MINUTES

MONTANA SENATE
54th LEGISLATURE - REGULAR SESSION

COMMITTEE ON AGRICULTURE, LIVESTOCK & IRRIGATION

Call to Order: By **CHAIRMAN CHUCK SWYSGOOD**, on January 30, 1995, at 1:05 p.m.

ROLL CALL

Members Present:
Sen. Charles "Chuck" Swysgood, Chairman (R)
Sen. Gerry Devlin, Vice Chairman (R)
Sen. Thomas A. "Tom" Beck (R)
Sen. Don Hargrove (R)
Sen. Ric Holden (R)
Sen. Reiny Jabs (R)
Sen. Greg Jergeson (D)
Sen. Linda J. Nelson (D)
Sen. Bob Pipinich (D)

Members Excused: None

Members Absent: None

Staff Present: Doug Sternberg, Legislative Council
Jennifer Gaasch, Committee Secretary

Please Note: These are summary minutes. Testimony and discussion are paraphrased and condensed.

Committee Business Summary:
Hearing: SB 173
Executive Action: None

{Tape: 1; Side: A ; Approx. Counter:; Comments: .}

HEARING ON SB 173

Opening Statement by Sponsor:

SENATOR TERRY KLAMPE, SD 31, Florence, introduced SB 173. **SEN. KLAMPE** stated that game farms have cost Montanans a lot of money and spread tuberculosis in wild game. **SEN. KLAMPE** stated that it was a threat to the cattle industry by the spreading of tuberculosis (TB). He stated that game farms were spreading TB to cattle. **SEN. KLAMPE** stated that 20% of a $2.3 million budget was attributed to TB eradication. In New York, where the Department

of Agriculture was solely in charge of game farms, the state has spent around $1.5 million to regain its TB free status. In of Virginia there was a TB outbreak in the cattle. They have discovered TB in game farms in Virginia also. This information was to let the committee know what was happening in the United States and what could happen in Montana. There was a copy of a resolution that the Virginia Cattlemen's Association presented in their statement. **(EXHIBIT #1) SEN. KLAMPE** stated that this situation was occurring in Virginia and referred to their results and their problems. **SEN. KLAMPE** stated that SB 173 was divided into three parts, one being to phase out game farms over a period of 2 years; the second was a moratorium during the 2 years; and the third was to stiffen fees, fines, and regulation of game farms. The fiscal note has no basis in reality.

Proponents' Testimony:

Jim Richard, representing Montana Wildlife Federation, read his written testimony. **(EXHIBIT #2)**

Valerius Geist, Professor of Environmental Sciences at the University of Calgary, in Calgary, Alberta, Canada, stated that game farming was not new. He stated that red deer were introduced in Canada a number of times, but they produced swine brucellosis, which spread to the native cattle, and infected a lot of animals and also humans. TB is also in bison in the national parks. A TB epidemic was believed to be initiated by the red deer from New Zealand. **Mr. Geist** stated that Canadians were also concerned with contracting TB or other diseases from the red deer in Montana. **Mr. Geist** stated that there was an optimistic side which stated that the little problems were costing them millions of dollars to keep a TB-free status in Canada. There was more information contained in **EXHIBIT #1B**.

Jim Posewitz, representing Orion-The Hunters Institute, read his written testimony. **(EXHIBIT #3)**

Gayle Joslin, representing the Montana Fish & Wildlife Association, read her written testimony. **(EXHIBIT #4)**

Billie Elliot, representing herself in Ravalli County, stated that she had jointly owned property with a game farm. She stated that the fences had been rammed be the animals trying to get out and native animals trying to get in. She stated that the animals had been chased with 4-wheelers and 11 head were killed. The stream-bed had been destroyed by game farm animals. She stated that she was a stock grower, a sportsman, and breeder of cattle and horses. She wanted to know how to protect herself and others from the diseases.

Dale Taliaferro, representing the Department of Health and Environmental Services, read his written testimony. **(EXHIBIT #5)**

Alan Blakley, attorney and Professor of Law at the University of Montana, stated that he was a proponent of the bill. He addressed the issue of takings. He stated there were no constitutional violations of SB 173. He stated that he found that there were no potential search and seizure problems within the bill. He stated there were questions of takings and he stated that there was compensation for the property taking for animals and fences, so there were no problems.

Michael Miller, representing the Colorado Division of Wildlife, stated that commercial trading of wildlife puts major wildlife resources at risk. There are diseases that can degrade or diminish wildlife habitats. He gave a brief background and referred to more information in **EXHIBIT #1B**. He stated that the risks to native wildlife depends on the interaction with the game farm animals. In Colorado there was a documented 42 escapes from the game farms. As wildlife managers they are concerned because they do not know what affect all of the diseases would have on the native wildlife. The TB outbreak was concerning around 40 herds that were infected. They have been trying to eliminate the red deer genes from the wildlife.

Dave Majors, from Stevensville, presented a letter from **Stan Swartz. (EXHIBIT #6)**

Bob Bugni submitted his written testimony. **(EXHIBIT #7)**

Bob Lovegrove, representing Ravalli county Fish and Wildlife Association, stated that they support SB 173. He stated they feel that the public property rights and a TB-free status are more important than the private property rights.

Jim Bradford, Montana Bow Hunter's Association, submitted his written testimony. **(EXHIBIT #8)**

Dave Campbell, representing United Bow Hunter's of Montana, stated they must remember that any time there were two or more people there was a society and this was a democracy, and each committee member must vote as to what the society wants. He stated that this was a issue of the State of Montana. **(EXHIBIT #9 & #10)**

Janet Ellis, representing the Montana Audubon Legislative Fund, submitted her written testimony. **(EXHIBIT #11)**

James Kehr, concerned citizen, stated that the industry created more public danger than public good. **(EXHIBIT #12)**

Joe Gutkoski, representing Gallatin Wildlife Association, stated that their newsletter goes out to around 250 members. **(EXHIBIT #13)**

Mike Vashro, representing Montanans opposed to Game Farms, stated they supported SB 173. **(EXHIBIT #14)**

Pat Simmons, from Bozeman,Mt., stated that she was in support of SB 173. **(EXHIBIT #15)**

Dennis Fraiser, from Skylinesports in Butte, Mt., stated they support SB 173.

Stan Frasier, from Helena, Mt., stated he supported SB 173. **(EXHIBIT #16)**

Herbert Johnson, representing Montanans Opposed to Game Farming, submitted written testimony. **(EXHIBIT #17)**

Stephen Kenley, representing Ravalli County Fish & Wildlife, stated they supported SB 173.

Ed Johns, representing Russell Country Sportsman Association, stated they support SB 173.

Doug Pollel, stated he supported SB 173.

Tony Schooner, representing the State Lands Con., stated he supported SB 173.

Sam Babich, representing Montana Action for Actis, stated they support SB 173.

Bill Holdorf, representing Skylinesportsmen, stated they support SB 173.

Everette Maxwell, from Great Falls, Mt., stated he supported SB 173.

Bob Cole, representing Flathead Wildlife, Inc., submitted his written testimony. **(EXHIBIT #18)**

Art Callan, from Bitteroot Valley, submitted written testimony. **(EXHIBIT #19)**

Jim McDermand, representing Medicine River Canoe Club, stated they support SB 173.

Bill Callaghan, from Butte, Mt., stated they support SB 173.

L.F. Thomas, an Anaconda sportsman, stated he supported SB 173.

Steve Wilson, representing the Bitteroot, stated that Montana was the last best place and let us keep it that way.

A letter by **Marshall Bloom** was submitted. **(EXHIBIT #20)**

A letter by **Doris Miner** was submitted **(EXHIBIT #21)**

A letter by **John Gibson** was submitted. **(EXHIBIT #22)**

Opponents' Testimony:

Bob Spoklie, representing Montana Game Breeders Association, stated he would address hybridization in reading a handout that was presented to the Fish, Wildlife, and Parks in 1992. He read that he could offer himself to game breeders to test for hybridization and to make arrangements to define hybridization in eastern Montana until they could be disposed of, in effort to eliminate the red deer hybrid from Montana. In January 1992, Mr. Spoklie requested of Fish, Wildlife, and Parks to certify Montana as a hybrid-free state upon completion of the testing. Evidently Fish, Wildlife, and Parks notified **Mr. Spoklie** that current tests did not identify all hybrids. **Mr. Spoklie** stated that this was false. Within Montana there are those that could be imported at a later date. If no elk were imported into Montana it might be possible to hybrid test all game farm elk and their offspring for a period of 4 to 5 years to determine the existence of any hybrids. This says that the game breeders would test every animal in the state of Montana at their own cost and they did not want them to do it. They did it anyway and the hybridization was only a smoke screen. He submitted the test results. **(EXHIBIT #23)** He stated that there has never been hybrids in the State of Montana and there never will be. He stated in Alberta, there was the TB status and there has only been one human being diagnosed with TB. He stated that people use the antlers for all types of medicines and they have been using them for centuries. Canned hunts are fine as long as there were permits. The New Zealand TB outbreak was also carried around by the oppossum. Colorado was doing very well and so was Canada. The fiscal note stated that there was $9 million to phase out game farm animals and 25% of the animals the state will end up buying them. He stated that it would take over $6 million to phase out the facilities added to the $9 million. Also the land and the fences would be another $8 to $10 million. He stated that would be even more taxes for Montanans to pay.

Bill Nyby, representing the Spoklie Elk Ranch, stated he opposed SB 173. He stated that in today's struggling economy he thinks that new business or enterprise should be encouraged and assisted by the local, state and federal government, not forced out of business or limited growth. With the depressed grain markets and the lower cattle, sheep, and hog prices, many farmers and ranchers have diversify into other operations to supplement their income so that they can continue their rural way of living, which they dearly love. **Mr. Nyby** stated that he diversified into raising elk, which he enjoys. He stated that if it was not for the raising of elk he would have had to leave the State of Montana to find a job. He stated that if SB 173 passes, his

family will be losing a number of animals, and for 8 years he has tried to raise a quality herd. Not only would he be losing the animals he would be losing a job which he enjoys. With the loss of his ranching occupation, the lack of job opportunities, and the inability of the family farm to support three families he would be forced to seek employment in a different part of the country and most likely have to leave Montana. He stated that was the right of private property. He stated that it would be the taking of a citizen's private property. He believes in the democratic form of government. He stands in opposition to SB 173.

Gerri Backes, representing Montana Game Breeders Association, stated that her question was the morals and ethics of such a person proposing such a piece of legislation. She stated her animals were not proposing a threat or hybridization to the wild population. She stated SB 173 was the dishonest taking of private property without compensation for the animals and the business. All game farm animals were privately owned, required by a permit holder. She stated that she was opposed to SB 173.

Bruce Barta, representing the Montana Game Breeders Association, stated that he chose to teach school, but he wanted to pursue ranching. He then spent 2 ½ years researching game farms and could see that TB was not going to be a problem. He urged the committees support in defeating SB 173.

Dr. John Smith, veterinarian from Three Forks, stated he was opposed to SB 173. He read about the Montana Veterinary Association, where the game farm industry was a viable industry in Montana, so his colleagues in the Montana Veterinary Association do support the game farm industry. Many of his clients are ranchers who have sizable herds of cattle south of here, and he can assure the committee that his clients feel that there are much more serious disease problems in some wild animals very close to them than in the game farms. **Mr. Smith's** clients and colleagues both feel that tests are not perfect in any situation, that the Montana Department of Livestock has done an excellent job in controlling diseases. There can be some surprises, but they have confidence that they can handle it.

Lorna Frank, representing the Montana Farm Bureau, stated they oppose SB 173. She stated that they were opposed to the bill because it interjects the public trust on page 2, line 26. They do not feel the legislature or agencies within the government at that point in time should bring in the public trust doctrine because it was still debatable in the State of Montana. **Ms. Frank** stated that when first looking at the bill it looked like a taking of private property, but reading through the bill on page 15, there was a monetary impact and there was compensation to the affected people. The rate of value would be on the current value of the effective date of the section. The effective date would be January 1, 1997, or sooner. There could be a different value at that time. She urged the committee to look closer at that part of

the bill. The farmers and ranchers support the eradication of TB in the state, but do not feel that this would be the correct way to accomplish the task. She asked why domestic wildlife could not be treated like domestic livestock. For those reasons they opposed SB 173.

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John Bloomquist, representing the Montana Stockgrowers Association (MSGA), stated that when **SEN. KLAMPE** approached the **MSGA** with his proposal on game farms, they stated they were opposed to legislatively eliminating Montana businesses and the type of legislative dictates on private property which were in this legislation. Regarding animal health issues, **MSGA** are very supportive that those issues cannot be compromised. The evidence that the **MSGA** looked at stated that the game farms can be operated in a safe manner.

Jack Schubarth, Game Farmer, read his written testimony. **(EXHIBIT # 24)**

Dennis Iverson, representing Montana Game Breeders Association, stated that SB 173 was not a bill dealing with disease. The hybrid issue was explained and if it was a disease bill then it would be talking about a lot more animals. He stated that SB 173 was a property rights bill. It was telling the people that there was a part of that property right that they cannot use. They could not use it for the purpose of game farming. **Mr. Iverson** stated there were two extremes that could be taken in a property rights issue. One would be that a person could do anything that they wanted to with their property, that would not be right either. There were certain things that should not be done and that right should be limited. On the other extreme, a certain activity would be taken away and the taking of that use would be a part of the property. Part of SB 173 says that this would be taking part of the right to use a person's land. That would be the reason for the fiscal note. He urged the committee to object to SB 173 and look at the way a person has the right to use their land in a way that does not hurt other people. He stated that SB 173 was a private property issue and a takings issue.

SENATOR LARRY TVEIT, SD 50, Fairview, stated he was opposed to SB 173. He stated that the sportsman were concerned that the Fish and Game was using the people's money to manage game farms. He stated that the money could be spent in a better way. **SEN. TVEIT** stated there would be another piece of legislation coming before the committee having to do with transferring the authority of managing game farms to another agency. He stated there were two bosses today, that there should only be one boss, and that issue needed to be cleared up. He commented on the property right issue, the alternative farming issue, and the rights of people as long as they are managed and run properly. **SEN. TVEIT** stated he would like to see the committee oppose SB 173.

Chancie Ralls, from Hamilton, stated he was opposed to SB 173. He stated he had a game farm license for a number of years and he understood the concerns of others. He stated that most of the game farmers were responsible in what they were doing.

Informational Testimony:

None

Questions From Committee Members and Responses:

SENATOR RIC HOLDEN asked **SEN. KLAMPE** about the Montana Democratic party platform. On page 45 it said, "domestication of elk and deer under the guise of alternative agriculture is expanding in Montana and poses very serious threats. The Montana Democratic party supports closure of all commercial game farms." **SEN. HOLDEN** stated it also said "in continued public ownership of all wildlife." **SEN. HOLDEN** asked **SEN. KLAMPE** if that was something that you or I or the Democratic party brought up? **SEN. KLAMPE** replied that he did not attend that convention and did not bring that to the Democratic party. He stated this was not a matter of partisan politics. He stated he was here representing the people of Montana. **SEN. KLAMPE** stated he was sure many of the proponents of SB 173 were not Democrats.

SENATOR TOM BECK asked **Chancie Ralls** about the fiscal note and he stated that according to the fiscal note it will cost us $9 million to buy the elk out. He told **Mr. Ralls** that the fiscal note would pay $1,009 for a bull elk and $504 for a cow elk. **SEN. BECK** asked **Mr. Ralls** if he thought it was a reasonable price to pay game farmers for their elk at this time or did he think that it should be more than that? **Mr. Ralls** stated that there is trafficking of elk on the black market and they are receiving $12,000 for a bull. He stated if they wanted to buy him out at that price then he would sell out, but he stated he had never done that. **Mr. Ralls** stated he would not sell his elk for the price proposed in the fiscal note.

SEN. BECK stated the fiscal note already shows a $6 million impact to the State of Montana. **SEN. BECK** stated he thought the prices were too low, he did not see where there was anything about the fences. He did not see how the state was to be kept out of litigation if SB 173 was passed. **SEN. KLAMPE** replied that he would not mind litigation. He stated that **SEN. BECK'S** interpretation of the fiscal note was under local revenues and what an animal was evaluated at for local revenues for tax purposes. He stated the price for an elk was $5,000, not $1,000. **SEN. BECK** stated he was looking at compensation increases on the second page of the fiscal note for fiscal year 1997, $9,283,000. **SEN. KLAMPE** stated it was based on the $5,000 figure and not the $1,000 figure.

SENATOR BOB PIPINICH asked **SEN. KLAMPE** how much did the state or the Fish, Wildlife and Parks subsidize the farms? **SEN. KLAMPE** stated it was his understanding that subsidizing, was to the extent of about 98%. **SEN. KLAMPE** stated that in SB 173 there was a suggestion to increase fees for license renewal.

SEN. PIPINICH asked **Bob Spoklie** if there was cross-breeding between the red deer and the elk, as there was a scare up in the Avon area that came from the Fish, Wildlife and Parks **SEN. PIPINICH** asked him to explain that. **SEN. PIPINICH** asked if there were any loose red deer in the area? **Bob Spoklie** stated there has never been any red deer loose. **SEN. PIPINICH** asked if there was not a wreck a while ago when red deer were being transported? **Bob Spoklie** stated there was not. He stated that was speculation and there was no record to prove it.

SENATOR LINDA NELSON asked **Bob Spoklie** what type of internal controls did he have to control the disease in the industry? **Bob Spoklie** stated he had talked to **Dr. Siroky** many times and he stated that there has never been one disease other than TB ever detected in an elk herd in Montana. He stated as far as they were concerned they did not want any disease in the herds and they wanted to rid the state of hybrids and they have done everything that the state veterinarian wanted. He stated the people in Hardin detected TB and they got rid of the herd. He stated they wanted to be good neighbors and to take care of their industry.

SEN. NELSON asked **Dr. Clarence Siroky, the state veterinarian representing the Department of Livestock**, to give his opinion on the previous question. **Mr. Siroky** stated if there was a change of ownership, a TB test was required. He stated they were working with the game farm industry in developing a program in which the herd would be tested in their entirety. He stated they have one group left in the state under quarantine. He stated they had a bacteria that they were not too concerned with. He stated there were two other herds tested in the state. He stated when they are out of quarantine they do continue to test the animals.

SENATOR DON HARGROVE asked **Mike Miller** if there were a lot of conflicts in the testimony and he asked **Mr. Miller** to comment on the previous testimony. **Mr. Miller** stated they were not black and white issues and he stated the red deer testing referred to the testing in Colorado and that referred to the hybridization. He stated it was difficult to tell a hybrid because they were looking at the DNA. He stated they could not detect all of the hybrids because there are so many similarities. He stated with TB they can detect and eliminate the disease. He stated that there were some good tests and his question was that there might be other diseases that they do not know of.

SENATOR GREG JERGESON asked **Dr. Siroky** about the quarantine and if it was strictly physical, which works on sexually transmitted diseases such as brucellosis or hybridization. Were there airborne pathogens or waterborne pathogens and how do they quarantine against those not requiring direct contact between the animals? **Mr. Siroky** stated the law in the state of Montana only requires the state veterinarian to quarantine for certain diseases. He stated there had not been any other diseases that have had that concern. He stated they do have tests that they perform when the animal comes into the state.

SENATOR GERRY DEVLIN asked **Jim Posewitz** if there were any documented cases while he was working for Fish, Wildlife, and Parks that there was cross-breeding occurring, or that did occur, and was there any documentation? **Mr. Posewitz** replied he did not work on game farms while working for Fish, Wildlife and Parks and he stated he was testifying for the **Orion Hunters Institute. SEN. DEVLIN** stated he thought there was a grapevine and that he could answer the question. **Mr. Posewitz** stated he would rather not admit "hearsay" testimony. **SEN. DEVLIN** asked if there was someone that could answer that question? **SEN. PIPINICH** stated he had documentation that could answer that question.

SENATOR REINY JABS asked **Dennis Iverson** how prevalent escape was on the game farms. **Mr. Iverson** stated one gentleman testified that he had never had an escape. He stated that the fences were strictly regulated and that most everyone else would say the same thing.

SEN. NELSON asked **Gerri Backes** about the collars and if she would approve of her animals wearing the collars? **Ms. Backes** replied that she had four types of identification already and the collars could promote injury to the animals and at this point she would not agree with the collar. **SEN. NELSON** asked if it was the usual way to identify them with four types of identification? **Ms. Backes** stated they had a TB tag with a number on it, their own individual tag that they could channel, plus the tag that comes from the Fish, Wildlife, and Parks, their farm tattoo number and there's also a microchip which was put in some of the animals. There are as many as five different forms of identification put on some of the animals. **SEN. NELSON** asked **Ms. Backes** if most game farmers have as many forms of identification. **Ms. Backes** replied that most did.

SEN. JERGESON asked **Gerri Backes** if the forms of identification were easily recognizable? **Ms. Backes** replied they were. **SEN. JERGESON** asked if they were recognizable from a distance such as a hunter-orange vest? **Ms. Backes** replied they were not that recognizable. **SEN. JERGESON** asked if everyone who disagrees with the position that she may take is immoral? **Ms. Backes** replied no.

Closing by Sponsor:

SEN. KLAMPE stated that he had a list of escapes and wanted someone to give it to **SEN. JABS**. **SEN. KLAMPE** stated there were a few comments he would like to respond to. He stated that in regards to private property rights, there was a lawyer who testified that has been on both sides and **SEN. KLAMPE** urged the committee to believe his testimony. **SEN. KLAMPE** read from a letter from **Marjorie Byrd**: "These game farm opponents are troubling individual rights, ignoring the fact that the general population which treasures free-ranging, disease-free wildlife, and hunting, has rights too. Democracy guarantees rights only when they are not harmful to others." **SEN. KLAMPE** addressed **Mr. Spoklie**, (**SEN. KLAMPE** was showing a magazine to the audience, the committee did not have this information) this was taken from a magazine that he advertised in. He stated that there was a cross-breeding advertisement. **SEN. KLAMPE** stated after talking to experts they have told him they could not tell a crossbreed after the first generation. **SEN. KLAMPE** addressed **Mr. Spoklie** and stated although **Mr. Spoklie** thinks that things were fine in Colorado, **SEN. KLAMPE** would prefer the committee to shape their opinions by hard data and reporting from scientists that had been heard today. **SEN. KLAMPE** stated SB 173 responds to the Constitution of Montana and they do not need to rely on public trust. He stated that an 8-foot fence may not be adequate after a 4-foot snow storm. **SEN. KLAMPE** stated he toured a game farm where a fence had gone down in a spot. **SEN. KLAMPE** urged the committee to consider the testimony that had been heard in the context of a future Montana. SB 173 was to prevent other diseases and problems. **SEN. KLAMPE** stated SB 173 was proactive as well as reactive. He asked the committee if they wanted to see Montana covered with game farms as in Texas? **SEN. KLAMPE** stated that SB 173 was a challenge to the legislature and it was their responsibility. He stated that other states had outlawed elk farms and that Montana should do the same. SB 173 was a call to live up to the requirements in the Montana State Constitution. **SEN. KLAMPE** read part of Article 9, section 1 of the Montana State Constitution. He stated that SB 173 was fulfilling a constitutional requirement. He volunteered his time and effort to work through SB 173.

ADJOURNMENT

Adjournment: 2:50 p.m.

CHUCK SWYSGOOD, Chairman

JENNIFER GAASCH, Secretary

CS/jg

MONTANA SENATE
1995 LEGISLATURE
AGRICULTURE COMMITTEE

ROLL CALL DATE 1-30-95

NAME	PRESENT	ABSENT	EXCUSED
GERRY DEVLIN, VICE CHAIRMAN	X		
TOM BECK	X		
DON HARGROVE	X		
RIC HOLDEN	X		
REINY JABS	X		
GREG JERGESON	X		
LINDA NELSON	X		
BOB PIPINICH	X		
CHUCK SWYSGOOD, CHAIRMAN	X		

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Virginia Cattlemen's Association

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Daleville, Virginia 24083

Affiliated with National Cattlemen's Association

January 29, 1993

SENATE AGRICULTURE
EXHIBIT NO. 1
DATE 1-30-95
BILL NO. SB 173

RESOLUTION
ON THE RISKS OF DEER FARMING IN VIRGINIA

WHEREAS: The Virginia Cattlemen's Association, an organization of some 8,000 cattle producers in Virginia, constantly works to improve the economic climate of cattle production in Virginia. The sale of cattle and calves is the State's number one agricultural commodity, producing $412 million of farm gate receipts in 1991; and,

WHEREAS: Virginia currently enjoys an accredited Tuberculosis free status which augments interstate movement of seedstock and commercial cattle; and,

WHEREAS: Exotic deer farming as an alternative to agricultural enterprises has been lawful since 1989 with the change in policy by the Virginia Department of Game and Inland Fisheries; and,

WHEREAS: There is no fully reliable test to identify whether or not a big game animal is infected with bovine TB; and,

WHEREAS: USDA which handles disease problems in domestic livestock lacks authority to control shipments of ranched wildlife as it has for livestock; and,

WHEREAS: The USDA and Virginia Department of Agricultural and Consumer Services neither have proper jurisdiction over the health of exotic deer farming; and,

WHEREAS: There is an extremely high probability that farmed deer (cervids) due to acts of nature or accidents will get free to mingle with domestic livestock and wildlife with the very great risk of spreading disease that could ultimately be very damaging to the livestock industry from an economic standpoint and pose a public health problem.

NOW, THEREFORE, BE IT RESOLVED THAT:

The Virginia Cattlemen's Association urges that laws and policies be changed, making it illegal to farm exotic deer (cervids) anc further, that the game farming industry in Virginia be dismantled. In the interim, VCA recommends a continued ban on the import of all farm cervids into Virginia and a prohibition on movement of these animals within Virginia. During the phase out period, it would be expected that expansion of game farming will cease, that risk to domestic livestock and to wildlife will be reduced to the highest possible degree and that proper regulation and enforcement will be applied to farming and marketing operations that would prevent any possible accidents that might endanger domestic cattle or wildlife.

SENATE AGRICULTURE
EXHIBIT NO. 1A
DATE 1-30-95
BILL NO. SB 173

Changes in Fees, Fines, and Regulations
(Not including changes for the phase-out or moratorium)

Sen. Klampe

1.	p.5 lines 26-27	Renewal fees shall be commensurate with department's cost of administrators
2.	p.6 line 9	There can not be a transfer of a Game Farm license
3.	p.7 line 7	Tags must be visible from 50 yards
4.	p.7 line 8	DNA sample required
5.	p.10 line 10	Only a licensee may own or lease a Game Farm animal
6.	p.7 line 21	Necropsy mandatory on every dead Game Farm animal with immediate reporting of disease
7.	p.8 lines 16-20	Testing required on intrastate movement with quarantining of diseased animals and depopulating of herds if TB is discovered
8.	p.9 line 10 13 & 16	Recording of leases required
9.	p.10 line 29	Department shall require guaranteeing or destroying of any diseased or potentially diseased Game Farm animal
10.	p.11 line 3	Department shall restrict importation of species which pose a threat to our native wildlife or livestock
11.	p.11 lines 25-27	Double fencing
12.	p.12 lines 4-8	No co-mingling of Game Farm animals with livestock and a buffer zone around watercourses carrying Game Farm fecal matter
13.	p.14 lines 7	Revocation of Game Farm license
14.	p.14 line 8	Civil penalty not to exceed $50,000 fine

15.	p.14 line 15	Fine of not more than $10,000
16.	p.14 line 23	No transferring of licenses
17.	p.15 lines 21-24	Cooperative agreement with Indian Tribes
18.	p.15 line 26 p.16 line 1	State is immune from lawsuit for damages arising from the spread of TB, brucellosis, or any other communicable disease from a Game Farm animal to livestock. The Game Farm licensee is responsible

EXHIBIT 1B
DATE 1-30-95
SB 173

GEIST, Valerius **19 Jan. 1995**

Professor of Environmental Sciences, Faculty of Environmental Design. Adjunct Professor Dept. of Biological Sciences, The University of Calgary, CALGARY, Alberta, Canada, T2N 1N4, P: 403-220-7430/6601 Fax:403-284-4399.

Director, Wildlife Heritage Ltd., 6140 Dalmarnock Cr. NW, CALGARY, Alberta, T3A 1H2 (home address) P: 403-288-1508

BORN: 02/02/1938 in Nikolayew, USSR. **STATUS:** married to Renate Geist, nee Brall; three children. **CITIZENSHIP:** Canadian
EDUCATION: 1960 **B.Sc.** Honours Zoology, University of British Columbia (UBC), Vancouver BC.; 1966 **Ph.D.** Zoology UBC; 1967 Post Doctoral (NRC Fellow) Max-Planck Institut fuer Verhaltens-physiologie, Section: Konrad Lorenz, Seewiesen, Germany.
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GAME RANCHING, BOVINE TUBERCULOSIS AND OTHER DISEASES: EXPECTATIONS TURN INTO FACTS

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ABSTRACT As predicted, a fledgling game ranching industry in North America was soon haunted by diseases affecting wildlife, livestock and humans. Game ranching challenges fundamentally North America's system of wildlife conservation and ownership. It also puts in jeopardy decades of effort eliminating reportable diseases from livestock. It negates the conservation achievements of three generations of North Americans, risks civic liberties, and the rich economic returns generated by the private sector from public wildlife. Bovine Tb, a historic scourge of game ranching, spread with the industry, a parasite was imported, old diseases took on new significance, including Transmissible Spongiform Encephalopathy, currently decimating British cattle, which surfaced in three species of free living deer. There is significant costs to the public and livestock industry from the disease outbreaks. This, and court-tested evidence against game ranching, has not deterred agricultural bureaucracies from promoting this industry. Is this merely "deregulation"? Wildlife has been historically abrogated repeatedly from public ownership by the ruling elite for its sole benefit (Geist 1988).

----------Key words: game ranching, deer farming, conservation policy, wildlife economics, wildlife diseases, bovine tuberculosis, toxoplasmosis, spongiform encephalopathy, meningeal worms, sustainable development, bio-ethics.

INTRODUCTION Scientists warn in the hope that their predictions may never come true. A review of game ranching, the commercial raising and marketing of wildlife, warned of many negative consequences, including of disease outbreaks (Geist 1988). While diseases are the focus of this report, it is but a symptom of a greater problem: the legislative incompatibility of game ranching with North America's system of wildlife conservation. At stake is a successful, 70 year old system of sustainable development, that reversed the "tragedy of the commons", generated markets that support environmental conservation, and made public wildlife a creator of wealth and jobs in the private sector.

Policies, which would make game ranching a thriving industry, are opposed to existing policies which protect wildlife. These are, briefly: (1) the absence of private ownership of and (2) trafficking in wildlife (fur excluded), (3) the allocation of surplus wildlife by law and (4) disallowing the killing of wildlife, except for cause. Game ranching requires legislation permitting private ownership of wildlife, trafficking in wildlife, allocation by the market place and absence of regulations on the consumtion of wildlife. An infrastructure of producers, processors, wholesalers and retailers provides opportunities for the illgal disposition of public wildlife, leading to more law enforcement problems and costs. Predators are not compatible with game ranching, nor is public wildlife on habitat designated for private wildlife, ongoing escapes from game farms risk disease transfer to livestock, wildlife and humans, the genetic pollution of native stocks, and their displacement by feral exotics. A court deposition by Lanka et al. (1990) details the impact of game ranching (Dorrance v. Wyoming Game and Fish et al.

civic case No. 6244/ 6245, 1990; J. T. Dorrance, III, Application for permit to receive, import, process and manage certain exotic animals. See ruling by Wyoming Game & Fish Commission, Feb. 26, 1993).

With about 30 million big game animals in the U.S. and Canada (after Schmidt and Gilbert 1978), wild large mammals are much outnumbered by 270 million humans and over 200 million fire arms in private hands. Livestock outnumbers big game by over 110 to 1 (Pimentel et al. 1980). Despite great odds, our system of wildlife conservation returned many species from the brink of extinction, reversed Hardin's (1968) Tragedy of the Commons (Geist 1989), and made public wildlife a creator of wealth and employment in the private sector (1985 U.S. Fish & Wildlife Service, National Survey of Fishing, Hunting and Wildlife-Associated Recreation; Filion et al. 1983). It is an example of successful sustainable development in which markets promote conservation; game ranching endangers it by making dead wildlife valuable. The distinction between commerce based on living v. dead wildlife is crucial (Geist 1988, 1989).

At risk are also civic liberties based on public ownership of wildlife. In the past private ownership of wildlife restricted access to land by the public, led to its disarming, and made it subjected to severe punishment for trespass against private wildlife (Stahl 1979; Lund 1980; Caughley 1983). A price on dead wildlife not only places public wildlife at risk, but also public guardians of wildlife (see National Geographic Society, TV Series "Wildlife Wars USA", 1991; Poten 1991; Williams 1992). Control of wildlife mortality is fundamental to all efforts to save bio-diversity via habitat conservation. Commerce in

dead wildlife removes such controls, unless the public is disarmed and closely policed. The example of Germany shows just how difficult and costly that is (Geist 1988).

Court depositions in Wyoming (Lanka et al. 1990) and the testimony by expert witnesses detailed the technical, legislative and administrative barriers to controlling diseases in ranched wildlife (Dorrance v. McCarthy et al. No. C90-0110-J, 1991; ibid. civic actions 6244/6245, 1990; J. Dorrance III Application: see ruling 26 Feb. 1993 by Game & Fish Commission). So did a USDA assessment of bovine Tb (Anon. 1992b). By 1990 Tb in confined elk had become a continental problem (Miller and Thorne 1993). Despite this and the opposition by conservation and agricultural organizations, the outright prohibition of game ranching in several states and provinces, agricultural bureaucracies promote game ranching. Agriculture Canada, for instance, extended its policy of controlling reportable diseases in livestock to ranched wildlife, although this policy is neither technically nor administratively feasible. Yet this legitimises game ranching and commits the federal government to pay for the control of disease epidemics on game ranches, current and future. The expected regulatory failures were soon to follow (see below).

The game ranching controversy raises difficulties for scientists who communicate mainly via refereed publications. The context in which decisions are made contains little science. It must be learned from investigative reports, court documents, public hearings, ministerial letters, memoranda and minutes of meetings, statements by various "stake holders" as reported in the daily news media etc. In investigative reports credibility resides in the allocation of blame and the risk of facing suit over false allegations.

Private contacts are important. Court deposits by expert witnesses are subject to hostile, public cross-examinations by lawyers who, normally, are backed by the witness's peers, a test more severe than peer review. Consequently, court depositins such as Lanka et al. (1990) are significant, as are reports based there on (Lanka et al. 1992; Merritt 1992). The context surrounding game ranching is, in part, as follows:

1. Concern by agricultural bureaucracies of loosing their constituency due to failure to maintain farm income, making "alternative agriculture" (game ranching) a daeus ex machina.

2. The perception of potentially lucrative markets in North America for wildlife products (venison, oriental medicine, "fun products").

3. Attempts by New Zealand interests to establish deer farming operations in the northern hemisphere to even out seasonal deer production.

4. A potentially lucrative market for New Zealand for disease tests, know-how and products to a fledgling North American deer ranching industry.

5. The involvement of the banking industry by making loans to game ranching operations.

6. The extension of agricultural subsidies to game ranching, and the generous compensation paid to game ranchers for depopulated diseased herds.

7. The claim by some landowners and members of the elite to allodial rights (see Hargrove 1989).

8. Unhindered access by the game ranching leadership to senior members of elected legislative bodies and the civil service.

9. The secrecy by agricultural bureaucracies in Canada pertaining to diseases in ranched wildlife.

10. The reluctance of one jurisdiction to question the veterinary practices of another, even when grave doubt does exist.

11. The hostility of agricultural bureaucracies to public scruitiny of game ranching.

The lack of informed debate by government agencies promoting various policies, is, unfortunately, not new. This was pointed out by Doern (1981) in a study of science and public policy for the late Science Council of Canada. It wasts precious scientific resources acquired usually with public funds. Moreover, the manner in which the disease epidemics are being handled in Canada points to a warning by Beryl L. Crowe (1969) in her discourse on Hardin's (1968) "The Tragedy of the Commons". She wrote as follows about the behaviour of bureaucracies (the "watchers" hired by the public to guard the public's interest): "Our best empirical answer to the question.. Who shall watch the watchers themselves? - have shown fairly conclusively... that the decisions, orders, hearings and press releases of the custodians of the commons...give the large, but unorganized groups in American society symbolic satisfaction and assurances. Yet, the actual day-to-day decisions and operations of these administrative agencies contribute, foster, aid and indeed legitimate the special claims of a small but highly organized groups to differential access to tangible resources which are extracted from the commons. This has been so well documented in the social sciences that the best answer to the question of who watches over the custodians of the commons is the regulated interests that make intrusion on the commons."

BOVINE TUBERCULOSIS Moving wildlife in commerce risks the transfer of diseases between livestock, wildlife and humans (Holmes 1982; Smith 1982; Tessaro 1986; Samuel 1987; Lanka et al. 1990). It has happened before. Elk in Yellowstone got bovine brucellosis (Brucella abortus; Rush 1932; Honess and Winter 1956; Thorne et al. 1979). Swine brucellosis (B. suis biotype 4) spread from domestic reindeer in Alaska and Canada to caribou, grizzly bears, wolves, Arctic foxes, dogs and native people (Meyer 1966; Neiland et al. 1968; Neiland 1975; Broughton et al. 1970; Tessaro and Forbes 1986; Gates 1984). Bovine Tb spread from cattle to bison in Bison National Park (Tessaro 1986), and, along with bovine brucellosis, infect bison in Wood Buffalo National Park (Tessaro et al. 1990). Elaphostrongylus cervi, a parasitic nematode associated with brain and muscle tissue, may have been introduced with domestic reindeer (Rangifer tarandus spp.) to the island of Newfoundland from where it spread to native caribou (Lankester and Northcott 1979). Reindeer may have also introduced E. cervi to mainland caribou (Lankester and Fong 1989). Game ranching thus forms a "disease bridge" between livestock, wildlife and humans. The risk is grave for North America's large mammals of Siberian origin, man included, as they are very sensitive to diseases of relatives from the Old World (Geist 1985a, 1991; Foreyt 1989; Onderka and Wishart 1988; Onderka et al. 1988).

Furthermore, agricultural agencies may insist on destroying diseases, even in national parks: witness Agriculture Canada's application, supported by several federal and provincial agriculture and wildlife agencies, to kill off bison infected with bovine Tb and brucellosis in Wood Buffalo National Park (Connelly et al. 1990). While arguing to

eliminate bison, Agriculture Canada supported game ranching, a much greater disease threat, as was shown 1990 by Tb epidemics erupting on game farms, and the import of E. cervi. The bison, in their 66 years of diseased existence have done no known harm.

Bovine Tb in wildlife is not an obscure disease. A computer search revealed over 250 scientific entries, and New Zealand's DEER FARMER reports regularly about Tb in farmed deer. Earlier this century, in the former Buffalo National Park, Alberta, bovine Tb spread from cattle to bison and infected 6 percent of the elk and moose (Alces alces), and one percent of the mule deer (Odocoileus hemionus; Tessaro 1986). Two wolves (Canis lupus) with Tb were found in Riding Mountain National Park, Manitoba (Carbyn 1982, & personal communication 1991). In the U.S. confined elk were involved earlier in Tb outbreaks (Stumpf 1982, 1992a, b; Essey 1992). In the U.S.S.R., where deer farming is old and widespread (Stubbe 1973), the problem of Tb on deer farms is old and widespread (Fedoseev et al. 1982; Remenstrova et al. 1983; Lunitsyn et al. 1990). Tb is a problem in China with farmed sika deer (Cervus nippon), sambar (Rusa unicolor) and fallow deer (Wu 1986; Shyu et al. 1988). Bovine Tb has appeared in ranched fallow deer in Australia (Robinson et al. 1989), Denmark (Joergensen et al. 1988; Vigh-Larsen 1992), Taiwan (Wu 1986), in the U.S (Merritt 1992) and in British Columbia.

Bovine Tb struck the fledgling deer farming industry in New Zealand in 1978 (Beatson 1985). A voluntary Tb control scheme introduced in August 1985 and a compulsory one in January 1990 reduced the incidence of Tb in farmed deer (Bringans 1992; Hutching 1992a), although in January 1991 there were still 278 deer herds

diagnosed with Tb and under movement control (Carter 1992). However, this did not prevent Tb from emerging as a major threat to New Zealand's European and U.S. export markets in beef, dairy and deer products (Buddle 1992). Tb control appeared to work. By 1980 the number of cattle herds under Tb movement control had declined sharply, but then the trend reversed and numbers have risen steadily (Buddle 1992), even though Tb on deer farms declined to 4-5% of the more than 6,000 farmed deer herds (Carter 1992). By 1990 there were also 6 Tb infected free-ranging herds of red deer (with a prevalence of up to 30 percent), and 2 free-living Tb infected fallow deer herds (with a prevalence of about 2 percent). Epidemiological evidence suggests that infected captive red deer repeatedly passed on Tb to brush-tailed possums (Trichosurus vulpecula) and to cattle; infected feral pigs and cats were also found (Beatson 1985; Livingstone 1990; deLisle et al. 1990; O'Neil 1990; & correspondence). A preliminary study showed a high rate of Tb in feral ferrets within a Tb endemic area (van Reenen 1992). Such areas with endemic Tb, and control areas surrounding these, cover 28% of New Zealand (Buddle 1992). The market in live deer declined, and with the loss of income, compliance with the manadatory Tb testing programme has also declined (Hutching 1992b). Some have abandoned deer farming and a few have opened the gates and (illegally) let out their deer (Stevenson 1992). While possums were thought to be the major culprit in spreading Tb, the high rate of Tb in deer and ferrets, and the high infectivity of deer (Hutching 1992a) has given rise to concerns. So have deer fences in disrepair, poor compliance with deer farming regulations, the inability by inspectors to police the industry, and the escape or release of deer, in particular such as appeared on

dairy pastures. Erradicating released deer has proven costly and ineffective (Stevenson 1992). A small proportion of the 300 cases of Tb in humans is due to bovine Tb (Buddle 1992). The ability of New Zealand to control Tb has been questioned (Buddle 1992).

In 1985 TB struck deer farms in Denmark and spread to cattle; eradication imposed a notable cost on the public purse (WILD UND HUND 91/29 Jan. 1989 pp. 20-21; Vigh-Larsen 1992). A Tb outbreak in 1985 in Great Britain followed the import of infected red and fallow deer from Hungary; deer farmers demanded public compensation and better tests (Stuart et al. 1988; WILD UND HUND 92/30 July 1989, pp. 18-19). In Ireland 5 from 130 free-living red deer had bovine Tb, and in Great Britain's Weltshire and Dorset counties 7 from 450 culled red deer (Stuart et al. 1988). More Tb infected red deer were found subsequently in Ireland (Grange et al. 1990) and in England (Philip 1989); deer might have been infected with Tb from infected badgers (Meles meles; Clifton-Hadley and Wilesmith 1991; Zuckerman 1980; Little et al. 1982 a, b; Hewson and Simpson 1987).

Tb appears with high stocking rates of captive deer (Clifton-Hadley and Wilesmith 1991) and may appear in zoo stock (Kollias 1978; Stuart 1988; USDA 1992). Stress increases the susceptibility of deer to Tb (Griffin 1989; Buchan and Griffin 1990). Some 116 Tb strains have been identified in Asian wapiti (Fedoseev et al. 1982). Free-living deer of several species show low prevalence of bovine Tb in England, Hawai, and central Europe (Clifton-Hadley and Wilesmith 1991). Free-living red deer in England and Scotland are not uncommonly infected with avian Tb (Munroe and Hunter 1983; Stuart et al. 1988), as are ranched elk in Washington (Merritt 1992).

Historically, bovine Tb has been difficult to detect in deer (Fedoseev et al. 1982; de Lisle et al. 1985; Beatson 1985; Tessaro 1986; Stuart et al. 1988; McKeating and Lehner 1988; Griffith 1988; Fleetwood et al. 1988; Philip 1989; Buchan and Griffin 1990; Thone 1992; Lanka et al. 1992); it survived quarantine and lay dormant in tested animals (Silberman 1978; Stuart et al. 1988; Lanka et al. 1990); it was difficult to detect in stressed deer (Corrin et al. 1987); animals with advanced Tb may not respond to skin tests (Miller et al. 1991; Bringans 1992; Lanka et al. 1992) and viral diseases may suppress the immune response (Thone 1992). Moreover, common disinfectants (halids, hypochlorite, benzalkoniun chloride) used to decontaminate fascilities will not destroy tubercle bacilli (Thone 1992). Herds in New Zealand (Beatson 1986), Europe (Stewart et al. 1988), and the U.S. (Merritt 1992) tested negative for Tb shortly before the disease erupted. The "index" elk in Alberta, reputedly, tested twice negatively for Tb. A Montana rancher complained about the testing: "We done it and done it. You'd think some of our elk are drug addicts; they've got so many puncture holes in them".

At a conference on deer production held in 1983 in New Zealand, Baetson (1985) emphasized that bovine Tb in red deer manifests itself differently than in cattle, and warned that procedures found useful for cattle do not necessarily work on deer. Tb in the red deer species is more acute than in cattle; its first sign may be sudden death. Elk or red deer with advanced Tb may look normal (Fedoseev et al. 1982; Miller et al. 1991; Bringans 1992). A Tb infected elk was treated mistakenly for actinomycosis for weeks in Alberta (Fanning and Edwards 1991).

There is concern that bovine Tb may become endemic in free-living elk in North America. As USDA (Anon. 1992b) points out, the spread of Tb to free-living cervids earlier this century was unlikely due to low deer numbers. Cervid physiology, ecology, social behaviour, and the ability of veterinarians to intervene, may be factors in the spread of bovine Tb in the wild. Different species of deer have different patterns of feeding, gregariousness and social grooming. Some, like the white-tailed deer, appear unlikely to be infect from cattle, and would be unlikely to pass on Tb to others. It overlaps little with cattle, it browses, it tends to be solitary and usually grooms only its offspring. That is, unlike elk, it is unlikely to stick its snout where cattle do. Elk are highly gregarious, frequently groom themselves and others, and overlap in food habits with cattle. An infected elk is expected to work contagious saliva with its tongue into its own fur and that of others. Elk normally lick the body parts that the companion cannot reach, such as the neck, withers, croup, ears and head. One contagious elk could infect the fur of other elk through social grooming. Handling such elk risks contaminating the hands, and dislodging tiny airborne bits of dried sputum containing Tb bacteria that may be inhaled. At risk is anybody handling the fur of a contagious elk. Such are expected to contaminate with their body fluids the grazing areas and wallows, the salt-blocks put out for cattle, and standing pools of water.

Tb is more common in old elk than in young, and affects bulls more often than cows (Rementsova et al. 1983; Miller et al. 1991). In the red deer, Tb lesions up to 20 cm in diameter break out in the lymphatic, respiratory and digestive systems, as contagious running sores on the exterior of the body, and rarely in liver and intestines; it

may affect the pleura and serous coat of the intestines, and the mesenteries (Fedoseev et al. 1982; Baetson 1985; Stuart et al. 1988; Philip 1989; Buchan and Griffin 1990). At an advanced stage of Tb red deer show wasting and have visible abcesses that drain to the outside (Bringans 1992). Some Tb infected wild red deer observed in New Zealand had open sinuses draining from the pleural cavity and the submandibular, prescapular and popliteal lymph nodes. Tb may be spread among deer via the respiratory tract and via contact with contagious body fluids and feed; the bacterium may be shed with feces, urine, saliva and puss. Under ideal conditions, Mycobacterium may survive in the environment for two years, though normally it survives only weeks because of susceptibility to sunlight, ultraviolet radiation, desiccation and high temperatures (Wray 1975; Duffield and Young 1984; Grange and Collins 1987). Yet elk with advanced Tb, and presumably contagious, may not appear sick (Fedoseev et al. 1982; Miller et al. 1991). In infected free-living deer in New Zealand, without veterinary interference, Tb could spread within the bodies of deer with age. This would insure the spread of contagious body fluids on pastures.

Should Tb escapes into elk in America, then, in time, one may see in national parks tame elk with advanced Tb mixing with people on golf courses, picnic areas, lawns, camp grounds etc. Dogs walked on leashes along promenades will be exposed to Tb infected fluids. Diseased elk in the foothills will use the same areas as cattle, and are likely to pass on Tb, as red deer and elk have apparently done in the former U.S.S.R. (Rementsova et al. 1983), Denmark, New Zealand, Alberta (see below), the mid-west

(Lanka et al. 1990), and in New York and Pennsylvania. It would end hopes for a Tb-free status for the cattle industry, unless, of course, wild elk were to be exterminated.

Veterinarians employed by agricultural bureaucracies were not uninformed about bovine Tb in wildlife. In 1989, Agriculture Canada had this to say: "The detection of tuberculosis in wildlife is hampered by the lack of proven test methods. There is no reliable blood test, intradermal tuberculin test have not been properly evaluated in many wildlife species, and lymphocyte activation tests are not yet perfected" (Anon. 1989, pp. 4-22). USDA veterinarians pointed to inadequate controls over disease testing and transport (Lanka et al. 1990; Anon. 1992a, b; Essey and Mayer 1992; Essey p. 9, Feb. 26, 1993 ruling Wyoming Game & Fish Commission).

A comparison of dates marking the beginning of deer ranching and the outbreak of bovine Tb, suggests that Tb follows with a lag time of 5-10 years, when captive herds multiply (Clifton-Hadley and Wilesmith 1991). Deer ranching grew rapidly since 1985 (Anon. 1992b). It was thus not surprising that multiple bovine Tb epidemics struck game ranches by 1990 (Miller and Thorne 1993).

The above, some argue, is irrelevant with the development in New Zealand of a superior blood test for bovine Tb in cervids (Griffin et al. 1992). Even if this claim proves valid, it misses the point: disease control is more than science. In a lucrative market criminal elements will trade wildlife irrespective of testing, some operators will flout rules even in the absence of financial constraints, and innocent mishaps will occur, particularly in a mature industry with large numbers of operators and captive wildlife. Technical excellence does not make up for poor policies (Dratch 1993).

AN CHRONOLOGY OF DIESES EVENTS PERTAINING TO GAME RANCHING IN CANADA AND THE UNITED STATES

1978 The transfer of 2 elk from a zoo to a game ranch in Iowa (D) begins chain of Tb transmission, not discovered till 1981. From here Tb is transmitted to a South Dacota ranch that leads to the infection and destruction of 24 captive bison herds and to other elk ranches (Essey 1992). For tracing of Tb-infected elk over 6 stated, 1980-82, see Stumpf (1992a, b).

1984, Nov. 13. Alberta's new Wildlife Act foreshadows game ranching and paid hunting.

1985. Great Britain, following the import of Tb infected red and fallow deer, initiates extensive deer testing and erradication programme. Tb in wild badgers occasioanly infects wild deer and cattle (Fletcher 1992).

1986. The last 3 Tb infected cattle herds (550 heads) in Alberta were destroyed early this year.

1987, Feb. 26. Alberta's minister of Forestry Lands and Wildlife legalizes by Order in Council (No. 12/87, with Chairman Don Getty) the sale of (velvet) antlers, and makes available other species of wildlife for a, still, illegal game ranching industry.

Dairy farmers in Thecumse, Ontario, petition county against deer farming because of disease threat; absence of legislation precludes action.

27 elk from a Tb infected herd moved from Nebraska to a Montana ranch (A) and then moved 2 months later to Colorado ranch (C). The Nebraska herd assembled

from elk from Montana (B) and Iowa (E) in 1981; ranch (E) source of 1981 bison and elk Tb infections in South Dacota (Essey 1992).

1988, Elk are imported in May to the Alberta (index) game ranch from Montana ranch (A) of which one female is to die in June 1990 of Tb (Essey 1992). Denmark, free of bovine Tb since 1959, discovers Tb in farmed fallow deer. By 1991 approx. 1,600 deer were eliminated in 7 herds; 2 herds are now Tb-free, 5 held under observation (Vigh-Larsen 1992).

Sept. 26, Alberta's Departments of Agriculture, Forestry Lands and Wildlife imposes import ban on elk to preclude the spread of meningeal worm (P. tenius).

1989. Agriculture Canada (Ag.Can.) applies to destroy Tb and brucellosis infected free-roaming bison in Wood Buffalo Nationa Park (Connelly et al. 1990). Canada's cattle have brucellosis-free status since 1985. Tb-free status expected at end of 1989 (Tessaro et al. 1990). Based on 1978 study: brucellosis & Tb-free status would save livestock industry $1 billion over 20 years ($50 million per year). Acknowledges lack of reliable test method for Tb (Annonymous 1989).

1990. March. Lanka et al. (1990) report, detailing impacts of game ranching, tabled in court in Wyoming and widely circulated.

April. (USDA memo of 12/7/93). In British Columbia from 380 fallow deer destroyed, 13 showed TB lesions, including 3 deer imported from Oregon and one from New York. On a NY deer farm, 8 deer found with mycobacteriosis-like lesions, but Tb unconfirmed. BC sources inform that 2 fallow deer herds were depopulated, but Tb could not be traced due to book keeping problems. Ag. Can. official denies that 2 herds

were destroyed, claims that only one herd of New Zealand origin was destroyed in quarantine due to Tb. April. Elk with Tb confirmed on Alberta's index ranch (Fanning and Edwards 1991).

May 23. Mr. Fjordbotten, Alberta's Minister of Forests, Land and Wildlife, promises full debate on Bill 31, "Livestock Diversification Act" (game ranching legislation).

June. 26. Government of Alberta moved closure on Bill 31.

June. 29. CALGARY HERALD. 25 elk escaped from a game ranch at Kitscoty (near Lloydminster) on June 3; gate was left open. All but 9 were recaptured, but efforts to trace others failed.

August 8. V. Geist sends letter to editor of Calgary Herald, warns of outbreak of TB passed on by ranched deer as based on Danish and British experience.

Nov. 2. Elk from Alberta index game ranch confirmed dead from TB.

Nov. 8. CALGARY HERALD. 285 head of wildlife to be destroyed and compensated for on index ranch; $12,000 per elk.
(Edmonton Journal) Quarantine on 34 of 130 licenced game farms in Alberta.

Nov. 9. EDMONTON J. 5 escaped elk from quarantined game ranch, that came in contact with Tb infected elk, are being hunted down (unsuccessfully). (Calgary Sun). 52 Agriculture Canada vets and technicians are tracing about 150 elk sold to 35 other ranchers. (Calgary Herald) Government admits that half dozen elk from index ranch not accounted for due to "minor bookkeeping problems". Ag.Can: "Elk pose little threat to humans". A pig farm is also under quarantine for TB.

Nov. 11. EDMONTON SUN. Compensation up to $20,000 for each elk killed because of TB, says Dr. Terry Church, director, Alberta Agriculture Animal Health Division. Ernie Isley (Alberta Minister of Agriculture) aware that test is not 100% sure, but will proclaim (Bill 31) late this year or in 1991. (Calgary Sun) Ranchers fear elk TB may hit cattle herds. Alberta Cattle Commission concerned.

Nov. 18. CALGARY HERALD. A ranched elk suspected dead of Tb in Saskatchewan.

Nov. 21. CALGARY SUN. 23 elk confirmed with TB on index ranch; 2 more with suspected TB shipped from index ranch. An Ontario game ranch is depopulated because of (massive) TB; diseases game fed to tigers and other carnivores who also contracted TB.

Nov. 24. CBC NEWS: 41 game ranches under quarantine for TB in Alberta. Due to TB Federal government imposes ban on the import of cervids and camelids, and their transport across provincial borders. US does no test game animals for TB, except bison. Health & Welfare Canada acknowleges: Chronic wasting disease same as BSE (mad cow disease).

Nov. 28. Before Calgary Chamber of Commerce a prominent game rancher states that in addition to indexed (TB) elk herd there are 3 more ranches with Tb suspected elk; 60,000 ranched elk are required in Alberta to make game ranching viable.

Dec. 4. 8 ranches with TB positive elk in Alberta. Fish and Wildlife, alerted to a tagged elk running around free near index ranch, gunned down 4 elk - without finding the tagged elk.

Dec. 5. 2 Ottawa sources confirm compensation of $15,000 per elk. Current TB outbreak in Alberta is the most costly to date. A 2nd game farm with TB is found in Ontario.

Dec. 6. CALGARY HERALD. Of 5 quarantined elk ranches in Saskatchewan, one positive with TB.

Dec. 7. USDA memmo: one bull elk died of TB in Wisconsin; it was imported from a game farm in New York. The herd this elk was with, came from Canada 2 years earlier. Of 197 elk and red deer tested, 10 had a significant TB response; 2 of these deer originated from New Zealand and were imported into the US via Canada. A fallow deer died of TB in Florida; it came from a N.Y. exotic animal dealer.

Dec. 8. CALGARY HERALD & EDMONTON J. Alberta Fish and Wildlife records showe that index ranch had 160 elk, 25 deer and 25 bison. Rancher claims he had only 150 elk, 19 deer and 15 bison. Officials found 12 deer; rancher claims he found 7 deer killed by coyotes. 12 deer and 108 cattle killed proved negative for TB; 23 elk were TB positive. In BC flouting of registration is so widespread, as to make prosecution of individual game ranchers capricious.

Dec. 9. EDMONTON SUNDAY SUN. Agriculture Canada decreed that hoofed animals (deer, elk, reindeer, bison, antelope, camels, and exotic sheep, goats and pigs), can no longer be moved from their current premises. Domestic livestock, including cattle, sheep, pigs goats and horses are exempt from this order. Ottawa source: Agriculture Canada's compensation level for elk will be $15,000 per elk. Game ranch depopulated in Ontario costs taxpayers $2.0 million.

* Ed Struzik, HARROWSMITH No.94, Vol. XV:4 pp. 37-45. He reports that velvet antlers in reindeer are cut off without anesthesia. Agriculture Canada, though it has known about (swine) brucellosis in reindeer for a long time, did not prevent shipment of these animals to ranches in the south, though they finally stopped the mass movement of reindeer to B.C.

Dec. 15. CALGARY HERALD. "Ottawa won't pay elk-auction price". Compensation panel instructed by federal government to disregard Dec. 1 auction where average price per bred cow elk hit $13,700.00, due to irregularities. Auctions prior to end of October only to be considered. The gunning down of 4 elk by Fish & Wildlife in Drayton Valley confirmed. They had no tags and were TB free.

Dec. 17. Attorney for Wyoming Fish and Game, repots that opposing attorney claims that Tb has always been in Alberta, so don't blame elk.

1991 Jan. 2. CALGARY HERALD. Fears of TB outbreak spreading in Montana; elk on 3 farms to be tested. Ag. Can. identified Brogan's ranch as origin of TB infected index elk. Brogan told Montana Tribune that all elk were tested for TB before export to Alberta. "We've done it and done it. You'd think some of our elk are drug addicts: they've got so many puncture holes in them". Dr. D. Ferlicka, a Montana State Vet., said that no Montana elk ever tested positive for Tb. Concern: ranch is on edge of Yellowstone Park which has migratory elk. Bob Martinka pointed to poor fence around "some of those places". Brogan is appealing a 1989 conviction for failing to maintain fences and capturing wild elk; 83 wild elk were freed from his elk farm. Brogan said they jumped the fence. On ranch are 28 from 143 elk infected with TB.

Jan. 10. In Drayton Valley a tagged deer shot by hunter. Sighting of 2 tagged elk in a herd of 11 wild elk led to hunt by 24 conservation officers. 2 more cow elk with calves, with yellow streamers in ears were seen, but helicopter hunt killed 4 wrong elk.

Jan. 16. CALGARY HERALD. 8/127 elk ranches have Tb in Alberta; 1 in Sask. A Canadian game rancher, convicted previously of importing illegally elk and hybrids, was charged and jailed in Idaho for keeping 68 elk on an unlicensed game farm. 2 tested positive for brucellosis and were destroyed. Some 30 hybrids from this herd were moved into Alberta and/or Saskatchewan before charges were laid. Fish & Wildlife issued permit to move deer across Alberta.

Jan. 17. 3 game ranches in Montana quarantined for TB by Montana Livestock Board; it, not USDA, has power to force depopulation.

Jan. 19. CALGARY HERALD. Ag. Canada reports of 50 ranches under quarantine in Alberta, and 4,400 elk in captivity.

Jan. 30. Investigating officer, Idaho: illegal hybrids
shipped in small batches into BC; the story that elk went to Alberta did not check out with Alberta Fish and Wildlife.

Feb. 5. Canadian veterinarian: 62 elk ranches under quarantine in Alberta; tagged deer in Drayton Valley shot by hunter did come from a game ranch; search for TSE in elk preclude by lack of fresh tissues from depopulated elk; search was on for the elk, potentially infected with bovine brucellosis, shipped from Idaho.

Feb. 5. Montana state Veterinarian orders halt to changes of ownership and within-state movements of all privately owned elk due to bovine Tb.

Feb. 28. CBC NEWS: a worker on a game farm in contact with TB infected elk contracted TB.

Feb. 28. EDMONTON JOURNAL to release an article showing that Agriculture Canada had requested USDA to use a better TB test on elk - but nevertheless continued to import the inadequately tested elk into Canada.

March 2. CALGARY HERALD, "Game-ranch worker contracts tuberculosis from infected elk". 2 workers tested positive; one, a veterinarian, in sputum test was confirmed with TB. Treatment started 2 months ago.

March 3. Alberta Health minister Nancy Betkowski asking that all that came in contact with farmed elk be tested for TB.

March 14. CALGARY HERALD. Ag. Can. cuts compensation for elk killed because of TB from $14,000 per elk (as paid on the first 150 elk killed), to a maximum of $7,000 per pregnant female and $3,500 per bull. Game ranchers cry foul and may go to court. Montana pays $50 per elk destroyed and is considering eliminating all compensation.

March 16. CALGARY HERALD. On an unnamed ranch 219 from 350 elk tested positive for TB.

March 26. CALGARY HERALD. Bovine TB has passed from elk to cattle at a game farm. Ag. Canada to test cattle in a 16 km circle. CBC NEWS: the 150 elk on index ranch cost $1.5 million to taxpayers.

April 3. Red deer have been shot in southern Wyoming by game wardens, but rest escaped into Colorado.

April 8. EDMONTON JOURNAL: Ag. Can. discovered bovine TB infected pig on Alberta's largest game farm in July 1990, but kept it secret.

April 10. CALGARY HERALD. "Game farm families infected". Another 10 people in Alberta have tested positive for TB. They are game ranchers families. 10 cases discovered among 167 game growers. Federal officials confirmed that a pig, in contact with TB infected elk, got Tb and that they knew of this since July 1990. Over 1,000 elk destroyed; compensation will cost up to $10 million.

June 6. CALGARY HERALD. Minister of Agriculture will release law allowing elk meat sales. Ed Lakusta claims only 6 elk escaped and 2-3 at large. Bob Lanka, Wyoming: radio collared white-tailed deer have made it through intact game fence.

June 21. CALGARY HERALD. 4 workers TB positive after handling dis4eased elk carcasses handled in rendering plant.

Dr. Fanning: 280 people which were involved with elk have been tested for Tb. Of these 209 were negative on first test; they are being rechecked. Of those that tested positive, 13 are on treatment; 8 declined treatment (21 people). The people which declined will be monitored for 3 years.

June 23. CALGARY HERALD. Northern Alberta Processing Co., which had processed about 500 Tb infected elk, and whose employees tested positive for Tb, has refused to accept any further carcasses of elk killed in the Tb epidemic.

June. A Colorado herd of captive elk depopulated due to massive Tb (Essey 1992).

July 16-17. USDA Symposium on Bovine Tuberculosis in Cervidae, Denver, Colorado.

July 18. CBC NEWS: Ernie Isley has declared bill 31. Cattlemen worried.

July 26. CALGARY HERALD. Restaurant industry spokesman, John Milligan, executive director of Alberta Restaurant and Food Services Association, is critical of elk sales.

July 27. CALGARY HERALD. Tb contamination of elk is making it difficult to find slaughter houses to handle the depopulation of infected herds. Dr. Terry Church says that renderers will not take elk with or without Tb. Some 35 herds are still under quarantine. About 800 elk will be destroyed if a willing slaughterhouse owner is found.

July 31. Fanning and Edwards (1991): 446 contact persons identifies and 394 assessed; 313 negative; 48 positive for the first time. 8/30 surgeons dealing with Tb infected elk were positive, but only 1/20 who had handeled uninfected herds. 23/64 tanning plant workers tested positive, but these were largely immigrants from countries with high Tb. 69 from 110 game ranches quarantined in Aberta; 32 herds tested Tb positive (skin-test); 7 herds with lesions; 2 herds destroyed and made into chicken feed. handling of hides during off-loading and salting was riskey. It is not know what protectionis offered by today's prophylactic measures.

August 2 CALGARY HERALD. Agriculture Alberta has stopped autopsies of Tb infected elk pending an investigation into the spread of the disease, because 4 technicians test positive for Tb. They have been asked to start preventive medication. 36 people in Alberta, in contact with ranched elk, require medical treatment because they

test positive for bovine Tb. About 20% of the 412 people tested to date, that have involvement with ranched elk, have tested positive for bovine Tb.

August 10. BILLINGS GAZETTE, "Tb confirmed at elk ranch near (Yellowstone) park". Tb positively confirmed from tissue samples in Welsh Brogan's ranch. 28 elk positive from 143 of 146 tested (from 61 bulls, 8 positive).

August 17. Alberta Fish and Game Association lobbying to issue Tb warning to hunters due to escaped elk.

September 3. Government of Alberta News Release: Warns hunters not to handle elk with tags.

September 5. CALGARY HERALD. Alberta hunters have been warned officially of Tb infected elk by Alberta Fish and Wildlife Division. 6 elk from infected ranches are at large plus a 7th from an uninfected ranch.

Sept 6. EDMONTON JOURNAL. Agriculture Canada's procedures for handling elk were faulty; a new code of practice is being developed and will be in place by Sept. 6th. 1 in 10 people positive with bovine Tb are expected to develop active symptoms. It was assumed that since dead cattle did not infect workers, neither would elk.

Oct. 2, CBC NEWS. Elk meat from elk shipped live from Alberta to Saskatchewan, slaughtered in Wodena, is being sold for human consumption. Alberta plants have refused to accept the elk.

Oct. 3. CBC NEWS: Alberta Health will not allow rendering of elk in Alberta till a procedure is worked out that protects plant workers from bovine Tb.

10 cattle herd in Rossburn district, Manitoba quarantined and tested for Tb. 100 cattle already slaughtered. First confirmed Tb in 15 years.

Oct. 4. CALGARY HERALD. Elk are being shipped to Saskatchewan for slaughter; meat sold at bargain prices. Its safe to eat according to Ag. Can. Many elk in the Wodena plant had Tb-like lesions, though only 2 had tested positive. (USDA vets visiting the elk slaughter in Wodena; were taking back tissue samples).

On Oct. 15, 1991 Alberta's cow-calf operators voiced their opposition to elk ranching, pointing out that their cattle shared with wild elk the same pastures and the same salt blocks.

Nov. 4. False alarm among cow-calf operators close to Alberta's index ranch: a very sick elk calf discovered. Autopsy shows that it died of festering antler wounds.

Nov. 15. CALGARY HERALD. Alberta elk ranchers set hope on elk embryos transplanted to Ontario red deer.

Nov. 15. Ontario Federation of Anglers and Hunters. 6 red deer farms with over 1,000 deer, depopulated due to Tb in southern Ontario; 7th deer farm under investigation. 6,000 red deer imported from New Zealand in preceeding 3 years despite wideapreds Tb in New Zealand and inadequacies of testing (a New Zealand source reports about 10,000 red deer imported into Canada). All imports had tested Tb free. Ontario's captive red deer number about 12,000.

Nov. 16. THE LANCET publishes paper by Fanning and Edwars (1253-55) as well as an editorial "Tb and deer farming: return of the king's evil?"(1243-44).

Nov. 16. CALGARY HERALD. 300 elk being tested with new New Zealand Tb test in Alberta. Agriculture Canada will consider reassessing... its Tb eradication policy for elk if study supports it".

Nov. 19. CALGARY HERALD. Red deer imported into Ontario from New Zealand discovered with Elaphostrongylus cervi. Over 1,000 deer are affected.

Nov. 28. CALGARY HERALD. Ontario Federation of Anglers and hunters asks for deer farms to be phased out.

Dec. 6. CALGARY HERALD. Two Alberta cattle with Tb (exported to Utah) are being traced.

Dec. 9. 90 red deer, potentially infected with E cervi, escape in Ontario in transit to a slaughter house.

Dec. 11. Agriculture Canada disputes Fanning and Edwards (1991).

Dec. 12. WESTERN PRODUCER. Alberta Cattle Commission passes resolution to stop imports of exotic animals (alpaca from New Zealand) that are difficult to test for diseases. Of the 90 red deer that escaped in transit, 77 killed, 7 captured, 6 at large.

Dec. 18. All but one of the 90 escaped red deer killed or captured; they dispersed as far as 3 km.

Dec. 26. Broadford West Gwillimbury, Ontario. At meeting of dairy farmers over Tb quarantine of dairy herd, close to a depopulated red deer farm with Tb, federal official admits that Tb-free status for Canadian cattle herds not attainable by 1992 due

to Tb-epidemic on deer farms. Ag.Can. has difficulty finding enough qualified personell to test quarantied deer and cattle.

USDA assessment 1991. 10 Tb infected deer herds confirmed in 8 US states; confirmation pending in 2 additional cases. Deer ranching characterised by extensive movement of stock. Tb confirmed in a Nebraska cattle herd that that had been associated with Tb infected elk.

1992. January. A free-living elk with Tb-like lesions is killed by a hunter near Rossburn, Manitoba, 5 miles south of Riding Mountain National Park (RMNP), and confirmed for bovine Tb on June 16 by Ag. Can. The elk was shot in the vescinity of a cattle herd depopulated for Tb in November 1991 (H. Hristienok, Big Game Coordinator, Aug. 14, 1992). Carbyn (1982) reorted 2 wolves with Tb from RMNP.

Jan. 13. Montana suspends for 4 months the imports of exotic animals and requires genetic testing of elk. Colorado and Utah enacted laws to ban imports of certain species; Wyoming banned game ranching.

Jan. 17. LETHBRIDGE HERALD. Over protest by Alberta, 150 alpaca are being imported from New Zealand and quarantined in Alberta under directive from federal government. Federal government breaks its own import ban. Director General of Agriculture Canada conceeds that screening for Tb is not as reliable in alpaca as in cattle. (1993, summer, one of the alpacas in Alberta came down with "rye staggers". However, upon autopsy there were so many pathological anomalies, that examining veterinarian questioned in writing why such an animal was allowed to leave New Zealand at all).

Feb. 16. 1992. OTTAWA CITIZEN. Over past 14 months, 7 Ontario red deer farms hit by Tb; 1,300 red deer depopulated.

May 6. EDMONTON JOURNAL. A game rancher filed on May 1 a motion seeking a federal court injunction to prevent Ag. Can. from destroying a Tb infected elk herd of 23 animals. 5 other owners of elk ranches have filed for an injunction. 12 infected herds identified and 2,300 elk slaughtered.

June 19. District Court Judge William Dwyer rules on a challenge by Washington State game ranchers that the state does have a legitimate and rational interest in preventing disease, hybridization and competition (by ranched game) despite disagreement on magnitude of threat and that it has a legitimate interest in guarding against imperfectly understood environmental risks.

August 16. Due to spread of Tb from farmed deer to cattle, New York State looses its accredited-free Tb status for cattle and bison, and is downgraded to modified accredited (FEDERAL REGISTER 57[137]:31429-30), and on August 20th, the same fate befalls Pennsylvania (FEDERAL REGISTER 57[162]:37686-87).

Nov. 6. CALGARY HERALD. "Libel chill letters" have been sent by game ranchers to opponents; Alberta Chapter of Wildlife Scociety opposes game ranching.

Nov. 7. CALGARY HERALD. Alberta's ban on elk imports is to be lifted.

Dec. 3. WESTERN PRODUCER. Ranched wildlife in Canada at end of September was, bison: 14,925, reindeer: 15,470; fallow deer: 27,910; elk: 8,220; red deer: 4,520; other species: 1,415.

1992 assessment by NY Dept. Agriculture and Markets. Jan 1-Dec. 31/1991: 14 herds of cervids positive for Tb and 6 under investigation in 13 states (ID, MT, CO, OK, NE, TX, WI, MI, PA, NY, WA, MT, SD). 3 infected deer herds in N.Y. were depopulated, as were 2 cattle herds that caught Tb from captive deer. New York cattle industry, accredited Tb-free since 1980, looses this status. N.Y. law signed by Governor to keep cervids and cattle appart. N.Y. urges federal govt. to become involved in cervid Tb erradication programme. Evidence suggests that llamas may be resevoir for Tb. Disease induced export restrictions have already affected sales of deer and cattle negatively. Tb-free status cannot be restored for 2 years.

1993 Early in 1993 reindeer in the Yukon tested positive for Tb, so are elk on 2 more ranches in Alberta, one ranch in Montana and a Zoo in Quebec; 2 cattle herds in Alberta detected with Tb but source proves illusive.

January 19. Virginia Cattlemen's Association, to protect its accredited Tb-free status, passes resolution to make deer farming illegal, and to dismantle the game farming industry in Virginia. A similar request had been made earlier by the Canadian Wildlife Federation (Anno. 1992a).

Feb. 16. Alberta premier Ralph Klein promises to review game farming; game ranchers received an estimated $10 million in compensation for amimals destroyed in anti-Tb operations.

May 18. Governor Mike Lowry of Washington State vetoes game ranching legislation (Bill No. 1135, An Act Relating to Alternative Livestock).

July 28. Virginia Dept. Game & Fish. Synopsis of deer farming meeting: Tb confirmed in fallow deer in a petting-zoo after deer tested negative in December 1992. A pig also had Tb-compatible lesions. A cattle herd under quarantien whose owner traded with said zoo. 1 from 8 employees tested positive for Tb and is getting treatment. Deer farmer alerted VDGIF to "huge" market in fake veterinary certificates and that deer are being moved illegally in state. Virginia's cattle industry narrowly missed loosing its Tb-free status.

OTHER DISEASES: THE IMPORT OF ELAPHOSTRONGYLUS CERVI INTO CANADA In November 1991 the Old World brain and muscle parasite Elaphostrongylus cervi, was found in 3 from 983 red deer imported from New Zealand in Brunswick, and in one from about 260 in Ontario. The Bearmann technique used was not found to be a reliable diagnostic tool for detecting the related meningeal worm larvae (Parelaphostrongylus tenuis) in elk (Welch et al. 1991); the probability of detection was below 75 percent.

A meeting of experts and game ranchers was called by Agriculture Canada Nov. 4-5, 1991 to discuss the significance of E. cervi. The minutes reveal tense moments between Canadian and New Zealand parasitologists, with the latter insisting on the reliability of the Bearmann technique for testing for E. cervi in red deer. The technique remains controversial. It was claimed that E. cervi from red deer did not infect livestock and reindeer. This implies that there is not much threat that matters, and that the illness in Norwegian reindeer, Newfoundland caribou and Swedish moose was caused not by E. cervi, but the related E. rangiferini and E. alces. Thus Elaphostrongylus taxonomy is an

issue. The most likely host to be infected by E. cervi from red deer would be the ubiquitous white-tailed deer, which in feral populations in Europe, as since discovered, may carry adult E. cervi (Samuel, 1993, personal). An official from Agriculture Canada stated that manpower shortages led to a policy of approving applications for import and working out problems later. The minutes bore out Lanka et al.'s (1990) conclusions as to why diseases in wildlife could not be controlled with current knowledge and administrative practices.

Agriculture Canada suspended imports of red deer from New Zealand in August 1991, pending the development of a better test.

The infected herds were ordered shipped out of the country or destroyed; they were shipped to Flesherton, Ontario, for slaughter. On Dec. 9th, 1991, 91 from 190 of these red deer escaped in transit. A hunt by personnel of Ontario's Ministry of Natural Resources, killed most of the escaped red deer within 3 days; some had dispersed 8 km from the escape site. Larvae of E. cervi in the feces of deer may survive Canadian winters as they are resistant to cold (Halvorsen 1983), and to a limited number of repeated desiccation and freezing, as is the related meningeal worm larvae (Shostak and Samuel 1989). The feces of several of the shot deer, tested with the Bearmann technique, produced no larvae. Days later it was still not known how the deer had escaped from the abattoir.

MENINGEAL WORM. Studies by Samuel et al. (1992) have shown that elk may become carriers of the meningeal worm P. tenuis, which is indigenous to white-tailed deer in North America (Anderson 1972). Fallow deer may also be somewhat resistant to this

parasite (Davidson et al. 1985), but have not been identified as carriers. There is no method available to consistently identify elk which carry this parasite (Welch et al. 1991), no prescription to kill it in situ (Samuel and Gray 1988), and no way to guard against this disease except by prohibiting all movements of elk into areas free of meningeal worm. This policy was adopted by Alberta in September 1988; British Columbia banned the import of live deer, moose and elk in May 1991.

Currently, white-tailed deer in the west are not infected with P. tenuis, which is not found west of the Manitoba/ Saskatchewan border. With elk as potential carriers, there is danger that escaped elk from game ranches carry this disease to uninfected white-tailed deer and elk populations; conditions apparently favorable for P. tenuis are abundant in the west (Lanka et al. 1992; Samuel et al. 1992). This would have devastating consequences for mule deer, elk, moose, bighorn sheep (Ovis canadensis), bison, mountain goats (Oreamnos americanus), and mountain caribou (Rangifer tarandus caribou).

Toxoplasma gondii. This is a widespread protozoan parasite which may appear in wild deer. It requires cats as host for its sexual phase in which oocysts are produced. The disease varies in virulence and in humans may cause congenital malformations (Hibler 1981). The ROCKY MOUNTAIN NEWS and DENVER POST (04/01/93) reported of Toxoplasmosis infections in patrons of a restaurant which ate commercial elk meat Tartar style. It resulted in a case of congenital malformation leading to abortion, and a federal law suite. The Colorado Department of Health and the federal Centre for Disease Control are investigating.

TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHY (TSE). This is a fatal, incurable brain degeneration that breaks out after a long latency period, up to 30 years after oral infection in humans (Brown 1990; Davanipour 1991). TSE is named scrapie in sheep, Bovine Spongiform Encephalopathy (BSE) in British cattle; Chronic Wasting Disease (CWD) in elk and mule deer (Williams and Young 1980, 1982, 1992); Transmissible Mink Encephalopathy (TME) in mink (Marsh et al. 1991). In humans TSE has several variants, all transmissible, including Creutzfeld-Jakob-Disease (CJD), Gerstmann-Streussler-Scheinker-Syndrome (GSS) and kuru. This gives the impression of many types of TSE, but note Paul Brown's (1990:38) comment:"The separation of transmissible spongiform encephalopathies into veterinary and human categories is fundamentally artificial, as they all result from the same pathological process, involving the transformation of a normal host-encoded protein into amyloid fibrils that accumulate in and eventually destroy the brain".

TSE is a troubling disease, particularly when found in free-living elk, mule deer (Williams and Young 1992) and white-tailed deer (T. Thorne, Wyoming Game and Fish, 1993), the legal (and illegal) source of ranched cervids. Technical reviews of TSE preclude the need for a detailed review here (Lehr 1979; Weissmann 1989; Kimberlin 1990; Brown 1990: Paine 1990; Stoeber 1990; Truyen and Kaaden 1990; Collee 1990; Bastian 1991; Diringer 1990, 1991; Pruisner et al. 1991; Herbst and Moeller 1992).

Uncertainties due to paucity of research on several public health issues, combine with a number of troubling factors: (1) a nearly indestructible infectious agent that is next to impossible to removed during food processing (Taylor 1989, 1991; Brown et al.

1990; Brown and Gajdusek 1991); (2) the oral transmission of TSE to many species, primates included; (3) the long latency periods (Diringer 1990); (4) the fairly rapid appearance of BSE in Ireland, the Channel Islands, Iceland, Oman, Switzerland, France (Herbst 1991); (5) the unpredictable changes in pathogenicity in passage between species; (6) the lack of an immune response; (7) the difficulties in detecting TSE post- and ante-mortem (Williams and Young 1992); (8) the under-reporting of CJD and GSS, in part due to overlapping symptoms with several neurological diseases (Collinge et al. 1990; Davanipour 1991); (9) the lethal nature of TSE and resistance to therapy; (10) its rapid spread within Great Britain (Vet. Rec. 128:290, 1991) exceeding 90,000 dead cattle by 1993 (DER SPIEGEL No. 47/13:260, 1993); and (11) the appearance of TSE as a new disease in British cats (Leggett et al. 1990; Wyatt et al. 1991), and in 5 species of captive antelopes (Kirkwood et al. 1990).

Investigative reporting (DER SPIEGEL No.32/21:254-255, 1990; No.32/44: 164-166, 1990; No. 45/3 p.189, 1991; QUIRKS AND QUARKS 27th Oct. 1990, Canadian Broadcasting Corporation), revealed the divergent perceptions of BSE, and showed how regulations to contain the spread of BSE, were circumvented. The view of TSE in medicine (Bastian 1991), is not reassuring.

20 cases of TSE have now been confirmed in wild mule deer, white-tailed deer and elk in Colorado and Wyoming, with 4 further cases pending confirmation (Williams and Young 1992; Wyoming and Colorado Dept. of Game & Fish 1993). TSE was found here first in captive cervids (Williams and Young 1980, 1982, 1992; Bahmanyar et al. 1985; Guiroy et al. 1991 a, b), however, captive white-tailed deer appeared resistant to

TSE (Williams and Young 1992). TSE in elk and mule deer contains the same signature protein as scrapie (Guiroy et al. 1991 a, b) and has been transmitted via intracerebral inoculation from mule deer to other species of mammals (Williams and Young 1992). Game ranching could help distribute TSE. An elk imported into a Canadian zoo from a U.S. facility with TSE, was diagnosed with TSE (Williams and Young 1992). Escapes could spread TSE inadvertantly: an elk, originally from a Wyoming game farm, escaped from a North Dakota ranch, and was shot 1992 in Alberta. Earlier, Canada imported thousands of U.S. elk. In sheep scrapie is transmitted laterally through the ingestion of the expelled placenta (Diringer 1991); in captive elk and mule deer there appears to be rapid inter- and intraspecific lateral transmission (Williams and Young 1992). American cervids could contract TSE where their ranges overlap those of sheep. Deer are likely to nibble bones, a possible rout of infection if the bones are from sheep that died of scrapie and contain residues of bone marrow. "Wasting disease" as used by Bringans (1987) for wapiti in New Zealand is unrelated to TSE; it may be a nutritional deficiency disease.

TSE has not been found in Eurasian deer. In British zoos, deer must have been fed the same rations as African antelope that developed TSE. Maybe Eurasian deer have evolved some protection against TSE due their long evolutionary history with many species of caprids where TSE is endemic (Wood et al. 1992). In Britain BSE was traced epidemiologically to cattle fed on protein meal prepared from sheep cadavers after all but two rendering plants terminated the hydrocarbon solvent extraction of fat from meat and bones in 1981/82 (Wilesmith et al. 1991). Scrapie has been spread experimentally to cattle only by tissue injection (Gibbs et al. 1990). BSE was found in a cow born after the

988 start of the ban on pr n feed from cadavers (Vet. Rec. 128:15, 1991). Oral infection is suspected in 5 spe es of African antelope which died of TSE in zoos (Kirkwood et al. 1990); TSE spread from female to young and erupted within 2-3 years. TSE app ed in mink on a U . fur farm fed meat of cattle that died of "downer syndrome"; cattle inoculated with mink TSE tissue developed TSE, and the infected cattle in turn were able to pass on TSE via inoculation and orally route to healthy mink (Marsh et al. 1991). Scrapie and CWD were transmitted to mink (Burger and Hartsough 1965; Hanson et al. 1971; Lehr 1979; Williams and Young 1992).

In humans kuru is transmitted orally (Gajdusek 1977), but the relation of CJD to red meat consumption is controversial; there can also be a genetic predisposition to CJD (Pruisner et al. 1991). A review by Davanipour (1991) supports the view that CJD is related to meat consumption. There could be risk re brain tissue is incorporated into sausage. CJD is a rare disease which appears worldwide at 1-2 cases per million of population per year (Davanipour 1991). An editorial THE LANCET (July 7, 1990, No. 336:21-22) suggested that CJD is under-reported in reat Britain, and the real occurance may be 7,000-9,000 cases per year. CJD was ked to iatrogenic infections from rabies vaccine produced from sheep brains (Arya 990), and injections of hormone extracts from human pituitaries (Brown 1990). Oral transmission of TSE, less effective than intracerebral inoculation, requires in large mammals from 30-130 g of infected tissue (Diringer 1990, 1991).

The disease agent has not been found in muscle tissue, which is considered safe to eat. However, power sawing through spinal cord, brain and marrow, and thus spraying

the carcass with a film of infected neural tissue and marrow would contamination the meat with TSE. The removal of brain, spinal chord, large nerves and lymph nodes, all loci of TSE infections,is inadequate. One cannot remove large nerve strands and lymph nodes adequately from fresh, let alone from frozen meat. Cooking infected tissues does not remove the TSE agent; it has survived autoclaving (Collee 1990) and heating at 360° C (Brown et al. 1990). Burning, not burial of carcasses, is the only safe way to destroy the TSE agent, as it survives years of burial in soil (Brown and Gajdusek, 1991).

TSE infected ranched elk could remain a long time in commerce. TSE is difficult to detect, and elk, kept for velvet cutting and breeding, would be kept alive in excess of the latency period for the TSE agent to multiply, and infect the internal organs before reaching the brain. This increases the risk of elk with TSE being send to slaughter and their brains, lymph nodes and inner organs being incorporated in processed meats. The TSE risk in eating sheep or beef appears low as sheep are eaten primarily as lamb and beef as 2-3 year old animals, well before the spread of TSE through the body.

COSTS Carter (1992) gives a cost breakdown for the mandatory Tb control programme in New Zealand. It ammounts to about $3.63 million annually for an industry earning about $101 million. The costs to the Canadian federal government of controlling the TB outbreaks on game ranches is difficult to determine. It differs from New Zealand's in that not single reactors are destroyed, but the whole herd is depopulated if Tb is diagnosed in one animal. According to one report, 52 veterinarians and technicians were trying to cope with the Tb outbreak in Alberta, but Agriculture Canada admitted in January 1991 to only 25 veterinarians. In December 1991 Agriculture Canada

experienced a shortage of qualified personnel to deal with Tb testing in Ontario, Canada's most populous province. In addition to the cost of tracing, testing and retesting, thousands of captive elk, deer, bison and cattle, the testing of 394 humans who had been in contact with diseased elk and placing 42 of these under medical supervision and treatment (Fanning and Edwards 1991), and the cost of law enforcement, compensation was paid to game ranchers for every animal killed to eliminate TB.

The eradication of bovine Tb has been a goal in Canada since 1907. Much progress was made. In addition to annual operating costs for the Tb eradication programme ($3.35 million in 1978), $18 million were paid out in compensation for cattle destroyed between 1922-1987 (Anon. 1989, pp. 4-9); between 1980-1990 $2.5 million were paid out in compensation. This compares to $10 million paid in compensation to game ranchers by the federal government for about 2,300 elk destroyed and more awaiting slaughter in Alberta alone between June 1990 and March 13, 1992. This takes no account of the 1991 Tb epidemic in ranched red deer in Ontario or the compensation paid to deer ranchers in British Columbia and Saskatchewan, or compensation for the red deer in New Brunswick destroyed because of E cervi.

Even with a better TB test for elk or red deer, the sheer scale of the game ranching industry at maturity, the poor husbandry on some operations, the scale of illegal trafficking in game animals, the poor enforcement of regulations, and powerful political lobbies supporting game ranchers, will make expensive disease outbreaks inevitable.

DISCUSSION The preponderance of evidence makes game ranching untennable. Agricultural bureaucracies, without an electoral mandate, and despite wide-spread opposition, are, unilaterally dismantling our system of wildlife conservation. A 70 year old consensus between the U.S. and Canada on how to conserve wildlife is at stake. Minor matters aside, such as collusion between officials and game ranchers, or regulatory problems rooted in inadequate manpower, there emerges a pattern of denigration of public values and property, of "deregulation", and of lavish support for private ventures despite serious consequences and cost to the public.

One can safely predict: markets in dead wildlife will insure perpetual strife between agriculture and wildlife conservation. Public challenges to game ranching will make agriculture more environmentally accountable, but will lead to losses for livestock producers. Diseases in ranched wildlife will surface increasingly as livestock and public health problems as the industry expands. The TSE problem will remain vexing. Meat from medicated deer will not enhance the consumer's image of red meat. Foreign interests are not expected to respect North American wildlife values when seeking here a politically secure game ranching base. Depredation on public wildlife and the illegal movement of diseased wildlife will fluctuate with its market value and will lead to increased, though largely futile policing efforts. Canada, which has no federal wildlife police comparable to that of the U.S. Fish and Wildlife Service, will be blind to national poaching problems, except in national parks. Federal legislation (Bill C-42) passed Dec. 11, 1992 is similar to the U.S. Lacey Act and may redress this problem, but it is likely to die without being proclaimed.

While Agriculture Canada has the legal authority to contain Tb on game farms, the U.S. Department of Agriculture has little (Anon. 1992b). However, it appears to have a more realistic appraisal of the Tb problem. Williams (1992) quotes Dr. Mitchell Essey, senior staff veterinarian for the USDA Animal and Plant Inspection Service, who stated that Tb established in wild game populations would be an unparalleled catastrophe. "It's a picture you can paint as black as you want because that's the way it would be. I don't know what we'd do if Tb gets established in wild populations - no one knows how we'd control it if it got into elk herds like those in Yellowstone National Park or in the Gunnison (Col.) area. The potential ramifications are almost inconceivable".

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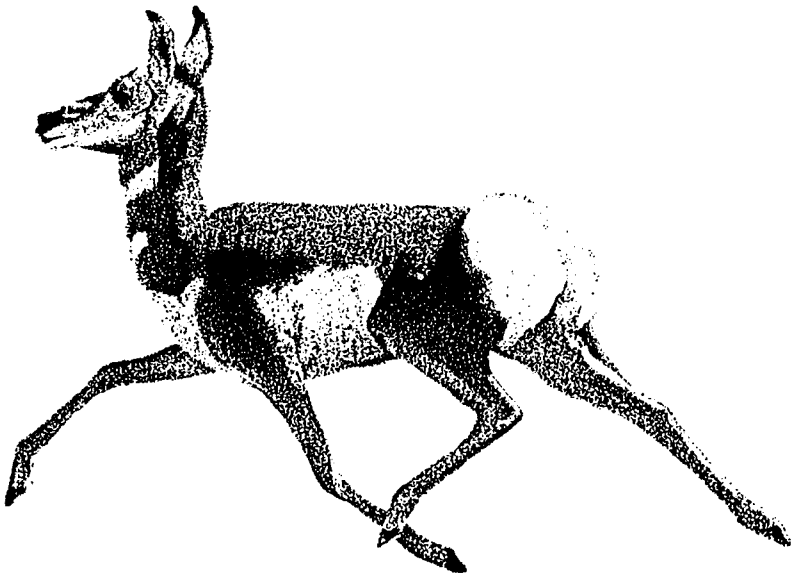

Special Session 8.
Implications of Wildlife Ranching

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Conservation Challenges Concerning Wildlife Farming and Ranching in North America

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Introduction

Recent increases in private ownership and relocation of native and exotic big game related to commercial husbandry have generated controversy throughout North America. This controversy pits the private sector, eager to diversify its agricultural base, against traditional sportsmen and government agencies, worried about impacts of such activities on indigenous free-ranging wildlife, particularly ungulates and their habitat (Demarais et al. 1990, Bunnage and Church 1991, Renecker and Hudson 1991, Benson 1992, Ervin et al. 1992, Geist 1992, Haigh and Hudson 1993). The recent outbreaks of tuberculosis (Rhyan et al. 1992, Thoen et al. 1992) in captive elk (*Cervus elaphus*) have not only "deepened the trenches" on this issue (because of fear of spread of the disease to other ungulates), but have become "we told you so" events for those opposed to game ranching and farming.

Privately owned exotic wildlife and specific commercial uses of native wildlife often fall outside historically regulated wildlife management activities. Because of this, many state and provincial wildlife or agricultural agencies (or both) in charge of regulating wildlife farming or ranching have found themselves without appropriate regulations and policies. A 1989 survey of the 50 U. S. states identified a general lack of knowledge

concerning specific policies and regulations affecting this industry among state agencies, which either were or could be directly involved in regulating the exotic deer industry (Ervin et al. 1992). Even when policies and legislation have been reassessed and revised, there has been a general lack of good biological information on which to base policy-making decisions.

In places such as Texas, where privately owned exotic big game and commercial management of native wildlife are well established, the questions is not whether to ranch captive wildlife or not, but how to establish the best possible management guidelines for exotic species (Demarais et al. 1990). In other jurisdictions, particularly in Canada and the West, the question is more basic: should there be privately owned wildlife held behind fences?

Central to any successful free-market system is the need for the private sector to have the freedom and flexibility to extend venture capital to stimulate economic development and return financial dividends to the investor. The currently burgeoning wildlife farming and ranching industries in North America can be looked at as an appropriate effort by financially challenged rural farm and ranch communities to diversify, and thus stabilize, their financial status. However, given the rather unique product involved in these ventures, these efforts should be evaluated and tempered relative to a concern for potential long-term impacts on "The Commons" and on the more traditional livestock industries.

This Special Session is designed to address the major controversy. Separate panels of experts have been developed to address topics within these two realms. Before we venture into these rather detailed areas, first we must bring everyone to a common ground of understanding concerning the nature of the industry with a presentation describing wildlife farming and ranching in North America. The first panel will deal with population-level biological issues which are at the heart of the regulatory and policy controversy. These include:

1. disease-related interactions between commercial livestock and native cervid and the concern that if translocated ungulates have diseases or parasites, these too are translocated;
2. competitive interactions of native and exotic big game, and the concern that exotic species will outcompete native species; and
3. potential consequences of interbreeding between native and exotic big game, and the concern about how genetic make-up of affected populations could be altered.

The second panel will deal with social and biopoltical issues surrounding regulations and policies from several perspectives. Some of the topics to be addressed within these perspectives include the legal classification (or lack thereof) of animals and management systems, the rights of the private landowner and legal mandates to safeguard publicly owned native wildlife in the presence of privately owned animals. Perspectives to be presented include:

1. the private enterprise perspective, with reference to the uniquely different management systems associated with ranching and farming;
2. the perspectives of state and provincial government agencies with either actual or potential regulatory authority over the industry; and
3. the perspective of the Colorado Division of Wildlife, which has been very active in the regulatory and policy-making process in recent years.

The primary goal of this Special Session is to promote the exchange of current knowledge concerning the biological-based controversies and to promote at least acknowledgement, and perhaps understanding, of the social and biopolitical issues. Although

some biological information is available concerning potential negative interactions involving disease, genetics and competition, the projection of potential state- and province-wide impacts typically is based on theoretical assumptions and only limited real world experience. However, these limitations should not hinder the pursuit of policy decisions. Where biological information on which to base decisions is limited, we recommend that the appropriate approach is to err on the side of conservatism with regard to our native wildlife resources. We further recognize that the private sector has a valid right to pursue agricultural diversification. This right currently is being infringed by the lack of clear regulatory authority and management framework. We call for an action-oriented policy-making effort which clearly will outline the potential regulatory limitations and eliminate the atmosphere of legal uncertainty currently pervasive in most states and provinces.

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Central and South America. Most production, however, comes from wild stocks, and most is harvested in subsistence hunting. Annual production of dry, salted capybara meat averaged 400,000 kilograms on 53 ranches in Venezuela during 1975–1985 (Ojasti and Rivero-Blanco 1988). However, production from the 53 ranches was less than 2 percent of the total value of capybara meat harvested in the state of Apure (Ojasti 1991). The total value of the caiman harvest in Venezuela in 1987 was $9,017,072 (Thorbjarnarson 1991).

The success of game farming probably is best known from New Zealand (Yerex 1979), where the industry in 1990 contained over a million animals (Drew 1991) on more than 5,000 farms developed since the early 1970s. Sales of antler velvet for Oriental medicines, meat and brood stock have been a powerful stimulus to an economically flat agricultural industry on the island.

While Europe has been the primary market for venison and Asia for antler velvet, it was not until the success of the New Zealand industry became known that intensive game farming began to develop in other regions of the world. Taking the cue from New Zealand, Australia, Europe and now North America are developing game-farming industries which have revolutionized production of venison for a growing market.

Harvests of several ungulates, primarily moose (*Alces alces*), red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), saiga antelope (*Saiga tatarica*) and wild boar (*Sus scrofa*), totaled 460,000 head in 1988 in the USSR, of which 134,250 were reindeer (Kuzyakin 1991). Except for reindeer, these largely are culling figures from wild stocks.

The saiga antelope is receiving increased attention because of the decrease in its numbers in Kalmykia and Kazakhstan. Cropping or culling of saiga antelope in the Soviet Union for meat, hides and horns used in Oriental medicines is perhaps the best known wildlife cropping scheme in Eastern Europe (Bannikov et al. 1961). Upwards of 600,000 were cropped in some years.

However, the decline of saiga in recent years has greatly curtailed production of the species in the Autonomous Republic of Kalmykia and perhaps also in Kazakhstan. Poaching for the animals' horns, overgrazing of its habitat by sheep and disruptions of its migration routes by roads, telecommunication lines, canals, fences and other contrivances are responsible. The Kalmykian population declined from near 1 million animals as recently as the mid-1970s to less than 150,000 at present. Poaching for its valuable horns has resulted in a greatly distorted sex ratio which further imperils the species' future as an economic resource (Teer et al. in press).

Current Industry in North America: Size and Trends

United States

Approximately 55,813 deer are commercially raised on 291 farms in the United States (Table 1). Most wapiti (*Cervus elaphus*) are farmed in 16 states of which seven jurisdictions permit the farming of the species under a "grandfather" clause. Another five states allow pure wapiti farming but not crosses of wapiti and red deer or pure red deer. The farmed wapiti population has increased at a rate of about 14 percent per year since about 1985 (Renecker 1990). Most wapiti stock located on game farms in the United States originated from surplus animals captured by the federal government during the 1950s and then sold to private individuals. This practice ceased in the 1960s and government agencies shifted their management strategy to killing surplus animals. Presently,

agencies choose to provide supplemental feed to free-ranging stock during winter. Only New Mexico made provision for ranchers to fence large tracts of land and then incorporate the animals enclosed by the fences into their commercial hunting operations.

In a mail survey of the 50 states in the United States and 10 provinces and 2 territories of Canada concerning game farming and ranching, respondents reported fallow deer (*Dama dama*), sika deer (*Cervus nippon*) and wapiti were the most numerous on game farms (Teer 1991). Other common species of deer on farms and ranches included axis deer or chital (*Axis axis*), and red deer. While not reported in the survey, it is known that some landowners have sambar (*Cervus unicolor*), barasinga or swamp deer (*Cervus duvauceli*), and musk deer (*Moschus moschiferus*) in penned or husbanded stocks.

Today, the economic value of the commercial deer farm industry in the United States is about $1 million in animals (farm gate value) and another $54.8 million in facilities excluding land (Barbara Fox, North American Deer Farmers Association, personal communication).

Importation of exotic animals is a growing practice. Ninety-eight percent of the average of 700 translocations of wildlife of all species made annually in the world was made in the United States and Canada (Griffith et al 1989). Of all the states, introductions and translocations of exotic large mammals for the purpose of sport hunting are most advanced in Texas (Teer 1991). Ranching of large mammals produces important revenues to the owners. Surveys of exotic large mammals by the Texas Parks and Wildlife Department have been made at intervals of about five years (Traweek 1989). Numbers and kinds have grown from a few hundred animals in 1963 to more than 164,000 individuals of 67 species on 486 ranches in Texas in 1988 (Figure 1).

Alaska's reindeer are non-native, con-specific with caribou and classified as domestic livestock. The herd has had a checkered past. From an introduction of 1,280 individuals in the late 1800s, reindeer numbers grew to over 640,000 by the early 1930s (Dieterich 1991). Numbers declined to about 25,000 in the 1950s because of overgrazing, poaching,

Table 1. Wild ruminants on game farms in the United States.

Species	States farmed in	Number of farms	Number of animals
Farmed			
Fallow deer		252[1]	23,800[2]
Axis deer			350[2]
Red deer			6,300[2]
Sika deer			1,050[2]
White-tailed deer			3,500[2]
Wapiti	16		20,000[3]
Reindeer	20	39	813[4]
Plains bison	47	461	130,000[5]
Extensive herding reindeer	1	19	43,000

[1]Total number of farms for fallow deer, axis deer, sika deer,red deer, white-tailed deer and wapiti.
[2]Source: Barbara Fox, North American Deer Farmers Association.
[3]Source: Wade Hainstock, North American Elk Breeders Association.
[4]Source: Tom Scheib, Reindeer Owners and Breeders Association.
[5]Source: Harold Danz, American Bison Association.
[6]On state and federal agency property owned by Native tribes, Yellowstone National Park.

predation, disease and losses to migrating caribou. Because of the growth of the velvet antler industry and improvement in husbandry methods, numbers of reindeer are increasing. Today, about 43,000 reindeer are located on the Seward Peninsula (15 herds), Nunivak Island, Umnak Island, Hagemeister Island, Kodiak Island and several other islands in the Aleutian Archipelago, and four reindeer farms on the mainland.

Canada

The Canadian Venison Council estimates that the Canadian deer herd in autumn 1992 exceeded 70,000 head with an investment value of $375,000,000 (Table 2) (Hudson and Burton 1993). In Canada, wild ruminants are raised primarily for agricultural purposes except in Quebec where sizable populations of white-tailed deer (*Odocoileus virginianus*) are used for fee hunting.The oldest and best-established industry is based on bison (*Bison bison*)—so well-established that bison are not classified as game—which now approach 20,000 animals, compared with about seven times that number in the United States. Herds are currently compounding at 26 percent per annum.

Most of Canada's reindeer are in one herd in the Mackenzie Delta, Northwest Territories. A small herd has been released on the Belcher Islands where they provide meat for the local community. Some reindeer are farmed in the Peace River area of British Columbia and a few are held under special permit elsewhere.

The most rapid growth has been in fallow deer with British Columbia and Ontario leading. The wapiti industry began in the 1970s and compounded at over 20 percent annually until herds were reduced to control tuberculosis. This segment of the game industry has started its recovery based largely on growth from locally established game farm herds. In eastern Canada, several large companies have imported red deer, mainly

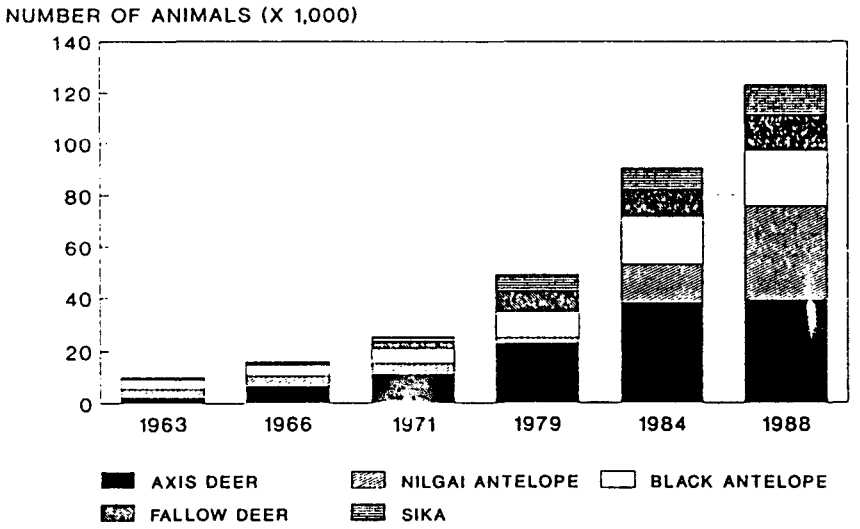

Figure 1. Numbers of the five major species of introduced large mammals in Texas. The five are free-ranging in large areas primarily west of the 100th meridian in Texas. One other, the aoudad or Barbary sheep, also exists in wild stocks. (Data from Dewcek 1989.)

from New Zealand. In provinces west of Ontario where wapiti are indigenous, importation of red deer and sika deer is prohibited to prevent hybridization of wild herds.

Products

Sport Hunting

While there is no standard inventory or national registry to assess large mammal populations on a national or regional scale, it is unquestioned that large mammals have been produced through management and used in North America almost exclusively for sport hunting. Further, the harvest of white-tailed deer has far exceeded harvests of other species of large mammals since the demise of the Great Plains bison herds. Moreover, hunting on both private and public lands is trending toward commercial or fee-hunting systems in which those who own or manage the land receive compensation for their efforts (Teer and Forest 1969, Burger and Teer 1981, Teer et al. 1983, Thomas 1984).

Unable to provide statistical information on sport hunting on more than a state level, we have chosen to elaborate on the hunting system in Texas, as it is perhaps the most noteworthy in terms of commercialization and size of the kill, especially in white-tailed deer.

From a population of white-tailed deer estimated at 5,398,874 in the 1991–92 season, 474,047 of both sexes were harvested (Boydston 1992). Leases commonly bring $5 to $8 per acre, and most are made for white-tailed deer hunting. Data are lacking on the total value of leasing to landowners. However, if we accept a modest value of $3 per acre for leased land in only the area west of the 100th meridian where white-tailed deer are most numerous and leasing most prevalent, the sum accruing directly to landowners comes to over $33 million. The 1985 survey of hunting, fishing and wildlife-associated recreation reported that Texas residents spent over $4.8 billion to pursue their interests in wildlife in 1985 (U. S. Department of the Interior 1989). Of the total, $1.07 billion was spent for hunting.

Table 2. Wild ruminants on game farms and ranches in Canada, November 1992.

	Bison	Reindeer	Fallow deer	Wapiti	Red deer	Other cervids[1]
Yukon		70		550		
Northwest Territories		15,000				
British Columbia	3,500	250	17,500			
Alberta	9,000			5,000		825
Saskatchewan	2,240		1,500	4,000		400
Manitoba	1,120			85		15
Ontario	2,500		7,000	1,200	3,500	500
Quebec	4,000		1,200	40	1,800	10,700
New Brunswick	275		60	12	1,000	75
Nova Scotia			7	7	39	
Prince Edward Island	25	20		10		
Newfoundland						
Total	26,660	15,340	27,267	10,904	6,339	12,515

[1]Moose, white-tailed deer and mule deer.

Meat

The term venison usually refers to deer meat, but the word comes from venerie (hunting) which suggests that it appropriately applies to all game meat. Until the late 1980s, international trade in game meats approached 30,000 tons annually, which represented approximately 7 percent of total game production or procurement (Luxmoore 1989). Although these figures still are quoted, the industry has changed markedly in the last several years. Red and fallow deer venison from New Zealand rapidly is approaching the former total game meat supplies which once came predominately from harvests of the brown hare (*Lepus europaeus*) in Argentina. Another change has been a glut of product from eastern Europe. This has had the expected depressing effect on international venison markets.

North America is viewed as a potentially large but complex market because of uneven and constantly changing provincial and state regulations. Most of the demand now is filled by New Zealand. Figures for domestic production are scanty except for established industries such as bison and reindeer. In Canada, an annual slaughter of over 1,000 bison provides 220 tons carcass weight, an amount which is compounding at almost 26 percent per annum (AgriTrends 1991). Production in the United States is about 10 times larger. The annual slaughter of Alaskan reindeer is 187 tons and has a value of $857,000 (Anonymous 1992).

In the lower 48 states of the United States, game-ranched and farm-raised venison production totaled 110 tons in 1990 (25 tons from farm-raised stock), which reflects an increase in production of 177 percent per annum since 1983 (Judy 1992). Average carcass weights of reindeer slaughtered in Alaska are 70, 69 and 47 kilograms for castrates, males and females, respectively, and are sold at about $7 per kilogram for state-inspected carcasses.

Of the farm-raised stock, most of the 25 tons of venison production is from fallow deer. Fallow deer are slaughtered at about 18–24 months of age and yield an average carcass size of about 30 kilograms. The carcass is marketed for about $6.60–8.80 per kilogram, which translates into a carcass return of about $230. Because stags are held currently for velvet production, venison production from wapiti and red deer is small, particularly in light of massive slaughters to control tuberculosis and *Elaphostrongylus cervi*. As this problem is resolved and as velvet prices continue to fall, attention will turn to venison production.

The demand for game meats is reflected in increased sales. In a survey by Judy (1992), multiproduct meat wholesalers that vend venison have increased sales 15–500 percent since 1984. Judy (1992) also reported that venison was the predominant import meat of every exotic/game meat wholesaler, and 76 percent of the businesses believed the game meat industry will double or triple in the next five years. While attention must be placed on consumer education and the development of value-added products, Judy's data show the confidence and potential of this market.

Antlers and Other By-products

There has long been commerce in game hides largely from animals killed by sport hunters. Trophies also have been bought and sold. A central controversy about the emerging game industry relates to velvet antlers (and, of course, bear gall bladders and other bear parts).Much of the world's production of velvet passes through Korea, Hong Kong or Taiwan. However, much is processed and re-exported to ethnic markets in Europe and America. Trade statistics are notoriously unreliable partly because of the different classifications used by custom agencies in each country. An undetermined amount enters as contraband to avoid high import duties and from poached stocks. Korea is the main buyer of large velvet from maral, wapiti and reindeer. Hong Kong absorbs much of the smaller product. New Zealand is one of the largest and best-organized suppliers, but in the last two years, markets have been flooded with velvet from Eastern Europe and Russia. However, the quality of product from these sources has been compromised. Maral velvet from Siberia was once a premium product, and better pieces of wapiti velvet from other origins have been marketed under this label. Spoilage of Russian reindeer velvet in 1992 led to voluntary termination of all reindeer velvet imports by the Korean Pharmaceutical Traders' Association.

Current velvet antler production from wapiti is about 35 tons of raw product in North America. At a current conservative value of $110 per kilogram, velvet antler production is worth about $3.5 million. In comparison, the reindeer industry in the United States produces about 22 tons of velvet antler. At a price of $55–100 per kilogram, the total value was $780,000.

Prices for wapiti velvet have been as high as $230 per kilogram for the green product. With yields of over 8 kilograms per mature stag, annual returns well over $1,600 per stag once were obtained. The current glut has depressed prices for all but the best-quality product.

Brood Stock and Reproductive Products

At this early stage of the industry, sale of breeding stock remains a main source of income for game producers. Except for certain exotic species, some of the strongest prices are for wapiti in the wake of disease-control slaughters and the closure of interjurisdictional movement of stock.

Current estimates of cervid and bison breeding stock remain high as people reinvest their compensation from sacrificing their herds (Table 3). However, new investors have been momentarily deterred and prices have stabilized. Within the United States, breeding

Table 3. Representative stock prices (U.S. dollars) in 1992.

	Breeding males	Bred females	Yearling males	Yearling females	Female calf/fawn	Male calf/fawn
Fallow deer						
Midwest USA	700–800	700–900			680[1]	425[1]
South/northwest	800–1,000	350–400				
Red deer		2,400		1,600		
Wapiti	2,250	8,500			6,000	1,100
Bison—farm/ranch-raised						
Stock sales	1,700–2,125	1,800–3,000	1,800	1,830	1,150–1,355	725
Public sales[2]	1,600	1,030	810	970	750	640
Reindeer						
Open range			1,000–1,500	1,000–1,500	800–1,500[3]	
Farmed			2,000	2,500		

[1]Prices are averages for North America.
[2]Average 1992 sale prices from the National Bison Range, Custer State Park, Blue Mounds State Park and/or Fort Niobrara National Wildlife Refuge.
[3]Price range for male and female calves combined.

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alter age structures and reduce recruitment in these populations. Consequently, overall population performance and resilience could be compromised.

Establishing novel pathogens in native cervid populations also could limit options for resource management. Introduction of some diseases would dramatically affect use of sport hunting as the preferred management tool for controlling infected populations. Both public health concerns and perception would impact hunter participation. Establishment of some novel diseases in an area also would affect management of other wildlife (and domestic) species and could preclude translocating animals from or establishing new susceptible species in infected areas. Introducing certain diseases into wild cervids could affect suitability of public lands for livestock grazing. Establishing foci of tuberculosis or other livestock diseases in free-ranging wildlife could fuel conflicts between livestock and wildlife interests and the respective state and federal agencies representing them, not unlike those already associated with brucellosis in the Greater Yellowstone Area (Thorne et al. 1991a, 1991b; Thorne and Herriges 1992).

Big game sport hunting is an economic mainstay of many "game cash"-funded wildlife management agencies. Reducing these revenues would be detrimental to agencies and their management programs. Big game sport hunting also provides significant income for many state and provincial economies, particularly in the West. For example, in 1991 deer and elk hunting contributed nearly $450 million to Colorado's state economy (Colorado Division of Wildlife 1993). Loss of hunting revenues could be particularly devastating to rural economies. Establishing reservoirs of reportable diseases in wild cervid populations could adversely affect livestock markets and agricultural economics by changing "disease-free" status of affected states, provinces and nations. Finally, attempts to control significant disease problems in free-ranging cervids will be costly. Such activities, unless paid for by those responsible for initial disease introductions, could divert funding from other important management activities.

Lack of data limits reliable quantitative assessments of risks to native wildlife populations associated with diseases that could be introduced through captive cervids. Many factors preclude unequivocal predictions regarding the outcomes of such introductions. Knowledge is incomplete for most diseases in native and exotic cervids. Details of epizootiology in and among various species in captivity and/or in the wild are undescribed. Host ranges for many infectious and parasitic agents are undefined. Diagnostic tests for many important pathogens generally are unproven, unreliable and/or unavailable for use in captive cervids. Perhaps most critical, *the long-term consequences of introducing any of these diseases into free-ranging wildlife populations are unknown or, if known, are highly undesirable.* Equally disturbing, based on experiences in North America and elsewhere, is the recognition that *many of these diseases, once introduced, will be virtually impossible to control in free-ranging wildlife populations.* Clearly then, preventing such introductions is the only responsible option available to agencies charged with protecting, preserving and enhancing native wildlife resources.

Strategies for Preventing Disease Introductions by Captive Wildlife

In the absence of reliable knowledge diminishing the potential impacts of diseases introduced by captive cervids on native wildlife resources, we believe responsible resource management agencies are justified in adopting conservative approaches to minimize opportunities for such occurrences. Legal precedent supports our belief. A recent decision[1] in U. S. District Court in Washington upheld that state's "legitimate interest in guarding against imperfectly understood environmental risks, despite the possibility that they might ultimately prove negligible."[2] The court found that the state need not "sit idly by and wait until potentially irreversible environmental damage has occurred, or until the scientific community agrees on what disease organisms are or are not dangerous before it acts to avoid such consequences."[1]

Introduction of tuberculosis, brucellosis, parelaphostrongylosis, the African form of malignant catarrhal fever, foreign animal diseases (e.g., rinderpest, foot-and-mouth disease, etc.) or other significant infectious and parasitic agents into native cervid populations via commercial wildlife facilities could be biologically and/or politically catastrophic. It follows that developing proactive programs and regulations to prevent captive cervids and other captive wildlife from introducing significant diseases into native wildlife populations is the only sound management strategy presently available. For some disease problems in certain species, genera or families of wildlife commercially traded, completely banning their importation and possession is presently the only effective means of preventing introduction of novel pathogens or parasites into native wildlife populations. Cases where importation and possession of species, genera or families for commercial purposes are prohibited have been carefully considered in Colorado (Kahn 1993), Wyoming (Lanka et al. 1990) and elsewhere. With respect to disease problems, we believe this classification generally should be reserved for those diseases with high potential for introduction and/or irreparable damage to native wildlife, livestock resources or public health that cannot be prevented by diagnostic screening and/or treatment of infected individuals of all susceptible captive wildlife species. For many species, genera or families in this category, threats posed by potential for interbreeding and/or competing with native species also may contribute to their classification as prohibited (Lanka 1990, Smallwood and Salmon 1992, Kahn 1993).

In cases where prohibition is unjustified or infeasible, uniformity in regulatory approaches affords the greatest level of protection to native wildlife resources; inconsistencies compromise efficacy of these efforts. Components of a proactive approach to preventing disease introductions while allowing private ownership of captive cervids should include regulations for identification, record keeping, movement, disease testing, quarantine and health inspection of captive cervids and other commercially owned wildlife (*see* Anonymous 1991 for specific recommendations). Additional elements needed to ensure success of programs prohibiting and/or regulating captive cervids to protect native wildlife from disease introductions include support for monitoring compliance and enforcing regulations, prosecution and penalties for violations (including liability for costs of depopulation or eradication programs), and support for improving species-specific diagnostic testing and detection methods for important disease problems. State wildlife management agencies should have the lead role in these regulatory efforts. However, because several diseases of captive cervids represent serious threats to agriculture and public health interest, improved communication and cooperation between wildlife management, agriculture and public health agencies is essential. These entities should work closely together in all jurisdictions to ensure that the fledgling commercial wildlife in-

[1] *Pacific Northwest Venison Producers et al. v. Curt Smitch et al.* USDC WD No. C92-1076WD; September 2, 1992.
[2] *Maine v. Taylor*, 477 U.S. at 148, cited and quoted in *Pacific Northwest Venison Producers et al. v. Curt Smitch et al.*

dustry does not jeopardize viable and vital established interests through introduction or perpetuation of serious disease problems.

Introducing novel pathogens or parasites into North America's wild cervid populations through commercial propagation of captive wildlife poses a clear and present threat to the health and management of our native wildlife resources. Coordinated interagency regulatory efforts are needed to prevent such occurrences and protect valued wildlife resources. Recent attention to problems associated with wildlife commercialization in North America has focused largely on those associated with captive wild ungulates, particularly elk and other cervids. Similar potential problems undoubtedly are associated with captive propagation of other native and exotic fish and wildlife species that, although not addressed here, should neither be ignored nor underestimated in developing proactive management strategies.

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Interspecific Competition Between Four Exotic Species and Native Artiodactyls in the United States

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Introduction

Numerous species of exotic big game occur throughout the United States either confined or free ranging (Lever 1985). Many big game introductions were made in the early 1900s when little attention was paid to wildlife management in general and none to consequences of introductions for habitats or native species. Many of the resulting free-ranging exotic big game populations have been in place 70 years or more. Both negative and positive factors may be associated with any exotic population (Craighead and Dasmann 1966, Demarais et al. 1990, Morrison 1989). Wildlife agencies generally consider exotic big game as potential competitors with native wildlife, and as having no positive qualities (Ervin et al. 1992). Interspecific competitive relationships often are difficult to quantify because of temporal and spatial complexities of study areas, and unique attributes and characteristics of populations involved (Brown 1989, Crawley 1989, Wiens 1977). As such, empirical data on interspecific competitive interactions between free-ranging populations of exotic and native big game are limited. From the applied standpoint of wildlife agencies dealing with habitat degradation and ever-diminishing fiscal resources, free-ranging exotics often are viewed as contrary to the best interests of an overall management program.

We review evidence for interspecific competitive interactions between native artiodactyls in the United States and four species of exotic, sympatric, free-ranging species: sika deer (*Cervus nippon*), axis deer (*Cervus axis*), fallow deer (*Dama dama*) and aoudad or Barbary sheep (*Ammotragus lervia*). These exotic species were selected because they are common in terms of current distribution and/or density. Also, they have been in place for many years and are therefore significant for management considerations, and are species for which at least some empirical data are available. Evidence for interspecific competition is reviewed within the following contexts: (1) the degree of overlap in resource use; (2) changes in resource use caused by the presence of another species; and (3) changes in population characteristics (such as density or age-structure) or individual characteristics (such as fecundity or survival) caused by interaction with the other population(s) (MacNally 1983). We define an exotic as a species not distributed naturally in the Nearctic faunal region (Demarais et al. 1990). We consider interspecific competition as use or defense of a limited resource by a species that reduces the availability of that resource to one or more other species.

Methods

Published information related to interspecific competition was compiled for the four exotic species. State and federal agency personnel currently involved in management of exotics were contacted for current information, policies and programs dealing with exotics. Agency personnel also provided unpublished data and file reports on the four exotic species reviewed.

Results

Sika Deer

Sika deer are native to Japan and the east Asian mainland. In the U. S., free-ranging populations are sympatric with white-tailed deer (*Odocoileus virginianus*) in Maryland, Chincoteague Island in Virginia, and Texas. There also was a small population in south-central Wisconsin. Free-ranging sika deer were introduced in Maryland in 1916. The greatest concentration of sika deer in the state occurs in the southern portion of Dorchester County. The density and local distribution of this population were quite restricted until the 1970s (Feldhamer et al. 1978). From 1973 through 1977, total deer harvest in southern Dorchester County remained stable, but the number of whitetails declined from 75 percent of the harvest to 36 percent. For the last three hunting seasons for which data are available (1989–1991), total harvests have increased an average of 68 percent from the 1970s (to a mean of 1,339 deer per year), although the mean percentage of whitetails (34 percent) has remained constant (Table 1). This is suggestive, although certainly not conclusive, of depressive competition favoring sika deer, if one accepts the implied assumption that harvest trends parallel relative population densities. Several biases may affect the validity of this assumption, however. Sika deer may be preferred by hunters because of their uniqueness or novelty as trophies. Conversely, hunters may prefer whitetails because of their greater body size. Finally, interspecific competition may not be operating at all. Each species may have responded differently to either a habitat change

Table 1. Harvest-revealed relative percentage of free-ranging sika deer (*Cervus nippon*) and white-tailed deer (*Odocoileus virginianus*) from southern Dorchester County, Maryland. Includes data from archery, firearms and muzzleloader seasons.

Year	Total number of deer harvested	Percentage sika deer	Percentage white-tailed deer
1973[a]	973	24.8	75.2
1974	883	33.6	66.4
1975	828	39.6	60.4
1976[b]	921	55.8	44.2
1977	981	64.1	35.9
1989[c]	1530	69.8	30.2
1990	1349	62.9	37.1
1991	1138	65.5	34.5

[a]Two deer of either sex and species.
[b]Firearms allowable bag limit: 1 white-tailed deer and 2 sika deer; or 3 sika deer. Archery allowable bag limit: 1 white-tailed deer and 1 sika deer. No muzzleloader season.
[c]Current allowable bag limits in Dorchester County are: archery—1 white-tailed deer and 1 sika deer; firearms—1 white-tailed deer and 2 sika deer; muzzleloader—1 white-tailed deer and 1 sika deer. An additional deer of either species may be taken with a Bonus Deer Stamp during all three seasons (archery, firearms and muzzleloader).

or disease during the 1970s and maintained a new equilibrium. However, the idea that the Maryland harvest data reflect interspecific competitive replacement is reinforced by trends in other sika deer populations, including the results of experimental enclosure studies on sika deer and white-tailed deer in Texas.

The trend in sika deer numbers in Texas has increased steadily. The latest statewide survey lists about 12,000 sika deer, of which 5,600 are free ranging (Trawcek 1989), and these figures are very conservative (J. Baccus personal communication: 1993). Sika deer have increased 49 percent from 1984 to 1988. In an effort to investigate competition between sika deer and whitetails, studies were done in enclosures in the Edwards Plateau region. Six adults of both species were introduced into a 96–acre (30 ha) enclosure in 1971 and monitored through 1979. A similar enclosure, operated since the 1950s, with about 15 adult whitetails, was used as a control (Harmel 1980). While the sika deer population increased from 6 to 62 by the end of the experiment, whitetails increased to 17 the second year and then declined to extinction (Figure 1A). There was a significant inverse relationship in population density between sika and white-tailed deer in the enclosure (Spearman $R = -0.746$; $P = 0.02$). The control population remained stable at 14 individuals by 1979, or about 0.36 deer per hectare. This is about average deer density for the region. The yearly population density of whitetails in the experimental enclosure was independent of the whitetail population density on the control enclosure during the study period ($P > 0.05$). On both enclosures, forage production was poor and was considered to be limiting. Browse and forbs were consumed by both whitetails and sika deer. The exotic deer also ate grass and maintained reproduction as other forage species were consumed. These results again are suggestive of depressive competition. It may be argued however, that a different outcome might have occurred had individuals in each population been allowed to disperse beyond the bounds of the enclosure, had different individual deer with different genetic makeups been introduced into the pens originally, or had different weather prevailed throughout the experiment. Despite inherent assumptions and drawbacks, the Maryland harvest results and Texas enclosure experiments are consistent in their conclusions that sika deer outcompete white-tailed deer.

Additionally, we may consider degree of overlap in resource use noted by Keiper (1990), who reported that the diets of sika deer and white-tailed deer on Assateague Island, Maryland, were positively correlated ($P < 0.02$). He also found the deer population on Assateague Island was composed of 75 percent sika and 25 percent whitetails — similar to the relative percentage of each species in current hunter harvests from southern Dorchester County.

The situation on the southern extension of Assateague Island, specifically Chincoteague National Wildlife Refuge, Chincoteague Island, Virginia, is similar. Chincoteague N.W.R. has sympatric populations of sika deer and white-tailed deer. Sika deer were introduced in the 1930s. Both sika deer and white-tailed deer have been harvested since herd control management was initiated in 1[illegible]. During the 10–year period from 1977 through 1986, an average of 100 deer was harvested, of which [illegible]4 a year (84 percent) were sika deer. In response to a perceived decline in the density of native deer, there has been no white-tailed deer harvest since 1987. Sika deer harvest has continued at an accelerated pace. In fact, the mean number of sika deer taken during the five-year period from 1987 through 1991 was 271 per year. This is more than three times the mean number harvested per year from 1977–1986. Nonetheless, autumn prehunt spotlight counts since 1989 indicate white-tailed deer comprise only about 20 percent of the total deer, compared to a 10–year average of 16 percent when both species were harvested (I.

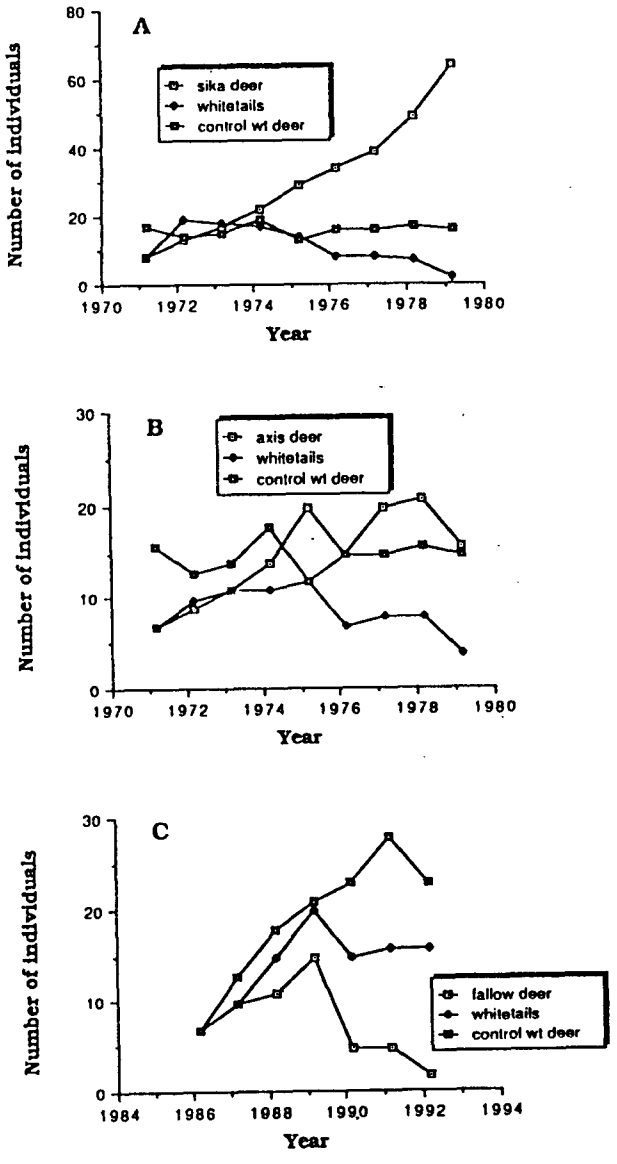

Figure 1. (A) Number of sika deer (*Cervus nippon*) and white-tailed deer (*Odocoileus virginianus*) in a 39–hectare enclosure, and a control population of whitetails in an adjoining 39–hectare enclosure without exotics, between 1971 and 1979 in the Edwards Plateau region of Texas; (B) Number of axis deer (*Cervus axis*) and white-tailed deer in a separate 39–hectare enclosure, and the control population of whitetails, between 1971 and 1979 in the Edwards Plateau region of Texas; (C) Number of fallow deer (*Dama dama*) and white-tailed deer in a 39-hectare enclosure, and a control population in an adjoining 39–hectare enclosure, between 1986 and 1992 in the Edwards Plateau region of Texas (from data in Harmel 1980, 1992).

Ailes unpublished data: 1992). As in Dorchester County and Assateague Island, Maryland; and Texas, the exotic sika deer appear to have effectively displaced native white-tailed deer.

Dietary overlap and competitive advantage of free-ranging sika deer over whitetails on forage-limited habitats in Texas again were noted by Butts et al. (1982), using the animal-bite observation technique, and Kelley (1970) and Henke et al. (1988) based on rumen analyses. These results are consistent with the conclusions of Hofmann (1985), based on comparative rumen anatomy and feeding behavior, that sika deer are more opportunistic, less specialized and more adaptable in forage selection than white-tailed deer. Finally, although there are no behavioral studies on sika deer and white-tailed deer in sympatric U. S. populations, the aggressive nature of sika deer and their ability to physically displace other species of deer has been documented elsewhere (Kiddie 1962).

Axis Deer

The spotted deer, chital or axis deer is native to India, Nepal and Sri Lanka. It is the most numerous exotic in Texas. Current estimates are over 39,000 individuals, of which 17,000 are free-ranging (Tranweek 1989). There are small populations of axis deer of undetermined status in Volusia and Marion Counties, Florida, which apparently have not expanded since their release in the 1930s (F. Montalbano and C. Chappell personal communication: 1992). They also have been introduced onto several Hawaiian islands (Lever 1985). These introductions will not be considered here as there are no native big game species in Hawaii, and thus no interspecific competition. As noted by Coblentz (1978, 1990) however, the biota of island ecosystems are particularly vulnerable to exotic mammalian herbivores. Since the 1940s, axis deer have been free-ranging on Point Reyes National Seashore, California, where they are sympatric with fallow deer and native black-tailed deer (*Odocoileus hemionus columbianus*). There has been no public hunting since 1967. Populations of both exotics on Point Reyes have been culled yearly since 1976 by the National Park Service to maintain about 350 individuals of each species. Culling (a high of 356 exotics in 1981, a low of 35 in 1983; J. Sansing unpublished reports: 1992) is done in response to perceived danger to the natural ecosystem posed by exotics (Wehausen and Elliott 1982), and the belief that "exotic deer are having a significant impact on the native black-tailed deer population" (Fellers personal files: 1983). There are no concurrent estimates on the size of the black-tailed deer population.

Again, enclosure experiments in Texas offer the only direct experimental attempt to determine the extent of competitive interactions. Six adult axis deer and six adult whitetails were studied in a 39-hectare enclosure from 1971 through 1979. The white-tailed population increased to a high of 11 animals in 1975 before declining to 3 nonbreeding individuals by 1979. Axis deer peaked at 20 individuals in 1978 and declined to 15 by the end of the experiment a year later (Harmel 1980, Figure 1B). In this case, yearly whitetail density was not significantly correlated with axis deer density (Spearman $R = 0.04$; $P > 0.9$). Nevertheless, whitetails declined on the experimental plot, as they did on the control plot during a drought from 1975–1976. Whitetails recovered on the control enclosure. They did not recover on the experimental plot with axis deer present, however.

Results of studies to determine resource overlap between axis deer and native species have been conflicting. Based on bite studies with a tame axis doe, and rumen analyses of axis and white-tailed deer, Smith (1977) found little overlap in feeding habits along the Texas Gulf Coast. Axis deer preferred grass while whitetails were predominately browsers. Similar results were reported by Kelley (1970) and Henke et al. (1988). On ranges in poor condition, however, competition was deemed likely, to the detriment of the native species (Ables and Fuchs 1977). Similar results were reported by Elliott and Barrett (1985) for the three species of cervids on Point Reyes N. S. Diets of axis and fallow deer, primarily grazers, overlapped with each other to a greater extent than either did with the native black-tailed deer. The only exception was during summer. In contrast, Butts et al. (1982), using the animal bite technique for axis deer in Kerr County, Texas, found axis deer had a definite preference for browse, but would switch to grass as browse declined. Butts et al. (1982:41) concluded axis deer (as well as fallow deer and sika deer) "...are severe competitors with white-tailed deer in the Edwards Plateau of Texas"

Fallow Deer

Fallow deer are native to Asia Minor and the Mediterranean region. They are the most widely introduced cervid throughout the world (Chapman and Chapman 1980). In the U. S., fallow deer are free-ranging in nine states. Small populations about which little is known exist in Alabama (Wilcox and Dallas counties), Nebraska (Boone and Wheeler counties), the Sacramento Mountains of New Mexico, and Maryland (Talbot County). Larger populations occur in Trigg County, Kentucky, on Land Between the Lakes, Little St. Simon's Island, Georgia, and Point Reyes N.S. in California. In Texas, about one half the 14,000 fallow deer in the state are free-ranging (Traweek 1989). This represents a 35 percent increase over a four-year period in the number of fallow deer in Texas.

Enclosure studies to assess competitive interactions of fallow deer and white-tailed deer were conducted in Texas from January 1986 through February 1992, under the same conditions described previously (Harmel 1992). Unlike the sika deer and axis deer experiments, the white-tailed population increased while the fallow deer population did not remain viable (Figure 1C). Most studies on potential interspecific competition in fallow deer have dealt only with the degree of overlap in feeding habits. On Point Reyes, California, population density of fallow deer apparently has increased more slowly than that of axis deer (Wehausen and Elliott 1982), although it is much more difficult to census fallow deer. As noted, fallow deer preferred grazing although their diet overlapped with black-tailed deer in summer (Elliott and Barrett 1985). In Texas, however, Henke et al. (1988) suggested the ability of fallow deer to use grass would confer a competitive advantage over native deer when forbs and browse are limited. This does not appear to be the case in Kentucky, however, where fallow deer on what is now Land Between the Lakes (LBL) were introduced in 1920. The population peaked at approximately 800–1,000 individuals, but currently numbers only 200–300. Since their introduction over 70 years ago, 90 percent of fallow deer stay within a very limited, overbrowsed area and never disperse—despite no hunting, abundant forage elsewere and no apparent aggressive interactions with sympatric white-tailed deer (S. Bloemer personal communication: 1992). The decline in the fallow deer population on LBL may be due to meningeal worm (*Parelaphostrongylus tenuis*), although this has not been confirmed.

An unknown number of fallow deer were introduced to Little St. Simon's Island, Georgia, around 1920. They apparently displaced the white-tailed deer, as the native species no longer occurred on the island by 1937. The island is about 3,240 hectares (8,000 acres), half of which provides suitable habitat for deer and supports a current population of about 500 fallow deer (K. McIntyre personal communication: 1992). As noted, island biota often are more vulnerable to exotics than are continental communities. This may account in part for the success of fallow deer on Little St. Simon's Island, and sika deer noted previously on Assateague and Chincoteague Islands.

Aoudad Sheep

Native to North Africa, free-ranging populations of aoudad currently occur in Texas and New Mexico. Recent free-ranging populations in California (Barrett 1980, Morrison 1984) have been eliminated through culling, and aoudad now occur only in confinement in the state (B. Clark personal communication: 1992). Aoudad have proven to be highly adaptable in their feeding patterns, disperse rapidly and have relatively high reproductive potential (Barrett 1967). As such, they are considered as potential competitors with mule deer (*Odocoileus hemionus*) and desert bighorn sheep (*Ovis canadensis*) (Simpson et al. 1978, Seegmiller and Simpson 1979).

As of 1988, there were over 20,000 aoudad in Texas, about one-half of which were free-ranging (Traweek 1989). This is exclusive of the harvested, free-ranging population in Palo Duro Canyon, established in the late 1950s (Dvorak 1980). Census estimates of aoudad in Palo Duro Canyon show an increase from 72 animals in 1965 to 775 animals in 1975. Unfortunately, there are no concurrent estimates of mule deer numbers during this period. Aoudad have since spread to surrounding counties outside the census area. Evidence for competitive interaction is again based on observed overlap in feeding habits studies. For the population in Palo Duro Canyon, Krysl et al. (1980) found a dietary overlap index of 74 percent between aoudad and mule deer, with browse providing the greatest component of similarity. They felt there was a strong potential for interspecific competition should populations continue to grow and forage become limited. Browse also was the preferred forage of aoudad on Kerr Wildlife Management Area, although grass made up the largest part of the diet (Butts et al. 1982). They concluded that competition between aoudad and white-tailed deer would occur for forbs, although availability of forbs and extent of habitat partitioning in the region was not addressed.

In Largo Canyon, New Mexico, Bird and Upham (1980) reported an overall dietary overlap of only 48 percent for aoudad and mule deer. The degree of overlap reached 92 percent during the summer, although this may have been an artifact of the sampling method. Low percentages of overlap in winter and spring suggested little potential competition, however. Additionally, they suggested there was relatively little habitat overlap (42 percent) on their study area, with the two species reducing the potential for interspecific competition through habitat partitioning. Current recommendations for aoudad in Largo Canyon, Canadian Canyon, and Hondo Valley, New Mexico, call for populations to be managed "...within levels so competition with other species is minimized and movement from these areas does not occur." Other aoudad populations are to be removed from areas occupied by desert bighorn sheep, and from areas designated for transplants of desert bighorns (D. Weybright personal files: 1992).

Discussion

It is apparent that the four exotic species considered have well-established populations in a variety of different regions and/or habitat types. Sika deer in Maryland, Virginia and Texas, axis deer in Texas, and aoudad in Texas and New Mexico appear to be particularly successful in terms of maintaining population density and distribution. Populations of fallow deer appear to be somewhat less consistently successful in expanding their local distribution. Other introductions of these species have failed. Axis deer have not increased in density or distribution in Florida. Sika deer introductions have failed in Michigan and Nebraska. Fallow deer introductions in Indiana, Louisiana, Michigan, Oklahoma and Colorado all failed to produce viable populations (Lever 1985). These failures no doubt were because of one or more factors—low initial numbers introduced, poor timing, sex and age ratios, health or genetic vigor of individuals, predators, parasites and diseases, and/or condition of habitat. In short, the n-dimensional mosaic of interacting factors, in addition to potential competition with native ungulates, makes the outcome of any big game introduction uncertain. From the standpoint of a resource manager, however, it is not important that a certain introduction may fail. What is critical is that it may succeed, most often to the detriment of native biota.

The same n-dimensional array of factors operate on successful introductions, and preclude the predictability desired by resource managers regarding native/exotic population interactions. This was stated by Brown (1989:104) in the general context of exotic vertebrates: "That particular problems caused by an exotic species in a certain area must always be dealt with on a case-by-case basis does not necessarily reflect on the inadequacy of basic ecological knowledge or the failure to apply general concepts to specific situations. Instead it is a necessity imposed by the historically based uniqueness of both organisms and their environments." Additionally, the relative influence of intraspecific competition within exotic and native populations never has been addressed. It may outweigh interspecific competition in certain situations, such as on overgrazed habitat.

We may expect competition between exotic and native artiodactyls both intuitively, and on the basis of previous field experiments with a variety of animal groups from various trophic levels and habitats (*see* Schoener 1983). Most studies on exotic species considered in this review have been on feeding habits. With the exception of the Texas enclosure studies, there has been no experimental work. Most studies have been primarily descriptive, with competition implied. Alternative explanations, other than interspecific competition, usually can be postulated. In this regard, Arthur (1987:30) noted "...it is necessary to persevere with whatever inadequate data we have at our disposal on natural populations, and attempt to weigh up the alternative merits of competitive and other hypotheses as explanations of species distributions in time or space. As usual in ecology, laboratory experiments give us clear conclusions whose relevance to nature may be debatable, while field studies can hardly fail to be relevant to nature, but are rarely conclusive." Considering the current status of the four exotics reviewed, and the consistent body of evidence suggesting competition, it would seem highly unlikely that interspecific competition was not a major force in these systems.

Competition does not operate in isolation, however. Other factors such as water needs, reproductive potential and dispersal abilities are important determinants in success of exotic populations as well. As noted, aoudad have greater reproductive and dispersal potential than native desert bighorns. On the other hand, the three species of exotic cervids considered generally have single births, while mule deer and white-tailed deer under normal conditions have multiple births (Bunnell 1987). Also, the exotic species generally have a higher age at first reproduction than the native deer (Feldhamer 1980, Feldhamer et al. 1988, although *see* Mullan et al. 1988). Additionally, both sika deer and fallow deer have slow dispersal rates. This is exemplified by the fallow deer population on Land Between The Lakes which, as noted, has not dispersed significantly from a severely overbrowsed area since their introduction over 70 years ago. Expansion of fallow deer and axis deer on Point Reyes also has been limited (Wehausen and Elliott 1982). Regardless, populations of exotic artiodactyls clearly are established and expanding at the expense of native species—again indicative of competition for limited forage resources favoring introduced species. This also may be evident in the generally poor

body condition of native species relative to exotics even before population density of the native species declines, as noted by Richardson and Demarais (1992).

Conclusions

Because forage and other resources are variable or unpredictable temporally and spatially (Southwood 1977, Keddy 1989), habitat characteristics necessary to support both exotic and native species rarely are available or constant on a long-term basis. Physiologically and behaviorally (Hofmann 1985), exotic artiodactyls clearly are better able to adapt to increasingly poor habitat conditions. Generally, managers faced with historically secure populations of exotic artiodactyls and sympatric native big game species, and poor habitat conditions, should make every effort to reduce or limit populations of the exotic (Baccus et al. 1985). This is the current management plan for fallow deer and axis deer on Point Reyes N.S., sika deer on Chincoteague N.W.R., aoudad in New Mexico and other areas. New introductions are ill-advised, with fiscal resources and personnel efforts better spent on native species and habitat acquisition or restoration. The guidelines established by Craighead and Dasmann (1966) with respect to introduced big game over a quarter century ago probably are even more relevant, practical and of critical importance today.

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Genetic Tests and Game Ranching: No Simple Solutions

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Introduction

During the last 15 years there has been a rapid growth in the captive rearing of deer species for profit. It is estimated that there are over one million deer on farms in New Zealand, a country with no native members of the family Cervidae. The social deer species, particularly North American elk and European red deer, as well as Asian sika deer and European fallow deer, have proved much more tractable on game ranches than more solitary or territorial deer. Several products of deer have high market value. The low-fat natural meat is sought by restaurants and gourmet shops; the soft leather is made into high-fashion garments; and the antlers and sexual organs are highly valued in Asian markets as medicinal remedies.

In North America, wildlife management and conservation has resulted in the recovery of most native deer species. The North American elk population has grown from less than 100,000 at the turn of the century to over three quarters of a million individuals today. White-tailed deer, which had been reduced to about 300,000 by overhunting, number over 18 million today.

To protect the genetic integrity of native deer populations and distinguish them from farmed deer, biochemical methods have been utilized. These methods were developed and published for the forensic identification of game meats (McClymont 1982) and to better understand the population genetics of native deer species.

Studies of exotic deer that have been intentionally released (Challies 1985) or hybrids that have escaped (Harrington 1985) indicate that they often can compete with or mate with native species.

As mule deer and white-tailed deer do not successfully breed with exotic deer species, they are of concern as vectors of disease rather than hybridization. Elk, however, can hybridize with European red deer and Asian sika deer, as well as other less commonly farmed species. For that reason, developing markers detectable from a blood sample have focused on elk and red deer.

Methods and Results

There presently are two biochemical markers in blood, hemoglobin and post-transferrin, utilized to distinguish elk and red deer (Dratch 1987, Dratch and Pemberton 1992). Two other genetic loci, transferrin and superoxide dismutase, provide secondary markers as they show substantial gene frequency differences between elk and red deer populations but do not distinguish all individuals in those subspecies. Other biochemical markers are under investigation but require testing with a substantial number of elk and red deer standards, i.e., blood samples from elk and red deer in populations where the chances of hybridization are remote.

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The testing regime utilized during the last six years to detect hybrids is represented schematically in Figure 1. The differences are detected by electrophoresis, as shown for the markers hemoglobin (Hb) and superoxide dismutase (SOD) in Figure 2. All elk are homozygous for the hemoglobin B allele; red deer are homozygous for the A allele; and hybrids are heterozygous AB. For superoxide dismutase, the differences are not absolute, as shown in samples 8 and 12. Only when animal shows a red deer allele for hemoglobin or post-transferrin, or when one of its parents shows one of these marker alleles, is it classified as not a pure elk.

Because the concern over hybridization has grown in recent years, these tests have been conducted on several thousand animals since 1987. Initial results showed 8–12 percent of those animals tested either in New Zealand or North America were hybrids (Figure 3). This does not reflect the degree of hybridization in the wild, but rather that on games ranches where hybridization had been suspected due to atypical behavioral or morphological characteristics. The percentage of hybrids detected has not changed markedly on North American elk farms tested since 1991, while it has grown to about 30 percent in New Zealand as the focus has shifted from pure stocks to producing fast growing animals.

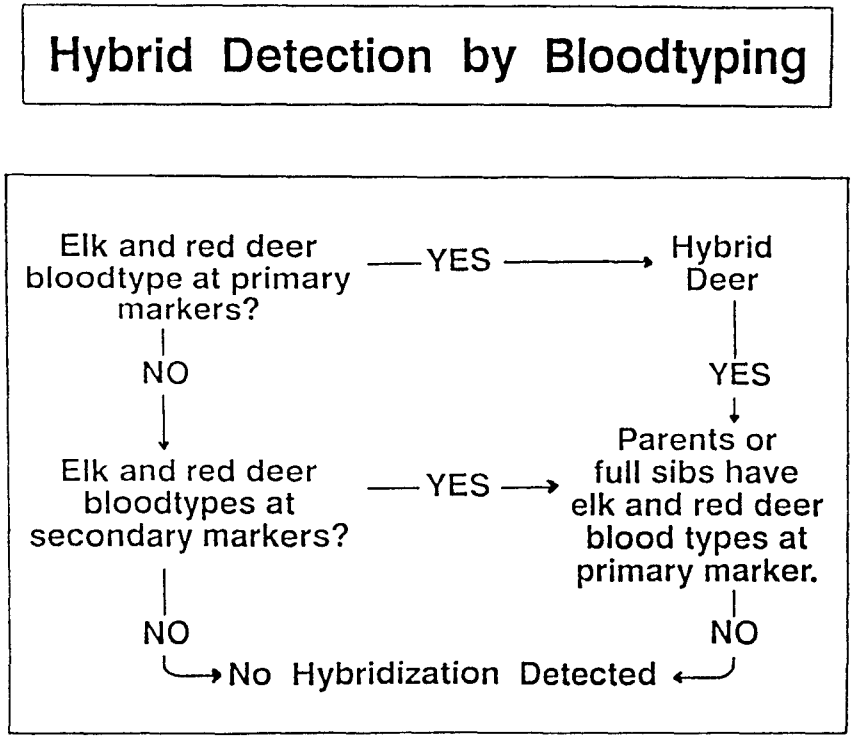

Figure 1.

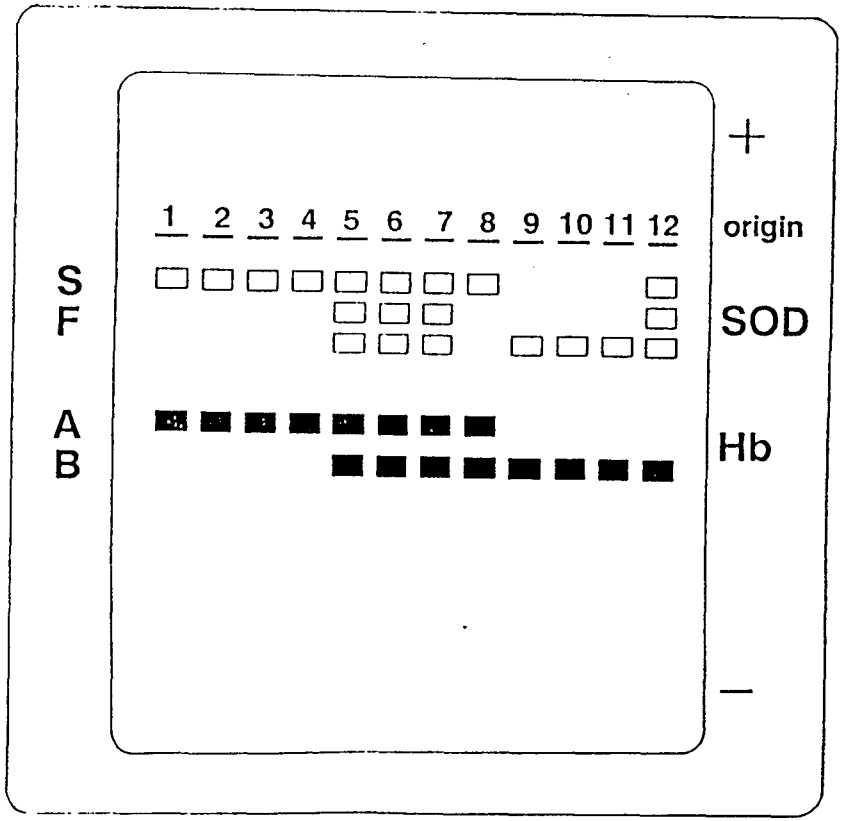

Figure 2.

Discussion

There are several problems in relying on laboratory tests to regulate the growing deer ranching industry. While the species of origin for native deer now can be determined from minute amounts of blood or tissue, there are no genetic tests to ascertain whether an individual animal was born behind a fence or in the wild. Moreover, because the domestication process that produced dogs and hogs took place over thousands of years of selection by man, there is no great likelihood of finding genetic markers after a few generations to ascertain whether a meat sample came from a farmed deer. The only possibility of distinguishing these animals genetically would be collecting blood samples from all animals on game farms so the DNA fingerprinting could be used at a later time to identify them or products from them individually. This is a costly process, in terms of analytical effort, sample storage and record-keeping.

The biochemical methods previously described will identify all pure elk, pure red deer and first generation elk/red deer hybrids. The detection problem lies with subsequent generations of hybridization. Because these markers show simple Mendelian inheritance, for a given marker locus, the offspring of hybrid parents can show the blood type of a pure elk or red deer (Figure 4). Thus, the test loses sensitivity in subsequent generations of hybridization, and particularly is exacerbated when hybrid animals are backcrossed to a pure elk bull (Figure 5). This loss of detection power with generations of hybridization demonstrates the need for many more distinguishing biochemical and molecular markers.

"Elk" Bloodtyping Results Through January 1991

	INVERMAY AGRICULTURAL RESEARCH CENTRE	BOVINE BLOOD TYPING LABORATORY	TOTAL
TOTAL TESTED	1234	2945	4177
HYBRIDS DETECTED	133	395	528
% HYBRIDS	10.8%	13.4%	12.6%

Figure 3.

If secondary markers are utilized to increase the sensitivity of hybridization tests, this is done at the expense of specificity. In other words, if these markers are utilized some pure elk will be called hybrids. The trade-off between sensitivity and specificity is a problem well recognized in disease testing, and recently has been seen in the tuberculosis testing of elk. From a management standpoint, it also is important to recognize that as more primary markers are discovered, animals that previously have been classified as pure elk will be identified actually as hybrids.

Most of the recent research on hybridization detection in the Cervidae has focused on elk and red deer. North American elk can breed with many other non-native deer species (Figure 6) and the genetic markers which would identify those hybrids remain to be found or verified with population genetic studies of known standards. Both the necessary genetic research and subsequent testing are costly, and a source of funds for that analytical effort has yet to be identified.

Conclusions

1. There are no genetic tests to determine whether an elk or any species of the deer family was raised on a game farm or came from the wild. The obstacles to developing such tests are as much biological as technical.
2. There are powerful forensic tests available to determine the species of origin for all

Hemoglobin Bloodtypes Of Elk - Red Deer F_1 Hybrids And F_2 Hybrids

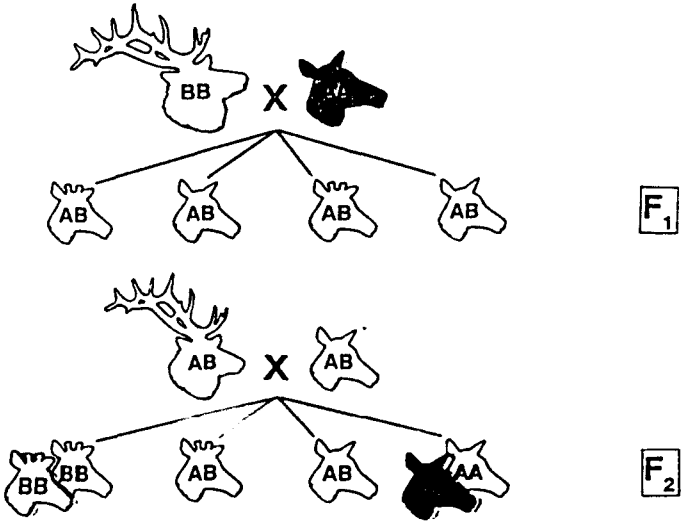

Figure 4.

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Hemoglobin Bloodtypes of Elk - Hybrid 1st and 2nd Backcross

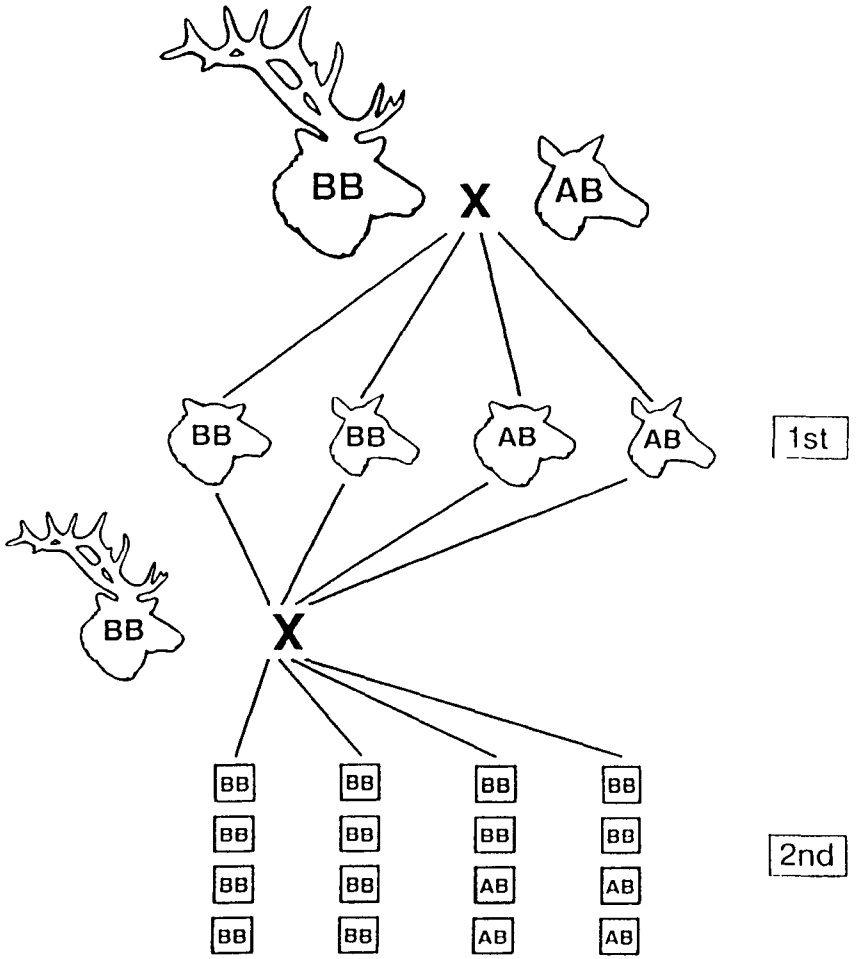

Figure 5.

Branches of the Family Cervidae That Can Hybridize

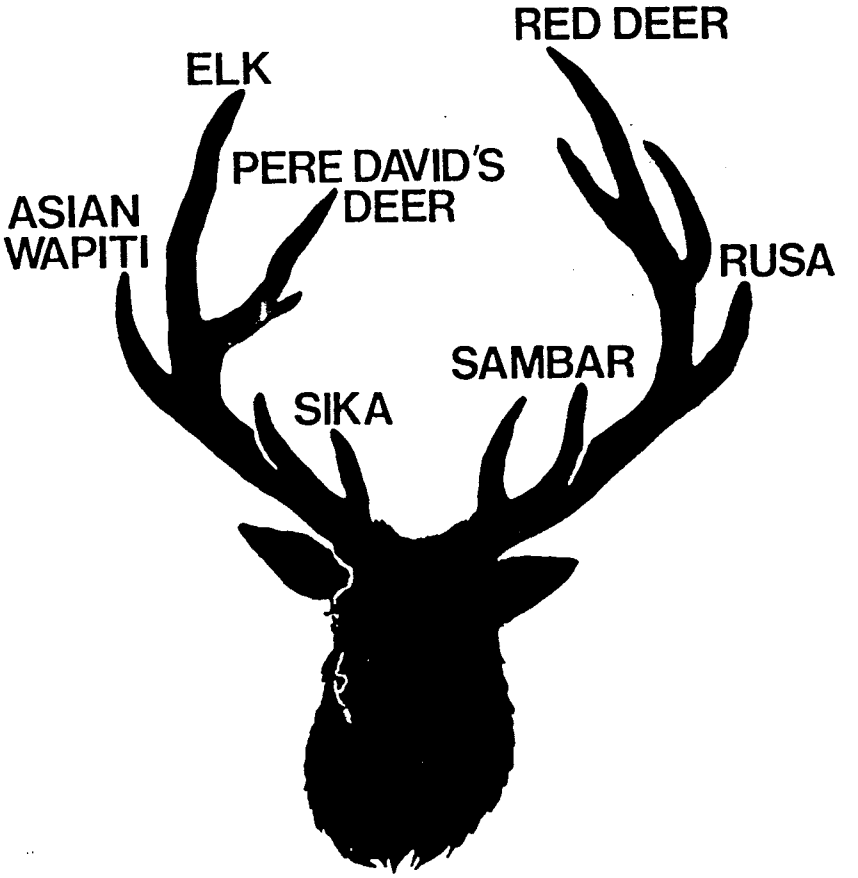

Figure 6.

Fifty-seven percent of agencies in the U. S. and 67 percent in Canada indicated a narrow definition which spoke generally to only native species or referred to wild nature, wild character, or other characteristics subject to interpretation when dealing with privately held animals. Six of 34 states (18 percent) indicated no definition of wildlife of any kind.

The definition of "wild" and "wildlife" may vary widely from jurisdiction to jurisdiction, leading to confusion and legal challenges to agency authority. It therefore is necessary in many jurisdictions to interpret the intent of the enabling legislation of the wildlife agency. This interpretation can then be challenged legally, with state by state and province by province case law establishing jurisdictional authority. There is no uniform interpretation of the definition of wildlife, for regulatory purposes, among agencies in North America.

When U. S. agencies were asked whether animals held on game farms or ranches were considered wildlife, 32 percent did not feel such animals were so classified and 68 percent felt they were. In Canada, eight of nine jurisdictions (89 percent) considered game farm animals as wildlife. Several jurisdictions reported that animals were not considered wildlife within the facility, but were immediately classified as wildlife upon escape or release.

The regulation of privately held wildlife generally has not been a priority for state or provincial wildlife agencies. Authorities have tended to deal primarily with issues associated more directly with wild populations. Increased interest in privately held wildlife has led to higher levels of involvement in this matter. Fifty-four percent of responding states reported recent legislative or rule-making changes regarding this issue. This indicates an increase in regulatory activity in recent years. Ervin et al. (1992) reported 15 of 50 states had either recent or pending legislation affecting exotics in a survey conducted in 1989. Of the 45 states responding to a question in our survey on policies towards game farming and game ranching, 11 percent indicated no agency policy and 64 percent permitted some level of activity with regulation. Seven percent of respondents indicated that other agencies were responsible, and 9 percent indicated opposition to the activity, at least for native species. In Canada, game farming generally is viewed as a legitimate diversification of traditional agricultural practices, but all responding jurisdictions recognized a concern for the potential impacts on free-ranging wildlife. Throughout Canada, restrictive regulations already are in place, or are actively being developed. Manitoba and Newfoundland do not allow game farming.

Current license and fee revenue generally has not paid for increased levels of regulation, indicating some diversion of sportsmen's dollars or public funds into this program. Fee levels in states or provinces with established game farming have shown that fees collected do not begin to cover the expenses of the program. Sportsman's dollars fund the majority of regulation costs in the United States. In Canada, public funds (i.e., agency budgets) must cover most or all of the program costs. If responsibility for an existing or expanded industry remains with wildlife agencies, either fees from the industry must be increased, sportsman's dollars must subsidize regulation, or both. In lieu of fee increases, other wildlife programs will be sacrificed. Of states contacted in our survey, 93 percent reported that the wildlife agency was fully or partially responsible for the enforcement and costs of game-ranching regulation. Seven percent reported that another agency was responsible. The state department of agriculture was the primary alternate enforcement and regulatory agency. Some degree of agricultural agency involvement in regulation was indicated by 11 of 45 states reporting, or 25 percent. In Canada three of nine jurisdictions have shared responsibilities between wildlife and agricultural agencies. However, in five responding jurisdictions, agriculture is the lead agency in Canadian regulation.

There has been concern over delegation of authority over game farming to agricultural agencies in some areas. These agencies generally do not have the statutory authority to protect wildlife populations, nor the expertise to recognize the legitimate concerns for wildlife. Instead, they often are charged with developing agricultural industries for commercial purposes. Agricultural agencies are more likely to recognize the positive aspects of game farming than are wildlife agencies (Ervin et al. 1992).

Jurisdictions define "game farming" differently. When asked to define the term, 16 percent (U. S.) and 22 percent (Canada) had no definition, 16 percent (U. S.) and 33 percent (Canada) equated the term to simple possession of live animals for regulation, and 46 percent (U. S.) and 44 percent (Canada) equated the term for regulatory purposes as connected to propagation, sale or other commercial use. When asked about regulations concerning current operations, 61 percent of U. S. wildlife agencies reported fencing standards, 80 percent required some form of animal inventory and 55 percent mandated some form of individual animal identification marking. In Canada, of the seven jurisdictions with regulations already in place, six had fencing standards, six had at least minimal facility requirements, six required annual inventory of all animals and all transactions involving game farm animals, six required individual permanent animal identification, and all had relatively detailed regulations for disease testing.

There is little consistency in what species are allowed on game farms. The three Canadian prairie provinces span the full range: Alberta allows only native species, British Columbia allows only non-native species and Saskatchewan allows a mix of native and non-native. Similar inconsistences occur throughout the U. S. There has been considerable discussion throughout North America on the pros and cons of each position, and each jurisdiction makes its own decision based on a combination of social, economic, biologic and political concerns.

There often is no clear legal authority to control escaped animals, even though they may pose an immediate threat to wildlife or an eventual threat to human safety. Escaped animals in some jurisdictions may take on the aspect of a protected wildlife species by default, since there is no clear legal authority for hunting seasons or other means of take. This may protect escaped animals at a higher level than native wildlife, potentially leading to a competitive advantage. At least two states (Colorado and Oregon) and three provinces (Alberta, British Columbia and Quebec) have rules which clearly define agency authority to control escaped big game animals. Of additional concern is the potential civil liabilities impacting legal hunters who kill escaped privately held wildlife, which may be at least superficially identical to their legal quarry.

The jurisdiction and regulation over privately held wildlife is complex and confusing. In addition to the questions of definition mentioned earlier, the current regulatory structure has several state, provincial and federal agencies responsible for different aspects of control. The U. S. Fish and Wildlife Service, Agriculture Canada and the Canadian Wildlife Service have jurisdiction over international import, migratory birds and endangered species. They have regulations and a permitting process concerning the possession of these animals. Beyond this level, jurisdiction over wildlife in captivity becomes complex, with different agencies, branches, divisions and sections responsible for the licensing of traffic in wildlife for commercial markets, exhibitions, disease control, and in food and fiber production.

In many states and provinces, different agencies have responsibilities for regulating the holding and health of wildlife. Generally these tend to be the departments of wildlife and agriculture. The release of domestically raised wildlife or imported wildlife often is

illegal, but there are questions concerning the legal definition of "release." Agencies generally consider release as any introduction which allows the animals to range freely. Some members of the public have questioned this interpretation and consider any stocking of private land to be a private property issue. Of particular concern is the stocking of large private holdings, with or without "game-proof" fencing, in the range of the same or similar species. Only a few jurisdictions (Oregon, Alberta and Utah) report restrictions on visibility within holding areas or on area size. The ownership and disposition of native wildlife within private land designated for the raising of privately held wildlife also is of concern to many agencies.

A fundamental issue underlying all aspects of private ownership is the change in philosophy inherent in the development of a widespread industry involving private ownership of endemic wildlife. The inception of modern wildlife management included the concept that endemic wildlife belongs to the people of the state or province, and responsibility for managing that wildlife is entrusted to the governmental regulatory agency. Development of a widespread industry involving the private ownership and sale for profit of native species would involve a change in this philosophy.

Private holding of wildlife in North America generally has not been permitted; however, there have been numerous exceptions to this policy. Zoos, private organizations, landowners and other have obtained wild animals legally, often with the assistance of government agencies interested in removing surplus wildlife or encouraging the distribution of certain species. As an example, for many years elk (*Cervus elaphus*) were trapped by the U. S. government in the Yellowstone area and shipped to other states and countries (Thomas and Toweill 1982). There was little apparent concern over the eventual "ownership" of these elk, and animals were shipped to government agencies, local Elks Clubs and private individuals.

The extent of privately held wildlife still is quite minimal for most species. In Oregon, there are an estimated 110,000 wild elk, while the number of captively held elk is numbered in the hundreds at the present time. Other states and provinces report similar ratios, with a few significant exceptions. Alberta currently has approximately 5,000 elk held in captivity, and only 17,000 free-ranging elk. In Texas, there has been an increase in populations of privately-owned big game species in recent years. The Texas Parks and Wildlife Department estimated 12,000 exotic big game animals in the state in 1963, 168,000 in 1986, and currently estimates over 500,000 individual exotic animals in the state (W. Armstrong personal communication: 1993). This still is significantly less than the estimated populations of native large mammals, but the ratio of exotics to native wildlife is increasing markedly.

The introduction of viable exotic wildlife species into new ecosystems is considered a risk to wildlife and wildlife habitats. Of the states and provinces responding to the survey, 84 percent and 100 percent, respectively, reported some policy or regulation on introductions. While most biologists might agree that the preservation of species integrity in wildlife/habitat assemblages is a desirable goal, there are few standardized policies on the introduction of exotic species. The survival, behavior and effect of many introduced species is unpredictable, and thus, introductions of exotic species into native habitats are considered detrimental by most ecologists. While examples of harmful introductions are abundant, there also are active, ongoing programs to introduce species for public benefit in many jurisdictions. Such introductions include many species of upland game birds and fish thought beneficial by constituent groups. These introductions often are made into environments that have been extensively modified by human activities. The introduction of non-native mammals, particularly large game animals, generally is not conducted, but even here, often no formal policy is in place.

Diseases and parasites in game farm animals are a significant component of the issues facing wildlife management agencies in Canada and the United States. Outbreaks of bluetongue (in Manitoba) and bovine tuberculosis (widespread in Canada and the U. S.) in game farm animals have moved these concerns from the theoretical realm to one of reality. Such outbreaks pose tremendous problems to wildlife and agricultural agencies at all levels in dealing with the political, regulatory, administrative, enforcement, media and public interest issues associated with an outbreak. This diversion of staff time and budgets occurs at the expense of traditional wildlife programs.

There is considerable discussion over the degree of risk, if any, that diseases in privately held wildlife pose to wild cervid populations in North America. From a management perspective, the risks of these diseases to free-ranging wildlife, agriculture and human health are significant even if only the perception of a risk is present. The intense public scrutiny and media attention associated with a reported disease outbreak often includes misinformation, confusion and vastly increased work loads for wildlife agencies. The lack of regulations, ease of transportation of game farm wildlife, and the absence of proven diagnostic tests and therapeutic treatments act in conjunction to increase the risk of spreading disease from captive to free-ranging wildlife. Although the extent of transmission risk cannot be specifically identified, it is clear that the risk of new introductions, from any source, should remain a serious concern for wildlife managers.

The lack of an indemnification program in the United States has led to problems when disease is identified in a privately held herd, especially when diseased stock may be identified, but not destroyed. Legal jurisdiction over captively held cervids also needs to be clarified among state agricultural and wildlife agencies and the U. S. Department of Agriculture. In contrast, Canada has a federal indemnification program to control and eradicate a series of "reportable diseases." Following confirmation of any such disease, Agriculture Canada has the authority to immediately quarantine, slaughter and compensate for any species in any jurisdiction. The scope of this authority allows swift and effective action to control these diseases.

Some progress in disease control has been made in the deer farming industry, particularly with bovine TB. Experience with conventional livestock indicates that cooperation between agricultural operators and government agencies can lead to effective control of disease in farmed animals. For example, Agriculture Canada recently declared that the outbreak of bovine TB in elk is under control, at least in Alberta, following the slaughter of 2,588 elk and payment of $ 16.2 million. However, lack of a U. S. indemnification program, misapplication of testing procedures from domestic to exotic species, unknown diseases and disease implication in farmed wildlife, and the presence of widespread and abundant wild cervids in the vicinity of some ranching operations all indicate that a continuing precautionary approach is warranted.

The current value of many wildlife species creates a financial incentive for unscrupulous individuals to illegally remove animals or products derived from animals (meat, antler velvet, trophies) from the wild for sale. This value also creates a legitimate economic growth impetus which may create wealth and provide jobs and associated benefits to many areas, particularly important in depressed rural communities. Of the states surveyed, 63 percent of respondents reported incidents of illegal activity associated with game farming or ranching. Fifty percent of the respondents to a question on the prevalence of the illegal activity felt it was moderate, high or increasing, and 50 percent felt

the prevalence was low. Forty-eight percent of respondents felt that illegal activities associated with game farming or ranching posed a significant threat to wildlife; 52 percent did not. When asked if the legal, permitted activities associated with private holding of big game animals posed a significant threat to wildlife, 70 percent of U. S. agencies did perceive such a threat, while 30 percent did not. In Canada, Alberta and Saskatchewan (two provinces where game farming is well established) reported evidence of illegal activities. These consisted primarily of poaching of live animals from the wild, unpermitted import and falsified records. Three jurisdictions indicated no evidence of illegal activities to date. Ontario, currently without regulations, could not differentiate legal and illegal activities. Most respondents indicated that legal and illegal activities at the current level were not a significant concern, but, as game farming increased, so would the opportunity for negative impact on wildlife. The most common threats cited specifically were disease, hybridization and the commercialization of wildlife.

The sale of antler velvet is legal in 78 percent of the 37 states responding to a question on allowable sale items in our survey. Ninety-two percent of respondents allow the sale of meat, 81 percent permit the sale of live animals and 68 percent the sale of hides. In Canada, all responding jurisdictions with game farming allowed the sale of live animals, six of seven allowed meat sales of one or more game species and five of seven allowed the sale of hides. Sixty-five percent of the states responding allow some form of hunting of privately held animals, but only one Canadian province (Quebec) allows this activity.

There are many operations in the U. S. which hunt game-farmed deer species on a fee basis. Legal questions exist concerning the required licenses, open seasons, disposition of product and other aspects of the hunting of privately held big game animals. Creating a venue for harvest of such animals, such as [illegible] outside of the current season and license structure creates the potential for illegal harvest of native wildlife. Regulation of this activity adds to the enforcement burden of an often shrinking or static enforcement staff. While some operators express little interest in this aspect of game ranching, it is a significant portion of the business in many states. Only 12 percent of states responding reported different regulations for game ranching, as opposed to game farming. The states reporting differences were primarily in the West. Game farming, for the purposes of this paper, was defined as the raising of traditional wildlife species primarily for sale as food, fiber or livestock. Game ranching was defined as the propagation of these species for purposes other than food, fiber or live sale, such as hunting.

Since elk and deer range widely in areas with game-farming industries, many current or potential deer and elk ranches are in big game habitat. Existing hunting seasons create the potential for conflict between hunters and operators. Incidents may involve hunters with valid tags taking game-farm animals during existing seasons, without known trespass. Escape of privately held animals or comingling of privately held and wild animals during hunting seasons pose potential liability problems to hunters, risk of financial loss to animal owners, and increased complexity in hunting regulations and enforcement.

Certain introduced species of wildlife can interbreed with native species, potentially producing fertile offspring. If such interbreeding occurs, the genetic make-up of affected populations may be permanently altered. Reductions in the genetic integrity of different species reduce the overall diversity of the entire ecosystem, therefore reducing stability. Hybridization between elk and red deer (*Cervus elaphus*) is a concern to wildlife agencies. Although they are the same species, they represent extremes in the species continuum and, as such, exhibit markedly different behavioral and morphological characteristics. Elk and red deer have hybridized in free-ranging situations in New Zealand, and

such animals commonly are encountered in auctions and markets throughout North America. In addition, at least three states (Colorado, Montana and Wyoming) have reported hybrid red deer/elk taken by hunters during authorized elk seasons. These animals were taken on public lands, and were either in herds of native elk or in close proximity to such herds. Hybridization readily occurs between other members of the genus *Cervus*. Red deer and sika deer (*Cervus nippon*) have hybridized in Scotland to the point where no true individuals of either species may exist. Tests for detecting hybridization have been developed, but are not 100 percent accurate.

The development of the relatively new industry of cervid farming has several potential positive impacts. The meat of most deer species is relatively low in fat and cholesterol. Wildlife can be raised in pastures which are not particularly high quality for some domestic species. The sale of hides, antler velvet and other potential products may add substantially to the potential income of producers.

Deer meat is in high demand in many communities. While total demand is unknown, it probably is much higher than the current, readily available supply. Substantial potential export markets also exist. Export of new agricultural products would benefit both local and national economies; however, the extent that the demand for these products, particularly meat, occurs at the expense of more traditional meat sources is unknown.

Jobs could be created by a new industry. Positions could exist in production, slaughter, marketing, export, restaurant trade and other areas. Deer farming itself requires substantial capital investment (primarily fencing and broodstock expenses), creating demand for these products. The industry is at an early stage of development, with most operators selling foundation stock to those entering the industry. Prices for breeding animals currently are quite high, but the eventual levels of these prices are unknown.

In addition to potential economic benefits, one known positive effect of privately held wildlife is the captive breeding of threatened or endangered species. However, the species raised in such operations generally hold little commercial potential and to date are a minor part of game-farm activities in Canada and the U. S.

It is clear that numerous conflicts and questions exist in the relationship between private big game ownership and traditional wildlife agency functions. Most agencies are not well equipped to address these questions, and often scarce resources must be diverted from traditional programs to attend to private ownership matters. It also is clear that, in the absence of a uniform policy on private ownership and native wildlife, fish and wildlife agencies must confront the issues concerning this situation in order to safeguard the resource consigned to their protection.

There often are profound philosophical differences between those interested in establishing an industry based on private ownership and sale of wildlife and the agencies charged with protection and enhancement of those species in the wild. The future course of this industry's development and our current perception of wildlife agency roles in wildlife management may be subject to dramatic change in the near future.

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Wildlife Management Agency Concerns about Captive Wildlife: The Colorado Experience

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EXHIBIT 1B
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Introduction

Private possession and subsequent commercial use of captive wildlife have increased dramatically in Colorado and throughout North America during the past 10 years. This increase has caused resource management agencies to reexamine policies, legislation and regulations that govern such uses of wildlife. In most instances, existing policies and laws have been inadequate to protect native wildlife populations from real and perceived threats of captive wildlife (Geist 1985, Lanka and Guenzel 1991). At the same time, however, the captive wildlife industry has tried to portray itself as a benign form of alternative agriculture and has attempted to divert control and regulation of this industry from wildlife to agriculture agencies. These two trends have been in direct opposition in many states and provinces during the past five years. The resulting conflicts have been highly emotional and confrontational. Consequently, in many instances, game-farming decisions have been determined by legislative and judicial bodies rather than by wildlife and agricultural commissions.

Current Status in Colorado

Private possession of wildlife was legalized in Colorado in 1968 by legislative action. Early regulations were concerned with commercial hunting facilities and required record keeping and some form of tagging animals. From 1968 to 1980, facilities licensed to hold captive ungulates grew from 2 to 10. Over the next 12 years the number of operations increased to 97; during that same period, the total number of captive elk in Colorado increased from 250 to over 3,200. Concurrently, the number of individuals interested in possessing exotic wildlife also showed a similar increase.

During the 1980s, the Colorado Division of Wildlife (CDOW) also first detected problems associated with wildlife commercialization. Five populations of exotic wildlife occurring in the wild were documented — these populations were all the results of escapes from private facilities. After examining existing law, it became evident that neither the CDOW nor the Colorado Department of Agriculture (CDA) had clear authority to regulate these expanding populations of captive wildlife.

In 1987, a working group consisting of personnel from CDOW, CDA and the Colorado Department of Health was convened to make recommendations on statutory and regulatory changes needed to manage Colorado's existing commercial wildlife industry and to protect native wildlife. This working group also interacted with the newly formed Colorado Elk and Game Breeders Association to insure industry involvement. In developing and defending recommendations and regulations, it quickly became evident that little published data on the impacts of game ranching on native wildlife existed, particularly in the western United States.

Domestic Livestock or Captive Wildlife?

Industry representatives expressed desires to be regulated by the CDA and have their animals classified as alternative livestock. Wildlife officials argued that captive wildlife are not domestic and still maintained all genetic characteristics of free-ranging conspecifics, the only difference being the constraint of movement caused by game-proof fencing. This conflict still is unresolved five years later and, in fact, is one of the primary points of contention between wildlife agencies and the commercial wildlife industry on an international basis. Various definitions of domestication have been used by the industry (Prescott-Allen and Prescott-Allen 1986, Hudson 1989). These definitions all conclude that when any animal is under some degree of human management, that animal can be classified as domestic or domesticated. In contrast, CDOW defines domestic animals as "those animals which through long association with humans have been bred to a degree which has resulted in genetic changes affecting color, temperament and confirmation, or other attributes of the species to an extent that makes them unique and distinguishable from wild individuals of their species" (CDOW Regulation #1100a).

Perhaps a more important criterion for policy makers should be how the public perceives an animal. An informal survey of resident licensed hunters conducted by CDOW suggested that the public in Colorado identified elk (*Cervus elaphus nelsoni*) as wildlife even when particular animals are privately owned and behind fence (Kahn unpublished data). Formal surveys concerning such public attitudes regarding captive wildlife are lacking. However, wildlife agencies need this information to more clearly define their role in regulating the industry.

Regulation

The process for adopting regulations for the commercial wildlife industry was developed by the Colorado Legislature. By statue, the Wildlife Commission and CDOW are the primary rule-making and regulating authorities, respectively. However, the Agriculture Commission must approve all regulations that involve captive wild ungulates raised as "agricultural products" (those animals raised for hunting are regulated exclusively by CDOW). CDA and CDOW jointly regulate health monitoring and disease control. This dual responsibility makes each agency and commission sensitive to the other's mission and goals. This sensitivity is particularly important to the industry, which tends to view wildlife agencies as being unsupportive and law-enforcement oriented. Experiences in Colorado show this type of authority can work, provided each agency takes the necessary time to justify its respective recommendations and consider alternative perspectives in decision-making processes.

Through the foregoing process, a series of compromise regulations were developed by CDOW, CDA and representatives from Colorado's commercial wildlife industry. These regulations on facilities, record keeping, animal marking, escape and other aspects of wildlife commercialization were designed to minimize the impacts of game ranching on Colorado's native wildlife populations without unduly hampering growth of the game-ranching industry in Colorado. Although an improvement over previous regulations, the relative efficacy of these new regulations, with respect to protecting Colorado's wildlife resources and providing a stable environment for the industry, has yet to be determined:

Facilities and Record Keeping

CDOW instituted new minimum facility requirements in 1990. These requirements were developed jointly by CDOW and industry representatives. Captive ungulate facilities require 8-foot fences, locked or double gates, animal handling facilities and a separate quarantine facility. Record-keeping standards require owners of captive wildlife to report all animal movements and transactions to CDOW within 10 days and provide CDOW with a detailed year-end inventory of all captive wildlife. Records on animal movements are essential in regulating health testing to prevent or tract disease problems (Miller and Thorne 1993), as well as for law enforcement purposes.

Animal Marking

All captive wildlife in Colorado must be marked with a tamper-proof eartag issued by either CDOW or the United States Department of Agriculture; both tags are unique alphanumeric coding systems. Eartags are the primary differentiation between captive and free-ranging individuals of native ungulate species and, as such, are essential in related law enforcement cases. Moreover, permanent marking is an integral component of health testing programs for captive wildlife (Miller and Thorne 1993).

Escape and Recovery of Captive Wildlife

Any risk assessment of game farming must take into consideration the likelihood that captive wildlife will escape and interact with native wildlife. Intuitively, most wildlife professionals and commercial wildlife operators know that fences are not escape-proof. Law requires owners to notify CDOW immediately of any captive wildlife escape. In addition, the owner has 72 hours to recapture escaped animals. Thereafter, CDOW can initiate recovery efforts and may bill the owner for all costs of such efforts.

Incidence of escapes from game farms or ranches rarely are documented and data are limited (Massey 1986, Rennie 1986). However, CDOW has documented 33 incidents of captive wildlife escaping or being released from wildlife parks since 1988 (Table 1). Over 75 percent of documented escapes have occurred since adoption of uniform fencing regulations in 1990. Among these cases, the number of individual animals escaping has ranged from 1 to 100, and total numbers are conservatively estimated at 400.

Success of efforts to recapture escaped captive wild ungulates has varied widely — from all to none. Escaped captive elk and elk/red deer hybrids have been recovered (both alive and dead) in 60 percent of these incidents. However, in only 33 percent of these cases have *all* escaped individuals been recaptured. A minimum of seven escaped captive elk were harvested by licensed hunters during the 1989–1992 hunting seasons. These harvests have occurred as far as 90 miles (144 km) from the facility of origin.

Recovery efforts have been even less successful for other species — in 67 percent of

Table 1. Escape and recovery of captive wildlife in Colorado 1988–1992.

Species	Number escaped	Number recaptured
Elk	173 (18 incidents)	154
Red deer	40 (3 incidents)	8
Barbary sheep	115 (4 incidents)	0
Ibex	65 (3 incidents)	15
Mouflon sheep	125 (5 incidents)	75

documented cases, owners of escaped exotic wildlife species have failed, and in some cases have not even attempted to recover the animals at large. CDOW has spent in excess of $150,000 during 1989–1992 in efforts to control and eliminate escaped populations of exotic ungulates. Despite extraordinary efforts, escaped exotics remain at large in several Colorado locations. Moreover, breeding populations of exotic ungulates have been established in the wild in at least six sites. These populations include aoudad (*Ammotragus lervia*), ibex (*Capra ibex*), red deer (*C. elaphus elaphus*), fallow deer (*Dama dama*) and wild boar (*Sus scrofa*).

CDOW also has documented incidents of native wildlife entering licensed facilities (Table 2). In many instances, ingress problems with mule deer (*Odocoileus hemionus*) are recurrent and cannot be rectified without double fencing. Mule deer in Colorado can readily gain access into facilities either by crawling over or going underneath fences (J. W. Seidel personal communication).

Prohibited Species

When CDOW managers originally began to rewrite the captive wildlife regulations in 1989, they decided that certain species of wildlife or groups of species had such significant potential for negative impacts on native species that the only recourse was a total ban on their possession and importation (Table 3). Documented problems with escapes and subsequent failures to recapture captive wildlife in Colorado, both before and after this list of prohibited species was formulated, demonstrate the need for such regulations.

Species were placed on the prohibited list for a variety of reasons. Exotic member os the subfamily Caprinae posed threats to Colorado's native bighorn sheep (*Ovis canadensis*) and introduced populations of Rocky Mountain goats (*Oreamnus americanus*). Specifically, mouflon sheep (*Ovis musimon*) readily hybridize with bighorn sheep and produce fertile offspring. Experiences in New Mexico with aoudad revealed that they compete successfully in western habitats and pose threats to desert bighorn sheep (*O. canadensis nelsoni*) and potentially all other wild ungulates (Morrison 1989). Colorado's experiences with several of these species (ibex, aoudad, mouflon sheep) already suggested that eliminating them from the wild once they were established was both difficult and expensive. The value of these species was quite low from an agricultural standpoint, but they were desirable, and in some cases essential, to operators of commercial shooting preserves.

Table 2. Ingress of native wildlife into licensed captive wildlife facilities in Colorado 1989–1992.

Species	Number entering	Number of individual incidents
Mule deer	185	22
Elk	123	6
Pronghorn antelope	7	3
Bighorn sheep	2	1

Table 3. Colorado's prohibited species list.

Species	Reasons for prohibition
All members of the subfamily Caprinae not native to North America	Disease introduction Habitat competition Hybridization
Oryx and addax	Habitat competition and degradation
Subfamily Alcelaphinae (wildebeest, hartebeest)	Introduction of malignant Catarhaal fever
White-tailed deer	Introduction of meningeal worm
All members of the family Suidae not native to North America	Habitat degradation
Red deer and any hybrid of red deer	Hybridization with elk

Members of the subfamily Alcelaphinae, including wildebeest (*Connachetes* spp.) and Hartebeest (*Alcelaphus* spp.), were prohibited at the request of the Colorado State Veterinarian. These species are carriers of the African form of malignant catarrhal fever, a herpes virus that is potentially fatal to numerous livestock and wildlife species. Adequate testing procedures are not available to screen for subclinical carriers of this virus.

Possession and importation of white-tailed deer (*O. virginianus*) were prohibited because of concerns about meningeal worm (*Parelaphostrongylus tenuis*). White-tailed deer carry this parasite, which poses a potential significant threat to mule deer, elk, moose (*Alces alces*), pronghorn antelope (*Antilocapra americana*) and domestic llamas (*Lama glama*) in Colorado. Lanka and Guenzel (1991) suggested that all factors needed to introduce this parasite into western North America are presently there, except for the parasite itself. White-tailed deer are common in eastern Colorado and their range is expanding westward; secondary host terrestrial snails are found throughout the Rocky Mountain region (Pilsbry 1939, 1940, Beetle 1989). It follows that because there were no definitive tests for detecting the presence of meningeal worm (Samuel 1987), banning importation and possession of white-tailed deer was deemed necessary to prevent the introduction of this parasite.

Recent work in Alberta suggests that elk can be infected with meningeal worm and pass larvae (Samuel et al. 1992). These discoveries have promoted further concerns that elk and other captive cervids may serve as alternate vectors for introduction of this parasite (Samuel et al. 1992, Miller and Thorne 1993). Currently, Alberta has a moratorium on the importation of all ungulates because of this possibility (Stevenson 1988). At present, however, white-tailed deer are the only species whose importation is prohibited by CDOW to prevent introduction of meningeal worm into Colorado.

All species of wild hogs (*Sus* spp.), including the European boar, were prohibited because of their potential impact on ground-nesting birds and native vegetation. In addition, wild swine carry several diseases of concern to domestic swine producers. One escaped population of wild boar survived at an elevation of up to about 8,700 feet (2,650 m) in south-central Colorado for four years before it was controlled. Another problem with these species is the high degree of hybridization that has occurred between domestic pigs (*S. scrofa domestica*) and wild species — hybridization makes enforcement of these particular regulations somewhat difficult.

Prohibiting possession of red deer was by far the most contentious of these issues. Two primary concerns formed the foundation for prohibition: (1) red deer or elk/red deer hybrids escaping and subsequently interbreeding with native elk could effectively alter the gene pool of Colorado's native elk herd and (2) imminent problems were likely because there were thought to be considerable numbers of red deer and red deer/elk hybrids on game ranches throughout Colorado. Statewide, native elk populations number about 225,000 head in total. Wild elk are highly valued by the people of Colorado. In 1990, elk hunting contributed over $250,000,000 to the economy of Colorado.

There are no reports of red deer and elk interacting in the wild in North America. However, studies in New Zealand (where both species were introduced) revealed that in the area surrounding Fiordland National Park free-ranging red deer and elk readily hybridized to such an extent that the number of pure elk found after approximately 80 years was minimal (Harrington 1985, Challies 1985, Nuggent et al. 1987). To examine probable consequences of red deer introductions into native elk herds, CDOW developed a simulation model designed to examine possible changes in genetic composition that could occur in elk herds after the introduction of red deer or red deer/elk hybrids (Hobbs 1990). This model showed serious potential consequences of such occurrences: 60 years after an introduction of ten red deer (or red deer/elk hybrids) into a population of 500 elk, 65 percent of the simulated herd had some degree of hybridization. Moreover, simulation results were consistent with field data from New Zealand (Nuggent 1989). In light of these results, regulations were adopted prohibiting possession of red deer and their hybrids to minimize this threat.

In modifying statutes governing regulation of captive ungulates, the Colorado legislature had previously mandated that if CDOW banned possession of red deer then owners of existing red deer and their hybrids would be compensated for their financial losses. Consequently, as part of the prohibition regulations, CDOW instituted a voluntary testing and compensation program. Methods developed by Dratch and Gyllensten (1985) and others were used to test captive elk in Colorado. A total of 1,645 captive elk were tested from 1990–1993; this represented about 90 percent of the state's captive elk population at that time. During three years of testing, 239 (15 percent) hybrids were found on game ranches throughout Colorado, and subsequently were sold out-of-state. The testing and compensation program ended in January 1993. CDOW spent about $810,000 on this program; most of that money went directly to captive wildlife producers to compensate for costs associated with replacing red deer hybrids with pure elk.

Environmental Concerns

Wildlife managers have focused on concerns such as disease (Miller and Thorne 1993), hybridization (Dratch 1993) and competition from exotic species (Feldhamer and Armstrong 1993) when addressing threats to native wildlife posed by game ranching. Although these are serious problems, the impact of extensive game-proof fences on wildlife habitat and migration should not be overlooked. By design, these fences restrict wildlife movement and access to and through specific pieces of property. In Colorado, these restrictions are exacerbated by necessary seasonal movements of wild ungulates from summer range to winter range. In specific situations, fencing has altered migration routes and increased mortality to migrating mule deer.

CDOW regulations now provide for denial or modification of planned or existing facilities that have the potential to disrupt migration, breeding or critical habitat for native wildlife. To date, this regulation only has been used to modify facilities rather than to prohibit them outright. This fencing issue is contentious because, on one hand, it directly affects landowners' private property rights, while on the other, there is a legitimate and growing concern that loss of habitat from game ranching could become significant as the industry expands. Potential impacts of this form of habitat loss are no less severe than those caused by road, housing or ski-area developments. In some ways they may be more severe because such habitats are totally lost to native ungulate uses. Colorado's law requires that all native wildlife be removed from commercial wildlife facilities prior

to licensing. Because "wildlife" still are seen behind the fences in these facilities, however, the public (and to some extent wildlife managers) may continue to view them as "habitat." Others argue that because the animals are captive and privately owned, these lands can no longer be counted as wildlife habitat. Wildlife managers need to be aware of this dichotomy of opinions and be careful not to overlook habitat concerns. Policies and regulations should be developed more fully to address the issue of habitat loss and impacts on free-ranging populations brought about by game farming.

Public Perceptions

Wildlife agencies know little about public perceptions on the issue of holding wildlife in private ownership for commercial gain. Geist (1985, 1988, 1989) contended introduction of markets and paid hunting jeopardize the North American system of public ownership of wildlife. Alternatively, Rasker et al. (1992) asserted that some current wildlife management problems can be solved by applying profit-motivated incentives offered by commercial markets. Most positive examples of this latter approach occur in Africa, where wildlife populations and habitat have declined dramatically over the past 50 years. Opponents of game ranching in North America argue that on this continent populations and habitat are much more stable and therefore these radical programs are not necessary.

For wildlife managers to decide whether to allow (or to attempt to ban) game ranching they must understand public perceptions within their particular geopolitical area. People in Wyoming seem to oppose unequivocally the concept of private ownership of native wildlife; this attitude is reflected in statutes and regulations of the Wyoming Game and Fish Department banning such activities. In Colorado, the public does not seem to share that same perception. It clearly wants CDOW to manage the industry and minimize risks to native wildlife, but there has been little support for or even discussion of a total ban on game ranching. These attitudes are reflected in the policies and regulations of the CDOW which acknowledges private ownership of wildlife as a legitimate enterprise. Such disparate public attitudes arising in adjacent states with similar cultures and resources demonstrate the need for wildlife managers and agriculture officials to design and use survey instruments in measuring public perception towards captive wildlife before making policy and regulatory changes.

Public support for wildlife programs and agencies is the key to their success. Does private ownership of wildlife jeopardize that support? Some argue yes. One attraction of wildlife is the wild and elusive nature of free-ranging animals, particularly when compared to domestic livestock that are easily accessed and viewed. Wildlife, from this standpoint, is different because it is not mundane or common. This public perception is very strong. Wildlife should remain wild and "different" from domestic animals.

If people in Colorado routinely see captive elk on elk farms behind fence, will they lose interest in elk? Will they be able to differentiate between captive elk and wild elk? Will they still support programs to manage and protect wild elk? Pomeranitz (1993) contended commercial ownership of wildlife will erode support and lead to trivialization. These concerns are heightened by a game-ranching industry that refers to its animals as domestic livestock. Whether today's captive elk are domestic or not is a matter of which definition is used. There is little doubt, however, that, as a species, the Rocky Mountain elk has started down the road towards domestication in Colorado. Two key issues for wildlife managers, agriculture officials and the captive wildlife industry are when the public will perceive this change to occur and what the outcome will be for free-ranging

elk populations? These issues must be considered by all of the entities involved in wildlife commercialization and its management. There are real biological concerns that must be addressed. Perhaps more importantly, though, fundamental changes in public perceptions and values of wildlife must be recognized as a potential concern of all those involved with the captive wildlife industry.

Acknowledgments

M. W. Miller reviewed this manuscript and provided many hours of conversation and insight on the topic of captive wildlife. L. H. Carpenter allowed the author the time to research and write this paper. Critical comments on the draft also were given by D. J. Freddy and J. A. Seidel.

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EXHIBIT 1B
DATE 1-30-95
SB173

EXHIBIT 1B
DATE 1-30-95
SB 173

TB EPIDEMIC IN NEW ZEALAND: COMPILED FROM NZ SOURCES

V. Geist, EVDS Univ. of Calgary. Fax;403-284-4399/P:403-220-7430

Bovine TB struck the fledgling deer farming industry in New Zealand in 1978 (Beatson 1985). A voluntary TB control scheme (August 1985), and a compulsory one (January 1990) reduced the incidence of TB in farmed deer (Bringans 1992; Hutching 1992a), which stabilised since 1988 at 260-270 deer herds diagnosed with TB per annum and under movement control (Carter 1992, 1993); this number is expected to rise (Livingstone 1993). This did not prevent TB from emerging as a major threat to New Zealand's European and U.S. export markets in beef, dairy and deer products (Buddle 1992). By 1980 the number of cattle herds under TB movement control had declined sharply, but then the trend reversed and numbers have risen steadily (Buddle 1992; Livingstone 1993), even though TB on deer farms declined to 4-5% of the more than 6,000 farmed deer herds (Carter 1992, 1993). By 1990 there were 6 TB infected free-ranging herds of red deer (with a prevalence of up to 30 percent), and 2 free-living TB infected fallow deer herds (with a prevalence of 2 percent). Epidemiology suggests that infected captive red deer repeatedly passed on TB to brush-tailed possums (Trichosurus vulpecula) and to cattle (Beatson 1985; Livingstone 1990; deLisle et al. 1990; O'Neil 1990; Pickett 1993; & correspondence); TB infected wildlife continues to pass on TB to captive deer and cattle (Carter 1993; Livingstone 1993). A preliminary study showed a high rate of TB in feral ferrets within a TB endemic area (van Reenen 1992). Areas with endemic TB, and control areas surrounding these, cover 28% of New Zealand (Buddle 1992). The market in live deer declined, and with the loss of income, compliance with the mandatory TB testing programme has also declined (Hutching 1992b; Carter 1993); two large venison exporters, Venison New Zealand and Fortex went under in 1994. TB herd tests are expensive; 410 000 deer were tested in 1992 (Carter 1993); compensation for cattle producers is to be abolished by July 1995 (Livingstone 1993). Some deer farmers have abandoned deer farming and a few have opened the gates and (illegally) let out their deer (Stevenson 1992). While possums were thought to be the major agent in spreading TB, the high rate of TB in deer and ferrets, and the high infectivity of deer (Hutching 1992a) has given rise to concerns. So have deer fences in disrepair, poor compliance with deer farming regulations, the inability by inspectors to police the industry, and the escape or release of deer, in particular such as appeared on dairy pastures. Eradicating released deer has proven costly and ineffective (Stevenson 1992). A small proportion of the 300 cases of TB in humans is due to bovine Tb (Buddle 1992). The ability of New Zealand to control TB is in doubt (Buddle 1992), The much praised BTB test developed in NZ for deer, to the dismay of NZ researchers, has been found wanting by a (still secret) study by Agriculture Canada (The Deer Farmer, Dec. 1993, "TB test questioned"). NZ veterinarians face unexplained TB occurrences (Carter 1993). It is considered technically impossible to eradicate TB from NZ free-living wildlife in the 5 large areas in which TB is now endemic in wildlife; TB control is very expensive (Livingstone 1993).

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MINISTRY OF AGRICULTURE AND FISHERIES
TE MANATU AHUWHENUA AHUMOANA

EXHIBIT 1B
DATE 1-30-95
SB 173

Ref: 1440-01

5 April 1991

Professor V Geist
Faculty of Environmental Design
The University of Calgary
200 University Drive NW
Calgary
Alberta
CANADA T2N 1N4

Dear Professor Geist

It was good to receive your letter and see the interest you have in this field. I can provide you with some brief details on the two points that interest you. Unfortunately there are only two papers that may be of value, most information is based on very reliable field observation, deer slaughter premise records and resulting epidemiological investigations and analysis.

1) Tb in Feral Deer

There are 7 species of deer that are classed as feral or wild in New Zealand. Red deer (Cervus elaphus) are most common and distributed widely throughout most of New Zealand except Northland. Fallow deer (Dama dama) are probably the next most common but are restricted in the locations where they are found.

As a consequence, these are the two feral species in which Tb has been found, but only in areas which we classify as being endemic for Tb (see map attached).

In some localised areas, Tb prevalences of 30% have been reported in feral red deer. Tb prevalences for fallow deer are lower around 1-2%.

I believe, based on Tb lesion distribution, that infection is spread via the respiratory tract from deer to deer. However it is unknown what effect other tuberculous feral/wild animals such as possums (Trichosurus vulpecula) which are considered the major vector for Tb, have on the infection seen in deer.

It must also be realised that red deer can become grossly infected and infectious. I have personally seen feral deer with open Tb sinuses draining from the pleural cavity, the submandibular, prescapular and popliteal lymph nodes. All these draining sinuses could act to spread infection to deer that came in close proximity or used the same wallows.

2) Spread of Tb from Farmed Deer to Free-Living Species

We have 3 areas in New Zealand where epidemiological evidence would suggest that farmed red deer, that were later found to be tuberculous, were responsible for infecting the local possum population.

Two pertinent papers that were presented in the Proceeding of a Deer Course for Veterinarians, Deer Branch of the New Zealand Veterinary Association, Auckland, July 1990, are enclosed.

One entitled "The Epidemiology of Bovine Tuberculosis in the MacKenzie Basin" by Geoff de Lisle investigates the use of Mycobacterium bovis DNA strains as a means of proving that Tb has probably spread from farmed deer to possums.

The method employed by Geoff de Lisle at Wallaceville Animal Research Centre, is the major epidemiological tool we have for investigating such spread. This method is continuing to be refined by Geoff.

The other paper entitled "Control Measures to Contain a Tuberculosis Breakdown in a Deer Herd" by Barry O'Neil describes the actions taken to initially contain, and then (now) eradicate Tb from the deer herd AND the surrounding possum population, which the deer were believed to have infected.

In addition, Tb farmed deer have infected cattle grazing in either the same paddock, or following the deer during a grazing rotation, on at least 3 occasions.

I have also include a paper I have prepared for presentation to a Tb Symposium being held at Massey University next week, outlining New Zealand's Tb situation with regard to cattle and our control policy for endemic areas. It also includes a map on which I have marked the location where Tb feral deer have been found.

Kindest Regards.

Yours sincerely

P G Livingstone
National Advisor (Tb)

Encl

EXHIBIT 1B
DATE 1-30-95
SB 173

REPORT OF THE DEER FARMING COMMITTEE TO THE VIRGINIA COMMISSION OF GAME AND INLAND FISHERIES

PREPARED BY

Carvel Blair, President, Virginia Wildlife Federation
Mitchell Byrd, Professor of Biology, College of William and Mary, retired
Robert Dennis, Piedmont Environmental Council
Don Gardner, Veterinarian, private practice
David Joyce, Attorney-at-Law
James Plumhoff, Virginia Agribusiness Council
Michael Vaughan, Assistant Leader, VA Coop Fish & Wildlife Research Unit and Associate Professor of Wildlife, VA Tech
Dee Whittier, Veterinarian and Professor VA-MD Regional College of Veterinary Medicine, Virginia Tech

Technical Advisors

Robert Ellis, Assistant Chief, VDGIF
Matthew Knox, Wildlife Biologist, (Deer Program Leader) VDGIF
Bettsy Stinson, Wildlife Biologist Supervisor, VDGIF

EXECUTIVE SUMMARY

"In April 1993, the Virginia Department of Game and Inland Fisheries (VDGIF) appointed an 8 member Deer Farming Committee to 1) examine the status of deer farming in Virginia, and 2) make recommendations on the future of deer farming in Virginia to the Board of the VDGIF. The Committee was established after the VDGIF received resolutions from the Virginia Chapter of the Wildlife Society, The Virginia Cattlemen's Association and the Virginia Dairyman's Association.

"The Committee was assisted (technical advisors) by personnel of the VDGIF who provided documentation on policies, legal status, and guidelines regarding deer farming in Virginia, and volumes of current scientific and popular literature related to the deer farming issue. The Committee invited input from deer farmers and visited a deer farming operation. In addition, the Committee invited several outside authorities to provide expert opinion and advice on various aspects of deer farming, including disease problems, environmental issues, and legal concerns.

"Based on materials reviewed and expert testimony, the Committee offers the following recommendations.

Recommendation 1: "The VDGIF issue no further permits for the commercial farming of endemic or exotic deer in the Commonwealth of Virginia.

Recommendation 2: "That individuals now holding permits to farm fallow deer, who are actively involved in deer farming, be allowed to continue their operations under restricted guidelines. We recommend that these permits be non-transferable for any reason, including inheritance.

Recommendation 3: "That the following restriction and regulations be placed on fallow deer operations permitted to continue:

1. "That each fallow deer operation be assessed an annual fee that approximates the cost of enforcing regulations on deer farming.

2. "That extensive controls and guidelines be established to ascertain the presence of and prevent the introduction of diseases, including tuberculosis, brucellosis and parasitic diseases. These should include:

   a) "quarantine of new stock both before and after arriving in Virginia for disease testing.

   b) "multiple whole herd testing for Tb using the most effective test available (cost to be borne by herd owner). Note: Whole herd testing of all deer farms remaining in operation should be completed as soon as possible, but no later than 1 year from the date the VDGIF establishes a policy on deer farming to determine the current disease status of those herds.

   c) "necropsy by VDACS veterinarians or other approved veterinarians of all animals that die of any cause.

   d) "inspection of all slaughtered animals by federal Food Safety and Inspection Service or VDACS personnel.

3. "That all animals be marked with a permanent identification (e.g. lip tattoo, PIT tag) and a marker that is visible from a distance (e.g. ear tag).

4. "Complete documentation of livestock, which must include accurate inventories of stock, origin of stock, records of disease testing, and disposition of stock. Documentation should be reviewed annually by the regulating agency.

5. "No combining or exposure of wildlife or domestic stock with farmed deer. This includes exclusive use of pastures and provision of a buffer zone for water courses that could carry fecal material from fallow deer to domestic livestock.

6. "Double fencing of fallow deer enclosures to provide a buffer from nose-to- nose contact between fallow deer and wild deer or domestic stock. The area between the double fencing should be graveled as a snail barrier. Also, fencing should be of adequate height and of sufficient strength to prevent fallow deer from escaping and to prevent wild burrowing or digging animals or domestic dogs from going under the fence. Fences should be checked and maintained on a regular basis.

7. "Immediate notification of the proper authorities in the event of an escape. If escaped animals are not recaptured by the owner within 30 days. VDGIF personnel should make every effort to locate and destroy the animal(s) and t owner should be assessed a fine sufficient to cover the cost to the VDGIF.

Recommendation 4: "That the VDGIF address the issue of captive exotics in general. Petting zoos, hunting preserv and other unregulated operations holding exotic animals present threats similar to those presented by deer farms."

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EXHIBIT 1B
DATE 1-30-95
SB 173

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

PREVENTIVE HEALTH SERVICES BUREAU

COGSWELL BUILDING
1400 BROADWAY

STATE OF MONTANA

(406) 444-0273 (OFFICE)
(406) 444-2606 (FAX)

PO BOX 200901
Helena, MT 59620-0901

September 23, 1994

Michael Korn
Montana Department of Fish, Wildlife and Parks
Field Services Division
1400 Eighth Avenue
Helena, Montana 59620

Dear Michael:

The Montana Department of Health and Environmental Sciences submits the attached in response to your request for comments to include in an environmental assessment of a proposed game farm in Lewis and Clark County.

Our Department contends that private holding of cervids is not without risk to human health. Medical researchers have asserted that the risk of zoonotic diseases from such sources should not be ignored. A better understanding of the natural history of disease in these animals, and better diagnostic tests are needed before public health officials can responsibly promote commercial game farming operations. Surrounding state health officials and federal experts on the subject whom I have consulted with are in agreement with our contentions.

If you would like additional information, or have any questions, please feel free to call on me at 444-3986.

Sincerely,

Todd Damrow

Todd Damrow, Ph.D., M.P.H.
State Epidemiologist

a). The proposed action is felt to have a potentially significant impact in the event of an accident or other form of disruption.

The risks to man of mycobacterial disease (tuberculosis) in elk are not widely appreciated. Researchers have warned of the dangers to human and animal health of bovine tuberculosis from farmed elk (Stuart FA, et al. Tuberculosis in Imported Red Deer (Cervus elaphus). Vet Rec 1988; 122:508-11.) Elk and deer are reported to be very susceptible to infection when farmed intensively; subacute or chronic tuberculosis spreads rapidly, but may not be clincally obvious for many months. Once disease becomes established in a herd there may be opportunity for spread to human contacts, to wildlife, and to neighboring cattle. Infection is generally spread from animal to animal by the respiratory route. There is a potentially significant risk that people in close contact with infected animals might contract respiratory infection with M. bovis and that they, in turn, could be a source of infection for other people.

b). The proposed action is felt to create a potentially significant hazard to domestic livestock.

According to the editorial staff of the Lancet, "There is justifiable anxiety that elk farming may upset the balance between commercial cattle herds and wild animals, and that spread of disease from farmed elk to cattle and to wildlife may undermine existing cattle control schemes. (Lancet 1991; 338:1243-4). The recent event in Big Horn County underscores the need for concern over the adequacy of containment of bovine tuberculosis within the confines of game farm fences. Incidents of tuberculosis infection among farmed elk have been reported despite established control measures and eradication schemes for M. bovis infection (Clifton-Hadley, et al. Tuberculosis in Deer: A Review. Lancet 1991; 129:5-12)

c). The proposed action is felt to create a potentially significant human health hazard.

An outbreak of tuberculosis among people in contact with farmed elk has been documented in Canada (Fanning A, and Edwards S. Mycobacterium bovis Infection in Human Beings in Contact with Elk (Cervus elaphus) in Alberta, Canada. Lancet 1991; 338:1253-5). The epizootic was first recognized in November, 1990, in a herd of 150 animals but was subsequently found to be widespread in elk throughout the province, involving 32 of 110 registered herds. Epidemiologic investigation identified 446 human contacts including farmers, veterinarians, post-mortem technicians, meat inspectors, and workers at rendering plants and tanneries. Eighty one of these had positive tuberculin skin reactions; 6 had converted to positive when tested for a second time, and a veterinary surgeon who treated a severely affected elk developed active, respiratory disease. The mode of transmission of M. bovis from the farmed elk to man was determined to be likely due to aerosolization of infected particles from diseased animals. Game farming of elk is not without risk to human health. Researchers have asserted that the risk to man can not be ignored. A better understanding of the disease in deer and elk, and better diagnostic tests are needed before public health officials can responsibly promote commercial game farming operations.

d). The proposed action is felt to have only a minor impact with reference to the creation of any safety hazard as a result of firearms discharge on the premises of the game farm.

Injury from gunshot to hikers, homeowners, hunters, recreationists. etc., however, is possible.

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EXHIBIT 1B
DATE 1-30-95
SB 173

Montana Department of Fish, Wildlife & Parks

P. O. Box 200701
Helena, MT 59620-0701
(406) 444-3186
FAX:406-444-4952
Ref:PG1015.94
October 28, 1994

David L. Majors
Montana Wildlife Federation
P.O. Box 1175
Helena, Montana 59624

Dear Dave:

In response to your request, attached is a summary of Montana Fish, Wildlife & Parks costs associated with game farm regulation for the past three fiscal years. There is considerable variation in costs from 1993 to 1994 that is primarily related to the estimated $27,000 cost of completing a complex Environmental Assessment, and associated legal challenges, in Region 2. As you can see, incoming game farm license fees account for less than 1 percent of the cost of regulation. The Department also recognizes that these costs will increase as a result of the addition of Karen Zackheim to the Enforcement Division staff to work on game farms. Future costs will depend on the number of new applications or amendments to existing applications. Because we are still working out procedures on annual monitoring, it is not possible yet to estimate those costs with certainty.

At this time the Department is working closely with the Department of Livestock to develop a proposal for game farm regulatory changes, including legislation if necessary. While there has been some discussion of the current fee structure, no decisions have been made to recommend a change. It may be reasonable to consider an increase for game farm licenses. However, I do not believe it is likely that the legislature would increase the license fees to cover 100 percent of the Department's regulatory costs.

Please let me know if I can provide any additional information.

Sincerely,

Pat Graham

Patrick J. Graham
Director

c: Karen Zackheim
Stan Meyer
Clarence Siroky

EXHIBIT 1B
DATE 1-30-95
SB 173

COMMENTS

ON

THE

SLEEPING GIANT ELK RANCH

GAME FARM LICENSE SCOPING MEETING
COMMENT SHEET
(Please write legibly)

NAME: John F. Rauch

ADDRESS: Box 167

Wolf Creek MT 59648

Issue(s) you feel need to be examined or are not currently being considered. Please be specific and explain why you believe the issue(s) need to be considered:

The issues that concern me most as a close landowner have been identified as disease - cost of enforcement - escape - and hybridization. As a landowner disease is the most important consideration. As I run sheep & cattle downstream and in close proximity to the proposed area I am very concerned that enclosed animals do not carry disease and that they cannot escape. As an aside issue for us as a landowner the access road to the proposed location runs through 2 miles of our property. I am concerned about the increased traffic which usually results in increased off road travel and increases in garbage, weed transfer, etc. I hope that all the above issues are seriously considered before issuing a license

(Use back side if additional space is needed)

GAME FARM LICENSE SCOPING MEETING
COMMENT SHEET
(Please write legibly)

EXHIBIT 1B
DATE 1-30-95
SB 173

NAME: Noel Rosetta

ADDRESS: 1100 Missoula, Helena Mt. 59601

Issue(s) you feel need to be examined or are not currently being considered. Please be specific and explain why you believe the issue(s) need to be considered:

Most of issues have probably been ~~[illegible]~~ expressed. ~~[illegible]~~ However some should be emphasized. I am personally opposed to game farms as an intrusion into wildlife habitats, a serious potential for spreading disease, genetic concerns, generally the threats to sport hunting. The basis of ~~[illegible]~~ an Asian fertility cult - hardly justifiable. Please keep me posted on ~~[illegible]~~ this issue.

(Use back side if additional space is needed)

Visit 9/15 a.m.

GAME FARM LICENSE SCOPING MEETING
COMMENT SHEET
(Please write legibly)

NAME: MRS. Viola Nelson (Currie-Hilger Ranch)

ADDRESS: PO Box 632
Helena 59624

Issue(s) you feel need to be examined or are not currently being considered. Please be specific and explain why you believe the issue(s) need to be considered:

- Own senior water rights on Beartooth Ck
- Concerned about disease transmiss. to cattle + people via Beartooth Ck running thru Game Farm
- Especially concerned w/ TB

(Use back side if additional space is needed)

EXHIBIT 1B
DATE 1-30-95
SB 173

COMMENTS

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THE

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Wolf Creek MT 59648

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ADDRESS: PO Box 632
Helena 59624

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- Own senior water rights on Beartooth Ck
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- Especially concerned w/ TB

(Use back side if additional space is needed)

Written Comment

GAME FARM LICENSE SCOPING MEETING
COMMENT SHEET
(Please write legibly)

EXHIBIT 1B
DATE 1-30-95
SB 173

NAME: George Holton

ADDRESS: 1219 11th Ave
Helena 59601

Issue(s) you feel need to be examined or are not currently being considered. Please be specific and explain why you believe the issue(s) need to be considered:

Concerns to address:
- Genetic contamination
- Transmission of Disease & parasites (CWD)
- Will there be an impact on Bald Eagles that utilize the area?

(Use back side if additional space is needed)

Having read the Sleeping Giant game farm proposal article by Mark Downey on Wednesday Sept. 7 is indeed controversial at the least.

After having to move cattle to different pasture in south central Montana last summer we had the misfortune of having a game farm next to the cattle. The game farm had some elk that tested positive for Tuberculosis (TB). With Montana being TB free this poses a serious threat to the livestock (domestic and wild) industry of the State. The elk were surrounded by an 8 foot fence but were able to escape during the rut to challenge wild elk with cattle mixed in with them.

Once the TB was detected several hundred cattle had to be tested for the disease by the state and local veterinarians and technicians. Our cattle were confined for over 3 months until they were cleared. Forcing us to miss out on good market prices for once as we were unable to sell any cattle until they were cleared. So the idea that cattle contaminating the elk as the article stated is laughable considering what we went through.

Some questions that do need to be addressed are:

1. Which agency will take the responsibility for the inspection of the game farms? Fish, Wildlife and Parks as the elk fall in their domain or the State Livestock Inspectors since the elk will be used as livestock?

2. Will the elk be tested as cattle have to be tested before they can be transported into or across our state to ensure that Montana remains TB free?

3. If allowed to operate the game farm and our experience with elk being able to escape an 8 foot fence wouldn't different rules for their enclosure be appropriate?

4. Cutting off the antlers while they are still in the velvet for sale is nauseating to those of us who raise livestock. To willingly make the animals suffer and get possible infections for profit is appalling. Also there is a world conference going on now to reduce the worlds population so why promote promiscuity?

5. No convicted felon can operate a game farm in the State according to the law, but hearing officer Dennis Moreen saw the good samaritan in Guthrie. Someone willing to plead guilty to a felony conviction for an employee who was embezzling funds? No innocent person in their right mind would do such a thing so is it possible a deal was struck in Guthrie's favor? Does the law state if you did it for the company and not yourself then it is O.K. to run a game farm?

Robert DeVries
Rt 1 Box 10
Conrad, Mt 59425

9/8-94

EXHIBIT 1B
DATE 1-30-95
SB 173

Sept 7, 94

Steve Lewis

Greetings

I strongly oppose the Game Farm being proposed in the sleeping giant area, we don't need more game farms, we need to get rid of the ones we have now. We are on the verge of destroying our natural wildlife herds now, from game farming, our natural herds are alot more important to all of us, than game farms, thank you for the chance to comment.

Sincerely

Gail Beezley

8 Shamrock Lane

Lit Falls Mont 59405

1905 Mountain View Drive
Great Falls, Montana 59405
13 September 1994

Helena Resource Area
Montana Dept. of Fish, Wildlife & Parks
1420 East 6th Ave.
P.O. Box 200701
Helena, MT 59620-0701

Subject: Comments on proposed game farm on Bear Tooth Mountain

According to the Notice of Public Meeting which appeared in the Great Falls Tribune, the public may make comments on the proposed game farm, so I hereby submit mine. I vehemently oppose the granting of a permit to establish a game farm in the Bear Tooth (Sleeping Giant) area for the following reasons.

1. The practices proposed, as described by the article in the Great Falls Tribune, are immoral and inhumane, to say the least. Shooting animals within a half mile square area would be like using penned domestic animals for target practice. Sawing off antlers still in the velvet certainly cannot be considered a humane practice, and it is a shameful thing to do for the purely mercenary reason of appeasing the demand of Asiatics for aphrodesiacs.

2. The location of the proposed game farm is in an area near a wilderness area, a proposed wilderness area, and the Bear Tooth Wildlife Management Area. It represents further encroachment into natural habitat for elk and mule deer.

3. There have already been problems with existing game farms--reference the charging of the game farmer in the Checkerboard area recently and the newspaper reports over the last year or so about the spread of tuberculosis from game farm animals to the wild population. Why add to the problems?

4. It appears to me that this is just another case of an out-of-state person wanting to take advantage of Montana in just another get-rich-quick scheme. Montana's resources should not be wasted in such a manner.

I urge the Montana Department of Fish, Wildlife and Parks to deny a permit for this operation. I see no good to come of it. Thank you for your consideration of this matter.

Marian J. Setter

MARIAN J. SETTER

EXHIBIT 1B
DATE 1-30-95
SB 173

and I'd hate the thought of it being ruined by some foolish act.

Yours Truly
Norma Ferguson

HUNTER WARNING: Members of the Russell Country Sportsman's Association are warning hunters about the possibility of being exposed to bovine tuberculosis.

In humans, the disease can cause "indulant fever." Symptoms are periodic chills and fever, accompanied by severe headaches. Once the symptoms set in, it might take the victim several days to recover, according to a statement from the local sportsmen's organization.

Things to look for before field dressing an animal are lesions anywhere on the animal or small lesions on or around the genital area. The association recommends that hunters should not dress animals if lesions are found and hunters should contact a game warden.

Last month the Montana Department of Livestock and Fish, Wildlife and Parks began a study of the probability of the disease spreading in wild animal populations in Bighorn County.

Tuberculosis in captive elk at the game farm was first confirmed in 1993. Elk on the ranch have and are continuing to undergo testing, according to FWP officials. By law, those animals testing postive must be destroyed.

For further information, contact the association by calling Gary Myrum at 454-1655 or Ed Johns at 761-8627.

Sept 14, 1994

Helena Resource Area
Mt. Dept Fish Wildlife, + Parks,
PO Box 200701
Helena, MT 59620-0701

RECEIVED
SEP 16 1994
FISH, WILDLIFE & PARKS
REGION 4

Dear Sirs: Re: Game Farms

This is to oppose approval of a Game Farm in the Sleeping Giant area — or any Game Farm in Montana, old or new.

There are many reasons — in particular introduction of new genes, tuberculosis or other diseases and the selling of game, mutilation of the animals for the purpose of selling antlers for the obsolete practice of aphrodisiacs by Orientals —

So me is seems wrong to pen up these magnificent animals,

Let's join the 20th or 21st century and join Wyoming in abolishing this practice.

Sincerely

Gracia A. Hilde

Mrs. Gracia A. Hilde
349 Fox Dr. #16
Great Falls, MT 59404

EXHIBIT 1B
DATE 1-30-95
SB 173

Helena Resource Center
Dept. Fish Wildlife & Parks
1420 East 6th Ave
Helena, MT 59620-0701

RECEIVED
SEP 16 1994
FISH, WILDLIFE & PARKS
REGION 8

Great Falls, MT
Sept 15, 1994

Gentlemen:

Reference the Game Farm proposal in the Sleeping Giant area. I offer the following comments in opposition to the proposal and for your consideration in preparing the EIS:

1) Past experience with Game Farms in Montana indicates they are impossible tomake fail safe.
2) Tuberculosis has apparently allready been introduced into native wild - life populations.
3) Genetic contamination has allready invaded our native elk population as result of game farm operations.
4) The Shooting Preserve proposal can trigger an anti hunting reaction against Montana Sportsmen. Many citizens abhor such a hunting concept, including many sportsmen. The concept is entirely foreign to the quality hubting concept that Montana is known for.
5) Private landowners make much of their right to do as they please with their private land and property, however, the public's rights should not be diminished by actions on private lands. It is virtually impossible for the Department to insure that public rights will not be diminished.
6) What will be the State's liability if suit is brought against the Department if a worst case scenario results? Who will pay? Sportsmen?

Respectfully,

George N. Engler

George N. Engler
2412 5th Ave South
Great Falls, MT 59405

September 13, 1994

Department of Fish, Wildlife, and Parks
1420 East 6th Ave., P.O. Box 200710
Helena, Montana 59620-0701

Sir/Madam:

I would like to express my extreme opposition toward the granting of a license for the proposed game farm to be located on Sleeping Giant Mountain.

I believe it is time for the State of Montana to put a stop to this ever increasing threat to our wildlife. Let's join the progressive leads of our neighboring state, Wyoming, and outlaw game farms before it's too late. Montana should not always be lagging behind logical measures such as this one. Why do we treat such a valued resource with such contempt? Has not the spread of TB to wild herds been documented? Why then does the Department of Fish, Wildlife, and Parks continue to allow such a threat to exist? While the state bends over backwards to protect livestock (site the destruction of Yellowstone bison who are only alleged to spread brucellosis to domestic animals) our game animals enjoy no such protection. Is not that the mission of FWP?

My son and I have hunted elk and deer herds which are known to frequent the area of this proposed game farm. While the rest of our beloved Montana lifestyle crumbles around us it is sad to see one of the strongest traditions, hunting, being threatened to allow out of state "armchair hunters" to come in and shoot penned in elk. Our game animal herds are just that: OURS! Your job as the FWP is to protect those herds for us. Please, sir/madam, do your job and reject this license application now and push for legislation in 1995 which will not allow any new game farms in our state.

Thank you very much.

Sincerely,

William Ramsay

William Ramsay
P.O. Box 604
East Helena, MT 59635

EXHIBIT 1B
DATE 1-30-95
SB 173

Steve Lewis Sept 7, 94

Greetings

I strongly oppose the Game Farms being proposed in the sleeping giant area, we dont need more game farms, we need to get rid of the ones we have now. We are on the verge of destroying our native wildlife herds now, from game farming, our native herds are alot more important to all of us, then game farms, thank you for the chance to comment.

Sincerely

Colin Beasley

8 Shamrock Lane

Lit Falls Mont 59405

Bill R. Martin
243 17th Ave. S.
Great Falls, Mt. 59405

September 12, 1994

Helena Resource Area
Mt. Dept. F.W.P.
1420 East 6th Ave.
Helena, Mt.59620

Dear Sirs:

This letter is to protest the granting of a license for a game farm in the Sleeping Giant area north of Helena.

This is a pristine area, and primary use of this land is wildlife and cattle grazing and should not be changed.

Game farms historically have become contaminated with tuberculosis and brucellosis that will spread to wildlife and the domestic livestock utilizing the surrounding areas.

I do not believe the promised 8' fence will keep farm elk in, or wild elk out. Anyone who thinks so, has not tried to fence elk out of hay yards, or seen bull elk when they catch the scent of cow elk in season. The perfume of estrous is irresistable to a bull elk and he has no respect for fences.

The above reasons and my native Montanan aversion to domestication and exploitation of wildlife prompt me to protest vehemently the granting of this licence.

Thank you,

Bill R. Martin

Bill R. Martin
Senior Native Montanan

Allen W. Tudor, P.E.
4212 Fifth Avenue North
Great Falls, MT 59405
(406) 453-2733, FAX 761-6969

EXHIBIT 1B
DATE 1-30-95
SB 173

September 11, 1994

Helena Resource Area
Montana Department of Fish, Wildlife & Parks
1420 East 6th Avenue
P.O. Box 200701
Helena, MT 59620-0701

re: proposed licensing of game farm on Beartooth Mountain

I would like the following comments to be made part of the minutes of the public scoping meeting regarding issues to be considered in the proposed licensing of a game farm in the vicinity of Beartooth Mountain.

Historically, the indigenous wildlife of this state has been considered state property to be managed by the state in the interests of and for the population of Montana. It is obvious that wildlife cannot exist without suitable habitat and if the license for this proposed game farm is granted, what replacement habitat will be made available for the displaced wildlife?

Secondly, the applicant also proposes to engage in a velveting operation. While the term "velveting" is not defined in the notice, I take it to mean that the antlers will be removed from adult *cervidae* for sale. This activity can only be considered as part of the worldwide commerce in the marketing of animal parts such as the gall bladders and claws of bears, rhinoceros horns and elephant ivory. Exploitative marketing practices of animal parts have led to the near destruction of several animal species worldwide within the past two decades and continue to pose a threat to the continued survival of many animals such as the rhinoceros. Any participation in this market is reprehensible.

While velveting may be legal in Montana, it is questionable whether contemporary resource management decisions of Montana can and should be made without regard to the larger worldwide resource issues. Any review of the application for this license should include consideration of the velveting activity in the context of pandering to the world market in animal parts for esoteric purposes which has proven to be detrimental to the survival of many species of wild animals.

Sincerely,

Allen W. Tudor

EXHIBIT 1B
DATE 1-30-95
SB 173

The Elk-Ranch Boom

By Ted Williams

Elk ranching is thriving. But is it a livestock bonanza or a wildlife disaster?

FEBRUARY 13, and already spring is busting out all over central Colorado. Flights of horned larks, carried like cottonwood leaves on the sweet Chinook wind, swirl over muddy pastures; and along the creek beds, burbling redwings ride bobbing cattails. In front of us Long's Peak rises white and cold; behind us red sandstone cliffs are washed in muted sunlight. With my companions—Rick Kahn and John Seidel of the Colorado Division of Wildlife—I hike up into the realm of the wild elk. But now it is the realm of captive elk, too.

The yearling bull pushes his glistening black nose through the wire fence and browses the collar of my nylon parka. When I step back he rolls his eyes, showing the whites the way wild elk do, then butts me with the painted stumps of his amputated antlers. A plastic square with a "1" on it dangles like an automobile air freshener from his left ear, and both ears carry punch-through metal tags. His neck is bare with mange.

Not having been bottle-fed, the other elk in the pasture hang back; but their coats are ratty, too. Human-habituated cervids are not, as the ranchers like to call them, "domesticated," nor will they be for thousands of generations. So while they may appear calm as cattle, there's a stress factor that shows up in their general condition. Further, they seem to have difficulty assimilating trace elements, and parasite

PATRICK DAVISON

loading is heavy.

Like most biologists, Kahn and Seidel don't like to see wild animals confined, but neither are they fighting elk ranching. It's too late for that. Instead, they are trying to work with the new industry in order to protect Colorado's 200,000 free elk—the most of any state or Canadian province. Kahn had apologized for taking me to this and another ranch because they were so well managed as to be not "representative." The others, though, were too far out of Denver for us to make it back to the downtown Radisson in time for the grand opening of the North American Elk Breeders Association's annual convention.

Above: Antlers are cut from an anesthetized elk with a common wood saw, then sold to Asian buyers for use in medicines and aphrodisiacs. Left: A de-antlered bull in Alberta, Canada. Opposite: Elk, with antlers in the velvet-covered stage, feed on hay at a ranch in Checkerboard, Montana.

PATRICIA DAVIDSON, ABOVE, AND BRIAN MILNE, FIRST LIGHT

The NAEBA convention's theme was "Elk! Livestock of the Future." But unlike livestock, captive elk usually aren't killed; instead, their antlers are cut off in the blood-engorged, velvet-covered stage and consumed by Asians in the belief that they ward off maladies and enhance sexual prowess. The state commissioner of agriculture was on hand to welcome us to the "Elk Capital of the World," so called for its free, not captive, elk. He was, he said, "proud" and "excited" to be associated with an industry so "dynamic" and "innovative," one that "epitomizes" agricultural diversification and has "blazed a trail" for the rest of agriculture.

Association president Sam Withiam, a beaming, white-haired Santa Claus of a man, warned about the forces of negativism that want "to see this industry fail and would enjoy seeing it fail." The association, he declared, is "an agent of an industry that is dynamic and growing. And let me tell you, you just have to grab and get ahold of yourself because the speed at which these things are happening is phenomenal."

How right he was. In 1990 elk breeders powwowed to set up an organization that would promote their mutual interests, i.e., procuring a bigger chunk of the Asian antler market. Then there were 17 members. Now there are 700, and they control about 85 percent of the 20,500 captive elk in North America, 17,000 of which are incarcerated south of the Canadian line. Sounds impressive until you consider that there are 1 million European elk, better known as red deer, under fence in New Zealand.

Later there were speeches, seminars, movies, open bars, exhibits, and a lavish banquet of elk steaks—the best red meat that ever passed my lips, after Yankee whitetail. There were auctions, too, in which members bought live brood stock from around the country, shown live by satellite on TV screens, and elk-product gewgaws lofted about the room. President Withiam offered "two ampoules of semen rated 'excellent' in motility, volume, density, and morphological evaluation." This from his prize bull elk "Northern Exposure," sired by the great "Kojak."

We had lots in common, these elk ranchers and I. For instance, we adored wild cervids and were bored by domestic ungulates. I liked everyone I met. They struck me as more animated and, well, smarter than other stockmen; and certainly I couldn't blame them for wanting to diversify. Environmentalists had been nagging them about their cattle, trying to push grazing fees on public land closer to fair market value and chanting "Cow Free by '93." With America souring on beef and even cowboys, a light bulb switches on in the intelligent rancher's head when he looks out his bedroom window and sees a wild animal worth $8,000 grazing on the far side of his barbed wire.

INCITE

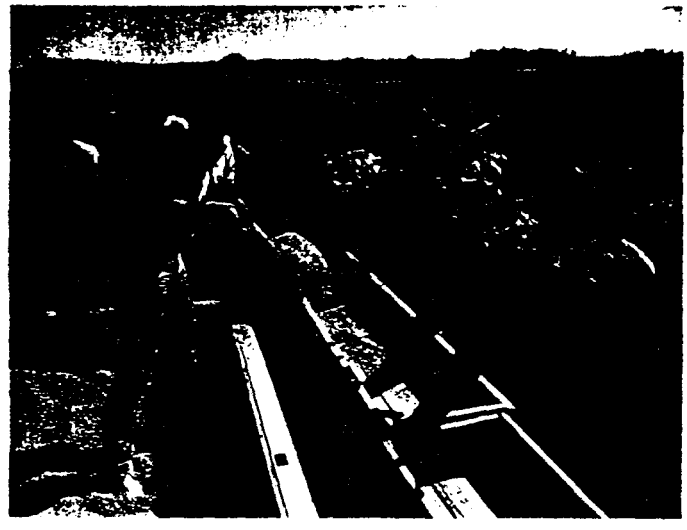
Recently, environmentalists have been nagging ranchers about their elk, too. When NAEBA members asked for my opinions, I told them I hadn't come to Colorado to lecture but to listen and learn. When they pressed, I admitted to harboring grave concerns about the commercialization and privatization of any native fauna—an approach that has failed spectacularly in Europe and that clashes with 75 years of successful wildlife management on this continent. Amidst all the excitement and festivity and happy, positive, can-do attitudes, it pained me to throw in with the forces of negativism. But I suppose that's the lot of environmental reporters these days.

Regular reporters as well, according to the Colorado Elk and Game Breeders Association, whose officers I met at the convention. "As we all know, the press loves to

INCITE

distort and emphasize the negative," proclaims the group's publication, *Elk Family News*. The *Denver Post* had reported that two former members were "fined" $6,450 each after the state accused them of luring 25 free elk into pens. The real story, reveals *Elk Family News*, is that the two ranchers "each *donated* $6,450 to Operation Game Thief." Technically correct, although the "donation" was part of an agreement in which they pleaded guilty to illegal possession of elk for sale.

"Never trust the media's intentions," instructs NAEBA's quarterly magazine, *North American Elk*. And by all means keep it away from "velveting" operations (cutting antlers in the marketable "velvet" stage). Otherwise, the public will be reading such descriptions as this, from the October 16, 1989, *Albuquerque Tribune*: "The body of the drugged animal leaps. Its hooves paw the ground. . . ."



Working from the back of a pickup truck, Dean Baumann feeds oats to the elk herd at his Alberta ranch, where he has built a $275,000 "velveting" facility for cutting antlers and where he has hosted a major antler auction.

Velveting, at least as it is now practiced by most NAEBA members, is no more inhumane than any of the other things people do to livestock. The bulls are thoroughly anesthetized. Occasionally they are turned on their sides so more of the highly valued blood, from which the medicine supposedly gets its potency, will drain into the still spongy antlers. Sometimes Asian buyers hover around, asking to imbibe the raw liquid as it spurts from the antler stumps. ("I can't stand that—to see them guys drinking that," one rancher told the *Tribune*.)

You have about four days to velvet, during which the quality of this renewable resource goes from excellent to good to poor to worthless. Do it right and you can make as much as $110 a pound. Sometimes antlers get bacteria inside them, but you can sort these in the drying room—with your nose. ("It's the rottenest stink you ever smelled," said a convention panelist). Throughout the week I learned lots more about velveting, but it is hard for the public to comprehend its true nature. So hard, in fact, that when I attended a session on the subject I was asked to turn off my tape recorder.

So I took careful notes during a session entitled "Starting an Elk Farm—The First Two Years." The panel included a hunting outfitter who spoke about the booming trade in "shooter bulls," geriatric elk shot in enclosures by trophy hunters [see "Canned Hunts," January-February 1992]. "It's a management decision," he explained. "If he's absolutely prime, has a Boone and Crockett rack, I'll pay twelve thousand dollars for him. Is three thousand dollars' worth of horns this year worth a gamble on keeping him another year, when you can put twelve thousand dollars in your pocket?"

I learned even more at the bars and display booths. But when I asked about the dangers to free cervids posed by genetic swamping, disease, and the new infrastructure for laundering stolen wildlife, the ranchers got tight-lipped and testy. "The people worried about that stuff never had shit on their boots or signed a paycheck on the back," boomed NAEBA board member Bob Spoklie, of Antelope, Montana, a square-jawed man with green eyes and steel wool hair who looks as if he just stepped off the *Gunsmoke* set. In addition to annually harvesting 200 antlers from his own herd (more than any operation in the United

PATRICK DAVISON

States), Spoklie canvasses the northwestern quarter of the nation, from Minnesota to Washington, collecting frozen velvet. He is honest, hardworking, and well respected in the industry. Recently he installed his own drying facility and staffed it with Koreans, some of whom were brewing up pungent antler tea at a convention booth. "Who are we to say it doesn't work?" he said.

But Spoklie hasn't used the stuff. I have. Sunny Chae showed me the ingredients—thin slices of dried antler perched like burned potato chips on a rat's nest of twigs, leaves, bark, and berries. "No," she said when I pointed suspiciously to the black, shiny pellets, "they are not elk droppings." She prescribed the $400 dosage; I opted for the $10 shot. Even this, said Sunny Chae, was a powerful aphrodisiac, and more important to me at the moment, it would cure my cold.

"Is your wife with you? This could get ugly," commented the rancher behind me as I pinched my nose and gulped. She wasn't and it didn't. During the rest of the evening I felt no more passionate than usual, and the next morning I awoke with clogged sinuses.

By far the most vocal opponent of privatization and commercialization of wildlife—the man elk ranchers love to hate—is Valerius Geist, 54, the ecologist who directs the Environmental Sciences Program at the University of Calgary, in Canada. Whenever an interview started to bog down, I'd bring up his name. It was like whistling "Marching Through Georgia" to the Savannah Elks Club.

"Valerius Geist! I'll tell you, the man is *crazy*," cried Welch Brogan, 84, when I phoned his ranch, in Corwin Springs, Montana. "The man is a radical."

The "Canadian Update" session was positively abuzz with talk of the vile and evil Geist. Wilf Jurke, president of the Saskatchewan Game Farmers Association, explained how this "self-acclaimed alien from another planet" had incited the Canadian Wildlife Federation to raise $1 million to sabotage game ranching and was helping it spread "half-truths and total lies," and how his group had "contacted one of the best lawyers in Saskatchewan" to write Geist a cease-and-desist letter.

The antlers are cut off in the blood-engorged, velvet-covered stage and shipped to Asian markets.

Scarcely anything that walks or haunts this earth frightens Val Geist, least of all gored elk breeders brandishing puffy letters. His strong spine and custom of saying precisely what he believes make him aberrant in the wildlife business, where the meek and manageable rise fastest and highest. "Do we endorse the bestial cruelty to elk on Canadian game ranches in order to fatten the profits of whorehouses in Seoul, Hong Kong, Bangkok, and Tokyo?" Geist demanded of the Canadian minister of the environment.

Geist may be a radical, but he is not, as his enemies contend, a crackpot or a charlatan. One of the most respected wildlife professionals on the continent, he has worked with Ian McTaggert-Cowan and Konrad Lorenz, serves on all manner of international committees, and has advised foreign governments. "The consequences of game ranching were predictable and have been borne out entirely so far," he wrote last November, "only earlier and worse than predicted, even by pessimists."

What does frighten Geist is red deer, the European subspecies of our elk—at least when they are shuttled about the planet in the deadly shell game humans play with plants and animals. Red deer are redder than elk, thinner in the shoulders and hips, with antlers that rise more vertically. They don't "bugle," they "bellow"; and when they duel they don't lock up and push, they thrust and parry. Bull elk refuse to fight them. In fact, if a rutting elk hears a red deer bellow in another pasture, he'll lie down. So when an escaped red deer stag meets a band of elk, he absconds with the females and breeds them all.

At Wildlife Division headquarters, in Denver, I sat at Rick Kahn's desk as he showed me a computer model of what would befall 500 Rocky Mountain elk if one were to unleash upon them 10 red deer. In 80 years, 95 percent of the herd

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wouldn't be elk anymore. They'd be something else, something less—mongrels. This disturbs Kahn and his colleagues, because they know that the only real guarantee you get with "game-proof" fencing is that sooner or later it will be breached by water, wind, snow, fire, vandals, or free elk sparring with captives; and because they see in their native elk a treasure more valuable than trophies, venison, or even antlers, a treasure that belongs not just to Colorado but to the planet.

A worker unloads a pile of "hard" antlers at a warehouse in Ennis, Montana. Although not as highly prized as those in the velvet stage, these antlers are sold to South Korean pharmaceutical firms.

PATRICK DAVISON

So in late 1990 they set about testing Colorado's captive elk for red deer genes. Fourteen percent of the animals checked turned out to be hybrids. These the state ordered deported, paying the ranchers the difference between what they could hawk them for and their alleged worth. The bill came to half a million dollars.

But elk ranching can't really make it in North America *without* red deer. Or so says the man who should know best—Mike Bringans, the young, affable vet from New Zealand (and more recently Ontario) who supervises the care and artificial insemination of some NAEBA elk. Reds, he told me, are cheaper, gentler, and more adaptable to diet. When you cross them with elk, "hybrid vigor" ensures faster growth. "What about genetic pollution of free elk?" I asked.

"Tell me what genetic pollution by an animal that looks like an elk is going to do in the wild," he pronounced. "If they interbreed, what are they going to do?" There was nothing left for me to say. We were speaking different languages.

One thing they might do, even if interbreeding doesn't occur, is contaminate elk with a nasty little nematode called *Elaphostrongylus cervi*, which, in the infective stage, lives in snails and slugs. Red deer in Europe and New Zealand accidentally ingest these slugs and snails with their browse. The young worms penetrate the gut wall and migrate to the spinal cord, brain, and muscles, where they mature and lay eggs. Larvae flow with the blood to the lungs and are coughed up in sputum, swallowed, and shed with the feces, which then attract slugs and snails. Red deer can usually handle *E. cervi*. North American cervids have no natural immunity and very likely can't.

So last November ranchers and game managers were appalled to learn that the test by which they'd been confidently certifying red deer *E. cervi*-free and shipping them around the continent was unreliable. But at least the hosts and maybe the worms were being kept within game-proof fences. Except, of course, around Colorado's Eagle Rock Ranch, where a flash flood had taken out the game-proof fence, and where red deer, along with all sorts of other weird exotics used in canned hunts, were reproducing in the wild. Then in October, *E. cervi* showed up in three red deer held in New Brunswick. Solution: The three were immediately killed, and the remainder of the herd was taken to Ontario for routine slaughter.

> The only real guarantee you get with "game-proof" fencing is that sooner or later it will be breached.

All the red deer arrived safely in Ontario—whereupon 91 escaped, taking up residence in the woods before eventually being hunted down and shot by game managers on foot and in helicopters. No *E. cervi* were found in the carcasses. If any infected feces were deposited, they will remain contagious for three Canadian winters.

Wildlife advocates west of the Great Plains are even more terrified of *E. cervi*'s cousin, the North American brain worm. Eastern white-tailed deer, which evolved with brain worms, aren't bothered by them. However, probably because the Great Plains are too dry to support many slugs and snails, brain worm doesn't occur in the West. If it gets there, it will devastate mule deer, elk, moose, caribou, mountain sheep, and mountain goats. So after Alberta rewrote its Wildlife Act to permit private ownership of public wildlife, it required game ranchers wishing to import stock to certify that it came from somewhere west of brainworm land. Unfortunately, reports Margo Pybus of the provincial Fish and Wildlife Division, some of them cheated, laundering eastern game through western ranches. As a result Alberta closed its borders to all captive big game in 1988.

Another nasty creature threatening North American wildlife is the bacterium that causes bovine tuberculosis (TB). Elk, moose, and caribou are especially susceptible because they evolved in the dry, cold climate of Siberia, where pathogens were scarce and strong immune systems superfluous. Captive elk spread TB by mutually grooming open sores and by dripping contagious saliva, feces, pus, and probably urine.

"I don't know what we'll do if TB gets established in wildlife populations," remarked the thoroughly unexcitable Mitchell Essey, senior staff veterinarian for the USDA's Animal and Plant Health Inspection Service. "No one knows how we'd control it if it got into elk herds like those in Yellowstone National Park. The potential ramifications are almost inconceivable." Unfortunately, the USDA has no jurisdiction over cervids because they're not "livestock." Responsibility lies with the states, which don't like to dispatch TB carriers because they fear the courts will force them to pay compensation. Two years ago ranchers and game

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managers were appalled to learn that the test by which they'd been confidently certifying elk TB-free and shipping them around the continent had been detecting only about 20 percent of the cases.

Having been in the business 46 years, Welch Brogan is the grand old man of North American elk ranching. He says he's had problems with some of the statements the state veterinarian has made to the press about his TB-infected elk, now under quarantine. It has, however, been documented by U.S. and Canadian wildlife and health authorities that Brogan shipped 18 elk to Alberta in 1988, and that they were later diagnosed with TB. Some U.S. and Canadian officials believe that TB had arrived at Brogan's ranch a year earlier via a shipment of 27 infected elk from Nebraska.

During the last two years Canadian officials have found TB in pigs, cattle, bison, and deer. Infected animals destroyed to date, costing the Canadian government $10 million in compensation, include 2,200 elk—close to half of Alberta's captive herd. At this writing the disease has been seen in captive game in 5 Canadian provinces, from New Brunswick to British Columbia, and 14 states, from New Jersey to Oregon.

But the threat extends beyond livestock and wildlife. The disease can be contracted by humans who handle a host, inhale its breath, touch its body fluid, or drink its unpasteurized milk. It used to be rampant in its native Europe, where, according to a report in *Time* magazine, it may have caused lesions on Joan of Arc's brain and other organs, bringing on her visions and loss of menstruation. The recent outbreak in Alberta quickly spread to farmers, vets, postmortem technicians, meat inspectors, and tanning-plant workers, most of whom were put on preventive medication but at least one of whom developed the actual disease.

If TB does get a toehold in the wild, Geist predicts, then "in national parks tame, infected elk, dripping contagious body fluids, will mingle with the public on golf courses, lawns, picnic grounds, campgrounds, promenades, even sch yards."

Because Yellowstone elk play Brogan's backyard, wildlife officials w hoping he'd tend his game-proof fen Alas, there has been ebb and fl between Brogan elk and public el Brogan told me he's been offended b st ments made by the local game w dens, who, like the state vet, "get carr away with stories" when they talk to t press. However, the Montana Six Judicial District Court told this stor a "finding of fact": "The defend [Brogan] within a few minutes after t game wardens left his home drove through the 'cow' pasture to open gate on the triangular pen and herd the wild elk he had lured onto premises . . . by leaving the gates o baited with hay." On September 5, 1 Brogan was found guilty of "captu over eighty head of wild elk for use in game farm business."

Brogan is the exception, not the r Were he an NAEBA member, he c be summoned before the organizatio board of directors for possible rep mand, suspension, or expulsion. In al aspects of their privatization and co mercialization of public wildlife, ranchers of the NAEBA want desper ately to be responsible and ethical. T tragedy for them, as well as for wild and the public, is that the nature of business makes this impossible.

According to the state of Colora TB bacteria allegedly hitched a ride fr the Brogan ranch to the Royal Elk Ran in Powderhorn—another atypical ope tion whose owner, accused by the U government of passing cocaine and c verting his barn into a "hydroponic la ratory for the growing of marijuana," a is not an NAEBA member. The point, though, is that pathogens, parasites, and alien genes don't care who's typical a who isn't.

Recently the Division of Wildlife gravely offended the NAEBA by sh ing slides of TB eradication at the R Elk Ranch, where it killed and burned animals. In one photo a firestorm ra around the carcass of a diseased bull. through the flames, standing as tall a beautiful as Joan of Arc, is a pair of per fect antlers. Antlers worth perh $2,500. It was the most powerful ima I took home with me.

MONTANA WILDLIFE FEDERATION

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Jim Richards

SENATE AGRICULTURE
EXHIBIT NO. 2
DATE 1-30-95
BILL NO. SB 173

For Montanans, game farms create several real concerns.

First, game farms present a threat to our native wildlife species. Those threats are in the form of disease, hybridization, and loss of habitat for wild game. We are not being alarmists in our fear of disease or hybridization in wildlife. Since 1991, tuberculosis has required quarantines on 6 game farms. Recently, bovine tuberculosis, transmitted from an elk game farm, was found in wild deer in southeastern Montana. In the same area, a coyote tested positive for TB. Near Avon, red deer genes were found in a wild elk.

Our second concern is that game farms pose a risk to Montana's livestock industry. In New York and Pennsylvania TB was transmitted from game farm animals to livestock, and as a result those two states have lost their TB-free status for livestock. In Alberta, TB-infected elk from Montana caused a TB outbreak in livestock. Not only were livestock infected, at least 100 people were tested positive for TB as a result of that outbreak.

These risks are real because escape of game farm animals is inevitable. Fire, flood, high winds, fallen trees, vandalism and neglected fences and gates prevent failsafe confinement.

Third, because game farm licenses cost $100 and renewals cost only $50, sportsmen and women subsidize more than 98% of the $100,000 the Department of Fish, Wildlife and Parks spends annually on licensing, regulating, monitoring and enforcement related to game farms. And our dollars are also spent when the Department of Fish, Wildlife and Parks must correct problems, such as capturing escaped animals or dealing with an outbreak of TB.

Fourth, game farms offer no benefit to Montanans. We do not use the products or services - aphrodisiacs, "canned" shoots, specialty meats. Game farms create NEGATIVE impacts for Montana - threats to wildlife, livestock, sportsmen, and tremendous subsidy for monitoring and regulating the industry.

Finally, game farm animals are wild animals. They are not livestock. Most Montanans believe that raising native wildlife species in captivity is simply wrong.

The Montana Wildlife Federation urges your support of SB 173.

SENATE AGRICULTURE
EXHIBIT NO. 3
DATE 1-30-95
BILL NO. SB 173

TESTIMONY ON

SB 173

AN ACT GENERALLY REVISING THE LAW RELATING TO GAME FARMS; PLACING A MORATORIUM ON THE ISSUANCE OF NEW GAME FARM LICENSES; PHASING OUT EXISTING GAME FARM OPERATIONS BY JANUARY 1, 1997; PROHIBITING FURTHER IMPORTATION OF GAME FARM ANIMALS; PROVIDING THAT GAME FARM LICENSE IS NONTRANSFERABLE; REQUIRING PRESENT GAME FARM LICENSE FEES TO BE SET COMMENSURATE WITH ADMINISTRATIVE COSTS; PROVIDING FOR LIMITED COMPENSATION FOR CERTAIN GAME FARM PROPERTY; REVISING GAME FARM LICENSING REQUIREMENTS AND PENALTIES; ENCOURAGING STATE-TRIBAL NEGOTIATIONS WITH REGARD TO GAME FARMS AND THE PROTECTION OF WILD GAME POPULATIONS; PROVIDING STATE IMMUNITY FROM SUIT FOR DAMAGES ARISING FROM THE SPREAD OF DISEASE FROM A GAME FARM ANIMAL TO LIVESTOCK; AMENDING CERTAIN SECTIONS; AND PROVIDING EFFECTIVE DATES.

BEFORE THE SENATE AGRICULTURAL COMMITTEE
JANUARY 30, 1995

Prepared and Presented by Jim Posewitz
Orion - The Hunters Institute

Mr. Chairman, my name is Jim Posewitz, I am executive director of Orion - The Hunters Institute and testify in support of Senate Bill 173. Before forming Orion I spent 33 years working for the restoration, conservation and preservation of fish and wildlife with the Montana Department of Fish Wildlife and Parks.

During my time with the state I learned of the monumental effort invested by three generations of Montana people to restore fish and wildlife to the abundance that we take for granted. Few people realize that places like the Bob Marshall once had only a few hundred elk where there are now 11,000; and that the 3,000 or so antelope on our eastern plains in 1920s have grown to over 125,000. In the study of that history I learned that within the record of this legislative body there is a tradition of action to preserve fish and wildlife that goes back to 12 years before Custer died at the Little Big Horn. It is a proud and consistent record. The abundance of game, wild lands, and exceptional rivers that characterize our home was not an accident, but rather, a consistent commitment of hunters, anglers, landowners and legislators spanning all the generations, from our territorial years to this day.

Through the winter of 1988-89 our state, and Montana hunters, received an unprecedented level of criticism for shooting bison leaving Yellowstone National Park. In the wake of that criticism Governor Stan Stephens convened the first Governor's Symposium on the North American Hunting Heritage to address the reality and the image of hunting and hunters.

The dominant conclusion of that symposium was that if hunting is to survive it was going to have to, in the words of more that one speaker, "clean up its act." In the wake of that conference I left government service to pursue the preservation of hunting and to address "cleaning up the act." The initial focus of Orion has been to address the question of hunter ethics.

While the subject of hunter ethics contains debatable issues there is consensus that the concept of raising and then shooting penned animals resides at the bottom of any list of socially popular practices. We have all seen examples of anti-hunting groups using this practice to denigrate all hunters and hunting. Yet we see game farms persisting in advertising "guaranteed hunts."

The wildlife restoration and conservation that occurred in Montana is a remarkable achievement in which all the people participated in the effort to preserve a few wild resources that belong to all of us. This state has generally represented the public's interest in our wildlife. Today that public interest is threatened by a process that domesticates the wild and free species we cherished. The public interest in wildlife is compromised by totally privatizing species we valued enough to retain as public resources when Montana was settled. The public interest in wildlife is diminished by the complete commercialization of species that were restored from the brink of extinction because we valued their wild nature and because they belonged to all of us.

Montana native game animals are valued by our culture because they were the perfect products of wild nature and we felt that this was important enough to retain as part of our culture. Those values were important enough to receive legislative attention and protection since 1864. Domesticating our native wildlife, mocking our hunting tradition by shooting penned animals, and marketing replicas of animals that achieved value by virtue of their wildness is a path we need not pursue.

Because these resources are as precious to us as they were to all the previous generations of Montana citizens, Senate Bill 173 should be passed.

SENATE AGRICULTURE
EXHIBIT NO. 4
DATE 1-30-95
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TESTIMONY BEFORE THE SENATE AGRICULTURAL COMMITTEE
Regarding SB 173
By
The Montana Fish & Wildlife Biologists Association

January 30, 1995

Mr. Chairman, members of the Committee. My name is Gayle Joslin. I am a member of the Montana Fish & Wildlife Biologists Association, for whom I am testifying. The Association represents 92 professional fisheries and wildlife biologists. We speak from a professional perspective on behalf of the wildlife resources of the State of Montana.

In North America, unlike most other countries of the world, wildlife belongs to the common person. Because wildlife is a public trust, the Association believes we all have a responsibility to protect wildlife from the serious possibilities of disease and hybridization. Big game wildlife as we know it, as well as Montana's future hunting heritage, are at risk, as long as game farm animals and wild animals are able to cross game farm enclosures. Because enclosures have been breached every year for the last 9 years that we have records, it is a simple but sad fact that exotic animals with imported diseases are the legacy that game farms have bestowed upon Montana.

As wildlife biologists, we play a key role in the stewardship and management of wildlife within the state. From that perspective we take an interest in the presence and monitoring of game farms.

There are 93 licensed game farms in Montana. Over half of them are licensed to raise elk. Although there are a number of issues to be addressed, disease and parasites among the most serious, our focus will be on the cross-breeding that can and has occurred between various members of the Cervidae (deer) Family. Throughout this discussion, the terms North American elk and wapiti are used interchangeably. The scientific name for the species that includes both elk and red deer is Cervus elaphus.

Offered here is an abbreviated literature review (Kirsch and Greer 1968) about the evolution of Cervus elaphus, the long history of red deer/elk hybridization in the game farm industry, the fact of currently incomplete testing techniques to detect hybridization, and the resulting biological consequences for Montana wildlife.

EVOLUTION OF CERVUS ELAPHUS

Cervus elaphus have been reproducing on earth for about 3 million years (Harrington 1985, Thomas and Toweill 1982). Evolutionary forces that have shaped animals to particular environments are to be respected. We humans cannot appreciate the

subtleties that mold a species to the land, but we can grasp the wisdom of the late Aldo Leopold's (1949) words:

> If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.

Although red deer and North American elk, or wapiti, are the same genus and species, they are a different subspecies (Whitehead 1972). Subspecies are formed when they become isolated from each other by virtue of geography. In this case, the Bering Land Bridge melted away some 10,000 years ago, which was 110,000 years after the arrival of wapiti in North America, separating the Asian version of Cervus elaphus from the North American version. (Thomas and Toweill1982, Whitaker1970, Harrington 1985).

In the ensuing thousands of years, our North American elk have evolved unique physical, physiological, behavioral features (Thomas and Toweill 1982, Lincoln 1985, Kramer 1973, Bubenick 1985), including • larger body, head and antlers; • a lighter buff body color (while red deer are comparatively red); • distinctive cream color rump patch (while red deer tend to have a smaller indistinct, less white rump patch); • and the ability to bugle (while red deer roar). Their behavioral traits differ in that the wapiti tend to be: • wilder in nature (they are more difficult to handle in captivity), • more prone to stress, • have a longer gestation period, • are less aggressive breeders than red deer, and • require more roughage in their diet. There are other more complex but less obvious differences as described by dozens of researchers (Caughley 1971, Banwell 1966, Batcheler and McLennan 1977, Hofmann 1985, Kay 1985, Mackintosh 1992). Subspecies however, are capable of interbreeding, and the off-spring assume various characteristics of both parents (Caughley 1971, Whitaker 1970).

We value and are understandably proud of our unique North American wapiti, and wish it to remain distinctive.

HYBRIDIZATION

Existing genetic testing technology is not capable of detecting all crosses between red deer and elk. A test of 100% accuracy can only be obtained on the first cross breeding between a purebred elk and a purebred red deer. Accuracy of the test declines quickly with each subsequent backcross breeding. (Cronin et al. 1993, Dratch and Gyllensten 1985, Dratch 1986, 1993, Dratch and Pemberton 1992, Waye and Haigh 1992). The purity of game farm animals therefore cannot be assured since the practice of cross breeding red deer with elk has been common within the international industry for decades.

In New Zealand, as the game farm market became saturated with breeding stock, prices dropped, and it was found to be cheaper to simply open the gates and let the animals loose than to maintain fences and feed them (Bennett 1992).

We do not know whether similar circumstances have or could occur on Montana game farms, but we do know with certainty that game farm animals escape and/or wild animals penetrate the fences around game farms every year. Ingress/egress records in Montana reveal 64 incidents involving 442 animals, where either wild animals got in or game farm animals got out of game farms (MDFWP, Enforcement Div., Jan. 1995).

Hybrid crosses between eight introduced deer species in New Zealand have resulted in extensive populations of hybrid animals. (Challies 1985, Whitehead 1972, Fisher and Bryant 1993). Several of these species became established as a result of releases comprising fewer than one dozen individuals. Of these, red deer have been the most successful (Challies 1985). New Zealand researcher C.N. Challies states that they are "resigned to soon losing wapiti as a pure form, and progressive red deer-isation of the hybrid herd."

Loss of Montana's native wildlife through hybridization is a serious concern from a biological perspective for the following reasons:

- As hybrids reproductively phase out the native species, there is no longer a match between the land and the animal. The result: Loss of adaptive strategies that have evolved to make a native wildlife species best suited for a particular environment.

- Disease and parasites that are introduced through exotic species (who are themselves semi-resistant to such pathogens), often destroy or severely debilitate native species.

Arguments that attempt to minimize the consequences of hybridization are numerous (Morrison 1988, Moore and Littlejohn 1989, Price 1984). The simple fact is:

> "If you change the way you grow and manage the animal,
> then you change the animal" (Fukuoka, 1978).

NECKBANDING GAME FARM ANIMALS

We request that a neckband, of the type displayed here, constructed of "Ritchie" material (produced by the Ritchie Company), be placed on every game farm animal in the State of Montana. The collars would be of the same color on all game farms. Each collar would be inscribed with the specific identifying number ascribed to each game farm. The acid based paint used to inscribe numbers or symbols on the collars chemically etches itself into the base material and lasts virtually for decades. Collars have been retrieved from wild animals that have been in the field for more than 13

years, and they appeared almost new.

Every animal would still be individually numbered as they are now, with colored ear tags. Neckbanding would help game farmers and those who monitor game farms to quickly recognize when wild animals get into game farm compounds, and escaped animals would be immediately recognizable when they get out. The ability to monitor captive and wild animals is extremely important and would be significantly enhanced if game farm animals were collared.

The Department of Fish Wildlife & Parks has placed more than 5,000 neckband and radio collars on wildlife in the field. They have not been an impediment to the animals. The cost of a neckband is approximately $6.

In summary, the Montana Fish & Wildlife Biologists Association believes hybridization is a serious threat to our native wildlife species. At a minimum we need an effective way to monitor escapes of game farm animals. Use of highly visible neckbands would provide that mechanism.

Thank you for this opportunity to offer comment.

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SENATE AGRICULTURE
EXHIBIT NO. 5
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BILL NO. SB 173

COMMENT ON SB 173

The effect of game farming operations on public health is a subject that has received close and careful attention by MDHES. The department is on record expressing concern about human health risks associated with the private holding of cervids. While there have not been any cases of human disease linked to commercial game farms in Montana, outbreaks of tuberculosis among people in contact with farmed elk in Canada are well documented in the scientific literature. Higher than expected rates of infection among persons working with M. bovis infected elk herds, suggests that tuberculous Cervidae may present a greater human health risk than traditional livestock species.

It is felt that a better understanding of the natural history of disease in these animals, and better diagnostic tests are needed before public health officials can responsibly promote commercial game farming operations. Surrounding state health officials and federal experts on the subject, with whom we have consulted, support such a position.

Testimony for Senate Agriculture, Livestock and Irrigation Committee
by: Dale Taliaferro, Administrator of Health Services Division
Department of Health and Environmental Sciences
January 30, 1995

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SENATE AGRICULTURE
EXHIBIT NO. 6
DATE 1-30-95
BILL NO. SB 173

January 29, 1995

Members of the Agriculture Committee:

My name is Stan Swartz. I was raised on a ranch in Dillon, Montana, received my Doctor of Veterinary Medicine degree from colorado State University in 1967 and have engaged in large animal practice in Western Montana for the last 28 years. During my professional life I have worked with the treating and control of infectious diseases in domestic livestock as well as working on a limited basis with the wildlife Research Unit at the University of Montana and the Montana Fish and Game.

I support passage of S.B. 173 for the following reasons:

Can we be reasonably assured that game farming does not pose a threat to our existing agricultural industry, public health and wildlife resources in Montana? Let's look at the facts. Contagious and infectious disease management and control even in a domestic controlled livestock setting is difficult at best as evidenced by past experience. Why is this so? The best testing procedures and protocols we have available at this time are not always infallible for detecting diseases such as T.B. or Brucellosis. Due to variations in the stage of the disease process and the animals immune response at the time of testing, animals carrying these diseases can be missed. A case in point is the outbreak of T.B. in game farm elk in Canada. This was traced back to infected elk from a game farm in Hardin, Montana. These elk had been tested for T.B. and cleared for shipment to Canada. The Canadian government spent millions of dollars for indemnities and testing procedures to control the outbreak. In the process T.B. was contracted by some of the people involved in handling the elk.

It is a well known fact that confining and concentrating elk and deer promotes spread of contagious diseases such as T.B. and Brucellosis. During its life a game farm animal can be sold and traded many times, exposed to various locations and herds throughout the United States, thus increasing disease exposure and control problems for health officials.

Is there a fool proof enclosure for elk and deer? I think most people realize there is not. Even if there were, under certain conditions disease from a confined animal within an enclosure can be spread via rodents, contaminated water or even ravens and magpies.

What can we do if T.B. is spread to our wildlife population? Once in the wild we are fairly helpless to do anything about it. Some animal health officials feel the incidence of transmission of T.B. in wildlife will not be significant. If unsuspecting hunters or others handling infected game animals contract T.B., is that not significant? Dr. George F. Risi, an infectious disease specialist from Missoula states that we should be concerned. If our domestic livestock exposed to infected game farm animals contract T.B., what is significant? Any rancher who has had to go through testing and quarantine procedures with an infectious or contagious disease will tell you it is significant in terms of labor and financial loss. If an outbreak of T.B. occurred in our domestic livestock the loss of a T.B. free state status would be a direct burden financially to the existing agriculture community.

Due to early game farm practices the European Red Deer gene exists in game farm elk now. The Red Deer hybrid has already been documented in our native elk due to exposure to game farm elk. What effect will this have on our wildlife populations in the future? Nobody knows, but it has the potential to be genetically disastrous.

Many states have restricted or outlawed game farming including Wyoming, Oregon and Washington.

In closing, I do not represent an organization or political group, the aforementioned concerns are mine personally as a concerned Montana citizen. I respectfully submit these statements for your consideration and hope that good judgment and common sense prevail when you consider S.B. 173.

Stanley Swartz, D.V.M.

SENATE AGRICULTURE
EXHIBIT NO. 7
DATE 1-30-95
BILL NO. SB 173

SENATE

AGRICULTURE COMMITTEE

WITNESS STATEMENT

PLEASE PRINT

NAME BOB BUGNI BUDGET

ADDRESS 3865 REMINGTON, EAST HELENA DATE 1/30/95

WHOM DO YOU REPRESENT? PRICKLY PEAR SPORTSMEN'S ASSN (PPSA)

SUPPORT X SB 173 OPPOSE AMEND

COMMENTS:

- AS AN AFFILIATE CLUB OF MONTANA WILDLIFE FEDERATION WE CONCUR WITH JIM RICHARDS TESTIMONY
- PPSA HAD FIRST HAND LOOK AT GAME FARM RIGHTS IN HELENA AREA. HUNTERS REPORTED ELK BELLOWING INSTEAD OF BUGLING DURING (AVON AREA) OUT SEASON. FWP INVESTIGATED AND FOUND A TRANQUILER KIT IN THE FIELD. GENETIC TESTING WAS ORDERED BUT CAPTURE OF ELK IN AREA WAS UNSUCCESSFUL FOR COMPLETE TESTING TO BE DONE. RED DEER GENETICS WAS FOUND.
- THE GENETIC POLLUTION OF THIS ELK HERD IS UNKNOWN. MILLIONS OF YEARS OF EVOLUTION HAVE BEEN PUT AT RISK
- SB173 IS MEANT TO PROTECT OUR WILDLIFE

HR:1993
CS16

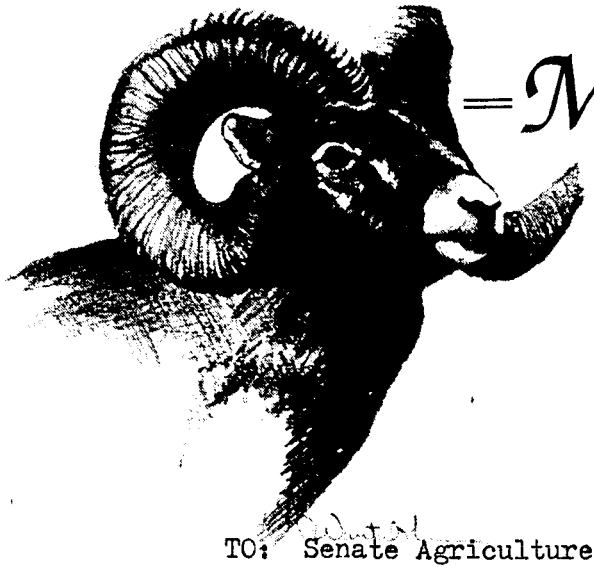
The stockgrowers of this State request the sportsmen and the Fish, Wildlife, and Parks Dept. to take care of the bison that wander out of Yellowstone Park. They want to prevent the spread of disease to their domestic herds. That request has been heard. PLEASE!! Hear our request to keep Montana's wildlife intact.

I believe farmers and ranchers in Montana to be some of the first true conservationists. Well noted conservationist Aldo Leopold once stated: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." Game farms do nothing but prostitute and commercialize wildlife.

I know Game Farmers are trying to make this an issue about private land and free enterprise. They talk about how much money they will not be able to make! The phone calls you receive and the testimony you are hearing today from sportsmen are not about money, private land, or free enterprise. It is about an irreplaceable resource we care very deeply about. Please pass SB173. Montana's wildlife cannot be replaced. Yet there are many other ways these people can become more wealthy than they already are.

Thank You

Jim Bradford



MBA

MONTANA BOWHUNTERS ASSOCIATION

SENATE AGRICULTURE
EXHIBIT NO. 8
DATE 1-30-95
BILL NO. SB 173

January 29, 1995

SENATE AGRICULTURE
EXHIBIT NO. 8
DATE 1-30-95
BILL NO. SB 173

TO: Senate Agriculture Committee

FROM: Jim Bradford, President, Montana Bowhunter's Association

The Montana Bowhunter's Association wholeheartedly supports SB173. While we do support free enterprise, we cannot support an industry that allows profits for so few people with the ability to do irreversible damage to Montana's wildlife.

Game Farmers argue that their animals are purebred wild animals, that there is no fear of polluting the genetics of our wild animals if a game farm animal escapes from its pen. Tests have proven otherwise but for the sake of discussion let's say it's so. If the animals on these farms are purebred wild animals, what are they doing penned up in the first place?

Game Farmers argue that their herds are disease free. Most everyone knows that whenever wild animals are kept in close contact in small areas the possibility of disease skyrockets.

Game Farmers argue that their game animals won't escape, that they do enough fencing to keep animals penned in. Big Velvet Game Farm in the Bitterroot Valley is generally considered to be one of the better operations in the State by Fish, Wildlife, and Parks Dept. personnel. Yet in the last year alone they had two animals escape. One of these animals, a mule deer doe, was shot and recovered. The other, a large whitetail buck, escaped and was never recovered. Biologists recognize 17 different sub-species to our whitetail deer. Did this deer bring genetics from a different sub-species to our whitetail herd? Will they be harmful in anyway? What about disease? I heard the buck escaped within hours of its arrival and normal tests couldn't be done. This is just one Montana Game Farm. Supposedly one of the more responsible ones. What happened at all the others?

Hunting is under constant scrutiny from many different directions. The canned hunts that many game farms offer give our sport a black eye. To watch someone shoot an animal within a confined area leaves a bad taste in anyone's mouth. Then they proudly call it hunting.

SENATE AGRICULTURE
EXHIBIT NO. 9
DATE 1-30-95
BILL NO. SB 173

UNITED BOWHUNTERS OF MONTANA, INC.
P.O. BOX 6062
GREAT FALLS, MT 59406-6062
1-406-454-1370

TO: State of Montana
Senate Agriculture Committee

RE: Senate Bill #173

Date: January 30, 1995

Dear Committee Members;

On behalf of the United Bowhunters of Montana, I thank you for the opportunity to address you regarding Senate Bill #173.

In the past few years, Game Farming or more properly called "Game Ranching" has created much controversy among Montana citizens. With all of the diverse opinions held by Montana citizens, it's very easy to get lost in the shuffle and to not be able to see the forest for the trees. We must keep in mind that what is really at issue here is Private Property Rights vs. The Public Trust In Montana Wildlife.

We must remember that anytime you have two or more people you have a society. It has been a common belief among Montana citizens that in any society we have to have democracy in order to survive. Democracy is defined as; Government by the people. We cannot have government by the people without majority rule. The job of this Committee and this Legislature is to find out what the majority of the people want regarding the issue of Game Farms. Once that has been determined, the rest is simple, you each simply have to vote for what your constituency wants.

As stated earlier, what is at stake is Private Property Rights vs. the Public Trust In Wildlife. All of us know that no matter what decisions are made, some will be happy and some will not. Majority rule will have to decide the issue.

Lets first examine all the rights that have to be considered:

A). The rights of a small number of people to own and raise wildlife for profit.

B). The rights of farmers and ranchers to keep their domestic herds free from TB and other infectious diseases.

C). The right of Montana citizens as a whole to believe that the wild animals that grace our great state belong to all the people equally.

D). The right to believe in the Public Trust In Wildlife and to believe that our state government will protect that Public Trust for the enjoyment of all of Montana's citizens.

Lets take a look at the right to own and dispose of private property. We doubt very much that there is a person in this room that doesn't feel the need to protect his or her Private Property Rights. Conversely, we doubt that there is a person in this room who truly believes that they have a right to exercise their Private Property Rights to the extent that they infringe upon the rights of their neighbors and fellow citizens.

For example, would it be right for a Game Rancher to raise wild elk that are infected with TB next to a cattle ranching operation that was exercising its right to maintain a domestic herd that was free from infectious diseases? Each of these people would be exercising their right to own and dispose of private property, but one would be infringing on the right of the other to maintain a disease free domestic herd.

I don't believe that there is anyone here today that believes that it is their right to exercise their Private Property Rights solely in the name of the dollar if it infringes upon their neighbor and it violates the Public Trust in Wildlife and threaten the good health of domestic livestock herds.

Farmers and ranchers must be reminded what the danger of TB and other diseases can do to damage their livelihood if their herds become infected. They, above all, should realize what is at stake here. Its time to take the high road and get rid of Game Farms and the threat that they represent. Montana's Farm and Ranch Heritage and its Wildlife Heritage are both at stake here. Game Farms are a serious threat to both of these heritages. Our domestic livestock industry along with our farming industry provides a real social benefit and dollar value to the state of Montana. The problem we are facing today has come from the attempted domestication of our wildlife herds for the sake of the dollar. It is not justifiable for less than 100 Game Farm/Ranch operations to continue to operate in the name of profit at the expense of the Public Trust In Wildlife and domestic farming and ranching operations. Montana farmers and ranchers provide a strong economic base to our state economy. That base should not be threatened by the spread of TB and other diseases so that a minority few can profit.

Montana's wildlife provides a strong recreational benefit to all of its citizens along with a strong economic base from hunting, fishing and wildlife photography. These benefits should not be threatened so that a few Game Farm/Ranch operations can profit from the sale of wild animals and wild animal parts.

EXHIBIT 9
DATE 1-30-95
SB173

In our opinion, Game Farming/Ranching has no redeemable social value and it certainly has no worth while heritage. It is strictly about big bucks for a few at the expense of all of Montana's citizens. Game Farming certainly has no care for the majesty of the Elk or the elusiveness of the White Tail Deer. To enclose these great animals in a fenced area is a sin against nature. To saw off the horns of a Bull Elk in full velvet destroys the image of what wild animals are all about. To provide "canned hunts" for so called hunters for huge fees does a disservice to all hunting.

Are we going to let the promise of big dollars for a few destroy everything that Montana's Wildlife Heritage stands for? The answer is simply, NO WE WON'T!

The good Lord gave us Montana in its wild and natural state. We need to remind ourselves how fragile this balance of nature is. Why would we endanger our wild animal herds by upsetting this balance of nature so that a few can profit? The bulk of the demand for Game Farm products seem to come from our Asian neighbors. The uses are primarily for medicinal and aphrodisiac purposes. Are these uses more important to Montana's citizens than maintaining Montana Wildlife Heritage? We think NOT!

Let us remember what the market in ivory trade has done to decimate the African elephant herds. Does our Wildlife Heritage mean so little to us that we are willing to destroy it just for the sake of the profit of a few Game Farm/Ranch operations. Again, we think NOT!

Most of us moved to Montana or stayed in Montana in order to enjoy a quality of life far above what most states offer. Much of that quality is directly related to our enjoyment of wildlife in its WILD NATURAL STATE. Let us not be fooled by the presumption that Montana Farmers & Ranchers economic woes are going to be cured because a few make huge profits by selling wild animals and wild animal parts.

The real dangers of Game Farming/Ranching far outweigh any economic benefits gained by a few Montanans. The threat of disease spreading from Game Farms/Ranches to both our wildlife and domestic animal herds is a <u>REAL THREAT</u>! The threat of interbreeding between wildlife and imported exotic species is a <u>REAL THREAT</u>!

Let us show the courage that our neighboring state of Wyoming showed a long time ago. We need to just say no to Game Farming. The Game Farming issue does not just affect Montana farmers and ranchers. It affects all of Montana's citizens. It could have a dire affect on the exportation of Montana cattle. It could have a dire affect on Montana game herds. We need to have the courage to stop it now before its too late.

We would hope that this Committee realizes that the Game Farm issue is a far reaching issue. Montana's citizens will not sit idly by and let the attempts of a selfish few ruin our Wildlife Heritage and our disease free domestic cattle herds.

Please, make the responsible choice and pass Senate Bill #173. Just say NO to Game Farming and Ranching!

The United Bowhunters of Montana felt there was a need to do a survey of it's membership regarding the Game Farm/Ranch issue. We are providing the Committee members with a copy of the results of that survey. In our survey, we made an attempt to provide our membership with as much information on Game Farms/Ranches as we could. I would like to read you the questions on our survey and the response percentages.

As you can see, the majority of our members by a wide margin favor placing a moratorium on all new Game Farm applications. they also favor phasing out all existing Game Farm operations.

Our membership is made up of persons from all across Montana and provides a good sample poll on this issue. At our memberships request, We ask you to do what is right by the majority of Montana's citizens and pass Senate Bill #173.

Respectfully Submitted,

David C. Campbell, Spokesperson
United Bowhunters of Montana
Great Falls, Montana
1-406-761-1644

SENATE AGRICULTURE
EXHIBIT NO. 10
DATE 1-30-95
BILL NO. SB 173

UNITED BOWHUNTERS OF MONTANA, INC.
GARY L. GILPIN, SECRETARY
P.O. BOX 6062
GREAT FALLS, MT 59406-6062
1-406-454-1370

RESULTS OF NOVEMBER 1994 SURVEY CONCERNING GAME FARMING

****

TOPIC: GAME FARMS

QUESTION #1: "DO YOU BELIEVE THERE SHOULD BE A MORATORIUM ON ALL NEW GAME FARM APPLICATIONS?"

YES: 78%

NO: 16%

NO OPINION 6%

QUESTION #2: "DO YOU BELIEVE ALL EXISTING GAME FARMS SHOULD BE PHASED OUT? IF YES, OVER WHAT LENGTH OF TIME?

YES: 62%

NO: 36%

NO OPINION 2%

TIME FRAME:

1. 1 YEAR (2%)
2. 1 YEAR OR LESS (5%)
3. 2 YEARS (7%)
4. 3 YEARS (7%)
5. 4 YEARS (2%)
6. 5 YEARS (14%)
7. 5-10 YEARS (2%)
8. 5 YEARS IF NOT SOONER (2%)
9. 10 YEARS (7%)
10. BY THE YEAR 2000 (2%)
11. AS FAST AS PRACTICAL (2%)
12. WHY WAIT (2%)
13. SOON (2%)
14. NO OPINION (42%)

QUESTION #3: "SHOULD MONTANA HUNTING LICENSE DOLLARS BE USED TO PAY FISH, WILDLIFE & PARKS TO MONITOR GAME FARMS.

YES: 18%

NO: 80%

NO OPINION: 2%

QUESTION #4: "SHOULD THE COST FOR GAME FARM APPLICATIONS AND OR RENEWALS BE INCREASED?"

YES: 96%

NO: 0%

NO OPINION: 4%

HOW MUCH:

1. TO COVER COST OF MONITORING THEM (30%)
2. MAKE THEM SELF-SUPPORTING. (2%)
3. WHAT IS NEED FOR REGULATION (7%)
4. $100,000.00 (7%)
5. $1,000.00-NEW; $500 TO RENEW (2%)
6. COVER COST PLUS 10% (2%)
7. 75% (2%)
8. 50% (2%)
9. 500% (2%)
10. 1,000 (2%)
11. $1,000.00 (2%)
12. $1,000.00 NEW $1,000.00 RENEWAL (2%)
13. $5,000.00 (2%)
14. TO EQUAL COST OF REGULATING AND THE INDUSTRY SHOULD BE BONDED. (2%)
15. RENEWALS ONLY (2%)
16. A DOLLAR AMOUNT PER HEAD (2%)
17. LIKE CAR INSURANCE - THE MORE YOU USE THE MORE YOU PAY. (2%)
18. NEW - $1,500.00 RENEWAL - $3,000.00 (2%)
19. NO OPINION (21%)

QUESTION #5: "DO YOU THINK FISH, WILDLIFE & PARKS SHOULD BE INVOLVED IN OVER SEEING THE GAME FARM INDUSTRY?"

YES: 96%

NO: 4%

EXHIBIT 10
DATE 1-30-95
SB 173

QUESTION #6: "WHICH IS MORE IMPORTANT TO YOU?"

PRIVATE PROPERTY RIGHTS	22%
THE PUBLIC TRUST (WILDLIFE)	58%
BOTH	9%
NO OPINION	9%
NOT THAT SIMPLE	2%

QUESTION #7: "DO YOU BELIEVE THAT "GUARANTEED HUNTS" REFLECT NEGATIVELY ON HUNTING?

YES:	91%
NO:	9%

QUESTION #8: "SHOULD GAME FARMERS BE COMPENSATED BY THE PUBLIC TO KILL DISEASED GAME FARM ANIMALS IN AN EFFORT TO PROTECT WILDLIFE?

YES:	2%
NO:	98%

****

Montana Audubon Legislative Fund

P.O. Box 595, Helena, MT 59624

SENATE AGRICULTURE
EXHIBIT NO. 11
DATE 1-30-95
BILL NO. SB 173

Senate Agriculture Committee
January 30, 1995

Mr. Chairman and Members of the Committee,

My name is Janet Ellis and I am here speaking on behalf of the 2,400 Montana Audubon members in the state. Many of our members hunt and fish - and all of our members care about wildlife.

We support SB 173.

Wildlife is precious and important to all Montanans. It is a critical part of what makes Montana - Montana.

Our elk and deer populations are an essential part of our state's wildlife. As a matter of fact, we largely take these animals for granted - assuming that they will always be here. But our elk and deer populations are threatened by game farms. This threat is real.

The threats by game farms to elk and deer are primarily four:

1. Disease and parasite transmission, particularly tuberculosis, from game farm animals to native elk and deer populations, and to livestock.

2. Danger of genetic pollution, particularly to elk, caused by escaped game farm red deer that hybridize with wild elk.

3. Habitat loss and competition due to the fact that before a game farm begins operation, all wild deer and elk must physically be removed from the game farm.

4. The cost of regulation is tremendous because of 1) the dangers listed above, and 2) the potential to poach wild elk and deer by allowing these animals to illegally enter a game farm - and be claimed as property by the game farm rancher.

The bottom line is: is it worth risking our elk and deer populations for the profit of a few individuals? We think not.

Our state's wildlife provides us with a recreational and cultural heritage well beyond the monetary benefits game farm operators might gain. The economic benefits game farms might get today could *quickly* be offset by the immeasurable losses to the citizens of this state if our wild elk and deer populations become threatened.

SENATE AGRICULTURE
EXHIBIT NO. 12
DATE 1-30-95
BILL NO. SB 173

NAME James Kemr

ADDRESS N21 Virginia Dare Helena

HOME PHONE 2-8053 WORK PHONE

REPRESENTING SELF

APPEARING ON WHICH PROPOSAL? SB 173

DO YOU: SUPPORT ✓ OPPOSE AMEND

COMMENTS:

Game Farms Are A Threat that is very Real. Phasing them out is Not A "Taking" that is unreasonable.

It's time to do the right thing Before it's too late for Montana Wildlife —

WITNESS STATEMENT

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

WITNESS.F11

SENATE AGRICULTURE
EXHIBIT NO. 13
DATE 1-30-95
BILL NO. SB 173

NAME Joe Gutkoski

ADDRESS 304 N. 18th Av. Bozeman MT 59715

HOME PHONE 587-3242 WORK PHONE 587-3242

REPRESENTING Madison Gallatin Alliance

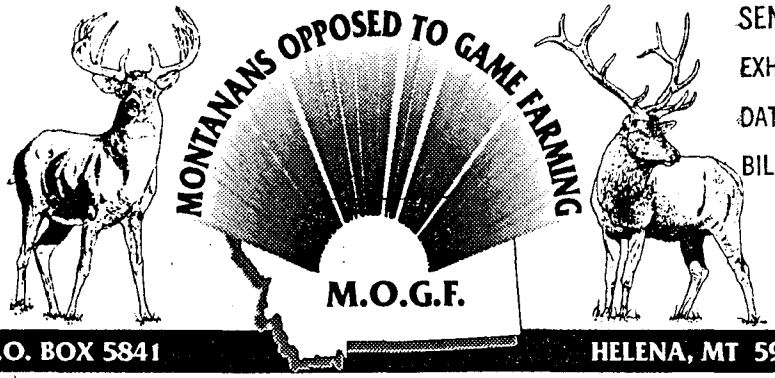
APPEARING ON WHICH PROPOSAL? SB-173

DO YOU: SUPPORT ✓ OPPOSE _____ AMEND _____

COMMENTS: Game farming
Violates public ownership & state control of wildlife
A public owned resource is sold into private property to be manipulated by the market.
Vulnerable wildlife is killed & traded in markets & enables laundering of illegally taken wildlife beyond control of authorities
Allocation of surplus wildlife by law is negated by paid hunting which allocates wildlife for consumption by the ability to pay.
Frivolous killing is encouraged by trophy shooters on captured animals.
a. Game farming commercializes the last remnant of the wild commons
. It privatizes what was held in trust by all of us.
. It domesticates the wildness we seek to preserve.
. It trivializes what fires our imagination & makes our spirits soar

WITNESS STATEMENT

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY



SENATE AGRICULTURE
EXHIBIT NO. 14
DATE 1-30-95
BILL NO. SB173

P.O. BOX 5841 HELENA, MT 59604

Herb Johnson
756-5725
Co-Chair

Mike Vashro
458-9454
Co-Chair

SB173
Senate Agricultural Committee
Senator Swysgood, Chairman

WRITTEN TESTIMONY
January 30, 1995

I am here today as Co-Chairman of Montanans Opposed to Game Farming. Our organization represents thirteen groups throughout Montana. We support Senate Bill 173 because of the threat game farms pose to native wildlife, humans, and livestock. All of us in this organization live in Montana because of what our state has to offer, with wildlife being its centerpiece. We would be opposed to anything that threatens our native wildlife.

We don't believe that wildlife should be held captive behind fences. It seems ludicrous that we have laws prohibiting the private ownership of free-roaming wildlife, yet we allow the buying of wildlife from in and out of state to be kept on game farms.

We also take the threat of disease to our native wildlife from game farms very seriously. We are not just talking about bovine TB, but a whole myriad of diseases associated with game farm animals. There are also diseases which we don't know anything about. If there is a one percent chance of disease transmission to our wildlife from game farm animals, that is one percent too much. We are not willing to use our wildlife as guinea pigs in this strange experiment. The agricultural community in Montana would not put up with any threat to their stock, and we should not treat our wildlife any differently. All we have to do is look at the Madison River to see what an exotic disease can do to a wild resource with no cure in sight.

We also face very real problems such as ingress and egress of animals on game farms. We have a very real problem in the Yellowstone Valley right now with fallow deer running wild after escaping from a game farm, and there is no solution to this problem. How many other escaped animals do we have and

what are the consequences? Only time will tell. We are not willing to stand back and watch our native wildlife become genetically polluted or pushed off home ranges.

We feel it is time the game farmers in this state pay their fair share and quit getting a free ride. This is why we support Senate Bill 173.

Mike Vashro
Co-Chairman

SENATE AGRICULTURE
EXHIBIT NO. 15
DATE 1-30-95
BILL NO. SB 173

January 30, 1995

I am Pat Simmons from Bozeman, Montana. I am speaking in favor of Senate Bill 173. I think Senator Klampe has done an excellent job of designing a comprehensive and fair bill to counteract the critical problems generated by game farms. I see that there are four major insurmountable problems with game farms: disease transmission, genetic dilution of wildlife, commercialization of a publicly owned resource, and the unethical shooting of animals in confined spaces.

Tuberculosis, brucellosis and other diseases in game farm animals have been documented and are carried by escaping animals, or via close contact with wildlife through fence openings and by rodents going in and out of game farm properties. People and domestic livestock have or can be affected. The track record of game farming in Montana and other states and provinces indicates that escape of game farm animals from their enclosures is inevitable. In addition, existing disease testing procedures developed for domestic livestock do not always provide definitive diagnosis for native wildlife or exotic species, nor have they been developed for a number of wildlife diseases.

There is clear documentation of red deer escapes and their hybridization with resident native elk in Montana. Feral populations of animals have been established in Colorado, Texas and many other places. They outcompete native wildlife, and genetic screening procedures only detect the first generation hybrids. We can't risk the elimination of the true Rocky Mountain Elk.

The state has an obligation, as administrator of the public trust, to protect native wildlife populations. With game farms we are interfering with or eliminating wildlife habitat, migration routes, allowing disease and genetic pollution to occur, all to allow a few people to personally profit from a public resource.

Shooting captive animals is not a fair chase or a sporting hunt, and is plain, not ethical. The animal rights groups will play havoc with this event sooner or later, and Montana will look terrible.

Game farms are a threat to native wildlife, domestic livestock, and the public, and it cannot be mitigated by regulations. Talk to the enforcement folks in Fish, Wildlife & Parks, and in the other states and provinces. This is a deficit spending program, because you don't even charge the industry the actual costs of regulating. How can you folks risk the wildlife resources for our future generations of citizens, that is your children, and for economic reasons, that is the tourism industry, the people who pay to enjoy wildlife and pay to hunt ethically. In addition, so many people are up in arms about brucellosis transmission from bison, how can you ignore this disease and tuberculosis, which can also infect domestic livestock and people?

We need to stop this industry now and buy these people out in order to ~~protect~~ recover their investments made. You need to remember your conscience by stopping a dangerous precedence before you cannot do so. Thank you for listening and vote FOR SB 173.

Pat Simmons

Pat Simmons
1916 So. Black Ave
Bozeman, MT 59715

SENATE AGRICULTURE
EXHIBIT NO. 16
DATE 1-30-95
SB 173

Jan. 30, 1991

Testimony On SB 173

Deer and Elk farming pose an excessive risk to Montana's livestock and wildlife.

New York, Pennsylvania, and Virginia have lost their TB free status for livestock.

Canada had a TB outbreak, caused by game farm elk from Montana, that cost $20 million. This included cattle, elk, and over 80 people.

Disease in deer farms in New Zealand is nearly uncontrollable.

Escape of farmed deer and elk is inevitable.

If TB were to become established in small animal populations it would be impossible to control.

Wyoming outlawed game farms 20 years ago. Why is Wyoming's Legislature so much smarter than Montana's?

Stan Frasier
Box 5841
Helena MT

SENATE AGRICULTURE
EXHIBIT NO. 17
DATE 1-30-95
BILL NO. SB 173

TO: Senate Agriculture Committee
FOR: Montanans Opposed To Game Farming
BY: Herbert Johnson, Co-chair
DATE: January 30, 1995

Late in the summer of 1994, the Department of Fish, Wildlife, and Parks, in conjunction with the Department of Livestock, undertook to reduce the number of deer in the vicinity of the Elk Valley Game Farm to reduce the chances of the spread of tuberculosis among the wildlife herd. Subsequent to that action the Elk Valley Game Farm has been depopulated in an effort to eliminate the existence of tuberculosis on that farm. Tuberculosis was, however, already present outside the confines of that farm. This incident was not the result of a farm manager who did not take care of his farm. This was a well maintained and carefully operated farm, yet it fell victim to the ravages of a dangerous, communicable disease. This incident highlights the threat to wildlife, livestock, and people from even a well-managed farm.

In the Avon area, through no known fault of any individual, traces of red deer genes were found in a wild elk herd. This incident plus the Elk Valley incident provide ample avidence that diseases and/or exotic genes can and will escape from game farms if they are allowed continued existence. Once escaped there is virtually no way to recover these animals that look just like the wild animals. In Colorado where an estimated four hundred animals escaped in twenty-four seperate instances between 1974 and 1992, all animals were recovered or killed in only eight of those escapes. There are numerous cases of escaped game farm animals being seen or killed in Montana. Do these animals have tuberculosis? Perhaps some of them do and we all know that wild animals do mingle with domestic livestock.

If game farms are allowed to proliferate, the odds of escape and ultimate infection of wildlife herds increases as well. In fact, the odds become so high that infection becomes a virtual certainty. Once an animal escapes and mingles with a wild herd, recapture becomes almost an impossibility. If that animal is diseased or has exotic genes, there is no way to reverse the affects. It is then too late.

We, the Montanans Opposed To Game Farming, therefore urge this committee to pass this bill on to the full Senate with a recommendation for approval. The threat to the economy of the State of Montana is too imminent to let this bill die in committee.

Thank you.

Herbert Johnson

FLATHEAD WILDLIFE, Inc.
P.O. BOX 4
KALISPELL, MONTANA 59903

SENATE AGRICULTURE
EXHIBIT NO. 18
DATE 1-30-95
BILL NO. SB 173

January 30, 1995

I'm Bob Cole, President of Flathead Wildlife, Inc. and I wish to testify in favor of SB 173.

Flathead Wildlife is a Sportsman Club with members throughout the FLathead Valley. Most of us are either currant or retired businessmen or professional persons who like to hunt, fish and recreate in Mt. A show of hands at one of our meetings some time ago indicated a 100% opinion that each of us could make more money if we were somewhere other than Montana in our fields of endeavor. We live in Montana because we are willing to take financial loss (don't worry, none of us are starving or on welfare). We don't, however, want to lose what we are willing to take a financial loss to enjoy---namely loss of elk as we Know them.

The Game Farming issue has caused probably the most intense, to say the least, discussions that our club ever worked through. Most, if not all, of us are property owners and as you know, property rights are a hot issue in the Flathead. We, as mentioned, own or owned businesses and understand that if rights are taken from one business, perhaps rights may be next taken from our business and on and on.

Using the old adage "your rights end where my nose begins", we decided our noses begin where the possible destruction of "our" elk begins. We cannot take the chance that domesticated elk with the strong possibility of genetic contamination with red deer may interbreed with wild elk. Most of us have been associated with a ranch or two and none of us believe that it is possible to really eliminate any possibility of contact between wild and tame animals--trees fall over fences, people leave gates open, there are always a few bad apples in any profession or business who take shortcuts or won't cooperate--and on and on. This is a fairly new business and we don't believe there are any financially strapped elk farmers who are hanging on by their fingernails as with cattle, sheep, wheat etc. This is a new thing and it is reasonable to take action now and before we have people turning out diseased or genetically screwed up animals because they aren't profitable or whatever. Our last point is that we are aware that inquiries have been made by an elk farmer who wishes to purchase property in the Swan Valley and raise captive elk for moneyied out of state hunters. That is the Texas way--not the Montana way to hunt!

FLATHEAD WILDLIFE, Inc.
P.O. BOX 4
KALISPELL, MONTANA 59903

Normally we would support any new business venture. Elk and game farming however have too many bad possibilities. It doesn't make economic sense to jeopardize the currant income to the State of about $137,000,000 for goods and services and over $18,000,000 in license fees each year. Since we can take action without great financial loss to the State at this time, we would recommend you pass this bill.

Thanks for your time.

Bob Cole

– I talked to the pres. of the Libby Rod & Gun Club & they wish to endorse this letter w/ the addition "the economic gain doesn't justify the risk".

Tom Horlick (by phone)

SENATE AGRICULTURE
EXHIBIT NO. 19
DATE 1-30-95
BILL NO. SB 173

Arthur D. Callan
935 Corvallis Hills Dr.
Corvallis, MT 59828
January 30, 1995

Senate Committee on Agriculture, Livestock and Irrigation
Senator Klampe's Senate Bill 173 on Game Farms

I support Senate bill 173 the Game farm bill. The agriculture committee is a good place to discuss this measure because agriculture has the most to lose. I am very concerned about game farms and the effect on the livestock industry in this state. Montana's elk and deer game farms have proven to be reservoirs for disease.

The most serious diseases are tuberculosis and brucellosis. The most serious in the publics perception is tuberculosis an insidious disease, slow to kill allowing the disease to infect other animals for a long period of time.

Our wild populations of animals have natural population cycles that help control diseases. Livestock have no such protection, and TB is especially troublesome where livestock and wildlife are confined and concentrated encouraging transmittal of the disease. A hard winter can bring deer and elk into contact with livestock at feeding areas.

How can ranchers survive with reduced herds and no market. Thats where we are headed if we don't get rid of these elk and deer game farms. Tuberculosis is present in captive herds, difficult to detect and pervasive. Our wild herds will probably survive, we may just have fewer animals and fewer hunters.

Game farms have no redeeming attributes.

1) Paying to kill an animal in a fenced enclosure is just blood lust.
2) Red deer genes are endemic in game farms and threaten the genetic integrity of our wild Rocky Mt. elk.
3) Game farms require a subsidy of thousands of dollars to monitor and enforce game farm laws.

Terry Klampe's Bill is the best way to deal with this issue. This bill should be the agricultural industry's Bill.

A healthy farm and ranching community is important to those of us who enjoy our wildlife resources. Thank you.

Sincerely,

Arthur D. Callan

903 South 4th Street
Hamilton, MT 59840
406-363-3485
January 25, 1995

Senator Chuck Swysgood
Chairman, Agriculture Committee
Montana State Senate
Capitol Station
Helena, MT 59620

TE AGRICULTURE
T NO. 20
1-30-95
SB 173

Dear Senator Swysgood,

I will be unable to attend the hearing next Monday on SB 173, sponsored by Senator Terry Klampe from Ravalli County, but would like to enter a few brief comments on this outstanding piece of legislation. I am FAXing this letter to Senator Klampe so that he can distribute it to you and the other committee members.

Game farms present a palpable and serious threat to numerous aspects of Montana life, including agriculture. These operations introduce large animals of questionable pedigrees onto the Montana landscape into situations from which escape is inevitable. Besides the threat of contaminating our valuable and unique native big game species, the so-called game farms produce animals in which diseases dangerous both to wildlife and stock. In particular, the spread of tuberculosis from game farm animals to our wildlife has been documented. The next step in the spread may be to cattle. In addition, the diagnostic assays applied to cattle are unreliable in elk and other game animals. The potential risk to our agricultural industry is too great to accept. One need only consider the recent concerns raised by neighboring states relating to the potential of brucellosis acquired by our cattle from the Yellowstone bison herds.

Further proliferation of game farms will increase the probability of a catastrophe to both wildlife and agriculture and must be avoided at all costs. Furthermore, present game farms need to be phased out. Senator Klampe has examined this problem thoroughly and arrived at an excellent solution that will both remedy current problems and prevent future ones. I urge you and the members of your committee to endorse this bill and strike a blow for the future of agriculture and wildlife in our state.

Thank you for your consideration.

Sincerely,

Marshall E. Bloom, M.D.

January 19th,1995

Senator Charles Swysgood , Chairman
Senate Agriculture, Livestock & Irrigation
Capitol Station
Helena, MT 59620

SENATE AGRICULTURE
EXHIBIT NO. 21
DATE 1-30-95
BILL NO. SB 173

Dear Senator Swysgood,

To many Montana citizens, the establishment of big game farms (elk farms in particular) is an "unnatural act" arousing somewhat the same feelings of abhorrence as mention of other "unnatural acts".

Ravalli County has become the unwelcomening host to several such installations in the past several years much to the anger and frustration of local citizens who have historically regarded our local native wild animals with feelings of reverence, respect, and delight.

The sight of these magnificant creatures behind wire fences, in "barnyards" if you will, whose heritage has been freedom to roam, and to provide an honorable and daunting hunting challenge to our hunters ,gives rise to revulsion and to a determination to see these big game farms abolished.

I need not go into the history of disease transmission etc as this information is well known and verified by qualified biologists. It seems clear to me that the Montana Legislature and the state agency which is supposed to protect our wildlife resources have both been almost criminally remiss in not only allowing such farms but in tolerating their proliferation. in face of the known threats that they represent to wild herds.

Senator Klempe's bill, S 173, is a long overdue effort to right this situation. I sincerely hope that this Committee will take a long hard look at the potential that these farms have for creating terrible problems in Montana, and will support S 173.

cc: Committee members

Sincerely,

Doris Milner
65 Ricketts Rd,
Hamilton,Mt. 59840 (363-1705)

BILLINGS ROD & GUN CLUB

P.O. BOX 33
BILLINGS, MONTANA 59103

Members of the Agriculture Committee
Montana Senate.
Capitol Station
Helena, MT 59620- 1706

Jan. 24, 1995

SENATE AGRICULTURE
EXHIBIT NO. 27
DATE 1-30-95
BILL NO. SB 173

Members;

The members of the Billings Rod and Gun Club ,(807 families in the Billings area), request that you Support S.B. 173 by Senator Terry Klampe. As you know, this bill is designed to phase out game farming in our state and reimburse present game farm operators.

It is our opinion that this issue goes far beyond the concept of personal property or individual freedom. Fallow Deer running loose in the Pryor Mountains, animals that contain both elk and European red deer genes near Ovando and Montana game farm elk causing T.B. outbreaks in Alberta, Canada demonstrate that Game Farming has far-reaching impacts that remove it from any personal property justification.

We believe the livestock industry in this state should favor the elimination of game farms in order to protect their T.B. Free Status. Two states, (New York and Pennsylvania), lost this status as a direct result of game farm animals infecting domestic livestock. The track record of game farms operations in this state should be evidence enough that it will happen here.

Surely, no one believes that the Montana Department of Agriculture can do a better job of controlling game farm violations than the Fish, Wildlife and Parks with it's cadre of trained, experienced law enforcement people.

ASK YOURSELF IF YOU THINK THE TAXPAYERS OF THIS STATE ARE PREPARED TO PAY THE COST OF PROTECTING DOMESTIC LIVESTOCK AND WILDLIFE FROM THE THREAT OF DISEASE AND HYBRIDIZATION BROUGHT ABOUT BY AN EVER EXPANDING GAME FARM INDUSTRY.

The final issue concerning those of us who hunt wild game is the insult to our hunting heritage that occurs when animals are killed in pens. Has the obsession with money brought us to the point where "Fair Chase" no longer matters?

We believe the citizens of this state, be they sportsmen, livestock producers or just plain taxpayers have much to lose if game farming is allowed to continue. Please support S.B.173 as submitted by Senator Terry Klampe.

Sincerely

John Gibson

John Gibson
Chairman, Legislative Committee.
2512 Broadwater Billings MT 59102

I concur:
Paul F. Berg, President,
Southeastern Montana
Sportsmen Association.
Jan. 28, 1995

Saskatchewan
Research Council

BOVINE BLOOD TYPING LABORATORY

15 Innovation Blvd. Saskatoon, Saskatchewan Canada S7N 2X8 Phone: (306) 933-7700 Fax: (306) 933-5505

March 21, 1994

SENT VIA FAX

Mr. Ward Swanser
Moulton, Bellingham, Longo and Mather P.C.
Suite 1900, Sheraton Plaza
27 North, 27th Street
Billings, Montana 59103-2559
U.S.A.

Dear Mr. Swanser:

Dr. Jerry Haig from Saskatoon provided me with many pages of correspondence and documentation pertaining to the detection of alleged elk-red deer hybrids in Montana. He told me that you had sent him these documents. Dr. Haig asked me to review this material, also on your behalf, and relay my comments to you.

1. Concerning the reports from the Oregon laboratory dated November 15 and November 23, 1993. Four specimens were submitted (Lab-1 to 4) and the results showed that three were from one and the same animal.

The report dated November 15, 1993, states that: "Lab-2, Lab-3 and Lab-4 showed banding patterns for superoxide dismutase and hemoglobin that are more typical of samples from elk-red deer hybrids than from native North American elk."

Unfortunately, the exact types, Hb AA, AB or BB and SOD FF, FS or SS were not given. SOD is a secondary marker and does not give conclusive evidence on the purity status of a single individual. Hb is a primary marker. If Hb showed a red deer specific band, why does the lab report not state that samples Lab-2 to 4 are from a hybrid rather than give the ambiguous conclusion "more typical of---elk-red deer hybrids than---elk."

Our laboratory can not be characterized as a forensic laboratory and we have done little forensic work using blood groups and blood proteins in elk and cattle. (We do a considerable amount of forensic work using DNA). In our limited experience we have not been able to characterize in a reliable manner blood proteins such as hemoglobin and transferrin obtained from tissue extracts.

...2

2. Concerning the reports from the Oregon laboratory dated January 11, 1994 and January 25, 1994. Of special interests are the samples Lab 12 and Lab 18.

The DNA tests show that these samples are most likely from one animal. The SOD test results show that these two samples "could come from elk, red deer or an elk-red deer hybrid." In other words, the test results were inconclusive. Again, the exact test results were not provided.

3. Concerning the reports from the Oregon laboratory dated February 15, 1994 and February 17, 1994. Sample Lab-20 was determined to originate from "a North American elk, a European red deer, or an elk/red deer hybrid." It was also determined that the samples Lab-12, Lab-18 and Lab-20 were from one and the same animal.

Is there any connection between the samples Lab-1 to 4 as examined in November, 1994 and the samples Lab-1 to 25 as examined in January and February, 1994? Are there two animals that could be "an elk, a red deer or an elk-red deer hybrid" or is there only one?

It is interesting to note that the samples tested in November, 1993 were examined for hemoglobin types and the samples tested in January and February, 1994 were not. Is there any particular reason for this change in test techniques?

As mentioned before, SOD is a secondary marker. This means that the three types FF, FS and SS occur in both elk and red deer, but in different frequencies. I have presented these frequencies in the article that Vicki Gerwing and I wrote a few years ago. These data were based on 88 wild elk from Alberta and 122 red deer from deer farms in Eastern Canada.

In January, 1993 we tested 66 elk samples submitted by the Department of Wildlife in Colorado (John Seidel). I presume these were all wild elk, although I do not have written documentation stating this.. None of these showed red deer genes in pTf or Hb.

I will here tabulate the data on the three groups of animals.

SOD type	88 Elk - Alberta		66 Elk - Colorado		122 Red Deer-E. Canada	
	number	%	number	%	number	%
FF	57	65	41	62	1	1
FS	26	29	22	33	10	8
SS	5	6	3	5	111	91

SENATE AGRICULTURE
EXHIBIT NO. 24
DATE 1-30-95
BILL NO. SB 173

Sun River Game Park
Jack and Ellen Schubarth
Box 132 Star Route
Vaughn, Montana 59487

SN BILL 173

SENATE COMMITTEE MEMBERS;

MY NAME IS JACK SCHUBARTH. I HAVE BEEN A GAME FARMER SINCE 1987. I HAVE NEVER HAD AN ESCAPE, WE HAVE NEVER HAD A CASE OF TB OR FOR THAT MATTER A CONTAGIOUS DISEASE

MR KLAMPE'S BILL IS BASED ON FALSE INFORMATION ABOUT HYBRIDS AND DISEASE. HE AND OTHERS ARE USING EMOTION AND MISINFORMATION TO TRY TO RID A VIABLE INDUSTRY FROM THE STATE OF MONTANA. THE FACTS ARE THEIR WERE NO HYBRIDS IN THE AVON AREA IN THE ELK. THE FACT IS OUR DEPARTMENT OF LIVESTOCK IS THE ONLY AGENCY ABLE TO DETECT A DISEASE ON GAME FARMS. WE TRUST THIS AGENCY TO DETECT DISEASE IN OUR CATTLE AND SHEEP INDUSTRY SO WHY DOES MR KLAMPE FEEL THEY CAN'T DO IT IN OUR INDUSTRY? THE FACT IS THE TB FOUND IN OUR ELK HERDS IS FROM THE 80'S WHEN THERE WERE INACCURATE TESTS FOR TB BEING USED. THE TEST NOW BEING USED FOR TB IN ELK AND DEER IS AS ACCURATE AS THE TEST BEING USED FOR OUR CATTLE AND SHEEP INDUSTRY. SO IF YOU FEEL SAFE THAT OUR CATTLE AND SHEEP INDUSTRY WILL NOT CAUSE A TB PROBLEM IN OUR STATE, IT STANDS TO REASON THE GAME FARM INDUSTRY IS AS SAFE, ESPECIALLY WHEN YOU CONSIDER THE GAME FARM ANIMAL IS BEHIND A EIGHT FOOT FENCE. THE FACT IS THERE IS NO TB IN ANY GAME FARM IN THE STATE AT THIS TIME. THE FACT IS THAT THE AGENCY ASSIGNED TO INSPECT OUR FENCE SINCE 1983 WAS THE FISH AND GAME . MOST GAME FARMS WERE NOT INSPECTED, THIS SHOWS THE LACK OF INTEREST THIS AGENCY HAS HAD IN THIS INDUSTRY. THE FACT IS I STARTED GAME FARMING IN 1987 AND HAD ONE INSPECTION FROM THE DECK OF MY HOUSE IN 1987, FROM 1987 TO 1991 I NEVER HAD ANOTHER INSPECTION. THIS AGENCY HAS A VERY POOR RECORD WITH OUR INDUSTRY.

HYBRIDS WERE A CONCERN FOR THE GAME FARM INDUSTRY WHEN THE PROBLEM SURFACED. WE REQUESTED HELP FROM THE REGULATORY AGENCY FOR SOME KIND OF CERTIFIED PROGRAM TO TEST THE ELK OF MONTANA BUT WERE TURNED DOWN. WE THAN DID WHAT ANY RESPONSIBLY INDUSTRY WOULD DO. WE STARTED OUR OWN TESTING FOR HYBRIDS IN OUR HERDS. TO OUR KNOWLEDGE THERE ARE NO HYBRIDS IN THE STATE. THE FACT IS I ASKED KAREN ZACKHIND FROM FISH AND GAME IF SHE KNEW OF ANY IN THE STATE SHE REFUSED TO HELP ME IN THIS CAUSE. THIS IS WHAT I WOULD CONSIDER TO BE A NORMAL RESPONSE FROM OUR REGULATORY AGENCY.

I BELIEVE THIS IS REASON ENOUGH TO TABLE SB173 AND SUPPORT OUR SB 215 AND PUT THIS INDUSTRY WHERE IT BELONGS, IT'S PRIVATE OWNED LIVESTOCK, NOT PUBLIC OWNED WILDLIFE. PLEASE PUT US UNDER THE DEPT. OF LIVESTOCK. THANK YOU. JACK SCHUBARTH

NAME Dave Campbell

ADDRESS 1034 17th Ave SW - GT Falls, MT 59401

HOME PHONE 406 761-7556 WORK PHONE 406 761-1644

REPRESENTING United Bowhunters of Montana

APPEARING ON WHICH PROPOSAL? SB 173

DO YOU: SUPPORT X OPPOSE _____ AMEND _____

COMMENTS:

I was very disappointed in the short amount of time that I was given to present our position + testimony - Our organization spent much time surveying our membership. We are made up of people all over the state of Montana. Would would ask that you read the written testimony and our survey results that we have presented you. Hopefully we have presented you with a lot of helpful information. This is not only an Economic issue or a Fwp land issue. This issue strongly affects all montanans - Please take it seriously + give it its just due. The people will not let this issue go to rest for this Committee transferring authority to the Dept of Livestock.

Thank You

WITNESS STATEMENT

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

WITNESS.F11

EXHIBIT 24
DATE 1-30-95
SB 173

NAME Don Majors

ADDRESS 3269 Wood Duck Ln, Stevensville MT 59870

HOME PHONE 777-3642 WORK PHONE —

REPRESENTING Self

APPEARING ON WHICH PROPOSAL? _____

DO YOU: SUPPORT X OPPOSE _____ AMEND _____

COMMENTS:

See attached

WITNESS STATEMENT

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

WITNESS.F11

EXHIBIT 24
DATE 1-30-95
SB 173

January 22, 1995

Senator Swysgood:

Dear Mr. Swysgood:
Their have been a number of questions asked by many sportsmen throughout the state about game farms and how they will be run. In January of last year, sportsmen of Ravalli County asked the Department of Fish Wildlife and Parks many explicit questions, and to this date, have not received the answers. Following are those questions which I hope the committee will consider in any action taken concerning game farming in Montana.

1. By whom and how often will the fences be checked? Who pays?

2. By whom and how often will the animals be counted, vaccinated and health checked? Who pays?

3. By whom and how often are health inspections conducted on the property and what diseases are these animals tested for. Who pays.

4. If any animals become sick and have to be quarantined, what rules are followed. Are all the animals that had contact with the infected ones quarantined. Are all the quarantined pens separated and do they have a independent water source that will not contaminate creeks, rivers or drainage ditches. Who pays.

5. What rules apply if either brucellosis or tuberculosis is found in any game farm animals.

6. If native animals {elk, deer, birds etc.} get in one of the enclosures, who's job is it to report this intrusion, what would be the recommended method of removal? and again Who pays?

7. If domestic animals {game farm} elk, deer, etc., get out of the enclosures, who's job is it to notice the escape and what is the recommended method of recapturing these game farm animals, also what time frame will be acceptable for recapture, and who will pay.

8. If game farm operators fail to comply with rules and regulations, what fines will be levied, what will the structure and amount of these fines be? who will pay for the administration?

9. What are the legal tagging requirements for game farm animals? We hope the ear tags would be large enough to be seen from a distance of at least 100 yards.

10. What position and or consideration has been taken concerning predatory birds and animals inside the enclosure?

These are but a few of the questions. Should we sportsmen be UNABLE to convince our legislators that game farms are NOT in the best interest of Montana, it should then become obvious to everyone of the risk the wildlife of this great state will have to endure. In the past year {1994 } game farms have cost the sportsmen of Montana over a 100 thousand dollars in administrative costs. These costs must be paid by the owners of these businesses in the future, and they should not be subsidized by anyone else. If game farms are to be a part of Montana in the future, it is up to you legislators to see to it that the publics wildlife is NEVER placed at risk in anyway.

It has been said that the Department of Livestock should be the governing body for game farms in the future, because they have better control of our borders, and no animals will enter or leave Montana without health certificates {really} then tell us how on April 5, 1991, 1085 sheep, were delivered to the Shinning Mountain Ranch in the Sula Basin without health certificates, or a import permit.. Some of these sheep were found to be diseased. Boone Jones was the inspector, and Jack Ward was the Vet.

We have questioned may people about program diseases such as brucellosis and tuberculosis and feel it is your responsibility as our legislators to be as well informed as possible.
The Montana State Vet Mr. Siroky is by no means the only and last word on disease. Listed below for your convenience are the names and numbers of people that should be contacted before you proceed.

Dr. Bob Meyer USDA\APHAS Colorado: 303-748-6201
National Vet Service Lab: Jake Ryhan Vet Pathologist Iowa: 515-239-8521
Vic Nettles, South East Disease Leader for wildlife in Athens, Georgia: 404-592-1741
Tom Thorne wildlife Vet in Wyoming: 307-766-5629
Mike Miller wildlife Vet in Colorado: 303-484-2836
Dave Hunter wildlife Vet in Idaho: 208-454-7638 or 208-327-7070
Keith Aune wildlife Biologist in Montana: 406-994-3285

Thank you for your consideration!

Sincerely,
Directors: Ravalli County Fish & Wildlife Assoc.
cc: All Ravalli County Legislators:

DATE 1-30-95

SENATE COMMITTEE ON Agriculture

BILLS BEING HEARD TODAY: SB 173

< ■ > PLEASE PRINT < ■ >

Name	Representing	Bill No.	Check One: Support	Oppose
Steve Wilson	Myself	SB173	X	
Linda Habeck	Self	SB 173	X	
Stephen Kenley	Ravalli Co. Fish+Wildlife Ass.	SB173	X	
Art Callan	Self	SB173	X	
BILLIE ELLIOTT	SELF	SB 173	X	
STAN RAUCH	Self	SB173	X	
HARRY LAFRINIERE	SELF	SB173	X	
Jim Posewitz	Orion-The Hunters Inst.	SB173	X	
Dolores D'Angel	Self	SB173		X
Bob Sparks	Self			X
Jim McDermand.	Medicine River Canoe Club.	SB173	X	
John Tannowski	Self	SB173	X	
Bob Cole	Flathead wildlife	SB173	X	
Dave Majors.	Self	SB173	X	

VISITOR REGISTER

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

REGISTER.F10

DATE 1-30-95

SENATE COMMITTEE ON Agriculture

BILLS BEING HEARD TODAY: SB 173

Name	Representing	Bill No.	Check One: Support	Check One: Oppose
Eric Grove	SELF	SB 173	✓	
Vince Fischer	Skyline Sportsmen Assoc 800 Members	SB 173	✓	
Jim Jensen	MEIC	SB 173	X	
Bill Cebedra	Self	SB 173	X	
Mark Mitchell	Montana Feedlot	SB 173		X
Amy Titzemeier	Self-Livingston	SB 173	X	
Bill Nyby	Spoklie Elk Ranch	SB 173		X
Jack Bridgewater	MGBA	SB 173		X
Myra Bridgewater	MGBA	SB 173		X
Jim Richard	MWF	173	✓	
John W. Hart	self	SB 173	X	
Alan F. Blakley	Self	SB 173	X	
Roger Nelson	SELF	SB 173		✓
Leslie Okel	self		✓	

VISITOR REGISTER

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

F10

DATE 1-30-95

SENATE COMMITTEE ON Agriculture

BILLS BEING HEARD TODAY: SB 173

< ■ > PLEASE PRINT < ■ >

Name	Representing	Bill No.	Check One: Support	Oppose
S. John Smith, DVM	MT Veterinary Medical Assn	SB173		✓
Noel Rosetta	Helena Cow Coalition	SB173	✓	
Bill Nyby	Montana Game Breeders Assn	SB173		✓
Gerri Backes	Montana Game Breeder Assn	SB173		✓
Mike Ashes	Montana Opposed Lobby	SB173	✓	
Janice Kerr	MT Wildlife Recovery Program	SB173	✓	✓
Larry Townsend	MT Wildlife Recovery Program	SB173	✓	
Mike Miller	Colo Div of Wildlife	SB173		
Bruce Barta	Montana Game Breeders Ass	SB173		✓
Everette Maxwell	Self	SB173	✓	
Scott Schubarth	Montana Game Breeders Ass	SB173		✓
Bill Dougherty	Montana Game Breeders	SB173		✓
Ed Johns	Russell Country Sportsmen	SB173	✓	
Ellen Schubarth	Vaughn, MT. Game Farm	SB173		✓

VISITOR REGISTER

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

REGISTER.F10

DATE 1-30-95

SENATE COMMITTEE ON _____ Agriculture

BILLS BEING HEARD TODAY: SB 173

< ■ > PLEASE PRINT < ■ >

Name	Representing	Bill No.	Check One: Support	Oppose
Joe Gutkoski	Gallatin Wildlife Assoc.	SB 173	✓	
James Kemp	Self	SB 173	✓	
Alan Rollo	Self	SB173	✓	
Jim Bradford	Montana Bowhunters Assoc	SB173	✓	
DAVE Campbell	United Bowhunters of Montana	SB 173	✓	
Jim Shelton	Self	SB173		✓
Val GEIST	self	SB173	✓	
DENNIS IVERSON	MGBA	SB 173		✓
Kate Ann	Self	SB 173		✓
JACK Schubarth	self	SB173		✓
Leni Feeler	Self	SB173		✓
James Ralph Feeler	self	SB 173		✓
ARTHUR SCHUBARTH	SELF	SB 173		✓
JACK & MYRA BRIDGWATER	MGBA	SB 173		✓

VISITOR REGISTER

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

REGISTER.F10

DATE 1-30-95

SENATE COMMITTEE ON _____ Agriculture

BILLS BEING HEARD TODAY: SB 173

< ■ > PLEASE PRINT < ■ >

Name	Representing	Bill No.	Check One: Support	Oppose
Bob Lovegrove	Ravalli Co. F+W. Assoc.	SB173	X	
DOUGLAS COMBS	Hamilton F+W. Assn	SB173	X	
Gayle Joslin	MT ASSN FISH & WILDLIFE BIOLOGISTS	SB173		
Stan Frasier	Self	SB173	X	
DON Bianchi	"	"	X	
John Bloomquist	Mt. Stockgrowers	SB173		X
BOB BUGNI	DAIRY PEPSI SPORTSMAN ASSN	SB173	X	
LARRY Brown	Ag. Pres. Assoc	SB173		X
John Grove	self	SB173	X	
Darlene Grove	✓	SB173	X	
Mick Womersley	University of Montana	SB173		
Michelle Brown	University of Montana	SB173		
Christine Phillips	self	SB173	✓	
Robert Lee	self	SB173	✓	

VISITOR REGISTER

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

REGISTER.F10

DATE 1-30-95

SENATE COMMITTEE ON Agriculture

BILLS BEING HEARD TODAY: SB 173

Name	Representing	Bill No.	Support	Oppose
Chancy Rolls	Self	SB 173		✓
HERB JOHNSON	MONTANANS OPP GAME F	SB173	✓	
Darlene Grove	Self	SB173	✓	[illegible]
JOHN GROVE	Self	SB 173	✓	
~~[illegible]~~	—	~~SB173~~		~~[illegible]~~
SAM BABICH	Self		✓	
BILL HOLDORF	SKYLINE SPORTSMEN		✓	
Tony Schoonen	State Land (Co).	SB173	✓	
L.F. Thomas	ANACONDA SPORTSMEN		✓	
Deborah Taylor	Helena		✓	
Lorna Frank	MT. Farm Bureau	SB173		✓
JACK HAYNE	SELF RANCHER			✓
Pat Simmons	Self	SB173	✓	
Janet Ellis	MT Audubon	SB173	✓	
Maureen Clary-Schwinden	Women In Farm Eco	SB173		
Gary Powell	Self	SB173	✓	

VISITOR REGISTER

PLEASE LEAVE PREPARED STATEMENT WITH COMMITTEE SECRETARY

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