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**File ##16-147894 regarding Proposal # 2160 to ban llamas as pack stock**

I have been asked by Rosemary Ladouceur and Bev Henry from Llama Canada to offer my assistance in addressing this proposed ban. They have provided me with all the printed dialogue pertaining to the proposal. My name is LaRue W. Johnson DVM, PhD, and professor emeritus at Colorado State University. While I have been officially retired from CSU since 2002, I remained active as a recognized camelid expert for a total of 30 years. At the peak of my camelid career, my wife and I owned 40 llamas and 6 alpacas that for many years did share pasture with our small flock of Suffolk sheep as well as 3 horses. On the same premises, we also had a small herd of milking goats as a 4H project for our daughter. I was at that time serving as CSU ambulatory teaching clinician as a small ruminant (sheep and goat) specialist. In addition, because of demand, I was having approximately 40 camelid clients with over 1000 animals in my care. This stimulated me to be involved in multiple research projects pertaining to camelid reproduction, nutrition, neonatal care, congenital conditions, tuberculosis, juvenile llama immunodeficiency syndrome, *Eperythrozoon lamae* (now *Mycoplasma haemolamae*) and herd health. A total of 80 publications emerged from these activities.

I have been an invited speaker to virtually all the USA state and national veterinary conventions as well as venues in Canada, England, Australia, Peru, Argentina, Bolivia and Ecuador. My deceased colleague Dr. Murray Fowler and I initiated the annual Camelid Conference for Veterinarians that has now been in existence for 33 years. This venue has greatly facilitated exchange of information regarding camelid health matters. 70 printed proceedings records include my presentations at the various venues. I am the sole editor and chapter contributor of two llama books in the Veterinary Clinics of North America series as well as one of the co-editors in the more recently published Llama and Alpaca Care on medicine, surgery, reproduction, nutrition and herd health. I would be happy to provide my

detailed curriculum vitae if it is deemed necessary.

It came as a giant surprise to me to find there is yet another attempt to ban pack llamas, this time from a locale in BC for the reason that llamas will pose a health threat to resident wildlife. This pattern began when the park superintendent of Canyon Land National Park here in the USA decided to ban pack llamas from his park to protect the Desert Big Horn Sheep from Johnes disease. Finally having a fact-finding discussion by various experts showing that the risk was minimal at best and that zero risk policy is not attainable eventually defeated this. During this prolonged process, many other National Parks were considering banning llamas showing how the “snow ball effect” proceeds. A similar proposal was eventually defeated in Alaska such that pack llamas are now allowed for hunting of Dall’s sheep and mountain goats. Proposal #2160 is yet another attempt to exclude llamas as an alternative pack animal based upon an extremely low risk of introducing disease to resident wildlife.

While I was presented with some impressive publications highlighting diseases of South American Camelids (SAC), they have tended to include llamas with sheep and goat diseases. As was well covered by Dr. Fowler’s letter in 2012, llamas are not true ruminants like sheep and goats. No doubt the publication’s inclusion is possibly based on how llamas and alpacas have been included in the American Association of Small Ruminant Practitioners that Dr. Fowler never did approve of. In addition, the United States Animal Health Association place llamas in the committee entitled Cattle, Llamas and Bison that further “muddies the water”.

There also has been a tendency in the provided print dialogue to deem SAC as exotic or foreign animals. The early progenitors of SAC going back millions of years ago existed and thrived in North America before they decided to migrate to South America. As such, they have been brought back to their origins. They would appear to be one of the oldest domesticated animals in the world as was accomplished by the indigenous SA residents. There is also a tendency to assume llamas and alpacas are essentially the same as regards use, management and need for veterinary care. Alpacas are not used as pack animals, generally are much coddled and more likely to have owners pursue veterinary care resulting in recorded disease condition confirmation. This would account for greater alpaca representation in attempts to study camelid disease incidence. Lastly, there seems to be a generality proposed that llamas commonly are raised with sheep. Guard

llamas indeed live with their assigned flock and I am confident any proven guard llama would not be taken away from his charges to become a seasonal packer.

As regards pack llamas that would be used for hunters to carry their camping gear as well as to help carry meat and trophies from BC environs, I can assure you they will by necessity, have to be healthy specimens. Good pack llamas will be expected to carry as much as 1/3 of their body weight depending upon their conditioning as well as “bulkiness” of the load. The point being, no llama that is sick would be put to the task of hitting the trail. In addition, I am sure they will be up to date as regards vaccinations, deworming, and nutritional supplements recommended by area veterinarians.

Following are my generated thoughts as I read through the two provided publications on disease risk from pack llamas to wildlife in British Columbia.

Both of these publications are in my opinion providing great contributions to our understanding of potential risk to wildlife by any intrusion into their domain. In addition the assemblage of disease occurrence in the various species in question is of great value.

### **Communicable Disease Risk to Wildlife from Camelids in B.C. Schwantje & Stephen 2003**

Why should alpacas have been included in these surveys since only pack llamas are under consideration for the proposal?

The information generated about camelid health problems is likely more complete as owners are motivated and financially capable of pursuing a diagnosis.

It appears that risk assessment remains hypothetical even after this study.

Did the owner mail survey include llama and alpaca owners?

If the veterinary sampling was only done on llamas, why has alpaca information been used in the tables?

I appreciate this study was generated before the Proposal 2160 was crafted and yes included alpaca input. But if data is being used against a small group of llamas, can you be valid in using all camelid data?

Considering the downturn in the camelid industry, data pertaining to populations generated in 2001 hardly reflects 2016.

Use of the term translocation for pack llamas seems inappropriate in that it

implies moving in to be established in the new environment. Humans, dog and horses then would also be considered as translocating.

Perhaps inappropriate to interject at this point, but if the health of a naïve wildlife population is of concern, why do we allow harvesting of the superior (best trophy) individuals that must be superior at coping with existing disease threats. Their superior genes are also harvested.

Remember, exposure to a disease and survival without treatment means survivors are superior (survival of the fittest).

*Pasteurella hemolytica* (now *Mannheimia haemolytica*) does not appear to be a primary disease problem in llamas.

To prevent introduction of new infectious agents to a naïve wildlife population, there will have to be absolute isolation including human including researchers, all domestic animals and control of any air traffic (helicopter and sea planes).

How do you control natural migrations?

There is a comprehensive list of camelid diseases and conditions that would tend to suggest camelids are very unhealthy. Very few on the list have a specific etiologic agent being they are strictly “-itis” diagnoses which can have many possible causes including management, nutrition, stress secondary infections and of course include many alpaca submissions. Comparable lists for horses, humans and dogs would further suggest no trafficking should be taking place in the domain of wildlife.

While the required testing of camelids coming into Canada is a plus, it is unlikely that pack llamas will be entering but if they do, they should be subjected to a thorough veterinary health check.

And the same comprehensive preventative measures should apply to humans, horses and dogs.

Is there a current disease survey of the naïve population at risk to the introduction of pack llamas? Without such, how would one know the impact of llamas being introduced?

Repeatedly throughout this publication, the authors state that the probability of adverse results coming from llama introduction is extremely low.

The Precautionary Principle actually equals Zero Risk.

Llamas have been demonstrated to have blood serum + reactions to both blue tongue virus as well as vesicular stomatitis virus with no clinical manifestations and that does not suggest they are capable of transmitting those diseases.

Since humans are now apparently allowed to frequent the same areas that pack llamas are proposed to be denied, where are the statistical numbers regarding human traffic and what requirements do they face over and above

the presumed requirements for buried defecation?

As regards possible environmental impact by pack llamas, bear in mind that llamas are preferential browsers such that they would not be competing with wildlife grazers. Remember that when llamas defecate, they totally empty and often in the same location that they or others have defecated. The point being, they are not “random” defecators like sheep and goats. In addition, the physical footprint of llamas is virtually negligible as compared to horse hoof/shoe prints.

My summary comments regarding this publication are that there is a lot of good information that can be utilized to formulate whatever conclusion you choose. The major constraint is that there has been far too much influence of alpaca content to afford reliable conclusions about the threat of pack llamas being a threat to the targeted wildlife population.

The fact that the authors of this publication consistently state that results regarding the risk assessment of camelids to BC wildlife remain hypothetical even after this study is extremely significant.

**Examining the Risk of Disease Transmission between Wild Dall's Sheep and Mountain Goats, and introduced Domestic Sheep, Goats and Llamas in the Northwest Territories." Guard, Kutz, Schwantje, Veitch and Jenkins, 2005.**

An impressive cadre of contributors and the study was funded by what appears to be other than biased organizations.

This publication uses an impressive approach to evaluate transmission and health impact risks assuming it accurately deals with a targeted model.

I will up front concede that if a pathogenic disease is introduced to a naïve wildlife population, the results can be devastating.

While there are other possible sources of pathogen introduction, this risk assessment specifically targets domestic sheep, goats and llamas as sources of infectious agent for Dall's sheep and mountain goats.

It would seem that each species (sheep, goats and llamas) should be evaluated independent of the others

Again, it seems to be convenient to “lump” camelids with sheep and goats that was confronted adequately by Dr. Fowler.

Irrespective of geographical location, with or without infectious disease or naïve populations of wildlife, we need to look at the potential threat of pack llamas rather than bunch them together with sheep and goats.

I ask myself, “What is the greatest NWT priority group trying to pass this proposal?” I list existing horse pack hunters, businesses, politicians, local

employment, livestock expansion groups or??

While camelids can be exposed to various infectious agents, what is important is not that they develop an antibody titer but whether they can harbor and transmit the agent to other individuals. There have been many examples of camelid demonstrating exposure with serum detectable titers, but with no observed disease and no transmission to other individuals.

It seems that Johnes disease as caused by *Mycobacterium avium* s.s. paratuberculosis (MAP) is being considered as a major threat to BC wildlife by allowing pack llamas to be used. Firstly, I can assure you that any camelid that would be affected by MAP would not be a packer. In contrast to typical chronic Johnes in cattle, the clinical course in camelids has been consistently very acute rendering it unable to perform as a packer. Secondly, very few cases of Johnes have been reported in North America. Thirdly, in that it has now been strongly proven, humans with Crohn's disease have MAP in their bodies and it appears that there are many "normal" humans having MAP in their bodies. So, the real take home message here is that in all likelihood humans pose a great threat to a naïve wildlife population.

*Mycoplasma conjunctivae* in my experience was rarely to never observed in camelids.

It seems in this publication that llamas are consistently included in concerns that are truly a problem only with sheep and goats.

Considering the total number of potential pathogens being of concern, very few are of significance to llamas.

Nasal bots are a very common infestation of sheep and very rarely encountered in llamas. The nasal bot of camelids is *Cephenemyia spp.* and also is very rare. Direct transmission to an aberrant host like Dall's sheep would be very unlikely.

*Chlamydia spp.* cause female reproductive problems in sheep and goats causing abortion and infertility. Most pack llamas are geldings making this threat minimal.

To highlight a single or minimal occurrence of an infectious agent, hardly makes it a threat.

While domestic sheep can potentially introduce *Mycoplasma ovipneumoniae* to wild sheep, there is no evidence the infectious agent is a normal resident of camelid airways. In addition, the two most up to date camelid textbooks make no reference and thus do not consider it a camelid pathogen

Contagious ecthyma (CE) is a very well established viral disease in sheep and goats. It has very rarely been reported in llamas. Because of the close contact a guard llama has with sheep, one would think it to be a common occurrence. During my career, I have only seen one case and that was in a

guard llama. Humans get CE from infected animals and the condition is referred to as Orf. While infected, humans can also infect other susceptibles. Dogs have become infected from feeding on an infected carcass. Internal parasites from pack llamas should again present very minimal risk to wildlife in BC. There already exists shared types in the potential hosts and with camelid dunging pattern not being random, soil contamination with eggs will be unlikely. Effective fecal testing and deworming of pack llamas would be part of practiced health program.

It appears to me that risk assessment pertaining to pack llamas transmitting disease to BC wildlife remains hypothetical at best and unless all trafficking into the concerned areas ceases, there is no justification for restricting pack llamas.

Respectfully,

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