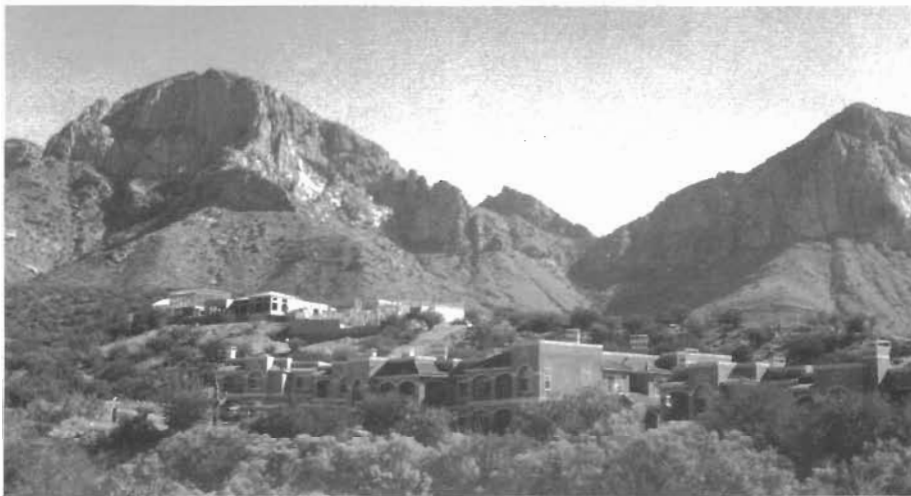


Standing on the Edge

By Jim Heffelfinger,

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Photographs courtesy of the Arizona Game and Fish Department



New development at the base of Pusch Ridge.



Desert bighorn ram and ewe on Pusch Ridge overlooking the city of Tucson.

The problems surrounding the management of this herd are not unique; it is the classic case of trying to preserve a place for wildlife in the face of inevitable human expansion.

The Santa Catalina Mountains north of Tucson, Arizona felt the hooves of desert bighorn sheep on its spires and rocky crags long before it heard the wail of police sirens below on the streets of the city. This is the southeastern-most extant herd of desert bighorn sheep in Arizona. This herd has never been supplemented with additional sheep, except for a few transients from other transplants who decided they knew more about bighorn habitat needs than us biologists.

For years this population fared remarkably well despite ever growing pressures from Tucson's wildfire-like growth. However, this is not exactly the type of wildfire the sheep need right now. Arizona Game & Fish Department (AGFD) records show a survey conducted in 1936 resulting in a total of 48 sheep observed all along the southern face of the Catalinas. The number of sheep observed in the Pusch Ridge Wilderness (PRVW) of the Santa Catalina Mountains has declined steadily for the past 10 years. Survey totals dropped from 50 in 1986 to just 3 observed in 1995. The last ram taken by a hunter was in 1993, before the hunt was closed the following year.

There has been no obvious incidents of disease throughout this period. This population was watched very closely because it is literally in the backyard of many sheep enthusiasts. Nothing resembling a disease problem has ever been reported and the decline has been gradual through the last decade. If disease played a part it would have to have been indirectly through effects on reproduction.

A surprising amount of research has been conducted on the potential limiting factors for the sheep of the PRVW. Research-

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ers at University of Arizona have shown that Pusch Ridge sheep were not limited by forage quantity or quality in the dry year of 1987-88. They suggested future research focus on other factors which may limit sheep. The same research concluded fire is important for this population because it reduces tall vegetation that can obstruct vision by sheep which can lead to less use of some habitat and probably to higher mortality from predation. They went on to say fire could be an important tool in restoring abandoned desert bighorn sheep habitat in PRW.

In the early 1980's, Purdy and Shaw found PRW received in excess of 34,000 recreational visitors annually. Their study showed that backcountry visitors favor recreational use restrictions if necessary for the welfare of the sheep population. They recommended "the timely implementation of a program of habitat rehabilitation through prescribed burning and a well planned and well enforced set of recreational restrictions" to improve the chances of the long-term survival of this herd.

Richard Etchberger compared habitat abandoned by sheep in PRW with presently used habitat and found some interesting differences. He estimated this herd abandoned 80 square miles of historic habitat and now occupy 17 square miles. Habitat presently used by sheep in PRW has less



Pusch Ridge Wilderness desert bighorn ram.

human disturbance, is more open, and has more side oats grama, red brome, brittle bush, and forb cover than habitat abandoned by sheep. Etchberger stressed the importance of minimum human disturbance in sheep habitat and fire for improved habitat visibility.

Graduate student, Lisa Harris completed a study on the effects of recreational use in PRW. She reported over 24,000

recreationists annually on the Pima Canyon Trail alone. She also reported an estimated 2,824 dogs per year on this trail, of which 1,800 were unleashed despite the Pima County leash law. She found that 59.6% of the recreational users supported some type of recreational closure if sheep abandoned habitat because of human activity. Of the homeowners surveyed (within 1 mile of the PRW boundary), 78.6% observed free ranging dogs in their neighborhood. A full 67.2% of the users themselves agree or strongly agree that dogs should be restricted in PRW. Only 2.5% of the users said the primary purpose of using the wilderness was to walk their dog.

The Catalina Ranger District has sheep habitat characteristics stored in a Geographical Information System (GIS) format. This database includes locations of water sources, riparian areas, rocky outcroppings, historical fire occurrences, vegetation types, trails, and roads. Any of these "layers" of information or combination of layers can be printed in map form.

As you can see there is a lot of good information with which to manage this sheep herd, far more than is available for most sheep populations on the continent. It is time to stop asking questions and start answering some. There are several problems facing this herd including but probably not limited to, brush encroachment, low lamb survival, apparently high lion densities, high recreational use, urban encroachment, unleashed dogs, and possibly the bisecting of corridors for genetic exchange with other populations. All of these problems are intermingled but they can be distilled into two main categories:

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ries: human disturbance and brush encroachment.

This population is undoubtedly the most unintentionally harassed bighorn sheep herd in Arizona. The Pusch Ridge Wilderness is the backyard playground for so many Tucsonans, we may be loving this sheep herd to death. We are faced with the age old problem of letting an unlimited number of people enjoy a wilderness experience. When Aldo Leopold was in the U.S. Forest Service in the Southwest, long before this nation had its first wilderness, he often argued for "some logical reconciliation between getting back to nature and preserving a little nature to get back to."

Every weekend during the spring, recreationists launch a frontal assault on the mountain. The trails in PRVW mostly follow the riparian zones which sheep use very little. It is not the trail users that disturb the sheep as much as the increasing number of off-trail users. Many of these recreationists bring their dogs and allow them to run free in violation of a county leash law. There always was a dog closure in place within a core area of the PRVW, but was largely ignored. The closure began 1/4 mile up the trail; by the time someone traveled that far with Fido, they were committed and reluctant to return to the car. Research has shown that a dog need not chase an animal to cause an increased heart rate. The mere presence of a dog can cause an increased level of stress to sheep.

The high human use in the early spring unfortunately corresponds to the peak in lambing when ewes retire to traditional lambing areas in escape terrain. There are other populations in which bighorn sheep come into close contact with humans and urban areas. The difference with the Pusch Ridge sheep seems to be that they do not have an extensive area to retreat to in solitude. Human disturbance occurs not only around the periphery of the sheep habitat but all throughout as well.

Urban encroachment right up to the base of PRVW eliminates or limits the use of the foothills, or *bajadas*, by sheep. In other more remote populations sheep make extensive use of the lower slopes at some times of the year. That option is rapidly being taken away from sheep inhabiting the PRVW. The highest concentration of sheep has always been on Pusch Ridge itself, a massive ridgeline which forms the southwestern corner of the Santa Catalina Mountains. The city of Tucson has grown around 3 sides of Pusch Ridge like something out of a 1950's science fiction movie. It is hard to quantify the effect of urban encroachment, however, watching law enforcement officers perform a felony stop on Oracle Road some

night can't possibly be positive stimuli for a band of desert bighorn sheep. Many of the resorts encroaching the wilderness have plans for expansion. Residential lots adjoining the wilderness boundary command top dollar - wilderness is so beautiful and pristine everyone wants to build a house on the boundary fence.

Sheep movements between Southern Arizona mountain complexes were probably more frequent before we criss-crossed the desert with highways and canals. Some sheep still effect long range movements from one "population" to another. We are aware of the PRVW herd receiving two additional rams from other mountain ranges in past years. One came from the east and one from the north; both were sheep that were recently transplanted and apparently didn't like their new home. Immigration from the east and north may indicate that the large canal (Central Arizona Project) to the west and Interstate 10 to the south and west are providing a barrier to movements. Besides the obvious problems inherent in managing a sheep population close to a large metropolitan area, we also have to contend with mother nature. The sheep habitat in the

PRVW has suffered from what can be called the "Smokey the Bear Syndrome". So many of us grew up with that big lovable bear telling us that fire was bad for wildlife. With an increase in brush encroachment, sheep habitat starts looking a little less like sheep habitat and a little more like lion habitat. We all know what affinity lions have for sheep steaks. Over the years, local sheep enthusiasts glassing the Pusch Ridge area have seen an unusually high number of lions; more than the average person sees while glassing. If lion populations are high in PRVW and sheep numbers low, it could be a contributing factor to declining sheep observations and low lamb survival. It would be nice to get a pack of hounds in there and remove some mutton-munchers but the dog closure makes this option illegal; the plot thickens.

Besides public misconceptions about the value of fire, there are some real concerns about burning in the PRVW. Because of years of fire suppression, we now have dangerously high fuel loadings in some areas of the mountain. Fire entering some of these areas could get out of control quickly, and with the

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small community of Summerhaven directly up hill, there are some understandably concerned citizens and Forest Service administrators. Another chronic problem with a let-burn policy is complaints of heavy smoke. Many people moved to the Tucson area because of respiratory problems and it is inconceivable to them that some inconsiderate government bureaucrats are jeopardizing their health for a bunch of sheep.

USFS policy is to control fire in the PRW when it approaches within 1 mile of the Forest boundary with human developments. Eichberger estimated that 80% of the habitat still used by sheep in PRW is within 1 mile from a boundary. Also, the Forest Service Manual (2324.22, #7) states "*Do not use prescribed fire in wilderness to benefit wildlife, maintain vegetation types, improve forage production, or enhance other resource values*". Ironically, it is perfectly alright to use prescribed fire in a wilderness to maintain vegetation types and improve forage production for cattle grazing within the wilderness (but not native bighorn sheep).

Treating the brush with a chemical such as tebuthiuron to kill it without the safety concerns associated with fire would probably work well. Mentioning the prospect of chemically treating a wilderness area, however, tends to make wilderness managers throw back their heads in a sort of insane kind of laughter. I don't think it's an option in light of today's set of restrictive wilderness management rules.

Actually, 4 prescribed fires and 2 wildfires have burned from 1,350 to 4,300 acres in the PRW in the last decade. However, both wildfires were actively suppressed and only one of the prescribed fires has occurred since PRW was designated as wilderness in 1987. This burn, the Buster Burn, took a considerable effort culminating in a signature from the U.S. Forest Service Chief. The original fire plan for the Buster Burn called for a larger fire but concerns of containing it forced us to reduce the size of the planned fire to something more manageable. Not long after ignition the fire jumped these smaller fire lines, got out of control and was finally contained near the originally planned fire breaks. This resulted in the burn we originally wanted, but not without a few near coronaries.

As you can see there are obstacles to halting the brush encroachment. These are not insurmountable and through cooperation with the Coronado National Forest we may be able to once again let fire play its natural role in the ecosystem.

The University of Arizona, USFS, AZ



Ram band, Pusch Ridge Wilderness.

Desert Bighorn Sheep Society, and AGFD personnel have met frequently in the last year to discuss the future management of this herd. Through these meetings we have developed a series of 21 recommendations to improve conditions and lay the groundwork for the re-establishment of a thriving population of desert bighorn sheep.

The main recommendations were:

- 1) Maintain existing trails and close unauthorized trails which lead hikers and rock climbers into important lambing and escape habitat. Require all recreationists to stay on trails during the peak of the lambing period (Jan-Apr).
- 2) Develop a Prescribed Natural Fire Plan which would allow the restoration of fire to the natural workings of the ecosystem.
- 3) Extend the dog closure out to the Forest boundary at the base of the mountains.
- 4) Establish a maximum group size of 15 individuals day-time user groups.
- 5) Initiate cooperative presentations by AGFD and USFS employees to hiking groups and area landowners.
- 6) Install 3 informative signs; educating trail users to the history of these sheep and how to minimize their impact on the herd during their use of the wilderness.
- 7) Continue planning for a supplemental transplant when sheep become available.

The dog closure and recreational restrictions were implemented on March 11,

1996 and all other actions are being worked on and are in various stages of completion. There are a few local hikers who, despite having hundreds of square miles of National Forest near Tucson, do not like being told they can't walk their dog in the 17 square mile Pusch Ridge area. Fortunately, the rebellion of this minority has been drowned out by the overwhelming majority of forest users that support restrictions to help the sheep. Even those who have never seen the sheep receive great pleasure in looking up at Pusch Ridge through their windshield at a stoplight in Tucson and just knowing they are up there. The sheep provide a magical, mystical, yet intangible quality to the whole mountain range.

The population is now too low to recover on its own. It is literally standing on the edge, looking into the dark crevice of extirpation. Even with a miraculous turnaround in reproduction and survival, the genetic resources are too limited to provide sufficient genetic diversity to a large population. With restrictions of recreational disturbance, an educated public, and additional sheep, we hope to bring back a healthy population of desert bighorn to its rightful place on the spires and rocky crags of Pusch Ridge.

