

History of the Kaibab Deer Herd, Beginning to 1968

WENDELL G. SWANK

2326 Quail Run Road, Cottonwood AZ 86326

SIGNIFICANCES OF THE KAIBAB DEER HERD

The Kaibab deer (*Odocoileus hemionus*) herd has been prominent in wildlife management circles for years. A wildlife biologist in the past could not have received a degree from any recognized university without knowing the history of the Kaibab deer herd. And it has had a long history. Details of studies made by some of our most distinguished leaders in the wildlife profession go back to the early 1920s, and notes of reconnaissances made through the area go back even farther.

Another attraction of the Kaibab is the beautiful country occupied by the deer. The hunts have traditionally been held in 2 sections. The first hunt has usually occurred in mid-October when the weather is pleasant, the fall colors are gorgeous, and the deer are on the plateau in the open ponderosa pine (*Pinus ponderosa*) forest. This hunt is a family outing. The second hunt has been held toward the last of November, and is considered the "trophy hunt" because the bucks are in the rut and the deer are in the more open winter range, hence are more vulnerable to the hunters. Snow can, and usually does, fly sometime during this hunt. But trophy deer hunters are a dedicated lot, and this is the most popular of the hunts.

The Kaibab has long been noted for large trophy heads, and the area has been featured in hunting magazines as a place to go for big bucks. The possibility of getting a Boone and Crockett record head has attracted many outdoor writers, thus publicizing the area. Deer from the area tend to have a high number of points, and there are more non-typical heads from the Kaibab in the record book than typical heads.

I examined the mule deer listings in the last 4 editions of Records of North American Big Game; the 7th, published in 1977, the 8th, published in 1981, the 9th, published in 1988, and the 10th, published in 1993. I looked only at the first 100 listings in both typical and non-typical heads. In those first 100, there were only 3 heads from the Kaibab in the typical category. Those heads were entered in 1938, 1939, and 1957. In the 7th Edition the head taken in 1938 was ranked 18th, the 1 in 1939 was ranked 51st, and the 1 taken in 1957 was ranked 57th. In the 10th edition these 3 heads had slipped in ranking to 23rd, 75th, and 85th respectively.

In the non-typical category the Kaibab is much more prominent. In the 7th edition 10 heads were listed in the first 100; all but 1 had been taken prior to 1954. The 10th Edition lists the number 3 head as taken on the Kaibab in 1943 and the number 6 head as taken there in 1941. Only 1 head, ranked number 32, was taken after the 1954-55 die-off, and that was taken in 1969. In spite of that, the Kaibab, at least in Arizona, is the place to go for a record-book head.

WHY LOOK AT THE KAIBAB?

The Kaibab mule deer herd is an ideal herd to study. It is, to a great extent, an isolated herd, bounded on all 4 sides by inhospitable deer habitat. To the south it is bounded by the Grand Canyon, which falls away precipitously and at its greatest depth to desert type vegetation. Similar conditions prevail to the west, where the land falls away to Kanab Creek. On the east the transition is less abrupt, but the vegetation changes from ponderosa pine to juniper (*Juniperus* spp.) and pinyon pine (*P. edulis*), then to the open grassland of House Rock Valley. At the north end the deer-

occupied range is made up primarily of sagebrush (*Artemisia tridentata*), and there may be some intermixing of deer from the Vermillion Cliffs to the north-east and from Utah to the north.

The habitat of the Kaibab Plateau is typical of mule deer range in the intermountain West. The area used by the deer in the summer consists of a mixed ponderosa pine, northern coniferous forest vegetative type. The intermediate range, which the deer pass through on their spring and fall migration, consists of sparse stands of ponderosa pine with an understory of Gambel's oak (*Quercus Gambelii*) and black locust (*Robinia neomexicana*) at the upper periphery, and gradually changes to pinyon pine and juniper. This gives away to juniper that is less dense, and mixed cliff-rose (*Cowania mexicana*) and sagebrush, the dominate vegetation of the winter range.

The Kaibab deer herd has been under scrutiny for at least the last 75 years, and pages reporting on the results and conclusions would probably fill a room. That is the reason I think an examination of the North Kaibab deer herd is appropriate for this workshop.

EARLY HISTORY

Mule deer evidently have always been a major part of the fauna on the North Kaibab. In fact the early name for the area was Buckskin Mountain, because that is where early settlers and those that came before them went to get deer to make clothing. In 1893 the area was established as the Grand Canyon Forest Preserve by Executive Order of President Benjamin Harrison, although there was no U. S. Forest Service to protect and administer the area until 1905 (Trefethen 1975). The Kaibab received additional protection in 1906 under an act of Congress that made the area a National Game Preserve which gave protection to all game animals. Grand Canyon National

Park was dedicated in 1919, withdrawing a portion of the north rim of the canyon from the Game Preserve, making the administrative division of land about as we know it today.

As written by Jim Trefethen, "*When President Theodore Roosevelt created the Grand Canyon National Game Preserve on November 28, 1906, he set aside the finest deer herd in America. But in doing so, he unintentionally wrote the first chapter of a harsh lesson whose impact is felt to this day in every deer management plan on the continent*" (Trefethen 1967). The prohibition on hunting of deer and systematic removal of deer predators was a great success in building a deer population; in fact it was soon obvious that it was too successful. There are no recordings of deer numbers, but Rasmussen (1941) said that the population in 1906 was estimated at 3,000 to 4,000, and that by 1924 the herd had increased to 100,000. By that time the combined deer and livestock had decimated the range. Almost every type of vegetation within reach was hedged, both on the summer range and the winter range. A high proportion of the annual fawn crop died every winter, and was so common that it was considered normal. In January of 1924, Henry C. Wallace, the Secretary of Agriculture appointed a committee to assess the North Kaibab situation and come up with recommendations. The Committee confirmed that range conditions on the area were critical, and that immediate action was essential if the deer herd was to avert disaster. Recommendations of the Committee included live trapping of deer and transplanting them to other areas, and shooting of deer. Trapping turned out to be less productive than anticipated, and the Forest Service prevailed upon the State of Arizona to authorize hunting. Accordingly, in October of that year the first hunting season to take deer on the North Kaibab was

instituted. For a fee of \$5.00 hunters could take 3 deer of either sex, but getting to the Kaibab was a long and difficult journey and the 270 hunters who showed up took only 675 deer. Another scheme to reduce the deer has been attributed to Zane Grey, but that is undocumented. What is documented is that George McCormick of Flagstaff organized a drive to gather deer on the Kaibab Plateau and with the help of cowboys and Indians, herd them into the Grand Canyon and across the Colorado River to the south side. The "Great Drive" took place on the morning of December 16, 1924, when 50 cowboys and 70 Navajo men began the drive toward Saddle Canyon and the Rim beyond where "counters" were stationed to tally the deer. In the thick brush it became impossible to see either deer or the adjacent driver, and when the drivers arrived at the edge of the rim not a deer was recorded to have dropped into the canyon (Russo 1967).

Hunting continued under Arizona regulations of 1 deer per hunter from 1924 through 1928 and the annual kill remained at less than 1,000 deer. Since all other programs to reduce the deer had failed, the Forest Service proposed to shoot deer to reduce the number. Accordingly, shooting by federal employees started on December 15, 1928, and 1,124 deer were killed before the then Governor Hunt of Arizona threatened to call out the National Guard to prevent such action. During the court battle that followed, the Forest Service abstained from killing deer and a limit of 1 deer per hunter was instituted to comply with Arizona regulations. The Supreme Court Decision, *Hunt vs. The United States* (1928) affirmed the right of the Secretary of Agriculture to have deer killed to protect the forage resources on the Kaibab.

In 1929, the Arizona Game and Fish Commission was established by the Legislature, and an agreement for

management of the Kaibab deer was concluded between the Commission and the Forest Service. The killing of deer by government employees was permanently discontinued. The record is not clear, but evidently the probation against taking mature does was lifted and hunters could take more than 1 deer. Hunters jumped to 2,372 and the deer kill increased to 3,688. In 1930, 2,704 hunters killed 5,033 deer.

For some unexplained reason, the number of hunters in 1931 dropped to 980 (Russo 1967). It probably can be attributed to a reduction to 1 deer per hunter, as the hunt record shows that the 980 hunters killed 879 deer. There is also evidence that there was a continuation of the winter die-offs, and Trefethen (1967) stated that starvation, disease, malnutrition, and shooting had reduced the deer herd to less than 20,000. Russo (1967) reports that during the summer of 1930 there was above normal rainfall, which was followed by an open winter and above normal rainfall during the summer of 1932. This increase in moisture on the range seemed to have reversed the downward trend of forage plants, although he records that the deer herd in 1932 was estimated at 14,000 head. In any event hunters did not seem to be attracted by conditions on the Kaibab, and during the remainder of the 1930s hunter numbers hovered around 1,500 with a hunter success of around 80%.

During the first half of the 1940s hunters numbered around 800; the reduction was probably caused by World War II activities. The hunter success of that period was around 70%. In 1945, the hunt was restricted to 1,000 permits, and the 704 hunters that showed up took only 398 deer for a hunter success of 56.6%. This alarmed the hunters and the Commission, resulting in 1946 of a return to buck only hunts and a reduction to 500 permits. Obviously, this was a mistake, because it was almost

immediately apparent that the deer herd was again getting too numerous for the food supply; hence permits were doubled over the previous year in 1947, 1948, and in 1949. In 1949, only about 2,700 of the authorized 4,000 permits were sold. Deer numbers were estimated at 57,000 animals; range conditions had continued to deteriorate, and it became clear that changes had to be made to induce hunters to the area.

This inducement was provided by Commission regulations in 1950 for 2 hunts, with 2,500 permits in each section and the taking of antlerless animals in the later hunt on the winter concentration area on the west side. Permits sold numbered 4,860 and 2,858 deer were killed, of which 604 were does and fawns (Kimball and Watkins 1951). This was the highest hunter take on the Kaibab except for 1929 and 1930 when hunters could take 2 deer, but the removal was inadequate to stem the tide.

During this period biologists from the Forest Service and the Arizona Game and Fish Department jointly conducted pre-hunt and post-hunt surveys and monitored forage conditions. Deer continued to increase and forage conditions declined. Field personnel recommended more liberal hunts. The Commission did increase permits to 7,000 in 1952 and 10,000 in 1953, and any deer was a legal deer. Forty-three hundred deer were taken in 1952 and 6,000 in 1953, and hunter success in 1953 reached 84.5%.

PRELUDE TO A DIE-OFF

On Monday, April 5, 1954, personnel of the Forest Service, Park Service, and the Arizona Game and Fish Department gathered on the North Kaibab at Big Springs Ranger Station to formulate the recommendations to the Arizona Game and Fish Commission for the 1954 hunting season. I was there, and the following is a summary from my field notes:

Tuesday, April 6. The inspection party

visited Sowatts and Jumpup points on the west side. On Sowatts, the deer had eaten all of the current year's growth on most browsed plants, and were using last year's growth. On Jumpup the browse was in slightly better condition, probably due to more moisture during the growing season.

Wednesday, April 7. We went over to the east side. Conditions of the browse there were only slightly better. We went back over to the west side to check the Horse Springs and Little Springs points. On both areas the browse was not in good shape. On the return to Big Springs I personally counted 76 deer.

Thursday, April 8. We had the Study Group meeting at Big Springs this morning. Phil Cosper was appointed Chairman, and it was decided that all comments would be confidential so members of the group could express their feelings without constraints. Each person was invited to speak. Sam Sowell, Assistant Supervisor of the Kaibab National Forest, said he believed that quite a few more deer needed to be removed, and that Russ Rey, the Kaibab Supervisor was also of this opinion. He thought the removal should be 12,000 deer.

Fred Faver, member of the Arizona Game and Fish Commission, stated that he declined to give his opinion because he would have to be 1 of those making the final decision on the regulations.

Phil Cosper, Assistant Federal Aid Coordinator, Arizona Game and Fish Department, said that in his opinion the range is in poorer shape than it was 2 years ago and that more deer should be removed. For once, he would like to see enough deer removed to get on top of the herd.

Ted Knipe, Biologist, Arizona Game and Fish Department, said that the range is in worse shape than last spring. The deer appear to be in good shape, probably because of the open winter and the deer were able to spend more time in the

intermediate range where there had been less use of the food plants. The deer herd will not be hurt if more are removed, and there are a lot of deer here.

Flick Hodgen, Regional Office of the Forest Service, Albuquerque, said he wasn't here last year, however, he is concerned about the downward trend in range condition. The cause is difficult to determine, that is, it can be related to cattle and/or deer use, or drought, but whatever it takes we must reverse the trend. It is imperative that we decrease the deer herd, and there is no lasting danger of overshooting. We are losing our major browse species, and it seems that as more deer are removed the fawn crop gets higher.

John Hall, Biologist, Arizona Game and Fish Department, said that it has been the same story for the last 7 years. The range continues to deteriorate, and the deer continue to increase. Something should be done to increase the productivity of the range. We need more deer removed, but we couldn't sell a removal of 12,000 deer to 20 people in the state.

Kenny Diem, Biologist, Game and Fish Department, assigned to the Kaibab, noted that there has been an increase of 163% in hunter harvest since 1941, and deer per mile counted on the annual surveys has increased 137%. Range analysis has shown 77% more use on the available browse and annually there has been a 20% die-off of browse plants. Last winter there was a 5% increase on the use of browse on the winter range and a 54% increase on the intermediate range. On the west winter range the deer are using last year's growth of browse. There should be a removal of around 12,000 deer.

Lee Hover, President of the Arizona Game Protective Association, stated that he represented the unmanageable portion of the puzzle, the sportsmen. Whatever the Commission came up with it was his job to

sell the program to the sportsmen. In the eyes of the sportsman the cow gets most of the blame for the poor range conditions on the Kaibab, and there is more concern on the drop in buck weights. In his opinion, the range appears to be in worse shape than last year.

Charley Pase, Wildlife Biologist of the Forest Service assigned to the Kaibab, said lack of moisture on the Kaibab this past year had decreased forage production, and over-utilization had begun to decrease plant vigor. This year the deer took a lot of their food from the intermediate range, and we are just 1 jump ahead of a die-off. A season of poor growth on the browse, coupled with a hard winter, will result in a tragedy.

Jay Craven, District Forest Ranger for the North Kaibab, said that he is the local person responsible for the forage condition, and as far as he is concerned the deer have first priority. He is also concerned about the drop in weight of the bucks.

Bob Bendt, Wildlife Biologist for Grand Canyon National Park, said the Park cannot take direct action unless there is danger of extinction of a species. He believes that the Park should receive more emphasis in studies, such as livestock/deer competition, because on the Park there is no livestock grazing and the area could be used as a check on damage to browse caused by deer. He favored more emphasis on late hunts, because more deer from the Park are harvested on those hunts. There are areas on the Park, such as points leading into the Canyon, where cliffrose is completely gone.

Bid Clark, Game Warden for the Utah Department of Fish and Game, said that the Kaibab is a beautiful deer range, but it has been severely abused. He continued by stating that this is not a problem confined to the Kaibab. Many of the western deer ranges have been or are being abused, but thus far no deer herd has been depleted by over-shooting. One problem in wildlife

management is that sportsmen don't believe the Wildlife Department Directors, and the Directors don't believe their people in the field.

After a brief discussion and a last word by anyone wanting to speak, Phil Cosper suggested that the group should recommend a hunt that would remove 10,000 deer. The group then recommended that 12,000 permits be made available in a 3 section hunt of 4,000 for each section.

The Commission regulations authorized 12,000 permits and 11,553 permits were sold. About 1,000 permit holders did not show. This was not unusual, for at that time in Arizona permits were not required to hunt in most management units and hunters frequently bought permits for the Kaibab in case they were not successful in earlier hunts, or they were persuaded to go hunting somewhere else by friends after they had purchased a Kaibab permit. Eight thousand and fifty-eight deer were checked through the checking station, of which about half were bucks and the remainder antlerless (Table 1). Most deer were in poor body condition and mean buck weights dropped to 124 pounds from 145 pounds the previous year and 155 pounds in 1952.

THE AFTERMATH

In 1955, the original regulations for the North Kaibab deer hunting season was for 2 sections; 4,000 permits for each section. However, there was a marked reduction in the number of deer observed on the pre-hunt survey and the permits were reduced to 3,200 in the first section and 1,500 in the second. There were 4,146 hunters checked in for the 1955 hunt, and they removed 2,311 deer. Many hunters reported seeing old deer carcasses on the winter range. Why the die-off during the winter of 1954-55 was not detected earlier, I do not know. The resident Arizona Game and Fish

Biologist, Kenny Diem, had departed shortly after the 1954 hunt, and evidently no one was aware of the situation. To determine the extent of the die-off a "body count" was conducted by Game Department and Forest Service personnel November 28 through December 2, 1955 on the winter ranges of both east and west sides. This was done by walking transects randomly selected, calculating the area covered and dead deer found, then expanding the results to the winter deer ranges. The results indicated that about 18,000 deer, or 2 out of every 3 deer present were lost in the die-off. Thus, the die-off of 1954-55 and the hunt of 1955 removed about 20,000 deer from the area.

POST DIE-OFF PERIOD, 1956-1968

Range conditions improved after the 1954-55 die-off. The average adult buck weight went up from 124 pounds taken in the 1954 hunt to 137.7 pounds in 1956 and 163.4 pounds in 1957. From 1958 to 1961, buck weights hovered around 160 pounds (Table 2). Russo (1964) emphasized the importance of moisture to summer plant growth on the Kaibab, which in turn affects the body condition of deer in the hunting season. Average weight was 164 pounds in 1961 and continued to climb to 170 pounds in 1962 and, with the help of an exceedingly wet summer, reached 186 pounds in 1963. Weight of yearlings, however, is a better gauge of forage condition because the younger animals are less able to compete and must use energy for body growth rather than putting on fat as do the older animals. The weight of yearling bucks followed the trend of the older deer.

Measuring range conditions and trends has been fraught with many difficulties as it has on other deer ranges. Methods used were revised several times from 1951 through 1968 to improve the reliability of

Table 1. Hunter harvest data taken on the North Kaibab, Arizona, 1950 to 1968.

Year	Bucks	Does	Fawns	Total	Number Hunters	% Hunters Success
1950	2,254	604	C*	2,858	4,556	62.7
1951	1,905	614	C	2,519	4,754	53.0
1952	1,770	2,188	354	4,312	6,446	66.9
1953	2,884	2,556	613	6,053	7,166	84.5
1954	3,973	3,373	712	8,058	10,648	75.7
1955	1,084	1,022	205	2,311	4,146	55.9
1956	1,189	1,084	414	2,687	4,321	62.2
1957	1,748	1,117	374	3,239	5,377	60.2
1958	2,273	2,672	966	5,911	9,693	59.6
1959	1,411	1,851	499	3,761	4,867	55.3
1960	789	601	144	1,534	3,983	40.1
1961	296	400	114	810	2,585	31.6
1962	666	366	171	1,203	2,586	47.4
1963	787	402	239	1,428	2,610	54.7
1964	1,039	507	296	1,842	3,178	58.0
1965	1,065	867	408	2,340	6,127	38.1
1966	1,410	1,194	465	3,069	6,173	49.7
1967	561	602	225	1,388	6,295	22.0
1968	352	194	54	600	1,594	37.6

*C = Closed

Table 2. Weight of bucks from hunter-harvested deer on the North Kaibab, Arizona, 1950 to 1968.

Year	Average weight, mature bucks, pounds	Percent yearlings more than 80 pounds
1950	149	
1951	168	
1952	159	
1953	148	
1954	124	
1955	146	94.7
1956	137	74.1
1957	163	92.2
1958	148	84.3
1959	155	82.4
1960	153	86.7
1961	164	97.6
1962	170	100.0
1963	186	100.0
1964	173	97.6
1965	171	96.2
1966	155	80.7
1967	167	95.5
1968	157	96.6

the results (Russo 1964), but because of the many variables involved none appeared to be completely satisfactory. The amount of moisture available during the growing season tends to be the dominant influence on range conditions on the Kaibab, as it is

over most of Arizona. Also, as in most of Arizona, rainfall fluctuates greatly from year to year. Overall range conditions, however, continued to improve after the 1954-55 die-off.

WHAT WE LEARNED FROM THE KAIBAB EXPERIENCE

1. Integrating the management of deer and people requires a great amount of lead time by the management agency. The attitudes of people are not readily changed, so we must plan ahead if we anticipate making changes in our management programs. As an example, how long did it take us to gain acceptance by hunters of the necessity of taking antlerless deer? I would say a half century, and perhaps we have convinced no more than 50% at that.
2. We must have data that the public can easily comprehend, stated in terms that are normally used in daily discourse. As an example, the Wildlife Management and Research Divisions of the Arizona Game and Fish Department began calculating and using numbers of deer to replace trends as a management tool in 1952. There was a lot of opposition and some ridicule because logic tells anyone that we can't get a precise figure on the population of deer in an area. Nevertheless, the general public thinks in numbers. They balance their check books, adjust their budgets, and get reports on their investments in numbers of dollars. Using trends they may see whether their stocks and bonds have gone up or down, but they cannot determine how much money they lost or gained if they do not know the number of dollars they have invested. Moreover, numbers became important when we first began issuing permits to hunters because we anticipated and projected the number of deer that would be removed by a given number of hunters. On the Kaibab after the 1954-55 die-off we calculated the number of deer on the Kaibab back to 1951 (Swank 1958). Those data said that we had 24,668 deer prior to the 1951

hunting season and 36,627 prior to the 1954 season. The pre-hunt data for 1955 indicated that 11,889 deer were present before the hunt, so we had lost about two-thirds of our deer herd. Also working with actual numbers we showed that from 1951 through 1955 hunters removed a low of 10.2% of the population in 1951 and a high of 19.5% in 1955. As Russo (1964) points out, getting an estimate of the population gives us something concrete to work with, but we should constantly look at our data in an effort to come up with more accurate results.

Information such as percent hunter success the preceding season and deer seen per mile on surveys may be acceptable when things are not critical, but when we are dealing with possible over populations of deer, over harvesting of deer by hunters, or low recruitment to deer populations we need better data, and finer tuning of our management. People expect it, and we should provide it.

3. We must be more diligent in getting continuity of data and emphasizing the importance of long-term research. I must say that preparing this paper is more of a rehash of previous experiences than of new experiences. Following the trail of data after the 1954-55 die-off was like following smoke. It became obscure, then disappeared completely. John Russo's book gave good information through 1961, but he skimmed through 1962 and 1963 because there was no resident biologist at the Kaibab for those years. There are few places where wildlife information is available over such a long period and as detailed as there is for the North Kaibab, but even there it is sketchy and incomplete. We must do better.

LITERATURE CITED

- Hunt vs. The United States. 1928. 278 U.S. 96.
- Kimball, T. L., and A. G. Watkins. 1951. The Kaibab North cooperative deer-livestock forage relationship study. Arizona Game and Fish Commission. 77pp.
- Rasmussen, D. I. 1941. Biotic communities of Kaibab Plateau, Arizona. Ecological Monographs. 3:236-243.
- Russo, J. P. 1967. The Kaibab North deer herd. Arizona Game and Fish Department. 95pp.
- Swank, W. G. 1958. The mule deer in Arizona chaparral. Arizona Game and Fish Department. 109pp.
- Trefethen, J. B. 1967. The terrible lesson of the Kaibab. National Wildlife. June/July Issue. pp 4-9.
- Trefethen, J. B. 1975. An American crusade for wildlife. 1975. Winchester Press, New York. 409pp.

