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Fred W. Johnson
U.S. Forest Service

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Hunter-Game Relationship

By FRED W. JOHNSON
U. S. Forest Service—Region III.

Editor—Game as a forest resource demands attention and regulation by the forester and Fred Johnson points out that proper hunter education and careful game-kill checks prove most important in hunter-game relationships—a subject on which but little scientific work has yet been done.

Some excellent work has been done on predator-prey relationships by Dr. Paul R. Errington at Iowa State College, who has been a pioneer in a distinct phase of game management. His efforts along with Stoddard's, have shed a lot of light on the mechanics of predation and escape cover.

In Region III of the U. S. Forest Service, which includes the national forest areas in Arizona and New Mexico, we have been trying to determine, in a broad way, some of the hunter-game relationships. This subject itself is a large field, and can and probably will be developed as a distinct phase of game management as has the predator-prey relationship studies of Errington and his contemporaries.

The field of hunter-game relationship, for some reason, has been without benefit of much scientific study, but has been the subject of night-long discussion by both sportsmen and sportsmen-game managers. Much of our work on America's big game mammals and upland game birds has been in the hands of men so busy trying to unravel the tangled biological web of modern game range conditions that they have had little time to devote to the effect of harvesting game on the game populations. However, a start in this direction has been made by Gerstell of the Pennsylvania State Game Department on quail covey requirements. Gerstell showed conclusively that if quail coveys are shot to a low number the few remnants of the covey may perish during periods of low temperature due to too few birds in the winter "huddle." This is an important hunter-game relationship.

Nineteen Forty-one
Your National Forests are considered large public shooting grounds. They are operated as such in cooperation with the State Game Departments, and national forest public shooting regulations conform to the State’s game laws within which they occur. In operating the National Forests as public shooting grounds, we are interested in the promotion of quality of sport shooting, that is, giving each party of hunters a degree of isolation compatible with good sport and game needs. We are interested in improving the quality of big game crops which may lead into genetics or the maintenance of high quality breeding stock, and proper sex ratios. In addition to the above, it is necessary to prevent over-shooting in order to retain adequate numbers of breeding stock of big game, wild turkey and quail. These are some of the hunter-game relationships on which we are just starting to work and I wish to discuss some of the initial work and methods that are being used to isolate a few of the hunter-game relationships that are being studied.

One of the most important needs of big game hunt management in this Region is obtaining hunter distribution evenly over the game range. We find that hunters concentrate on areas most easily reached by car if there is any game available. Hunter distribution is controlled by roads and topography, and a large part of this Region is accessible by car. Our remote areas are actually under-hunted, with the result that our best deer, elk and wild turkey crops come from areas least accessible by car.

As a study method, we find that hunter checking stations, strategically located on roads so as to check the highest percentage of hunters using the broad areas behind these stations, are a very valuable tool. Here, deer and elk crops are measured as to number and sex. Weights and male antler measurements are recorded. Wild turkey and quail crops are recorded as to number and the ratio of adult to “birds of the year” is secured through age identification. For the purpose of studying hunter distribution, a kill spot map is made on which the kill location is recorded. These have proven to be of high value.

As an example of one phase of administrative work in connection with concentrated hunting on the west side of the Sacramento Division of the Lincoln National Forest in New Mexico, a deer management unit has been established this year for the purpose of obtaining better hunter distribution, herd improvement, and deer forage improvement. This unit has

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been established by the New Mexico State Game Commission in cooperation with the Forest Service, and has legal recognition as a game management unit in their game code.

The information used as the basis of the establishment of this unit was obtained through kill records recorded at hunter checking stations, through locating each kill on a kill spot map for the 1939 open deer season and field examination of the game range as to forage conditions.

The Sacramento Division of the Lincoln National Forest and kill spot map are shown on a following page. The concentration of hunting on the west side of this area in 1939 resulted in the harvesting of 228 bucks in one township. About 900 hunters used the entire west side area. This hunting effort had prevailed for a good many seasons, and the accumulated effect of this heavy hunting pressure on the males of this herd area is shown in the low quality of the deer crop for the 1939 season as judged by the following antler beam diameter classes:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5” — 1.0”</td>
<td>1.1” — 1.4”</td>
<td>1.5” — 2.5”</td>
</tr>
<tr>
<td>No. 239</td>
<td>89</td>
<td>23</td>
</tr>
<tr>
<td>% 68%</td>
<td>22%</td>
<td>10%</td>
</tr>
</tbody>
</table>

The low quality of this crop (68% immature deer) is definitely a hunter-game relationship, and we maintain that this is the result of concentrated hunting. Concentrated hunting causes competitive shooting and is the mechanical factor in running deer from cover over the area and under the guns of the hunters.

In addition to the condition of over-hunting, there is an overstocking of deer, and herd numbers continue to increase in spite of heavy hunting of males only. Several “doe” seasons have been held in the past, but the herd, within a few years, bounces right back. An attempt is now being made to hold annual controlled hunts for deer of both sexes in order to level off the rate of herd increase and to allow for a higher rate of male survival.

*Nineteen Forty-one*
THE West Sacramento Deer Management Unit has operated over one season, and we have stumbled upon one very interesting hunter-game relationship. Here is the story.

This season (1940), there were 350 special permits issued to hunters for this area, but only 286 hunters attended the hunt. This was a reduction from 900 hunters in 1939 to 286 hunters in 1940. These 286 hunters actually had a real hunt and only 146 deer were taken, of which only 82 were bucks. This is a reduction from 352 bucks in 1939 to 82 bucks in 1940. There were 64 does killed during the season, and the interesting part of this story, which is hard to describe on paper, is that in 1939, with the hills full of hunters, deer were easy to kill. However, when the hunting effort was reduced, even on an area overstocked with deer and where both sexes were legal game for the first time, the hunters had to hunt many long hours to secure either does or bucks.

This example points out the importance of hunter distribution in managing public hunting grounds. Concentrated hunting tends to reduce the effectiveness of such legislative restrictions as length of season and bag limits set up to limit the degree of kill. Concentrated hunting may also destroy the sporting qualities of the hunt and the hunters.

Deer hunt management under a "buck law" concentrates hunting efforts on the males and where high percentages of immature bucks appear in the harvest, it is the result of concentrated hunting over a period of years. The taking of a large percentage of immature males greatly lowers the rate of male replacement in the herd and if continued over a period of many seasons, permits but few males to grow to full maturity. This is an important hunter-big game relationship.

On areas where the number of hunters and kill of deer of either sex can be controlled, each doe taken allows one male to grow one year more toward maturity. Eventually it is believed that the way to maintenance of big game herd quality and to maintenance of quality of sport on our public shooting grounds will be through the limited killing of an equal number of both sexes of big game and equal distribution of hunting effort and hunting privilege.

Examples of hunter-upland game bird relationships are very rare in this Region. We have, as yet, little authentic information concerning the relationship. Our approach to hunt

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management of wild turkey and quail, like big game hunt management, is through hunter checking stations where have an opportunity to measure and record the conditions of the upland game birds killed by areas. During the 1939 and 1940 seasons in Arizona and New Mexico, the records of wild turkey kills as measured at these stations, show a low adult to “young of the year” ratio. The hunter-wild turkey relationship may be a very important factor where habitat conditions for wild turkey have also reduced their net rate of reproduction.

Nineteen Forty-one
THE following table shows the age relationship (as indicated by the kill) for wild turkey in the States of Arizona and New Mexico for the 1939 and 1940 seasons.

### Summary 1939 and 1940 Wild Turkey Kill

<table>
<thead>
<tr>
<th>Year</th>
<th>Adult Gobblers</th>
<th>Adult Hens</th>
<th>Young of This Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1939</td>
<td>93</td>
<td>115</td>
<td>207</td>
</tr>
<tr>
<td>1940</td>
<td>108</td>
<td>195</td>
<td>221</td>
</tr>
</tbody>
</table>

Total adults 511:428 young.

For the both seasons, these records show a very low adult to young ratio, and point to perhaps a very low net rate of wild turkey production. The hunter-game relationship to this low rate of production is not known, but under present control of hunting effort, it might be very serious, and it appears that wild turkey could not stand up to heavy hunting pressure.

This same type of work or initial approach is being attempted on a few quail shooting areas. The results of the quail bag records obtained in Arizona at four separate checking stations in 1940 are shown in the table on a following page.

The results of these records at two of these stations are rather startling as they show a high percentage of adult birds rather than birds under 18 months of age. At the Cave Creek station on the Coronado Forest, the adult to under 18-months-old bird ratio was less than 1:2. It was a natural expectation that more birds of 18 months and under would appear in the hunter bag, since this age group would include birds of the 1940 and 1939 generations. Most of the quail of the 1939 generation would be hatched after the middle of May and would not be 18 months old until after November 15, 1940.

Of interest in this table is the low young-to-adult ratio, the large number of unrecovered birds (20%) and the report from the Dripping Springs area on the Crook Forest where 70 Gambel quail were taken with 47 shells. This means flock shooting, or “ground sluicing” them. Some hunters call this “Arkinsawin” the birds which are known to huddle under cover in small coveys. A high ratio of lost birds (1.8 to 1) occurs where unsportsmanlike shooting methods are used.

The above three examples are used to show a few of the

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## Analysis of Quail Bag Records

*Taken at Oracle, Cave Creek, Ice House and Dripping Springs Checking Stations
1940 Season*

<table>
<thead>
<tr>
<th>Checking Station</th>
<th>Total Adult Birds</th>
<th>Total Birds Under 18 mos.</th>
<th>Total Bag</th>
<th>Shells Used</th>
<th>Shells Per Bird</th>
<th>Birds Lost</th>
<th>Ratio of Retrieved to Lost</th>
<th>Total No. of Hunters</th>
<th>Average Bag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle</td>
<td>2148</td>
<td>1286</td>
<td>3763</td>
<td>10,065</td>
<td>2.67</td>
<td>872</td>
<td>4.3 to 1</td>
<td>615</td>
<td>6.1</td>
</tr>
<tr>
<td>Cave Creek</td>
<td>128</td>
<td>209</td>
<td>337</td>
<td>953</td>
<td>2.82</td>
<td>82</td>
<td>4.11 to 1</td>
<td>85</td>
<td>4</td>
</tr>
<tr>
<td>Ice House</td>
<td>126</td>
<td>43</td>
<td>169</td>
<td>260</td>
<td>1.5</td>
<td>17</td>
<td>9.9 to 1</td>
<td>43</td>
<td>3.9</td>
</tr>
<tr>
<td>Dripping Springs</td>
<td>70</td>
<td>Birds not segregated</td>
<td>70</td>
<td>47</td>
<td>.67</td>
<td>39</td>
<td>1.8 to 1</td>
<td>20</td>
<td>3.5</td>
</tr>
</tbody>
</table>
hunter-game relationships to big game and upland game birds that are important to game administrators on public lands. It is only logical to believe that the harvesting of game can seriously affect both the quality and quantity of game populations. To isolate these relationships, there is need of demonstration game management units through which clear-cut and authentic measurements can be made of the effect of hunting on game populations.

The many-sided job of obtaining hunter distribution and control of the kill factor, self-discipline of hunters, which is the essence of sportsmanship, must play an important part in the democratic process and progress in this phase of game management. In addition to knowing the results of hunting pressure on game populations and applying separate or combined controls to secure proper game harvesting, there is need of developing in each hunter a sense of ethical responsibility. After all, the ultimate objective of game management is the development of sport shooting. The manner and the methods that we use in taking game are important in character development, especially in our youngsters. This is perhaps the key to and the most important of hunter-game relationships.

Predator-prey relationship studies and hunter-game relationship studies should go hand in hand. If the former subject is considered an important phase of game management, should not the latter also have benefit of scientific study?