



WAFWA Wild Sheep Working Group Winter Meeting NOTES
Virtual Zoom Meeting
associated with Wild Sheep Foundation's Sheep Week



January 12, 9 am – 4 pm – PST
&
January 13, 9 am – noon - PST

Zoom Link for Day 1 and Day 2 can be found at this Link:
[WSWG Jan 2021 Meeting Google Folder](#)

Tuesday, Jan. 12, 9 am – noon PST, 10 am – 1 pm MST – Session #1

Some of the action items are highlighted in cyan color

Welcome, Online Attendance Sign-in Sheet, Announcements, Introductions,
URL for attendance sheet: <https://bit.ly/2QCjJHs>

- Mike – WAFWA staff last year changed the Wild Sheep Working Group to the Wild Sheep Initiative
 - Still working on November WSWG notes
 - Hope we can get in person meetings again soon
- Kevin – Virtual Sheep Week, lots of people involved
 - \$200,000 into this format
 - 3600+ registered so far
 - Some staff in Reno, some scattered about
 - Wild and Wool film Monday night, 75 participants
 - Early registrants have chance for desert sheep hunt
- Mike – Role call, WSWG introductions
 - Ask all to sign in via URL

WSWG Members in Attendance: Darren Bruning & Kimberlee Beckman for AK; Anne Hubbs AB; Dustin Darveau & Amber Muning AZ; Helen Schwantje, Bill Jex & Caeley Thacker BC; Tom Stephenson CA, Andy Holland CO; Hollie Miyasaki ID; Brent Lonner MT; Todd Nordeen NE; Eric Rominger & Caitlin Ruhl NM; Don Whittaker OR; Froylan Hernandez TX; Riley Peck UT; Doug McWhirter and Daryl Lutz WY; Brian Logan, John Shivik & Lucretia Smith USFS; Frank Quamen BLM; Nathan Galloway & Melanie Woolever NPS.

WSWG Apparel – old ball caps and new hats for the stylish ones

- Mike – still have WSWG trucker caps for folks, let me know if you want one; seeking interest in ordering a safari brim hat with WSWG logo on it – let me know if you would be interested in one.

Risk of Contact Model Workshop - 9:30 am – 11:30 am PST, 10:30 – 12:30 MST

- Presented by Josh O'Brien, Anthony Titolo, Kezia Manlove, Melanie Woolever, Frank Quamen, and John Shivik
- Link to the screen video of the workshop is on Vimeo at link below:
- <https://vimeo.com/512651889>

Risk of Contact (RoC) Tool Training-Notes

- Folks and Agencies involved in revising this tool – BLM, NPS, USFS, USGS, WSWG, WSF

- Agenda
 - Welcome and introductions
 - History/background
 - Conceptual model
 - Input data and requirements
 - Description and demonstration
 - Discussion of the results
 - Accessing the tool and data
 - Discussion
- Welcome to the Model revision Team
 - Josh O'Brien-Spatial Ecologist, Anthony Titolo-BLM, NOC, Frank Quamen-BLM, HQ, Kezia Manlove-USU, Melanie Woolever-NPS
- Introduction- Land management and state wildlife agency need
 - BLM guided since 2016 by Manual 1730
 - Congressional appropriations language strongly encourages BLM and USFS to conduct RoC analyses. Quantifying risk of contact helps managers to make decisions on public lands
 - BLM Updated tool conversion to R software
 - Frees analyses from dependence on ESRI ArcGIS
 - Maximize accessibility and increase stability of the use of the Tool
- Melanie Woolever - History
 - What is the potential for exposure to disease pathogens and how it might impact herd viability, process started in 2005, finalized in 2010
 - USFS commissioned a team to develop a tool to assess contact of domestic and wild sheep
 - How can the contact of wild bighorn sheep to domestic sheep affect wild sheep persistence
- Josh O'Brien - Conceptual model, Input data and analysis, description and demonstration
 - Original Payette Analysis, New model is similar to Payette Analysis. Extensive dataset collected over 13 years by the Hells Canyon initiative. From 444 animals and 12 herds in the Hells Canyon metapopulation. Observational and VHF data both used
 - How likely are animals to move from their home range?
 - Input from biologists from Washington, Oregon, Idaho and 4 separate tribes
 - Foray probability model
 - Estimate Core Herd Home Range (CHHR)
 - Foray Frequency and Distance Distribution
 - Estimate of habitat selection
 - Habitat raster, Foray probability surface, how likely an animal is to using that habitat, defines probability of contact with other individuals by using a habitat model and the risk of contact with domestic animals
 - CHHR polygon combined with the spatial habitat raster and foray probability raster that can produce a table of values that estimate contact rates with a public allotment or private parcel with domestic sheep and/goats
 - Habitat layers
 - Based on access to escape terrain of Bighorn sheep
 - Good topography combined with accessible food
 - Escape terrain
 - 2 hectares or greater
 - Slope between 31 and 85 degrees
 - Ruggedness index>300 or within 300 meters of(or within 500 meters and between two areas of) such area
 - Horizontal visibility
 - Modeled using LANDFIRE vegetation layers
 - Hells Canyon with < or = 30% forest canopy cover

- Proximity to perennial water
 - Three basic habitat classes- gives relative preference for animals versus the availability
 - Habitat
 - Connectivity area – ridges and land features wild sheep will travel on
 - Non-habitat – like playas, valleys, developed areas, forests
 - Inputs from these classes go into the RoC Tool
 - RoC Tool Overview
 - Tool is implemented in R, available as a simple installer
 - When launched, you receive a browser based interface with three tabs
 - Estimate CHHR/Estimate risk of contact/Map
 - Home range Tool component (Estimate core herd home range)
 - Kernel density estimator
 - Two bandwidth estimators and other tuning parameters
 - Reference (Href) estimator produces a larger rounder area estimate
 - Plug in (Hpi) estimator produces a smaller narrower area estimate
 - Estimate Risk of Contact
 - Load allotment layers (from shapefile or geodatabase)
 - Meant to represent any area you want to estimate the risk of contact for; it can a large public land grazing allotment polygon or even a small farm with a flock of sheep or goats
 - Load habitat layer (must be stored as a GeoTiff file)
 - Habitat classes can be loaded from a CSV file
 - Input herd demographics
 - ram to ewe ratio; herd size;
 - Input foray behavior
 - Ram forays often exceed 10 km
 - Observed HC foray distance consistent with other reports
 - Perform RoC analysis
 - Observe produced interactive map
- Anthony Titolo - BLM - Discussion of results
 - How to use the data produced
 - Once the analysis is complete, a table of results is produced with probabilities of distribution
 - Several allotments overlap the core herd home range
 - Assumes that any allotment which intersects the home range will result in the contact and is not included in the analysis, these are flagged in red in the produced table and one should assume that there will be contact
 - Ring column
 - Annual probability that a single ram or ewe will leave the home range and contact the allotment
 - Ewe and ram contact rate
 - Single animal contact probability
 - Summation columns
 - Sums up the probability rate
 - Interpreting output probability tables
 - Estimating the interval of years between contact and apply various assumptions about disease transmission occurrence
 - Estimating disease return intervals based on assumptions between the contact and the probability of an outbreak resulting in a disease transmission

occurrence which can then result in an estimation of years between a disease return intervals.

- Management decisions can be based on some assumptions
- Josh O'Brien-Accessing the Tool and Discussion
 - Discussion and wrap up
 - Where the Tool is available to download
 - BLM, NPS, and USFS
 - Will be available on USGS-hosted public facing website thanks to Paul Cross
 - Available by contacting Josh O'Brien
 - Model assumptions
 - CHHR is accurate
 - Locations and movements are representative of the herd
 - Collar data are not temporally auto correlated
 - Habitat layers and preferences are appropriate for local wild sheep herd
 - Per capita foray rates are independent of the density and sex ratio
 - Limitations
 - Calculates the risk of contact with allotments, not the probability contact with domestic animals and pathogen transmission
 - Does not model attraction between bighorn and domestic sheep
 - Model does not account for stray domestic sheep
 - Questions?

Mike – Many improvements made to the model

Frank – BLM program lead, presentation will be on the website

Melanie, Josh, Anthony – PP presentation continued

- RoC tool is on Federal sites, future availability to all via a website, contact Josh as needed

Frank – Questions:

Chat Questions (see Chat conversations)

- Contact Josh, Kezia, John, Frank, Melanie with additional questions and explanations

Melanie -First of February, USGS will have the RoC available, prior to that contact RoC folks above

- WSF and others providing money to help support training and user support
- Additional CHHR estimators to model coming

Kezia – Issues with data (older VHF data vs new GPS high resolution data) so working on identifying best data sets for use with the RoC tool (See slides) (See recorded zoom meeting)

Mike – bring more awareness to all involved and continue to work with respective agencies and entities. Want Josh to be able to help everyone but will need additional funding, consider agency sources

- Kezia Manlove-KDE vs MCP coverage (with href)
 - Full dataset (4-hour fixes)
 - Very narrow fix rate data
 - Using points from once daily dataset (GPS)
 - May use points from one weekly point (Old VHF)
 - Data models produce similar results
 - KDE as a point estimator tends to be biased higher

Wild Sheep Genomics Group – Update on California Bighorn Taxonomy Project and development of a genome- and range-wide genetic dataset – Clint Epps and Josh Jahner

Mike – what do we think the historic distribution of California bighorn sheep was?

Josh – Not going past the Snake River plain or Columbia Plateau.

Clint – PP presentation (see slides)

- Develop a genetic management strategy for California bighorns for managers to decide whether or not to:
 - Preserve existing genetic structure and make no additional effort to increase genetic diversity beyond existing practices
 - Preserve distinction between California and rocky mountain populations, but actively manage genetic variation in California populations via translocation
 - Or Allow mixing between California and Rocky Mountain or other native bighorn subspecies populations
- Objectives for Phase 2
 - Finish acquiring samples
 - Generate next generation sequencing libraries
 - Begin bioinformatics and population genetic analyses
 - Differentiation among California and Rocky mountain herds
 - Compare levels of genetic diversity among herds
- Genetic samples from;
 - Alberta, British Columbia, Washington, Idaho, Wyoming, Colorado, Nevada, Oregon; over 1,300 already sequenced and over 400 to be sequenced later
- **Funding needed to complete analyses requesting agencies to consider assisting with funding in 2021**
 - Past funding
 - 100K from NDOW
 - 10k from WSF
 - Mostly used for data generation

Josh – Excited to work on this and welcome any collaboration and involvement

Clint – Want to be transparent with the project

Mike - Are jurisdictions trying to keep California and Rocky Mountain Bighorn Sheep separate or not?

- Nevada probably has more interactions with Desert and California bighorns

William – Tried to maintain those genetic distinctions. Don't think they have any hybridized herds

Mike – how much interactions with British Columbia? William – do have some; Bill – yes have some

Kevin – WGF did mix the two species. ND has done the same.

Doug – hybrids in Wyoming - Devils canyon have been used as transplants. These herds continue to do well.

Clint – hope to learn more from these Hybrids

Doug – Interesting to see results of these hybrids from WY

Mike - Nevada – now have 3 subspecies in the state. Statewide mgmt. plan encourages broader distribution of Desert bighorn. Maintain California bighorns in some areas. Discussions will continue on hybrids of deserts and California

Tom – Until recently never had California, taxonomy confusing with Sierra. Now have some California bighorn coming in from NV and Oregon. Discussion should we let California BHS expand in the state? Discussion on which are best adapted to area.

Clint – Deserts seem to have impressive forays. Some California seem to stay put. Would that change with hybrids?

Mike – NV has had California bighorn moving back and forth into Oregon for years.

Lunch - Noon – 1 pm PST

Session #2, Tuesday Afternoon

Identify and discuss planning, implementation, and outcome of Test and Removal Projects by all jurisdictions

Mike – Frances moving this idea and project along and seeing more states doing this

- **Consider a working user's manual on Test and Remove**

- Perhaps more of a question/answer from each state for this discussion

Kezia – a compact narrative from each state, challenges, worked well, experimental

Frances – also hear from others about this user guide/manual

- Natural removal and possibly affecting populations with other herds

Helen – two herds with history of Movi – Chasm and West Fraser River herds

- Many animals positive for Movi, in concert with many ewes not producing lambs
- Past year several animals removed and observed increase in recruitment

Mike – did you have a game plan with the project?

- Helen – initially felt like might have to shoot them all and start over
 - o Instead collars were put on some and monitored
 - o Then used the test and remove method using helicopter netgun and removed after only 1 test if PCR Movi positive
 - o Chasm Herd – very few if any lamb survival since 2014; population went from 100 to 35; then in November 2020, first time 5 lambs survived.
 - o West Fraser River herd – conducted health survey in herd that hadn't been sampled for many years. Confirmed 10% of ewes Movi PCR positive with 20% ELISA positive with essentially no lamb recruitment
 - o Had a treatment and control band and tested with Biomeme units
 - o Removed 11 animals then Nov 2020 saw a lamb recruitment increase 49% from previous year
 - o Biomeme was not easy
 - o Took multiple swabs from each animal to compare Biomeme results with labs
 - o May go back to the treatment band for more testing
 - o Interested in seeing if Movi persists
 - o May expand to other herds
 - o Likely will continue with Biomeme but collar and release rather than remove
 - o Lesson learned – more complicated than initial thought, Lots of things to contend with. Did have good buy in from various groups who were present during the testing.

- Daryl – what were population sizes?

Helen - ~30 and 40 - 45 respectively

- o Do have prevalence rates in herds
- o Just did one year – 2020
- o Had one heard back in the 90s that appeared to recover on its own
- o Drugs used – Nasal atomizer and metatomidine (lightly)
- o No post testing yet but that will com

William – what is preventing some people from moving forward with a Test and Remove - in WA in Yakima

Cnyn Herd (100-120 animals) we have concerns that we won't capture them all and remaining

shedders will interact with subherds and continue to have herd struggle and perpetuate the problem.

We are thinking of taking 2 years for testing.

- Mike – Pros and cons of having to stretch this out since you can't catch them all at once?
 - o Will it affect the results by extending the results or perhaps just a one year deal
- Frances – Good question, has never done it for just one year.
 - o Helen – in hindsight wish we would have put collars on and released and not removed

- Was interesting showing on site what pneumonia looks like
 - Mike – in Snowstorm herds – would like to do one year instead of multiple herds
- Frances – many working on smaller groups, not meta populations
- Helen – Even if you don't get them all in the 1st year, you may get more lamb survival than not doing it. I think it's worth doing.
- What is youngest supershedder? 4+ typically
 - Frances – Agrees but has some positive that were younger, even if positive may not be a shedder
 - William – How to identify them? Seems to be adults
 - Frances – Many clear it
 - Daryl – Lots of questions regarding this topic or focus on the document?
 - Mike – keep the creative juices flowing; others will have the same questions. Regardless, we will be producing a document
 - Daryl – WGF really want some of your time, considering a workshop with WSWG agencies to share their insight on Test and Remove Projects they have conducted.
 - Helen – started with a basic framework then perhaps spreading out to others
 - Kezia – pose your questions in the Chat and to help through these questions
 - Frances – other states doing this like NE and SD
 - Mike – a few people start with the document then open up to others
 - For now continue ask questions
 - Daryl – we are talking about treating individual bans of sheep in a greater population like in Hells Canyon. Is there a herd size where it's too big and won't clear?
 - Frances – don't know but try it. Hells Canyon total metapopulation is 1,000, 16 herds, treated 3 subherds but one still has Movi. Rest of herds are now Movi clear after clearing the 2 subherds. 14 herds had Movi
 - Daryl – was there other environment conditions etc. That helped clear the non-treated herds.
 - Frances – Just started at one end of the river system metapopulation. Had Movi in these herds for 20 years +; May have been some environmental factors but feel the treatment helped
 - Helen – how to determine supershedders, hard to tell by observing
 - Frances – need to test multiple years and if they are continually positive, then yes
 - Daryl – Did you have sinus tumor
 - Frances – some do, some don't
 - Mike – have to kill animal for sinus tumor testing
 - Nate in NV – Chronic vs supershedder – Chronic shedder is now more accurate
 - Eric – Is anyone killing rams or just ewes or lambs
 - Frances – just ewes
 - Mike – can have positive rams floating around only interacting with ewes during the rut as Frances has pointed out, but in Nevada, we have Movi positive rams using same guzzler as ewes and lambs during the summer and so we have removed rams because of that potential interaction when lambs are still susceptible to pneumonia.
 - Daryl – Could guzzlers be a source for Movi?
 - Tom – looked at that a lot. Could detect nonviable Movi in small amounts of water but not viable Movi. Never saw any transmission via water
 - Daryl – How about guzzler structure itself? We swabbed guzzler and tested water.
 - Tom – no work in that regard, Be more worried about it surviving in moist environment than water itself. Still an open question though
 - Daryl – didn't find it either in what they sampled
 - Hollie – Perhaps more about the sheep congregating at water
 - Tom – think that is potentially important to consider
 - Helen – Biomeme – hand held PCR unit, company that developed this is now very involved with Covid
 - Daryl – Is there is sense of false positives?

- Helen – false negative worse but both are concerns
- Daryl – how accurate?
- Tom – Both false positive and negatives do happen
 - o Need to understand PCR technology, would help with detecting false results
 - See more false negatives, perhaps attributed with swabbing?
 - o Helen/Caeley – they produced a summary of the use and performance of the Biomeme unit and comparable results from established labs conducting PCR. Will send that out to Mike Cox.
 - o Mike – Test and remove process on mountain goat herd in Nevada
 - o Brent – Mt goats and sheep comingling?
 - Mike – Had all PCR negatives in 2019 in sympatric bighorn herd but Mt Goat herd continued to decline; hope to clear Movi from Mt Goat herd
 - Have detected same strains of Movi in Goats and sheep; mtn goats can be a reservoir
 - o Mike/Kezia – what other questions today to help with developing the Test and Remove User Manual?
 - o Kezia – all the logistics involved into setting up a Test & Remove project
 - Follow up monitoring of lamb recruitment, demographics, looking for shedders
 - Biosecurity knowledge – do you have a sustained risk that was part of the original spillover and have you take steps to eliminate it or control it?
 - When chronic shedders naturally die, are you able to document that
 - o Kilpatrick – Strain types?
 - o Helen – had consistent strain types, have seen from both domestic and BHS.
 - o Frances – Factors that might interfere with test and remove. New strains can come in, important to keep track of
 - o Kilpatrick – Guzzlers associated with other diseases and other species (i.e., Mule deer & CWD)
 - o Helen – research on shared sources for CWD, greater concern with that as opposed to Movi
 - o Mike – What about the different strains?
 - Snowstorms – have a nasty strain and/or sinus tumors, did we get the last sheep or did another strain spill over into the herd?
 - o Tom – Kezia eluded to as well but difficulty in implementing on a large scale
 - o Frances/Tom – what is the largest population? Frances 150, now working on a 400 population – not trying to catch everyone in this herd. About 65 ewes in the 150 and caught about 60 in 2-3 years, Can still consider substructure and not capture all.
 - o Kezia – one herd in the Hells Canyon is like the central herd so there may be a means to focus on a central herd that may impact the entire.
 - o Frances – subpopulations within large and not all connected. May be effective to all that are connected
 - o Tom – Considering this and figuring the logistics. So much knowledge within the populations it is beneficial not to have to remove
 - o Frances – how to answer all these questions and apply
 - o Kezia – We don't really know what it looks like in an emerging disease event. Have different consideration for different types of events
 - o Tom – So many ways it can play out – more isolated herds vs those more connected. Different management actions.
 - o Frances – After an outbreak, sometimes we see lamb survival recovery within a couple years – May want to do testing during this timeframe and may be a point in time that you have you have the lowest prevalence rate and that may be the time to conduct Test and Remove.

- Daryl – Can we ask others to participate with WGF workshop? Yes
- Mike – perhaps before the WGF meeting can have a manual or draft in place
- Steve K. – Thoughts about stakeholders, perhaps keep them involved
- Becky – Don't forget to include some private local vets, some efforts going on in the domestic side too with Movi clearing.
- Helen – agreed to have your domestic sheep community on your side and understanding what you are doing and trying to do
- Mike – last fall, reached out to domestic producers. Woolgrowers in Nevada are on-board working toward a Movi free flock. Thankful for the University of Nevada, Reno and their involvement
- Mike – Volunteers for this Test and Remove User's Manual – Daryl, Becky, Caeley, Tom, Frances, Kezia, Mike, Tom, Peri, Nate, Kristin M possibly others, Mike will send out an email to the group for participation and insight.
- Daryl – List of people to be involved in the Test and Remove Workshop - Frances, Kezia, Helen, Tom, Chad, Peri, Todd, Nate, Jon Jenks. Any others would be helpful.

Major Topics/Processes/Methods within our Capture and Handling Guidelines that have been long standing tradition, concern, or difference of professional opinion that need clarity and good lively decisions by WSWG to endorse in the guidelines

Translocations - What matters and what doesn't, and do we even know?

- What level of habitat evaluation is necessary for translocating bighorn into new area?
- Mike – In NV probably short on this evaluation so how detailed should it be.
- Tom S. – Continue to develop guidelines for winter, summer habitat. With new reintroductions perhaps some sheep don't find the habitats. Produce RSFs
- Mike – we have the tools now to evaluate what is available for habitat use by sheep. How much staffing is available to develop models for habitat availability?
- Tom – More staff would be helpful to analyze data and make assumptions. Attempt to develop more user friendly products for biologists to use. Gather supporting data. Tools are becoming easier to use, i.e. RoC model.
- Mike – strive to pull this information together
- Andy – Used to have a more rigorous transplant committee. Now rely more on field staff to evaluate habitat. Have only few places that have suitable habitat without domestic herds. Now more locals look at specific areas where sheep may be seen. Colorado list of potential release sites is relatively small, therefore they do not need a rigorous committee to look at all sites and prioritize sites.
- Bill – unique high elevation BHS herds may be overlapping coal mine developments in Canada. What areas can be offset areas that are suitable or like habitat for bighorn sheep for the time being. What work do we have to do to support the translocation? Help look at the landscape in a different way with the inevitable.
- Eric – Bighorn sheep know where the habitat is and they will persist where they choose their habitat. Sheep like steep and they don't like brush. Come up with a slope cover model, how much of the canyon/mountain has contiguous steep topography and is not brushy? Any sheep habitat outside of the Mojave can hold 2-6 sheep per sq. km on area that is steep but not brushy. Value base on precipitation and sheep per square km.
- Marcus – Seeing shift of diet, consider the vegetation type, source vegetation type to transplant site.
- Mike – anyone out there doing an evaluation for a future or recent reintroduction?
- Brent – Just did one in MT, some is the Carlson Conservation plan, recently translocated sheep in Montana in the Little Belt Mountain Range. Some of the transplant site assessment is laid out by previous biologists that includes goals to meet, protocols, biomedical protocols, laid out in their current conservation strategy. Little Belts did have some domestic issues. Transplant site was moved to a lesser-preferred location for the

bighorn. Current location was still very appropriate as to where the sheep were translocated.

Translocation was based on support from many parties, including landowners.

- Daryl – Had Kevin Monteith conduct an assessment of the Ferris-Seminole Mtns using a resource selection function to decide if there is still more habitat availability for additional augmentations.
- Eric – Many resource selection models and literature sources available
- Tom S. – Fairly easy to model sheep habitat- worth assessing how much lambing habitat is available. Definite value in having some sort of quantitative assessment of the habitat to confirm or overrule people's perceptions
- Bill – use selection, mineral licks have shown to be an important site in comparison to summer forage etc. Assessing how many natural mineral nutrients and if they are available to the sheep. Mineral compositions within the soil.
- Hollie – ID will start updating the sheep plan in a couple months. Translocating to vacant habitat or augmentations? Historic range? Is there enough habitat to support the translocation of more sheep for a specific area? Are you addressing limiting factors? Address the problem so that new animals introduced/Augmented do not meet the same fate as the individuals they are replacing.
- Mike – unoccupied
- Hollie – addressing limiting factors
 - Minimum distance of bighorn introduction area to nearest private and public land domestic sheep flock/band or follow results of RoC modeling
- Mike – Is there a minimum distance that a reintroduction will occur from the domestic sheep in an area? How much area in between is enough to promote a translocation. What variables along with raw distance are being looked at when translocating? Features of the land, habitat, and connectivity. WE need to be smart and patient with the translocations. If the wild sheep are too close to domestics, the probability for interaction will increase
- Kevin – Previous document and recommendations addressed that but didn't feel confident in that. Addressed the minimum buffer zone, did not think there was a noted guideline for a buffer distance, distance is situational and did not address a minimum distance.
- Eric – Difficult to put a number on. There is no distance from domestic sheep where wild sheep cannot travel. Sheep can travel many miles therefore if a domestic individual is near the wild sheep, it is possible for the interaction between the types.
- Kurt – previous review where 100 km buffer around all Montana BHS herds showed it would be hard for either BHS or domestics.
- Mike – what are we going to do or not do regarding introductions
- William – using RoC of model would want to have consistency with that using in Washington and elsewhere. Maintain consistency.
- Kevin – domestic sheep grazing allotments can be used to help reduce overlap with wild sheep. Where is the boundary in the agricultural setting where overlap may occur?
- Eric – landownership with federal allotment more feasible than with private land
- Mike – What is the contact range going to likely be? Trying to get all of us to think about preparing for sheep on the mountain for introductions.
- Kevin – Mexico – reaggregating large holdings, situations a lot difference for private land states
- Clay – Incentives for landowners may help mitigate these issues.
- Mike – don't want to get into negotiations but if there is a risk we should ask how it can go away
- Kurt – What kind of effort have we put in to determine science based operation practices? Procedures to maintain separation such as trained dogs. On the ground training/separation practices.

- **Source Stock Considerations - Is presampling a standard to conduct prior to use of a herd for source stock to confirm status of M.ovi?**

- Eric – NM is now doing this within the last 4 years
- Andy – Identify source herds and test those periodically, also do range expansion when not comfortable bringing new sheep in. One herd nearly functions as a source stock, sheep are removed and tested periodically. Range expansions have been conducted to tier 1 related herds where they are not comfortable bringing new sheep to the source herds to prevent transmission of disease. Rather than bring new sheep in, sheep were moved to an unoccupied area that was still within a part of their range. Animals that returned back to the original range just allowed for greater data observation as the expanded sheep received GPS collars. Some sheep started moving back and forth up and down the range that had been relocated
- Mike – agrees with the concept and looking at expansion opportunities in Nevada
- William – Question on expansion
- Andy – Take sheep from at one end of the same area to the other end, just move the same native sheep from north of range to south. Risk of having some move back but observed some start moving back and forth.
- Eric – Psoroptes to naïve herd
- Anne – Leukotoxin positive on pasturella
- Mike – try to be aware of sinus tumors
- Anne – Sinus tumors but harder to test for
- Mike – get skulls from taxidermist to evaluate sinus tumors through hunter harvest samples
- Nate – Do you check of sinus?
- Andy – Karen Fox got skulls from taxidermists

- **Breeding timing – source vs. release site/resident herd**

- Mike – We should consider the timing of lambing season in source stock relative to the release site and any resident bighorn sheep and their lambing season in the release area in relation to weather, plant phenology, etc.
- Kevin – Whiskey Basin – late lambing – release sites were dry and didn't match Whiskey Basin sites. Phenology of vegetation needs to match up with the lamb drop time. Source versus release herd and timing of the lambing. Must do the best one can to coordinate peak vegetation with lamb drop to promote lamb survival.
- Eric – desert bighorn lamb (Jan to Apr) depending on precipitation. All of NM transplants have come from Alpine herds and are released in sagebrush sites. In NM they have seen good increases. May not be that important at least not in NM?
- Andy – May not stay. If they can see a mountain they will go to it
- Eric – have a few sheep that try to leave but most stay.
- Kevin – Has observed a different response with milk production drying up because of vegetation change.
- Tom S. – If the sheep stay is all about having adequate forage quality and predation risk is low to allow the population to grow. What was the gradient change for the Whiskey Basin bighorn?
- Kevin – Source population was in 20 - 30" precip zone with the low elevation release site in the 4 - 5 " precip zone
- Mike – in the guidelines, talk about what has worked but to also be cautious in your decision to use a source population that has drastically better habitat and lambs much later.
- High vs. low elevation source relative to release site
 - Marcus – detected change in gut flora and changes in body condition, pregnancy rates, etc. the first year. The following year, however, they did respond positively.

- Mike – philosophy is not to put the animals through the ringer on the transplants; just because a few survive doesn't mean it was a good decision.
- Vern – essential and necessary to allow for some flexibility. Priority with the guidelines should be that of “Doing no Harm”. Weigh the risks to potential benefits

- Avoid or Don't place source animals into a release site that is a drier/more harsh environment.

- Kevin – Needed sedentary sheep for Bighorn Mountains due to domestic allotments
- Mike – is there a state that has lost migratory herds and ways to restore?
- Doug – Tetons, 2001 we almost transplanted diseased bighorn into the Tetons. Has been a loss of use of migratory corridors in the Tetons but hard to address. Consider same range sheep.
- Tom S – Sierra winter high range sheep. Challenge to reestablish long-range migrations.
- Eric – often it is timber between winter and summer range that presents biggest challenges.
- Tom – may be worth considering humans in some way to lead bighorn to winter range

- Minimum size of source herd (i.e., # removed not to exceed a % of source's pop estimate)

- Mike – what has been the smallest source herd from? How many? Do we monitor their recovery? Should this be identified in the guidelines?
- Vern – Again “Do no harm”
- Mike - general rule of thumb in NV is minimum 75 - total population, we are not dealing with an endangered species. Typically looking at 20 for transplant.
- Tom Stephenson – develop model to quantify probability of extinction based on population numbers and 10-15 years of population data. Never pull anything from a population that has fewer than 40 females spread among several years. The degree that one can protect the translocation stock from predation is very important
 - Eric Rominger- minimum source size is likely a genetics question, several of the ewes from the same captive population. Genetics of the issue can become a problem. Genes from all over, may run the risk of bottlenecking a population when they are run down too far and too long.
- Vern- guidelines in 1953 for desert bighorn in CA was not reduce the population to under 50 females from the source population
- Amber – 75 - 100 total minimum population in AZ, and do not get below 50 ewes
- Eric – Lambda get radically different in herds above and below 45 ewes in the herd

- Genetic diversity – herd and individual level

- Mike - any genetic diversity metrics to analyze genetics within the population and manage source stock diversity and warrant questioning the use of diversity metric
- Josh Jahner- genetic diversity is a good general metric; the higher the better; but maybe more important is how well is the source herd adapted to the release site. Look at levels of genetic diversity, herd performance and match that with where the animals are going.
- Eric – many ungulate species have been restored from less than 10 individuals and not sure what matters.
- Josh – would be great to run experiments on different sizes of source herd starts but may not be feasible.
- Mike – overall there were general thoughts of what is the best fit and the best match, there is not just one attribute or characteristic we need to look at
- Mike – looking at chat questions – Adam Grove had question on doing summer transplants; in NV we are trying to use dropnets to capture bighorn during the summer and transplant them in optimal summer range with known water sources which is critical in Nevada and then let them decide where to spend winter at.

Kevin – Wildlife Professionals meeting will start Wednesday 1:00 PST

- Jim Karpowicz memorial comments from Kevin, Clay, Melanie – he was huge in helping establish the Wild Sheep Working Group

Wednesday, January 13, 9 am – noon PST - Session # 3

Mike – Announcements – Trimming audio and video from yesterday, which will be available for all attendees. Share Chat as well. In Google folder.

Kevin – provided link to Wildlife Professionals meeting. 1:00 PST. On Wild Sheep Account

Peri/Kevin – Sheep week going well

Don – virtual booths going well, tags appear to be going well

- Is source stock adapted to its proposed new environment?

- Mike – Covered yesterday as well, any other thoughts?
 - Kilpatrick – had a habitat assessment done in Ferris-Seminole Mtns by Monteith. Daryl sent Monteith's to Mike yesterday
- Experience with predators
 - Mike – Using source herds with predator experience, some sheep may see bobcats but may not know what mountain lions are about. What sort of predation rate have people observed on bighorn during their 1st 6 months post release?
 - Amber – don't see predation change unless within areas of higher predator numbers
 - Don – More of an issue of naïve to the habitat, not the presence of cougars
 - Vern – agrees with Don – lion predation was #1 cause of mortality following translocation attributed to lack of familiarity to area.
 - Bill – Moved Caribou and lost several due to naïve to cougar and/or habitat. Created cougar movement to a migration route which impacted that sheep population. Most likely more related to the way the sheep are connected and are using the landscape. One cat that was very good at killing sheep moved to an area where there were limited cats and became very effective at picking off sheep within a bottleneck migration pattern. The sheep may not have been aware of a threat mtn lions in a specific area.
 - Don – Should not ignore the issue. More important about naivety to the habitat
 - Vern – in hindsight would should have removed some lions from the San Rafael Mountains to reduce predation on the released bighorn
 - Eric – Faced criticism due to high lion predation on released bighorn assuming it was due to the with pen coming from penned facility
 - Mortality was actually higher of wild sheep not from the pen area
 - Over 30 years, did not pretreat for lions resulting in failed releases
 - Now pre-treat areas for all sheep transplants
 - Removed 14 lions at one release site, even though very low mule deer numbers and no other native ungulate.
 - If not controlling lions in NM, see heavy losses of sheep
 - Mike – NV will do lion pre-treatment removal if ground assessments by Wildlife Services lion hunters warrant high lion sign
 - Clay – Texas does pre-treatment, early regulations prohibited it but was changed and saw benefits to doing that. Texas did a year in advance and sometimes after which seemed to have a positive influence. Historically, 50% of sheep loss were lion related. Not done as much now in Texas. Goal was always to remove the problem well in advance, a year in advance and fairly persistent. Outcome paid off well and

made the project worthwhile. Differences of opinion within the agency can cause rough patches. In the early years and through early 2000 they were still doing aggressive treatments to the lions

- Tom S – Difference of opinion now?
- Clay – More of a reluctance to do large scale lion removal. Under greater pressures today. Big Bend Ranch – sporadic predator control with contractors.
- Brent – MT is in process of another transplant. Source population has low predator density, area they are going is greater predator density. May have more information on this in coming months
- Mike - What is your response to lion-caused bighorn mortality control?
- Brent – involves multiple predators but if lions are an issue could be potential to add more lion harvest. Don't have a definitive answer yet
- Kurt – MT – Spanish Peak – reviewed lion harvest records. Had not been any lion harvest ever so established a liberal lion harvest level which improved sheep numbers

- Social structure – capture X number from a group/subherd in hopes bighorn will stay together at release site; include or exclude attendant lambs
 - Mike – Capture crew mindful of social sheep groups, etc... Do others ask capture crews about this?
 - Eric – drop netting can work towards that. Net-gunning is much harder and not sure social structure is that important. Sheep come and go so social structure changes regularly.
 - Mike – Gave Deserts to Utah, All ewes were radio collared and getting picked off by lions. How were they captured from Mountain? Sporadically captured so wonder about the need to be aware of social structure.
 - Tom S – Sheep interact more in some areas than other areas. Seems like they remain together if they had been together. See some not familiar with each eventually start getting together. Not a deal breaker
 - Eric – If you release sheep in area of no sheep – see more movement. Areas with resident bighorn involving an augmentation sees less forays
 - Don – Oregon – Should guarantee that sheep have some sort of social structure. May have some wondering sheep. Collared sheep showed that it took about 3 years for sheep to move farther outside their area. Did not see very much area use overlap within the first year. Don't want to harass a group too much to get more than a couple animals in fear of overheating them. Prefer to spread around the capture. Can take a while for sheep to start interacting with each other
 - Mike – try to get lambs with ewes if possible
 - Eric – Also important to note how old lambs are but not always easy to determine
 - Eric – behaviorally lambs will seek out others to interact with. Early captures may be greater risk of orphans

- Min and max total number transplant; initial and subsequent release?
 - Mike – For new areas with no existing sheep, how many transplants? How many within each transplant
 - Eric – NM prefers 1st release with 30 – 40, goal of getting herd to 45 ewes ASAP
 - Don – 20 is typical release #, depends on post release monitoring
 - Kevin – Wild Horse Island – 2 sheep then 6 sheep; then 2 sheep over a long period; now with a large island population
 - Amber – some sheep may be held in a holding pen before release, 1970s. Now most translocations are 30 animals unless the animals can support the higher number of translocation. Typically occurs over a 3-4 year period. A second translocation could include less than 30 animals. 4 translocations into Catalina, first 3 had 30 animals each and the fourth release was only 20 animals. Current population is only around 60 animals
 - Brent – minimum of 20, will do more

- Mike - Ram ages and how many?; reverse psychology? Young rams will eventually go on forays; older mature rams may be more sedentary; does hassle of transport outweigh possible translocation benefit?
- Mike – Do some rams do forays getting into trouble
- Amber – no hard data but moved rams 5-9 yrs. old. Older rams headed for home and died. Have observed older rams going on larger forays. Higher mortality on older rams during capture process
- Don – stick with young ones
- Eric – two part of this – one is transplanting from wild population take ~25% (??) rams, could have father/daughter mating if you do not send enough rams. 2nd – Captive facility - take 50/50 including older rams.
- Tom S – minimum of 10 females then augment to get 20 females. Consider genetic diversity – genotyping and selecting those with greater diversity, which included older rams. Saw greater movement with those. Now thinking more of younger rams since more likely to stay
- William – Corral traps but stick to younger rams
- Lutz – in Ferris-Seminoes – started with 25 sheep, over last 11 years done 6 augmentations with 20-25 per transplant now up over 225 sheep
- Don – Young rams will produce a dominate breeder at a young age with lack of competition
 - Rams may be more sedentary; does hassle of transport out way possible translocation benefit?

- Better to harvest excess rams in source herd vs. separate ram translocation - skipped

- Use of sedatives? High strung animals, body temps, long distance in trailer, overnight
- Mike - NV – never used much through early 2000s but high-strung pronghorn experiences made us think about addressing this in bighorn on long-distance travel. Animals can get too hot in trailers, etc... What reasons do folks use sedatives?
- Don – Sedatives can be helpful in trailer, etc... but when releasing see back to mountain from processing them, some stumble and may still be under sedation – may be compromising them. Reversible sedatives may be more manageable.
- Nate – What sedatives?
- Don – Not sure what the Vet staff was using – think Midazolam
- Colin – use short duration drugs. Feels it is a value to reduce stress
- Don – At times is useful in some situations but maybe not all
- Daryl – Some nights in trailer so did use a cocktail and were good in the trailer and released well. Have concerns about captures where releasing immediately
- Mike – hoping to get more info on this in guidelines
- Doug – have capture crews administer drug cocktail on the mountain
- Peri – have good data from Lone Mtn capture, 99% of ewes were collared and VITed and then slung back to mountain with helo and released, gave each of the ewes prior to VIT placement 10 Mg of Midazolam IV. All did well, no mortalities but didn't get specifics from capture crew upon release on mtn how did they get up and run off. Captures are an art and a science so still more to learn. Useful tool.
- Mike - California bighorn more high strung in NV. What was used on high stressed ewes? Might need something that will calm the sheep down prior to transport or processing.
- Peri – we used Midazolam IV and occasional Azaperone
- Eric – Distinction on sheep transported. Transported sheep do better even on same day releases. Sheep just process and released NM don't do it
- Mike – this is under the translocated section so assumed this discussion was more about that. NV normally does not use on quick releases

- Nate – clarified that in some instances we have used Midazolam when animal is high stressed/kicking or injured or high temps and are given IV fluids to bring temp down and are held for long time and then released
 - Mike – What can we do to reduce sheep piling on top of each other in the trailer, etc..?
 - Peri – they are not out of it. Be good to know how they respond in moving trailer
 - Daryl – have new trailers with cameras. Most sheep relax with past observations in trailers
 - Peri – See different reactions with sheep
 - Eric – Any mortalities with sheep piling in trailers?
 - Daryl – None
 - Mike – None
 - Tom S. – Boxes – may put 3 sheep in a box and 1 ram in a box. See no need for sedation in the boxes. Typically not holding overnight
 - Amber – agrees with Tom – may use with high stress animals. Will sometimes put 2-3 rams in a box and do sometimes hold over night
 - Vern – in 80s and early 90s moving sheep in boxes, no sedation
 - Mike – more opportunity for discussion in the future
- **Post-release Monitoring - Collar deploy – all or portion? GPS only? What about lambs? If concerns, use geofence option?**
 - Mike – what are folks doing? What % of animals collared? Lambs? Geofencing? How intense of monitoring? Lambing site?
 - Daryl – all sheep collared for any disease concerns, don't collar lambs, using geofencing to help ensure separation
 - Kevin – agreement in WY between wild sheep and domestic producers to provide separation about 20 years ago
 - Eric – collar most sheep that can wear a collar, want to know more about the predation rate so collar more. The more you can collar the more data you will get. When all sheep are collared there is little estimate to determine what is happening.
 - Don – Don't move a lot of sheep but do collar the ones being moved. For disease monitoring, everything captured is getting collared
 - Mike – What about responding to a mortality the first year? Need people ready to go to help collect mortality and other data
 - Peri – agree 100%
 - Eric – have to go to all mortalities. NM goes to all
 - Don – it is important to assess all mortalities but it may be difficult to find the staff to do such a job. Many VHF collars are on the landscape and not all staff can get to the specific collars, resource availability. From a sheep standpoint, if it is a release it may be higher on the priority list. And they staff may be more interested and willing. Where the collars are going on a sheep standpoint the areas may be more remote. Other issues revolve around the actual location of the mortality signal
 - Mike – plan better, get more reliable people
 - Don – resource availability, if a release is higher on the priority list. Remoteness is a factor
 - Brent – staffing is an issue, geofencing – issue of lag time or delays; hope for improved technology
 - Mike - volunteers
 - First few weeks see above
 - 1st lambing season
 - Mort investigations to discern cause; capture-related or not
 - Foray vs. assessing neighborhood? When to lethally remove if approaching risks?

- Mike – With domestic flocks nearby had to kill 5 wild sheep that left the mountain. When do you pull the trigger?
- Eric – have places where lines are drawn on the map. Can't cross that line
- Chad – not much tolerance. Don't take a chance with wandering sheep
- William – similar to South Dakota; darted some of wandering animals and returned them
- Don – Is this mainly for newly release animals?
- Mike – yes
- Don – Most of us have policy for forays from existing herds vs. animals from a transplant

Collaring and Marking

- Consider standard that all GPS/Telemetry collars must have either a drop off device or cotton spacer to prevent collar on animal the rest of its life beyond the time frame of data collection
 - Mike – more aware of animal welfare. If not collecting data, don't want collar on that animal
 - Daryl – agreed
 - Doug – may need to think of better release mechanisms or an early release
 - Eric – would be good to gather data on collars that dropped and the companies that producing the collar. Want to have the collar to drop off around the same time the battery dies.
 - Mike – Agree with Eric. What experiences do people have that works well?
 - Tom S. – Drop off units aren't reliable beyond 2 years. Have some get to 4 years. Using Solar collars with hopes of lasting longer than that. Recapturing collared animals and re-collaring animals to prevent the failure of the release device. When going beyond 2 years, there is lots of error and the collar becomes even less reliable
 - Mike – Sense a lot of failure on release devices
 - Tom S. – agree don't need sheep wearing failed collars but no good answers
 - Kevin M – Big loss with failed collars. Don't reuse those collars
 - Paige – Collar manufactures producing reliable collars. Should we require more from Company's?
 - Mike – have the desire but we don't have the best technology to get us there yet
 - Paige – have the technology but need more out of companies. Use Lotek currently. Have used Vectronix as well with drop-off mechanism. Programmed to 18 months – we'll see how that works in the future. Drop-off adds weight which is a factor to consider.
 - Bill – have ATS collars out for 30 months – no failures from that batch. Weight consideration for Bighorn sheep is a toss up but did have success
 - Mike – want to hear about successes
 - Mike – has anyone used any material that they have used to get the job done?
 - Bill – cotton firehose
- Double collaring animals
 - Mike – what about double collaring? What else can we do besides this?
 - Paige – always double collar with GPS and vhf for long-term survival study. Questionable reliability with GPS to good reliability on VHF. Lengthens the time the sheep are able to be monitored.
 - Don – Oregon hasn't done any of that yet, primarily due to financial considerations.
 - Doug – have done that in the GYA. Micro VHF too but has been awhile since doing that.
 - MT – Typically not but for big research recently we did.
 - Mike – Weight ratio? Any guidelines

- Paige – discussed with Clint and Tom, drastic variation in body weight; cognizant of body condition; but no body weight ratio standard
- Continued use of VHF only collars? - skipped
- Recognizing huge seasonal weight loss & gain, pregnancy status, and coat/hair loss annually, should all females have a stretch section on collar?
 - Mike – see many seasonal changes on body mass of ewes. We need to have expansion section for all ewes.
 - Tom S. - Highly recommend pre-measuring the collar or pre-marking a collar. Knowing what maximum neck size is and putting collar on as tight as possible. Customize padding. Round vs oval collars. Try to make sure collar is fit for the animal. Weight is important factor as well. Haven't used expansions on ewes yet but feel fit is important first
 - Mike – late winter captures vs late summer
 - Eric – echo Tom – never seen a collar too tight on a ewe. May consider a little loose on a smaller ewe
 - Frances – lots of different fits, close to head will be smaller than lower neck. Always fit closer to the head so that the collar does not slide forward. Seems ewes have a tapered neck from head to shoulder. Collar always seems to be tighter when they are laying down
 - Tom S. – Should fit close to head
 - Frances – Yes close to head. Hard to fit exact with different neck shapes and sizes, Seems tighter when laying down than when standing up
 - Tom S – prop animal on sternum for that reason
 - Mike – showed collar stretch section. Most companies don't have this for ewes since necks are so small. Should talk to more collar companies to allow them to introduce the stretch segments for better fitting collars. Are we moving to the teardrop shape for sheep or mostly sticking with round collars?
 - Mike – What about the shape? Round vs tear drop
 - Don – mostly focusing on the fit itself and the snugness of the collar. Most people are concerned about too tight. A younger animal may have this issue if it grows as it gets older. Make sure to look at the collar when the animal is standing to determine the actual tightness. Training and direction guidelines may be necessary such as finger rules. Collar experience helps.
 - Mike – request capture photos for guidelines
 - Mike - Anyone using Telonics collars
 - Don/Daryl – using some
 - Mike – Telonics collars have a great spring cable mechanism, would like to have a small group put pressure on the collar companies to improve on some things. Need to continue to work with the collar companies more to try to get better models. The biologists know what collar fits and what is most important
 - Doug – Drop off and VHF as well. Is anyone buying just release mechanisms separately from collar?
 - Mike – Lotek sells separate components.
 - Don – Discussions with vendors – market is greater now. Thousands purchased today!
- Data Management Platforms?
 - Agencies (Utah) building own platforms doing this and not relying on company platforms
 - Don – have a small version of that in OR. Nothing like Utah's, Project specific creates issues
 - Mike – will take years but we can push more. Need more help in managing data

- William – system in WA designed to collect the data that is a sharable tool. Have dedicated staff doing this. Can put others in contact with these folks
- Mike – be helpful to pick the brains of WA and UT
- William – Once built, easier to move over to other systems, is however built around certain collar types. Contact Will if interested
- Frances – ID also has a similar system. Thinks it was coded in R
- Caitlin – NM moving in this direction with web based GIS
- Mike – maybe have a small group meeting with WA, UT and others to help demonstrate this
- Tom S – California is also moving in this direction.
- Frances – has anyone thought of archiving data to ?? world bank?
- Doug – WY is
- Should all collars have oval, tear-drop shape design and not rounded? – no specific comments
- Guidelines will have appropriate neck circumference charts but what about collar/animal weight ratio?
 - Mike – Any guidelines people use?
 - Paige – Doesn't have those numbers with, See variable body sizes to have a collars size for each. Trying to keep track on though. Ram collars have a magnetic extension. Tough one to track in all instances
 - Mike – tries to limit to 500g on a 100 lb. ewe
 - Tom S – About 500g total but more concerned about individual collar and how it rides

Topics – skipped with some covered in other discussions

- Proper Fit - general metric or guideline?
- Stretch/expand section – flat bungee, magnets, spring cable; what is most functional and practical?
- Appropriate messages to collar manufacturers on:
 - We are all willing to pay more for reliable collars
 - Improve/invest in data management platforms
- Animal welfare vs. mgmt./research needs

Base Camp Operation

- Appropriate length of time to restrain animals and process them
 - Mike – no length of time in NV
 - Helen – Could let the Vet make the call on proper time to hold an animal. Have someone responsible for the animal. Works well with their operations
 - Peri – No true temperature of hyperthermia of sheep but others is 107. Any time in that range is critical for holding time. Time is critical with hyperthermia situations. Every minute that the animal is in this state, the organs are cooking and can be detrimental on the animal. Time is of the essence when dealing with the conditions of hyperthermia.
 - Mike – must be dealt with, animal must be cooled down if temperature is pegged too high
 - Helen – other measures – Oxygen, cold fluids. Boss needs to make that decision after assessment
 - Tom S – agree with Peri – work towards cooling animal before releasing or putting in trailer. More data now showing we can hold them longer (1 hr) as long as cool. Get as much data on animal as long as it's in good condition and staying cool. Why would we not get as much data as possible out of that animal while we can at basecamp if the temperature can be kept stable enough to work up the animal?
 - Mike – reviewing Chat – Impress on crew to reduce change time as much as possible. Other animals running you are not aware of then end up chasing those animals. Hard to know that and prevent.

- Is there a distance that is too far to release animals at basecamp back to their home range? - skipped

Animal and Herd Health

- Consideration for cross contamination and pathogen transmission; where is the appropriate level of sanitation and precautions: capture gear, moving across jurisdictional lines, herd to herd, animal to animal
- Use of sedatives?
 - Mike – steps taken to prevent pathogen transmission
 - Anne – between capture location – nets are washed in Pinosol/rinsed in bleach water, clean up stretchers and trailers. Hard to clean the wood boxes.
 - Brandon – Disinfect between herds using Vercon ? On nets, capture bags, hobbles, etc...
 - Peri – Helen and Peri provided info to Anne for this segment in document
 - Peri – Emphasize this to capture crew. Demand from capture crews to disinfect. Some states use their own
 - Mike – using two new capture crews which have cleaned prior to moving to NV

Helicopter Netgun Capture

- Which months to capture
- How close to parturition date to capture ewes/nannies
- Air temperature for captures
 - Mike – Is there any guidelines to share on what or when not to do? Is there any chance to capture animals with summer coat?
 - Nicholas – California has in summer months in the past. Animals still shed heat quickly possibly from short summer coat.
 - Vern – in California, moved from winter to summer coat captures. Had success with that. Assume sheep have mechanisms to reduce heat this time of year. Summer time coats seem better for capture than winter coat captures. – for Desert sheep anyway
 - Mike – Any temperature considerations?
 - Vern – worked in cooler part of day but did work in high temperatures. Had few mortalities
 - Mike – get winter coats early – September. What winter coat temperatures does anyone use?
 - Doug – developing own capture guidelines but waiting on WSWG guidelines. Considering 70 degree mark for winter captures
 - Daryl – Summer coat captures intriguing
 - Mike – Deserts have low elevation beneficial to helicopter than high elevation in high Temp
 - MT – Capture windows – December to March 1, no specific temperature cutoffs, if 40 – 50 may delay to cooler part of the day.
 - Mike – Visited with Eric, Tom about parturition dates – common today is not to capture in last trimester of pregnancy but others going longer
 - Bill – Caught ewes first week of April but had snow and cool temps. Weren't pushed hard. Experienced gunners. Installed VITS – lambed 6-10 weeks after. No issues. Monitored after with no issues. Would probably plan earlier so may do it that time if necessary and could meet crew requirements
 - Marcus – Captured ewes 2 weeks before birth without knowing the changes in parturition dates. Had no issues.
 - Tom S – More discussion and literature about more stable individuals in late trimester. Haven't had issues over the year in the last trimester.

- Peri – the uterus could potentially cause problems during capture if issues occur. Should not say that it is ok to capture ewes in the third trimester. Just for the stress on the ewe it should not be recommended or tried to be captured in the third trimester. Death should not be the stress scale.
- Mike – try to avoid the last trimester
- Minimum Requirements Decision Guide (MRDG) for wilderness captures
 - Mike – Guidelines for Wilderness captures. Should we have info in the guidelines to address Wilderness capture?
 - Vern – Absolutely
 - Don – State agencies take to Federal agencies with those respective meetings. Many times locally driven
 - Vern - agrees with Don. Wildlife conservation and principles are not a big part of wilderness act in his opinion. Nothing is interpreted the same way within each entity or individuals.
 - John – FS understands the challenges – offered assistance with those issues.
 - Paige – shout out to Frank with this issue. Have made some gains and continue district meetings and maintaining communications. Include successful agreement for others to use.
 - Mike – NV – copying that blueprint
 - Frank – Apologize for those remaining blocks but is grateful for the work with Paige and others and those gains made. Reach out to Frank as well.
 - Don – Echo those comments reference Frank
 - Mike – will include that in guidelines

Development of a License/Tags, Harvest, Demand, Population Estimates Publication

- Mike – Benefit to develop a publication regarding data above. Asking for help from others to produce
- Kevin – started this spreadsheet, then Clay and Mike. Information is important to NGOs as well. Look at weekly.
- Mike – like hunter demand values that has been added.
- Clay – important when chasing funding as well.
- Mike – would be a publication, a template could allow for easy updates.

Upcoming Wild Sheep related events and meetings:

- Desert Bighorn Council, hosted by Texas Parks and Wildlife, April 6-9 2021
 - Mike – Clay will provide an update at WP meeting. Date change to April 7-8, 2021
- - This summer Mike will step down as Chair from WSWG. Will help the next person moving forward. Will still do summer meeting. Will get video and notes to website.

Adjourn