West-wide Adaptive Wild Sheep Disease Management Venture

Steering Committee Meeting, November 17-18, 2016, Duncan, British Columbia

(Fairburn Guesthouse, 3310 Jackson Rd, Duncan, BC V9L 6N7, Canada)

<u>Agenda Topics</u>

Introductions, logistics, Goto Meeting overview, housekeeping.

- Review updated science, current diagnostic techniques, and pathogen roles (Movi, Pasteurellas , nasal tumors, viruses, others) in wild sheep polymicrobial disease events.

- Review and discuss Carson Butler's Thesis chapter from Montana and Wyoming bighorn herd surveillance efforts – compare and contrast this project with the west wide DMV and if we should, then how we could merge or build upon it.

- Review and refine all the various categories of candidate herds based on pathogen exposure and herd responses

- Brainstorm on key biotic and abiotic variables involved in herd responses.

- Review jurisdiction candidate herds.

- Refine the overall DMV study design - develop a unified message/direction/approach from the DMV Steering Committee to vets and wild sheep managers.

- Develop list of questions to take back to each jurisdiction about herds to help the Steering Committee develop a hierarchical/priority list of herds for enhanced monitoring and adaptive management actions based on their category, unique circumstances, past data, and level of monitoring that can be committed to by each jurisdiction.

- Discuss Mike Miller's idea of not worrying about solving the mystery of why herds respond differently to pathogen exposure (enhanced monitoring) and place most of our DMV emphasis on experimentation to find practical management actions that may reduce disease transmission, improve herd health, and recover herds to viable/sustainable population levels.

- Evaluate current and identify other (e.g., creating Movi free flocks) adaptive management actions that we can implement that may be or appear to be, worthwhile.

- Revise DMV Project Proposal and develop timeline and business plan beyond collecting data.

- Data sharing processes and agreements.

- DMV Membership - Roles and Responsibilities of DMV Steering Committee- who and what should they be doing

- DMV funding - develop funding initiatives, identify grant opportunities, and discuss jurisdictional funding to implement DMV

- Update disease sampling, storage guidelines, naming conventions, necropsy protocols, and laboratory roles within the WAFWA Wildlife Health Committee's Wild Sheep Herd Health Monitoring Recommendations

West-wide Adaptive Wild Sheep Disease Management Venture

Attendees: Helen Schwantje, Peri Wolff, Rich Harris, Clay Brewer, Mike Cox, Karen Fox, Hank Edwards, Tom Besser, Frances Cassirer, and Craig Stephen (invited guest); via phone: Emily Almberg, Rusty Robinson

BC is conducting Psoroptes mite monitoring along Washington state line looking at new diagnostic testing and new ELISA and treating sheep with new drug "Long Range"; also has a Stone sheep health monitoring project that is starting.

WA is continuing to monitor their Yakama Canyon Herd that has Movi. This herd might be a candidate for adaptive mgmt options. No new outbreaks.

FC – Asotin was first herd test and culled; outbreak in 2012, poor lamb surv in 2013, next 4 yrs good lamb survival; no evidence of pneumonia; haven't detected any shedding of new sheep; old sheep that went through outbreak are not shedding but still have Movi titers. Encouraging news; did remove a few ewes that were shedding. Some of the adjacent control herds are doing well where no shedders have been removed. Lostin herd is a control herd where old ewes seems to be more positive. Gribble Park Herd Paper in Colorado said you need to intervene early after an outbreak and remove carriers sooner than later. SDSU pen study of comingling animal from different herds is continuing.

Dr. Craig Stephen was invited to be a brainstorm catalyst and play partial role as facilitator. Craig is a veterinarian and epidemiologist; currently Executive Director of the Canadian Wildlife Health Cooperative; he has worked internationally on "environmental surprises", emerging zoonotic infections and brings a wealth of insight to assisting in furthering the DMV Strategy.

MC – brought everyone back to the main agenda topic of appreciating the role of all the other pathogens besides just Movi.

PW – is the DMV too Movi-centric? Been through major outbreaks with varying impacts; the one common theme that all the herds that had major losses had Movi. Confused me the most is the detection of sinus tumor. Seen herds that are doing well with Movi. Most herds had M. hemolytica. Can the increase in clinical signs of psoroptes being a measure of poor health that could lead to a dieoff.

HS – we need to be more focused on immune function, need to learn the levels of some of these immune functions before, during and after outbreaks.

PW – Elizabeth Bowen – protein expression in sea otters. We collected blood for RNA to measure protein expressions; she has looked at domestic sheep genome (similar to bighorn) and she has found interesting gene expression that may indicate stress.

Managers want to know if a herd is going to do well or die.
PW – Clint Epps is conducting research on the role of Major Histocompatibility Complex (MHC) in multiple bighorn herds and subspecies. Inherent ability of white blood cells to fight off diseases.

KF – general thoughts:

- gaps in our knowledge for certain tests for shedders and nasal tumors
- learning from each other is good
- herd replicates within specific categories may not be as clean as we thought; we may not be aware of differences that are not readily apparent; we may need to take a broader approach to categories;
- come up with management strategies and have various states try them and share their results
- metric may not be the same for all herds and all jurisdictions
- lamb recruitment is primary metric and the treatment we apply to the herd (whatever it may be), lamb recruitment will be the response variable to the treatment
- pathogen response/test result – indicator/predictor
- Are sinus tumors contributing to shedding of pathogens; Multocida may be a good indicator along with Movi
- we need more management strategies/actions to test; she likes Test and Cull and depopulation; for Translocations identify not just Movi strain but a broader concept of "varying strains of pathogens"

HE – we need to look at other factors besides the bugs that are contributing to herd response; certainly complex and difficult; so many differences among herds

PW - we need a better definition of "healthy" herd;

Me thinking retrospectively Generally people are saying there are lots of differences among our herds (I would question that since none of the speakers actually have knowledge of what each of the herds have or don't have only what their herds have; we all are making assumptions that our herds are unique and that another person's view of the situation is wrong). If we actually sat down and shared the real data we have collected from each herd, we probably will find that there are more similarities than differences.

CS – these discussions are reminiscent of shipping fever we looked for pathogens and found more pathogens; – his bighorn disease is "deja vu"; I wonder what do you all agree on since I've heard what you don't agree on; the original intent of the DMV was to support managers; all different approaches to look at disease processes;

EA – what can we do by chasing the bug knowing the key pathogens then maybe we can clean up domestic flocks; test and cull; but maybe we don't need to know about the bugs

HS – the DMV is adaptive and many of us don't want to do research or have the ability to do research

PW – high herd densities are an issue in NV; we need to know what pathogens herds have if we are to move sheep from herds that are overpopulated

FC – she gets the whole herds doing well and overpopulating their habitat but she thinks we need to think out of the box

PW – we have 65 sheep going on the next mission to Mars!

TB – He hasn't spoke much because the discussion has been mostly on mgmt actions and he just a microbiologist at an institution; he thinks "chasing the bug" is worthwhile if the can explain the broader picture; he began culture independent work to see what bugs are in the lungs, but the suite of

bacteria detected in sheep died of pneumonia were no different than the ones that died of other causes; then he got skeptical and started looking for an additional factor; most of the bugs in the dying animals are obligate anaerobes; Pasteurellas are a minor part of the suite of bugs. He doesn't think there are any 2 animals that are dying of the same combination of pathogens; he decided to go to animals earlier and earlier at the onset of disease and focused on the lambs. What he found was the first pathogen found in the lungs was Movi. He has tested this hypothesis through various comingling studies, with and without Movi and others have repeated this and regardless of the suite of Pasteurellas in at least 3 experiments, if you have comingling of domestic sheep that don't have Movi, wild sheep don't die, if comingled with domestic sheep with Movi, all the wild sheep die of pneumonia. He thinks the testing of metabolomics such as RNA gene expression involves so many variables and lots of associations; that you have to sort through them all to discern what is causing the gene expression, and in the end it will be very difficult to interpret.

HS – Might be interesting to compare pathogens in thinhorn sheep that haven't experienced pneumonia to bighorns that have to look at the differences.

CS – ask for clarification on what is our intentions of the DMV? Bring all the states together, same as CWD lack comparability, lack of controls; To identify testable projects that are replicated in multiple jurisdictions or to develop a comparable platform for testing a series of hypothesis? Are you going to identify a "Win" means and how to measure those; have Tom come in and do his research; trying to get a sense of what the DMV is supposed to do; Do you want multi-jurisdictional experiment?

RH – likes the development of a comparable platform; make sure communication is happening; less worried about Mike Miller or Bob Garrott conducting research because they will publish; more worried about local biologist trying something but didn't do enough enhanced monitoring to detect what truly happened; not optimistic in finding a single magic bullet. It is incumbent on us to add knowledge when something occurs and thought that was the main focus and purpose of the DMV.

CS – this reminds me of working in 3rd world countries, lack of resources, lack of communication, money scarce, people found a way communicate in similar language and routinely share what worked and what didn't and not wait for 4 yrs of a publication

MC – Craig is bringing us back to the core question in our DMV proposal: "What contributes to this variation in herd response to respiratory disease and how can management actions eliminate M. ovi or improve herd performance despite persistent infection?"

RH – can we remove some of the discomfort by changing the wording ". . .despite the presence of Movi or HS - take out the "eliminate M. ovi" and simply improve herd performance!

CS – brought up the "Harm Reduction Approach" that has been used many times in drug use like Heroin, LSD, Tobacco, etc.; so you have safe injection sites to reduce overdoes, reduce HIV, etc; HRA says this, we are not going to get rid of the drug (or in our case domestic sheep), remove the socials harms of the drug (deaths due to overdoes, crime, spread of other diseases, etc); 4 principles – 1) try to reduce drug exposure, 2) reduce susceptibility to the community and individuals to the harms associated with the hazard or drug, 3) increase capacity of the community to cope with the problem (concept of resiliency), 4) attack the additional cumulative stressors (food, water, predation, minerals, etc.) that push the population to the edge. So pneumonia in wild sheep is basically a harm reduction model. Probability of getting rid of the disease is low, probability of effectively vaccinating herds is low; availability of a therapeutic agent to make animals well is low; as I listen, dichotomy of

elimination of the bugs vs. how does the population cope with the persistent stressor in a changing environment.

RH – elephant in the room – we agree that dom sheep/goats and infected wild sheep continue to be a reservoir of disease that are a risk of uninfected herds and we you bring up ability of herds to cope you suggest that throw in the towel to allow for more comingling; focus on herds that have disease; but it doesn't mean that we let down our guard to allow clean herds to disease exposure.

FC – is the DMV just to manage wild sheep? or is it to manage transmission to wild sheep and prevent new infections; most said yes on the later but not primary focus;

MC - so we agree we are working on 2 fronts: improve herd performance of exposed herds and prevent clean herds from being exposed to disease or exposed herds from getting a second strain of pathogen

TB – points out that we sometimes see pathogens go away from herds over time;

CS – consider a "management pie" made of many slices of different mgmt options to deal with disease; some states can eliminate dom. sheep, some can't, some can cull herds some can't, so if we can characterize the pie slices so you can "adaptively manage the situation", by collating consistently all the different experiences happening across the jurisdictions; you're not going to get replicated trials or take this as an experiment because of the natural populations out there, but you can "triangulate" in the lab or in the wild on an annual basis of what happened and under what conditions.

Several members chimed in at once that this is exactly what the DMV was meant to do!! Craig characterized it perfectly!

CS - Classical experiment and the need for appropriate replicates; Each herd is an n = 1, 1) so sample size to see a difference because of the herd affect is small to begin with; 2) comparable but different subspecies, different ecosystems; 3) no control; so you really can't demonstrate causal relationships; so the best we can do with all the herds we have are "case series" across highly divergent areas that are good to nominate putative(standard) causative factors but not very good for proving causation.

PW – made point that our adaptive mgmt actions like test and cull were to be replicated across the different jurisdictions and subspecies to see if the treatment of removing shedders would improve lamb recruitment to see how it may work the same or differently among the subspecies.

FC – say you do test and cull in desert bighorn and it doesn't increase lamb recruitment is it because it didn't matter if you have Movi or not; or you weren't able to get rid of Movi through test and cull as you did in California bighorn. So you may fail to cull the right animals as you did in another subspp , but it doesn't mean that test and cull failed, you just didn't apply it consistently across subspp.

What would be Colorado's non-pathogenic (not worrying about removing Movi or not) mgmt actions

KF – nonselective culling or ewe hunts

FC – what if you do a nonselective ewe removal and you recover the herd with good lamb recruitment? But you don't know why it worked; is it because you removed the shedders or because the herd is now smaller? You should have some null hypothesis to start with.

CS – he is not discouraging us from conducting "clinical trials" (in replace of experiments) because it will allow you to "triangulate" and learn stuff and accumulate all these observations and knowledge and may see consistent patterns of some level of success but it won't have the validity or power of a true experiment.

TB – if you have simple experiment, with simple clear hypothesis like test and cull and you replicate it across many herds that have lots of differences (so yes it is poorly controlled) because we can't control for the differences among herds and it works, along with having herds that you don't conduct test and cull to and they (control herds) continue to have poor lamb recruitment, then you have a powerful experiment or trial because it worked across all this variability.

RR – I still think we are going in circles to what this DMV is. Is it to improve communication? If so we have conferences and meetings that we are doing that in; but if you allow jurisdictions to try different approaches in their own way, because they don't have a research branch or because of lack of funding, you may learn from that; some people are working on the pathogen part and others are focused on genetics; sharing with others what doesn't work; If the DMV primary role is to just communicate we need to come up with something better.

CS - What is the problem that the DMV is trying to solve?   He keeps asking this question!!!! We tell him trying to find ways to recover herds and improve lamb survival; but he argues that many people are trying to do that (not so sure that is true; a few jurisdictions are trying but most are not); his point is the DMV was designed with a particular approach to do ??

Me thinking retrospectively (I think we are trying to provide a reasonable framework to follow but not too rigid nor "helter skelter" and to be a clearinghouse of results and feedback loop to everyone so we can adapt from what is learned and if we find things that work we encourage others to try; if things don't work we tell people may not want to waste your time on that.

CB –We have never compared notes; we have been poor communicators;

EA – we want to speed up our learning; we are all doing are own thing and that is a problem;

HE – shouldn't we (DMV) be providing mgmt options to states to improve their herds

HS – we are assuming we understand what the factors are that create variability in herd response then we will have healthy herds.

Everyone weighed in what they think the DMV should do or accomplish or what it already has done.

Me again! So if the DMV is going to provide advice and provide good feedback that is useful, we need to have some moderate level of scrutiny and QA/QC before we knee jerk and tell everyone this process works and then find out it doesn't because a single jurisdiction didn't probably document what they did and made too many assumptions or changed the processs from year 1 to year 2.

PW – we have only a handful of states trying a few things but rest of the jurisdictions are waiting and wanting direction; some groups are publishing like mad and the rest of us are confused and then get an outbreak and don't know what to do.

HS – we started by developing standard guidelines for sampling and how to interpret results

CB – became the bug chasing thing; so the managers are trying to track all "this" and getting confused; sportsmen groups are confused and saying managers don't have their act together, domestic sheep industry sees that we are just chasing our tail and each week there is something new; give me some tools and help me crawl out of this mess!

Me again! Information sharing is critical! We need to provide a framework for agencies to follow but don't dictate how they go about their business – double edge sword (don't want to tell people what to do but also garbage in is garbage out).

Not enough funding to accomplish everything we want to under the DMV;

RH – just having a single business manager in charge of the WSWG is not the answer; Mike and Clay have been trying to collect information but many states simply don't respond. The DMV was thought to be an avenue to have us all come together.

PW – the DMV has brought many of us together that want to learn and improve things.

CS – Is it just about research and sharing research results or is it more to share policy, practices, etc.

PW – The DMV has provided a more effective way to communicate with everyone on what they are doing and where to go next.

CS – making important point that the DMV is not just about immunology and pathology; it provides much more of a broader perspective and info sharing on the policy, social, and environmental context of what works and what doesn't

PW – this is a way to bring us together and look at the disease issue and how it impacts herd performance and health of the herds and sustainability

FC – people want to bring up the point we have lots of difference situations but instead we need to focus on the commonalities we have.

KF – said the current DMV adaptive mgmt strategies were very stringent

HE – know that some states may have limitations in implementing adapt mgmt actions

PW – we need to provide enough guidelines to help those states that want direction in trying actions; for those states that have more expertise, they won't need the specific guidelines

Break

HS – BC biologists who were given the opportunity to nominate herds for DMV monitoring are bought into the DMV and are really thinking about disease processes in their herds more than ever.

RR – we need 2 or 3 main goals that we all agree to; We provide the tools (protocols), DMV – core mission - communicate, share information, provide tools, encourage jurisdictions to explore other mgmt tools and share, make sure we give equal time to sharing what didn't work with what worked.

HS – she went through ideas written on flipchart for EA and RR

RH – Concerned about not documenting the how and why things work. Example: if you do nonselective culling and you get a improved lamb recruitment, you might get where you want to go but you may not know how or why you got there.

HS – adaptive mgmt is learning as you go, so you should understand what is working.

CS – don't necessarily need to know the detailed causal pathways but you need to know enough of the context of the trial to allow your jurisdiction to have the confidence to extrapolate the mgmt action to more herds

RH and CS – DMV should be a clearinghouse, don't prescribe but suggest and encourage

EA – can we refine the enhanced monitoring and try to trim them down to make it easier for the jurisdictions. We went through the enhanced monitoring table and pretty much agreed it is good list and don't need to simplify

CS – made point that we need to add other variables to collect beyond the biological and pathogen monitoring to allow for comparisons across herds like distance to disease risks (domestics or infected bighorn), drought, fires, other environmental stressors.

PW – brought up we need to share the long list of variables that Mike came up with some time ago that may affect herd performance

CS – framed up our the Steering Committee deliverables to all the jurisdictions; he made flipchart of what to ask jurisdictions and what we are to give them

Everyone – reviewed the DMV project proposal –

FC – speed the collective learning, what EA wrote; reiterated what RR stated as the 3 main goals

RH – DMV will act as a facilitator or energizer among jurisdictions

CS - DMV will be the "super connective", giving advice to jursidictions, we are not trying to solve the respiratory disease but we are trying to solve the communication synapses among the jurisdictions and share the results of trials.

CB – we told all the directors we are stopping the bag chasing and we are going to identify and evaluate management options and will give states mgmt options and tools that work

CS – exploit others knowledge and what others are doing and share it with everyone

RH – The DMV is really trying to solve the communication problem and try to speed the ability to find workable mgmt strategies

HS – I wrote our main purposes we just discussed of the DMV on flipchart

PW – using nasal tumors as an example to help speed the collective learning; share protocols to collect samples, share knowledge from Karen Fox from her research, and continue to ask jurisdictions to try different methods to control its spread, share it with everyone.

HS – had dieoff in Okanagon back in early 2000, detected Movi and we culled the herd and they quickly recovered

General discussions on funding of the DMV; RH – vision of getting money and sharing it without having a project manager/coordinator;

CB – DMV will never reach its full potential without adequate funding

CS – end of the day DMV is trying to get faster more efficient knowledge to action

CS – writing up a newsletter online for all jurisdictions to read on their own leisure of the outcomes of the monitoring and adapt. mgmt trial work

RH – Again spend funding on jurisdictions work not a project manager

CS – can you sell the DMV that it will make a difference and identify what needs we have for funding; PW comments were very helpful that some jurisdictions like NE just don't know what to do and need help from the DMV.

PW – we are making a difference through the health guidelines and training we gave; we need to summarize the patterns of herds across the west and share that info and convince other jurisdictions to try things that others heard about and this is speeding our collective learning

CB – He thinks selling to directors and NGOs, the DMV concept of collective learning is not as easy, as selling something that is management driven.

PW – Argues that in recent years, we have bios in NV that have been willing to admit that if I kill ewes that may improve lamb production and in CO to have bios willing to killing the remaining 15 ewes from a herd that hasn't gone anywhere for 20 years is HUGE! We are making big strides with our biologists.

KF – by having a group under WAFWA that says this strategy might be worth trying gives it more credibility to the managers; if it was just me saying you should try it, they might not be willing to do it.

PW – Texas for the first time is sampling their bighorn sheep; again major strides resulting from the concept of DMV

HS –Same thing happening in BC of major strides to enhancing our collective learning: efforts to sample small farm flocks has been well received because biologists have been listening to others west wide that we need to try to do something to improve herd health.

CS – summarizing what has been accomplished: improved respiratory disease mgmt by increasing awareness; has these efforts resulted in a victory somewhere; like in Alaska, WSF gave them $50K to match with federal aid to sample dall sheep; you need to go to the next level of being impactful!

FC – we need more participation across more agencies.

PW – we need to toot our own horn in the way that sportsmen will read it or hear the message (publishing it in a journal is not reaching them) like by removing 5 ewes has resulted in improved lamb recruitment; need to tell the success stories in a way that people to listen. "We are cautiously optimistic that we have had successes"

HS – WSF has email blasts, Tom Besser has been writing columns in the Wild Sheep Magazine; we need others to write articles;

HE – he suggested having 1 rep from each WSF affiliate group come to a DMV mtg once a year and give research review to them to share our successes

CS – want more awareness, local champions; get more jurisdictions coming together and sharing successes; how can the DMV group to be better. We need all the jurisdictions to come to the table during our annual gatherings

KF – think about broader concepts to be discussed;

CS – we need more mgmt options for jurisdictions to try;

MC – CO and MT are not yet willing to jump on board to the DMV but they are close to it; how do we get them to get full buy in

CS – reminds me of a provincial fish health committee that got funding that paid 1 day a week that a person could review literature and write a white paper on various topics; white papers could be foundation for getting justification for getting funding

HE – would like to try fertility drugs for herds on NPS lands where we can't get hunters

RH – wondering about MT buy in to the DMV;

EA - MT is already conducting enhanced monitoring so we don't need the DMV (UGGGGG!!); they are afraid of giving data to a third party; they didn't understand what we were asking for;

CS - We need to build more trust with MT so that they will participate in the DMV in the future

RR – we need to find out what MT is uncomfortable with;

Lunch

RH – we owe jurisdictions a report on what we have "asked them to do for the DMV"

Discussion on agenda items and "deliverables" back to the members on what we have learned and progress made on the DMV

CB – we asked last January to sign up their candidate herds and many states did that and we owe them a summary of what we found out.

Preparing for the January WSWG meeting

RH – MC needs to generate a summary of the candidate herd Google Survey even if some states have yet to enter any herds

Also give summary on Frances' JWM journal manuscript "A Review of Pneumonia in Bighorn Sheep

Discussion to develop list on flip charts of what we "asked" jurisdictions and what to "Give Back" to jurisdictions at Year 1 and Year 2 – 5.

BMP or Assessment/White Paper documents are important to generate in Year 2- 5 to share with everyone what works and what didn't and what has potential.

CS – made point that you need toshow the value added by the DMV by producing written products and there is currently not enough time even from all the DMV members to produce these products, so eventually, you need to think about hiring a person to assimilate and write up these various publications and explanations .

KF – review of Gribbles Park CO herd; 13 ewes were removed to Thorne Williams Research Center in WY but she thought the remaining rams were shot and killed; it was repopulated with animals from a "clean" herd within the region. Later during the 1.5 years the ewes were in captivity testing over time showed more P multocida spp that other bacteria

This data represents pathogens in animals years after the initial spill over which we don't have data for in terms of the actual suite of pathogens that caused the initial disease event. But it was generally accepted that some jurisdiction vets are done with chasing Pastereullas, they won't bother to sample anymore, but for others like Karen Fox, if she wants to look for patterns of specific pathogens beyond Movi that are responsible for disease events, her work is encouraged because that is how we have learned in the past, especially uncovering nasal sinus tumors.

CS – explained the Harm Reduction Approach involving tobacco; at first no one could agree that Tobacco was bad for you because they were not sure what chemical was bad. Could be nicotine, formalin, etc. Just like the different pathogens, people will argue which bug Is the culprit; he is convinced that yes sheep pneumonia is polymircrobial but that it will not be the same suite of pathogens in every sheep that dies. So you need to describe it as a sheep respiratory disease and not focus on any one pathogen.

KF – domestic sheep are "cigarettes" to bighorn sheep!

PW – if we could eliminate the Pasteurellas, Mycoplasma, and even fusobacterium (this is an anaerobe that is not looked for in culturing; only aerobe can be cultured), bighorn sheep would be happy for a very long time. One of the reasons for using Movi as much as we do, is that I can detect lots of different Pasteurellas, I can speciate them, get few or many, figure out whether or not they produce leukotoxins, I don't know what to do with the data, because all of the healthy herds have them. We have lots of herds we tested before they experienced a disease event and they were doing well and had no Movi but after we detected it in the herd we started seeing increased adult morts at various levels and worse was the poor lamb survival.

FC – PW advocates for collecting swabs and freezing them for later testing. Ok, well Hank during Bob Garrott's research look at a ton of these samples I want HE to tell us what did they find through all their testing and analyses?

HE – his take from Carson Butler's paper is that M. hemolytica is difficult to detect and what his paper provides is the guidelines that say you must look at this many sheep in order to detect that bug. But he didn't tell us that they detected a pattern of M. h. as a significant player in causing dieoffs. So we are still wondering what is the significance of looking for that bug?

FC – is there a better test to be focusing on something that might be more directly tied to the cause of pneumonia outbreaks like leukotoxins?

HE – has anyone been testing how well the bacteria stay viable in TSB medium at various ultracold freezer temps?

TB –you need to keep TSB at -80F to keep them viable for more than a few months.

HE – So much of Carson Butler's research was evaluating how samples are collected and stored and the probability of detecting each pathogen based on collection and storage methods.

EA - Carson's paper showed that Pasteurellas detection levels are extremely low; so if you can't accurately detect Pasteurellas it raises concerns of detecting these bacteria. The more we have sampled healthy herds in MT the more we detect Movi where we are not seeing major respiratory disease. So question is how well have we sampled these healthy herds and how good is our ability to determine the presence of pathogens vs. presence of the disease. Might we learn more by focusing on these healthy herds.

HE – know the limitations of sampling

TB – taxonomy of Pasteurellas is a mess.

End of Day 1

Day 2

CS – Overview of what was discussed yesterday; refer to flipchart

We agreed to make Hank Edwards an official member to the DMV Steering Committee; make sure Mike Miller continues to be member, we just need to get him to engage more (busy guy); we recognize that Tom and Frances are official committee members. Bob Garrott should be a member also; we need to approach him of his time and interest.

Revising the DMV old "Project Proposal"

Timelines for rewriting the new DMV Strategy
- Nov 30 – draft to DMV members so they can review it and give it back to MC to incorporate edits
- Dec 12 – send out draft DMV Strategy to all WSWG members for their review
- Jan 5 – Final DMV Strategy document

ES – Movi or generally any/all respiratory pathogens?

PW&HS will transfer the current herd response/pathogen exposure categories to the flow chart diagram for the strategy document

RR – Don't forget to identify herds that have had contact with domestic sheep and has not shown any negative population response

Provide rationale or advise states

Management Actions or Options; list the options by name in the Strategy but place details in the appendix.

Test and Cull – be broad on the predicator variable used to "test". Currently it is PCR+ for Movi, consider other variables

Translocations – make it more clear about the concerns for both the source and recipient herds

Other Options
- Controlling parasites – lots of differences in utility of doing it????
- Nonselective Cull or Removal: not just for getting lucky of removing the shedders but also to reduce densities

 FC

Reno WSWG meeting Roles and Responsibilities
Very important to "Get Buy In".
Message must be clear to the WSWG members! Get to the point!

MC – needs to get with WAFWA webmaster to see how we add content to the website for each jurisdiction; generate newsletter back to WSWG members to encourage or remind them of conducting enhanced monitoring; Clean up of jurisdictional responses in the Google Survey; contact them to get clarification (ex., Rich thought ??

FUNDING IDEAS

RR – go to Western Hunting Exposition in SLC to have booth and sell tickets for wild sheep hunt or some other experience
CB – somehow acquire 4 auction tags from jurisdictions for proceeds to go to the DMV
HE – auction people to go out on bighorn captures
MC – go after multi-state grant funds through USFWS Wildlife Restoration Federal Aid Program