Borrichia frutescens

Sea oxeye, *Borrichia frutescens*, a woody plant of negligible value to waterfowl, encroached on Bulls Island National Wildlife Refuge in South Carolina as a result of drought conditions which exposed all "flats" in an impoundment. At the time little was known relative to the control of this plant or its susceptibilities to herbicides. In 1956, 21 acres were divided into three 7-acre plots and each plot received the following treatment:

Plot No. 1: One treatment on May 15 with the isopropyl ester of 2, 4-D applied at a rate of 5 lbs. acid-equivalent per acre. The 2, 4-D was diluted with diesel oil and a volume of 5 gallons per acre was used.

Plot No. 2: Two treatments, the first being applied May 15 and the second June 19. Both treatments used rates and volumes identical with the application in Plot No. 1.

Plot No. 3: One treatment on June 19 at the same rate and volume as the other applications.

The sea oxeye was growing on soils of a high salinity due to previous flooding with salt water. No surface water was present at the time of either treatment.

The plant was in a full-leaf stage of development at the time of the May treatment, but had not begun to flower. In the June treatment the plant was in the very initial stages of flowering. Average height of the plant at the time of both treatments was approximately 3 feet.

Final results indicated little differences between Plots No. 1 and 2 where 95 percent root kills were in evidence. The final kill in Plot No. 3 was estimated at 75 percent, indicating the mid-May treatment was the most successful. It may be possible lower rates of 2, 4-D could accomplish similar kills. Giant foxtail invaded the area after treatment.

Acknowledgement for much of the field information in this report is made to the following personnel of the U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife: Biologist, Royston R. Rudolph; Refuge Manager, Carl Yelverton; and Assistant Refuge Manager, Enos O. Mellinger.

THE OTTER IN NORTH CAROLINA

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ABSTRACT

The fall-winter foods of otters living along the coast are largely fish—principally carp, catfish, suckers, and sunfish. The otters' diet at other seasons of the year is largely comprised of fish, blue crab, and crayfish. Other foods, all taken in small quantities, are shrimp, clam, water beetles, decapod, muskrat, rails, and waterfowl.

An examination of 53 female otters from northeastern counties over a 12-winter period (1947-48—1958-59) showed that breeding starts during January and continues into February and possibly into March.

Of eight gravid otters in a study sample of 53, five contained three embryos, two contained two, and one contained four embryos. This is an average of 2.88 embryos per female.

Sex data obtained on 273 otters showed 149 (55%) males and 124 (45%) females. This is 120 males for every 100 females.

Weights were obtained on a total of 238 otters. The average weight of 138 males was 18 pounds and 3 ounces, and the average weight of 100 females was 15 pounds and 7 ounces.

The longest of 22 otters, a 24-pound male, measured 51½ inches; the shortest, a 13-pound female, was 38 inches long. Body lengths ranged from 23 to 36 inches and tails from 14 to 19½ inches. Otter pelts, after they were skinned and placed on a drying board, measured from 8 to 19½ inches longer than did the carcasses.

North Carolina contains an estimated population of about 3,000 otters. Estimated populations on large untrapped refuges range from one otter for each 367 acres to one for each 1,100 acres. During the 1958-59 trapping season, 10 otters were trapped from about 5,000 acres of marsh in Currituck County. This is a yield of one otter for about every 500 acres of land.

Otters appear to travel more during the mating season that at any time during the year, an estimated 10 to 12 miles. Families from the birth of young in spring to the time of separation in fall or winter appear to live within an area of about nine square miles.

Otters may be legally taken with traps or firearms and/or by dogs during a season that averages about 80 days. Most otters are taken in traps.

During twelve trapping seasons, 1947-48—1958-59, a total of 12,557 otters was harvested. A record yield of 1,514 animals was caught in the 1954-55 season. An epizootic that apparently struck following the destructive hurricanes in 1955 reduced yields to 687 otters in the winter of 1956-57.

The fur of North Carolina otters is ranked among the best in North America. The average price paid trappers in recent years varied from $12.00 to $22.00 per skin. Select black pelts sold in New York in 1957 brought up to $48.00 each.

Otter management is best accomplished by trapping regulations that insure the leaving of ample brood stock.

INTRODUCTION

Intelligent, strong, docile, playful, superb swimmer, ferocious fighter, valuable furbearer and one of the world's best fisherman. That describes the otter. Many people love them and many fishermen dislike them. Some trappers believe otters destroy large quantities of fur and some hunters contend they are destructive to waterfowl. But despite the trapper's trap, and the hunter's gun, and many years of persecution, the otter is still a relatively common animal in some sections of North Carolina.

Information on the numbers of otters harvested in the country is published annually by the Fish and Wildlife Service. According to figures in Wildlife Leaflet 410, during the winter of 1957-58, a total of 16,595 otters was harvested in the United States. These animals came from 23 states. Louisiana was first with 4,382 otters, Alaska, second with 3,890; Wisconsin, third with 1,366 and North Carolina was fourth with 992 otters.

In many states, otters are uncommon or rapidly becoming extinct. Most mid-western states are entirely void of otters. In Pennsylvania, despite its extensive forest areas and numerous watercourses, this valuable furbearer is absent in all but a few sections. In New York, otters are largely absent except in the Adirondacks and a few southern counties. In North Carolina, when it became apparent that populations were low, otter trapping was prohibited from 1938 to 1946. It has been said that this nine-year respite may have saved the otter from near total destruction. Today many of us remain alert to this possibility.

Most of the data in this paper were obtained at J. J. Flora's fur shed in Moyock where observations were made on hundreds of otter carcasses and pelts. Some of them were from Virginia and South Carolina, but most were from North Carolina. Additional time was spent in the field and on traplines in otter habitat in many sections along the coast.

DISTRIBUTION AND HABITAT

Otters occur over approximately half of the state with heaviest populations along the coast. Extension of its range to the west is apparent but very slow.

A few animals have been seen in remote parts of the Catawba and Yadkin River watersheds. These rivers are between 250 and 300 miles from the coast. No otters are known to inhabit the Appalachian Mountains section of the state.

Several hundred thousand acres of coastal marsh and swamp provide optimum otter habitat. The Outer Banks bordering the Atlantic Ocean, extend intermittently from the Virginia state line on the north to the South Carolina state line on the south and all of them are inhabited by otters. Behind the Outer Banks lie seven sounds—Albemarle, Bogue, Core, Croatan, Currituck, Pamlico, and Roanoke—bordered by thousands of miles of marsh shoreline. Behind the marsh in many areas there is swamp. The Cape Fear, Neuse, Roanoke, Tar, and numerous smaller coastal rivers are all bordered by thousands of acres of swamp. The inland waterway, and numerous inlets and bays are largely bordered by marsh, bog, and swamp. It is in these types of habitat, parts of which are probably some of the best in the world, that otters thrive and increase.

FOOD HABITS

A common belief that bass and other pan fish comprise the otter's principal food has given it a bad reputation in the state. It is also the opinion in some quarters that they destroy large quantities of wildlife. Both of these opinions are half-truths. Many of the fish caught by otters are considered unfit for human consumption. Furthermore numerous farm ponds and watercourses in the state contain many thousands of undersized fish because of insufficient food. Similar conditions exist in other sections because the fishermen are not catching enough fish. In many instances, therefore, when otters eat fish, they are actually helping the fisherman.

Trappers whom the writer has met often accuse otters of devouring large numbers of muskrats but they have never proven this claim. In 1951, an analysis of eleven otters scats, mailed by a trapper from marsh on Pamlico Sound, disclosed the presence of flounder (*Pleuronectidae*) and two unidentified species of marine fish, but no muskrat. On another occasion, an irate trapper showed the writer two large otter toilets in marsh at Corolla on Currituck Sound that he said contained the remains of black muskrats. Field examination revealed, however, the shredded remains of waterfowl. At the time (January), the waterfowl season had just closed and marshes contained the remains of dead coots (*Fulica americana*), other waterfowl and some crippled ducks. Subsequent field examination of several hundred droppings observed at toilets near Corolla and at many other points on Currituck Sound revealed mostly fish or crustaceans, feathers of rails. but no waterfowl or muskrat.

A four-year (fall and winter of 1947-48 to 1950-51) collection of otter digestive tracts and a two-year (fall of 1950 and 1951) collection of otter scats included material most of which was from Currituck County, North Carolina. Laboratory examination of the food remains in 24 digestive tracts and 61 droppings showed fish by frequency of occurrence in more than 90 percent. Since the objective of the study was to determine the role of otters as muskrat predators, no effort was made to identify all the fish species. The bulk of them, however, were carp, suckers, sunfish, and catfish. Three samples contained white perch, and one contained largemouth bass. Other foods were crayfish, blue crab, water beetles, bird (mostly king rail), shrimp, decapod, clam, trap bait, and one muskrat.

BREEDING

There is a wide variety of opinion concerning the length of the otter's breeding season in North Carolina. Some trappers claim that mating occurs from January into March. One man said he saw a pair of otters playing and mating in a swamp creek during January. Others think that most mating occurs in February and a few trappers believe that December is the month that breeding takes place.

During the twelve winters (1948 to 1959) that the author has periodically autopsied otters at the Moyock fur shed in Currituck County, no pregnant animals have ever been examined in December. From January 23 to March 14, in 1959, 25 otters were examined for fetuses. Four of the 25 were pregnant. They were received at the fur shed between January 23 and February 13. None

of three animals received at the fur shed between February 14 and March 14 was pregnant. Of the 22 animals in the January-February study sample, four weighed about 20 to 21 pounds each; thirteen were in the 14 to 19 pound group; and five in the 10 to 13 pound group. The smallest female weighed 11 pounds and 12 ounces; the largest 21 pounds and 8 ounces.

From 1947-1958 a total of 28 female otters was examined. Most of this work was done while weighing and sexing muskrats at the fur shed. Of the 28 females examined in the eleven-year period, four contained embryos. Two of the pregnant animals were trapped in January and two in February. Embryos in the February specimens were about three inches long and every detail of the body was developed. Embryos in the January otters were walnut size. It appeared that all four females had been bred in January.

Emil E. Liers, a world authority on propagating otters in captivity, states, "An otter is not sexually mature until two years old." It is believed that female otters seldom, if ever, attain 14 pounds during their first year. Therefore, the five (23%) individuals in the 10 to 13 pound group are considered subadults and the seventeen (77%) otters in the 15 to 21 pound groups are adults. Of the seventeen adults, two of eleven trapped in January were gravid and two of six February specimens were gravid. An examination of these embryos revealed that all four females apparently had been bred in January.

The eight sets of embryos found in the two study samples indicate that otters in northeastern North Carolina mate in January. The absence of visible pregnancy in five specimens trapped during February and March, suggests that mating among otters continues through February and probably into March.

GESTATION PERIOD

Liers, in his notes on the river otter, states that the gestation period of animals reared in captivity "varies from 9 months and 18 days to 12 months and 15 days." On the other hand, Ernest Thompson Seton records the gestation period of English otters as 61 days. While the gestation periods given by Liers may be normal for otters reared in captivity, there is reason to question whether they hold for those in the wild. It does not appear reasonable that a difference in gestation periods of more than seven months exists between the English and American forms of otters. Poole maintains that the difference may be "due to delayed implantation of the blastocyst"—a phenomenon that occurs in captivity among several other mustelids, namely, the badger, fisher, martin, and weasel.

It is evident that if Liers' gestation periods apply to wild otters as some authors have indicated, females bred in January and February would bear their pups between September and March. If parturition generally occurred during this period it would be readily evident on animals taken during the trapping season: (1) *The mammae on the carcasses and pelts of trapped otters would show evidence of lactation.* (2) *Gravid mothers would be heavy with large embryos.* (3) *Trappers would catch the young in their traps and see them in the field.*

During eight winters of trapped fur examination, not one lactating otter was found, there were no females heavy with young and no pup otters were trapped. Indeed, the opposite was true. During May, 1949, L. B. Turner, Fish and Wildlife Service, found three young otters in a sand furrow along a road on the Pea Island National Wildlife Refuge. According to Turner, they were a little bigger than a large muskrat and an estimated six to eight weeks old. It would appear that they had been born early in April or late in March. During August, 1953, the author observed three half-grown otters playing in a shallow creek on Bray Island on the northern end of Currituck Sound. A trapper told the writer of young otters found tangled in fish nets in Pamlico Sound during June. These and other observations indicate that most otters are born in March and April.

We are therefore led to the conclusion that the gestation period in North Carolina otters is probably the same as in English otters—about 61 days.

SIZE OF LITTERS

Little information has been published on the sizes of otter litters in the United States. Of seven litters reported by Liers: four contained four young; two

contained three; and one litter contained two young. Fetuses in eight North Carolina otters showed that five contained three embryos; two contained two each; and one contained four embryos. See Table I. Two litters reported in the field contained three otters each. From these limited data, it appears that the average number of young per litter is three.

TABLE I

DATA ON THE FETUSES OF EIGHT OTTERS FROM NORTHEASTERN NORTH CAROLINA

Approx. Date Killed	*Wt. of Parent (Lbs.-Ozs.)*	*No. of Embryos*	*Size of Embryos*	*Estimated Date of Conception*
1/49	data lost	3	about 80 mm.	January
1/24/52	17-9	4	about 35 mm.	January
2/ 6/—	23-8	2	about 85 mm.	January
2/14/58	13-12	2	about 90 mm.	January
1/59	?	3	53 mm.	January
1/59	?	3	43 mm.	January
2/59	?	3	65 mm.	January
2/59	?	3	88 mm.	January

SEX RATIOS

There appears to be a paucity of reliable published data on the sex ratios of otters in North America Most of the information presented here was obtained from otters from northeastern counties in the state and a few animals were from southeastern counties in Virginia. All data were obtained at the fur shed in Moyock. During January, 1954, a sample of 58 otter pelts contained 31 (54%) males and 27 (47%) females. Of 34 pelts examined in February, 1957, 19 (56%) were males and 15 (44%) were females. During the winter of 1958-59 an examination of 181 otters revealed 99 (55%) males and 82 (45%) females. The combined total of 273 otters contained 149 (55%) males and 124 (45%) females.

WEIGHTS AND MEASUREMENTS

There is also relatively little published information on the weights and measurements of otters. Hamilton gives these figures: "Total length, 900-100 mm.; tail, 300-400 mm.; hind foot, 100 mm. Weight 12 to 15 pounds, seldom exceeding the latter." Trippensee reports: "The adult river otter varies in length from 40 to 48 inches, the body being about three-fourths of this length and the tail one-fourth. The adult otter weights from 6 to 20 pounds," Anthony reports: "Total length 45 inches; tail vertebrae, 18 inches. Weight from 18 to 25 pounds, about 20 being the average."

Weights and measurements of otters reported in this study were obtained mostly at the Moyock fur shed. Standard scales certified for accuracy were used. The weight of each otter was recorded to the nearest quarter pound. Measurements included total length, body length, and tail vertebrae to the nearest half-inch.

During the twelve-winter period, weights were obtained on a total of 238 otters (Table II). The smallest, a male, weighed 7 pounds and 8 ounces; the largest, a male, 31 pounds. Another large male weighed 28 pounds and 8 ounces. The heaviest female weighed 23 pounds and 8 ounces. Of 138 males, 49 (36%) weighed 20 pounds or more and one weighed under 10 pounds. Nine (9%) of 100 females weighed 20 pounds or more and three weighed under 10 pounds. The average weight of the males was 18 pounds and 3 ounces and the average weight of females was 15 pounds and 7 ounces. Thus the males outweighed the females by an average of about three pounds.

Total length measurements were obtained on 22 otters and pelt measurements on 8 animals. See Table III. The longest otter, a 24-pound male, measured 51½ inches. The shortest specimen, a 13-pound female, was 38 inches long. Body lengths varied from 23 to 36 inches and tails from 14 to 19½ inches.

Table II

Distribution of Weights of 238 Otters
(Weights Expressed in Pounds and Ounces)

Weight Group	Male		Female	
	No.	*Wt.*	*No.*	*Wt.*
5-0 to 9-15	1	7-8	1	8-0
Ounces	–	– –	1	9-4
" "	–	– –	1	9-8
Total and Mean	1	7-8	3	8-11
10-0 to 14-15	1	10-0	2	11-0
" "	1	10-8	3	11-12
" "	1	10-12	2	12-0
" "	1	11-8	3	12-4
" "	3	12-0	3	12-8
" "	2	12-4	5	13-0
" "	1	12-8	1	14-4
" "	2	12-12	4	13-8
" "	2	13-0	4	13-12
" "	2	13-8	2	14-0
" "	2	14-0	3	14-4
" "	2	14-4	3	14-8
" "	2	14-8	4	14-12
" "	5	14-12	–	– –
Total and Mean	27	13-1	39	13-4
15-0 to 19-15	6	15-0	7	15-0
" "	2	15-4	2	15-4
" "	2	15-8	3	15-8
" "	2	15-12	4	15-12
" "	6	16-0	3	16-0
" "	3	16-8	1	16-4
" "	2	16-12	4	16-8
" "	3	17-0	3	16-12
" "	2	17-4	5	17-0
" "	6	17-8	1	17-4
" "	4	17-12	7	17-8
" "	7	18-0	1	17-12
" "	1	18-4	3	18-0
" "	4	18-8	1	18-8
" "	2	18-12	1	18-12
" "	3	19-0	1	19-4
" "	2	19-4	1	19-8
" "	3	19-8	1	19-12
" "	1	19-12	–	– –
Total and Mean	61	17-8	49	16-8
20-0 to 24-15	9	20-0	1	20-0
" "	2	20-4	1	20-4
" "	2	20-8	2	20-8
" "	3	20-12	1	21-0
" "	1	21-0	2	21-8
" "	6	21-8	1	22-8
" "	1	21-12	1	23-8
" "	7	22-0	–	– –
" "	1	22-8	–	– –
" "	7	23-0	–	– –
" "	1	23-8	–	– –
" "	2	24-0	–	– –
" "	1	24-8	–	– –
Total and Mean	43	21-10	9	21-4

TABLE II—*Continued*

DISTRIBUTION OF WEIGHTS OF 238 OTTERS
(Weights Expressed in Pounds and Ounces)

	Male		*Female*	
Weight Group	*No.*	*Wt.*	*No.*	*Wt.*
25-0 to 29-15	3	25-0	–	— —
" "	1	25-12	–	— —
" "	1	28-8	–	— —
TOTAL AND MEAN	5	25-14	–	— —
30-0 to 31-0	1	31-0	–	— —
TOTAL AND MEAN	1	31-0	–	— —

Average weight of males—18 pounds, 3 ounces.
Average weight of females—15 pounds, 7 ounces.
Average weight of all otters—17 pounds.

TABLE III

CARCASS AND PELT MEASUREMENTS (IN INCHES) OF NORTH CAROLINA OTTERS

		Carcass			*Stretched Pelt*		
Sex	*Weight Lbs. and Ozs.*	*Body*	*Tail*	*Total Length*	*Body*	*Tail*	*Total Length*
Female	15-8	28	17	45	..	..	..
Female	13-0	27	14	41	..	..	..
Male	18-8	28	16	44	..	..	..
Male	18-0	27	17	44	..	..	..
Male	19-0	25½	19½	45	..	..	..
Male	18-0	26½	15½	42	..	..	..
Female	16-8	26½	19½	46	..	..	..
Female	17-8	27	17	44	..	..	..
Female	22-8	30½	16½	47	..	..	..
Male	20-8	29	15	44	..	..	..
Female	13-0	23	15	38	..	..	..
Male	23-0	28½	18½	47	42½	23½	66
Male	23-0	30	17	47	..	..	..
Male	24-0	..	..	51½	..	..	..
Male	16-0	27	17½	44½	..	..	53
Male	22-0	36	15	51	38	25	63
Male	24-0	..	..	48	38	23	61
Male	18-8	..	..	44½	..	..	..
Female	21-0	..	..	46	..	..	..
Male	21-0	31	18	49	..	..	..
Male	15-12	27	17½	44½	31	21½	52½
Male	19-0	..	..	..	..	..	56
Male	31-0	..	..	..	43	25	68
Male	23-0	30	18½	48½	..	..	..
Female	23-8	..	..	..	..	..	59

The otter with the 36-inch-long body had a 15-inch-long tail and measured 51 inches. This pelt on a drying board measured 63 inches—an increase of 12 inches after skinning. The recorded lengths of other stretched pelts showed increases ranging from 8½ inches to 19 inches. The pelt of the large 31-pound otter had the following measurements: body 43 inches, tail 25 inches, total length 68 inches. This animal's pelt at the base of the tail was 9¼ inches wide and 8¾ inches wide at the shoulders.

POPULATION DENSITIES AND RANGE

Published information on the population densities and range of otters is scarce. Seton in discussing the subject mentions that Ontario has excellent otter range and estimates a population of one otter for every eight square miles.

Certain national forests in Oregon and Washington are said to contain an estimated population of one otter to each 70 square miles. Using the information in the 1958-59 North Carolina fur dealers' report (Figure 1) as a guide, and figuring two otters left for each one taken, it may be estimated that before the 1958-59 trapping season a total of 3,087 otters inhabited the state. This would be one otter for every 17.05 square miles on a state-wide basis.

While there is no known method of censusing large acreages of otter range accurately, it is possible by observation and/or trapping to obtain a rough estimate of the number of otters using a marsh or a watershed. Refuge superintendent L. B. Turner estimated that the 11,000-acre Pea Island National Wildlife Refuge supported a maximum population of 30 otters. This is one otter for every 367 acres. William Henderson, the game manager at Camp Lejeune U. S. Marine Base, estimated that 80,000 acres of land and marsh on the base supported at least 100 otters—one for each 1,100 acres.

During the 1958-59 trapping season, marsh on and near the northern end of Currituck Sound yielded ten otters. These animals were taken by two trappers from about 2,000 acres of marsh within a four-mile radius that encompassed about 5,000 acres of marsh. The number of otters trapped from the remaining 3,000 acres is unknown but it probably did not exceed two and it is possible that none was caught. Thus we have a yield of at least one otter per 500 acres from 5,000 acres of range. During the winter of 1957-58, trappers caught seven otters from the same area. This would be a yield of one animal for about 700 acres of habitat.

MOVEMENTS

It is generally considered that otters travel long distances over the same general routes year after year. Usually they follow watercourses but at times they may travel ten or more miles over land. Liers states that "individuals may cover 50 to 60 miles of stream course in a year. Families range about three to ten miles in a current season."

From observations made in coastal North Carolina, it appears that many otters travel within the limits of a much smaller area, covering a course of 8 to 12 miles a year. Food is plentiful and getting it does not require extensive travel. What appeared to be entire families were observed spending most of the spring and summer months in an area of about four square miles. Our observations indicate that by October and cooler weather they travel more, possibly over an area of nine square miles, until late fall when the family separates.

We have only fragmentary information on the time of family dispersal. Some families remain together longer than others and at times the father leaves to wander and forage for food alone. Mating in winter brings the adults together again but the time appears to be largely determined by weather and number of animals present. On December 10, 1958, the tracks of five otters (presumably a family) were seen in a coastal marsh near Hobucken. On January 9, 1959, on marsh in Currituck County, the tracks of two otters were seen in snow. Both animals were traveling in the same direction about a mile apart. On the same day, a trapper saw the tracks of another otter traveling alone. Tracks on snow and bubbles and broken ice along creeks have been observed on other occasions and in each instance the sign was made by solitary animals. Some trappers, however, have reported seeing pairs into late winter. It is quite likely that otters travel more miles during the mating season than at other times of the year.

HARVEST

The open season for trapping otters are aligned with the periods for trapping other furbearing animals in the state. The earliest season opens November 16 and the latest season closes March 15. In most parts of the state the season is about three months long.

Otters in North Carolina may be legally taken with traps or firearms and/or dogs. Of these methods, trapping is the most productive. During winters of little rainfall packs of dogs are used effectively in bagging otters in swamps. This method is largely employed in the southeastern part of the state. Trapping and hunting with dogs are in general not wasteful but the promiscuous

shooting of otters with firearms is wasteful. Such promiscuous shooting is wasteful because in many cases the animals cannot be retrieved. J. J. Flora, Currituck fur dealer, spoke of a man who said he shot four otters in a creek in Currituck County and all of them sank, mortally wounded. Recently a hunter reported to us that he shot at two otters 20 feet from his duck blind. Both appeared to be mortally wounded, but they disappeared in water and dense submerged vegetation less than four feet deep and were never found. Another hunter reported that he had quit shooting otters. The reason: He shot three a few winters ago and lost all of them. Thought of the waste was too much for him.

All shot otters are not lost. But their pelts generally bring only 50 to 75 percent of their value in comparison to trapped animals. An inspection a few years ago of a random sample of 58 otter pelts at Moyock revealed that 22 or about 40 percent had been shot. These pelts brought from $5.00 to $15.00 less that the $20.00 paid at the time for undamaged pelts.

YIELDS

All people who buy the skins of wild fur animals in North Carolina are required by law to submit an annual fur dealer's report. These reports are tabulated and the amounts of fur recorded. An unknown amount of other fur shipped to out-of-state fur houses is not recorded. Studies, however, indicate that most otters—at least 95 percent—are sold to fur dealers who buy fur in the state. The records compiled from the fur dealers' reports are, therefore, considered approximately correct.

During the twelve winters from 1947-48 to 1958-59, trappers and hunters harvested a total of 12,557 otters in the state. This is about 1,046 otter per year. The largest catch was recorded in the 1954-55 season when 1,514 animals were caught. Two seasons later, following the destructive hurricanes in 1955, at which time there was extensive flooding and millions of fish died, yields dropped to the lowest in 12 years. That winter (1956-57) trappers took 687 otters and the winter before (1955-56) only 797. See Figure 1. This sudden drop in population was apparently caused by an epizootic that struck otters and minks soon after the 1955 hurricanes. Trappers and farmers reported finding dead otters and minks, mostly the latter, and the pattern of the epizootic appeared to go from east to west. That is, trappers in coastal areas first noticed the short supply of otters in the 1955-56 season, but it was not until the winter of 1956-57 that the drop in populations was detected farther inland. Today, otter populations in the state are building back to normal.

FUR VALUES

Prices paid for otter peltries in 1940 are low compared with what the trapper receives today. According to New York Fur Auction Company prices received for North Carolina otter pelts compare very favorably with those harvested in the lake states. During twelve winters (1947-48 to 1958-59) the average estimated price received by trappers for skins ranged from $12.00 to $22.00. See Table IV.

Dark brown pelts bring more than light brown pelts. The dark pelts come from dense coastal swamps, the light ones—some a bleached yellow-brown—from marsh and other sun exposed habitat. Many otters range in both marsh and swamp and their fur is a variation of common brown. Each year a few nearly black pelts are found in collections. In the 1956-57 season, a very small assortment of choice North Carolina skins brought $48.00 each on the New York market and a collection of not quite so choice pelts averaged $36.00 each.

MANAGEMENT

North Carolina otters have optimum habitat in many sections of the state. This cannot be improved by management. But good habitat is not enough. Trapping seasons and harvest must be regulated to sustain the present level of production. This is the only practical management.

FIGURE 1.

NO. OF OTTER PELTS, AS DETERMINED FROM
NORTH CAROLINA FUR DEALER REPORTS, 1948-1959

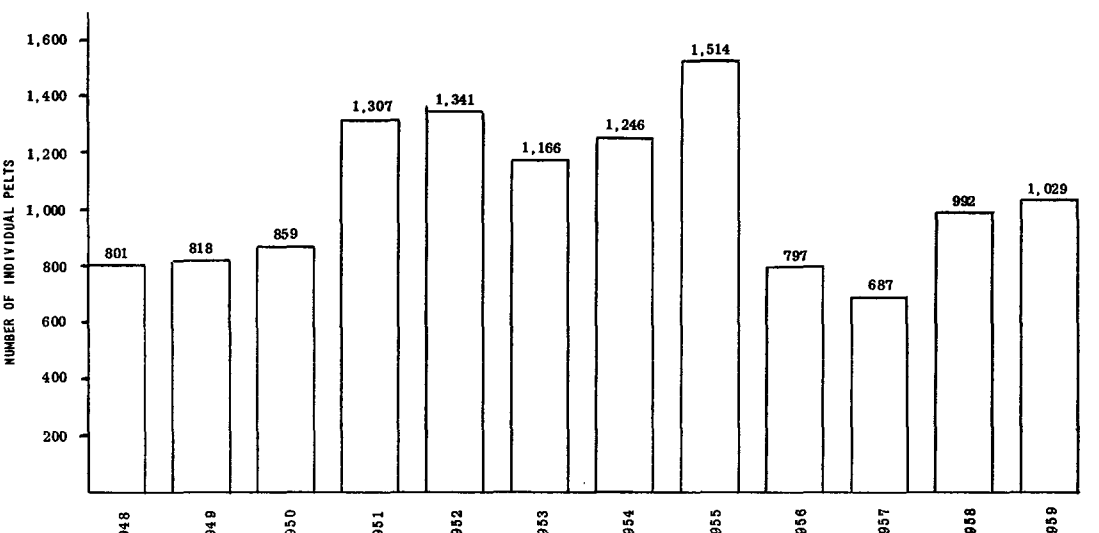

TABLE IV

ESTIMATED AVERAGE VALUE OF OTTER PELTS, NORTH CAROLINA 1947-48 THROUGH 1958-59

Year	*Price of Each*
1947-48	$20
1948-49	13
1949-50	12
1950-51	15
1951-52	14
1952-53	15
1953-54	15
1954-55	16
1955-56	22
1956-57	22
1957-58	21
1958-59	19

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DIVING DUCKS—THEIR PAST AND FUTURE

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The term "diving duck" applies to a large group of waterfowl differentiated from so-called "dabbling" or shoal-water species by certain habits and morphological characteristics. Broadly viewed, the diving duck category includes species that nest inland as well as along the coast. I shall limit the present discussion to the diving duck species on which fairly comparable data are available on status and population distribution, namely, the canvasback, redhead, ring-necked duck, greater and lesser scaup (collectively), and ruddy duck.

The literature gives clues to the former status of diving ducks, but the accuracy of methods of population estimation varies enough to reduce the validity of actual comparisons of year to year abundance. There seems to be little doubt, however, that the number of diving ducks now wintering in the Atlantic flyway is smaller, compared with that encountered during the best seasons prior to the "lean years" of the 1930's. Records based on data gathered in a systematic and uniform manner during the last decade show short-term relationships not apparent from the incomplete published observations.

During most years, well over half of the fall flight of ducks is composed of juveniles. Populations which migrate each fall, accordingly, are responsive to rates of production and survival of the young of any given year, and to a lesser extent, to the size of the adult breeding population. This is true for