July 12, 2017) (requesting comments). The comment period ends on August 10, 2017. *See* 82 Fed. Reg. 22,142.

The North American Packgoat Association, Inc. is an organization established specifically for promoting packing with packgoats. The organization was incorporated in March 2001 as a 501(c)(3) non-profit organization. NAPgA seeks to further the pursuit of goatpacking by sharing the knowledge, ideas and experiences of its members, by promoting the use of packgoats to the public as a means of low impact wilderness transportation and recreation, by serving as an advisory group on local and national land use issues, and by engaging in other activities related to educating the public about goatpacking.

NAPgA appreciates this opportunity to comment on the RADT Report and SDEIS. NAPgA and its numerous goatpacking-members will be affected by the management direction proposed in the draft goals and standards. The proposed management direction would result in closure of one of the premier goatpacking areas in the nation, and set a bad precedent for other forests to follow in managing goatpacking as a recreational use. These comments will better inform the RADT Report and SDEIS and further develop the efficacy of the management direction as defined by the draft goals and standards.

## **II. Legal Background for the Comments**

### **A. NEPA Prohibits Uninformed Agency Action**

In passing NEPA, Congress “recogniz[ed] the profound impact of man’s activity on the interrelations of all components of the natural environment” and set out “to create and maintain conditions under which man and nature can exist in productive harmony.” 42 U.S.C. § 4331(a). To bring federal action in line with Congress’ goals and to foster environmentally informed decision-making by federal agencies, NEPA “establishes ‘action-forcing’ procedures that require agencies to take a ‘hard look’ at environmental consequences.” *W. Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 486 (9th Cir. 2011) (citing *Metcalf v. Daley*, 214 F.3d 1135, 1141 (9th Cir. 2000)). Foremost among those procedures is the preparation of an environmental impact statement (“EIS”). *Id.*

Agencies considering “major Federal actions significantly affecting the quality of the human environment” are required to prepare an EIS. 42 U.S.C. § 4332(C). The EIS “shall provide full and fair discussion of [the] significant environmental impacts” of the proposed action. 40 C.F.R. § 1502.1. That discussion serves two purposes:

First, it ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts. Second, it guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision.

*W. Watersheds Project*, 632 F.3d at 487 (quoting *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 768 (2004)). This process does not mandate particular substantive results, but “NEPA . . . prohibits uninformed . . . agency action.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989). By focusing agency and public attention on the environmental effects of proposed action, “NEPA ensures that the agency will not act on incomplete information, only to regret its decision after it is too late to correct.” *Marsh v. ONRC*, 490 U.S. 360, 371 (1989).

In addition, Forest Service regulations require that “best available science” be taken into account in forest planning. 36 C.F.R. § 219.3. In taking “best available science” into account, the Forest Service must “document how the best available science information was used to inform the assessment, the plan decision, and the monitoring program” and such documentation must “[i]dentify what information was determined to be the best available scientific information, explain the basis for that determination, and explain how the information was applied to the issues considered.” *Id.*

## **B. Review Under the APA**

The Administrative Procedure Act (“APA”), 5 U.S.C. §§ 701-706, provides for judicial review of agency actions, such as those at issue here.<sup>1</sup> Under the APA, a reviewing court shall “hold unlawful and set aside agency action, findings, and conclusions found to be . . . arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law; . . . [or] without observance of procedures required by law.” 5 U.S.C. § 706(2)(A), (D). Although the arbitrary and capricious standard is a “narrow one,” the court is required to “engage in a substantial inquiry” and a “thorough, probing, in-depth review.” *Native Ecosystems Council v. U.S. Forest*

---

<sup>1</sup> NEPA claims are subject to judicial review under the APA, 5 U.S.C. § 706(2)(A). *See Dep't of Transp. v. Pub. Citizen*, 541 U.S. at 763; *Marsh*, 490 U.S. at 375–76; *League of Wilderness Defenders-Blue Mtns. Biodiversity Project v. U.S.*, 549 F.3d 1211, 1215 (9th Cir. 2008) (the APA provides authority for the court’s review of decisions under NEPA); *W. Watersheds Project v. U.S. Forest Serv.*, 2006 WL 292010, \*2 (D. Idaho) (same).

*Serv.*, 418 F.3d 953, 960 (9th Cir. 2005) (quoting *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 415-16 (1971)).

Under this standard, an agency decision is to be reversed as arbitrary and capricious if the agency has “. . . entirely failed to consider an important aspect of the problem, [or] offered an explanation that runs counter to the evidence before the agency. . . .” *Motor Vehicle Mfrs. Ass’n v. State Farm Mutual Auto. Ins. Co.*, 463 U.S. 29, 43 (1983). “The reviewing court should not attempt itself to make up for such deficiencies.” *Id.* (citation omitted). Most fundamentally, the agency must “examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’” *Motor Vehicle*, 463 U.S. at 53 (quotation omitted).

Where, as here, there has been a change in policy from allowing goatpacking on the Shoshone NF to eliminating goatpacking on the Forest, judicial review starts with the presumption that the change in policy is *not* justified by the administrative record. *Motor Vehicle*, 463 U.S. at 42. Additionally, the traditional presumption of agency expertise “‘may be rebutted if the decisions, even though based on scientific expertise, are not reasoned.’” *W. Watersheds Project v. Ashe*, No. 11-462, 2013 WL 2433370 at \*5 (D. Idaho June 4, 2013) (citations omitted).

### **III. Comments on the RADT Report and SDEIS**

To assist the Shoshone NF, NAPgA’s comments refer to specific pages of the RADT Report and SDEIS that form the basis for each comment. Often, NAPgA’s comments will apply to more than one page or section of the RADT Report and SDEIS or the comments may be general comments. Comments are intended to apply to all listed pages and should be addressed in the context of each of the listed pages or in general.

NAPgA looks forward to the Shoshone NF’s responses to its comments. In addition to its general obligation to respond to public comments under 40 C.F.R. § 1503.4(a), the Shoshone NF must specifically “discuss at appropriate points in the final [SEIS] any responsible opposing view which was not adequately discussed in the draft [SEIS] and . . . indicate the agency’s response to the issues raised.” *Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1167 (9th Cir. 2003) (quoting 40 C.F.R. § 1502.9(b)). A failure to do so is itself a NEPA violation. *Id.* at 1168. The Shoshone NF must also “insure the professional integrity, including scientific integrity, of the discussions and analyses” included in its RADT Report and SDEIS. 40 C.F.R. § 1502.24.

- A. Collaborative Effort to Develop Additional Potential Reasonable Alternative**
  - 1. The Shoshone NF Should Grant NAPgA’s Request for an Extension of the Comment Deadline and Should Consider and Analyze the Additional Potential Reasonable Alternative as Part of the SDEIS, When Submitted.**

NAPgA filed a formal request for an extension of the comment deadline to allow for the development of an additional potential reasonable alternative for analysis in the SDEIS in collaboration with other interested parties. NAPgA's request is attached hereto as Exhibit 1. The Shoshone NF indicated that it would not grant NAPgA's request for an extension, but that it would consider an additional potential reasonable alternative submitted by NAPgA and other interested parties at some time before September 30, 2017. As a result, NAPgA intends to continue to work with other interested parties to develop such alternative. Upon submittal of such alternative to the Shoshone NF, NAPgA requests that the Shoshone NF consider and analyze the alternative as part of the SEIS.

**B. Comments on the RADT Report**

**2. The RADT Report Does Not Indicate If and How James Wilder, Wildlife Biologist, and Andrew Pils, Wildlife Biologist, are Qualified to Prepare a Risk Analysis of Disease Transmission between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep.**

The cover page of the RADT Report indicates that two individuals prepared the report, but no information is provided concerning these individuals' qualifications to conduct a risk analysis of disease transmission and prepare the RADT Report. Such information must be provided. It is unclear whether the named individuals are veterinarians, infectious animal disease experts, or pathologists with the requisite knowledge and experience on disease transmission. If these individuals do not have the requisite knowledge and experience, the Shoshone NF should have qualified persons conduct a risk analysis of disease transmission and prepare the RADT Report.

**3. The Shoshone NF Must Consult the Agricultural Research Service, within the United States Department of Agriculture, Before Preparing the Final SEIS and Record of Decision.**

NEPA imposes on federal agencies conducting environmental review a duty to consult with certain other agencies." Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved [in the proposed action]." 42 U.S.C. § 4332(2)(C). Further, to promote NEPA's policies of public participation and informed decisionmaking, copies of the EIS and comments thereon from other agencies "shall accompany the proposal through the existing agency review processes." *Id.*

The regulations implementing these provisions state that "[a]fter preparing a draft environmental impact statement and before preparing a final environmental impact statement the agency shall . . . [o]btain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved . . . ." 40 C.F.R. § 1503.1(a)(1); *see also id.* § 1500.1(b) ("Accurate scientific analysis, expert agency comments, and public

scrutiny are essential to implementing NEPA.” (emphasis added)). “Special expertise” is defined as “statutory responsibility, agency mission, or related program experience.” *Id.* § 1508.26. Under the statute and its implementing regulations, the Shoshone NF has a duty to consult with the Agriculture Research Service (“ARS”) before issuing the Final SEIS. *See Idaho Wool Growers Ass’n v. Vilsack*, 816 F.3d 1095, 1103 (9th Cir. 2016).

ARS has “special expertise” concerning significant aspects of the proposed decision, including the mechanics of pathogen transmission in domestic sheep and goats. For example, 7 C.F.R. § 2.65 delegates to ARS, among other matters, the authority to “[c]onduct research concerning domestic animals and poultry, their protection and use, [and] the causes of contagious, infectious, and communicable diseases.” Also, ARS’s mission statement proclaims: “ARS conducts research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to . . . enhance the natural resource base and the environment . . . .” U.S. Department of Agriculture, Agricultural Research Service, ARS: About US, <http://www.ars.usda.gov/aboutus/aboutus.htm>.

Thus, considering the language establishing NEPA’s consultation requirement is expansive. It mandates consultation with any federal agency that has “special expertise with respect to any environmental impact involved.” 42 U.S.C. § 4332(2)(C) (emphasis added); *see also* 40 C.F.R. § 1503.1(a)(1) (“[T]he agency shall . . . [o]btain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. . . .” (emphasis added)). And, further considering that *Warm Springs Dam Task Force v. Gribble* suggests that for the consultation requirement to apply, the particular expertise of an agency does not have to encompass the proposed project as a whole or the issue the proposed project was designed to address. Rather, the expertise need relate only to one of the project’s anticipated environmental effects. *See* 621 F.2d 1017, 1020-21 (9th Cir. 1980) (*per curiam*); *see also Idaho Wool Growers Ass’n*, 816 F.3d at 1103. It is a clear requirement that the Shoshone NF MUST consult with the ARS on issues of disease transmission, such as those presented in the RADT Report and SDEIS, prior to issuing a Final SEIS.

#### **4. In Violation of the Stipulated Settlement Agreement, the Shoshone NF Has Failed to Separately Analyze the Potential for Disease Transmission Between Domestic Sheep, Domestic Goats and Packgoats.**

The Stipulated Settlement Agreement between NAPgA and the Shoshone NF required the Shoshone NF to separately analyze the potential for disease transmission between domestic sheep, domestic goats, and packgoats, and wild bighorn sheep on the Shoshone NF and “to consider whether there are differences in the potential for disease transmission by domestic sheep, domestic goats, and packgoats to wild bighorn sheep. *See* Stipulated Settlement Agreement at 3. The reason for this requirement was to prevent the Shoshone NF from using science regarding disease transmission between domestic *sheep* and bighorn sheep to implicate domestic *goats* as a cause of fatal pneumonia in wild bighorn sheep populations. The Shoshone NF’s previous 2012 and 2013 Risk Analysis of Disease Transmission reports failed to present



any science regarding disease transmission between domestic *goats* and bighorn sheep, and instead, relied solely on the science regarding disease transmission between domestic *sheep* and bighorn sheep to implicate domestic *goats* as a cause of fatal pneumonia in wild bighorn sheep populations.

In violation of the Stipulated Settlement Agreement, the Shoshone NF has once again analyzed the potential for disease transmission between domestic sheep and domestic goats and wild bighorn sheep together, instead of separately, and has improperly relied on the science regarding disease transmission between domestic *sheep* and bighorn sheep to implicate domestic *goats* as a cause of fatal pneumonia in wild bighorn sheep populations. Sheep and goats are different species with different characteristics in terms of disease transmission and interactions with bighorn sheep. As a result, and according to the Stipulated Settlement Agreement, the potential for disease transmission between the two species and wild bighorn sheep must be analyzed separately. The Shoshone NF must revise its RADT Report to analyze the potential for disease transmission between domestic *goats* and wild bighorn sheep separately from its analysis of the potential for disease transmission between domestic *sheep* and wild bighorn sheep.

**5. The Shoshone NF Fails to Ensure the Scientific Integrity of the RADT Report and SDEIS and Must Correct and/or Remove Unsupported Statements Concerning Domestic Goats and Packgoats from the RADT Report and SDEIS.**

In evaluating the environmental impacts of a proposed action, NEPA requires federal agencies to ensure the scientific integrity of an EIS by considering appropriate studies and data. 40 C.F.R. § 1502.24. The Shoshone NF must “insure the professional integrity, including scientific integrity, of the discussions and analyses” included in its EIS. *Id.* An agency may not rely on conclusory statements unsupported by data, authorities, or explanatory information. *Seattle Audubon Soc’y v. Moseley*, 798 F. Supp. 1473, 1480-83 (W.D. Wash. 1992), *aff’d*, 998 F. 2d 699 (9th Cir. 1993). NEPA requires that an agency candidly disclose in its EIS the risks and effects of its proposed actions, and that it respond to adverse opinions held by respected scientists. *Seattle Audubon*, 798 F. Supp. at 1482 (citing *Friends of the Earth v. Hall*, 693 F. Supp. 904, 937 (W.D. Wash. 1988)). Further, under NEPA, courts have held that agency actions based on unexplained assumptions are arbitrary and capricious. *Ctr. for Biological Diversity v. U.S. Dep’t of the Interior*, 623 F.3d 633, 650 (9th Cir. 2010); *see also Dow Agrosciences LLC v. Nat’l Marine Fisheries Serv.*, 707 F.3d 462, 470 (4th Cir. 2013) (agency must explain why lab tests reflect nature).

The Shoshone NF has failed to ensure the professional integrity, including scientific integrity, of the discussions and analyses in the RADT Report (and SDEIS) as required under NEPA. The Shoshone NF appears to be operating on incomplete information concerning disease transmission from domestic goats, including packgoats, to bighorn sheep, and also appears to be ignoring important aspects of the problem of disease transmission as well as offering explanations in the RADT Report (and SDEIS) that run counter to the evidence before the

Shoshone NF. Much of the analysis and discussion in the RADT Report lacks factual or scientific support.

In particular, the following statements concerning domestic goats from the “Bacterial Pneumonia” (pages 4-5), “Causes of Disease Outbreaks in Bighorn Sheep” (pages 5-6) and “Evidence of Large-scale, Rapid, All-age Die-offs” (pages 7-8) sections of the RADT Report should be corrected and/or removed from the Shoshone NF’s discussion of these topics because the statements lack scientific support.

### **Bacterial Pneumonia**

#### **a. The Shoshone NF Has Failed to Provide the Public with Copies of References from the RADT Report and Fails to Support Statements Concerning *M. ovi*, as they Pertain to Domestic Goats.**

The Shoshone NF provides in the RADT Report, “*Mycoplasma ovipneumoniae*, a primary pathogen that triggers bighorn sheep pneumonia . . . , has a host range limited to the subfamily *Caprinae* (primarily sheep and goats) (Nicholas et al. 2008) and is frequently carried asymptotically by domestic sheep and goats (Martin and Aitken 2000).” RADT Report at 4. NAPgA requested a copy of Nicholas et al. (2008) from the Shoshone NF, but has not yet received it, and is thus unable to confirm the Shoshone NF’s reliance on Nicholas et al. (2008). However, the statement that *Mycoplasma ovipneumoniae* “has a host range limited to the subfamily *Caprinae* (primarily sheep and goats)” appear inaccurate. According to the Shoshone NF’s own references, *M. ovi* has also been detected in cattle (Wolfe 2010). As a result, the Shoshone NF should research and provide further information on the full suite of potential hosts of *M. ovi*, including cattle.

Further, NAPgA requested a copy of Martin and Aitken (2000) from the Shoshone NF, but likewise has not yet received it, and is thus unable to confirm the Shoshone NF’s reliance on Martin and Aitken (2000). However, the reference refers to “Diseases of sheep” not “diseases of goats” and the Shoshone NF provides no other reference for the statement that *M. ovi* is “frequently carried asymptotically by domestic sheep and goats.” In following, the Shoshone NF should provide scientific support for this statement with regard to domestic goats. The Shoshone NF should also consider science indicating that domestic goats are affected by *M. ovi* and do indeed show symptoms related to hosting *M. ovi* (Besser and Cassirer 2016).

### **Causes of Disease Outbreaks in Bighorn Sheep**

#### **b. The Shoshone NF Does Not Provide Any Valid Scientific Information Indicating a Risk of Disease Transmission from Domestic Goats, Including Packgoats.**

The Shoshone NF makes the statement that “[d]omestic sheep and goats are the cause of many disease outbreaks in bighorn sheep,” but does not provide a single reference to support

such statement, particularly as it applies to domestic goats. Thus, the Shoshone NF should remove “goats” from this statement, as there is no scientific evidence that domestic goats have been the “cause” of ANY disease outbreaks in bighorn sheep, and there certainly is no scientific evidence that domestic goats have been the cause of “many” disease outbreaks in bighorn sheep.

The Shoshone NF also makes the statement, “[a] large body of evidence underscores the risk of disease transmission from . . . goats (e.g., Foreyt 1994, Coggins 2002, Rudolph et al. 2003, Miller et al. 2011, WAFWA 2012) to wild sheep.” RADT Report at pages 5-6. This statement should be corrected to omit the word “goats” and/or the statement should be removed entirely, because there is NOT “[a] large body of evidence [that] underscores the risk of disease transmission from . . . goats.” Indeed, the Shoshone NF’s references fail to demonstrate the risk of disease transmission from goats. As a result, the above statement by the Shoshone NF should be corrected or removed to account for the best available science on disease transmission from domestic goats, which indicates that domestic goats, especially packgoats, do not pose a significant risk of disease transmission to bighorn sheep.

The Shoshone NF references Foreyt (1994) to support the statement that domestic goats pose a risk of disease transmission to bighorn sheep. The Foreyt (1994) study, however, actually supports the opposite: that domestic goats DO NOT pose a risk of disease transmission to bighorn sheep. The study shows that penning of domestic goats with bighorn sheep does not result in pneumonia in bighorn sheep (Foreyt 1994).

In the study, *P. haemolytica* was isolated from the three domestic goats used (Foreyt 1994). The goats were then placed together with two bighorn sheep in a pen and held there for 60 days (Foreyt 1994). After 60 days, the three domestic sheep and two bighorn sheep were healthy and all survived (Foreyt 1994). Even Coggins (2002) recognizes the results of the Foreyt (1994) study, stating, “some goats do not carry pneumonia causing bacterias. Foreyt (1994) penned 2 yearling bighorn rams in a 0.4 ha enclosure at Washington State University for 60 days with 3 wether domestic goats. The bighorns survived and appeared healthy at the termination of the trial.” Further, Coggins (2002) stated, “the penned study found that bighorns did not contract disease from the goats they were penned with.” Thus, the Shoshone NF’s reliance on Foreyt (1994) for the statement above is misplaced and the Shoshone NF should instead rely on Foreyt (1994) to show that domestic goats DO NOT pose a risk of disease transmission to bighorn sheep.

The Shoshone NF also references Coggins (2002) to support the statement that domestic goats pose a risk of disease transmission to bighorn sheep. Notably, unlike the Shoshone NF, Coggins (2002) recognizes the actual results of the Foreyt (1994) study that goats DO NOT pose a risk of disease transmission to bighorn sheep. Beyond that, Coggins (2002) presents the “opinion” of Victor L. Coggins of the Oregon Department of Fish and Wildlife, who is tasked with management of bighorn sheep through his job and who is a known opponent of livestock use on public lands. In Coggins (2002), there is not a shred of “evidence” establishing the risk of disease transmission from domestic goats.

Consider the three so-called “incidents” reported by Coggins (2002). The first incident indicates that “[d]omestic goats have been circumstantially implicated in a pneumonia outbreak in Hells Canyon” and references the Rudolph et al. (2003) study discussed below. Beyond that reference, no evidence is presented.

The second incident concerns bighorns affected by scabies *Psoroptes* spp. that “were reported” to be near a large herd of 1200 range goats. There is no documentation of interaction between the bighorns and goats, and indeed Coggins (2002) provides no evidence the species ever interacted or that the species carried disease or that any disease was transferred. Later, several bighorns in neighboring herds died and certain of those were found to have died because of pneumonia (Coggins 2002), although Coggins (2002) does not present any evidence of such. Despite several deaths, Coggins (2002) notes that “[m]any individual bighorns were apparently not affected. Based on that undocumented story, Coggins (2002) shares, “[c]ause and effect evidence is admittedly lacking, but I believe this disease outbreak started with the goats and adjacent Big Canyon bighorns and spread to the other two herds.” While Mr. Coggins is entitled to his beliefs, they are not considered “evidence” and do not constitute “science” and cannot be relied upon by the Shoshone NF to conclude that domestic goats pose a risk of disease transmission to bighorn sheep.

Finally, the third incident in Coggins (2002) concerns California bighorns, not the Rocky Mountain bighorn sheep that are at issue on the Shoshone NF, and “suspects” that feral goats were on the range potentially used by California bighorn rams that were part of a herd that experienced a die-off. Once again, Coggins (2002) notes that “proof of contact is lacking” and fails to provide any documentation or other “evidence” that goats had anything to do with the die-off of California bighorns.

Notably, Coggins (2002) states, “[r]ecommendations in a September 3, 1998 letter to goat packers indicate domestic goats should ‘avoid approaching wildlife within 50 feet’ (Hunter et al. 1998).” NAPgA concurs with this recommendation and would be amenable to including such as a best management practice on the Shoshone NF.

Next, the Shoshone NF references Rudolph et al. (2003) as part of its “large body of evidence” underscoring “the risk of disease transmission from . . . goats.” The Rudolph et al. (2003) study was funded by the Foundation for North American Wild Sheep and involved a feral domestic goat, which has been the source of significant speculation and conjecture, but no actual evidence of disease transmission. The conclusion of Rudolph et al. (2003) was that both the feral goat and bighorn sheep at issue in the study carried *Pasteurella* spp. strains (Rudolph et al. 2003). The study, however, did not show whether *Pasteurella* spp. was passed from the feral goat to the bighorn sheep or vice versa (Rudolph et al. 2003) (“Because samples were not obtained from the animals prior to contact, the direction of transmission could not be ascertained with certainty.”).

Perhaps the most significant finding of the Rudolph et al. (2003) study, though, was that the *Pasteurella* spp. strains carried by the feral goat at issue WERE NOT a cause of bighorn die-offs (Rudolph et al. 2003). In Rudolph et al. (2003) it states, “there is no evidence that those organisms were associated with subsequent disease or deaths.” (emphasis added). In fact, Rudolph et al. (2003) states, “we know of no other information regarding transfer of potentially lethal *Pasteurella* spp. between domestic goats and free-ranging bighorn sheep.” (emphasis added). Despite this complete lack of evidence, Rudolph et al. (2003) states, “we believe that goats can serve as a reservoir” of *Pasteurella* spp. and recommends that interactions between goats and bighorn sheep should be avoided.

Although the Rudolph et al. (2003) study did not involve packgoats and was unable to provide any evidence that goats of any kind transmit disease to bighorn sheep and cause bighorn sheep die-offs, Rudolph et al. (2003) adds: “Pack goats have gained popularity for use on public lands. We recommend that individuals with pack goats have total control of their animals when in or near bighorn sheep habitat, both while on the trail and at the campsite. Likewise, we recommend that any bighorn sheep should be driven away from goats to prevent nose-to-nose contact and that any bighorn sheep that does come into direct contact should be removed from the herd to prevent potential transmission of disease causing organisms to other bighorn sheep.” This recommendation does not track the outcome of the Rudolph et al. (2003) study and was likely added to appease the group that funded the study (Foundation for North American Wild Sheep). Nevertheless, NAPgA agrees that such recommendations constitute prudent management and is thus agreeable to implementing such recommendations as best management practices on the Shoshone NF.

Dr. Margaret A. Highland at the Animal Disease Research Unit-ARS-USDA has provided a thorough analysis and explanation of Rudolph et al. (2003) to clear up the Shoshone NF’s and others’ wrongful interpretations of the Rudolph et al. (2003) study. The analysis and explanation is provided at Exhibit   and is incorporated into these comments and should be considered by the Shoshone NF.

The Shoshone NF also references Miller et al. (2011) to support its statement that “[a] large body of evidence underscores the risk of disease transmission from . . . goats,” although the purpose for doing so is unstated and unclear. Of apparent importance from Miller et al. (2011) is the fact that “[n]o domestic goats or bighorn sheep had evidence of respiratory disease” during the study and, interestingly, “a single, apparently healthy bighorn sheep ram that shared shelter, food, and water with domestic sheep and goats for >6 mo” was euthanized and oral swab and lung tissue were collected from such bighorn for Pasteurellaceae and *Mycoplasma* culture. Samples were negative for *Mycoplasma* sp., although *Mycoplasma* sp. was isolated from the domestic sheep and goat population (Miller et al. 2011). As a result, Miller et al. (2011) concludes, “*Mycoplasma* may not be easily transmitted to bighorn sheep.” Otherwise, Miller et al. (2011) concludes:

This study documents the presence of multiple Pasteurellaceae biovariants, *Mycoplasma*, and viruses in apparently healthy bighorn sheep, domestic sheep, and goats that are at the domestic animal/wildlife interface and in isolated populations. When these results are considered with their presence in animals with respiratory disease in other reports [ ], it is evident that further work is needed to clarify environmental, agent, and host determinants of respiratory disease, as well as standardize sampling and laboratory procedures. \* \* \*

\* \* \* Any time contact occurs among populations, the potential for transmission of novel agents to naïve animals exists [ ], and there are established quarantine, vaccination, testing, risk assessment, and other strategies for minimizing spread of infectious diseases among translocated domestic and wild animal populations [ ]. However, there is a need to rigorously document the true risks of interspecies transmission under field conditions, as well as determine the efficacy of different management strategies. \* \* \*

(citations omitted).

There is no evidence in Miller et al. (2011) linking domestic goats with transmission of disease to bighorn sheep. Instead, Miller et al. (2011) indicates that domestic sheep, domestic goats and bighorn sheep share many similar pathogens, and some different pathogens. The impact of this finding is not explored in Miller et al. (2011) beyond the conclusion that more work is necessary to “rigorously document the true risks of interspecies transmission under field conditions, as well as determine the efficacy of different management strategies.” NAPgA agrees with this additional work and posits that packgoats pose no true risk of interspecies transmission under field conditions and that the most appropriate and reasonable management strategy would be to allow the use of packgoats on public lands with implementation of best management practices.

Finally, the Shoshone NF references WAFWA (2012) which is a collection of agency “Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat,” not a scientific research paper. To the extent there is any scientific evidence referenced in WAFWA (2012) that somehow supports the Shoshone NF’s statement above, the Shoshone NF should cite to that science and allow the public to review and comment on the science. Otherwise, the Shoshone NF should remove the reference WAFWA (2012) as support for the statement above because it is not a scientific research paper presenting any novel “evidence” concerning disease transmission between domestic goats and bighorn sheep.

**c. The Shoshone NF Fails to Document the “Central Role” of Domestic Goats in Bighorn Sheep Exposure to Pathogens.**

The Shoshone NF states, “[t]he central role of domestic sheep and goats in bighorn sheep exposure to pathogens is well documented; pathogen transmission from domestics to bighorn

sheep is the only supported hypothesis in experimental trials (Wehausen et al. 2011).” (p. 6). While the Shoshone NF states that “[t]he central role of domestic . . . goats in bighorn sheep exposure to pathogens is well documented,” it fails to provide a single reference to any document to support such statement. If the “central role” is so well documented, the Shoshone NF should provide the numerous references that support such statement with respect to domestic goats. Further, the Shoshone NF adds above, “pathogen transmission from domestics to bighorn sheep is the only supported hypothesis in experimental trials (Wehausen et al. 2011).” Does the term “domestics” refer to domestic sheep AND domestic goats? If so, the Shoshone NF should provide references indicating that the statement applies to domestic goats. The reference (Wehausen et al. 2011) only considered disease transmission issues between domestic sheep and bighorn sheep, not between domestic “goats” and bighorn sheep. Unless the Shoshone NF can prove that the above statement applies to domestic goats, it should either remove “goats” from the statement or otherwise remove the statement altogether.

**d. The Shoshone NF Misrepresents the Literature Concerning Bighorn Sheep Die-offs in the Wild and Controlled Experiments with Bighorn Sheep, as it Pertains to Domestic Goats.**

Next, the Shoshone NF states, “[t]he literature includes both circumstantial evidence linking bighorn die-offs in the wild to contact with domestic animals, and controlled experiments where healthy bighorn sheep exposed to domestic sheep and goats subsequently displayed high mortality rates (e.g., Goodson 1982, Foreyt 1989, 1990 1992a, b, 1994; Foreyt et al. 1994; Onderka et al. 1988; Onderka and Wishart 1988; Garde et al. 2005, Lawrence et al. 2010).” RADT Report at 6. Does the term “domestic animals” refer to domestic “goats”? If so, that should be specified and the “literature” that “includes” “circumstantial evidence linking bighorn die-offs in the wild to contact with domestic [goats]” should be referenced and discussed. Likewise, the “literature” that “includes” “controlled experiments where healthy bighorn sheep exposed to domestic . . . goats subsequently displayed high mortality rates” should be specified and discussed.

In truth, NONE of the stated references support the Shoshone NF’s statement above as it pertains to domestic goats. Instead, the references provided, with the exception of Foreyt (1994), discussed above, and Garde et al. (2005) discussed below, are references to literature concerning only domestic sheep and NOT domestic “goats.” As previously discussed Foreyt (1994) establishes that domestic goats DO NOT pose a risk of disease transmission to bighorn sheep. The reference DOES NOT support the statement above by the Shoshone NF.

Reliance on Garde et al. (2005) for the above statement by the Shoshone NF is also misplaced. The reference refers to a risk of disease transmission examination concerning wild Dall’s sheep and mountain goats in the Northwest Territories. The examination does not involve wild Rocky Mountain bighorn sheep, which are at issue here, nor does it concern the Shoshone NF or any Forest nearby in the United States or Canada. Still, the primary finding of Garde et al. (2005) was that “we know very little concerning the identity, geographic distribution,

transmission dynamics, and impacts in Dall’s sheep and mountain goats” of numerous infectious agents. As readily admitted in Garde et al. (2005), because of the “great number of unknowns” the standard scientific guidelines for preparing risk assessments from the Canadian Cooperative Wildlife Health Centre should have precluded the continuation of the assessment.

Because Garde et al. (2005) fails to follow standard scientific guidelines and presents little information relevant to the issues on the Shoshone NF, which concern disease transmission between domestic goats and Rocky Mountain bighorn sheep (not Dall’s sheep and mountain goats), the reference has limited applicability and should not be used by a federal agency as the basis for decision-making. As a result, the Shoshone NF should explain, specifically, how the reference to Garde et al. (2005) supports the above statement and how the reference can be used in the RADT Report when it does not comply with or follow standard scientific guidelines. Otherwise, the Shoshone NF should remove the reference as it does not appear relevant, reliable or in support of the Shoshone NF’s statement.

In sum, the Shoshone NF provides absolutely NO basis for the statement that “[t]he literature includes both circumstantial evidence linking bighorn die-offs in the wild to contact with domestic animals, and controlled experiments where healthy bighorn sheep exposed to domestic sheep and goats subsequently displayed high mortality rates . . . .” The statement is false as it pertains to domestic goats and should be corrected and/or removed from the RADT Report. The Shoshone NF can point to no science showing “controlled experiments where healthy bighorn sheep exposed to domestic . . . goats subsequently displayed high mortality rates.”

**e. The Shoshone NF Presents No Scientific Evidence that Bighorn Sheep and Domestic Goats are Attracted to Each Other.**

The Shoshone NF states, “[b]ighorn sheep and domestic sheep and goats are attracted to each other, particularly during rut, which increases the probability that they will make the close contact necessary for disease transmission (Onderka et al. 1988, Foreyt 1989, Ward et al. 1997, Dubay et al. 2002, Borg et al. 2016).” RADT Report at 6. Which of these reference supports the Shoshone NF’s statement as it applies to domestic goats? None of the references concern domestic goats, rather they concern only domestic sheep. Unless the Shoshone NF can provide a scientific basis for applying the above statement to domestic goats, which are a different species than domestic sheep and bighorn sheep, the Shoshone NF should correct the statement so that it does not apply to goats, or remove the statement from the RADT Report.

**f. Rather than Misrepresenting the Findings of the Sells et al. (2015) Study, the Shoshone NF Should Properly Report the Findings and Correctly Apply them to the Situation on the Shoshone NF.**

The Shoshone NF also provides, “one study showed that the odds of a pneumonia epizootic are more than three times greater if domestic sheep or goats are within a 14.5-km



buffer of a bighorn sheep herd's distribution (Sells et al. 2015).” RADT Report at 6. This statement is a gross overstatement and does not reflect what Sells et al. (2015) found. The statement should be corrected, so that it is accurate, and its application to domestic goats should be explained as the statement appears to be used by the Shoshone NF to indicate some sort of risk of disease transmission from domestic goats.

To be accurate, Sells et al. (2015) states, “[o]dds were >3.3 times greater if domestic sheep or goats were used for weed control in a herd's area of high risk,” and “[o]ur hypothesis that risk of pneumonia epizootics increases when domestic sheep and goats are used for weed control in or near areas occupied by bighorn sheep herds was supported, with a >3.3-fold increase in risk compared to areas or years without known weed control using domestic Caprinae species.” Notably, and contrary to what the Shoshone NF provided, the greater odds were associated with domestic sheep and goats “used for weed control” in or near a herd's area of “high risk” (Sells et al. 2015). And, the reference to “domestic sheep and goats” actually refers to domestic sheep and goat “allotments,” not actual domestic sheep and goats (Sells et al. 2015). The phrase “sheep and goat allotments” is a federal management designation and not an indication of whether or not goats are actually grazed on a particular allotment. In fact, Sells et al. (2015) does not indicate whether a single goat was involved in the risk modeling performed in the study.

In other words, and again contrary to what the Shoshone NF states, there is no evidence in Sells et al. (2015) indicating that the odds of a pneumonia epizootic are greater if a domestic goat is within a 14.5-km buffer of a bighorn sheep herd's distribution. Further, it is unclear how the study is applicable to the situation on the Shoshone NF, considering that the odds reported in the study did not involve any allotments on Forest Service lands Sells et al. (2015) within a herd's area of high risk and, in fact, there are no sheep and goat allotments on the Shoshone NF for weed control, or for any other purpose. In other words, application of the Sells et al. (2015) study on the Shoshone NF would indicate that the odds of a pneumonia epizootic are zero.

Although glossed over by the Shoshone NF, the Sells et al. (2015) modeling actually indicated that risk of pneumonia epizootics was positively associated with greater amount of private land, weed control with domestic sheep and goat allotments, history of pneumonia epizootic in a herd or nearby herd, and higher density. Risk also appeared to be associated with spring precipitation (Sells et al. 2015). Most interesting and important to management of bighorn sheep populations on the Shoshone NF is the finding from Sells et al. (2015) that “[r]isk of a pneumonia epizootic increased >5-fold when herds were at a medium density and nearly 15-fold when herds were at a high density compared to when they were at a low density.” Further, Sells et al. (2015) indicated, “[d]ensity is a component of risk that has previously received little attention because the positive association between risk of pneumonia and higher densities had not been quantified. The association between higher herd density and risk may appear to contradict the idea that herds of larger population size should be less threatened by extirpation than smaller herds [ ].” (citations omitted). So, according to Sells et al. (2015), the most important consideration, by a long shot, in managing to avoid pneumonia epizootics is control of

bighorn sheep herd density and, in particular, ensuring that bighorn sheep herd density does not get too high. Rather than misreporting the findings from Sells et al. (2015), the Shoshone NF should consider the findings and explain how they are managing bighorn sheep herd density to avoid pneumonia epizootics.

**g. The Shoshone NF Should Correct its Discussion of Miller et al. (2011), so that it is Accurate.**

The Shoshone also provides a discussion of Miller et al. (2011) and states, “[a]s a result, any time contact occurs between domestics and bighorn sheep populations, the potential for transmission of novel agents to naïve bighorns exists (Miller et al. 2011).” RADT Report at 6. The reference (Miller et al. 2011) is discussed above and comments from above are also applicable here. The statement made by the Shoshone NF is not consistent with the statement made in Miller et al. (2011), which reads as follows:

Reflecting upon basic animal disease control principles and how they might be applied to free-ranging wildlife will be more useful. Any time contact occurs among populations, the potential for transmission of novel agents to naïve animals exists [ ], and there are established quarantine, vaccination, testing, risk assessment, and other strategies for minimizing spread of infectious diseases among translocated domestic and wild animal populations [ ]. However, there is a need to rigorously document the true risks of interspecies transmission under field conditions, as well as determine the efficacy of different management strategies.

(citations omitted). Notably, the statement from Miller et al. (2011) is much more general than the statement provided by the Shoshone NF and does not identify “domestics” and “bighorn sheep,” nor does it indicate a direction for transmission of “novel agents” to naïve animals. Bighorn sheep could just as easily transmit “novel agents” to naïve domestic goats. Indeed, Miller et al. (2011) found that bighorn sheep had 60 different Pasteurellaceae species or biovariants compared with only 37 in domestic goats, and that the majority of Pasteurellaceae species or biovariants in domestic goats were already found in the bighorn sheep. If the Shoshone NF discusses and/or references Miller et al. (2011) it should do so accurately, instead of trying to spin the results of Miller et al. (2011) in an attempt to implicate domestic goats in disease transmission to bighorn sheep.

**h. The Shoshone NF Indicates that Contact Between Cattle and Bighorn Sheep, and Subsequent Disease Transmission, is More Likely than Contact and Subsequent Disease Transmission Between Domestic Goats and Bighorn Sheep. This Finding Must be Presented and Discussed in the RADT Report and SDEIS, and the Shoshone NF Must Take Action to Limit Contact and Subsequent Disease Transmission Between Cattle and Bighorn Sheep on the Shoshone NF.**

Interestingly, the Shoshone NF indicates that contact between bighorn sheep and cattle is more frequent than contact between bighorn sheep and domestic goats. RADT Report at 6. The Shoshone NF also reports, “pathogenic bacteria can be transferred from cattle to wild sheep” and cautions that “intimate interactions between wild sheep and cattle (e.g., shared feed lines or troughs) should be discouraged as part of a comprehensive approach to health management and conservation of North American wild sheep (Wolfe et al. 2010).” *Id.* The findings from Wolfe et al. (2010) are actually more telling than the Shoshone NF reports. In Wolfe et al. (2010), a pneumonia epizootic in bighorn sheep was determined to be caused by cattle. The study further indicated:

Segregating wild sheep from domestic sheep has long been recognized as important to preventing epizootics in bighorn sheep (Warren, 1910; Shillinger, 1937; Foreyt and Jessup, 1982). Thus far, similar emphasis has not been placed on preventing interactions between cattle and bighorn sheep, most likely because species differences and a tendency toward interspecies avoidance are thought to help minimize opportunities for pathogen exchange (Foreyt and Lagerquist, 1996). However, the similarities between *Pasteurellaceae* and other respiratory pathogens of cattle and domestic sheep suggest similar adverse consequences to bighorn sheep if pathogen transmission were to occur between cattle and bighorns (Onderka et al., 1988; Singer et al., 2000). Such consequences have been demonstrated experimentally: five of eight bighorns died within 4 days of receiving intradermal injections of a cattle vaccine containing attenuated, live *Mannheimia haemolytica* (Onderka et al., 1988), four bighorns died within 2 days after intratracheal inoculation with *M. haemolytica* isolated from cattle (Dassanayake et al., 2009b), and one of five captive bighorns died 6 days after being copastured with Holstein calves (Foreyt and Lagerquist, 1996). We conclude from our findings, combined with other published observations, that intimate interactions between wild sheep and cattle (e.g., shared feed lines or troughs) also should be discouraged as part of a comprehensive approach to health management and conservation of North American wild sheep species.

(Wolfe et al. 2010).

Although the Shoshone NF does not discuss the evidence, the Shoshone NF’s scientific references show a much stronger correlation between disease transmission from cattle to wild sheep populations than they do a correlation between disease transmission from domestic goats to wild sheep populations. In addition to Wolfe et al. (2010), the Shoshone NF references Drew et al. (2014) which analyzes the health of 18 bighorns that were in contact with domestic ruminants in the northwestern United States between 1994 and 2008. Of the four bighorn sheep that allegedly contacted domestic goats, all of them were euthanized (i.e., they were killed instead of dying of other causes) and none of them showed evidence of pneumonia (Drew et al. 2014). In contrast, of the four bighorn sheep that contacted cattle, two were euthanized and two

died (i.e., died of other causes and were not killed) and one of the bighorns that died showed evidence of pneumonia (Drew et al. 2014).

Likewise, in Foreyt (1994) and Foreyt and Lagerquist (1996) NO bighorn sheep died after being penned with domestic goats, yet a bighorn sheep died shortly after being penned with cattle. The Onderka et al. (1988) study referenced by the Shoshone NF states, “[i]t is suggested that bighorn sheep are very susceptible to *P. haemolytica* from domestic livestock and *should not be allowed in contact with sheep or cattle.*” (emphasis added). In addition to these scientific studies referenced by the Shoshone NF, there is overwhelming scientific literature indicating that cattle carry the pathogens that the Shoshone NF states are of concern with regard to disease transmission to bighorn sheep on the Forest. Here is a small sampling of such literature for the Shoshone NF to review and discuss in the RADT Report and SDEIS: <http://jcm.asm.org/content/52/2/438.full>; <https://www.ncbi.nlm.nih.gov/pubmed/20619191>; [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=29&ved=0ahUKEwjhhpLdzsbVAhWLRVQKHx6TA2M4FBAWCFYwCA&url=https%3A%2F%2Fwww.acvp.org%2Fmeeting%2F2013%2FappFiles%2F212\\_Paulsen.docx&usg=AFQjCNEoj-FbW09Fo3FPnifTf1BMHc4zEw](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=29&ved=0ahUKEwjhhpLdzsbVAhWLRVQKHx6TA2M4FBAWCFYwCA&url=https%3A%2F%2Fwww.acvp.org%2Fmeeting%2F2013%2FappFiles%2F212_Paulsen.docx&usg=AFQjCNEoj-FbW09Fo3FPnifTf1BMHc4zEw); <https://www.addl.purdue.edu/newsletters/2004/fall/mycoplasma.htm>; <http://anrs.oregonstate.edu/system/files/u3084/Extension-MycoplasmaPneumoniaCalves.pdf>; Rehmtulla, A.J., Thompson, R.G., 1981. A review of the lesions in shipping fever of cattle. *Can Vet. J.* 22, 1-8 ([https://www.researchgate.net/publication/16179700\\_A\\_Review\\_of\\_the\\_Lesions\\_in\\_Shipping\\_Fever\\_of\\_Cattle](https://www.researchgate.net/publication/16179700_A_Review_of_the_Lesions_in_Shipping_Fever_of_Cattle)); Nicholas RAJ, Baker SE, Ayling RD, Stipkovits, L (2000). *Mycoplasma* infections in growing cattle. *Cattle Pract* 8: 115-118; Maunsell FP, Woolums AR, Francoz D, Rosenbusch RF, Step DL, et al. (2011). *Mycoplasma bovis* infection in cattle. *J Vet Intern Med* 25: 772-783 (<https://www.ncbi.nlm.nih.gov/pubmed/18460630>); Maeda T, Shibahara T, Kimura K, Wada Y, Sato K, et al. (2003). *Mycoplasma bovis*-associated suppurative otitis media and pneumonia in bull calves. *J Comp Path* 129: 100–110 (<https://www.ncbi.nlm.nih.gov/pubmed/12921715>); <http://www.sciencedirect.com/science/article/pii/S2314853513000310#bib36>. These publications are all available online or as indicated above. If the Shoshone NF is unable to access these reports by clicking on the above links for via a “Google” search, NAPgA can provide hard copies of the publications.

Thus, based on the scientific evidence provided by the Shoshone NF and reported above, cattle pose a much more significant risk of disease transmission to wild bighorn sheep on the Shoshone NF than domestic goats. Indeed, the Shoshone NF does not provide a single scientific research paper indicating that domestic goats in the wild or in experimental trials transferred disease to bighorn sheep, causing pneumonia in bighorn sheep populations and related bighorn sheep fatalities. Such evidence, however, is abundant with respect to cattle.

From a management perspective, Forest Service Manual (“FSM”) sections 2670.32 and 2672.1 direct the Shoshone NF to avoid or minimize impacts to species listed by the Regional Forester as a sensitive species. Rocky Mountain bighorn sheep are designated as such a species on the Shoshone NF. See RADT Report at 1. Further, as described in FSM 2672.4 and based on

the above, analyzing and disclosing the potential effects of cattle grazing and use on bighorn sheep is needed to meet Forest Service direction for sensitive species management.

The Shoshone NF has designated 375,368 acres as generally suitable for grazing according to the May 2015 Record of Decision for the Land Management Plan Revision at [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprd3837255.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3837255.pdf) (last visited July 14, 2017). This acreage overlaps considerably with reported bighorn sheep habitat on the Shoshone NF. See [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprd3837057.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3837057.pdf) (last visited July 14, 2017). In order to comply with Forest Service regulations and guidance, and considering the overwhelming evidence presented by the Shoshone NF that cattle pose a significant risk of disease transmission to bighorn sheep on the Shoshone NF, the Shoshone NF must consider closing all cattle grazing on the Shoshone NF within 35 kilometers of reported bighorn sheep habitat.

Furthermore, what is the impact of cattle on bighorn sheep habitat? The large number of grazing acres for cattle on the Shoshone NF would appear to reduce the overall habitat for bighorn sheep on the Forest, thereby increasing the susceptibility of bighorn sheep herds to disease as a result of habitat loss and higher density (Sells et al. 2015), but also because there is a greater chance of contact and subsequent disease transmission between the species as they are closer together. Under the APA and NEPA, the Shoshone NF cannot ignore the significant risk of disease transmission posed by cattle on the Shoshone NF, particularly considering the Shoshone NF's proposed approach in managing the extremely small risk of disease transmission allegedly posed by packgoats on the Forest. The effects of cattle grazing on the Shoshone NF must be studied in the RADT Report and SDEIS.

### **Experiments**

**i. The Shoshone NF's Statements Concerning Domestic Goats in the "Experiments" Section of the RADT Report are Unsupported and Do Not Take into Account Recent Scientific Research Indicating Packgoats Do Not Commonly Carry Disease-Causing Organisms.**

In the "Experiments" section on page 7 of the RADT Report, the Shoshone NF makes the statement: "Domestic sheep and goats commonly carry these disease-causing organisms, which typically cause few deaths and little illness in domesticated adults and lambs (Martin et al. 1996, Glimour and Gilmour 1989)." Both of the references provided concern studies or literature reviews involving domestic sheep, not domestic goats. Thus, the statement that "Domestic . . . goats commonly carry these disease-causing organisms" has no support. As a result, the Shoshone NF should remove "goats" from the above statement or otherwise provide scientific information justifying the statement as it pertains to goats. Recent scientific research summarized in Exhibit [redacted] indicates that, in particular, packgoats DO NOT commonly carry these disease-causing organisms. The results of the testing performed for the research summarized in Exhibit [redacted] is also provided in the Exhibit, so that the Shoshone NF can consider the results and

verify the legitimacy and scientific method in the research. This research should be presented and considered in the RADT Report, along with the research discussed above indicating that domestic goats DO NOT transmit disease to wild bighorn sheep in the wild or in experimental studies.

**Field Evidence of Large-scale, Rapid, All-age Die-offs**

**j. The Shoshone NF's Statements in the Section on "Field Evidence of Large-scale, Rapid, All-age Die-offs as They Relate to Domestic Goats Must be Corrected or Removed as the Statements are Unsupported and/or Inaccurate.**

As with the sections of the RADT Report discussed above, the Shoshone NF in the section on "Field Evidence of Large-scale, Rapid, All-age Die-offs" attempts to implicate domestic goats as a cause of die-offs in bighorn sheep populations, however the Shoshone NF fails to present any scientific information supporting such implication. In particular, the Shoshone NF provides, "not all bighorn sheep disease events can be attributed to contact with domestic sheep or goats (Onderka and Wishart 1984, Aune et al. 1998, Besser et al. 2012b)." The statement leads the reader to believe that some, or a majority, of bighorn sheep disease events can be attributed to contact with domestic goats, however none of the references provided present any information linking domestic goats with bighorn sheep disease events. All of the references concern domestic sheep, not domestic goats. Are there any bighorn sheep disease events that can be attributed to contact with domestic goats? The Shoshone NF does not present any. Thus, "goats" should be removed from the above statement or the Shoshone NF should revise the statement to clarify that NO bighorn sheep disease events can be attributed to contact with domestic goats.

The Shoshone NF also provides, "[h]owever, no studies report any bighorn sheep herds, fenced or free ranging, that have come into contact with domestic sheep and remained healthy (Schommer and Woolever 2001)." RADT Report at 7. While this statement does not implicate goats, it is based on an outdated reference and is not true. *See, e.g.*, Miller et al. (2011). The statement should be removed from the RADT Report because it is inaccurate.

In addition, the Shoshone NF states, "[w]hen contact between bighorn sheep and domestic sheep or goats is documented, the severity of the bighorn sheep die-off is typically greater (Onderka and Wishart 1984, Martin et al. 1996, Aune et al. 1998, George et al. 2008)." RADT Report at 7. This statement as it pertains to goats is problematic for a host of reasons. First, when has contact between bighorn sheep and domestic goats been documented AND led to a bighorn sheep die-off of any severity? That has never happened. The Shoshone NF fails to present any evidence indicating that contact between bighorn sheep and domestic goats has ever led to a bighorn sheep die-off. Second, none of the references provided concern domestic goats, they only concern domestic sheep. As a result, the Shoshone NF should remove "goats" from the

statement above or otherwise remove the statement entirely from the RADT Report. The statement is not accurate.

### **Evidence for Disease Transmission from Domestic Goats**

**6. The Shoshone NF Must Correct the Numerous False, Misleading and Unsupported Statements in the Section of the RADT Report on “Evidence for Disease Transmission from Domestic Goats.”**

**a. The Shoshone NF Provides No Support that There is an “Abundance” of Connected Evidence that Domestic Goats are a Vector.**

The Shoshone NF correctly recognizes that “there is no direct experimental evidence of domestic goats, and specifically pack goats, infecting wild sheep with life threatening diseases,” but wrongly concludes that “there is an abundance of connected evidence that leads to a reasonable conclusions that domestic goats are a vector.” RADT Report at 8. The Shoshone NF provides no references or other support indicating what this “abundance of connected evidence” may be. Such support should be provided, or otherwise an opposite conclusion should be drawn. The Shoshone NF also fails to specify what goats are allegedly a “vector” for, such as for “life threatening diseases,” “bacteria,” or something else. The Shoshone NF in the RADT Report should provide these details.

**b. There is No Scientific Support Provided by the Shoshone NF to Implicate Domestic Goats in Wild Bighorn Sheep Die-offs.**

The Shoshone NF also states that “[d]omestic goats are physiologically capable of carrying and spreading several of the bacteria that are implicated in wild sheep die-offs,” but fails to provide any references to support this statement and also fails to indicate which of the “several” “bacteria” that domestic goats are “capable of carrying” have been implicated in wild sheep die-offs. References and this other information should be provided. Likewise, the Shoshone NF must disclose that there is a significant difference between being “capable of carrying” certain bacteria and actually causing a wild sheep die-off. The science provided by the Shoshone NF, regardless of the bacteria implicated, does not show that domestic goats have ever caused a wild sheep die-off. In fact, the scientific research, shows the opposite: that penning domestic goats with bighorn sheep DOES NOT lead to bighorn sheep die-offs.

**c. The Shoshone NF Should Provide Information on the Likelihood of Packgoats Approaching Bighorn Sheep in the Wild.**

The Shoshone NF states that “[d]omestic goats may approach bighorn sheep” in several circumstances, including “when used as pack animals supporting back-country recreation,” but provides no information on likelihood or history of such situations occurring. With respect to packgoats approaching bighorn sheep, the Shoshone NF should disclose the extreme unlikelihood of such a situation along with the fact that such an event has NEVER happened.

See, e.g., RADT Report at 32 (“Currently, there are no documented cases of disease transmittal from domestic sheep or goats to bighorns on the SNF.”).

**d. The Shoshone NF Does Not Provide Any Information on “All-age” “Die-offs” Following Contact with Domestic Goats.**

In addition, the Shoshone NF provides, “[a]lthough there have been all-age die-offs following observed contact between domestic goats and wild sheep, many of them occurred prior to the technology that allows for DNA strain typing to positively identify the source of the bacteria,” but again does not provide any references or other basis for making such a statement. What “all-age die-offs following observed contact between domestic goats and wild sheep” is the Shoshone NF referring to? The Shoshone NF should document these die-offs as well as the information concerning the “observed contact between domestic goats and wild sheep.” Without that information, the Shoshone NF’s statement is groundless and should be removed from the RADT Report.

**e. The Shoshone NF Misrepresents the Findings of Rudolph et al. (2003) and Fails to Provide Support that Literature Exists Implicating Domestic Sheep in Disease Transmission and Die-offs in Bighorn Sheep Populations.**

Again, without any references or other support, the Shoshone NF makes another statement concerning domestic goats: “[t]he literature that does exist indicates a connection between contact between domestic goats and bighorn sheep and disease transmission.” RADT Report at 8. What literature, exactly, is the Shoshone NF referring to? Such literature should be referenced, if it exists, and the Shoshone NF should explain how the literature supports such statement.

Although not referenced to support the above statement, the Shoshone NF provides Rudolph et al. (2003) as the single example of a connection between contact between domestic goats and bighorn sheep and disease transmission. The Shoshone NF’s discussion of Rudolph et al. (2003), however, blatantly misrepresents the findings of Rudolph et al. (2003) and wrongly concludes that a feral goat was the cause of a bighorn sheep die-off in Hells Canyon. RADT Report at 8. The Shoshone NF states, “the cause of a bighorn die-off in the winter of 1995-96 in Hells Canyon was traced by DNA fingerprinting to a domestic goat that had been recently released in the wild.” Such statement is completely FALSE and presents such a blatant misrepresentation of the findings of Rudolph et al. (2003) that the ethics of the authors of the RADT Report should be seriously questioned.

The findings of Rudolph et al. (2003) are more fully discussed above in Comment  , but, in pertinent part, the Rudolph et al. (2003) study concludes that the *Pasteurella* spp. strains carried by the feral goat at issue WERE NOT a cause of bighorn die-offs (Rudolph et al. 2003). In Rudolph et al. (2003) it states, “there is no evidence that those organisms were associated with



subsequent disease or deaths.” (emphasis added). In fact, Rudolph et al. (2003) states, “we know of no other information regarding transfer of potentially lethal *Pasteurella* spp. between domestic goats and free-ranging bighorn sheep.” (emphasis added). As a result, the statement by the Shoshone NF that “the cause of a bighorn die-off in the winter of 1995-96 in Hells Canyon was traced by DNA fingerprinting to a domestic goat” is a gross misrepresentation and MUST be removed from the RADT Report. Further, the remaining discussion of the 1995-96 Hells Canyon event should be removed or revised to reflect the actual findings of (Rudolph et al. 2003).

The Shoshone NF should also note that the Rudolph et al. (2003) study is outdated and concerned the investigation of *Pasteurella* spp. as a primary pathogen thought to influence epizootic pneumonia in bighorn sheep. Current research relied upon by the Shoshone NF shows that the focus, findings and conclusions of Rudolph et al. (2003) were inaccurate, as *Mycoplasma ovipneumoniae* from domestic sheep, not *Pasteurella* spp., has been demonstrated to be the primary pathogen involved in widespread pneumonia in bighorn sheep. See RADT Report at 5 (citing Besser et al. 2008; 2012b); see also Besser et al. (2012a). Thus, the Shoshone NF’s reliance on Rudolph et al. (2003) as well as Schommer and Woolever (2001), which discusses the findings of Rudolph et al. (2003), is misplaced, not just because the Shoshone NF misrepresents the findings and conclusions of Rudolph et al. (2003), but also because Rudolph et al. (2003) is outdated and the current best available science renders the findings and conclusions of Rudolph et al. (2003) inapplicable.

**f. The Shoshone NF Relies Upon Outdated and Irrelevant Science and Should Instead Rely on the Current Best Available Science.**

The Shoshone NF continues to oddly revert to decades-old science in its discussion of evidence for disease transmission from domestic goats, despite the fact that such discussion inconsistent with the current science referenced in the Shoshone NF’s discussion of “Bacterial Pneumonia” at pages 4-5 of the RADT Report. RADT Report at 8-9. Most of the Shoshone NF’s discussion of pathogens in the “Evidence for Disease Transmission from Domestic Goats” section is outdated and inapplicable because of the current best available science. For example, the Shoshone NF provides:

As in domestic and bighorn sheep, strains of *Mannheimia haemolytica* are the organisms most frequently isolated from the lungs of pneumonic domestic goats. *Mannheimia haemolytica* A1 is infrequently isolated from the upper respiratory tract of healthy bighorn sheep, and is thought to act as an opportunistic invader much the same way as other strains of *Pasteurella* spp. *Mannheimia haemolytica* A2 has been found in the upper respiratory tract of healthy domestic sheep and goats, but has not been isolated from healthy wild sheep (Garde et al. 2005). It is thought that bighorn sheep are infected with *M. haemolytica* A2 through contact with domestic sheep or goats (Foreyt and Lagerquist 1996, Martin et al. 1996, Schommer and Woolever 2001). This bacteria has the potential to act as a

primary pathogen in bighorn sheep, resulting in all-age die-offs (Garde et al. 2005). In addition, *Pasteurella* spp. were also isolated from feral goats and bighorn sheep in Hells Canyon National Recreation Area. Although the direction of transmission could not be established, evidence suggests transmission of strains from goats to bighorn sheep (Rudolph et al. 2003, Foreyt et al. 2009, Cassirer et al. 2016).

RADT Report at 8-9.

The Shoshone NF's reasoning for including the above overview, mostly copied verbatim from Garde et al. (2005) is unclear considering the Shoshone NF recognizes in the RADT Report at pages 4-5 that the science presented in the overview is no longer accepted. See RADT Report at 4-5 (citing Besser et al. 2008; 2012b); see also Besser et al. 2012a; Cassirer et al. 2016 ("Although pneumonia in bighorn sheep is a polymicrobial disease, pathogens other than *M. ovipneumoniae*, including *lktA* positive *Pasteurellaceae* and respiratory viruses, were either not detected or showed no association with disease."). *Mannheimia haemolytica* is no longer thought to act as a primary pathogen in bighorn sheep, resulting in all-age die-offs. See *id.* Even the review by Garde et al. (2005), which is discussed above and is now very outdated, concluded that *M. Haemolytica* is rarely a primary pathogen. Likewise, Foreyt and Lagerquist (1996), Martin et al. (1996), Schommer and Woolever (2001), and the other references relied upon by the Shoshone NF, are also outdated and do not represent the current best available science. Further, these references do not present studies involving disease transmission from domestic goats to Rocky Mountain bighorn sheep and are thus inapplicable to the discussion concerning disease transmission from domestic goats to bighorn sheep on the Shoshone NF.

In addition to the outdated and inapplicable discussion of science concerning *M. haemolytica*, the Shoshone NF also adds, "*Pasteurella* spp. were also isolated from feral goats and bighorn sheep in Hells Canyon National Recreation Area," but fails to provide a reference for such statement. While Rudolph et al. (2003) found that a single feral goat in the Hells Canyon area, after being exposed to domestic sheep, may have carried a strain of *Pasteurella* spp., that goat was determined NOT to be the cause of a die-off among bighorn sheep in the Hells Canyon area. Plural "goats" certainly were not involved in the Rudolph et al. (2003) study, as the Shoshone NF states. Further, "the direction of transmission" of the strain of *Pasteurella* spp. strain at issue could not be determined, so researchers do not know whether the strain went from the domestic goat to the bighorns or from the bighorns to the domestic goat (Rudolph et al. 2003). Regardless, the strain was not implicated in a bighorn sheep die-off (Rudolph et al. 2003). Indeed, no strain of a disease-causing organism from a domestic goat has been shown to result in a bighorn sheep die-off.

Dr. Margaret A. Highland at the Animal Disease Research Unit-ARS-USDA has provided a thorough analysis and explanation of Rudolph et al. (2003) to clear up the Shoshone NF's and others' wrongful interpretations of the Rudolph et al. (2003) study. The analysis and explanation

is provided at Exhibit [redacted] and is incorporated into these comments and should be considered by the Shoshone NF.

**g. The Shoshone NF Should Acknowledge that the Heinse et al. (2016) Is Not Directly Applicable to Packgoats, but Supports the Best Available Science Showing that Packgoats Do Not Often Carry Pathogens Linked with Disease Transmission to Bighorn Sheep.**

Although the study by Heinse et al. (2016) referenced by the Shoshone NF indicates that certain farm flocks of sheep and goats may carry *M. ovi*, none of the flocks were reported to contain packgoats. The Shoshone NF does not indicate how Heinse et al. (2016) applies to packgoat usage on the Shoshone NF. Still, the study by Heinse et al. (2016) presents several interesting findings. First, the study demonstrated that small flocks of goats (around 4) tested negative for *M. ovi*, while large flocks of goats (around 30) were more likely to test positive (Heinse et al. 2016). Second, flocks that had significant interaction with domestic sheep and other animals were also more likely to test positive (Heinse et al. 2016). Finally, flocks of pure-bred goats were unlikely to test positive (Heinse et al. 2016).

The results from Heinse et al. (2016) are consistent with those presented by Dr. Highland in Exhibit [redacted]. Small flocks of goats, along with pure-bred goats are unlikely to test positive for offensive pathogens, such as *M. ovi*. Most, if not all, flocks of packgoats are small and many packgoats are pure-bred. As such, the results obtained by Dr. Highland are consistent—packgoats do not often carry *M. ovi*.

The management direction recommended by Heinse et al. (2016), for dealing with farm flocks, was to assist owners in purging *M. ovi* from their flocks and then setting up an annual sampling and certification for both *M. ovi* free flocks “and pack goats.” Considering that the latest veterinarian work suggests that *M. ovi* is harmful to domestic sheep and goats also, sheep and goats owners have an incentive to eliminate *M. ovi* from their animals (Heinse et al. 2016). Although the likelihood of a packgoat ever carrying *M. ovi* is extremely low, and the likelihood of a packgoat with *M. ovi* ever contacting a bighorn sheep and such contact leading to transmission of *M. ovi* highly improbable, NAPgA has indicated that their members would be willing to submit to *M. ovi* sampling and certification as recommended by Heinse et al. (2016).

**h. The Shoshone NF’s Reliance on the Abstract of a Presentation as Science in the RADT Report is Improper.**

The Shoshone NF also references the study by Besser and Cassirer (2016) to support a statement that goat-origin *M. ovi* strains were capable of causing respiratory disease symptoms and pneumonia lesions in susceptible bighorn sheep. RADT Report at 9. First, the reference provided by the Shoshone NF appears to be to an abstract provided for presentation and not to an actual scientific research paper. Second, the abstract does not appear to support such a statement. While both domestic goats and bighorn sheep involved in the study were noted to display

symptoms of respiratory disease upon comingling, such symptoms decreased over time for both species Besser and Cassirer (2016). Indeed, after 100 days of comingling in two separate experiments, not a single domestic goat or bighorn sheep died (Besser and Cassirer 2016). No animal had succumbed to any sort of pneumonia and all were showing fewer symptoms of respiratory disease prior to being euthanized by the researchers in the study (Besser and Cassirer 2016). Once again, consistent with prior studies, domestic goats were not shown to cause deaths of bighorn sheep as a result of disease transmission, even after 100 days of comingling together in a pen; sharing feed, water, etc. (Besser and Cassirer 2016).

**i. The Shoshone NF Misrepresents the Findings of Cassirer et al. (2016).**

The Shoshone NF, in its obvious push to implicate domestic goats as a cause of disease transmission to bighorn sheep, also misrepresents the findings of Cassirer et al. (2016). First, the study in Cassirer et al. (2016) is another study that contradicts the Shoshone NF's earlier discussion concerning *M. haemolytica* as a primary cause of disease in bighorn sheep. The study shows that *M. ovi* is the concern, not other pathogens (Cassirer et al. 2016), so the Shoshone NF's discussion concerning *M. haemolytica* based on long-outdated science is inapplicable.

Second, the study does not provide any evidence that domestic goats in the Hells Canyon area ever came into contact with bighorn sheep, and that such contact resulted in disease transmission (Cassirer et al. 2016). The Cassirer et al. (2016) study indicates that a new strain of *M. ovi* was detected within a few bighorn sheep, and that such strain had never been detected before, in any animal, in the western United States. The strain was not shown to have caused a die-off in any bighorn sheep population and was not widespread amongst bighorn sheep (Cassirer et al. 2016). The study only indicates that five total bighorn sheep died, and only three of those exhibited signs of moderate to severe bronchiopneumonia (Cassirer et al. 2016). Following these deaths, the large number of surviving bighorn "appeared to make a full recovery with no evidence of ongoing disease" (Cassirer et al. 2016).

Because the strain of *M. ovi* supposedly involved in these bighorn deaths was "novel," Cassirer et al. (2016) surmised that it was likely of "domestic sheep or goat" origin, however, Cassirer et al. (2016) also admitted that "it is also possible that pneumonia outbreaks could be precipitated in carrier bighorn sheep populations." "Mutations in key virulence genes or in genes coding for the *M. ovipneumoniae* capsule, which likely plays a role in adherence to host cells and in evading antibody recognition [ ], could cause disease and are unlikely to be detected by our strain-typing method" (Cassirer et al. 2016). (citations omitted).

In addition, Cassirer et al. (2016) indicated that "[a]nother plausible mechanism of pneumonia resurgence would be reintroduction of the same strain of *M. ovipneumoniae* into a population following either pathogen fade-out and waning immunity [ ] or recruitment of unexposed susceptible individuals." Finally, Cassirer et al. (2016), indicates that "other factors may play a role in triggering outbreaks such as pathogen dose, host contact patterns, immunocompetence, and invasion of secondary pathogens." Thus, the Shoshone NF's

conclusion that a domestic goat was somehow involved in some sort of “outbreak” in Hells Canyon is tenuous at best. There is no evidence of such involvement, the so-called “outbreak” only involved three bighorn deaths and there are numerous other explanations for the detection of a new strain of *M. ovi*.

Despite the lack of evidence presented in Cassirer et al. (2016) implicating domestic goats in disease transmission, the Shoshone NF states that the “[a]uthors conclude that the lack of cross-strain immunity in the face of recurrent spillovers from reservoir hosts may account for a significant proportion of the disease outbreaks in bighorn sheep that continue to happen regularly despite a century of exposure to domestic sheep and goats (Cassirer et al. 2016).” RADT Report at 9. However, the conclusion made by Cassirer et al. (2016) is much narrower: “Lack of cross-strain immunity to *M. ovipneumoniae* could be one explanation for the regular occurrence of pneumonia epizootics in bighorn sheep over a century after initial contact with domestic sheep.” Still, to protect against this one possible explanation for pneumonia epizootics, Cassirer et al. (2016) indicates that preventing spillover could be accomplished by “clearing *M. ovipneumoniae* infection from domestic hosts.” This is a strategy that NAPgA has agreed to adopt with respect to packgoats. Only packgoats free of *M. ovi* would be permitted for use on the Shoshone NF.

**j. If the Shoshone NF is Going to Randomly Report on Other Disease Organisms Carried by Domestic Goats, It Must Also Do the Same For Domestic Sheep, Cattle and All Other Animals on the Forest that Carry Other Disease Organisms to Which Bighorn Sheep May be Susceptible.**

In addition to references concerning respiratory disease transmission from domestic sheep and goats to bighorn sheep, the Shoshone NF curiously adds several references concerning other disease organisms that can be carried by domestic goats. RADT Report at 9-10. The Shoshone NF does not include a similar discussion for any other animal, including domestic sheep, so it is unclear why such discussion is included for only domestic goats. In order to avoid arbitrary and capricious action, the Shoshone NF should either remove the discussion from the RADT Report or include such discussion for all animals that carry disease organisms that can be transmitted to bighorn sheep, such as domestic sheep and cattle, among other species.

**k. The Shoshone NF’s Discussion of Other Disease Organisms Does Not Implicate Domestic Goats in Disease Transmission and Subsequent Bighorn Sheep Die-offs. The Discussion Appears Irrelevant to the Issue of Transmission of Respiratory Disease to Bighorn Sheep.**

The discussion, however, appears out of place considering the RADT Report identifies the primary issue of concern for bighorn sheep on the Shoshone NF as transmission of respiratory disease to bighorn sheep, *see* RADT Report at 1, not keratoconjunctivitis or lungworms or sore mouth. First, with regard to the Foreyt et al. (2009) study concerning

lungworms, the study does not demonstrate that domestic goats are a risk for disease transmission. It should be noted that the study was not a study of the transmission of *Pasteurella* spp. from goats to bighorn sheep, rather it was a study of the transmission of lungworms from domestic goats to bighorn sheep on common pasture. See Foreyt et al. (2009). To that end, the study involved four herd domestic goats (not pack goats) that were infected with lungworms prior to the study. *Id.* The four domestic goats were then placed in a pen with seven captive bighorn sheep. *Id.* The animals were co-pastured together for 11 months. *Id.* During that time, the goats and bighorn sheep “freely associated with each other, including bedding together.” *Id.* (emphasis added). Besides the stress of being penned up together for 11 months, the bighorn sheep in the study also had the stress of being “captured individually with a drive net,” “physically restrained,” and having “fecal samples [ ] removed manually from their rectums.” *Id.* Despite all this, “[a]ll four goats (100%) and five (71%) of seven bighorn sheep remained healthy and survived the 11-mo copasturing experiment.” *Id.* (emphasis added).

The conclusion of the study was that domestic goats that are already infected with lungworms could infect bighorn sheep that share a pen and bed together for 11 months. *Id.* On the Shoshone NF, however, the concerns over bighorn sheep die-offs are not tied to lungworms, so this conclusion is of little value for the RADT Report and SDEIS and certainly does not support the assumption that pack goats transmit *Pasteurella* spp. or other respiratory disease to bighorn sheep on the Shoshone NF.

According to the Foreyt study, two of the seven bighorn sheep died of pneumonia while the domestic goats were in contact with them. *Id.* The study, however, did not indicate that any of the domestic goats carried *Pasteurella* spp. or that they transmitted *Pasteurella* spp. to the bighorn sheep that died. In fact, Foreyt states in the study “the potential deleterious effect of *M. haemolytica* [a.k.a. *Pasteurella* spp.] of goat origin in bighorn sheep has not been clearly documented.” *Id.* Instead, Foreyt suggests that “it is possible that *M. capillaris* [type of lungworm], or *M. capillaris* in combination with *Protostrongylus* [type of lungworm], may have been a predisposing factor in the [bighorn] deaths.” *Id.* Foreyt also suggests that pneumonia in bighorn sheep is “linked to environmental stressors in combination with bacteria and lungworms.” *Id.* (citations omitted).

Foreyt’s recommendation from the study was: “Based on results of this experimental study, bighorn sheep that occupy habitat with domestic goats are at potential risk of acquiring *Muellerius* infections, thus, increasing the potential risk of verminous pneumonia with possible concurrent or secondary bacterial pneumonia. Therefore, prudent management of bighorn sheep populations should minimize habitat sharing between the two species.” *Id.* Again, the recommendation was not for elimination of packgoats from the Shoshone NF, but for prudent management. *Id.*

The Jansen et al. 2006 study cited by the Shoshone NF also does not support the assumption that domestic goats transmit *Pasteurella* spp. or other respiratory disease to bighorn

sheep. This study involved the release of 4,800 herd domestic goats near occupied bighorn sheep habitat in Arizona. Jansen et al. (2006). Jansen posits that some of these 4,800 domestic goats carried a bacterium that is associated with an ocular disease that affects domestic livestock and most wild ruminants in North America. *Id.* Several months after the domestic goats were released, clinically affected bighorn sheep were observed. *Id.* Jansen suggests that the domestic goats transmitted the bacterium that is associated with the ocular disease to the bighorn sheep. *Id.* The Jansen et al. study does not indicate that a single bighorn sheep was affected by *Pasteurella* spp. after the release of 4,800 domestic goats; that a single bighorn sheep contracted pneumonia and died after contacting a domestic goat; or that there was a resulting die-off of bighorn sheep following the release of the domestic goats near bighorn sheep habitat. *Id.* The Jansen et al. study simply is not relevant to the Shoshone NF's assumption that domestic goats transmit *Pasteurella* spp. or other respiratory disease to bighorn sheep on the Shoshone NF. Despite the presence of 4800 domestic brush goats comingling with bighorn sheep, there was not a single report of pneumonia associated with the incident, even though the goats remained in bighorn sheep habitat for over 60 days. Thus, consistent with other studies, commingling of domestic goats (even 4,800 goats) with bighorn sheep does not appear to lead to respiratory disease and subsequent bighorn sheep mortality events.

## **Vaccines**

### **7. The Shoshone NF Misrepresents the Viability of Vaccines and Fails to Consider the Vaccination and Removal of *M. ovi* from Domestic Ruminants as a Strategy for Reducing Potential Disease Transmission to Bighorn Sheep.**

The Shoshone NF provides the statement, “[s]o far no vaccine has completely protected wild sheep commingled with domestic sheep or goats in captive settings or shown potential for efficacy in free-ranging animals (Callan et al. 1991, Kraabel et al. 1998, Cassirer et al. 2001, Subramaniam et al. 2011, Sirochman et al. 2012).” RADT Report at 11. The reason the Shoshone NF has included “goats” in the above statement is unclear, considering that none of the references appear to be studies involving goats. The Shoshone should clarify which studies concern goats or otherwise remove “goats” from the above statement.

Still, the statement appears to be inaccurate. Subramaniam et al. (2017) reported that previous studies concerning vaccines did not test vaccines specifically designed to protect against *M. haemolytica*. As a result, the study tested a vaccine designed to protect against *M. haemolytica* (Subramaniam et al. 2017). The vaccine was a success. “All controls died while 100% of vaccinated BHS survived the challenge with *M. haemolytica* A2” (Subramaniam et al. 2017). Likewise, Kraabel et al. (1998) tested a vaccine designed to protect against *P. haemolytica*. Kraabel et al. (1998) reported: “our data suggest that the multivalent *P. haemolytica* vaccine used here is safe and stimulates protective immunity in bighorn sheep. Consequently, we believe field evaluation of this vaccine through carefully designed management experiments in free-ranging bighorn sheep is warranted.” Contrary to the Shoshone’s statement above, vaccines have been shown to protect bighorn sheep from offensive

pathogens. As a result, the statement should be corrected to account for the success of certain vaccines. In following, the Shoshone should also consider administration of vaccines to bighorns on the Shoshone NF as recommended by the best available science referenced in by the Shoshone NF in the RADT Report.

Rather than actually considering administration of a vaccine to protect bighorn sheep, the Shoshone NF dismisses the use of vaccines in the statement: “[i]f successfully developed, vaccinations would be logistically difficult and expensive to administer (Wehausen et al. 2011); therefore, repeated vaccination in the wild would likely not be practical.” RADT Report at 11. The Shoshone NF should explain why administration of vaccinations would be “logistically difficult” and “expensive,” particularly considering that bighorn sheep on the Forest are extensively studied, fitted with tracking collars and otherwise handled frequently by Wyoming Fish & Game and other researchers. Every bighorn sheep involved in these studies could be vaccinated quite easily. If not all bighorn sheep can be vaccinated, the prudent, logical and proper management direction would provide for vaccination of those bighorn sheep that could be vaccinated. By analogy, it is recommended that people still get flu vaccinations even though the entire population does not get such vaccinations—at least those people that get the vaccination are protected.

Further, the Shoshone NF fails to consider the possibility of vaccinating domestic sheep and goats, instead of vaccinating bighorn sheep. By doing so, the alleged logistical difficulties and expenses of vaccinating bighorn sheep in the wild would be solved. Domestic goats could be vaccinated to protect against *M. ovi* and other pathogens (to the extent other pathogens are a concern), so they would not be carriers of such pathogens and would, therefore, not be able to transmit such pathogens to bighorn sheep. Both Heinse et al. (2016) and Cassirer et al. (2016) recommend that managers of public lands and livestock owners alike work to clear *M. ovi* from domestic hosts. While almost all packgoats are free of *M. ovi* already and pose no risk of disease transmission to bighorn sheep on the Shoshone NF, NAPgA has agreed to submit to a testing and certification process to ensure all packgoats used on the Shoshone NF would be free of *M. ovi*. Rather than dismissing the use of vaccines to protect bighorn sheep as too difficult or too expensive, the Shoshone NF should consider how vaccines can be used to clear domestic hosts of *M. ovi* and other pathogens, so they do not pose any risk of disease transmission to bighorn sheep. In addition, the Shoshone should consider that domestic hosts that are free from *M. ovi* do not pose any risk of disease transmission to bighorn sheep and can therefore be used on the Shoshone NF.

### **Forays**

- 8. The Shoshone NF’s Discussion of Forays is Inapplicable on the Shoshone NF. The Shoshone NF Should Use the Available Data from Bighorn Sheep Herds on the Shoshone NF.**



The Shoshone NF's discussion of "Forays" at page 11 of the RADT Report does not provide ANY information on bighorn sheep movements on the Shoshone NF, nor does the discussion present ANY information concerning risk of contact with domestic goats (versus domestic sheep). Rather, the discussion focuses on bighorn sheep forays from the Hells Canyon bighorn population in Idaho and only discusses risk of contact with domestic sheep. RADT Report at 11. How is the discussion relevant to bighorn sheep movements on the Shoshone NF? Instead of providing data and discussion concerning some other bighorn population that lives in a vastly different area and habitat, the Shoshone should provide relevant data and discussion on the bighorn populations that live on the Shoshone NF. Telemetry and observation data is readily available from the Wyoming Fish & Game concerning most the herds on the Shoshone NF, especially the Whiskey Mountain Herd. The Whiskey Mountain Herd has an abundance of data on it, including information regarding forays. Such data must be used on the Shoshone in place of inapplicable data from some other unrelated bighorn sheep herd. Likewise, instead of discussing only information on domestic sheep, the Shoshone NF should provide information on domestic goats or otherwise indicate that there is no risk of contact with domestic goats or that there is no information on risk of contact with domestic goats.

### **Domestic Sheep Grazing on the Shoshone National Forest**

### **Domestic Goat Use on the Shoshone National Forest**

#### **9. The Shoshone NF Should Consider the Extent, Magnitude and Characteristics of Packgoat Use on the Shoshone NF.**

On page 12 of the RADT Report, the Shoshone NF discusses "Domestic Goat Use on the Shoshone National Forest." The Shoshone NF indicates that "little is known about the extent, magnitude, and characteristics of pack goat use in this area," which is curious considering NAPgA, its members and other interested parties have been educating the Shoshone NF on packgoat use for over five years. In fact, much is known about "the extent, magnitude, and characteristics of pack goat use" on the Shoshone NF.

Packgoat users commonly submit a Popo Agie Wilderness Area Stock Permit to the Washakie Ranger District office when either entering the Shoshone NF from the Lander, Wyoming side (Worthen Meadow Trailhead, Dickinson Park, Fiddler's Lake), or when entering the Shoshone NF from Washakie Pass or Hailey Pass via the Bridger-Teton National Forest. Thus, the Lander Office as well as the offices of the Bridger-Teton National Forest have records of the extent and magnitude of packgoat use in the southern Wind River Range via their stock permit system. Thus, the Shoshone NF has access to and can report on the extent and magnitude of packgoat use on the Shoshone NF. Other use of the Shoshone NF via the Glacier trailhead has been limited to a few goatpacking trips per summer.

#### **10. The Shoshone NF Fails to Account for the Important Differences Between Packgoats and Herd Domestic Goats and Domestic Sheep.**

Packgoats are very different from other domestic goats (and domestic sheep), both by breed and by use. These differences result in far less risk to bighorn sheep than the risk posed by domestic goats (or domestic sheep) on grazing allotments. The EIS must account for these differences. To consider packgoats the same as other domestic goats (or domestic sheep) for purposes of analyzing the risk of disease transmission to bighorn sheep on the Shoshone NF would be a critical error.

Packgoat owners go to great lengths and expense to find and train particular goats that will not stray from the security of a finite string of packgoats and their owner. Packgoats are inextricably bonded to their owners, which represent the “alpha goat” in their small herd. As a result, packgoats are not prone to straying and remain in very close proximity to the “alpha goat.” Other domestic goats (and domestic sheep), while often included in herds that number in the hundreds or thousands (compared to a string of packgoats ranging from two to ten goats), are not individually trained and, thus, there may be a greater risk of individual domestic herd goats (or domestic sheep) straying from the herd. The risk associated with domestic sheep or domestic goats transmitting disease to bighorn sheep requires “physical contact” between the domestic animal and the bighorn sheep, therefore, a packgoat that is less likely to stray and thereby come into contact with a bighorn sheep poses a much lower risk of transmission than any number of herd domestic sheep or goats which can wander and stray.

Domestic goat and sheep herds typical to grazing allotments on public land represent larger populations of animals that are more difficult to maintain, and which may not be in immediate proximity of their caretaker at all times. Packgoats, on the other hand, require their owner or “alpha goat” to be present to monitor the herd at all times, and are always in their owner’s immediate presence and control. The small size of a packgoat string and perpetual control of the owner allows packgoats to be tied in unison while on trails, and tethered or high-lined at night (among other best management practices that can be easily implemented) to reduce the risk of contact between a packgoat and a bighorn sheep. Furthermore, if ever in sight of a bighorn sheep, there is always a human present in close proximity to the packgoats, making it extremely unlikely that a bighorn sheep would approach the string. In the presence of wild animals, such as bighorn sheep, packgoats are also on heightened alert and retreat to a position near the “alpha goat,” i.e., their human caretaker. This and the other defining traits of packgoats, and the nature of their use and training, make packgoats far less of a risk of coming into contact with a bighorn sheep than herd domestic goats and/or domestic sheep.

Further, the lifestyle and care of a packgoat differs greatly from that of a typical herd domestic goat or domestic sheep. This difference in care means that packgoats are healthier and less likely to be the carrier of a disease. Packgoats are seen by their owners as a significant investment in time and resources. A packgoat is not viable for packing purposes until at least the age of three or four, and often packgoats do not reach their packing prime until the age of five or six. Thus, a goatpacker will have had to invest a number of years into a packgoat before it is ready to hit the trail. During this time, and throughout a packgoat’s life, packgoats see

personalized veterinary care in order to keep the goat healthy and prolong their useful life, a luxury that other free ranging herd domestic goats or domestic sheep do not enjoy.

Because of their overall health and stamina, a trained packgoat can bring a sale price of over \$450. This means that a packgoat owner has a large financial interest in each of his or her packgoats. This high financial interest means that the owner of packgoats is likely to see to their care and protection whether that is protection from disease at home, or from contact with other wildlife when on public lands.

Further, typical herd domestic goats and domestic sheep may be sold and intermixed with goats from other herds. In contrast, packgoats—which are treated more like household pets than livestock—are not likely to change owners. The higher frequency that typical herd domestic goats and domestic sheep may be exposed to other domestic stock, would increase the opportunity for disease to spread between individual animals. On the other hand, packgoats are infrequently transferred between owners because of the nature of their function and required bonding. This greatly reduces the risk of exposure of packgoats to various diseases as compared to herd domestic goats and domestic sheep.

In short, packgoats are very different than other herd domestic goats or domestic sheep that are grazed on or near the Shoshone NF, and the use of packgoats on the Shoshone NF is very different than the use of other herd domestic goats and domestic sheep. The RADT Report and SDEIS fail to account for these differences in the analysis of disease transmission from domestic sheep and domestic goats to bighorn sheep on the Shoshone NF. As a result, the SDEIS must be revised to consider (1) packgoats separate from other herd domestic goats and domestic sheep and (2) the unlikelihood that packgoats carry disease and (3) the unlikelihood that packgoats would ever come in close contact with bighorn sheep on the Shoshone NF. Further, the Shoshone NF must consider that nature and use of packgoats on the Forest already achieves the spatial and/or temporal separation recommended by the Forest Service to minimize potential disease transmission. Thus, there is no justification and no need for the elimination of packgoats from the Shoshone NF.

#### **11. The Shoshone NF's Closure of the Forest to Goatpacking Has Not Been "Temporary" and Has Thus Been Implemented Unlawfully.**

The Shoshone NF also provided on page 12 of the RADT Report that there has been a "temporary" area closure restricting packgoat use on the Forest since November 14, 2011. The Shoshone NF's use of a "temporary" closure to restrict packgoat use on the Shoshone NF for the last six years without preparing and environmental analysis or environmental impact statement under NEPA studying such major federal action is a violation of NEPA. "Temporary" closures are intended to be just that—TEMPORARY. Six years is not "temporary." "Temporary" closures may avoid NEPA review in the short-term based on categorical exclusions, but no such exclusions have been invoked here, nor can the closure be considered short-term after six years. As a result, the Shoshone NF should explain the legality of the so-called "temporary area

closure,” considering that the closure has not undergone NEPA review, that no categorical or other exclusion has been invoked for such closure, and that such closure is not “temporary.”

## **Bighorn Sheep Status on the Shoshone National Forest**

### **Whiskey Mountain Bighorn Sheep Herd**

#### **12. The Shoshone NF’s Proposed Management of the Whiskey Mountain Herd Appears to Contradict Recommended Management Practices and Should be Reconsidered Based on Best Available Science.**

The Shoshone NF’s discussion of the “Whiskey Mountain Bighorn Sheep Herd” on pages 18-19 of the RADT Report indicates that the Whiskey Mountain bighorn sheep herd was once a very large herd, but experienced a die-off. Since then, the herd has been growing. RADT Report at 18. The die-off and reported population growth in the Whiskey Mountain herd is consistent with the latest science indicating that herds at high density are at a much, much greater risk of die-offs than those at low density (Sells et al. 2015). Sells et al. (2015) found that “[r]isk of a pneumonia epizootic increased >5-fold when herds were at a medium density and nearly 15-fold when herds were at a high density compared to when they were at a low density.” Further, Sells et al. (2015) indicated, “[d]ensity is a component of risk that has previously received little attention because the positive association between risk of pneumonia and higher densities had not been quantified. The association between higher herd density and risk may appear to contradict the idea that herds of larger population size should be less threatened by extirpation than smaller herds [ ].” (citations omitted).

So, according to Sells et al. (2015), the most important consideration, by a long shot, in managing to avoid pneumonia epizootics is control of bighorn sheep herd density and, in particular, ensuring that bighorn sheep herd density does not get too high. The Shoshone NF and Wyoming Fish & Game in managing the Whiskey Mountain herd should consider this best available science. Consistent with the findings of Sells et al. (2015), when the Whiskey Mountain herd was at a much higher density it experienced a die-off, but at a lower density, it has not experienced a die-off for more than 25 years. Based on the experience of the Whiskey Mountain herd and the best available science provided by the Sells et al. (2015) study, it would be prudent management direction for the Shoshone NF and Wyoming Fish & Game to maintain the Whiskey Mountain herd at a lower density, so that it does not face the nearly 15-fold increase of risk of die-off at a higher density.

#### **13. The Shoshone NF Does Not Analyze or Discuss the Effects of the Whiskey Mountain Herd Living With and Transmitting Disease.**

The Shoshone NF indicates that the Whiskey Mountain bighorn sheep herd already carries *M. ovipneumoniae*, that the herd has shown signs of pneumonia and that the herd experiences chronic bacterial infection. RADT Report at 18. Despite these factors, the herd’s population is steadily growing and it appears the herd will stabilize soon. *Id.* How do these facts

and factors affected the risk analysis of disease transmission, particularly in terms of the Whiskey Mountain Herd transmitting disease to other bighorn sheep populations? These facts and factors need to be discussed in the RADT Report and SDEIS.

### **Methods**

#### **14. The Risk Assessment and Viability Analysis Outlined by the Shoshone NF in the RADT Report Is Not Applicable To Domestic Goats and is Misrepresented by the Shoshone NF.**

In the “Methods” section on page 21 of the RADT Report, the Shoshone NF indicates that the Deputy Chief of the Forest Service outlined an approach to risk assessment and viability analysis (USDA Forest Service 2011b). The risk assessment and viability analysis, however, was designed and issued for domestic sheep, NOT domestic goats, so it is unclear if and how it applies to domestic goats. The Shoshone NF should explain application of the risk assessment and viability analysis to domestic goats and justify use of the assessment and analysis in the RADT Report.

Rather than following the risk assessment and viability analysis proposed by the Deputy Chief in 2011, the Shoshone NF modifies the analysis and misrepresents steps of the analysis in the RADT Report. *See* RADT Report at 21. For example, Step 2 reads: “[a]ssess spatial and temporal overlap of bighorn sheep core herd home ranges with *domestic sheep* allotments, use areas, and driveways. . . (USDA Forest Service 2011b). (emphasis added). The step only applies to domestic sheep. *Id.* Yet, the Shoshone NF indicates in the RADT Report that Step 2 states: “[a]ssess spatial and temporal overlap of bighorn sheep core herd home ranges with *domestic livestock* allotments, use areas, and driveways.” RADT Report at 21 (emphasis added). That is NOT the Step 2 provided by the Deputy Chief.

Likewise, Step 4 reads: “[i]dentify management practices with the goal of separation between *domestic and bighorn sheep* where necessary to provide for Forest-wide bighorn sheep viability” (USDA Forest Service 2011b). (emphasis added). Again, comparison of this statement to what is provided by the Shoshone NF shows that the Shoshone NF has changed Step 4 provided by the Deputy Chief. *See* RADT Report at 21 (“Identify management practices with the goal of separation between *domestic livestock* and bighorn sheep where necessary to provide for Forestwide bighorn sheep viability.” (emphasis added).). Contrary to what is provided by the Deputy Chief, the Shoshone NF attempts to make the step applicable to domestic “livestock,” including domestic goats, even though the step was designed and issued ONLY to apply to domestic “sheep.” The Shoshone NF should disclose to the public that it has manipulated and misrepresented the risk and viability analysis proposed by the Deputy Chief, and indicate that the analysis only applies to domestic sheep, not domestic goats. To the extent that the analysis is applied to domestic goats, justification for doing so should be provided.

**15. The Shoshone NF Has the Necessary Data and the Issue of Disease Transmission is Sufficiently Complex on the Forest to Warrant a Quantitative Bighorn Sheep Viability Analysis.**

Based on the analysis recommended by the Deputy Chief, which does not apply to domestic goats, the Shoshone NF concludes that the issue of disease transmission on the Shoshone NF “is not as complex” as on other Forests “because of the limited amount of domestic sheep and goat use in occupied bighorn sheep habitat on the SNF.” RADT Report at 21. Although the Deputy Chief’s recommendations are not readily applicable on the Shoshone NF because they do not concern domestic goats, the recommendations provide: “Forests that have necessary data, issue complexity, and the ability to conduct a quantitative bighorn sheep viability analysis may do so. However, a qualitative approach to NEPA analysis for bighorn sheep viability is sufficient as long as clear and reasonable rationale for the decision is displayed” (USDA Forest Service 2011b).

The Shoshone NF appears to have the “necessary data” and the “ability” to conduct a quantitative bighorn sheep viability analysis, so these are not limiting factors. The Wyoming Fish & Game, for example, has an abundance of telemetry and observation data on the Whiskey Mountain Herd and other bighorn sheep herds on the Shoshone NF. The only reason for not conducting such analysis given by the Shoshone NF is that the issue on the Shoshone NF is “not as complex” as on other Forests “because of the limited amount of domestic sheep and goat use in occupied bighorn sheep habitat on the SNF.” RADT Report at 21. This is hardly a “clear and reasonable rationale for the decision is displayed.” It is not even clear how the Shoshone NF can apply the analysis to domestic goats when it was not designed for such application? Application of the analysis beyond its intended use and to packgoats on the Shoshone NF, which are mobile and not restricted to allotments, and which do not often carry *M. ovi*, and which have NEVER been associated with disease transmission to bighorn sheep, would seem to heighten the complexity of the issue on the Shoshone NF, not decrease it.

While domestic sheep may have been shown to pose a risk of disease transmission to bighorn sheep, the same is not true for domestic goats, and certainly not true for packgoats. As a result, the assumptions underlying the analysis recommended by the Deputy Chief are inapplicable, or at least in question, on the Shoshone NF. Application of the analysis to a different species that is not constricted to allotments, that is not a likely carrier of *M. ovi*, that is only found moving on the Shoshone NF for a very limited amount of time, that is kept in the presence of a human, that can be tethered and high-lined to restrict movement, that has never been shown to transmit disease to or come into contact with a bighorn sheep, etc., obviously increases the complexity of the issue on the Shoshone NF. The issue is sufficiently complex to require the Shoshone NF to apply a quantitative analysis taking into account the factors listed above. If such analysis is not applied, the Shoshone NF should explain in detail the reasons such analysis will not be applied.

**16. The Shoshone NF Does Not Indicate Whether the Preparers of the Risk Assessment Were Knowledgeable and Experienced with Issues Concerning Disease Transmission.**

The Shoshone NF states that the “Risk Assessment process involved participation by Forest Service wildlife biologists and rangeland management specialists, and WGFD biologists.” RADT Report at 21. It is not clear that any of these persons are veterinarians, infectious animal disease experts, or pathologists with the requisite knowledge and experience on disease transmission. Comments # and # are applicable here. The Shoshone NF should disclose and discuss the knowledge and experience of the persons who prepared the risk assessment, especially in terms of their experience with disease transmission.

**17. The Shoshone NF’s Sequence of Events by Which Contact and Disease Transmission Between Bighorn Sheep and Packgoats Might Occur Is Incomplete and Uninformed.**

Although Step 3 of the Deputy Chief’s recommended analysis is not applicable to domestic goats, the Shoshone NF attempts to apply the step to domestic goat use on the Shoshone NF on page 22 of the RADT Report. The Shoshone NF provides a sequence of events that must take place for disease transmission to occur between domestic goats and bighorn sheep on the Shoshone NF. *See* RADT Report at 22. The sequence of events that is provided excludes several important events required for disease transmission to occur that should be included by the Shoshone NF. First, after coming into physical contact with a goat in a packgoat use area, in order for disease transmission to occur, the goat must actually be carrying and shedding disease. The best available science indicates that it is highly unlikely that a particular packgoat would be carrying and shedding disease. *See infra* Comment #. Second, the bighorn sheep that comes into contact with the goat must be susceptible to the disease. The best available science shows that bighorn sheep that come into contact with domestic goats are unlikely to contract disease leading to pneumonia and death. Moreover, some bighorn have developed immunity to disease and are therefore not at risk, or at less risk of contracting disease. Further, particularly with respect to the Whiskey Mountain bighorn sheep herd, the bighorn already carry *M. ovi* and are surviving despite infection. These steps need to be considered by the Shoshone NF in the sequence of events that must take place for disease transmission to occur between domestic goats and bighorn sheep on the Shoshone NF.

**18. The Risk of Contact Tool Used by the Shoshone NF Has No Applicability to Packgoat Use on the Forest and the Assumptions Inherent in the Tool Likewise Do Not Apply to Packgoats.**

Also, with regard to Step 3 of the Shoshone NF’s modified analysis, the Shoshone NF makes the grand assumption that “by definition, an allotment or pack goat use area that overlaps with a bighorn core home range is assumed to experience at least one bighorn contact per year.” RADT Report at 22. This assumption is based on the statement that “the Forest Service/Bureau

of Land Management Risk of Contact Tool presumes 100% probability of contact when there is direct overlap between a bighorn core home range and an allotment or pack goat use area (USDA Forest Service 2013).” *Id.* It is unclear where the Shoshone NF came up with this statement. Regardless, the statement is a gross misrepresentation of the assumptions used in the Forest Service/Bureau of Land Management Risk of Contact Tool. The Risk of Contact Tool does NOT “presume[ ] 100% probability of contact when there is direct overlap between a bighorn core home range and [a] . . . pack goat use area” (USDA Forest Service 2013). *See also* [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd527641.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd527641.pdf); [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd513118.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd513118.pdf).

The Risk of Contact Tool is designed solely for domestic sheep and says NOTHING about domestic goats (USDA Forest Service 2013). Indeed, the design and impetus of the Risk of Contact Tool are based on the following: “Extensive scientific literature supports the relationship between disease in bighorn sheep populations and contact with *domestic sheep*. Field observations have associated bighorn sheep respiratory disease events subsequent to being observed near *domestic sheep*, which has led to numerous independent research efforts. Research results provide strong evidence that bighorn sheep have a high probability of contracting fatal pneumonia following contact with *domestic sheep*” (USDA Forest Service 2013). (emphasis added). The Risk of Contact Tool provides absolutely NO information on domestic goats and is entirely designed and focused on domestic sheep. In discussing the Risk of Contact Tool, the Forest Service specifically states “the ROC [(Risk of Contract Tool)] is Not” a tool that “calculate[s] potential risk from . . . goats.” [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd513118.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd513118.pdf) (emphasis in original).

The assumptions and science, etc., used to develop the Risk of Contact Tool are not applicable to domestic goats. Moreover, the Risk of Contact Tool dealt with domestic sheep “allotments,” not with Forest Service trails sporadically used for a limited point in time by a limited number of packgoats. It is ludicrous to assume that a bighorn sheep would ever contact a packgoat, let alone assume that such contact would happen “at least” once per year. There is no data or science supporting such an assumption. In reality, NEVER has a bighorn sheep come into contact with a packgoat in the wild. *See, e.g.*, RADT Report at 32 (“Currently, there are no documented cases of disease transmittal from domestic sheep or goats to bighorns on the SNF.”). As a result, the Shoshone NF’s assumption concerning contact is outrageous, completely unsupported by science and reality, and must be changed.

#### **19. The Shoshone NF’s Assumptions Concerning Contact Between Bighorn Sheep and Packgoats on the Forest are Unsupported and Unrealistic.**

Based on its outrageous assumption of contact between bighorn sheep and packgoats on the Forest, the Shoshone NF states, “[a]lthough we assume a contact rate of 1.0 for . . . pack goat use areas that overlap a bighorn core herd home range, annual contact rates could be higher with multiple contacts occurring per year. When there is direct overlap between [a] . . . packgoat use area and a bighorn core herd home range, there is a high risk for contact and therefore no need to



model the potential for contact by foray.” RADT Report at 23. Although there has NEVER been a contact between a packgoat and a bighorn sheep in the wild, the Shoshone NF assumes that such contact will occur at least once per year, if not more. Such assumption has no basis in reality. If such assumption were realistic, contact would have occurred in the past when packgoats were permitted on the Shoshone NF. That did not happen.

Further, the Shoshone NF does not provide any indication on how, exactly, contact would occur between a packgoat and bighorn sheep on the Shoshone NF. Packgoats are only used on the Shoshone NF for very limited periods during the summer and in very limited numbers. The packgoats remain on designated trails, or in camp, and are always accompanied by their human owner. What are the chances that a particular packgoat on the Shoshone NF will come into contact with a particular bighorn sheep on the Shoshone NF, while the packgoat is moving on a trail tethered with other packgoats or high-lined in camp in the presence of its human owner for a week out of the summer? It is almost an impossible situation. This is the situation, however, that the Shoshone NF should be analyzing, because it presents a realistic situation.

**20. The Risk of Contact Tool Can and Should be Used to Model Contact Between Bighorn Sheep and Cattle on the Shoshone NF.**

While the Risk of Contract Tool has no useful application to packgoat use on the Shoshone NF and provides no science concerning risk of contact or disease transmission between bighorn sheep and domestic goats, the Risk of Contact Tool CAN be used to model contact between bighorn sheep and cattle. See [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd527641.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd527641.pdf). Considering the significant risk of disease transmission between bighorn sheep and cattle, as detailed in the best available science referenced by the Shoshone NF, **see Comment #**, the Shoshone NF should use the Risk of Contact Tool to model contact between bighorn sheep and cattle. Consistent with the Shoshone NF’s methodology and rationale for risk rankings, as presented in the RADT Report, the Shoshone NF would then need to close all cattle allotments on the Shoshone NF within 35 kilometers (21 miles) of bighorn sheep core herd home range on the Shoshone NF. Based on the best available science and in order to avoid arbitrary and capricious decision-making under the APA and NEPA, the Shoshone NF should apply the Risk of Contact Tool to cattle allotments on the Shoshone NF and subsequently close those cattle allotments that show at “high” risk of contact.

**21. The Shoshone NF Should Use Actual Data on Forays by Bighorn Sheep on the Forest.**

With regard to forays, the Shoshone NF states, “[b]ecause information on foray distances and probabilities are also lacking for bighorn sheep herds on the SNF, the analysis in this Risk Assessment uses the default value for maximum foray distances from the Risk of Contact Tool,” which estimates that bighorn sheep foray out to 35 kilometers (21 miles) away from their home range. RADT Report at 23 (citing USDA Forest Service 2013). First, the Shoshone NF has extensive data on the bighorn sheep herds on the Shoshone NF, so it is unclear why such data is

not used for the RADT Report? *See, e.g.*, RADT Report at 18-19 (discussing extensive data on the Whiskey Mountain bighorn sheep herd and indicating that the herd's movements are quite limited). Rather than using a "default value" for foray distances, which has not been demonstrated to be applicable on the Shoshone NF, the Shoshone NF should use actual data on foray distances collected from bighorn sheep on the Shoshone NF. Second, the Shoshone NF provides no basis for using the maximum foray distance of 35 kilometers from the Risk of Contact Tool. How is that foray distance relevant to the bighorn sheep on the Shoshone NF? The Shoshone NF should use actual data on foray distances from bighorn sheep on the Shoshone NF or otherwise explain how and why "default" foray distances are relevant to the situation on the Shoshone NF.

### **Rationale for Risk Rankings**

#### **22. The Shoshone NF's Assumptions Concerning Contact and Risk of Disease Transmission Contradict the Best Available Science.**

Under the Shoshone NF's "Rationale for Risk Rankings" at pages 23-24 of the RADT Report, the Shoshone NF explains that it does not examine the risk of disease transmission with a subsequent bighorn mortality event, but assumes that if a bighorn sheep comes into contact with a packgoat use area that there is a higher risk of disease transmission. The Shoshone NF states: "[t]he likelihood of disease transmission following physical contact, and the potential for a subsequent bighorn mortality event, is not known with certainty and remains the subject of debate, and therefore will not be used as the basis for determining relative level of risk." RADT Report at 23. Similarly, in the "Results" section of the RADT Report, the Shoshone NF states, "[n]o presumption is made that physical contact would lead to disease transmission or a subsequent bighorn sheep mortality event. However, the assumption is made that physical contact between bighorn sheep and . . . goats results in an increased risk of disease transmission to bighorn sheep, with increased potential for a subsequent bighorn mortality event." *Id.* at 24.

These statements by the Shoshone NF are confusing and should be clarified. While the Shoshone NF states that "[t]he likelihood of disease transmission following physical contact, and the potential for a subsequent bighorn mortality event, is not known with certainty and remains the subject of debate, and therefore will not be used as the basis for determining relative level of risk," it still assumes that "physical contact between bighorn sheep and . . . goats results in an increased risk of disease transmission to bighorn sheep, with increased potential for a subsequent bighorn mortality event." *See* RADT Report at 23-24. Thus, it appears that the Shoshone NF IS using "[t]he likelihood of disease transmission following physical contact, and the potential for a subsequent bighorn mortality event," as "the basis for determining relative level of risk," which it said it would NOT be doing. The Shoshone NF's statements are incongruous and should be corrected.

Further, it is unclear why the Shoshone NF references science concerning disease transmission between domestic goats and bighorn sheep in the RADT Report and then declines

to use such science in its risk assessment. Of what value is the referenced science if it is not used in the risk assessment? The Shoshone NF should use the best available science in the risk assessment. That science indicates that the likelihood of disease transmission following physical contact between a bighorn sheep and packgoat, if that ever occurred, would be extremely low because packgoats are rarely carriers of *M. ovi*. See *infra*, **Comment #**. Likewise, not all domestic goats are carriers of *M. ovi*. With regard to the “potential for a subsequent bighorn mortality event,” the best available science indicates that contact between bighorn sheep and domestic goats does NOT lead to disease resulting in pneumonia in bighorn sheep, followed by a subsequent mortality event. See *infra*, **Comment #**. This is the best available science and must be used by the Shoshone NF in the risk assessment.

Practically, if physical contact were ever to occur between bighorn sheep and a packgoat that was not a carrier of *M. ovi*, there would be not be an increased risk of disease transmission to bighorn sheep, and no potential for a subsequent bighorn mortality event, because there would be no disease to transmit. Rather than making assumptions that have no basis in science or reality, the Shoshone NF is required to use the best available science in its risk assessment, which indicates that the risk of disease transmission between bighorn sheep and packgoats is slim to none, and that there is no risk of a subsequent bighorn mortality event.

## **Results**

### **Assessment of Risk from Domestic Sheep and Goats by Herd Unit**

#### **23. The Shoshone NF’s Assumptions that Contact Between Bighorn Sheep and Packgoats Would Occur on the Forest Have No Basis in Science or Reality.**

In the Shoshone NF’s “Assessment of Risk from Domestic Sheep and Goats by Herd Unit” on pages 24-27 of the RADT Report, the Shoshone NF assumes that “without a prohibition on pack goat use there would be spatial and temporal overlap between pack goats and bighorn sheep” and that “[c]ontact between bighorn sheep and pack goats would be expected, thus increasing the risk of disease transmission.” RADT Report at 26. It is unclear how contact between the species would be “expected,” considering the details presented in **Comment #** and considering the reality that such contact has NEVER occurred before. See RADT Report at 32 (“Currently, there are no documented cases of disease transmittal from domestic sheep or goats to bighorns on the SNF.”). These statements by the Shoshone NF have no basis in science or reality and should be revised accordingly.

## **Step 4**

### **Spatial and/or Temporal Separation**

#### **24. The Shoshone NF Fails to Consider Other Available Management Tools for Minimizing Pneumonia Outbreaks.**

On pages 28-29 of the RADT Report, the Shoshone NF discusses “Spatial and/or Temporal Separation” and indicates, “current recommendations for minimizing pneumonia outbreaks in bighorn sheep are to maintain spatial or temporal separation between bighorn sheep and domestic sheep and goats.” The Shoshone NF overlooks or fails to adequately consider the other current recommendations for minimizing pneumonia outbreaks in bighorn sheep. For example, and as discussed above, current management recommendations involve clearing *M. ovi* from nearby herds of domestic ruminants as well as application of vaccines to both bighorn sheep and domestic ruminants.

### **Proposed Mitigation Measures for Pack Goats**

#### **25. The Shoshone NF Fails to Adequately Consider Mitigation Measures for Packgoats and Improperly Dismisses the Feasibility of Such Measures.**

The Shoshone NF’s consideration of “Proposed Mitigation Measures for Pack Goats” at pages 29-31 of the RADT Report is much less a “consideration” than it is a “dismissal” of such measures. It appears that the Shoshone NF worked hard to come up with ways the proposed mitigation measures might not work, rather than actually considering how they could and would work on the Shoshone NF to maintain separation between bighorn sheep and packgoats. To start, the Shoshone NF indicates that certain mitigation measures proposed by NAPgA “were considered to be infeasible and were not considered further.” RADT Report at 29. The Shoshone NF should indicate which measures these were and provide justification as to why such measures were “considered to be infeasible.”

With regard to mitigation measure #2, as stated on page 29 of the RADT Report, the Shoshone NF dismisses the measure by indicating: “pack goat users may be disinclined to report contact between their goats and bighorn sheep, or even lost goats, for fear of incurring additional restrictions on their use.” RADT Report at 30. What is the basis for this statement? Absolutely NO support is provided for this statement in the RADT Report. Although there is NO science indicating that contact between a bighorn sheep and a packgoat would happen on the Shoshone NF, and lead to disease transmission, if such an event did occur and bighorn sheep were to experience a disease-related mortality event, restrictions on packgoat use would likely result. Meanwhile, if packgoat users reported contact between their goats and bighorn sheep, or even lost goats, proper management action could be taken by the Shoshone NF to avoid the remote possibility of a disease-related mortality event. Such action would avoid drastic restrictions on use that would be implemented in the event of a disease-related mortality event. Thus, it is more probable that packgoat users would be inclined to report contact.

Further, detection of a lost goat would be quite easy under a permit system, as the packgoat user would leave with fewer packgoats than it started with. The Shoshone NF could require a check-in and check-out procedure as part of the permit system. If lost goats were truly a concern, goats could be fitted with GPS collars, so they could be easily found.

Finally, packgoat users are just as concerned about disease transmission from bighorn sheep to their packgoats as they are the opposite. The bighorn sheep on the Shoshone NF, particularly in the Whiskey Mountain bighorn sheep herd, are known to carry *M. ovi* and are diseased. Packgoats, as well as other domestic goats, are susceptible to diseases from bighorn sheep. No packgoat owner would want to subject their pet to the suite of diseases carried by bighorn sheep on the Shoshone NF. As a result, packgoat owners would be more inclined to take immediate action to report and address contact, as well as lost goats, in order to protect their packgoats.

In its discussion of mitigation measures, the Shoshone NF also states, “[b]ighorn sheep and domestic sheep and goats are attracted to each other, particularly during rut, which increases the probability that they will make the close contact necessary for disease transmission (Onderka et al. 1998, Foreyt 1989, Ward et al. 1997, Dubay et al. 2002, Borg et al. 2016).” RADT Report at 30. With respect to goats, this statement is completely unsupported. NONE of the listed references indicate that bighorn sheep and domestic goats are attracted to each other, during rut or at any other time. All of the references concern domestic sheep, NOT domestic goats. Further, rut occurs in November and December, which are months in which packgoats would not be used on the Shoshone NF, so there would not be an increased “probability that they will make the close contact necessary for disease transmission.” In addition, most of the packgoats used by packgoat users are male, which should be considered by the Shoshone NF when the Forest is making statements concerning the “attraction” between bighorn rams and packgoats during rut, or at any other time. No information has been provided by the Shoshone NF indicating the male bighorn sheep on the Shoshone NF are “attracted” to male packgoats that may be used on the Shoshone NF. Based on the following, the statement above made by the Shoshone NF should be corrected to remove “goats” from the statement, or otherwise, the statement should be removed entirely from the RADT Report.

In addition, the Shoshone also indicates that “attraction” between bighorn sheep and packgoats, and potential contact between the species, “could occur even under a scenario where pack goats were under close control as required by mitigations 4 and 5.” RADT Report at 30. The Shoshone NF should explain how this “could occur,” particularly when packgoats have a human owner with them at all times under mitigation measures #4 and #5. Is the Shoshone NF familiar with documented instances in which a bighorn sheep has approached humans in the wild on the Shoshone NF? The scenario would seem highly unlikely. Rather than stretch for ways to dismiss potential mitigation measures to avoid the potential of contact between bighorn sheep and packgoats on the Shoshone NF, the Shoshone NF should actually consider the mitigation measures and properly assess them under realistic scenarios.

NAPgA has gone as far as to agree to veterinary health inspections and disease testing of all packgoats before entering Shoshone NF lands in order to demonstrate that packgoats on the Shoshone NF are disease-free and pose no risk of disease transmission to bighorn sheep on the Shoshone NF. See RADT Report at 29. A certificate or other record could be used to

demonstrate such disease-free status. *Id.* A packgoat that has been demonstrated to not be a carrier of *M. ovi* nor other disease would pose no risk to bighorn sheep on the Forest.

Although this mitigation measure #7 presents a secure method to avoid the risk of disease transmission to bighorn sheep on the Shoshone NF, the Shoshone NF dismisses the measure by stating that sampling protocols used by veterinarians might not be “standardized” and “would be unfamiliar to most veterinarians used by pack goat enthusiasts.” RADT Report at 31. This dismissal is based on a reference to “H. Edwards, WGFD, personal communication 04/20/17.” *Id.* Although it is unclear who “Hank Edwards” is as he is not listed as staff at the Wyoming Game & Fish Department Wildlife Health Laboratory, *see* <https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Wildlife-Disease/Wildlife-Disease-Laboratory>, he appears to be a “Laboratory Supervisor.” Still, Mr. Hank Edwards’ qualifications for opining on issues of veterinary health inspections and disease testing in livestock are unknown and should be presented by the Shoshone NF. Further, it is also unclear how Mr. Edwards knows “most veterinarians used by pack goat enthusiasts?” The Shoshone NF should explain how Mr. Edwards is familiar with the veterinarians used by “packgoat enthusiasts” and provide several examples of veterinarians used by “packgoat enthusiasts” who are unfamiliar with sampling protocols used for packgoats. Mr. Edwards’ statement, as presented by the Shoshone NF, appears unsupported.

In reality, there are a number of animal disease diagnostic laboratories as well as knowledgeable veterinarians across the country that have designed and implement standardized sampling protocols for *M. ovi* and other pathogens. For example, the Washington Animal Disease Diagnostic Lab (“WADDL”) performs such testing on a routine and standardized basis. *See* <https://waddl.vetmed.wsu.edu>. Indeed, without even considering the number of qualified veterinarians, there are similar labs available to perform such testing across the country, including in Logan, Utah; Laramie, Wyoming; Bozeman, Montana; Fort Collins, Colorado; Davis, California; and Pullman, Washington, among other locations. Considering that there are “standardized protocols” for testing for *M. ovi* and other pathogens and that such testing takes place routinely at labs like WADDL, it is unclear why testing of packgoats could not be performed, as the Shoshone NF seems to conclude. The Shoshone NF should consider and allow mitigation measure #7, based on the above, or otherwise present and explain the information and best available science it is using to conclude that veterinary health inspections and disease testing of packgoats is not possible.

The Shoshone NF also states that “[t]here is also the possibility that ‘certified’ animals could come into contact with other livestock after being tested and inspected, and potentially contract pathogens that could be transmitted to bighorn sheep.” RADT Report at 31. While there are many “possibilities,” some are not likely to occur. Packgoats are specialized pack animals that are rarely, if ever, kept in large herds with other livestock. Rather packgoats are pets that are cared for and protected from disease. Herding packgoats with other livestock is not commonplace because domestic goats are susceptible to similar pathogens that bighorn sheep are susceptible to. Packgoat owners are concerned about contact with other livestock and actively

prevent such contact for the same reasons that wildlife managers work to prevent bighorn sheep contact with other species. Packgoat owners do not want to contaminate their goats with foreign pathogens.

To help prevent the unlikely possibility that a packgoat will have come into contact with other domestic livestock post certification and pre-entry onto the Shoshone NF, the Shoshone NF could include a question such as “has your packgoat come into contact with other livestock after certification” on the permit application to be obtained to enter the Shoshone NF. The Shoshone NF could also look at the animals prior to their entry onto the Forest. Other domestic livestock that carry offensive pathogens affect packgoats, just like they affect bighorn sheep—they are bad for both species and there are telltale signs and symptoms following such contact and transmission of offensive pathogens.

Finally, if the Shoshone NF is going to try to dismiss mitigation measure #7 based on a remote “possibility” of contact with other livestock post inspection, it should provide some detail on exactly what that “possibility” is? What are the chances of such contact? What are the chances that such contact will lead to transfer of offensive pathogens? What are the chances that such transfer would go unnoticed by the packgoat owner or Shoshone NF prior to permitting and entry onto the Forest? What are the chances that the affected packgoat would then come into contact with a bighorn on the Forest, that such packgoat would shed the offensive pathogens, and that the bighorn sheep would be susceptible to such pathogens? What are the chances that such pathogens would then trigger pneumonia in the bighorn sheep and an eventual mortality event? The Shoshone NF should explain the likelihood of this particular chain of events, as this is the chain of events that would need to happen to put bighorn sheep at risk on the Shoshone NF and appears to be the chain of events upon which the Shoshone NF is basing its dismissal of mitigation measure #7.

The Shoshone NF’s final statements concerning NAPgA’s proposed mitigation measures are absolutely ridiculous. They read:

To be effective, these measures would depend on the diligence of the pack goat user. Pack goat users have stated that ‘the restrictive nature of these best management practices will act as a deterrent for those users not willing to submit to the extensive preparation and implementation of these practices’ (Jennings 2011). If mitigation measures are perceived by pack goat users as restrictive and difficult to implement as implied by this statement, noncompliance with them could be substantial. Compliance checks by the Forest Service would be infrequent due to the very remote and rugged environments that goat packing takes place in.

RADT Report at 31.

First off, many of the proposed mitigation measures would be required PRIOR to entry onto the Shoshone NF, as a prerequisite for a permit, so implementation would be guaranteed and the Shoshone NF could easily check for compliance as it issues a permit. Second, the statement by Jennings (2011) does not say that mitigation measures would be “difficult” to implement, rather they would require preparation and planning, which more dedicated and diligent goatpackers would be willing to undertake.

The Shoshone NF’s conclusion that additional restrictions would lead to greater noncompliance is illogical. First, as just stated, most of the compliance would be required and checked at the time of permitting, so noncompliance would not be possible. Without compliance, no permit would be issued allowing the goatpacker to use the Shoshone NF. Second, the alternative to implementation and compliance with mitigation measures, as proposed by the Shoshone NF, is complete closure of most of the Shoshone NF to goatpacking. Rather than completely losing the ability to goatpack on the Forest, goatpackers are highly inclined to implement and comply with mitigation measures. Based on the Shoshone NF’s logic, all permit systems everywhere on our public lands, be they for camping, backpacking, climbing, stock use, rafting, filming, etc., would completely fail because additional restrictions would result in noncompliance with those restrictions. Such logic is flawed. The opposite is actually true—the increased restrictions lead to greater compliance and protection of the resource.

Take for example the permitting system implemented by the Forest Service required to go whitewater rafting on the Selway River in Idaho. In order to obtain a permit, one must complete an application for a permit; be awarded such permit; detail the plans of the proposed trip with the Forest Service and pay a permit fee; plan and pay for a shuttle; purchase and carry special gear such as a groover, fire pan, safety equipment, etc.; then the permit-holder must check in at the Forest Service office on the way to the Selway River to obtain the permit and listen to instructions on proper river travel, safety issues and other Forest Service concerns; and then the permit-holder must use the required equipment and adhere to Forest Service instructions on the river; then, the permit-holder is required to turn his or her permit back into the Forest Service to close out the trip. In order to take such a trip there is a considerable amount of planning and expenses. Despite all of this, there is a very high level of compliance, if not a complete level of compliance with all imposed restrictions. Why? Because people who are not willing to put in the money, preparation and time to plan and accomplish a trip down the Selway River do not apply for and obtain permits. The people who do so are generally experienced and respectful of restrictions and ensure that their impact on the resource is minimized. This holds true for most permitting systems, and more so for those permitting systems with additional requirements.

Still, the Shoshone NF could set up a system of fines for noncompliance or cause a goatpacker to lose his or her privilege to use the Forest based on noncompliance. The Shoshone NF seems to be calling into question our entire rule of law system in the United States. Over the last 200+ years, we have developed systems to encourage people to comply with the law. The whole reason for such systems is to achieve greater compliance, not less compliance. The



systems have proven effective in almost all other contexts. It is unclear why in this particular case involving packgoat use of the Shoshone NF that such a system would fail?

If the Shoshone NF decides to conclude that permitting systems lead to heightened resource damage more so than non-permit systems, it should provide information and examples supporting such conclusion. After all, the entire purpose of permitting systems on our public lands is to avoid and minimize resource damage and to encourage proper use of a particular resource. If these systems are not useful, the Shoshone NF should state as much and lead the charge in eliminating all permitting systems across the country. Contrary to the Shoshone NF's conclusion, however, the reality is that permitting systems are more effective at avoiding and minimizing damages to resources than not having permitting systems in place, and, those permitting systems with additional or heightened restrictions actually result in greater compliance and further avoidance and minimization of damages to resources than not having the permitting systems in place.

Finally, as stated above, the Shoshone NF provides that “[c]ompliance checks by the Forest Service would be infrequent due to the very remote and rugged environments that goat packing takes place in.” RADT Report at 31. This statement seems to ignore that much of the compliance with the proposed mitigation measures would be a prerequisite to obtain a permit and would take place at a Forest Service office, not in the “remote and rugged environments that goat packing takes place in.” Compliance could be easily checked and achieved at a local Shoshone NF office. The Shoshone NF should consider such fact in the RADT Report.

Further, it is unclear why the Forest Service, as well as the Wyoming Fish & Game, could not undertake compliance checks. Does the Shoshone NF and Wyoming Fish & Game not have any rangers or other officials and employees that access the Shoshone NF outside of an office? How does the Shoshone NF ensure that any Forest user is in compliance with applicable restrictions and regulations? How are fishing and hunting permits controlled on the Forest? The Shoshone NF should provide information on which personnel patrol the Forest and how frequent such patrols are. They should also provide similar information on Wyoming Fish & Game employees on the Forest. It is unclear why these persons could not monitor goatpacker compliance with applicable mitigation measures. Further, under a permit system, the Shoshone NF would be well aware of the locations and dates of the infrequent packgoat usage that would occur on the Forest, so it would not be that difficult to pinpoint compliance checks.

### **Summary**

#### **26. The Shoshone NF's Statements in the “Summary” to the RADT Report are Unsupported as They Apply to Domestic Goats.**

In its “Summary” on page 31 of the RADT Report, the Shoshone NF provides, “[a] long history of large-scale, all-age die-offs in bighorn sheep exists across North America, many associated with domestic sheep and goat contact.” This statement is not supported by the science

referenced in the RADT Report. In particular, the Shoshone NF fails to specify which, if any, “large-scale, all-age die-offs in bighorn sheep” have been associated with “goat contact.” The Shoshone NF should provide such information or otherwise remove the word “goat” from the above statement.

Moreover, the Shoshone NF indicates, “extensive scientific literature supports the relationship between disease in bighorn sheep populations and contact with domestic sheep and goats.” RADT Report at 31. Exactly, what “extensive scientific literature supports the relationship between disease in bighorn sheep populations and contact with . . . goats?” The Shoshone NF does not present such literature in the RADT Report, so the basis for the above statement is unclear. The Shoshone NF should indicate what “extensive scientific literature” they are referring to with regard to disease transmission between bighorn sheep and goats or otherwise remove the word “goats” from the above statement.

The Shoshone NF additionally states, “[a]lthough the scientific literature on the risk of disease transmission between domestic sheep and goats (including pack goats) and bighorn sheep is not complete, some conclusions are available. Domestic sheep and goats carry disease organisms with serious consequences for bighorn sheep (Herdon et al. 2011, Miller et al. 2011, Wehausen et al. 2011, Besser et al. 2014, Drew et al. 2014, O’Brien et al. 2014, Shannon et al. 2014, Fox et al. 2015, Sells et al. 2015).” RADT Report at 31. Which of these references, precisely, determine that “goats carry disease organisms with serious consequences for bighorn sheep? The Shoshone NF should list the references that apply to goats and explain the findings of each such reference in terms of transmission of disease from domestic goats to bighorn sheep leading to “serious consequences” for bighorn sheep. Based on the information and references provided the basis for the Shoshone NF’s conclusion is unclear.

Finally, in the “Summary” section of the RADT Report, the Shoshone NF provides, “[t]he central role of domestic sheep and goats in bighorn sheep exposure to pathogens in well documented; pathogen transmission from domestics to bighorn sheep is the only hypothesis supported in experimental trials. Even minimal direct contact is believed to contribute to the death of individual wild sheep, herds of wild sheep, and entire populations.” RADT Report at 31. What is the basis for these statements? In particular, what information and science does the Shoshone NF have and present to conclude that “[e]ven minimal direct contact” with goats “is believed to contribute to the death of individual wild sheep, herds of wild sheep, and entire populations?” There does not appear to be any support for such statement in the RADT Report, as it pertains to goats. In fact, the science referenced by the Shoshone NF indicates that even EXTENSIVE DIRECT CONTACT with goats does NOT contribute to the “death of individual wild sheep, herds of wild sheep, and entire populations.” *See infra*, Comment #. As a result, the Shoshone NF should explain the support for their statements above or otherwise revise the statements so that goats are not implicated as a contributor to bighorn sheep mortalities in the wild.

## **Likelihood of Contact Between Domestic Livestock Areas and SNF Bighorn Sheep Herds**

### **27. The Shoshone NF's Statements About the Likelihood of Contact are Incorrect and Should be Revised.**

In the section titled “Likelihood of Contact between Domestic Livestock Use Areas and SNF Bighorn Sheep Herds,” at page 32 of the RADT Report, the Shoshone NF reports, “without a pack goat closure order, the likelihood of direct contact and risk of disease transmission as a result of pack goat activities is **High** for all bighorn sheep herds on the SNF, although mitigation measures could be applied to reduce this risk to **Moderate** levels.” In light of previous comments, this statement is incorrect and should be revised to reflect the actual likelihood of contact and risk of disease transmission based on the best available science.

## **Cumulative Effects**

### **28. The Shoshone NF Does Not Discuss Mitigation Measures to Reduce Cumulative Effects.**

In the section on “Cumulative Effects,” the Shoshone NF indicates that there is a risk of contact between domestic animals, especially domestic sheep, and bighorn sheep on lands adjacent to the Shoshone NF and that such contact increases the risk of disease transmission to bighorn sheep herds on the Shoshone NF. RADT Report at 32; *see also id.* at 34 (discussing similar cumulative effects). The Shoshone NF, however, fails to provide any discussion as to how it plans to avoid or minimize this risk of disease transmission. If such risk exists, the Shoshone NF should address it in order to better protect bighorn sheep herds on the Shoshone NF. For example, the Shoshone NF should encourage and/or require vaccination of domestic animals near the Forest to eliminate the presence of offensive pathogens in such animals. The Shoshone NF could educate nearby landowners on bighorn sheep disease transmission issues, so they are aware of the issues and knowledgeable about how to reduce the risk of disease transmission. The Shoshone NF could also partner with the Wyoming Game & Fish to implement other programs and restrictions to ensure that bighorn sheep do not come into contact with domestic animals off the Forest and that such contact, if it does occur, does not lead to disease transmission and a subsequent mortality event. Discussion of such measures should be included in the RADT Report.

## **Opposing Views, Incomplete Information, Scientific Uncertainty**

### **29. The Shoshone NF Misrepresents the Best Available Science on Disease Transmission Between Domestic Goats and Packgoats and Bighorn Sheep.**

In the section titled “Opposing Views, Incomplete Information, Scientific Uncertainty,” in the RADT Report at pages 33-34, the Shoshone NF attempts to convince the reader that there is a “large body of evidence” concerning disease transmission between bighorn sheep and domestic

goats. RADT Report at 33. The Shoshone NF makes statements like “the majority of the literature supports the potential for disease transmission between the species [and] documents bighorn die-offs near domestic sheep and goats” and “the preponderance of scientific literature supports the potential for respiratory diseases to be transmitted from domestic sheep and goats to bighorn sheep, frequently followed by bighorn mortality events (e.g., Martin et al. 1996, Schommer and Woolever 2001, USDA Forest Service 2010a, USDA Forest Service 2011b, Besser et al. 2012 a, b, WAFWA 2012, Cassirer et al. 2013).” *Id.* The Shoshone NF also states, “the compilation of data over many decades contributes to an increasing body of scientific evidence that overwhelmingly demonstrates bighorn sheep near domestic sheep and goats are at risk for disease transmission.” *Id.* The Shoshone NF finally states, “[f]urther, and perhaps most importantly, there is no peer reviewed literature that suggests bighorn sheep can be in proximity to domestic sheep and goats without concern for disease transmission between the species.” *Id.* NONE of these statements are true with regard to domestic goats and ALL should be corrected to remove the word “goats” or the statements should be removed entirely from the RADT Report.

First off, not one of the Shoshone NF’s references supposedly supporting the statement “the preponderance of scientific literature supports the potential for respiratory diseases to be transmitted from domestic sheep and goats to bighorn sheep, frequently followed by bighorn mortality events” is a reference to a study involving bighorn sheep and domestic goats. *Id.* ALL of the references concern studies involving domestic sheep, not goats. Further, the references Schommer and Woolever (2001), USDA Forest Service (2010a), and USDA Forest Service (2011b) are NOT “peer reviewed literature,” nor do they report on studies involving bighorn sheep and domestic goats—they are Forest Service documents. Likewise, as discussed above in Comment # [REDACTED] the WAFWA (2012) report is again, not a study involving bighorn sheep and domestic goats, and has no relevancy to disease transmission between bighorn sheep and domestic goats.

Finally, while the Martin et al. (1996), Besser et al. (2012 a, b), and Cassiser et al. (2013) may be peer reviewed literature, they are not studies concerning disease transmission between bighorn sheep and domestic goats and NONE of these studies, nor any of the above-mentioned reviews and reports, indicate that “respiratory diseases” are “transmitted from domestic . . . goats to bighorn sheep, frequently followed by bighorn mortality events.” Rather than providing unsupported statements and irrelevant references to implicate domestic goats in disease transmission to bighorn sheep, the Shoshone NF should specifically discuss the best available science concerning disease transmission between bighorn sheep and domestic goats and provide references to studies that actually involve domestic goats, NOT domestic sheep.

Second, the Shoshone NF’s statement that “there is no peer reviewed literature that suggest bighorn sheep can be in proximity to domestic . . . goats without concern for disease transmission between the species” is a blatant and egregious misrepresentation of the science concerning disease transmission between bighorn sheep and domestic goats. The very science referenced by the Shoshone NF contradicts this statement. For example, the Shoshone NF references the study by Foreyt (1994), which is discussed above in Comment # [REDACTED]. The study

shows that domestic goats DO NOT pose a risk of disease transmission to bighorn sheep. After being penned together for 60 days, both the domestic goats and the bighorn sheep remained health and survived (Foreyt 1994). The study by Foreyt (1994) is “peer reviewed literature that suggest[s] bighorn sheep can be in proximity do domestic . . . goats without concern for disease transmission between the species.” Not only does the study “suggest” such outcome, it actually proves it in a pen setting over a 60-day time period.

In addition the Shoshone NF references the study by Miller et al. (2011), which is also “peer reviewed literature that suggest[s] bighorn sheep can be in proximity do domestic . . . goats without concern for disease transmission between the species.” This study is discussed in Comment # . During the study by Miller et al. (2011), “[n]o domestic goats or bighorn sheep had evidence of respiratory disease” and, interestingly, “a single, apparently healthy bighorn sheep ram that shared shelter, food, and water with domestic sheep and goats for >6 mo” was euthanized and oral swab and lung tissue were collected from such bighorn for Pasteurellaceae and *Mycoplasma* culture. Samples were negative for *Mycoplasma* sp., although *Mycoplasma* sp. was isolated from the domestic sheep and goat population (Miller et al. 2011). As a result, Miller et al. (2011) concludes, “*Mycoplasma* may not be easily transmitted to bighorn sheep.”

The Shoshone NF also references the study by Drew et al. (2014), which again is “peer reviewed literature that suggest[s] bighorn sheep can be in proximity do domestic . . . goats without concern for disease transmission between the species.” This study is discussed in Comment # . Drew et al. (2014) analyzes the health of 18 bighorns that were in contact with domestic ruminants in the northwestern United States between 1994 and 2008. Of the four bighorn sheep that allegedly contacted domestic goats, all of them were euthanized and none of them showed evidence of pneumonia (Drew et al. 2014).

In addition, the studies by Besser et al. (2008, 2012 a, b) have shown that *Mycoplasma ovipneumoniae* from domestic sheep has been demonstrated to be the primary pathogen involved in widespread pneumonia in bighorn sheep. See also RADT Report at 5. This pathogen is very rarely found in packgoats as shown by the studies by Dr. Margaret Highland discussed in Comment # . Without the presence of *M. ovi*, packgoats DO NOT pose a concern for disease transmission to bighorn sheep. Even when domestic goats, as opposed to packgoats, are injected with *M. ovi* and forced to commingle with bighorn sheep for 100 days, the study by Besser and Cassirer (2016) shows that both species initially display symptoms of respiratory issues, but such symptoms decrease over time and both species remain healthy and survive. Indeed, in the study by Besser and Cassirer (2016), not a single domestic goat or bighorn sheep succumbed to any sort of pneumonia and not a single animal died as a result of disease during the study. While a copy of the complete study by Besser and Cassirer (2016), rather than the abstract, has not been provided by the Shoshone NF to NAPgA, and does not appear to have been peer reviewed or published based on the reference provided by the Shoshone NF, the study indicates that commingling between bighorn sheep and domestic goats DOES NOT lead to mortality events in bighorn sheep populations, just as the studies by Foreyt (1994), Miller et al. (2011) and Drew et al. (2014) previously indicated.

Based on the above, the statements by the Shoshone NF on page 33 of the RADT Report concerning “the large body of evidence,” “peer reviewed literature,” “increasing body of scientific evidence,” and “preponderance of scientific literature” should all be corrected to remove the term “goats” from the statements, or the statements should be entirely removed from the RADT Report. The statements are unsupported and inaccurate as they apply to domestic goats and packgoats.

**30. The Shoshone NF Must Analyze and Consider the Fact that Packgoats Rarely Carry Disease-Causing Pathogens and Do Not Pose a Significant Risk of Disease Transmission to Bighorn Sheep on the Forest.**

The Shoshone NF indicates, “there is emerging science, yet to be published, that suggests that pack goats may not carry disease-causing pathogens to the degree suggested by other published peer reviewed research (Dr. Margaret A. Highland, pers. Comm. 2016).” RADT Report at 33. This science is discussed in Comment # [redacted] and must be considered by the Shoshone NF in the RADT Report. Simply mentioning that such science exists is insufficient under NEPA, rather, the Shoshone NF must consider the implications of packgoats not being carriers of *M. ovi*. If packgoats are not carriers of disease-causing pathogens, then they do not pose a risk of disease transmission to bighorn sheep on the Shoshone NF.

Further, it is unclear what “other published peer reviewed research” the Shoshone NF is referring to that suggests that packgoats carry a certain degree of disease-causing pathogens. What study was that, exactly? Unless the Shoshone NF can reference and discuss a study supporting its statement indicating that other studies have shown a higher degree of disease-causing pathogens in packgoats, it should correct the statement to indicate that packgoats have NEVER been shown to carry a high degree of disease-causing pathogens.

**31. The Shoshone NF Does Not Adequately Consider or Discuss the Degree of Scientific Uncertainty in the RADT Report.**

The Shoshone NF states that the RADT Report “considered the degree of scientific uncertainty concerning the risk of foray contact and potential disease transmission.” RADT Report at 33. Specifically, with regard to domestic goats and packgoats, where is the “scientific uncertainty concerning the risk of foray contact and potential disease transmission” considered within the RADT Report? What is the conclusion of such consideration and what is the basis for such conclusion? This discussion does not appear to be provided by the Shoshone NF in the RADT Report. As a result, the Shoshone NF should indicate, specifically, where and how it has considered the “degree of scientific uncertainty concerning the risk of foray contact and potential disease transmission,” and what conclusions were formed based on such discussion.

**32. The Shoshone NF’s Statements Concerning “Behavioral” and “Mutual” Attraction are Not Supported.**

The Shoshone NF also provides a number of statements concerning “behavioral” and “mutual” attraction between domestic sheep and goats and bighorn sheep. RADT Report at 33-34. For example, the Shoshone NF states, “there is uncertainty regarding how the behavioral attraction between domestic sheep and goats and bighorn sheep could increase the risk of contact within the landscape.” *Id.* at 33; *see also id.* at 34 (“The natural behavioral attraction between the species also makes it more likely that straying domestic sheep or goats may seek out and comeingle with bighorn sheep.”). Where in the RADT Report does the Shoshone NF discuss and prove “behavioral attraction” between domestic goats and bighorn sheep? Such attraction is not discussed or proven with regard to domestic goats, and as a result, the Shoshone should eliminate the word “goats” from the above statement or otherwise eliminate the statement altogether.

The Shoshone NF goes on to state, “[h]owever, because there is mutual attraction, while on forays bighorns are more likely to come into contact with domestic sheep or goats.” *Id.*; *see also id.* at 34 (“the effect of mutual attraction likely results in increased potential for physical contact between the species, but the degree of increased potential for contact is unknown”). Again, what is the basis for this statement as it pertains to domestic goats? The Shoshone NF in the RADT Report provides no basis for this statement. The Shoshone NF should present and discuss its support for this statement in the RADT Report as the statement pertains to domestic goats. Otherwise, the Shoshone NF should eliminate the word “goats” from the statement or eliminate the statement altogether.

Further, with regard to forays and the alleged but unsubstantiated “attraction” between bighorn sheep and domestic goats on the Forest, the Shoshone NF also fails to take into account that most longer forays are taken by bighorn rams, and that the timing of such forays often coincides with rut. Packgoats would not be on the Forest during rut, so forays at that time would not add to risk of disease transmission between bighorn sheep and packgoats. Further, most packgoats used for goatpacking are male, so, in general, the “attraction” between a foraying bighorn ram and a packgoat (assuming such foray took place in the summer, while a packgoat was on the Forest), would be male-to-male attraction. That factor should be presented and discussed by the Shoshone NF in the RADT Report.

Finally, and for the same reasons just discussed, the Shoshone NF should remove the word “goats” from the statement, “[s]ince *Mannheimia* spp. and *Pasteurella* spp. transmission both require very close (less than 60 feet) contact to transfer contagions through coughing or sneezing, it is more likely to occur between bighorn sheep and domestic sheep or goats due to their attraction to one another (Dixon et al. 2002).” *Id.* Otherwise, the Shoshone should remove the statement altogether. There is no support provided by the Shoshone NF in the RADT Report indicating that bighorn sheep, and in particular bighorn rams, are attracted to domestic goats, and in particular male packgoats. Further, it is unclear why the Shoshone NF is discussing transmission of *Mannheimia* spp. and *Pasteurella* spp. on page 33 of the RADT Report when the Shoshone NF has already concluded based on the best available science that *M. ovi* is the primary concern for disease transmission, not these pathogens. *See* RADT Report at 5.

**33. The Shoshone NF Has the Modeling Tools and Science Available Concerning Disease Transmission to Better Determine the Probability of Contact, Disease Transmission and a Subsequent Mortality Event on the Forest.**

The Shoshone NF states, “[d]etermining the probability that a bighorn sheep will reach an occupied domestic sheep or goat area on the SNF, and that contact between the species will result in disease transmission, is problematic, because essentially there is no research that would allow such a determination (USDA Forest Service 2010a).” RADT Report at 34. This entire statement is problematic. First, the reference to USDA Forest Service 2010a is outdated and fails to account for the current best available science. Plus, the reference only focused on disease transmission between bighorn sheep and domestic sheep, not domestic goats, so its applicability is limited.

Still, with regard to contact, the Shoshone NF has modeling tools available (such as those discussed in USDA Forest Service 2010a) that could be manipulated to determine a more accurate probability that a particular bighorn sheep will contact a particular goat on the Shoshone NF during the small amount of time that a limited number of packgoats are present on the Forest with their human owner during the summer months before rut. It is unclear why the Shoshone NF is not using such modeling tools to more accurately assess the risk of contact on the Forest?

Second, there is ample science concerning disease transmission between bighorn sheep and domestic goats, including packgoats. As discussed above in Comments [REDACTED] the preponderance of scientific literature concerning disease transmission between bighorn sheep and domestic goats indicates that contact between the species DOES NOT lead to disease transmission and bighorn sheep mortality events. Further, current research, as relied upon by the Shoshone NF and discussed in Comment # [REDACTED] shows that *M. ovi* is the primary pathogen of concern in disease transmission between bighorn sheep and domestic goats. Most packgoats do not carry *M. ovi*, and are therefore not a concern for disease transmission to bighorn sheep. *See infra*, Comment # [REDACTED]. So, it appears there IS research available to allow the Shoshone NF to determine the extremely low probability that a bighorn sheep would contact a packgoat on the Shoshone NF, and that contact between the species will result in disease transmission. Such research should be discussed, along with the other factors presented in these comments, to come up with a realistic and supportable determination about risk of disease transmission between bighorn sheep and packgoats, leading to a bighorn sheep mortality event on the Shoshone NF.

**C. Comments on the SDEIS**

**34. NAPgA Objects to the Shoshone NF’s Choice of Alternative 2 as the Preferred Alternative.**

The Shoshone NF indicates that “[t]he Forest Service has identified alternative 2 as the preferred alternative” from the SDEIS. SDEIS at i. Alternative 2 would prohibit packgoat use from “core native bighorn sheep ranges,” which not only include core native bighorn habitat, but



also a 35-kilometer “buffer” zone beyond that. *See* RADT Report at 20. Such prohibition would effectively close most of the Shoshone NF to goatpacking. Such prohibition is in violation of the MUSYA and NFMA, and associated Forest Service regulations, as it eliminates a use of the Shoshone NF. Because Alternative 2 closes the Shoshone NF to goatpacking and considering the potential illegality of Alternative 2, NAPgA strongly disagrees with the Forest Service’s choice of Alternative 2 as the preferred alternative. NAPgA instead urges the Forest Service to adopt Alternative 3, as written or as modified, as the preferred alternative.

**35. The Shoshone NF’s Choice of Alternative 2 as the Preferred Alternative Would Violate the Multiple-Use Sustained-Yield Act and the National Forest Management Act.**

The Forest Service’s planning authorities required the Shoshone NF to manage the Forest for “multiple uses,” including both outdoor recreation (goatpacking) and wildlife (bighorn sheep). The Multiple-Use Sustained-Yield Act (“MUSYA”), 16 U.S.C. §§ 528-531, provides that “it is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes.” 16 U.S.C. § 528 (emphasis added). In other words, the national forests are to be administered for “multiple use,” which includes management of outdoor recreation and range resources, along with management of wildlife. *See* 36 C.F.R. § 219.10 (“the plan must provide for ecosystem services and multiple uses, including outdoor recreation, range, . . . wildlife, and fish”); *see also* 36 C.F.R. § 219.10(a) (“The plan must include plan components, including standards and guidelines, for integrated resource management to provide for ecosystem services and multiple uses in the plan area.”).

The National Forest Management Act (“NFMA”), 16 U.S.C. §§ 472A, 476, 500, 513-516, 518, 521b, 528 (note), 576B, 594-2 (note), 1600 (note), 1601 (note), 1600-1602, 1604, 1606, 1608-1614, references the MUSYA, 16 U.S.C. §§ 528-531, and requires that plans developed for units of the National Forest System “provide for multiple use and sustained yield of the products and services obtained therefrom . . . and [must] include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness[.]” 16 U.S.C. § 1604(e) (1). “Thus, the NFMA is explicit that wildlife viability is not the Forest Service’s only consideration when developing site-specific plans for National Forest System lands.” *The Lands Council v. McNair*, 537 F.3d 981, 990 (9th Cir. 2008). Further, nothing in NFMA requires the Forest Service “to improve a species’ habitat to prove that it is maintaining wildlife viability.” *Id.* at 995.

Alternative 2 in the SDEIS, which proposes to eliminate goatpacking on the Shoshone NF, does not manage for “multiple use” as it eliminates a recreational use (goatpacking) from the Shoshone. Thus, implementation of this alternative will violate the MUSYA. Further, Alternative 2 is inconsistent with NFMA because the Shoshone NF only considers wildlife viability and does not give any consideration to the continuation of goatpacking on the Forest. Because Alternative 2 only considers species viability and will curtail goatpacking on the

Shoshone NF, the alternative is inconsistent with the MUSYA and NFMA and should not be chosen as the preferred alternative.

Further, the Shoshone NF concludes that Alternatives 1 and 3, which do not eliminate a recreational use of the Forest, “would not likely result in a loss of viability on the Planning Area, nor cause a trend to federal listing or a loss of species viability rangewide.” SDEIS at 20. Whereas, Alternative 2 will curtail goatpacking on the Shoshone NF, but allegedly provide a “Beneficial Impact” to bighorn sheep. *Id.* There is no requirement under the MUSYA or NFMA supporting the Shoshone NF’s elimination of a use of the Forest that would not impair species viability. Likewise, there is no authority requiring improvement to a species’ viability to the detriment of other Forest uses. As a result, the Shoshone should choose an alternative other than Alternative 2 as the preferred alternative.

**36. The Shoshone NF’s Statements in the SDEIS Concerning “Risk” and “Potential Impacts” to Bighorn Sheep Do Not Apply to Domestic Goats.**

The Shoshone NF states on page iii of the SDEIS that it proposes to restrict the use of “domestic goats and pack goats on the Forest to reduce the risk of disease transmission to bighorn sheep.” The Shoshone NF also states, “[t]his action is needed to because of the potential impacts to core native sheep herds.” SDEIS at iii. As discussed above in Comments # [REDACTED], consistent with past use of packgoats on the Forest, the best available science does not indicate that there is a risk of disease transmission from packgoats to bighorn sheep on the Forest. Such transmission has *never* occurred before, there is little to no possibility that packgoats would come into contact with a bighorn sheep on the Forest and the best available science shows that domestic goats do not transmit disease to bighorn sheep, resulting in mortality events. There is no “need” to restrict packgoat use on the Forest. The totality of factors must be considered in the SDEIS in considering to restrict packgoat use on the Forest. The statements above concerning “risk” and “potential impacts” are unsupported as they pertain to packgoats and, as a result, should be corrected to remove the words “packgoats.”

**37. The Shoshone NF Violates the Stipulated Settlement Agreement By Failing to Separately Analyze Disease Transmission Between Domestic Sheep, Domestic Goats and Packgoats.**

On pages iii and 1-2 of the SDEIS, the Shoshone NF discusses the Stipulated Settlement Agreement entered by the Forest Service. The Agreement requires the Shoshone NF to prepare a Supplement to the EIS and new RADT report “consistent with NEPA and all applicable laws and regulations.” For the reasons discussed in the comments above and below, the Shoshone NF has failed to achieve compliance with NEPA and other applicable laws and regulations and is therefore in violation of those laws, as well as the Stipulated Settlement Agreement.

Further, the Agreement requires that the Shoshone NF “analyze[ ] the potential for disease transmission between domestic sheep, domestic goats, and packgoats, and wild bighorn

sheep on the Shoshone National Forest.” The SEIS “shall consider whether there are differences in the potential for disease transmission by domestic sheep, domestic goats, and packgoats to wild bighorn sheep.” In both the SDEIS and RADT Report, however, the Shoshone NF fails to separately analyze the potential for disease transmission between packgoats and wild bighorn sheep on the Shoshone National Forest and likewise fails in both documents to adequately consider whether there are differences in the potential for disease transmission by packgoats to wild bighorn sheep. Such failure is discussed above in Comments # [REDACTED] concerning the RADT Report.

In the SDEIS, the Shoshone NF analyzes and considers “risk factors” of disease transmission between domestic sheep, domestic goats and packgoats together, not separately, as required by the Stipulated Settlement Agreement. *See* SDEIS at 14. As a result, and as discussed in Comments # [REDACTED] below, the Shoshone NF draws conclusions about disease transmission which only apply to domestic sheep and which are only supported by science concerning domestic sheep. The conclusions do not apply to domestic goats and packgoats. The whole point of the above requirements from the Stipulated Settlement Agreement was to force the Shoshone NF to develop, analyze and consider the science on disease transmission from domestic goats and packgoats to bighorn sheep separately from the science on disease transmission from domestic sheep to bighorn sheep.

Goats and sheep are different species and the science concerning disease transmission between these species and bighorn sheep is vastly different. The Shoshone NF cannot continue to include all three species together in its discussion of disease transmission in order to attempt to implicate domestic goats and packgoats in disease transmission to bighorn sheep. Each species has different science and each species poses a different risk of disease transmission. Because the Shoshone NF has failed to analyze and consider these differences, the Forest is in violation of the Stipulated Settlement Agreement. To correct such violation, the Shoshone NF must provide separate science on disease transmission for both domestic goats and packgoats, and then separately analyze that science. The conclusions and science concerning domestic goats DOES NOT apply to domestic goats and packgoats.

**38. The SDEIS is Inadequate Because the Shoshone NF Fails to Examine Additional Reasonable Alternatives.**

NEPA requires that as part of its preparation of an EIS, an agency must “study, develop, and describe appropriate alternatives to recommended courses of action,” 42 U.S.C. § 4332(2) (E), and discuss alternatives that it has considered, 40 C.F.R. § 1508.9. The agency’s discussion of reasonable alternatives forms the “heart” of the EIS. 30 C.F.R. § 1502.14. NEPA mandates that federal agencies “provide legitimate consideration to alternatives that fall between the obvious extremes.” *Colorado Env’tl. Coalition v. Dombeck*, 185 F.3d 1162, 1175 (10th Cir. 1998). More specifically, NEPA is violated when an agency dismisses the consideration of an alternative “in a conclusory and perfunctory manner that [does] not support a conclusion that it was unreasonable to consider them as viable alternatives.” *Davis v. Mineta*, 302 F.3d 1104, 1122

(10th Cir. 2002). “The existence of reasonable but unexamined alternatives renders an EIS inadequate.” *Ilio ’ulaokalani Coalition v. Rumsfeld*, 464 F.3d 1083, 1095, 1101 (9th Cir. 2006) (Army’s failure to consider alternative of transforming 2d Brigade outside of Hawaii rendered EIS inadequate).

The Shoshone NF only presents two alternatives to the proposed action in the SDEIS. See SDEIS at iii, 3, 5-7. Additional reasonable alternatives should also be considered, including and especially modified versions of Alternative 3, as discussed above and below in these comments. The alternatives analyzed in the SDEIS represent only the extremes of the spectrum of potential actions and create all or nothing scenarios. The Shoshone NF is required to offer and evaluate alternatives in the SDEIS that would allow goatpacking on the Forest, while avoiding and minimizing the risk of disease transmission to bighorn sheep from packgoats, to the extent there is any.

### **39. The Shoshone NF Must Evaluate Alternatives that Consider Strengthening Bighorn Sheep Immunity to Disease**

Established epidemiology shows that disease occurs in bighorn sheep populations in the absence of contact with domestic sheep and other animals, including packgoats. These data indicate that infectious agents and other contributing factors involved in the disease process are present within bighorn sheep populations. It appears that most bighorns are getting pneumonia from other bighorns because most of the herds that have outbreaks of pneumonia, are not in contact with domestic sheep or domestic goats. This indicates that the major problem is the lack of a good immune system in the bighorns. As discussed below, there are inherent risks in choosing a management strategy that attempts to isolate bighorn sheep populations from all perceived transmission risks (when complete isolation is not possible); instead the focus should be on managing population immunity.

The critical component of managing infectious diseases is population immunity. A decision to isolate a given population of bighorn sheep from contact with potential sources of infection assumes the ability for that population to maintain isolation. The wisdom of this management scheme (maintaining immunological naivety) in animal populations within the United States, when sources of infection are present in nature, is questionable at best. Two methods which provide population immunity are vaccination and/or exposure of populations through natural exposure (transmission). This latter situation is also referred to as premonition (resistance to a disease due to the existence of its causative agent in a state of physiological equilibrium in the host and/or by immunity to a particular infection due to previous presence of the causative agent).

A primary risk associated with incomplete immunologic isolation of animal populations is cycles of disease when isolation is broken as opposed to a continuum of managed population immunity through vaccines and/or natural exposure and premonition. When multiple sources of a given pathogen or group of pathogens exist, the prudent long-term health management dictates

that population immunity be the primary tool. As an example of population immunity being the most effective management tool, the Lostine River herd of bighorns experienced a die-off in the 1980s, but is now considered the most viable herd in the Hells Canyon area due to successful population immunity. Since bighorn sheep are infecting each other, building up their immune systems could have a beneficial effect on survival from many forms of disease.

Likewise, bighorn sheep face the risk of infection from domestic sheep and other animals on and off the Shoshone NF. Consequently, the elimination of packgoats on the Shoshone NF, even if there was evidence that packgoats carried and transmitted disease, would not eliminate the risk of disease transmission to bighorns. This fact is not adequately considered in the SDEIS. It will be impossible for the Shoshone NF to eliminate the risk of disease transmission to bighorns because of the numerous variables besides packgoats (which are not even a known carrier or transmitter of disease) on the Shoshone NF. As a result, the Shoshone NF must analyze alternative solutions to maintaining bighorn sheep viability.

The Shoshone NF must also analyze the possibility that without interaction between bighorn sheep and other animals, bighorn sheep tolerance to disease may become worse, leading to more widespread die-offs, instead of fewer die-offs. Instead of considering this likelihood, the SDEIS only considers one course of action: total separation. Based on the analysis in the SDEIS, the most prudent and most logical management action would be to encourage development of immunity in bighorns because total separation is impossible. This action must be considered by the Shoshone NF in the SDEIS.

**40. The Purpose and Need Provided by the Shoshone NF are Too Narrow and Fail to Accurately Capture the Actual Purpose and Need for the Proposed Action, Which is to Maintain the Viability of Bighorn Sheep Populations on the Shoshone NF.**

The purpose and need provided by the Shoshone NF on pages 2-3 of the SDEIS are too narrow and fail to capture the actual purpose and need for the action. According to the Shoshone NF, in the RADT Report, the primary issue of concern in managing habitats to support viable populations of bighorn sheep and in avoiding or minimizing impacts to the species is addressing the risk of respiratory disease within bighorn sheep populations on the Shoshone NF. RADT Report at 1. Under NFMA and associated regulations (36 C.F.R. § 219.19), and under Forest Service Manual §§ 2670.32, 2672.1 and 2672.4, the Shoshone NF is not directed to single out domestic sheep, domestic goats and/or packgoats in managing bighorn sheep habitat on the Forest, rather, the Shoshone NF is directed to avoid or minimize any and all impacts to the species.

To the extent “respiratory disease” is an impact to the species, it should be avoided or minimized from all potential sources, not just from domestic sheep, domestic goats and packgoats. To single out a single species and only address potential risk from that species, when other species also pose a risk, would be arbitrary and capricious, and would also ignore a

significant aspect of the problem. For example, the RADT Report indicates that cattle pose a significant risk of disease transmission to bighorn sheep on the Shoshone NF. As that is the case, cattle cannot be ignored in the analysis of disease transmission in the RADT Report and SDEIS. Other species also pose a risk of disease transmission to bighorn sheep on the Shoshone NF, and such risk should also be considered in the RADT Report and SDEIS.

The purpose and need for the proposed Federal action being considered in the SDEIS is to comply with NFMA requirements and Forest Service Manual direction to manage habitat to support viable populations of bighorn sheep and to avoid or minimize impacts to such species on the Shoshone NF, and to determine what, if any, recreational, stock or other uses are appropriate within the Shoshone NF by analyzing the risk of respiratory disease within bighorn sheep populations on the Forest, and to determine what, if any, direction should be included in the revised Forest Plan.

It would be a gross violation of the APA, NEPA and NFMA to arbitrarily and capriciously single out domestic goats and packgoats as the primary and/or sole potential risk for respiratory disease within bighorn sheep populations on the Shoshone NF. Other species, as well as bighorn sheep themselves, contribute to such risk. The Shoshone NF under the APA and NEPA cannot ignore these significant aspects of the problem. As a result, the Shoshone NF should revise the purpose and need for the proposed Federal action to take into account the additional factors that contribute to risk of respiratory disease. The Shoshone NF's regulations and direction are not so narrow as to only concern potential risk from packgoats, nor does the best available science indicate that packgoats are the only potential risk for disease transmission to bighorn sheep on the Forest.

**41. NAPgA Disagrees with the Shoshone NF's Proposed Action and Requests Further Explanation as to the Need for the Action and as to What is Meant by "Core Native Bighorn Sheep Herds" or "Ranges" as Such Terms Are Not Defined in the SDEIS.**

The Shoshone NF presents its "Proposed Action" on page 3 of the SDEIS. NAPgA disagrees with the Shoshone NF's proposed alternative and instead requests that the Shoshone adopt Alternative 3 as written, or as modified, as the proposed and preferred alternative. Within the "Proposed Action," and throughout the SDEIS, the phrases "core native bighorn sheep ranges" and "core native bighorn sheep herds" should be defined. How are these ranges or herds determined and what do they encompass? Those specifics need to be presented in the SDEIS. Further, it is unclear and unexplained why "SENS-Standard-06" is necessary to minimize the risk of disease transmission to bighorn sheep? The Shoshone NF should explain why it is proposing not to allow recreational packgoat use in core native bighorn sheep ranges based on the best available science and unlikelihood of contact between packgoats and bighorn sheep on the Forest.

**42. The Shoshone NF Misidentifies the “Significant Issues” To Be Considered in Its NEPA Review.**

On page 4 of SDEIS, the Shoshone NF identifies “significant issues” to be considered in its NEPA review. The “significant issues” listed are inappropriately narrow and fail to capture issues that warrant detailed study in the SDEIS. To start, Issue #1 states: “[t]here is potential for disease transmission from domestic sheep, domestic goats, and pack goats to wild bighorn sheep.” There is also potential for disease transmission from cattle, other wild animals and from wild bighorn sheep themselves. What aren’t these avenues of disease transmission being considered in the SDEIS? Under the APA and NEPA, they must be. As a result, Issue #1 should be revised to state: there is potential for disease transmission from domestic sheep, domestic goats, pack goats, cattle, other ruminants, wild animals, wild bighorn sheep to wild bighorn sheep.

Issue #2 should be updated to reflect the above changes to Issue #1, noting that there are differences in the potential for disease transmission by different species to wild bighorn sheep. Issue #3 is also too narrow. Issue #3 states: “[t]here are minimal options for reducing potential contact and disease transmission.” SDEIS at 4. Issue #3 appears to foreclose consideration of the numerous options available for reducing potential contact and disease transmission, such as implementation of NAPgA’s proposed best management practices, use of vaccines, removing cattle grazing allotments from the Forest, etc. Issue #3 should be changed to read: there are options for reducing potential contact and disease transmission.”

Finally, Issue #4 should also be updated to reflect the above changes to Issue #1, and it should be further revised to indicate that contact between bighorn sheep and other species, or other bighorn sheep, increases the risk of disease transmission to bighorn sheep ONLY if those other species or other bighorn sheep are carrying and shedding disease that the bighorn sheep may be susceptible to. The best available science on disease transmission, especially with regard to domestic goats, shows that goats that are not carriers/shedders of offensive pathogens are not a risk for disease transmission to bighorn sheep.

**43. The Shoshone NF Fails to Consider an Alternative that Would Reduce the Risk of Domestic Sheep Grazing on the Forest.**

The Shoshone NF presents three alternatives for detailed consideration in the SDEIS. *See* SDEIS at 5. All of these alternatives allow for continued domestic sheep grazing on the Shoshone NF. If domestic sheep grazing poses a risk of disease transmission to bighorn sheep on the Forest, it is unclear why sheep grazing is being allowed to continue? An alternative should be presented and analyzed that would reduce such risk from domestic sheep grazing.

**44. The Shoshone NF Should Consider Variations of Alternative 3 as Part of Its Analysis of Reasonable Alternatives.**

Further, there are several variations of Alternative 3 that should be considered in detail in the SDEIS. First, as discussed above, to the extent domestic sheep grazing poses a risk of disease transmission to bighorn sheep on the Shoshone NF, it should be eliminated under a modified Alternative 3. Second, Alternative 3 can and should be modified (to the extent the Shoshone NF demonstrates with best available science that there is any risk posed by disease transmission from packgoats to bighorn sheep on the Forest) to restrict packgoat use from core native bighorn sheep ranges in abundant and known grizzly bear habitat, such as those core native bighorn sheep ranges occupied by the Clark's Fork Herd, Trout Peak Herd, Wapiti Ridge Herd, Francs Peak Herd, and Younts Peak Herd. Based on NAPgA's understanding, goatpackers have not expressed significant interest in using packgoats in these areas occupied by grizzly bears. Consistently, the Shoshone NF reports that no packgoat use is known to occur with the listed core native herd ranges. *See* SDEIS at 10-12. Based on restrictions to packgoat use in these areas, only the areas occupied by the Whiskey Mountain Herd and Temple Peak Herd would be considered under the permit process proposed in Alternative 3. As a result, only one core native herd would be "potentially" at risk of disease transmission, not six as stated on Page 7 of the SDEIS, and such "potential" could be reduced to insignificance with application of proposed permit process and best management practices that are part of the current Alternative 3. This modified Alternative 3 should be considered and adopted by the Shoshone NF.

Also, with regard to Alternative 3, the Shoshone NF indicates that "[a]dditional mitigation measures were provided by the North American Pack Goat Association but were not considered in this alternative because they were not feasible to implement." SDEIS at 7. What were these additional mitigation measures? Why weren't they further considered or why were they considered infeasible? The Shoshone NF should provide such discussion in the SDEIS and allow the public to comment on these additional mitigations measures.

In addition to the mitigation measures proposed in Alternative 3, the Shoshone NF can and should considered additional potential mitigation measures as part of Alternative 3 or a modified Alternative 3. For example, pack goat use could be restricted on certain "high risk" trails within the Whiskey Mountain Herd area; pack goat use could be limited to daylight hours; camping with packgoats could be limited to certain areas, such as denser forested areas not commonly occupied by bighorn sheep within the Whiskey Mountain Herd area; and/or pack goat use could be restricted to the months of June through September to avoid rut. These and other mitigation measures could be employed both within the Whiskey Mountain Herd area, and the Temple Peak Herd area to nearly eliminate any possibility of contact between packgoats and bighorn sheep on the Forest. The Shoshone NF should consider these and other available mitigation measures in the SDEIS.

**45. There Are Additional Alternatives that Have Been Identified and Which Should be Considered by the Shoshone NF in the SDEIS.**

The Shoshone NF indicates on page 7 of the SDEIS that "no additional alternatives have been identified that are not outside the scope of the decision to be made, duplicative of the



alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm.” This statement by the Shoshone NF is inaccurate. NAPgA has provided several modified versions of Alternative 3 that can and should be considered by the Shoshone NF. There are additional alternatives that are within the scope of the decision to be made and which warrant consideration by the Shoshone NF.

**46. The Shoshone NF’s “Comparison of Alternatives” Is Inaccurate and Fails to Account for a Number of Important Factors Affecting the Alternatives.**

The Shoshone NF indicates in Table 1. “Comparison of Alternatives” in the SDEIS that Alternative 3 would allow “[d]omestic goats (including pack goats)” “in core native bighorn sheep habitat under permit system.” SDEIS at 7. How and why are “domestic goats” being allowed in “core native bighorn sheep habitat under permit system?” Alternative 3, as described on pages 6-7 of the SDEIS, does not appear to contemplate domestic goat use on the Shoshone NF, as opposed to packgoat use. As a result, it appears that the description of Alternative 3 in Table 1 should be corrected, or the Shoshone NF should further explain how “domestic goats” are going to be allowed on the Shoshone NF under a permit system.

Likewise, in Table 1, Alternative 1 states, “[d]omestic goats (including pack goats) allowed on entire Shoshone National Forest.” SDEIS at 7. How are “domestic goats” allowed on the entire Shoshone NF under Alternative 1? Under Alternative 1, the no action alternative, there are no domestic sheep and domestic goat allotments overlapping core native bighorn sheep ranges on the Shoshone NF. Thus, selection of Alternative 1 would not allow for “domestic goat” use on the entire Shoshone NF. Rather, as the case is now, without action, “domestic goats” are not allowed on the entire Shoshone NF. They are only allowed in designated domestic sheep and goat allotments, which are very limited and do not overlap with core native bighorn sheep habitat. As a result, the Shoshone NF should correct the description of Alternative 1 in Table 1 of the SDEIS.

Further, Table 1 indicates that under Alternatives 1 and 3 that six “core native bighorn sheep herds [would be] potentially at risk of disease transmission.” SDEIS at 7. It is unclear under either alternative how six core native bighorn sheep herds would be potentially at risk of disease transmission? As the Shoshone NF recognizes at pages 10-12 of the SDEIS, neither domestic sheep and domestic goat grazing, nor goatpacking occurs within the core native bighorn sheep ranges occupied by the Clark’s Fork Herd, Trout Peak Herd, Wapiti Ridge Herd, Francs Peak Herd, and Younts Peak Herd. So, under Alternatives 1 and 3, these herds would not be “potentially at risk of disease transmission” from domestic sheep, domestic goats or packgoats. None of these animals are present, nor have they been present in these core native bighorn sheep ranges. Thus, the number of “core native bighorn sheep herds potentially at risk of disease transmission” for Alternatives 1 and 3 should be reduced to one in Table 1 of the SDEIS.

Further, Table 1 states that there are zero “core native bighorn sheep herds potentially at risk of disease transmission” under Alternative 2. SDEIS at 7. How can that be? On page 12 of the SDEIS the Whiskey Mountain Bighorn Sheep Herd is reported to carry disease and suffer from chronic pneumonia. So, regardless of the presence of domestic sheep, domestic goats or pack goats on the Shoshone NF, the Whiskey Mountain Herd is at risk of disease transmission within the herd, between affected and unaffected members of the herd. Thus, the “[n]umber of core native bighorn sheep herds potentially at risk of disease transmission” for Alternative 2 is one. That change should be made in Table 1 of the SDEIS.

Likewise, based on the Shoshone NF’s own analysis of disease transmission, all core native bighorn sheep herds within 35 kilometers of an animal potentially carrying offensive pathogens are considered to be “at risk of disease transmission.” See RADT Report at 23-24. Based on such analysis, the Younts Peak Herd, the Francs Peak Herd, the Wapiti Ridge Herd, as well as the Temple Peak Herd appear to be “potentially at risk of disease transmission” from the diseased Whiskey Mountain Herd, as all of the ranges for these herds lie within 35 kilometers of the Whiskey Mountain Herd. Thus, based on the Shoshone NF’s analysis in the RADT Report and SDEIS, the actual number of “core native bighorn sheep herds potentially at risk of disease transmission” under Alternative 2 should be four, not including the Temple Peak Herd, which is not considered a “core native bighorn sheep herd.” This change should be made in Table 1 of the SDEIS.

**47. The Shoshone Must Consider the Impacts of Disease and Disease Transmission Within and From the Whiskey Mountain Herd.**

The Shoshone NF discusses the Whiskey Mountain Bighorn Sheep Herd on pages 12-13 of the SDEIS. Notably, the Shoshone NF indicates that the herd carries *M. ovi* and that persistent chronic pneumonia continues to be a problem within the herd. As a result, the Shoshone needs to consider the impact on disease within this population in the RADT Report. Likewise, the Shoshone NF needs to consider that this population poses a potential risk of disease transmission to itself and to other bighorn herds on the Forest. Neither of these aspects of disease and disease transmission are considered in the RADT Report and SDEIS, but are crucial factors in the viability of bighorn sheep herds on the Shoshone NF.

**48. The Shoshone Is Required to Consider and Use the Best Available Scientific Data on the Whiskey Mountain Herd, Including Relevant Foray, Telemetry and Observation Data.**

In addition, the Shoshone NF states that the Whiskey Mountain Herd “is isolated from other herds on the Shoshone National Forest,” and that the “Highway 26 corridor” north of the herd “contains unsuitable bighorn sheep habitat, which limits interchange with the Absaroka metapopulation.” SDEIS at 12. Further, the Shoshone NF indicates, “connectivity between the Whiskey Mountain and Temple Peak herds has not been demonstrated.” *Id.* Indeed, much is known about the extent of the Whiskey Mountain Herd based on observations by the Wyoming

Fish & Game and based on an abundance of telemetry and other data. *Id.* Yet, the Shoshone NF has failed to use any of this information in the RADT Report and SDEIS in determining potential risk of contact, and in turn, potential risk for disease transmission. In order for the Shoshone NF's risk assessment and NEPA review to have some basis in reality, and as a requirement of NEPA and the APA, the Shoshone NF must use the available data on the Whiskey Mountain Herd and must ensure the results of its risk assessment and NEPA review comport with reality.

Rather than using available data on the range of the Whiskey Mountain Herd and distance of occasional forays, etc., the Shoshone NF decided to model "risk" based on overlap between a bighorn sheep herds core range PLUS an arbitrary distance of 35 kilometers (21 miles) and a potential packgoat use area. *See* RADT Report at 22-23. The 35 kilometer extension of a bighorn sheep herd's range is apparently based on data from bighorn sheep forays in the Hells Canyon area. *Id.* The relevancy of these forays to forays taken by bighorn sheep on the Shoshone NF is not presented, nor explained. Regardless, the Shoshone NF has an abundance of telemetry, foray and other data on the bighorn sheep herds on the Forest, so it need not use data from some unrelated bighorn sheep population in a different climate and landscape and for which no correlation with the bighorn sheep herds on the Forest has been provided.

Based on the Shoshone NF's use of irrelevant data and faulty methodology, the Shoshone NF concludes that bighorn sheep from the Whiskey Mountain Herd foray 35 kilometers in all directions and that any packgoat use with the 35-kilometer area creates a "high risk" of disease transmission. *See* RADT Report at 20, 26; SDEIS at 15-18. Such conclusion does not comport with reality and actually contradicts the Shoshone NF's own data and expert input. As pictured in Figure 3 on page 20 of the RADT Report, the Shoshone NF's risk assessment indicates that bighorn sheep from the Whiskey Mountain Herd foray north into the Absaroka metapopulation and east into the Temple Peak Herd. It also appears that the bighorn sheep from the Whiskey Mountain Herd spend time in downtown Dubois and Pinedale. The Shoshone NF reports, and supports with actual data and observations, that these bighorn sheep movements do NOT actually occur. *See* RADT Report at 18-21; SDEIS at 12-13. There is no northward movement, there is no eastward movement and there certainly are not bighorn sheep walking around downtown Dubois and Pinedale. As a result, there is no reason and no justification for closing the Shoshone NF to packgoats within 35-kilometers of the Whiskey Mountain Herd, when the Shoshone NF knows that bighorn sheep from the herd will not be, and have not been, present in most areas within that 35-kilometer extension.

Use of the 35-kilometer extension to close areas on the Forest to packgoat use has no basis in science; is contradictory to available data, information and expert input; and unjustifiably closes areas of the Shoshone NF to goatpacking. As a result, the 35-kilometer extension should not be used as part of the Shoshone NF's RADT Report and SDEIS. Rather, the Shoshone NF must rely on actual and available data concerning the Whiskey Mountain Herd, which indicates that bighorn sheep movements from the herd are quite limited and that there is NO overlap with pack goat use areas on the southern end of the Fitzpatrick Wilderness, the

western and southern areas of the Bridger Wilderness, the Wind River Indian Reservation, and the Popo Agie Wilderness.

**49. The Shoshone NF Improperly Implicates Domestic Goats in Disease Transmission and Misidentifies the Issue of Greatest Concern for Bighorn Sheep Conservation.**

In the section “Risk Factor: Disease Transmission from Contact with Domestic Sheep and Goats” on page 14 of the SDEIS, the Shoshone NF states, “[t]he susceptibility of bighorn sheep to population declines or extirpation due to respiratory diseases that can be transmitted from domestic sheep and goats (Besser et al. 2012, Cassirer et al. 2013) is the issue of greatest concern for bighorn sheep conservation.” Neither of the references provided by the Shoshone NF appear to implicate domestic goats, as opposed to domestic sheep, in disease transmission and population declines or extirpation within bighorn sheep populations. As a result, the Shoshone NF should strike “goats” from the above statement, or otherwise explain with available science how the statement applies to domestic goats.

Further, current research, such as that by Sells et al. (2015), indicates that lack of habitat, resulting in high density bighorn sheep herds, is a much larger contributor to population declines or extirpation due to respiratory diseases within bighorn sheep herds than proximity or intermingling of those herds with domestic sheep or goats. Indeed, according to Sells et al. (2015), high-density bighorn sheep herds are five-times more likely to contract respiratory disease than herds in close proximity to domestic sheep or goat allotments. Thus, based on the best available science, it would appear that the “issue of greatest concern for bighorn sheep conservation” is herd density, either caused by herds that are too large or by habitat which is too small. This issue should be presented and discussed by the Shoshone NF and considered in the Shoshone NF’s management direction.

**50. The Shoshone NF Fails to Identify Any Science Linking Domestic Goats with Bighorn Sheep Die-offs in the Wild or High Mortality Rates Following Controlled Experiments.**

The Shoshone NF, on page 14 of the SDEIS, states, “[t]his evidence includes both circumstantial evidence linking bighorn die-offs in the wild to contact with domestic animals, and controlled experiments where healthy bighorn sheep exposed to domestic sheep and goats subsequently displayed high mortality rates (e.g. Goodson 1982; Onderka et al. 1988; Onderka and Wishart 1988; Foreyt 1989, 1990, 1992a, 1992b, 1994; Foreyt et al. 1994; Garde et al. 2005, and Lawrence et al. 2010).” With the exception of the reference to Foreyt (1994), the references provided appear to concern disease transmission between domestic sheep and bighorn sheep, not between domestic goats and bighorn sheep. As a result, the Shoshone NF should specify which of these references supports its statement that domestic goats are somehow linked with bighorn die-offs in the wild or high mortality rates of bighorn sheep following controlled experiments. None of the references appear to support the Shoshone NF’s statement as it pertains to domestic

goats. As a result, the Shoshone NF should strike the word “goats” from the statement. Further, the one reference that pertains specifically to goats—Foreyt (1994)—actually provides scientific evidence that domestic goats DO NOT transmit disease to bighorn sheep, thereby contradicting the Shoshone NF’s statement above. *See infra*, Comment #     .

**51. The References Provided by the Shoshone NF in the SDEIS Do Not Support the Shoshone NF’s Conclusions Concerning Disease Transmission from Domestic Goats to Bighorn Sheep.**

On page 14 of the SDEIS, the Shoshone NF regurgitates statements from the RADT Report attempting to implicate domestic sheep in bighorn sheep mortality events. For example, the Shoshone NF states there “is a body of literature linking disease transmission from domestic goats to bighorn sheep;” “there is an abundance of connected evidence leading to a reasonable conclusion that domestic goats can transmit disease to bighorn sheep;” and there are “cases where bighorn sheep disease outbreaks were believed to have originated from domestic goats.” SDEIS at 14. Further, the Shoshone NF states, “[e]ven minimal direct contact is believed to contribute to the death of individual wild sheep, herds of wild sheep, and entire populations.” *Id.* These statements are addressed in Comments #     , above.

The references cited by the Shoshone NF in the SDEIS, as well as those references cited in the RADT Report, DO NOT support the Shoshone NF’s conclusions concerning disease transmission from domestic goats to bighorn sheep. Certainly, the references do not support any of the Shoshone NF’s conclusions concerning disease transmission from packgoats to bighorn sheep. Instead, as discussed in Comments #     , the best available science shows that even in penned settings comingling of domestic goats with bighorn sheep DOES NOT result in bighorn sheep mortality events, even when domestic goats are injected with disease. Certainly, when such goats do not have disease, they are not a risk for disease transmission, as is the case with most packgoats. *See infra*, Comment #     . The Shoshone NF must update its discussion of “Risk Factor: Disease Transmission from Contact with Domestic Sheep and Goats” to correct its statements and conclusions about domestic goats, and packgoats, based on use of the best available science which indicates that domestic goats, especially packgoats, are not a risk for disease transmission leading to mortality events in bighorn sheep populations.

**52. The Shoshone NF Provides No Basis for Concluding that There Would be Overlap Between Packgoats and Bighorn Sheep on the Forest.**

With regard to “Direct and Indirect Effects” under Alternative 1 in the SDEIS, the Shoshone NF indicates that “there would be spatial and temporal overlap between pack goats and bighorn sheep, and the risk of contact between pack goats and bighorn sheep in the Whiskey Mountain herd would be high.” SDEIS at 15. Likewise, the Shoshone NF concludes that there be a “high” risk of contact between pack goats and other bighorn sheep herds on the Forest. *Id.* While there may be an extremely remote chance that there “could” be spatial and temporal overlap between pack goats and bighorn sheep in certain areas of the Shoshone NF, there is no

basis for the Shoshone NF's statement that there "would" be overlap. The Shoshone NF cannot predict the future and certainly cannot know for certain when and whether a packgoat will overlap with a bighorn sheep on the Forest at some point in the future. Based on the behavior of these species and the use and training of packgoats it is very unlikely that such an event "would" ever happen. As a result, the Shoshone NF should correct its statement concerning what "would" happen in the future.

**53. The Shoshone NF Fails to Explain What is Meant by "Risk" in the SDEIS.**

The Shoshone NF should also explain in the SDEIS what it means by "high" risk of contact between pack goats and bighorn sheep. Notably, such contact has never occurred before on the Forest, so "high" risk does not mean that contact is more likely than not, otherwise such contact would have already occurred. There is no scale of risk to inform the reader about the actual likelihood of contact. The Shoshone NF should explain what they mean by "risk," including the various scales of risk from high to low. Also, the Shoshone NF should explain how contact between pack goats and bighorn sheep on the Forest would actually occur. What does the Shoshone NF mean by "contact?" Would a bighorn sheep approach a packgoat on a trail, in the presence of the packgoat's human owner and make "contact?" Would a bighorn sheep enter into a camp in a forested area where there is a packgoat, again in the presence of its human owner, and make contact there? Is this nose-to-nose or sexual contact? When the Shoshone NF refers to "risk" and "contact" in the SDEIS it is unclear what the Shoshone NF is talking about and how such "contact" would occur. These things should be explained. Likewise, the Shoshone should discuss the likelihood of contact in understandable terms and present how such contact would occur based on the behavior of bighorn sheep and use and training of packgoats.

**54. The Shoshone NF's Analysis of the Mitigation Measures Under Alternative 3 is Unsupported and Improperly Biased.**

In its analysis of the "Direct and Indirect Effects" of Alternative 3 in the SDEIS, the Shoshone NF repeats its discussion of mitigation measures from the RADT Report. See SDEIS at 16-18; RADT Report at 29-31. The above Comments # [redacted] address that discussion and are equally applicable to the discussion in the SDEIS.

With regard to the last three sentences of the discussion in the SDEIS, which are not repeated from the RADT Report, NAPgA agrees with the Shoshone that "[i]mplementation of the mitigation measures would reduce the risk of contact and subsequent disease transmission between pack goats and bighorn sheep." SDEIS at 18. NAPgA, however, does not agree that "[d]irect spatial or temporal overlap would exist between pack goats and core native bighorn sheep herds (Figure 2)." *Id.* As discussed above in Comment # [redacted], there is no support for the Shoshone NF's statement that overlap "would" occur. Perhaps it "could" occur, but it is highly unlikely that it "would" occur. As a result, the Shoshone should revise its statement concerning overlap.

Further, the Shoshone NF states that under Alternative 3, “the risk of contact and subsequent disease transmission from pack goats to bighorn sheep would be moderate.” *Id.* This statement appears to present the opinion of the author of the Effects section of the SDEIS. There is no analysis provided to support such statement. As a result, the Shoshone NF should indicate in the SDEIS that such statement is a mere opinion and that the Shoshone NF. Rather, if implemented correctly, the mitigation measures would be effective.

**55. The Shoshone NF Should Discuss Options for Avoiding and Minimizing Cumulative Effects in the SDEIS.**

The Shoshone NF indicates, “four of the six core native herds on the Shoshone National Forest are potentially within 35 km of domestic sheep that are on lands adjacent to the Forest (Table 2).” SDEIS at 20. Based on the Shoshone NF’s RADT Report and SDEIS, such proximity to domestic sheep presents a very high risk of disease transmission to bighorn sheep. Thus, what is being done to mitigate this risk, and the potential effects of disease transmission from these domestic sheep? The Shoshone NF has tools and partners available to help avoid and minimize the cumulative effects discussed on page 20 of the SDEIS, such as retiring nearby domestic sheep grazing acreage. The Shoshone NF should discuss options for avoiding and minimizing cumulative effects in the SDEIS.

**56. The Shoshone NF’s Cumulative Effects Analysis in the SDEIS is Inadequate.**

Once the resources affected by a project have been identified, the geographic range occupied by those resources can be used to determine the appropriate geographic range for the cumulative impact analysis. Determining the appropriate geographic limits of an EIS “requires a complicated analysis of several factors, such as the scope of the project considered, the features of the land, and the type of species in the area.” *Selkirk Conservation Alliance v. Forsgren*, 336 F.3d 944, 958 (9th Cir. 2003). The proper scope of a cumulative impact analysis is limited to past, present and reasonably foreseeable future actions involving effects on a resource value that will overlap with a proposed project’s effects on that same resource value. 40 C.F.R. § 1508.7.

The Council on Environmental Quality (“CEQ”) Guidebook<sup>2</sup> suggests that the appropriate scope should be defined by determining the largest geographic area that is occupied by the resources that could be affected by the proposed action. CEQ Guidebook at 15; *see also id.* at 12 (noting that cumulative impact analysis “should be conducted on the scale of human communities, landscapes, watersheds, or air sheds.”); *Habitat Education Center, Inc.*, 381 F. Supp. 2d at 849 (“The presence of species habitat outside the project area is also a relevant consideration in determining the relevant scope of a cumulative impacts analysis for wildlife); *Idaho Sporting Congress v. Rittenhouse*, 305 F.3d 957, 974 (9th Cir. 2002) (Forest Service was arbitrary and capricious in using the “home range” of wildlife species as geographic area for cumulative impact analysis where Forest Service’s own scientists had concluded that habitat needs must be addressed at “landscape” level, and Forest Service failed to explain why it disregarded such information). Once the appropriate geographic boundary for a cumulative impacts analysis has been defined, actions that occur outside of that area and whose impacts on a particular resource value overlap with the anticipated effects of the proposed action on that resource value need to be considered in that analysis.

Determining which resources to consider and which actions to include in the cumulative impact analysis does not end the agency’s inquiry. The purpose of cumulative impact review is to provide “useful analysis” so that significant cumulative effects can be minimized. *See Kern*, 284 F.3d at 1075; CEQ Guidebook at 45. An agency must ensure that its cumulative impact analysis is “more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects.” *Ocean Advocates v. U.S. Army Corps of Eng’rs*, 402 F.3d 846, 868 (9th Cir. 2005); *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1075 (9th Cir. 2002); *Muckleshoot Indian Tribe v. U.S. Forest Service*, 177 F.3d 800, 810 (9th Cir. 1999).

In considering cumulative impacts, an agency must provide “some quantified or detailed information; . . . [g]eneral statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided.” *Ocean Advocates*, 402 F.3d at 868 (agency finding that dock extension at refinery would not increase oil tanker traffic did not constitute hard look required by NEPA where it relied exclusively on unsubstantiated letter from project applicant) (*citing Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1379 (9th Cir. 1998)). The EIS must provide

---

<sup>2</sup> The CEQ Guidebook, *Considering Cumulative Impacts Under the National Environmental Policy Act* (January 1997), is available at [http://ceq.hss.doe.gov/publications/cumulative\\_effects.html](http://ceq.hss.doe.gov/publications/cumulative_effects.html) (last visited July 17, 2014). Courts look to the guidebook when considering a variety of cumulative impacts issues. *See e.g., Native Ecosystems*, 304 F.3d at 896 (CEQ Guidebook cited by Ninth Circuit for need to consider cumulative impacts in EAs); *American Rivers v. FERC*, 201 F.3d 1186, 1195 n.15 (9th Cir. 1999) (CEQ Guidebook cited by Ninth Circuit for need to establish baseline conditions for environmental analysis); *Habitat Education Center, Inc. v. Bosworth*, 381 F. Supp. 2d 842, 849-50 (E.D.Wis. 2005) (CEQ Guidebook cited by district court when determining proper scope of cumulative impact analysis for wildlife).



enough information concerning other area projects and their impacts to allow the decision-maker to decide whether or how to alter the proposed project to lessen cumulative environmental impacts. *City of Carmel v. U.S. Dep't of Transp.*, 123 F.3d 1142, 1160-1161 (9th Cir. 1997).

The Shoshone NF's discussion of "Cumulative Effects" on page 20 of the SDEIS is inadequate and incomplete. First, although cattle are known to pose a significant risk of disease transmission to bighorn sheep, the Shoshone NF fails to provide any analysis of cattle on adjacent lands within 35 kilometers of core native bighorn sheep herds on the Forest. Such analysis is necessary in the Cumulative Effects section of the SDEIS and should be added.

Second, there is no analysis of the impact of habitat loss or conversion due to fire or due to development on adjacent lands. Habitat is the most important factor in bighorn sheep survival and avoidance of disease/mortality events. Yet, there is no discussion of habitat in the Direct and Indirect Effects section of the SDEIS, nor in the Cumulative Effects section. As a result, the discussions are inadequate and incomplete. The Shoshone NF must discuss what impact habitat is having on bighorn sheep populations on and off the Forest, particularly considering there have been recent major fire events within and nearby core native bighorn sheep herds on the Forest. The SDEIS should be updated with these discussions.

Third, other animals, such as mountain goats, pose a risk of disease transmission and also out-compete bighorn sheep in the wild. Mountain goats have been found on the Shoshone NF, yet the Shoshone NF provides no discussion of what impact mountain goats are having, or could have, on bighorn sheep populations on the Forest. Unlike the situation for packgoats, there is scientific information indicating that there is a risk of disease transmission from mountain goats to bighorn sheep.<sup>3</sup> Likewise, there is scientific information indicating that there is a risk of disease transmission from other animals to bighorn sheep. Weiser et al. (2003). There is also information indicating that mountain goats are out-competing bighorn sheep.<sup>4</sup> Although mountain goats are known to exist on and nearby the Shoshone NF, the Shoshone NF disregards their existence and contribution to disease transmission and competition in the SDEIS. Under NEPA, the effects of mountain goats and other animals on bighorn sheep on the Shoshone NF

---

<sup>3</sup> See, for example, Carson J. Butler and Robert A. Garrott, "Climatic Variation and Age Ratios in Bighorn Sheep and Mountain Goats in the Greater Yellowstone Area," available at [http://www.gyamountainungulateproject.com/annual\\_report\\_2011/AgeRatioDynamics.pdf](http://www.gyamountainungulateproject.com/annual_report_2011/AgeRatioDynamics.pdf) (last visited July 17, 2014) (citing T.O. Lemke, "Origin, expansion, and status of mountain goats in Yellowstone National Park," *Wildlife Society Bulletin* 3:532-541 (2004)) ("there is also the possibility that mountain goats will affect bighorn sheep and other ungulate populations through disease transmission").

<sup>4</sup> See Cory Hatch, "Mountain goats worrisome in bighorn sheep territory" (Feb. 20, 2012), available at [http://mtstandard.com/news/local/state-and-regional/mountain-goats-worrisome-in-bighorn-sheep-territory/article\\_2c82f2ba-5b83-11e1-92de-0019bb2963f4.html](http://mtstandard.com/news/local/state-and-regional/mountain-goats-worrisome-in-bighorn-sheep-territory/article_2c82f2ba-5b83-11e1-92de-0019bb2963f4.html) (last visited July 17, 2014).

must be considered in the SDEIS. The Shoshone NF must update the SDEIS to provide that discussion.

Fourth, at least the Whiskey Mountain Herd, if not other herds, carries disease that is detrimental to domestic ruminants on and off the Forest. What is the risk of disease transmission between bighorn sheep and other ruminants on and off the Forest? The potential for bighorn sheep herds to infect other species with disease must also be considered by the Shoshone NF in the SDEIS.

Overall, the analysis of risk and conclusions about disease transmission reached in the SDEIS do not provide a “useful analysis” of the cumulative impacts of present and future use on lands off the Shoshone NF. The Forest Service’s “[g]eneral statements about possible effects and some risk do not constitute a hard look” at the cumulative impacts. *See Ocean Advocates v. U.S. Army Corps of Eng’rs*, 402 F.3d 846, 868 (9th Cir. 2005); *Kern*, 284 F.3d at 1075; *Muckleshoot Indian Tribe*, 177 F.3d at 810.

**57. The Shoshone NF Wrongly States that There “Would” Be Overlap Between Packgoats and Bighorn Sheep on the Forest.**

The Shoshone NF determines that “[t]here would be spatial and temporal overlap between domestic pack goats and bighorn sheep on Shoshone National Forest lands under alternative 1,” and that as a result “[t]here would be an increased risk of contact with and potential disease transmission from domestic pack goats to bighorn sheep.” SDEIS at 20. As discussed in Comment # there is no basis for the Shoshone NF’s statement that packgoats and bighorn sheep “would” overlap on the Forest. The chances of this “overlap” happening in space and time are extremely small and such “overlap” is certainly not “definite.” The Shoshone NF cannot say that such overlap “would” happen. As a result, the language in the SDEIS should be changed to reflect the unlikelihood of overlap—while, hypothetically, it “could” happen, it is extremely unlikely to happen.

**58. Under Alternative 3, There Would Be Little to No Risk of Contact Between Packgoats and Bighorn Sheep on the Forest.**

The Shoshone NF also states that mitigation measures under Alternative 3 would reduce the risk of contact, but that “the analysis concluded that the risk of contact and subsequent disease transmission would still be moderate.” SDEIS at 20. The Shoshone NF’s analysis of Alternative 3 is addressed in Comment #. The Shoshone NF’s conclusion that risk of contact and subsequent disease transmission would still be “moderate” is unfounded and unjustified. Under Alternative 3 there would be little to no risk of contact and subsequent disease transmission.

**59. The Shoshone NF’s Analysis of the Effects of Closing the Forest to Packgoat Use is Inadequate and Improperly Minimizes the Effects.**

Concerning “Recreational Pack Goat Use,” the Shoshone NF minimizes the direct and indirect effects of closing the Absaroka Range on the Wind River Ranger District and north across the remainder of the Shoshone NF to packgoat use. *See* SDEIS at 21; *see also id.* at 22. The basis for discounting these effects is the Shoshone NF’s belief that these areas are not practicable areas for packgoat use because of large areas of core native bighorn sheep habitat and the potential for grizzly bear conflicts. *Id.* While the Shoshone NF provides in the section concerning “Recreational Pack Goat Use” that closure of these areas would have minimal effects because of the limited use of these areas, the Shoshone NF states the opposite when it wants to show that packgoats will pose a “high” risk of contact with bighorn sheep in these areas earlier in the SDEIS. *See* SDEIS at 15. The Shoshone NF conveniently manipulates the discussion to warp the effects analysis to show the effects it wants to show. If there is potential for packgoat use in these areas, as the Shoshone NF states there will be on page 15 of the SDEIS, then the same assumptions and information must be considered in analyzing effects on page 21 of the SDEIS. It is incongruous to claim that packgoat use in the Absaroka Range on the Wind River Ranger District and north across the remainder of the Shoshone NF will pose “a ‘high’ risk of contact between pack goats and bighorn sheep, and increased disease transmission risk” in one section of the SDEIS when the Shoshone NF wants to show effects, and then claim that there will be no effects as a result of closing these areas to packgoat use in another section of the SDEIS when the Shoshone NF does not want to show effects. The manipulation of the effects analyses in the SDEIS by the Shoshone NF to push its agenda to remove packgoats from the Forest is obvious and must be corrected to account for the effects to recreational packgoat use on the Forest.

Further, with regard to the “Direct and Indirect Effects” on “Recreational Pack Goat Use,” the Shoshone NF states under Alternative 2 that “impacts to recreational pack goat use would likely be concentrated to those areas of core native bighorn sheep habitat on the Wind River and Washakie Ranger Districts.” SDEIS at 21. Under NEPA, it is not just enough to say where there might be impacts. Rather, the Shoshone NF must actually state what the impacts will be and then discuss those impacts. The Shoshone NF fails to do this in its discussion of direct and indirect effects to recreational packgoat use on the Forest. As a result, the Shoshone NF must revise the effects analysis to properly consider effects to packgoat use, including economic and socioeconomic effects. These effects include among others, the elimination of a recreational use of the Forest, prohibition on use of the Forest by certain disabled and elderly people and limitation on hunters’ ability to hunt and pack game from certain hunting areas.

Finally, with regard to the direct and indirect effects of Alternative 3 on recreational packgoat use on the Shoshone NF, the Shoshone NF states, “[i]mpacts to pack goat use would be minimal and associated with the mitigation measures outlined above.” SDEIS at 22. As discussed in Comment # it is unclear how the Shoshone NF can close the majority of the Forest to packgoats and then claim that such closure will have minimal impacts? This is especially so, considering the Shoshone NF has stated that packgoat use on the majority of the Forest will pose a “high” risk of contact and subsequent disease transmission. Any and all removal of packgoats

from the Shoshone NF will have direct and indirect effects, which must be analyzed under NEPA in the SDEIS.

**60. The Shoshone NF's Discussion of Cumulative Effects is Uninformed and Inadequate.**

The Shoshone NF's discussion of "Cumulative Effects" to "Recreational Pack Goat Use" is uninformed and inadequate. *See* SDEIS at 22. First, the Shoshone NF repeats, "the cumulative impact of a prohibition on pack goats or conditional use based on mitigations to pack goat users and recreational users as a broader group would anticipated to be minimal." *Id.* The basis for this statement is unclear. With a closure of the Shoshone NF to goatpacking, goatpackers will lose one of the premier areas in the United States in which to goatpack and businesses in the area of the Shoshone NF as well as businesses catering to goatpacking nationwide will suffer.

More importantly, though, as the Shoshone NF is well aware, but fails to disclose in the SDEIS, several Forests in the West are awaiting the Shoshone NF's direction regarding goatpacking so that they may adopt such direction. These Forests include, among others, the Bridger-Teton and Blue Mountains Forests. Recently, the Bridge-Teton indicated, "[t]he BTNF is closely watching what the Shoshone NF is doing on the issue of DS/DG and BHS interaction in their plan revision; the BTNF is expected to adopt much of what the Shoshone decides." *See* Minutes, Statewide Domestic Sheep/Bighorn Sheep Interaction Working Group, August 8, 2008, WGFD Lander Regional Office. Thus, the Shoshone NF's decision will set a precedent for other Forests to follow in managing packgoat use and will have a huge impact on goatpacking across the West. This likely cumulative impact must be discussed in the SDEIS.

**61. There Are No Differences in the Commitments of Resources Under any of the Alternatives.**

Under the "Irreversible and Irretrievable Commitments of Resources" section of the SDEIS, the Shoshone NF states that the No Action alternative would present a "potential irreversible commitment of resources," but that "Alternative 2 and alternative 3 would not . . . because these would be administrative decisions that could be reversed at any time." SDEIS at 23. Do not all of the alternatives represent administrative decisions? How is the choice of alternative 1 any different, administratively, than alternatives 2 and 3? Further, regardless of the alternative, unless the Shoshone NF removes all risk of disease transmission between bighorn sheep herds and from cattle on and nearby the Forest, there remains a potential for disease transmission, so how is the "commitment of resources" under alternative 1 and different than under alternatives 2 and 3? The Shoshone NF must correct the section on "Irreversible and Irretrievable Commitments of Resources" in the SDEIS to address these questions.

**62. Epidemiological Modeling is Needed to Understand How a Range of Factors Affect the Dynamics of Disease Spread Under Various Management Alternatives.**

The disease review in the SDEIS is generally based on geographic characteristics of the disease in the context of interaction between domestic sheep and bighorn sheep. While this is a useful component of much needed research, it is not in itself enough to make well-informed recommendations on policy alternatives. There remains limited knowledge of transmission dynamics. Clinical studies have shown bighorn sheep susceptibility to disease from contact with domestic sheep. However, epidemiologic modeling is needed to understand how contacts with domestic sheep, bighorn sheep, and other disease carriers (elk, deer, wild goats, birds, etc.), forage and climatic conditions, and other factors affect the dynamics of the disease spread under various management alternatives.

The current disease model relied upon by the Shoshone NF is largely dependent on assumptions, and only focuses on the risk of transfer between domestic sheep, domestic goats and bighorn sheep. The model fails to consider other species or to account for the many variables at play in disease transmission between species. These variables need to be discussed and analyzed in the SDEIS. Further, the data and methodology used by the Shoshone NF in its modeling must be presented to the public, so the public may review it and provide comments on the data and methodology.

NEPA's procedures require the presentation of "complete and accurate information to decision makers and to the public to allow an informed comparison of the alternatives considered in the EIS." *NRDC v. U.S. Forest Service*, 421 F.3d at 813. Here, further modeling and additional study is needed to determine the added probability of disease transmission among bighorns and from other animals. The probability that healthy "carrier" bighorns are infecting "non-carrier" bighorns is likely high, since a large number of the bighorns on the Shoshone NF may be disease-carriers. Additionally, more information and study should be undertaken to determine the exact mechanism for developing pneumonia in bighorn sheep following association with domestic sheep or other animals. Further, the Shoshone NF must study the development of immunity to disease in bighorn sheep. All of this information should be considered and addressed by the Shoshone NF in the SDEIS.

**63. The Shoshone NF Fails to Consider the Most Important Aspects of the Problem in the DEIS.**

Under the APA, agency decisions under NEPA and NFMA will be set aside if they are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). Under this standard, judicial review of agency action seeks to determine whether an agency "has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a

difference in view or the product of agency expertise.” *See Motor Vehicle Mfrs. Ass’n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983); *Utah Environmental Congress v. Bosworth*, 443 F.3d 732, 739 (10th Cir. 2006).

In its SDEIS, the Forest Service has failed to consider and acknowledge that the proposed alternative is unlikely to control disease transmission and is implausible. Disease could still be a factor for bighorn populations on the Shoshone NF, regardless of the closure to packgoats. The SDEIS fails to address the fact that bighorn sheep themselves on the Shoshone NF may in fact already carry the pathogens that lead to disease. Thus, bighorn sheep are at risk of contacting other bighorn sheep that carry the pathogens that can lead to disease.

Because bighorn sheep are carriers of the pathogens that can lead to disease, contact with other bighorn sheep not only puts bighorn sheep populations at risk, but renders irrelevant packgoats as the vector for transmission of the pathogens (assuming that packgoats on the Shoshone NF are carriers of the pathogens). This can mislead readers to believe that eliminating risk of contact on the Shoshone NF between packgoats and bighorn sheep will eliminate the threat of disease transmission. Under this misleading premise, the SDEIS appears to be designed to depict packgoats as a significant cause of disease transmission or even risk of disease transmission, which is not accurate. The alternatives and the discussion in the SDEIS must acknowledge more fully the potential futility of alternatives and explain the need for more comprehensive solutions to the problem of disease transmission, such as the development of a vaccine or the improvement of bighorn sheep immunity.

The SDEIS also fails to consider that other animals on the Shoshone NF, like elk, deer, birds, etc., may carry the pathogens that can lead to diseases. Thus, contact between other animals, besides packgoats, and bighorn sheep may lead to disease transmission on the Shoshone NF. The SDEIS does not discuss this possibility. In addition, the SDEIS fails to acknowledge that bighorn sheep are at risk of contact with domestic sheep and other animals off the areas controlled by the Forest Service, and which risk is not mitigated by the alternatives or the ban on packgoat use.

Because the SDEIS wholly fails to consider the risks of disease transmission from other bighorns, the risks of disease transmission off the forest, and risks of disease transmission from other sources, the SDEIS is inadequate under NEPA. As a result, the SDEIS must be revised to consider risks of disease transfer from other bighorns, out of the forest and from other sources.

#### **64. The SDEIS Does Not Properly Address the Relevance of Unavailable or Incomplete Scientific Information.**

The Shoshone NF readily acknowledges in the SDEIS that it lacks complete information to assess the potential effects of disease transmission between domestic sheep and domestic goats and bighorn sheep, let alone packgoats and bighorn sheep. The SDEIS does little to address the lack of information with its subsequent conclusions.

In situations such as this, where the relevant information for assessing impacts is incomplete or unavailable, the agency preparing the EIS must take the following steps: first, if the incomplete information relevant to reasonably foreseeable adverse effects is essential to a reasoned choice among alternatives and the overall costs of obtaining the information is not exorbitant, the agency must include that information in the EIS. Next, if the relevant information cannot be obtained because the overall costs are exorbitant or the means of obtaining the information are not known, then an agency must include in an EIS:

- (1) a statement that such information is incomplete or unavailable;
- (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

40 C.F.R. § 1502.22(b).

Here, the Forest Service fails to take these required steps to address the incomplete or unavailable information relevant to ascertaining the possibility and consequences of disease transmission between domestic sheep/domestic goats and bighorns, and further fails to do so pertaining to the lesser risks of disease transmission from domestic goats in comparison to domestic sheep. The evidence provided in the SDEIS suggests the likelihood or risk of disease transfer is largely specific to domestic sheep and not to domestic goats. The SDEIS fails here to include contrasting scientific points of view that have studied the differences in disease transfer risk between domestic sheep and bighorns, and domestic goats and bighorns. Here also, the SDEIS fails to distinguish relevant information pertaining to disease transfer between other free ranging animals as comparable to easily managed and controlled animals like packgoats. Likewise, the SDEIS fails to contain a clear and direct statement that the required information is incomplete or unavailable. The SDEIS also fails to discuss the relevance of incomplete or unavailable information in light of evaluation of a reasonably foreseeable environmental impact. Lastly, the SDEIS fails to contain the Forest Service's own evaluation of such impacts "based upon theoretical approaches or research methods generally accepted in the scientific community." *Id.*

Instead of honestly evaluating the range of potential scientific opinion applicable to disease transmission between packgoats and bighorns, the Forest Service impermissibly fails to comply with the requirements of the CEQ regulations to address incomplete or unavailable scientific information. Based on this fundamental flaw in the evaluation of environmental consequences in the SDEIS, the SDEIS should be revised to provide further analysis.

**65. The Shoshone NF must Obtain Additional Information for the SDEIS.**

When particular information “relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives,” the agency must obtain that information and include it in the EIS, unless the cost is “exorbitant or the means to obtain it are not known.” 40 C.F.R. § 1502.22. If obtaining the information is too costly or infeasible, the agency can forego its collection, providing full explanation in the EIS. *Id.* § 1502.22(b). “In that case the agency must include in the EIS: (1) A statement that the information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information; (3) a summary of relevant “existing credible scientific evidence;” and (4) the agency’s evaluation of impacts based on “theoretical approaches or research methods generally accepted in the scientific community.” *Id.*

The Shoshone NF has not included the following relevant information in the SDEIS:

- Information indicating the differences between packgoats and other domestic goats;
- Information indicating that packgoats carry disease that can be transmitted to bighorn sheep;
- Information indicating that packgoats may come into contact or have come into contact with bighorn sheep on the Shoshone NF;
- Information indicating that BMPs and/or mitigation measures are not effective to ensure separation between packgoats and bighorn sheep on the Shoshone NF;
- Information indicating that packgoats may transmit or have transmitted disease to bighorn sheep on the Shoshone NF;
- Information indicating that bighorn sheep have contracted disease transmitted by packgoats on the Shoshone NF;
- Information indicating that bighorn sheep that have contracted disease transmitted by packgoats on the Shoshone NF have returned to their herds and infected other bighorn sheep;
- Information indicating that bighorn sheep that have contracted disease transmitted by packgoats on the Shoshone NF have returned to their herds and infected other bighorn sheep, which has led to a die-off;
- Information indicating that there is a risk of disease transmission from packgoats to bighorn sheep on the Shoshone NF;



- Information indicating the risk of disease transmission from other animals on and off of the Shoshone NF to bighorn sheep;
- Information indicating the impacts of wolves, mountain goats, and hunting on bighorn sheep populations on the Shoshone NF; and
- Information indicating the recreational, social and economic impacts on goatpackers of a closure of all or part of the Shoshone NF to packgoats.