

AN OUTBREAK OF PINKEYE IN BIGHORN SHEEP, YELLOWSTONE NATIONAL PARK:  
A PRELIMINARY REPORT

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ABSTRACT

Blindness in a number of bighorn sheep (*Ovis canadensis*) rams was first reported to park personnel December 13, 1981. Initial field surveys of sheep wintering in the Mt. Everts area indicated eye problems in both sexes and all age classes. Prevalence was highest in rams. Prevalence was less or nonexistent in bighorn sheep groups elsewhere on the northern winter range. Keratoconjunctivitis or pinkeye was suspected by consulting veterinarians when the condition as observed in the field was described. Necropsies conducted by the Montana Dept. of Livestock Diagnostic Laboratory at Bozeman, Montana, confirmed the condition; diagnostic procedures indicated the causative organism was *Chlamydia* sp. Mortality occurred directly because of accidents to blind animals and destruction of affected individuals which were helpless on a main road. Mortality occurred indirectly through impairment of foraging and sheltering ability. Individuals were observed in which affected eyes appeared to be healing naturally. Effects of the outbreak on the population will be assessed after an aerial count in the spring.

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REPORT

Blindness in some of the rams of the bighorn sheep population which winters on the west and north lower slopes of Mt. Everts (Figure 1) was first reported to park personnel December 13, 1981. Initial field surveys indicated that both sexes and all age classes were affected. Surveys of 117 and 107 sheep on December 14 and 22 respectively showed a prevalence of 25 percent, with 60 percent of the rams affected. Ratio of affected rams: ewes was approximately 10:1. As winter progressed survey results appeared more biased, apparently because healthy animals were better able to move to shelter.

Prevalence of pinkeye in bighorn sheep elsewhere on the northern winter range appeared less or nonexistent. Ten of 60 sheep observed during a ground survey in the less accessible area of Junction Butte - Specimen Ridge on January 1, 1982, had signs of pinkeye. One affected ram, and possibly a second individual, were observed in a group of 11 near Junction Butte during an aerial survey of 109 sheep in that general area and

eastward in early January. No cases were reported among the bighorns just north of the park near Cinnabar Mountain.

Keratoconjunctivitis, or pinkeye, comparable to that reported for livestock and some other species of wildlife, was suspected by consulting veterinarians when the condition as observed in the field was described (Dr. W. Quinn, Dr. T. Thorne, pers. comm.<sup>1</sup>). Necropsies conducted by the Montana Department of Livestock Diagnostic Laboratory at Bozeman, Montana, confirmed the condition; diagnostic procedures indicated the causative organism was *Chlamydia* sp. (Dr. W. Quinn, pers. comm.). The disease had not been reported previously in bighorn sheep (Dr. T. Thorne, pers. comm.).

The outbreak probably began in mid to late October; a ewe apparently suffering from this condition was seen October 31, but not reported then. The extent of the outbreak was influenced by the movement of the bighorns to winter ranges and the onset of the rut. Transmission apparently peaked during the rut and dropped abruptly thereafter in late December.

Based on the field observations, the course of the disease appeared as follows: incubation for perhaps a week; a period of intense irritation of the eyes with copious discharge (the eye or eyes were partly to completely closed, sometimes with obvious swelling of the lids); affected eyes a cloudy, milky, blue-white, generally open, sometimes less so in bright light, discharge generally less, and eye ruptured, animal blind or healing process began. Dense white scar tissue was seen in some eyes which in some cases appeared to be a permanent condition of a blind eye. Eyes of individuals were commonly observed to be in differential stages of the disease.

Affected animals were noticeable by their circling behavior when disturbed. Some undisturbed animals also circled; apparently they were restless and wished to move but could not see to travel. Animals also used a rather stilted "testing" walk, especially down grades. Afflicted animals appeared to adjust to some degree in making short range movements and later moved more normally when undisturbed. Blind individuals in the company of other bighorns moved more easily, apparently using their hearing ability.

Mortality appeared to have peaked during the first part of January, but continued at a lower rate at least through February. Mortality occurred directly through falls and destruction of blind animals which become helpless on the main road through a canyon. Mortality occurred indirectly through inability to forage and shelter adequately. Individuals continued to die during and after recovery from the infection because of loss of energy reserves while their vision was impaired.

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<sup>1</sup> Dr. W. Quinn, Montana Department of Livestock Diagnostic Laboratory, Bozeman, MT. Dr. T. Thorne, Wildlife Research Laboratory, Laramie, WY.

The exposed population units may have totaled 300 bighorn sheep out of an estimated park population of 550-600. Expected mortality was estimated conservatively at 50-70 individuals; by early February known mortality, mostly related to the outbreak, was 50. That number included 22 rams of various ages, 16 ewes, 5 lambs or yearlings, and 6 unknowns. A further assessment of the effects on the population will be made after an annual aerial count in the spring.

#### ACKNOWLEDGEMENTS

I thank the Foundation for North American Wild Sheep for financial assistance with the monitoring effort, much of which was done by Dave DelSordo. Field surveys were conducted with the assistance of many park people; Sandi Fowler was particularly helpful.

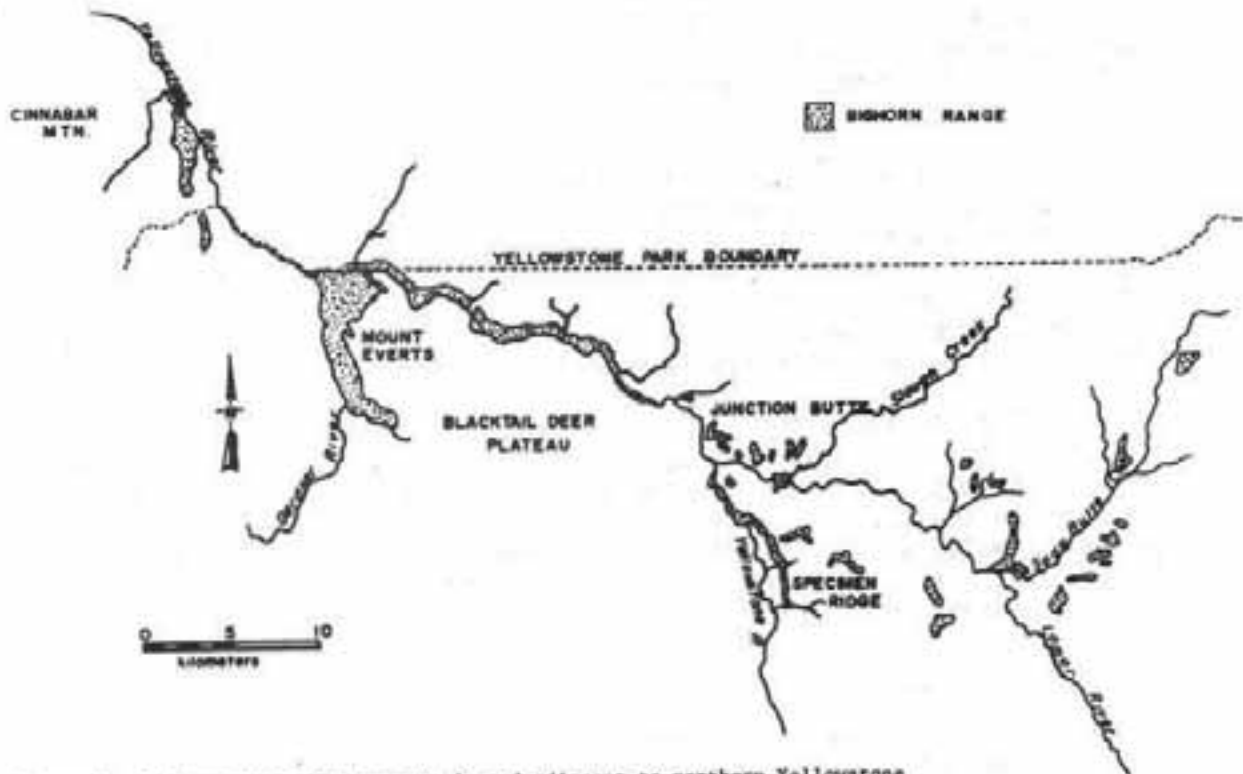


Figure 1. Bighorn sheep winter range in and adjacent to northern Yellowstone National Park. Adapted from Houston, D.B., The Northern Yellowstone Elk, in prep.

## CONFERENCE DISCUSSION

Questions regarding this paper were answered by Tom Thorne, who read the paper.

Q. Was there any contact with domestic livestock?

Ans. If there had been livestock on the range, I probably would have been quick to blame them also, but in the absence of livestock it would be pretty hard to say how bighorns might have contacted the infection from livestock. There was a great deal of controversy regarding whether or not to try to deal with the disease by treating the sheep. The Park Service caught a lot of flak and a lot of grief over it. I personally feel they probably did the right thing, but if it occurred outside the Park where we had access to the animals and they are managed by the Game and Fish Department for different purposes, I'm sure we'd handle it differently.

Q. In Bear and Jones (1973) there is a report of a ewe that was found in about 1954 in the Gore Range of Colorado, which was grazed by domestic sheep. The people who found the ewe said she had pink eye. She was blind.

Ans. Did they demonstrate Chlamydia?

Q. No.

Ans. Pink eye is about the worst term this disease could be called by. Pink eye is catch-all term. You could poke your finger in a sheep's eye and his eye would run and you could call it pink eye. He could have Moraxella sp. infection, it could be due to a sequela of blue tongue, a number of other bacteria and so on. So one individual way back when, when no etiologic agent was identified, does not make a diagnosis as far as I'm concerned.

Ans. Yes, I understand that, but that was one incident that was at least reported. Another thing, Mary Meagher told me that domestic sheep were recently moved onto the range of the Cinnabar herd, and that the Cinnabar herd exchanges individuals with the Mt. Everts herd.

Ans. (Shawn Stewart) However, I believe no infection has been documented in the Cinnabar herd.