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Comments:

I'm concerned with the sentence found in on page 27 of the Grand Mesa, Uncompahgre, and Gunnison National Forests Land Management working draft stating, "To maintain effective separation among species in habitat occupied by bighorn sheep, the use of recreational pack goats and the use of goats and sheep for invasive and/or noxious weed management is prohibited." The use of recreational pack goats should be removed from this prohibition, the reasons for which I hope to lay out in a convincing manner. I also object to the educational reference on page 143 under Native Species Diversity, the inference that the public is to be made aware that pack goats transmit disease to Bighorn Sheep (BHS).

I anticipated after reading in the Colorado Sheep and Goat hunting brochure stating, "LEAVE YOUR PACK GOATS AT HOME Diseases can be transmitted from goats to bighorns, even if your animals appear healthy. Some diseases can cause large-scale die-offs of wild bighorns. To prevent disease transmission, keep domestic goats out of areas occupied by bighorn sheep." as well as information that other forest across the nation have closed areas to pack goats, I was sure I'd find bad news. I dove into the studies wondering how dangerous my Pack Goats would be to the native BHS who I've always been awed by. My gut wrenched at the thought, as I love pack goats and really love watching BHS out in the mountains, that I'd need to find another way into wilderness.

I'm sure those individuals who published this draft and the many comments of management plans have read the studies regarding pack goats and BHS. I have not, I have not yet found any! Despite this push to educate the public on the disease transmission and "large scale die offs" from pack goats it has been brutal on my time trying to find any scientific article or even a single case study linking pack goats to these die offs. The only study I have found was published in March of 2017 by Mark L. Drew (unsure of his credentials), Potential Disease Agents in Domestic Goats and Relevance to Bighorn Sheep (*Ovis canadensis*) Management, which compared herd goats to pack goats. The study was not designed, nor did it demonstrate disease transmission to BHS nor of any pathogens known to cause large scale die offs. *Pasteurella haemolytica* & *Mycoplasma ovipneumoniae* are the only two organisms in all their variants that have the potential for large scale die offs. The remaining organisms studied including lungworm & keratoconjunctivitis (pink eye) either cause blindness or only compromise the immune system which either can be controlled through direct treatment or culling the effected animals before large scale die offs occur. In Drew's 2017 study he did not test for mycoplasma but only *Pasteurella* and in particular the *Pasteurella* species thought to be most virulent, *Mannheimia haemolytica*. Per the study, "*Mannheimia haemolytica* was not found in any of 48 pack goats but was isolated from 14 of 43 herd goats (33%) (Table 1)." As you will read they did isolate "untypeable" *Mannheimia* from pack goats which they thought may have disease potential in BHS although unknown at this time.

A study conducted in 2016 and awaiting peer review did test goats for *Mycoplasma ovipneumoniae*. They tested 194 nonpacker goats (milkers, kids and bucks) and 377 pack goats from 83 premises across western United States. Only 47 out of all 571 goats isolated *M. ovipneumoniae* and only 3.3% of the pack goats proved positive. The lack of any study or event that link pack goats to an actual BHS disease transmission is to be considered as a valid argument that prohibiting pack goats in the national forest is a gross overreach of regulation. This and the Drew study doesn't prove or disprove a presence of a disease transmission risk but does show that pack goats are far less likely than a herd goat to carry the pathogens that concern wildlife biologist and the wildlife managers alike. Again, illuminating the degree of over reaction of the proposed pack goat ban on national forest.

Let's then look at the risks we do know regarding goats in general. From the articles I've read on the subject and their references I found the four articles:

1.2017 Exposure of bighorn sheep to domestic goats colonized with *Mycoplasma ovipneumoniae* induces sub-lethal pneumonia. By Besser et al

a.They evaluated the ability of domestic goats carrying *Mycoplasma ovipneumoniae* to induce pneumonia in comingled bighorn sheep.

b.Results: three pregnant BHS developed nonfatal respiratory disease (cough and nasal discharge) after comingling with three infected goats. Repeating the experiment, they took the control 3 BHS that were part of the same group of BHS and remained disease free with disease free goats while the other three had developed the nonfatal respiratory disease and added to their pen an infected goat. These then developed the same respiratory disease.

c.Conclusion: *Mycoplasma ovipneumoniae* is transmitted from goat to BHS in a pen but results in a nonfatal respiratory disease in BHS.

d.My assessment: no risk for large scale die offs from a *Mycoplasma ovipneumoniae* contagious runaway pack goat comingling with a herd of BHS.

2.2007 Microorganisms Associated with a Pneumonic Epizootic in Rocky Mountain Bighorn Sheep by Karen M. Rudolph et al.

a.This publication and the one below by the same author reference the same Hells Canyon incidence.

b.This later article did not make conclusions that goats had possibly caused the BHS deaths but that a combination of pathogens and possible stress caused the deaths. As stated in the article, "It was concluded that this epizootic resulted from a complex of factors including multiple potential respiratory pathogens, none of which were identified as a primary pathogen, and possible stress factors."

3.2003 Sharing of *Pasteurella* spp. Between Free-ranging Bighorn Sheep and Feral Goats by Karen M. Rudolph et al. This is a case study centering around *Pasteurella haemolytica*.

a.In 1995 in the Hells Canyon Recreational Area a goat and one of two BHS who were carrying identical *haemolytica* strains were found together for an indeterminate duration. In addition two other goats with similar test results for this *Pasteurella* were also found in the vicinity but were not seen together with BHS.

b.Of the 1st three animals known to be comingling (goat, ewe and ram) all three were alive and only the ewe demonstrated symptoms of rapid respirations and nasal discharge.

c.About six months later within a 30 km radius of the above three animals, 8 BHS were found sick and treated with antibiotics and released and 12 were found dead (20 total). Upon necropsy the cause of death was fibrinous bronchopneumonia.

d.72 BHS near but separate from any of the above-mentioned animals were captured and tested also for the various strains. Many of these also died after capture from fibrinous bronchopneumonia.

e.Two additional feral goats that were near but again separate from the 72 BHS (60 of which had died after capture) were tested and compared to the strains found in the BHS group of 20 and 72. They found common strains between the BHS and the goats. Again, as stated in the 2007 article the cause of this pneumonia was thought to be from multiple organisms and possibly stress. The question in this publication was the origin of at least three of the *haemolytica* strains from either of the three goats. Not all of the dead animals had the same pathogens as were found in the goats.

f.My assessment: in the case of the three animals known to have comingled, they all were alive and may have survived if treated had they not been shot. Either way there was no evidence of an epidemic, despite comingling with a goat. That establishes a degree of scientific evidence that goats do not carry a virulent version of the *Pasteurella* bacteria. One may argue more evidence is required to make this conclusion but until more evidence proves there is higher virulence, this is what we have and concludes just the opposite of what this draft proposes, that goats do not pose risk for large scale die offs.

g.Regarding the 20 & 72 BHS with the two feral goats, the fact there was no known contact forces any conclusion made as circumstantial, remember they did not find goat DNA on the BHS. The only concern for goat causing large scale die off here, is the assumption that because the goats were present in the area they had caused the die offs. The facts are: a goat known to have comingled did not transmit a *Pasteurella* strains that were virulent enough to kill the two BHS it was with. Even out of the 8 BHS that were treated, recovered.

h.Because of the circumstances I see the concern from the biologists and the wildlife managers, but based on the evidence from the Hells Canyon incidence can you restrict tax paying US citizens from all three national forests? I believe a Judge would rule against such restrictions because of this study.

4.2002 Rocky Mountain Bighorn Sheep/Domestic Sheep And Domestic Goat Interactions: A Management Prospective by Victor L. Coggins.

a.This was again not a study but a review of mostly domestic sheep incidences of disease to BHS transmissions,

but he does relate two additional incidences of goat to BHS relationships in the natural environment.

b. Getta Creek Incidence: 1200 goats used for weed control were in the area when 121 BHS lambs died, many from pneumonia. The exact number is not clear but more BHS in the same herds lived. As there was no evidence that the different species actually comingled, he admits, "cause and effect evidence is admittedly lacking, but I believe the die offs started with the goats..."

c. Warner Mountain Goats: In CA there was a BHS die off sometime before 1988 and feral goats were seen in the area.

d. I mention these to convey a complete history of published goat to BHS incidences and to show that the only evidence that goats cause sheep die offs is circumstantial and the scientific evidence although at a level IV, demonstrates that goats in fact do not cause BHS mass die offs, but rather nonfatal respiratory disease.

I would also like to point out that any documents that put domestic sheep and goats together with the same disease transmission and data of die offs is completely incorrect and purposefully painting a picture in which goats are not included.

The behavior and management differences of pack goats from here goats further distance pack goats from any disease transmission to BHS. Pack goats are raised from a bottle from their first feeding for the purpose to bond that kid to humans and not other animals. They may stick to one another, but they include all humans into their herd and as the priority herd member to stay with. I often exercise them running by pastures full of sheep. At 1st I was worried they would be attracted to one another and due to this disease transmission, I did not want any sheep contact. They pay no more attention to sheep than they do the deer that pasture with them. We also train them to trail with us, to follow close behind or in front in many cases. They do not want to be left behind. It is not easy to lose a goat even when they are not on a pack string and very easy to control when they are either tied together or on a high line. Typically if you and maybe one other person is using pack goats then there are no more than 4 -6 goats. If you have more people you may have more goats but even then there are few who take more than 10-12 goats out at once and then you would have several people to help manage the goats. I recently took a scout troop on a 50 miler with 5 goats. These boys in a couple of days learned to manage the goats well. There is normally not a moment that the goats are not within 30 yards of anyone.

There is a remote chance that one will be spooked and separated from the group. I argue based my experiences with pack goats that they will head for home or the trail head and not seek after another species to join. I could give you pages of examples of my experiences that have shown how unlikely a pack goat would hook up with BHS. Within a week either that pack goat will be found or reported missing. They won't just be left in the forest, they are too valuable due to the time it takes to train your goat to jump in the back of your truck to not eating your stuff to crossing water. Not only that but they truly love you like a dog and like wise goat owners love their goats. This is why there is a 3% disease ratio in pack goats for MOVI and also less prevalence for Pasteurella. This why it would be well within the norm to test for pathogens and treat for pathogens. These unique behaviors of a bonded goat with humans and the high person to goat ratio reduces significantly the risk of disease transmission from pack goats to BHS. Certainly this risk is far less that it is for domestic sheep. I do feel domestic sheep have a place in our forests. There is however a greater chance that a lost domestic sheep will cross this "temporal separation" proposed by this draft than a pack goat has to hook up with BHS even if they were in view of that goat. This is why after all this time you have not yet seen any incidence of pack goats running with BHS. Spend 5 days out in the mountains with some pack goats and even BHS biologist would lessen their fear of potential comingling.

It is frustrating as a tax paying high forest use citizen to see a draft proposing complete elimination of pack goats. It raises my hackles when I see such wordage in public documents stating that the public needs to be educated on the risks of pack goats to BHS, when it seems that those who have written such phrases are the ones ignorant of both pack goats and the available science. I propose you plug the ear that is inundated with yelling "evil pack goats will kill of our BHS" and look at the data, assess the real risk and weigh that with the expansion interests of Bighorn sheep and the access of pack goat owners who would like to continue to share the mountains with them. Speaking for myself, If the courts rule that pack goats must go, I will adapt, it's not the end of the world. Any pack animal I switch to will be far harder on the environment than goats. Give goats a chance, they are best way to access the mountains for anyone who isn't in their prime.

