Appendix E

Report from the
Meeting on State-wide Issues Regarding Bighorn/Domestic Sheep Interaction
December 14, 2000, at The Outrider Restaurant in Laramie, WY

Participants

Vern Vivion, rancher
Regan Smith, rancher
Bryce Reese, Wy. Woolgrowers (WWGA)
Doug McWhirter, Wy Game & Fish Dept. (WGFD)
Walt Cook, WGFD
Dan Stroud, WGFD
Barb Franklin, B-TNF (Bridger-Teton National Forest)
Martha Hellyer, rancher
Bob Hellyer, rancher
Albert Sommers, rancher
John B. Erramouspe, rancher
John P. Erramouspe, rancher
Dave Roberts, BLM
Betty Fear, Sublette Co. Commissioners
Bill Taliaferro, rancher
Mesia Nyman, B-TNF
Mary Arambel, rancher
Pete Arambel, rancher
Ron Micheli, Wy. Dept of Agriculture (WDA)
Matt Wolfe, FNAWS
Kevin Hurley, WGFD
Melanie Woolever, Forest Service Regional Office
Bob Reese, B-TNF
Greg Clark, B-TNF
Levi Broyles, B-TNF
Truman Julian, rancher
Tom Thorne, WGFD
Terry Kreeger, WGFD
Mary Thoman, rancher
Cat Urbigkit, rancher/reporter
Bonnie Cannon, Rep. Cubin's office
Jim Magagna, Wy Stockgrowers (WSGA)

Facilitator. Bob Budd, The Nature Conservancy-Red Canyon Ranch (TNC-RCR)
Recorder: Carol Kruse, Wy. Office of Federal Land Policy (OFLP)

Committee Reports:

Public Participation Process

Betty Fear
Tabled until the committee can combine the recommendations.

Disease and Stresses and Research: Review of Existing and Future Agenda,

Tom Thorne and Bryce Reece

Committee minutes are attached. Full group discussion follows.

There will be 4 topics for this committees final recommendations to the full Working Group - .

1. Disease Management Tools
2. Stress
3. Predation .
4. Research

1. Disease Management Tools - these recommendations will be aimed at federal land managers

   - Prevention - translocation only from monitored source herds, use sedatives

   - Control:

     Preconditioning to the new environment prior to release, which can include all of these: using appropriate medications and vaccinations during the translocation process, identification of appropriate holding facilities that will precondition them, etc.; setting appropriate population densities and sticking to them (may mean more ewe hunting); be sure are providing minimum nutrition levels; implement stress management strategies during preconditioning/translocation such as reducing human interactions (need a capture protocol, and to provide predator control when needed); provide for separation; implement or develop appropriate veterinary techniques (for applying vaccines, etc); use genetic resistance when available; avoid inbreeding.

     Develop protocol for what will be done by whom when there is an active die-off/outbreak (G&F is developing a possible check list for discussion)

     Get accurate diagnoses from carcasses (send to State Vet lab0

Remove sick sheep (be aware that some may develop resistance)

Administer antibiotics (work on new drugs and ways to administer them)
Isolate affected herds

Minimize stress (during the summer when putting on fat, too - think about cutting hunting short, limiting access, etc)

Vaccinate quickly

Be aware of other factors such as snow depth, temperatures, etc.

– Management –

Habitat (sustain or re-establish migration corridors; control encroaching timber; improve forage production even by use of seeding, etc; manage grazing; build water developments; manag,~ the population through hunting, translocation, and predators; learn more about nutritional needs (research is being conducted at Sybille now); consider nutritional and mineral supplementation as short-term solutions, since we don't want to perform animal husbandry on a wild species (there was discussion about why this should be necessary in historic range - the two general answers that we know about are that curtailment of historic range prevents the bighorns from utilizing the full range of vegetation available to them throughout a year, historically, and that acid rain is acidifying soils on historic range so plants are taking up less selenium

2. Stress

Provide high quality habitat, minimize disturbances, control pre-disposing diseases and parasites, control other ungulates who are disease sources and compete for habitat (such as wild horses, elk, etc.)

3. Predation

Discussed their role as stressors pre-disposing bighorns to disease, as spreaders of disease, hunting stressors, contributors to co-mingling through disruption, etc. Need to evaluate past control efforts and the balance/interaction between predators and bighorn diseases; develop predator control proposals to enhance recruitment, etc. (mountain lions are the biggest predator problem, coyotes not that serious - no bighorns have been lost to wolves or grizzlies in Whiskey Basin); determine what recruitment rate we want; consider which predator control techniques to use which will be most effective and least stressful for bighorns.

4. Research -
On preconditioning: sedatives, disease checks, vaccines, veterinary tools/techniques, using old ewes from the target area to introduce a low level of pathogens they'll encounter in their new environment, etc.

On monitoring and evaluation of transplanted sheep: satellite technology, follow-up surveys
On nutrition: macro and micro requirements, etc; using hyperspectral imagery to assess habitat condition

On vaccinations: bacterial pasturella, etc

On monitoring captured bighorn sheep AND domestic sheep: genetic resistance to diseases, the impacts of predation, antibacterial treatment, new technologies, using fecal diagnosis to determine stress

The Committee will group the research needs into the categories of Disease/Health, Nutrition/Habitat, and New Technologies, and prioritize them.

Economic Viability, Loss of Allotments, and Distrust of Agencies Committee
Ron Micheli, chair

Committee minutes are attached. Full group discussion follows.

This Committee was charged with coming up with recommendations for dealing with vacant lotments. There was considerable discussion about individual gain (by selling allotments) vs industry ss (of grazing allotment capacity). It was determined that the Committee cannot develop commendations that will fit individual cases.

Regarding distrust of agencies, there was discussion about the ability to distinguish between the endangered Sierra Nevada California bighorn sheep and the British Columbia California bighorn sheep used for transplants. Bighorns are being re-classified taxonomica'.ly right now. The issue of using bighorn/domestic sheep interactions as a surrogate issue to remove domestic sheep was discussed again. It was stated that Jon Marvel has not contacted FNAWS about working with them to promote allotment buy-outs. The group agreed FNAWS should consider a response in the press. It was reported that at the RangeNet 2000 conference there was heavy and open emphasis on using wildlife issues as a surrogate issue to remove domestic livestock from public lands.

Habitat and Management Protocols
Truman Julian reported for Steve Thomas

The committee needs a sense of direction from the whole group on which direction the Committee should move. How about identifying a project and get it done. There was discussion about prescribed burns on the North Fork of the Shoshone.

New Business:

The working group needs to develop a conservation strategy/plan that will institutionalize this group's agreements and principles through that plan. It should be a framework for state and federal agencies, private sheep managers, everyone. We have a real opportunity here, but everyone will stay in their same ruts if the group's work is not binding. To avoid that,

The group needs to develop a pilot project that will push everyone to the new ideas. The North Fork will be a good one, and we need another one that has all the worst, where new tools can be tested.

The strategy/plan needs to be accompanied by funding recommendations

The fire letter needs to be completed and sent to Shoshone NF, supporting the proposed North Fork of the Shoshone burn (see attached)

Dan Stroud will provide maps of Bighorn habitat and prescribed burn proposals for this group to discuss at the next meeting; group also needs to deal with prescribed burns in wilderness.

Ensuing discussion noted that the FS is being unfairly criticized; that plans need to be more coordinated with all users; that between NEPA timeframes and weather condition windows a lot of planned burns can't be done; that project managers need to follow through on planned burns; that B-TNF needs to incorporate permittees earlier in planning long-term strategies rather than just on an activity-level basis; that the B-TNF is trying now to develop long-term, landscape-scale strategies (should this group recommend that to all federal agencies?); that there should be contingency plans for drought years, etc; that the federal agencies should re-think putting out wildfires where prescribed burns are planned; and that burn planning should include consideration of all wildlife species and domestic livestock, not just bighorns

Recommendations should be divided into short-term and long-term recommendations

The Wildlife/Livestock Disease partnership is moving ahead

The group needs to consider recommendations on what management changes or other things the domestic sheep industry can do to reduce risk - they're already working on new vaccines and monitoring techniques, trying shifting seasons of use, making domestic sheep people familiar with bighorn needs so they can adjust their management accordingly, using herders so when problems are identified the sheep can be moved more quickly, etc. Do the bighorn people need to know more about domestic sheep needs, so they can adjust their management accordingly? There should be

protocols for what to do when co-mingling occurs, and guidelines implementing that protocol available for the herders and others. The Information and Education Committee (Kevin Hurley, chair) can work on this.

A domestic producer should give a program at the next meeting.

We need to do tours of habitat - early summer, winter?

Consider a summer tour of a domestic sheep allotment

Remember we're building a tool box, and we (and the federal agencies) should be open to adding new tools as they appear

The Public Process Committee (Betty Fear, chair) should develop a public process using a bighorn sheep reintroduction project as a model; use the Boxelder as a case study, what could have been done differently

The Disease, Stresses, and Research Committee will meet Jan. 22, 2001, in Laramie. Funding requests need to be in to Congress by late March.

NEXT MEETING

Set from l0 am until 3 or 4pm on April 4 in Rock Springs at the Holiday Inn. A no-host buffet lunch for $10 or less will be served in the meeting room. The Disease, Stresses, and Research Committee will meet from loam until 3pm on April 3, also at the Holiday Inn.

Pati Smith has again arranged for meetings both days to be held at the Rock Springs Holiday Inn. If you call for room reservations, be sure you identify that you are with this group.

The group will meet December 5 in the afternoon and all day Dec. 6, 2001, at the Dubois Headwaters Conference Center. We will tour the Whiskey Mountain habitat for %day during that meeting.

PARTIAL LIST of AGENDA ITEMS FOR 4/4/01 MEETING:

Committee reports:

Economic Viability, Loss of Allotments, and Distrust of Agencies committee, including draft recommendations regarding vacant/closed allotments

Disease, Stress, and Research committee

Handouts on the population objective guideline process Kevin Hurley

Maps and the projection equipment to show them Dan Stroud

Setting a July tour date and site (of a domestic sheep allotment)

Attachments

Committee minutes, Disease, Stress, and Research

Committee minutes, Economic Viability, Loss of Allotments, Distrust of Agencies

Draft "fire" letter to Shoshone NF

Proceedings of the 2nd North American Wild Sheep Conference

Bighorn Sheep/Domestic Sheep Interaction Working Group
Disease, Stress, Predators, and Research Committee
Holiday Inn, Rock Springs, WY 13&14 December 2000

The working group met on 13 Dec from I0:00am-4:30pm and again on 14 Dec from 8:OOam-9:30 am. Participants included: Ken Mills, Frank Galey, Bill Tahaferro, Bryce Reece, Mary Thoman, Cat Urbigkit, Dick Loper, Les Henderson, Doug McWhirter, Kevin Hurley, Walt Cook, Terry Kreeger, Jim Logan, Tom McDonnell, and Tom Thome.

Tom T: Call the meeting to order. Asked if there were corrections to the notes form the last meeting or additions/changes to the agenda.

Bryce: Last meeting we said we would let Ron's group handle economic issues, yet the minutes for the big group indicate that all groups will address it.

Tom T: Ron's group will address it, but all groups need to consider economic impacts of their recommendations.

Bryce: Would like to discuss formalizing the Wildlife-Livestock Disease Research Cooperative (WLDRC).
Tom T: Added it to end of agenda. Asked Terry to give update on Research Paper synthesis.

Terry: Little progress since last meeting, at least now he has 4 documents: Mike Miller's (Pasteurella in BHS) is essentially done and up to date, Al Ward and Glynn Frank (Mechanisms of virulence and resistance) are combining their 2 papers, but not done yet-said will be done "soon", Jennifer Conlon (Pasleurella in domestic sheep) is redoing hers (what she has is 3 years old). Having extreme difficulty contacting her. There are no references on Conlon's paper; without refs, its essentially worthless. We have no leverage on these authors, so we are at their mercy.

There was considerable discussion on dealing with the papers/authors. The group felt that anything would be better than nothing even if it was incomplete and not suitable for public dissemination. Tom T recommended that Terry and Tom M put pressure on the authors to get the stuff together by the next meeting. If the authors don't respond, he asked Terry to go through the drafts we've got and make editorial comments in the margins indicating where they are incomplete (Ken Mills may help) so the group could read them as drafts for the group's use.

The group then discussed management options, which could be used to prevent control and manage BHS disease.

PREVENTION:

Tom M: Avoid transplanting diseases when transplanting BHS: isolation (or quarantine) of prospective transplants; Preventative PreConditioning (i.e. tools to condition BHS before they are caught: vaccination, treatment, ensuring good body condition etc.), pretrans. Vet exam etc. Livestock are generally vaccinated 3-4 wk before shipping uad again at shipping.
Doug: Monitored source herd is best-i.e. has had enough dz testing over several years that you know dz status.-Is that monitoring enough?

Tom T: Use more caution when augmenting existing vs. establishing new herd. Monitor herd so know don't have a pathogen or manage for that pathogen.

Kevin: Priority is to get BHS caught, moved and released quickly. Need a priori monitoring.

Bryce: Do we need different protocol for Core Native herds vs. Reintroduced herds?

Kevin: Generally take from Core Native herds, don't add to them (only exception: Targhee herd is genetically isolated, may wish to augment it). So, probably don't need diff. protocols.

Bryce: Do you prebait (could you precondition)?
Kevin: Yes at Whiskey Mt (the only place we trap in WY). With net gunning don't prebait.

Tom T: We do limited preconditioning now: long acting penicillin, ivermectin at capture.

Bryce: Environmental factors also a concern-what time of year do you capture?

Kevin: Winter-partly out of necessity. When on winter range much easier to trap. Want them pregnant, need lots of personnel (who are generally more available in winter).

(Cool weather also helps prevent 2 common problems: overheating and capture myopathy)

Bill: You are PreCon a bit by prebaiting. Might be good to have a PreCon pasture to maintain them on high quality forage (same as bait).

Kevin & TomT: Holding them may increase stress and necessitates a 2"° capture. Average capture mortality is less than I % for the I s' few days post capture. Don't have good long term #s.

Bryce: PreCon would make a good research topic.

Tom M, Bill & Bryce: Long term Post Release Monitoring would make a good research topic.

Kevin: Satellite relocations could offer some intensive monitoring.

Terry: Have we ever held BHS to see how they do?

Kevin: Scabies outbreak in New Mexico: caught, dipped held 2 wk, dipped again-most died. Through trial and error we know that the longer BHS are held in a trailer, the higher the mortality.

TomT: Sybille was originally established to "preCon" or to develop a source BHS herd (to use lambs as a source of BHS). Found that BHS died at Sybille as bad or worse than anywhere else. Utah Div of WL tried it near Ogden. Snow drifted over fences and BHS escaped. Texas tried it-Mt. Lions got in and killed many BHS. But, this should not be abandoned-no one has tried it recently.

Terry: The problem with current disease testing: animals are released before we get the results.

Mary: Asked about tranquilization.

Terry: There are new long acting tranquilizers that have not been tried on BHS. On some African species they are very effective in reducing stress. They don't work well on elk and are marginally effective on pronghorn.

Bill: Asked about Capture Myopathy (CM).

Tom T & Kevin: CM is due to extreme physical exertion. The build up of lactic acid causes necrosis of muscles. It can be fatal. Hobbling the legs together for extended periods, long chase times, and hauling wild animals can all stress large muscle groups. Putting bedding, straw or hay, and sand in trailers helps reduce muscle tightening, and can prevent CM. We also add snow as a water source to prevent dehydration on long hauls.

Bill: Domestic producers take livestock off water to haul them (moisture causes more slipping in the trailer)

Cat: Baiting sheep prior to capture provides an opportunity to give BHS minerals, anthelmintics, etc. At capture need health protocol, testing, vaccination. Also need a handling protocol.

Kevin: The Wild Sheep and Goat Counsel and the Western Wildlife Health Cooperative have been working together to develop a BHS Dz testing protocol. Dr. Mark Drew (of Idaho) has finished a draft and sent it to WWHC, which has approved the protocol and will present it to the Western Association of Fish and Wildlife Agencies in January. After that we'd like to present it to livestock producers for their input. WSGC is now trying to develop a capture protocol. Trying to develop a minimal dz testing protocol that everyone will use.

Tom M: Nevada used same minimal standards as required for livestock.

Tom T: Asked Terry to get a copy of the protocol for the next meeting.

We then broke for lunch.

Jim: Things used for livestock mgmt may not be practical for BHS. Concerned about antibiotic resistance. When long acting antibiotics are used as a one-time application the blood levels probably aren't sustained long enough to kill many bacteria. Doing this backfires with livestock.

Typically when a producer introduces new livestock they will isolate that new introduction for 3-4 wk. Sometimes when that animal is then put in with the resident flock it gets sick and/or dies, then the young animals from the resident flock may get sick. This occurs because the new animal is naive, resident bacteria and viruses cause clinical disease. This build up of pathogens then may affect young residents. Found that if producer would put a single old resident in with the new additions during the isolation period you could eliminate this problem because this exposes the new animal to a low level of resident bugs.

Tom T: This might make a good research project.

Tom M: Could we have intermediary herds? So BHS would be taken from the Core herd to Intermediary herd to other herds.

Doug: Minimizing the handling of BHS has been the #1 priority. Oregon has transplanted lots of Californian BHS. A key thing for ensuring populations do well is to keep pop density down. One way to do this is to translocate excess BHS.

Bill: Asked about hunting and if population goals had been set.

Doug: Ewe hunting is the only way to effectively use hunting to control pop size. We don't harvest ewes except in one hunt area. BHS mgmt is different from mgmt of other wildlife.

Tom T: We don't manage statewide-manage by herd unit. Each herd unit has its own pop objective. The question is: do we have such high densities in some herd units that we are increasing the risk of disease and stress etc. Whiskey Basin has active management, one other herd unit has ewe hunting; the rest don't have any real mgmt. We need more active mgmt on those herds. If pop gets too high we need to control by trapping or harvesting ewes.

Bryce: We're supposed to get a map showing where we have BHS, and where we want them.

Doug: Map keys on potential conflict areas both with grizzlies and BHS. We'd like to go through the process of how we go about putting BHS into an area.

Bill: At some point we will need to think of ewe/lamb harvest-may run out of places to put them.

Bryce: Don't do like elk where the pop just goes up and up. Like the Jack Marrow (?) elk herd. Ranchers helped elk get established; now elk are forcing ranchers out.

Jim: Need to look at pop from Dz standpoint. Need to avoid getting to point where can't manage BHS (i.e. public won't let you harvest). Need to establish pop objectives and need to know what plans/goals are 5-10 years out and adhere to pop objectives.

Tom T: Only one pop (W. Basin) where pop objective has considered Dz. Try to maintain it below carrying capacity (K) to prevent pneumonia outbreak. Need to look at other pops in terms of pop size to prevent die-offs. BHS are the most likely wildlife species to have a catastrophic die-off due in part to high densities.

Doug: Many herds are only looked at once a year; to come up with good estimate of K need to give it more emphasis

Tom M: Need to come up with nutritional/energy needs for BHS. How can you establish density goals without knowing nutritional needs

Doug & Tom T: We do have some predictors: forage utilization rates etc. There is a formula based on forage production & utilization on winter range. Want to keep total use at certain levels. Long-term knowledge helped determine how many need to remove. Not a perfect formula but it is useful tool. During W basin die-off they were at 90% utilization.

Bryce: Hyper Spectral Imaging (HSI) used by NASA could help determine places to put BHS. These cameras are flown over - tells plant species composition. Could tell you if you've got eh forage potential for BHS.

Cat: Some plants are more nutritional than others.

Tom T & Doug: Formula doesn't break down into species, only pounds of forage. Very few places could we determine this.

Bryce: H.S.1 can id plants to species.

Bill: If know its going to be tough winter start feeding early (when you have winter range you can get too. If you want to increase pop base need good nutrition. At some point you'll need to feed.

Tom T: Occasionally use bait to attract BHS to new areas. In most areas BHS so spread out that you can't effectively feed.

Bryce: Sheep don't need that much feed (1 Ib/day for DS).

Tom M: Black-tailed deer, protein was lacking, used DS to graze and cause regrowth that was higher in protein. E5zn. in last trimester nutrition is important

Tom T: at W basin using habitat alterations and keeping pop<K.

Mary: Suggested that we may be spending too much time on details. Suggested we brain storm on some of the ideas on the agenda.

Tom T: Lets talk about Vet. Techniques. E.g. vaccination of BHS and DS could decrease opportunity for transmission and reduce the emphasis on separation.
Terry: Oral anthelmintic (wormer).

Ken: Vacc of BHS- with cattle vacc eliminates clinical signs but Pasteurella remains.

Tom T & Tom M: Idea is to reduce shedding (mostly nasal) of Pasteurella.

Cat: Genetic research- N-ramp gene offers resistance.

Tom T: For Control: Removal of clinically Dzed BHS (shoot them)

Tom M: antibiotics. New generation of drugs may be very effective on BHS

Mary: 1 ` need to id the pathogen-Diagnosis.

Doug: When BHS dies, what samples should be taken-need a protocol.

Tom T & Jim: Don't want our activities to spread dz.

Cat: This may mean keeping the public out.

Terry: Vaccination may be able to control an outbreak.

Bryce: Viral vaccination may also help. Pred control to reduce stress.

Doug; Human disturbance causes stress.

Mary: Need to minimize factors increase transmission. E.g. water sources

Jim: What time of year are outbreaks most common?

Tom T: Usually winter (probably due to stress).

Tom M: Hell's Canyon outbreak had extremes in weather. If we could understand the conditions that set us up for an outbreak we may be able to do something to prevent it.

Bryce: How do you deal with this for wildlife? For DS use feeding and shelter.

Frank: Feeding causes wildlife to congregate and increases dz transmission.

Bryce: What about molasses blocks? Could scatter them to avoid congregation.

Tom T: For mgmt many things are already listed under prevention. Mgmt is mostly habitat based. Maintaining or establishing habitat corridors.

Tom M: Mgmt of timber. Encroachment reduces visibility and reduces forage production.

Doug: For forage use range pitting, fertilizing, spraying.

Mary: Seeding.

Jim & Tom M: Selective mgmt of livestock grazing. Water development may spread animals around.
Tom T: Pop mgmt can also go here: hunting, transplanting, predators.

Cat: Nutritional and Mineral supplementation.

Jim: For Stress- environmental factors: weather, temp, precipitation.

Doug: Providing high quality habitat, minimizing disturbance

Tom T: Predator control, human disturbance. Physiologically BHS are more stressed than they appear.

Mary: Capture protocol is part of stress mgmt.

Tom M: Have we looked at stress associated with fly-overs?

Tom T: Heart monitors and visual monitoring shows that ht rates increase and BHS scatter with Fly-overs. Back packers also disturb BHS, esp. rams.

Tom M: Any other way to count BHS?

Doug: South fork can be counted on the ground.

Bryce: Maybe we'll never eliminate human/BHS interaction. We may need to get BHS acclimated to people.

Tom T: That interferes with hunting. This is why I recommend against hunting ewes at W basin-don't want ewes stressed out over backpackers.

Doug: Problem may be where BHS hunted (summer range)

Tom M: Encroachment causes stress; this lowers the quality of the habitat.

Tom T: Truman's group is examining habitat, we defer to them. Other stressors include: viruses, lungworm, scabies, and non-Pasteurella bact. We need to control predisposing parasites and dz.

Frank: Nutritional deficiencies and toxins. Transplants in CA had problems with poisonous plants.

Doug: Competition with other wild or domestic ungulates may decrease habitat quality. Competition with feral horses.

Tom T: Horses or elk, may be direct or indirect: habitat competition, disturbance, disease.

Bill: Problem with feral horses: no one has authority to manage them.

Tom M: Asked about P. multocida in waterfowl, if it was threat to BHS. Tom T and Ken explained that it is a different strain and is generally specific to waterfowl. Dogs also have a unique P. multocida in their mouths.

Bryce: Suggests we include selenium testing in the sampling protocol. Asked about other minerals.

Frank: Need whole blood for Se. Blood tests for Copper and Zinc are very tough to interpret-liver is much better. Liver could be taken at necropsy.

Tom T: Minerals probably won't be part of (W WHC) disease testing protocol, but WY could incorporate it when we trap BHS. We could also ask hunters to collect livers, but we probably won't get large numbers.

Bryce: Isn't Se a problem in DS in WY?

Jim & Frank: Yes, in some areas- Fremont County, Hot Springs Co, Lusk, Newcastle. Higher mt areas tend to be lower in Se- very unpredictable in WY-some areas are very high, others low.

Predators and How they are Related to Dz and Stress:

Bill: If you're losing 20% of lamb crop it has a huge effect on pop. 1947-48 W. Mt herd was declining, WGFD killed coyotes and herd increased dramatically. DS producers lose 15% of lamb crop under intensive mgmt; BHS must lose much more. Joe White (of WGFD) did a paper on predator control showing that with control pops increase- problem is that you need a continuing effort

Doug: CO Division of Wildlife put together a good summary for their legislature.

Bill: WGFD complains about DS bedding grounds; with pred. Control didn't have to crowd DS and bedding grounds weren't an issue. We can do more for DS and BHS by controlling preds.

Tom T: Need to talk about preds on 2 levels: 1. How they relate to Dz. 2. How pred. Control can increase #s.

Bryce: WGFD is limited on wolf control need 50% loss of big game before can control wolves.

Bill: What % of lambs are you bringing back? Repro rate on BHS is very low- need 3 yr old ewe to breed?

Doug: It depends-at low density younger animals breed-both ewes and rams. Higher density means it will take longer to produce a legal ram. WGFD's goal is to have 40-50 rams (all ages)/100 ewes and most of our herds are there

Tom M: Predation may prevent ewes from going down to high quality forage (1988 paper).

Tom T: Need to evaluate effects of preds on DS distribution and how it relates to habitat quality and intermingling w/ BHS.

Bill: I bet you have 50% lamb loss to predators (since DS lose 15%)

Bryce: If you had 50% loss caused by DS you'd come after producers, need to treat preds the same.

Bill: WGFD $ depends on game #s. Reducing predators increases game and increases $. DS are a surrogate issue being used to get producers off public land.

Bryce: ADMB is doing 3 projects on pred control. We need to monitor these to see effect on WL.

Doug & Tom M: Female lions teach young to hunt. Some lions kill a lot more BHS than others.

Bill: Every coyote will kill DS.

Doug: Coyote dominated areas in some areas are being converted to wolf dominated areas. This may actually benefit WL and DS. At W. mt we looked at 3 things: 1. Breeding: Preg rates were 95%. 2. Were lambs being born: Yes. 3. What' killing them: In this case, lambs were unthrifty and lagged behind when following ewes to natural mineral salt licks and were preyed on by mt lions. Mineral blocks stopped the migration and increases lamb survival. In most areas we don't have the $ to monitor BHS well.

Bryce: Suggested trying pred control to enhance recruitment in select areas.

Tom M: One BHS study showed >60% loss occurred in I't 3 days of life-mostly by coyotes. Another showed 15% increased productivity with pred control.

Doug: Pred of DS scatters them and may cause strays, which may contact BHS. Preds may make it tougher to prevent co-mingling. .

Mary: Preds may also run BHS into DS.

Bill: Anytime lots of preds prey sp stay in herds. Need to look at preds and what the level of pred on BHS is.

Tom M: Will miss tomorrow. Fecal analysis being done on DS hopefully will be complete w/in I yr. Found cattle data doesn't transfer over to DS.

The group adjourned for the day and reconvened 14 Dec 2000 @ 8:00 am

Tom T: Suggested we begin making the research list- first just list items and later will prioritize them. list (from yesterday) includes:

- PreConditioning Transplanted BHS (includes Vet. Techniques)

- Monitoring and evaluation of transplanted BHS

- Sedative to reduce stress and CM in trans BHS (falls under PreCon)

- Holding trans BHS to PreCon & do thorough Dz check Vaccination
Low level exposure to resident BHS

- Determine nutritional needs- Macro (forage) & Micro (trace minerals)

- Vaccination (Past.)
    - BHS
    - DS

- Vaccination (viruses/other pathogens)

Predisposing viruses

- Antibiotics for treating BHS during outbreak
- Evaluate protein/mineral blocks (fall under nutritional needs
- Impact of preds on lamb survival to yearling (or just impact of preds on BHS)

Cat: Asked about genetic resistance to Dz and evaluating it.

Terry: Common gene in mammals (N-ramp) provides dz resistance to many pathogens.

Cat & Doug: BHS can have this gene. Part of habitat is related to K. K should go under nutrition.

Bill: Need to research historic documents on what BHS did in the past. Did they migrate?

Tom T: Early on they were in the low country. The W basin herd (preEuropeans) may have migrated down to Badlands. Some records indicate explorers found BHS much lower than today.

Cat: Health and Capture protocols wont; require much research, but needs to be done.

Tom T: Want to use the Dz protocol to monitor dz. It will probably have more stuff than WY can practically deal with-aimed at Vet. Regulations (interstate transplants).

Doug: We may also want to conduct DS dz surveillance especially as we determine which dz is biggest concern.

Tom T & Terry: We've talked about typing all BHS Past isolates-we could also do this with DS isolates. If there is one serotype that's of main concern before moving BHS into an area could screen DS for that serotype.

Bryce & Bill: IT would be fairly easy to collect DS blood or other samples. John Redosovich (sp?) checked > 1,000 of Bill's rams for epididymitis and took blood.

Tom T: Need blood &/or nasal culture. When bled DS should bank leftover serum. Bill, ask John if these samples still exist.

Cat: The breed of DS on range used by BHS may be important.

Bill & Bryce: Mgmt styles may also be important-range lambing vs. shed lambing. Range sheep are probably more resistant.

Mary & Doug: HIS may be a tool to analyze habitat.

Tom T: Other new technologies: GIS and satellite monitoring.

Bryce: NASA is developing major presence in WY; they may be able to help.

Group: Discussed telemetry collars. May be useful to find stray DS. Satellite collars on BHS when trans as part of follow up.

Cat & Tom T: Anthelmintics are a research need. Lungworm & scabies are main concerns. We give BHS ivermectin when trans. Need to make sure ivermectin is the most effective. We also give long-acting penicillin (Durapen). We need to investigate other antibiotics.

Doug: Stress research?

Terry: We could look at fecal cortisol levels in BHS. Have done this in moose. Found that even though moose in urban areas do not appear stressed, they are. This could tie in with work on long-acting tranquilizers. Fecal cortisol levels are a good indicator of chronic stress not acute stress-takes about 2 days for increased levels to show up in feces.

Research Priorities for Wildlife-Livestock Disease Research Cooperative:

Everyone agreed that Past vaccination was the top research priority. After some discussion it was decided that nutrition would be #2 realizing that nutrition would need to be studied incrementally (Se work will begin at Sybille in the near future). The 3`° priority was monitoring captured BHS and DS for dz. 4" was stress research, particularly fecal cortisols and evaluating they effects of long-acting tranquilizers. It was suggested that we ask ADMB to examine the effects of predation on BHS. It was suggested that we organize research under one of 3 possible headings: Disease/Health, Nutrition/Habitat, and New Technology. Bryce will find out who NASA and HIS folks are in WY and see if we can get them to talk to us sometime.

The next meeting is scheduled for 22 Jan. 2001 in Laramie (exact location TBA).

Flip Charts:

Bighorn Sheep Disease

(Natnl Disease Reserach Protocol – T. Kreeger)

1. Disease – Mgmt Tools/Prev
   - A. Prevention
     - 1) Translocation – caution
       - a. Use monitored source herd
         (tranquilizers)
         requires extensive disease testing
       - b. Monitor herds to be augmented
     - 2) PreConditioning with
       Appropriate medications (antibiotics)
     - 3) Appropriate Population Density
       - a. Evaluate pop. Objectives & establish Pop objectives

p.2

       - b. Adhere to pop. Objectives
     - 4) Nutrition
       - a. Min levels
       - b. Habitat requirements
     - 5) Stress Management & Factors
       - a. Human Disturbance
       - b. Capture protocol
       - c. Predator Control
     - 6) Separation Bighorn Sheep/Domestic Sheep
     - 7) Veterinary Techniques
       - a. Vaccination – Viral & Bacterial
         Bighorn Sheep
         Domestic Sheep
       - b. Wormers – oral (external & internal parasites)

p.3

     - 8) Genetic Resistance
     - 9) Inbreeding
   - B. Control – Outbreak
     - 1) Accurate Diagnosis – protocol
     - 2) Removal of diseased sheep
     - 3) Antibiotics – new drugs
     - 4) Isolation of affected herds
     - 5) Minimization of Stress

6) Vaccination
7) Other factors – water source – temperature extremes – environmental

p.4

C. Management
1) Habitat
a. Maintain or establish migration corridors
b. Timber Encroachment
c. Forage Production
Burns
Pitting
Fertilizing
Spraying
Seeding
d. Managed Grazing
e. Water Development
2) Population
a. Hunting
b. Transplant
c. Predators

p.5 * = protocols

3) Nutritional & Mineral Supplementation

2. Stress
A. Environmental Factors
Weather, temperature, precipitation ...
B. High quality habitat (Truman's Habitat Group)
C. Minimize Disturbances
1) Predators
2) People
3) *Capture protocol
4) Surveying/Monitoring Protocol

p.6

D. Control Pre-disposing Diseases and Parasites
1) Viruses
2) Parasites
3) Lungworms
4) Other Bacteria
5) External – lice, keds, scabies
6) Nutritional Deficiencies

7) Toxic Diseases (poisonous plants) – reintroduced animals not familiar with forage

E. Other Ungulates
1) Habitat/Forage Competition
2) Disturbances
Elk
Wild Horses or Desert
3) Disease

p.7

3. Predators
A. Evaluate Past Efforts
1947-50 Predator control on Whiskey Basin)
(any other ones)
Predator Control Paper 1987 Joe White WGFD
B. Mortality
Survivability rate/lambs
C. Predator Control to Enhance Recruitment in Select Areas

p.8

D. Influence of predators on co-mingling
(mixing, scattering herds, strays, Bighorns seeking protection and following domestics)

p.9

4. Research Ideas

PreConditioning transplanted sheep
Veterinary Tools/Techniques
Sedatives, vaccination
Thorough disease check - low level exposure to resident sheep
Monitoring and evaluation of transplanted sheep
Follow up surveys, etc.
Satellite collars (use new technology)
Nutrition
Macro and micro nutritional requirements
Evaluate protein/mineral supplements (blocks)
Carrying Capacity
Vaccination – Pasteurella
Bighorn Sheep
Domestic Sheep
Vaccination – other
Viruses
Parasite Control (bighorn sheep)

p.10

- Antibiotic treatment of Bighorn Sheep (during outbreak)
- Impact of Predation on Bighorn Sheep
  - Review existing information
  - ADMB
- Monitoring captured bighorn sheep for diseases (& parasites) (using protocol)
  - Typing isolates (& banking)
- Genetic resistance (N-ramp, etc.)
- Monitoring of Domestic Sheep
  - Banked samples
  - Breed specific
  - Management styles (shed lambing vs. range)
  - Status of past collected samples

p.11

- New Technology
  - Remote sensing (carrying capacity evaluation)
  - Satellite monitoring (sheep movements)
  - NASA?
- Stress
  - Fecal cortisol
    - Controlled experiment – expand to field survey
  - Examine effect of tranquilization

Major Priority Headings

Disease/Health
- Vaccine, preconditioning, disease surveys, antibiotics

Nutrition/Habitat
- Nutritional Requirements

New Technology
- Habitat Monitoring
- Telemetry

Bighorn Sheep Disease/Stress/Predators/Research

1. Disease - Management Tools/Prevention
   - Prevention
     - Trans location-caution
       - Use monitored source herd
         - Adopt disease monitoring protocol
         - Requires extensive disease testing
       - Monitor herds to be augmented
     - Pre-Conditioning with appropriate medications (antibiotics) & vaccinations (as available)
     - Appropriate population density
       - Evaluate population objectives & establish population objectives
         - Include disease and stress reduction in consideration
       - Adhere to population objectives •
         - Hunting
         - Translocation
         - Predation
       - Nutrition
         - Minimum levels
         - Habitat requirements
       - Stress management & factors
         - Human disturbance
         - Capture protocol
           - Adopt capture protocol
         - Predator control
       - Separation of bighorn sheep/domestic sheep a
         - (List techniques)
         - Response when bighorn sheep join domestic sheep
       - Veterinary techniques
         - Vaccination - viral & bacterial
           - Bighorn sheep
           - Domestic sheep
         - Wormers-oral (external & internal parasites)
       - Genetic resistance
       - Inbreeding

<u>Control-Outbreak</u>

- Accurate diagnosis-protocol for thorough necropsy it'not done at WSVI.,
- Removal of diseased sheep
- Antibiotics-new drugs
- Isolation of affected herds
- Minimization of stress
- Vaccination

- Other Factors
  - Water Source
  - Temperature extremes
  - Environmental

Management

- Habitat
  - Maintain or establish migration corridors
  - Prevent/reduce timber encroachment
  - Forage production
    - Prescribed fire
    - Pitting
    - Fertilizing
    - Spraying
    - Seeding
  - Managed grazing
  - Water Development
- Population control
  - Hunting
  - Transplant
  - Predators
- Nutritional & mineral supplementation

Stress

Environmental factors

- Weather, temperature, precipitation...
- High quality habitat (Truman's Habitat group)

Minimize disturbances

- Predators
- People
- Capture protocol -- adopt capture protocol
- Surveying/monitoring protocol -- adopt disease monitoring protocol
- Control Pre-disposing diseases and parasites (Do we need to make specific recommendations on how to do this?)
  - Viruses
  - Parasites
  - Lungworms
  - Other bacteria
  - External-
    lice, keds, scabies
  - Nutritional deficiencies
  - Toxic diseases (poisonous plants)-reintroduced animals not familiar with forage

Other ungulates
- Habitat/forage competition (Truman's Habitat Group)
- Disturbances
  - Elk
  - Wild horses or desert
- Disease
- Predators

Evaluate Past Efforts

- (1947-50 Predator control on Whiskey Basin)
- (any other ones'?)
- Predator control paper 1987 Joe White WGFD (?)

Mortality
- Survivability rate/lambs

Predator Control to enhance recruitment in Select Areas
- (Should this group prepare a specific proposal to ADMB?)

Influence of predators on Commingling
- Mixing, scattering herds, strays
- Bighorns seeking protection and following domestics

Research Topics

- Disease/Health
  - Veterinary tools and techniques
    - Vaccination - Pasteurella –
      - Bighorn sheep
      - Domestic sheep
    - Vaccination – Other
      - Viruses
    - Parasite control (bighorn sheep)
      - Antibiotic treatment of'bigliorn sheep during outbreak
  - Preconditioning translocated bighorn sheep
    - Sedative
    - Vaccination
    - Thorough disease monitoring
    - Low-level exposure to resident sheep
  - Monitor captured bighorn sheep for diseases and parasites
    - Adopt and use protocol
    - Type Pasteurella spp. Isolates
    - Bank isolates for future reference
  - Genetic resistance (N-ramp, etc.)
  - Monitor domestic sheep
    - Banked samples
    - Breed specific
    - Management styles (slied lambing vs. range)
    - Status of past collected samples

- Stress
    - Fecal cortisol (controlled experiment - expand to field studies)
    - Examine effect of tranquilization
- Nutrition/Habitat/Predation
    - Nutrition
        - Macro and micro nutritional requirements
        - Evaluate protein/mineral supplements (blocks)
        - Carrying capacity
    - Habitat
        - Monitor and evaluate translocated sheep
        - Follow-up surveys, etc.
        - Satellite collars (new technology)
    - Impact of predation on. bighorn sheep
        - Review existing information
        - ADMB
- New Technology
    - Habitat monitoring
        - Remote sensing (carrying capacity evaluation
        - NASA ('?)
    - Satellite monitoring
        - Bighorn sheep movements

Major Priority Headings

Disease/Health
- -vaccine, preconditioning, disease surveys, antibiotics

Nutrition/Habitat
- -nutritional requirements

New Technology
- -habitat monitoring -telemetry

Bighorn/Domestic Sheep Interaction Working Group
Economic Viability, Loss of Allotments, Distrust of Agencies SubGroup

[Assimilated notes from the meeting of December 13', 2000. Holiday Inn (Castle Rock Room - Rock Springs, Wyoming. Meeting time = 1. 00 pm to 3:45 pm]

SubGroup members (and others) present: Ron Micheli [Chairman], Levi Broyles, Fred Roberts, Pete Arambel, Kevin Hurley, John P. Erramouspe, John B. Erramouspe, Dave Roberts, Melanie Woolever, and Mesia Nyman.

NOTE: The following notes summarize the deliberations of the subgroup.

The meeting started with self introductions of all the participants present.

A quick review was made of the past subgroup meetings, and the recommendations resulting from those meetings were summarily referenced.

Economic Viability:

Discussions of this topic are inherently linked to the loss of domestic sheep allotments and domestic sheep AUMs, and therefore, are discussed below.

Loss of Domestic Sheep Allotments:

The concept of "no net loss" of domestic sheep operations was presented once again. No one on the subgroup knew exactly how to address this issue. Ron Micheli initiated the group deliberations by posing the question, "I still don't quite understand what has happened to the sheep allotments and AUMs that once existed in Wyoming. Can anyone tell me where they have gone?"

In response to Ron's question, it was acknowledged by all present the domestic sheep industry in Wyoming is currently in a downturn, and this downturn may be attributable to a variety of factors. Dave Roberts talked briefly about the Taylor Grazing Act and the adjudication process resulting from it, as well as the difference between "paper" AUMs and the actual AUMs (i.e., forage available/range carrying capacity) present on-the-ground. This may reflect some of the real, or perceived, loss of sheep numbers. Other possible answers discussed may include: 1. conversions in type of livestock and/or forage allocation from sheep to other domestic species, wildlife, or wild horses; 2. loss of domestic livestock AUMs to other resource allocations (i.e., recreation, watershed, wildlife habitat, mineral development, home sites and suburban development, etc.); 3. loss of available range to vegetation conversions (i.e., fire, tree encroachment, etc.) on either a temporary or permanent basis; and 4. the long term impact of other risk factors inherent to the livestock raising business (i.e., predators, market economics, etc.). One thing all parties agreed on, however, was that the woes of the domestic sheep industry should not be blamed on the presence of bighorn sheep.

Ron Micheli then led a discussion about what type of recommendations our subcommittee could present to the main working group. Everyone felt that while the concept of "no-net-loss" of domestic sheep allotments/AUMs was a worthy goal, no one knew exactly how this idea could practically be implemented. Therefore, we would not be making a subgroup recommendation on this item. There was also some discussion about a recommendation that there be no reintroductions of bighorns unless the replacement of domestic sheep could be assured. This was also thought to be a very difficult concept to implement, given the multitude of circumstances and situations that could exist. The subgroup had some discussion about the "allotment buyout" concept, and examples of completed or considered buyouts were discussed. The subcommittee agreed to one possible recommendation regarding this topic, as follows:

– All range/habitat "uses" should be willing to pay for their respective activities.

Distrust of Agencies:

The subcommittee reviewed the previously accepted communication principles. We also had a very brief discussion of some of the issues the public involvement subcommittee had been dealing with in regard to interagency/individual communications and coordination.

There was a brief discussion about some past bills submitted to the state legislature requiring legislative approval of any proposed species reintroductions anywhere in the state. The subgroup acknowledged that, at least for threatened and endangered (T&E) species, this was more of a political statement or posture than anything else. However, there was some feeling there could be more of these type of bill crop up in the future.

Since there had been some concern and apprehension surrounding the "potential" listing of bighorn sheep as a T&E species in the future, Kevin Hurley gave an update on the current taxonomy of the California bighorn subspecies. Kevin also planned to report on this to the main working group. As it currently stands, it appears the non-Sierra geographic populations of the California bighorn (vs. the Sierra geographic population) are now officially the same, taxonomically, as the northern race of the Rocky Mountain bighorn sheep (Ovis canadensis canadensis). This taxonomic rework was the result of measuring 16 morphologic and genetic parameters, including some DNA work. More DNA work remains to be done, but the reclassification has been peer reviewed and published in the Journal of Mammalogy, and apparently that's all that is required for mammals, according to Kevin's investigation. The current thought in Wyoming is that future, non-high altitude, non-alpine, reintroduction of bighorns in the State could utilize source stock from the non-Sierra California bighorn populations, since they may be better adapted to these types of habitat situations.

There was some discussion of a recent news article published in the Pinedale paper which implied a connection between the Foundation of North American Wild Sheep (FNAWS) and John Marvel, an anti-domestic livestock individual based in Idaho. Kevin

Hurley wanted to make clear that implied connection was erroneous, and was the type of misinformation we were all committed to squelching.

The subgroup had no further recommendation regarding the topic of distrust at this time.

Action Items Resulting from the SubGroup Discussions:

There were no action items assigned at this subgroup meeting.

January 2, 2001

Ms. Rebecca Aus Supervisor,
Shoshone NF
808 Meadow Lane
Cody, WY 82414

Dear Becky:

As you may know, under the direction and guidance of Senator Craig Thomas and Governor Jim Geringer, a Domestic Sheep/Bighorn Sheep Interaction working group of over 50 members was established in January 2000. In the 5 meetings held since February 2000, a variety of topics related to the management of domestic and bighorn sheep have been discussed. Among the committees and subgroups, the Habitat committee, comprised of state and federal agency personnel, domestic sheep producers, wild sheep advocates, and other interested folks has been one of the most active, and their recommendations have been discussed by the full working group.

One of the focal points of the Habitat committee has been the use of prescribed fire to improve bighorn sheep ranges across Wyoming. It is agreed by the group that one major limitation to sustaining healthy populations of bighorn sheep is habitat degradation due to conifer encroachment. This may lead to a variety of potential problems, including decreased forage quality, concentration of wild and domestic animals, loss of grassland productivity and traditional movement/migration patterns, and increased predation.

Recent and proposed burns to benefit wild sheep habitat have been identified and discussed, and additional opportunities have been suggested. In light of the difficult 2000 fire season, and fully aware of the resource constraints on the Forest Service, our working group would like to officially support and encourage use of prescribed fire for bighorn habitat enhancement.

We understand implementation of the Jim Mountain/North Fork Shoshone River prescribed burning effort was started in spring 2000, then ceased following the "moratorium" on burning in the aftermath of the Los Alamos/Cerro Grande fire last spring. As an inter-disciplinary working group, we encourage the continued use and implementation of planned prescribed burns in the Jim Mountain/North Fork area. This is a core native wild sheep herd which is one of the highest priorities for enhancement and conservation of bighorn sheep in Wyoming.

We recognize the delicate balance between resource needs and protection of property and structures, but feel with sound analysis, adequate planning, measurable objectives, sufficient funding, and application of fire science principles, prescribed burning for resource management, particularly improving bighorn sheep habitat, can proceed. We acknowledge and appreciate your efforts and those of your staff on the Shoshone

National Forest, home to the largest Rocky Mountain bighorn sheep population of any forest in the national forest system.

Sincerely,

Bob Budd
Wyoming Chapter of The Nature Conservancy, and
DS/BHS Interaction Working Group Facilitator