DATA

Sample of deer killed

| Number Killed | Number Persons |
|---|---|
| 1 | 55 |
| 2 | 19 |

Confidence intervals—mean deer killed with finite population correction:
$u = .2447 \pm (1.96)\ (.027398)\ (.585)$
$= .2447 \pm .031$ deer killed

Confidence intervals—total deer killed with finite population correction:
$T = 141 \pm (.031)\ (578)$
$= 141 \pm 18$ deer killed.

Sample of deer wounded

| Number Wounded | Number Persons |
|---|---|
| 1 | 57 |
| 2 | 6 |
| 3 | — |
| 4 | 1 |

Confidence intervals—mean deer wounded with finite population correction:
$u = \pm (1.96)\ (.0221)\ (.585)$
$= .192 \pm .025$ deer wounded.

Confidence interval—total deer wounded with finite population correction:
$T = 111 \pm (.025)\ (578)$
$= 111 \pm 14$ deer wounded.

# OTTER POPULATION STUDY[1]

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SOUTHEASTERN ASSOCIATION OF
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Trapping is one of the oldest occupations found in North America. Otter trapping has always been a profitable phase of business. During the period 1821 to 1906, the Hudson Bay Company collected 890,901 skins of otters, an average of 10,481 for each year. Studies on fur resources in British Columbia showed that the annual income of trappers (skilled) during a six months' period was $3,000,000, the average trapper $2,000,-$10,000. One trapper whose line ran 147.5 miles of stream had an income of $10,000 in 1943. Otter fur brings a higher price than any other fur in Florida.

Since this business is thriving and is profitable, this study was made to determine whether the statewide otter population is increasing or decreasing, to determine the factors contributing to the population fluctuations, to try to estimate the numbers of animals harvested annually, and to analyze biological data collected. The Florida otter (*Lutra canadensis vaga*) ranges from north Florida as far south as the Everglades.

The Florida Game and Fresh Water Fish Commission has set up regulations for fur dealers. There are four types of licenses that can be purchased. The four categories and the numbers of licenses sold are as follows:

Resident State Fur Dealers or Buyers License $100.00.
May advertise, solicit by mail, travel to buy or have agents or buyers.
Number sold in 1961-62: 10
Number sold in 1962-63: 5

Resident Local Fur Dealers or Buyers License $10.00.
May not advertise, solicit by mail, travel to buy or have agents or buyers.

[1] Credit is given Jim B. Whelan, formerly of the Florida Game and Fresh Water Fish Commission, for the compilation of some of these data.

Number sold in 1961-62: 7
Number sold in 1962-63: 9

Resident Dealer agent $5.00.
Agents must be licensed by the dealer they represent and may not supply any other firm or dealer than the dealer whom they represent.
Number sold in 1961-62: 28
Number sold in 1962-63: 18

Trapper's license: Resident State $25.50; Resident County $3.25.
Number sold in 1961-62: 559
Number sold in 1962-63: 556

Using records from license sales, a mailing list was composed.

One week prior to the opening of the fur-bearer season on December 1, 1961, questionnaires were mailed to state fur dealers, resident local fur dealers and resident fur dealers' agents requesting their cooperation in the otter investigation project. The fur dealers and agents were asked to furnish the names and addresses of all licensed trappers from whom they had received or contemplated receiving otter pelts. Little success was obtained with the questionnaire technique, and several trappers were contacted to assist in the investigation.

Prior to the opening of the trapping season, the dealers were given forms and requested to fill out reports showing the numbers of otters and coons purchased from trappers and the respective average prices paid.

Otter carcasses were saved by the trappers for the biological study. These were quick frozen by cooperators and picked up later for examination. Before skinning and freezing the otters, the cooperators were asked to record the mammal body measurements and field data. Stomachs and reproductive organs were collected and placed in a 10% formalin solution after being labeled. Data on life history were assembled from Game Commission personnel records and from otter carcasses preserved during the trapping season. Data on economic status and numbers of otters harvested were determined by hide dealers' reports and by interviews.

Reports from otter hide dealers and trappers indicate that the 1961-62 trapping season was one of the best in many years; however, the increase in otter pelt sales does not necessarily reflect an up trend in the otter population. Perhaps one major factor responsible for the increase in otter hides marketed in the 1961-62 season was their increased number due to low water level resulting from a prolonged drought. Fish, a natural food of otters, were restricted in their movements because of the low water level, thereby the chances for otter capturing them were increased. In 1961-62 otters were not forced to travel as far for food as in times of normal water levels. Their concentrations were more favorable for trapping, thus trappers were able to harvest more of the population than usual. Most otters trapped are from creeks and rivers rather than lakes or large bodies of water. Low water levels in streams occur more rapidly than do low water levels in large bodies of water; therefore, the daily movements of otters would cover a shorter distance during periods of low water and increased fish concentrations, until the food supply of fish became scarce.

An interview with Mrs. Emily Crosby of Perry, Florida, revealed that she purchased more otter hides during the 1961-62 season than she had purchased since the beginning of her business 30 years ago. Mr. Hyman Myers, owner of the Florida Hide & Skin Company in Tallahassee, Florida, states that the 1961-62 season had been one of the best regarding the total number of otter hides purchased.

Reports from the hide dealers in 1962-63 indicated that otter harvest dropped back near the harvest in 1960-61. The water levels at the beginning of the trapping season in 1962-63 were above normal in north Florida and later reached normal before the season closed.

In 1958-59 Florida was fifth in otter catch in the United States, in 1959-60 it was tied in fourth place with Wisconsin and in 1960-61 was third in the United States. The overall results of the 1961-62 season in the United States are not available at this time but it was Florida's best year in otter catch.

Table 1. Information from Hide Dealers' Reports

| Year | No of Otters Trapped | No. of Trappers Reported | Income of Trappers | Average Price Per Pelt |
|---|---|---|---|---|
| 1960-61 | 1435 | — | — | — |
| 1961-62 | 2779 | 148 | $34,510.82 | $12.42 |
| 1962-63 | 1739 | 120 | $23,562.34 | $13.55 |

It was found that the hide dealers' reports do not indicate the true fur catches. An interview with one hide dealer indicated that he bought 4,500 hides in 1961-62 when only 2,779 otters were caught in the entire state according to the hide dealers' reports.

It was found that the variation in the prices of pelts each year was due to the European market which determines the price of hides. The otter in north Florida was found to be a much better grade of fur than the otters of south Florida. The average price of otters in north Florida is $13.00 compared to $5.50 in the southern part of the State. Interviews with buyers revealed that the south Florida otter is mostly "hair and hide."

The results of the measurement data taken from 72 otters showed that the average size otter is as follows:

| | |
|---|---|
| Total length: | 43.4 inches |
| Hind foot: | 4.7 inches |
| Ear: | 0.7 inches |
| Tail: | 16.7 inches |
| Weight: | 14.9 pounds |

The largest otter trapped in the 1962 season in Lafayette County, north central Florida, had the following measurements:

| | |
|---|---|
| Total length: | 48.0 inches |
| Hind foot: | 5.0 inches |
| Ear: | 1.0 inches |
| Tail: | 23.0 inches |
| Weight: | 25.0 pounds |

The weights from 27 otters without the pelt weighed an average of 13.9 pounds.

Data gathered by a cooperating trapper living and trapping in Union County give an indication of his trapping success. From January 18, 1962, through March 16, 1962, the trapper successfully captured 22 otters on the Lake Butler Wildlife Management Area. Because of faulty traps used at the beginning of the trapping season, 31 otters which were caught managed to pull free and escape.

Table 2. Otter Trapping success on Lake Butler Management Area

| Trapping Period | No. of * trap nights | Average No. of Traps | No. of Otters Trapped | Probable No. of Otters Escaped |
|---|---|---|---|---|
| January 18, March 16, 1962 | 57 | 23 | 22 | 31 |

* One trap night is equal to one 24-hour period.

Average number of otter trapped per trap night (including those which escaped): 22 + 31 divided by 57 = .93.

Average number of otters trapped per trap night *per trap* (including those which escaped): .93 divided by 23 = .04.

The information in Table 2 indicated that about two dozen traps

should be set each night in order to capture approximately one otter per trap night.

The sex ratio calculated from the number of otters collected was 1.32 males : 1.00 females. The sex ratio of fetuses collected was 1.25 males : 1.00 females.

Table 3. Number of otters collected from Florida counties

| County | Location | No. of Otters Collected | Sex | |
|---|---|---|---|---|
| | | | Male | Female |
| Alachua | North Central | 1 | 0 | 1 |
| Broward | South | 3 | 3 | 0 |
| Clay | Northeast | 3 | 2 | 1 |
| Collier | South | 1 | 1 | 0 |
| Dade | South | 1 | 1 | 0 |
| Dixie | North Central | 4 | 2 | 2 |
| Franklin | Northwest | 1 | 1 | 0 |
| Gulf | Northwest | 1 | 0 | 1 |
| Lafayette | North Central | 10 | 6 | 4 |
| Liberty | Northwest | 3 | 3 | 0 |
| Palm Beach | South | 1 | 0 | 1 |
| Pasco | Central | 6 | 3 | 3 |
| St. Johns | Northeast | 1 | 1 | 0 |
| Union | Northeast | 24 | 6 | 18 |
| Wakulla | Northwest | 12 | 11 | 1 |
| Totals | | 72 | 40 | 32 |

Otters have been blamed for reducing the number of game fish; therefore, an investigation on the diet of the otter was added to this project. A total of 63 stomachs was examined. Only 18 contained food; the other stomachs contained litter or were empty.

Table 4. Percentage of content in 63 otter stomachs

| Type of Food | Per Cent Occurrence | Per Cent Composition |
|---|---|---|
| Rough fish | 17.4 | 54.3 |
| Game fish | 6.3 | 23.6 |
| Crayfish | 9.2 | 17.7 |
| Frogs | 1.5 | 4.4 |
| Empty or litter | 65.6 | 4.4 |

Rough fish made up most of the otter diet which consisted of 54.3% suckers, *Amia*, and catfish as the main fish identified. Crayfish were found more often than game fish.

Results from a study in Michigan on fish predation by the otter showed that game and pan fish were observed in 40.7% of the stomachs and most of these were centrachids. Forage and noxious fish were found in the stomachs of 55.5% of the otters with an occurrence of 22.2% crayfish and 16.7% amphibians. A study was conducted in Montana to determine the food habits of the otter by analysis of scats. A total of 1,374 known-age scats were collected. The analysis showed that the composition of scats in the Thompson Lake area (1,122 scats) consisted of fishes 65.2%, frogs 8.2%, snakes 3.0%, birds 2.5%, mammals 1.3%, and aquatic insects 22.4%. The percentage of fishes identified in Thompson Lake area scats were: sunfish 41.9%, bass 3.6%, trout 6.5%, and other fish 48.0%.

Analysis of 252 scats in Gary's Lake, Montana area, showed the composition of fishes 32.0%, frogs 19.9%, snakes 0.2%, birds 4.8%, mammals 10.6%, and aquatic insects 32.5%. Of the fish in the Gary's Lake scats, the percentages were trout 33.6%, sunfish 3.0%, and other fish 66.1%.

As a result of these studies one can conclude that the otter diet is made up of a variety of foods and not just fish. Although 50.0% of the otter's diet is usually made up of fish, it is evident from these analyses that rough fish are consumed more frequently than game fish. This is probably due to the fact that (1) rough fish are more easily caught, and (2) rough fish (suckers, *Amia*, catfish, carp, minnows, etc.) are found more frequently than game fish in streams and rivers where the majority of the otters are trapped.

The reproductive tracts taken from 26 otters were examined to determine if the otters had been pregnant and the number of fetuses when pregnancy occurred. Only three of the 26 examined were found to be pregnant. One female trapped on December 27, 1961, had two fetuses which were not well developed and measured 99 mm. and 95 mm. A female trapped on January 20, 1962, had four well-developed fetuses measuring 129 mm., 125 mm., 125 mm., and 120 mm. Another female trapped January 22, 1962, had three well-developed fetuses that measured 120 mm., 114 mm., and 115 mm. Eight of the tracts examined had swollen uterine horns. These otters were trapped on the following dates during 1962: January ?, 16 and 29; one on February 2, two on February 13, and two on February 17. Three other otters were found to be lactating when trapped on January 30, 1962, March 2, 1962, and March 13, 1962, but when examined they showed no pregnancy.

According to Liers (1951), the gestation period varies from nine months 18 days to 12 months 15 days. Delayed implantation of the embryo may be involved. In Minnesota, otters breed from December to early May. Using the above information on gestation and the results from analysis of reproductive tracts it suggests that the otter in Florida breeds from January to April.

An observation was made on an otter mating on the St. Marks Refuge, Florida, on January 9, 1958, by David Swindell of the Game Commission. He observed two otters following one another in a creek. There was a short struggle, after a short chase, before the male caught the female. Copulation was performed in the creek with the animals lying on their left sides. Very little motion was observed during the process except for frequent rises for air by the female. The male had the female by the scruff of the neck just forward of the shoulders and held with the forelegs around the abdomen. The only observed motions during 20 minutes of the act were short vigorous vibrations which caused two-inch water geysers to rise about 12 to 15 times at intervals of a count of three to five seconds. The otters left the water and completed copulation on the bank. After two vibratory periods the female struggled to escape on the bank and finally succeeded. Vigorous pursuit by the male was attempted, but no further copulation was observed.

## *CONCLUSION*

Judging from the trappers' reports the general trend seems to indicate that the otter population is on the increase in Florida. The fluctuations in water level seem to influence the harvest of otters by trappers.

Because hide dealers' reports are not accurate enough, it is recommended that a metal tag be affixed to each hide to get a more accurate record of the harvest of principal fur-bearers and their population trends. These tags could be sold to the trappers by the county judges' offices for the cost of the tag's manufacture. Counting the number of tags sold an indication would be given of the number of animals trapped.

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# GAME HARVEST AND HUNTER USE CAMP A. P. HILL, BOWLING GREEN, VIRGINIA

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## INTRODUCTION

Termed the show place of the Second Army from the hunting view point, Camp A. P. Hill is an excellent example of multiple use of military areas. With a two-deer, one of which may be a doe, bag limit it has produced and sustained a high deer kill and a high hunter use during the period for which records are available.

## HISTORY

Camp A. P. Hill was established in 1940-41 as an Army training camp from 76,795 acres of farm land in Caroline County near Bowling Green, Virginia of which approximately 18% was open farm land. During World War II and until 1946 the area was utilized to train approximately 70,000 troops yearly. From 1946 to the present it has been training from 50,000 to 60,000 yearly of the active Army, Air Force, Marine Corps troops, National Guard and Army Reserves.

The first records available show that the camp was open to hunting in 1954-55 by written permit only. However, there was limited hunting permitted as early as 1946 but no records were kept.

In 1958 a cooperative agreement was initiated between the Commission of Game and Inland Fisheries of the Commonwealth of Virginia and the Second Army for the management of the game resources on the post and became effective March 3, 1959. This is one of the first cooperative agreements between a military base and a state game agency and was the second agreement in Virginia with the Second Army. Camp Pickett was the first. The Second Army has been most cooperative and outstanding working relations have existed. Through this program the Virginia Game Commission furnishes technical assistance and law enforcement, as well as labor, equipment and supplies for improving habitat and management of the posts' wildlife. The Camp A. P. Hill command administers the hunting by use of written permits, an excellent check in and out system and by assignment of the hunters to designated areas.

In contrast to most areas in Virginia there has been a two-deer, one of which may be a doe, bag limit since the area was opened to public hunting.

## DESCRIPTION OF CAMP

The camp is divided into twelve hunting areas. At present about 5,000 acres are in open areas, headquarters, campsites, training fields, roads, right-of-ways and air strips and the remainder is in forest and abandoned farm land. The reservation is open to hunting except for the headquarters, campsites and administrative areas. Total acreage available for hunting is 76,663 acres. Areas 1 through 8, comprising about 53,000 acres, are available for hunting to service personnel and the general public except when training exercises are in progress in an area. Areas 9 through 12, known as the Range or Impact Area, are made available on a limited basis. Hunting in the latter areas is by organized drives guided by Installation or Range personnel. Unguided hunters are not permitted in these areas because of the danger due to firing ranges and active dud areas.