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MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

January-March 1947

Cooperating Agencies

Maine Department of Inland Fisheries and Game
Wildlife Management Institute
University of Maine
U. S. Fish and Wildlife Service

Unit Personnel

Leader - Howard L. Mendall
Assistant Leader - Jay S. Gashwiler
University Representative - Prof. Robert I. Ashman
Graduate Assistants - Malcolm W. Coulter
Leslie L. Glasgow
Graduate Students - James R. Reilly
Harold J. Dyer
Gerardus C. deRoth
Clerk - Margaret Spencer

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

January-March, 1947

RESEARCH PROJECTS

MUSKRAT MANAGEMENT

Sub-project: Life history studies.

Objectives : A study of life history and environmental factors leading to management recommendations.

Assignment : Jay S. Gashwiler, Assistant Leader.

Gashwiler spent about ten days in field work during the quarter; also nearly a month in the laboratory compiling the data from specimens obtained during the past year. Therefore, the material as presented will serve in the nature of a progress report since it involves activities much beyond the three month period January through March.

Field Studies

Some winter checks of muskrat houses and of mortality factors were made during each month of the period. The houses in Magurrewock Marsh (where the water is stabilized) appeared to stand the winter in good shape - only a small percent of them freezing. Muskrats were found traveling on top of the snow and ice during warm spells in early winter, and continued to do so until the spring break-up. One, which was tracked, crossed a relatively high ridge only to re-enter another spring-fed waterway about one mile distant. While in the open the animals were very vulnerable to predation, and several evidences of foxes preying on them were found. There was little evidence of fox damage to the houses, however, although they did visit nearly every one in the marsh at frequent intervals. Some house damage, which was probably fatal to the muskrats occurred from otters. Signs indicated that they enter the houses underneath the water, probably trapping the muskrats in the nest cavity, and then leave by going through the top of the house. Even if the muskrats elude the otter the seven to eight inch circular hole left in the house permits it to freeze if the weather is cold.

At the Mattanawcook Lake area there were only a few animals at the time of the fall freeze-up. The water was very low then, but was raised steadily during the period by the corporation holding the water level rights. A check made in midwinter revealed that the few houses present were frozen. It is thought that the animals probably moved up into the nearby beaver ponds, where the water was stabilized, but where the food resources were poor.

A few houses were under observation on a section of Pushaw Stream during the winter. This area is more or less unique in having a series of semi-permanent houses of large size which are occupied when the temporary fall-built houses are flooded. This shift in quarters was evident by January 9.

On the Calais study area a careful winter house count was made and the data, when compared with figures of a year ago, are very interesting. This area is on the Moosehorn Refuge and affords an example of how fast a population of muskrats can be built up with protection and stabilized water levels. The marshes consist of two relatively parallel streams each of which is divided by a dam. Both streams are barred to trapping throughout, but the water levels above the dams have been fairly stabilized for nearly two years while those below the dams fluctuate considerably. The combined house counts for the two marshes are as follows:

Locality	1945-'46 count	1946-'47 count
North Marshes (Fluctuating water)	60	39
South Marshes (Stabilized water)	43	171
Totals	103	210

Laboratory Studies

A quantity of data were collected last year from trapped muskrats at Mattanawcook Lake, Penobscot River, Pushaw Stream, Davis-Holbrook Thorofare, and (through the courtesy of the Refuge Division of the Fish and Wildlife Service) the Missisquoi and Moosehorn refuges. A few of the more interesting findings of the pelt and carcass studies are as follows:

Sex and Age Ratios - Fall muskrats from the Missisquoi Refuge in Vermont had a sex ratio of 42.1% females to 57.9% males. Of these animals 80% were muskrats of the year and 20% were adults. A smaller fall sample from the Moosehorn Refuge revealed a sex ratio of 51.6% females and 48.4% males with an age ratio of 71% animals of the year and 29% adults. The spring Missisquoi Refuge sex ratio was 42.5%

females and 57.5 males as compared to 41.9% females and 58.1% males for the Davis-Holbrook area. The foregoing data are based on those areas from which the largest number of specimens were available.

Damaged Pelts - Perhaps the most outstanding feature of the study was the seasonal data on damaged pelts (resulting from fighting) from the Missisquoi Refuge. Only 9.9% of the backs of the fall-trapped animals were damaged and 17.1% of the bellies. In contrast, 52.9% of the backs of spring-trapped animals were damaged as well as 58.0% of the bellies. A comparison of these data with those of Pushaw Stream, where the population is lower, is interesting. On Pushaw Stream 8.4% of the spring-trapped animals had the backs damaged and 27.4% of the bellies also. The density of population is apparently an important factor in pelt damage as well as the season of the year, i.e., the breeding season.

Pregnancy - Information was obtained on the number of pregnant females and the number of embryos in the uteri. The Missisquoi Refuge data best portray the progressive seasonal increase in pregnancy and is as follows:

Weekly Period	No. Females Trapped	Percent Pregnant Females
March 17 to 23	46	6.5
March 24 to 30	49	10.2
March 31 to April 6	26	15.4
April 7 to 13	20	35.0
April 14 to 20	7	71.4

A tally of the embryos in the uteri revealed an average litter of 7.5 young.

Proposed plans for the next quarter include the procuring of pelt and carcass data from the trappers, and a study of trapping methods; litter data; and population studies.

Sub-project: Muskrat habitat study.

Objectives : To determine the seasonal use of specific muskrat habitat types and to analize the data thus obtained as to the management applications.

Assignment : Malcolm W. Coulter, Graduate Assistant.

Bi-weekly house checks were conducted on the Davis-Holbrook study area. Adverse weather prevented checks at exact two-week intervals, but at least two checks per month were accomplished. The results of

these house inspections show that some lodges were flooded out during February and March. Many lodges were abandoned and later froze, though some were subsequently reoccupied. Several smaller lodges were never actually occupied, but were often used as feeding sites. A decrease in lodge use after mid-February may indicate that the muskrats began moving to den sites along shores and islands during that period.

Five instances of mortality are known to have occurred. One muskrat was killed at a feeding hole by a fox. A predatory bird had apparently fed on another, and a fox on a third. One muskrat was killed in a farmyard several hundred yards from the thoroughfare. Apparently a mink entered one very large lodge. Fur (in clusters) about one of the holes dug out by the mink indicated that it was probably successful in its capture of a muskrat. Soon after this observation the lodge froze solid and has received no use since. Foxes and dogs hunted the area all winter. Foxes commonly pawed the tops of lodges, but seldom dug deep enough to damage the nest cavities.

Very few push-ups were constructed this winter. The lack of winter push-ups may be due to the lower winter population and/or the abundance of small lodges constructed last fall which were used as feeding stations during the winter. A lower population, perhaps with fewer muskrats per house, may have rendered extension of the feeding range from the central lodge via push-ups unnecessary.

No evidence of muskrats freezing in their lodges was discovered in spite of frequent claims by trappers that this often occurs. A variety of winter storms changed the snow cover and water level several times. When rising water levels began to flood house cavities a few animals seemed to pile debris and vegetation inside the house, apparently in an effort to build a resting surface above the water. In some sections muskrats were found living under buckles in the ice and in hollow hummocks under clumps of brush. A favorite site for feeding holes was under snow drifts. In general, the animals seemed quite capable of adapting their mode of living to the changing conditions.

The ice varied in thickness from a mere shell over spring holes to 15-17" in some sections. A portion of the thoroughfare channel remained open all winter, but seemed to receive very little use by muskrats.

The tag from an adult female muskrat killed on February 9 in a farmyard several hundred yards from the marsh was obtained. The animal was reported to be in poor flesh. This wandering muskrat was killed shortly after a series of rain storms had resulted in some flooding in Davis Marsh, the locality where the animal was tagged last summer.

Coulter's spring studies will be centered around the trapping activities, post-trapping censuses, bi-weekly sign checks, and tagging studies.

DEER MANAGEMENT

Sub-project: Winter deer yard studies.

Objectives : To determine the amount of available food in two typical deer yards; to determine the preferences and utilization of the food by deer; and to obtain all possible information on the activities and mortality of deer while in the yards.

Assignment : Leslie L. Glasgow, Graduate Assistant.

Glasgow spent all his available time during the quarter in making field checks on his study areas. In addition he tabulated data obtained during the late fall hunting season. Thus this discussion constitutes a progress report covering the fall and winter.

Late fall studies. During the last half of the hunting season questionnaires to determine the fall condition of deer were distributed to the State checking stations surrounding the study areas. Twenty-eight were returned. Of these, 22 or 79% of the deer were in a good condition; 4 or 14% were in a fair condition; 2 or 7% were in a poor condition. 113 deer were tagged at the checking stations surrounding the areas. 39 animals or 34% were does and 74 animals or 66% bucks.

Pushaw Area. There was no deep snow in the Pushaw area until February and the deepest recorded was 18-20" the first week in March. There were approximately 12-15 deer in the area. There was no concentration of animals at any time. They were free to move easily and traveled nightly from the bog to adjacent cutting operations to feed. On March 14, a dead male deer seven to eight months old was discovered in the study area. Although it was badly eaten by foxes, an examination of the bone marrow indicated that it was in an advanced state of malnutrition.

Chesterville Yard. Since there was very little snow on the ground (1-2") and no zero temperatures during the first twenty days of December, the deer traveled about freely. During the last ten days, 30" of snow fell, the temperature dropped below zero four times, and on three occasions high northerly winds occurred. By the end of the month snow had accumulated to an average depth of 24" in the woods. The deer deserted the surrounding ridges and moved to coniferous growth along McGurdy Brook. They yarded in small groups of four to eight animals.

From a track census and a bed count it was estimated there were approximately 55-60 deer in the study area. For the first few days the deer remained under the coniferous growth. Shortly after yarding, they began to spread from their localized confinement areas. A network of paths was trampled in the snow and the small groups of deer formed into larger bands. They followed the well-worn trails and only ventured off them to the nearest available browse.

Early in January, 7" of snow fell and the accumulated total on the ground was 24". This snow was accompanied and followed by rain. Sub-zero temperatures soon created a crust which easily supported the weight of a deer. As soon as the crust formed, the deer began to move over a larger territory and extended their range up the surrounding ridges. However, this extension was somewhat limited and did not cover the normal summer range. From track indications and direct observations, it was apparent that the animals were going up the ridges to feed during the day and returning to the bog late in the afternoon and evening.

Throughout January, twelve intermittent rains occurred with a total rainfall of 3.2". With the exception of the first week only 5" of snow fell during the month. High northerly winds occurred on three occasions. By the end of the month snow depth in the timber was 20". The deer continued to browse on the ridges during the day, and returned to the swamp at night. They traveled over the crust as they desired.

In February 16" of snow fell at irregular intervals. There was only one day of sub-zero weather and seventeen days on which the temperature rose to the high 30's and 40's. The total rainfall was 3.4". High winds occurred twice during the month. A combination of warm weather and rain kept the total accumulated snow on the ground at approximately 20". However, there were drifted areas in which the snow reached a depth of 27 to 30".

In early March, 7" of snow fell increasing the total on the ground to 25". There was one day of sub-zero weather, but the maximum temperature was above 30° F. every day and on a few occasions topped 50° F. Approximately 20" of snow remained on the ground at the end of the month. The deer bands began disintegrating about the end of the first week of March. After that time it was common to see single deer or groups of two or three.

Even though there was moderately deep snow for 2 1/2 months, the deer were able to travel over the crust, and were confined to restricted areas only a few days. It was an "easy" winter for deer in comparison with many which occur in this part of Maine. Few evidences of mortality were noted. One adult buck approximately 7 years old was shot by the warden in the Chesterville yard. An autopsy disclosed that the

deer was in a bad state of malnutrition; the right carpal was injured, enlarged and stiffened; and there was a moderate number of lung worm larvae present. Since several fox scats containing deer hair were located, it is believed that at least one or more animals had died in the area.

During the coming quarter Glasgow will map the Pushaw and Chesterville yards and conduct a browse survey of them. Late this spring or early in summer he will initiate browse surveys in several other yarding areas throughout the State.

RUFFED GROUSE MANAGEMENT

Sub-project: Cover requirements and populations.

Objectives : To determine preferred cover types and population densities.

Assignment : Howard L. Mendall, Leader.

During the winter period, Mendall spent a total of about three weeks in making field checks chiefly in the central and north-central counties. Special emphasis was placed this winter on determining the influence of climatic factors to specific cover usage. Particular attention was paid to areas which have been checked at various seasons during the past three years and found to be favored haunts of the birds.

Climatic effects on the exact covers utilized was very striking. With relatively constant weather prevailing, the same groups of birds could be found on successive days in the same portion of a covert - even budding at night and morning in the same tree as on the previous day. But with marked weather changes, the behavior of the grouse changed abruptly, and what were apparently the same birds might be found frequenting a different type of cover up to half a mile or more away. The desirability of diversified cover - particularly as regards mixed growth upland and lowland sites - for maximum production of grouse in Maine was clearly demonstrated.

Not a single evidence of grouse mortality due to weather conditions was found. In spite of frequent ice storms during the first half of the winter, these were of short duration and apparently had little effect on grouse. Snowfall was not excessive and - except for one storm - was well distributed throughout the entire winter.

No special grouse studies are contemplated for the coming season, although some data will be accumulated during the course of other duties.

Nesting and summer population phases of the grouse work have now been taken over by the Federal Aid Division of the State Department of Inland Fisheries and Game, with the Unit's contribution being confined to the winter studies.

PARASITE STUDY

Objectives: To make an ecological study of endo- and ecto-parasites of certain important wildlife species in Maine, with special reference to management applications.

Assignment: James R. Reilly, Graduate Student.

Reilly had originally intended to confine his study to ruffed grouse, but a lack of a sufficient number of fresh specimens made it advisable to enlarge his scope. Accordingly plans were made through the Zoology staff (who are furnishing immediate supervision of this project) to revise his thesis program to include ruffed grouse, waterfowl, and muskrats. Intensive work on this revised study is now well under way.

COOPERATION AND EDUCATIONAL WORK

In January, Gashwiler completed his teaching duties in the undergraduate course in game management.

Several speaking engagements were given during the quarter by Coulter, Glasgow, Dyer, and Mendall to sportsmen's and civic groups.

Cooperative assistance was rendered to divisions of the Fish and Wildlife Service, apart from the Research Division - Gashwiler working for three days with the personnel of the Moosehorn Refuge on technical problems; and Mendall spending two days in assisting in the January waterfowl inventory, in cooperation with the Regional Office.

Mendall participated in several conferences during the quarter with personnel of the State Federal Aid projects, in an advisory capacity.

The usual assistance was given to game wardens and the general public; and an unusually large number of autopsies were handled this period.

Gashwiler and Mendall participated in the annual Unit Leader's meetings and attended the North American Wildlife Conference in San Antonio, Texas.

PUBLICATIONS

Mendall devoted considerable time throughout the quarter to work on the manuscript of the Unit's publication on black duck food habits. This publication, which will include analyses of over 600 stomachs from all seasons of the year, is to be based on nine years of collections by the Unit, assisted by the Federal Aid Division. Particular attention will be placed on food habits in relationship to management practises in the northeast.

PERSONNEL CHANGES

Just prior to the close of the quarter, final negotiations were completed for the hiring, by the University, of Dr. Harry Leon Kutz to serve as Assistant Professor of Game Management. Dr. Kutz, who will report for duty this summer, obtained a Ph D at Cornell, and has had several year's field experience in game management and several year's teaching experience in ornithology, conservation, game management, and various phases of zoology. This addition to the University staff will greatly strengthen the wildlife curriculum. Dr. Kutz will also serve as an active cooperator in the Unit program.

Respectfully submitted,

Howard L. Mendall

Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit

University of Maine
Orono, Maine
April 9, 1947

Apr-June Office

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

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RESEARCH PROJECTS

MUSKRAT MANAGEMENT

Sub-project: Life history studies.

Objectives: A study of life history and environmental factors leading to management recommendations.

Assignment: Jay S. Gashwiler, Assistant Leader.

As in 1946, Gashwiler devoted full time during the muskrat trapping season (April 1 to May 10) to working with trappers chiefly in Penobscot County; thus he obtained considerable data to permit comparisons of the two seasons. Trapping methods and results formed the basis of the study. In addition, pelts were measured and examined for primeness and damage; carcasses were weighed and sexed, and the sexual organs saved for laboratory study. About 600 pelts from central and eastern Maine were examined. Approximately 200 additional specimens from the Missisquoi Refuge in Vermont were made available through the cooperation of the Refuge Division of the Fish and Wildlife Service.

Trapping success was more erratic than in 1946. This year, due to the retarded season many marshes were still ice bound on April 1 and this resulted in a concentration of trappers at favored localities. On the whole the trapping conditions were much poorer than a year ago.

Considerable attention was given to the effects of spring trapping on wildlife species other than muskrats. Deaths occur regularly to many animals frequenting the trapped areas but mink and waterfowl losses predominate. The mortality to waterfowl was especially severe this year and even exceeded that of 1946. Black ducks were caught most frequently, though on the basis of species abundance, wood ducks suffer the heaviest proportionate losses. Other species in the order of total number of catches recorded are: green-winged teal, ring-necked duck, hooded merganser, and blue-winged teal.

With the conclusion of the trapping season, Gashwiler's efforts have been largely devoted to post-trapping season population checks and litter checks. During the summer his work on the muskrat project will be on population checks, litter studies, and live-trapping.

Sub-project: Muskrat habitat study.

Objectives: To determine the seasonal use of specific muskrat habitat types and to analyse the data thus obtained as to the management applications.

Assignment: Malcolm W. Coulter, Graduate Assistant.

Coulter's spring field work centered around the trapping season and habitat use on the Davis-Holbrook check area. Trapping was unduly heavy for such a small area as was the case in 1946 and this resulted in another low breeding population. Comparative figures for the two years are very interesting.

Year	No. Trappers	Trapping Period	Catch	Estimated remaining breeding population
1946	3	Apr. 1 - May 9	146	19
1947	4	Apr. 1 - 25	65	17

At least twenty-one muskrats tagged last summer and fall were taken by trappers and in most instances the exact location within the study area of the recovered animals is known. Considerable local movements were indicated.

Thirty-six dens showed signs of winter use when examined soon after the ice broke up as compared with only 5 or 6 in use before the fall freeze-up. This seems to substantiate the indirect observations made during the winter that a shift from houses to dens occurred throughout the winter. The increased use of lodges again in spring was evident, but excessively high water early in May necessitated a "retreat" of the animals back toward the woods and high islands. One lodge near the woods that had not been occupied since February of 1946 was in use at this time, although the animals moved out when the water receded. With gradually dropping waters since May the muskrats have extended their range toward the potholes and back channels.

For the coming quarter, Coulter's activities will be largely devoted to bi-weekly sign checks, surveying the tributaries of the study area, and live-trapping operations. He will also conduct an experimental management procedure.

DEER MANAGEMENT

Sub-project: Winter deer yard studies.

Objectives: To determine the amount of available food in two typical deer yards; to determine the preferences and utilization of the food by deer; and to obtain all possible information on the activities and mortality of deer while in the yards.

Assignment: Leslie L. Glasgow, Graduate Assistant.

Due to a heavy class schedule during the spring semester, Glasgow spent considerably less time on his thesis project than in the fall and winter. He was able, however, to start mapping the Pushaw and Chesterville yard areas; also to complete plans for conducting the browse surveys in other yards throughout representative sections of the State, work to which he will devote nearly full time this coming quarter.

WATERFOWL DISTRIBUTION AND MANAGEMENT

Objectives: To obtain all possible data on the abundance, distribution, and migration of waterfowl species in Maine; and to conduct research that will assist in the management of the important species breeding in Maine, especially the ring-necked duck and the black duck.

Assignment: Howard L. Mendall, Leader

Mendall devoted over half time during the quarter to the waterfowl studies, obtaining migration and breeding data. Gashwiler, Glasgow, and Coulter also spent several days each on this project; and during the height of the nesting season the services of two temporary field assistants were available. This intensive waterfowl study seemed justified by the critical condition of waterfowl generally in North America this year and by the need for specific population data in the northeast.

With a greatly retarded spring season this year the migratory flights were much later than usual. Excessive precipitation and subnormal temperatures prevailed from the first of April until mid-June and had a noticeable effect both on migration and nesting. The late spring break-up resulted in unusual concentrations of ducks at a few areas and this caused highly unreliable reports of abundance of certain species. In spite of the difficulties of evaluating the migration, an apparent increase was noted in black ducks, Canada geese, greater scaup, and green-winged teal. Decreases were recorded for the lesser scaup, wood duck, and blue-winged teal. Little change was noted in the ring-necked duck,

bufflehead, and goldeneye. Insufficient data were obtained on the pintail and Atlantic brant to warrant comparisons.

Breeding ground checks - much more reliable indicators of species status - are now nearly complete on the Unit's check areas in Maine although data from the western New Brunswick areas are still incomplete. Some revisions may be necessary on a few areas with later checks, but the tentative status of the six most important breeding ducks in Maine may be stated as follows:

Black Duck - definite increase over 1946, approximately 20 to 25%.
Ring-necked Duck - approximately 10% increase.
Blue-winged Teal - no appreciable change.
Green-winged Teal - no appreciable change.
Wood Duck - slight decrease - less than 10%.
Goldeneye - slight decrease - less than 10%.

Thus it will be seen that the population of breeding ducks in Maine this year is considerably improved over 1946. The decrease, even though slight, in the hole-nesting species is serious, however, for both these birds have been declining for several years.

In spite of the gratifying increase in the most important game duck, the black duck, the relative nesting success for this species is almost certain to be less than in 1946. A flood occurred throughout Maine and New Brunswick the first week of May which is known to have destroyed many black ducks' nests in the lowlands. Fortunately a fair proportion of blacks nest in upland sites; also some of those flooded out are known to have renested. But another flood, nearly as serious as the first, took place the first of June. Losses to other waterfowl species are believed to be slight, thanks to the greatly retarded breeding season, and the black duck bore the brunt of the effects of high water. The seriousness of the flood losses cannot be ascertained accurately until the July brood checks; but of 13 black duck nests under Mendall's observation, 4 were destroyed by flood while one desertion may possibly be attributed to this cause.

The nesting studies, which are still in progress, have resulted in the location to date of 50 nests, distributed as follows: ring-necked duck - 31; black duck - 13; wood duck - 5; green-winged teal - 1.

During the coming quarter, Mendall will continue the population studies, make periodic brood counts to determine productivity, and re-check all nests at intervals until they are hatched or destroyed.

WOODCOCK RESEARCH

Objectives: To take an annual census on the Unit's permanent census areas in Maine; and to correlate census results of cooperators throughout the northeastern states.

Assignment: Howard L. Mendall, Leader

Mendall devoted much of his time from the middle of April to the middle of May in carrying out the annual censuses in eastern Maine. In addition, the results from 33 cooperator areas in other parts of Maine, and in New Hampshire, Vermont, Connecticut and New York were analysed and tabulated. This work formed the basis of a special report submitted under date of June 7, so details will not be repeated at this time. The over-all results showed a 3.3% increase in woodcock populations this year. This indicated a satisfactory breeding population, since the 1946 studies showed the birds present in good numbers.

Nesting was greatly delayed in 1947 by the retarded spring, and the hatching peak did not occur in eastern Maine until the first of June. This was a full month later than in 1946 and more than two weeks later than in the average year.

Productivity is certainly less than in 1946, although it is impossible to state how much so. A few nests, located in lowland sites, are known to have been destroyed during the flood of early May and it is suspected that such losses may have been rather serious in a few areas. Also the heavy rains in early June probably caused a few losses among newly hatched young.

COOPERATION AND EDUCATIONAL WORK

The usual assistance was given to State wardens in performing autopsies, and to the general public.

Gashwiler and Mendall continued to serve as technical advisors to the State's Pittman-Robertson projects. Two of the Unit's students analysed statistically grouse data obtained from the State's game-kill questionnaires.

In June, four members of the Unit staff (Gashwiler, Coulter, Glasgow, and Mendall) devoted two days to instructing at the annual State Game Warden School in Augusta.

Several public lectures were given by Mendall during April to sportsmen's groups.

PERSONNEL CHANGES

Early in June, Mrs. Margaret Spencer, Unit Clerk, resigned. This vacancy has been filled, effective July 1, by Miss Maxine Horne.

Respectfully Submitted,

Howard L. Mendall

Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit

University of Maine
Orono, Maine
July 1, 1947

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RESEARCH PROJECTS

MUSKRAT MANAGEMENT

Sub-project: Life history studies.

Objectives: A study of life history and environmental factors leading to management recommendations.

Assignment: Jay S. Gashwiler, Assistant Leader.

Gashwiler devoted about half his time during the summer to intensive field work on the muskrat project. Litter checks were made on his study areas at 12 day intervals throughout the quarter. Because of the retarded spring and the unusual water fluctuations, the muskrat breeding season was prolonged over a longer period of time than in 1945 or 1946. A total of 43 litters was found in the houses; the last one was on September 2 and consisted of young less than two weeks old.

The Pushaw study area was completely mapped. Live-trapping and tagging were also carried out on this stream in the hope of obtaining information on the travels of the animals prior to the November trapping season.

During the coming quarter, considerable time will be spent in working with trappers. The State Legislature passed a bill permitting trapping during November in a few counties. An opportunity will thus be afforded this year to obtain data on fall trapped animals for comparison with information from the regular spring trapping season. Gashwiler will also make the usual fall population checks by the house count method; this work will be extended this year to include areas in southern Maine.

Sub-project: Muskrat habitat study

Objectives: To determine the seasonal use of specific muskrat habitat types and to analyse the data thus obtained as to the management applications.

Assignment: Malcolm W. Coulter, Graduate Assistant.

During the summer months, Coulter devoted nearly full time to his thesis project, camping on his study area to facilitate the work. A great deal of valuable data were obtained.

As was pointed out in the last quarterly report, the heavy trapping in April resulted in a very low breeding stock on the study area. At that time it was estimated only 17 animals remained. In spite of this, a total of 14 litters was found by Coulter during the period June 1 to August 30. These were divided into three distinct periods:

June 1-23 = 6 litters
July 15-25 = 4 litters
August 20-30 = 4 litters

Live-trapping and tagging operations were carried out on the Davis-Holbrook study area and on adjacent tributaries. A total of 67 animals was caught, divided by age and sex classes as follows:

	Adult		Immature		Total
	♂	♀	♂	♀	
Study Area	8	8	25	10	51
Adjacent Areas	2	4	8	2	16
Totals	10	12	33	12	67

The regular bi-weekly sign checks were carried out and considerable data were obtained on population shifts resulting from changing water levels.

During the coming quarter, Coulter will complete the field work on this sub-project and will start writing his thesis.

DEER MANAGEMENT

Sub-project: Winter deer yard studies

Objectives: To determine the amount of available food in several typical deer yards; to determine the preferences and utilization of the food by deer; and to obtain all possible information on the activities and mortality of deer while in the yards.

Assignment: Leslie L. Glasgow, Graduate Assistant.

A total of 17 deer yards were surveyed by Glasgow during the summer. These are well distributed throughout the heavy snow belt of central Maine as follows: Franklin County - 5, Somerset County - 3, Piscataquis County - 5, and Penobscot County - 4.

The method of surveying these yards was similar to the technique developed by Shaler Aldous for use in the Lake States. Compass lines were run perpendicular to the contour lines. Sample plots of one-one hundredth of an acre were tallied. The spacing of both plots and lines depended on the size of the yard. The density of available deer browse was estimated; also amount of browsing above the snow line and below the maximum height a deer could reach. Diameter class and overstory of the trees were recorded, and notes were taken on the ground cover.

During the coming quarter, Glasgow will continue the detailed studies of last winter in the Chesterville and Pushaw yards, and will visit all yards surveyed this summer. In addition he will cooperate with the State Federal Aid personnel in checking deer at warden road blocks. In this study information on sex, age and physical condition of the animals will be obtained.

WATERFOWL DISTRIBUTION AND MANAGEMENT

Objectives: To obtain all possible data on the abundance, distribution, and migration of waterfowl species in Maine; and to conduct research that will assist in the management of the important species breeding in Maine, especially the ring-necked duck and the black duck.

Assignment: Howard L. Mendall, Leader

In view of the present critical condition of many species of ducks, and the urgent requests of State and Federal administrators

for specific information on the status of breeding birds, the Unit's waterfowl studies were intensified this year. Field work in Maine was supplemented by about 3 week's observations in western New Brunswick. From April until October, Mendall devoted all the time that could be spared from the office to the project. He received considerable assistance from Gashwiler, Coulter, and Glasgow; also Merwin Marston, State Federal Aid Coodinator, and John M. Dudley, President of the Calais Rod and Gun Club, assisted in the field work for a bout a week during the height of the nesting season. Since the activities herein summarized are not confined to the July-September quarter, this material constitutes a seasonal progress report covering the entire breeding season.

Breeding Census

Final compilation of all the pre-nesting population data showed a few changes from figures previously reported so it seems desirable to present the complete tabulations at this time. Data for the black duck and the ring-necked duck represent actual counts of breeding pairs on the Unit's census areas which are well distributed throughout central, eastern, and northern Maine, and western New Brunswick. Figures for the other species of breeding ducks are based partly on counts from census areas and partly on estimates; although they are not as accurate as those for black ducks and ring-necks, they are believed to be sufficiently trustworthy to show the approximate annual trends of the ducks.

The following table shows the status of breeding game ducks in 1947 as compared with 1946:

Species	Maine	Western N. B.	Combined Areas
Black	30% increase	15% increase	25% increase
Green-winged teal	5% increase	No change	2% increase
Ring-necked duck	11% increase	22% decrease	1% increase
Blue-winged teal	No change	No change	No change
Goldeneye	5% decrease	No change.	2% decrease
Wood Duck	10% decrease	No change	5% decrease

Nesting Success

In spite of unusual water levels that made nest hunting difficult, a total of 59 was located, of which 55 were kept under observation until successfully hatched or destroyed. These were

distributed as follows: ring-necked duck = 32; black duck = 17; wood duck = 5; and green-winged teal = 1. Two-thirds of the nests hatched successfully but species success ranged from only 41% for the black duck to 81% for the ring-neck. Floods constituted the chief factor in nesting losses. The nesting study was supplemented by additional data obtained by correlating the number of breeding pairs on a given marsh with the number of broods subsequently appearing. This resulted in a slightly higher degree of success for blacks and a slightly lower percentage for ring-necks, but even so it was apparent that the former had an unusually poor nesting season and the latter enjoyed remarkably high success. In general the two earliest nesters (black duck and goldeneye) fared badly while the late nesters (ring-neck, green-winged teal, and blue-winged teal) were very successful. Nesting success for the wood duck was about average. The reasons for these extremes in species were apparently closely related to water levels. By the time the teal and ring-necks were ready to nest, the waters were fairly well stabilized except in some of the New Brunswick marshes.

Two very serious floods occurred during the nesting season. One was about the first of May and water levels were the highest recorded in 15 years. Even the hole-nesting goldeneyes and wood ducks were affected somewhat, and black ducks suffered heavy losses. The first of June another flood, nearly as bad as the first one, occurred. Again, black ducks--many of them being birds which were renesting--suffered heavily and a few ring-necks and teal also lost nests. Fortunately because of the extremely cold and retarded spring only a small number of teal and ring-necks had actually started to nest at the time of the June flood. According to present knowledge of black duck nesting requirements, approximately half of these birds select upland sites in this region. This fact undoubtedly prevented an almost complete failure of their 1947 nesting season in Maine and New Brunswick. Very few black ducks renested after the June flood.

Nest losses from predation were comparatively light in 1947 with the raccoon being the worst offender.

Brood Success

The 1947 brood season was quite successful for all species. The average brood size of downy young was lower than in 1946 but this would be expected in view of the late nesting season and the large number of renestings that were necessary as a result of the floods. The brood size for young at or near the flying age was close to the ten year average, thus indicating fewer than usual brood losses. Goldeneyes fared the poorest in raising young. Favorable water levels prevailed throughout July and August on most of the important rearing marshes.

Summary

The season's waterfowl studies may be summarized as follows:

1. The general status of waterfowl at the start of the breeding season was somewhat improved in 1947 over 1946, with a very substantial increase in the black duck.

2. Serious floods the first of May and the first of June caused heavy nesting losses to the black duck, and--to a lesser extent--the goldeneye and wood duck. The late nesting species (ring-necked duck and the two teal) suffered few losses. Predation was less than usual this year.

3. Brood success was good in 1947 for all species except the goldeneye.

MISCELLANEOUS STUDIES

Banding

Gashwiler spent a week in August and the entire month of September maintaining the Unit's waterfowl banding station on the Penobscot River. Six traps were located on a six-mile stretch of the river between Enfield and Lincoln.

Trapping conditions were very poor this year. The wild rice crop was better than usual, and with a late growing season this plant was still furnishing an abundance of food through much of September and the birds showed little interest in grain. It was only during the last ten days of trapping that many ducks were caught. A total of 170 birds were banded--141 blacks and 29 wood ducks.

COOPERATION AND EDUCATIONAL WORK

The usual assistance was given to State wardens in performing autopsies, and to the general public.

Unit personnel continued to serve as technical advisors to the State Pittman-Robertson projects. Coulter and Mendall spent several days conferring with Merwin Marston and inspecting the proposed new State waterfowl refuge near Belfast.

Gashwiler and Mendall continued to serve in an advisory capacity in the woodcock and waterfowl management program at the Moosehorn National Wildlife Refuge.

Several public lectures were given by various members of the Unit staff during the quarter.

In July, Dr. H. L. Kutz reported to the University of Maine as Assistant Professor of Game Management. As previously explained he is taking over all undergraduate teaching assignments previously carried by Unit personnel. This arrangement will enable Gashwiler to devote more time to research and to assisting Mendall in supervising the programs of the graduate students. It will also permit an expansion of the undergraduate wildlife curriculum. Dr. Kutz is serving as an active Unit collaborator.

Respectfully submitted,

Howard L. Mendall

Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit

University of Maine
Orono, Maine
October 31, 1947

Office Copy

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

October-December, 1947

Cooperating Agencies

Maine Department of Inland Fisheries and Game
Wildlife Management Institute
University of Maine
United States Fish and Wildlife Service

Unit Personnel

Leader - Howard L. Mendall
Assistant Leader - Jay S. Gashwiler
University Representative - Prof. Robert I. Ashman
Faculty Collaborator - Dr. Harry L. Kutz
Graduate Assistants - Malcolm W. Coulter
Leslie L. Glasgow
Graduate Students - James R. Reilly
Harold J. Dyer
Gerardus C. deRoth
Clerk - Maxine Horne

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

October-December, 1947

Note: It is usually the custom in quarterly reports of the Maine Unit to present merely a summary of the activities and progress on each project during the three-month period reported on. During the past fall, however, two special studies were carried out that resulted in some information of a very timely nature. These were the investigations on fall waterfowl populations and the hunting season and on the October forest fires. It seemed desirable to discuss these in considerable detail.

RESEARCH PROJECTS

MUSKRAT MANAGEMENT

Sub-project: Life history studies.

Objectives: A study of life history and environmental factors leading to management recommendations.

Assignment: Jay S. Gashwiler, Assistant Leader

Fall Trapping

At the last session of the Maine Legislature, a new muskrat trapping season was established, making it legal, in seven counties to trap both spring and fall. The new seasons in central Maine are November 17-30 and April 10-25. These regulations were in force this fall and Gashwiler devoted full time during the last half of November to working with the trappers.

A much smaller number of muskrats was harvested than had been expected. This is believed to be due to the following reasons: (1) adverse weather which caused the marshes and streams to be intermittently frozen and thawed; (2) a greater interest by the trappers in mink trapping and in deer hunting; (3) the reluctance of some of the better class of trappers to take muskrats twice during the year.

Despite the low catch, fur conditions and prices were good. As might be expected, the fall pelts ran a little smaller than those of spring and they were not as completely prime. However, much of the fur was very dense and approached the spring pelts in quality. The absence of damaged pelts this fall was very noticeable in comparison with those of spring which are often badly torn through fighting during the mating season.

Because of the small number of animals taken, only a limited amount of data on prices could be obtained. But many of the pelts brought as much as $2.50 each and lots of 30 averaged $2.25 per skin; and by the end of December fur buyers were quoting an average price of $3.00 per pelt. These prices are similar to those received during the spring season.

It may be seen from the foregoing that many of the objections which have long been advanced by the opponents of fall trapping were not nearly as serious as claimed.

Population Studies

During December, Cashwiler made his regular house counts on the various study areas. At the Davis-Holbrook and Pushaw Stream areas, the checks indicated little population change from last year.

Water conditions and muskrat populations continue to be unsatisfactory at Mattanawcook Lake. Only 6 houses were present, although 10 active burrows were located. But if the water rises during the winter as it very likely may, the animals will be flooded out and forced to resort to a nearby beaver pond as they apparently did last year.

On the Moosehorn Refuge in Washington County, the studies indicated another very heavy increase in population as was the case a year ago. The importance of water stabilization plus protection in the rapid build-up of muskrat numbers is clearly shown. Data from this area for the past 3 years show some interesting correlations.

Muskrat House Counts - Moosehorn Refuge

Portion of Marsh	1945	1946	1947	Water Conditions
Upper Magurrewock	32	140	287	Well stabilized (*)
Upper Barn Meadow	14	24	52	Reasonably well stabilized (*)
Lower Magurrewock	2	1	8	Highly fluctuating
Lower Barn Meadow	53	29	9	Highly fluctuating
	103	194	356	

(*) Except during unusual floods of May, 1947.

Southern Maine Study Areas

In order to give better statewide coverage to the muskrat studies, Gashwiler established several new check areas in the southern half of Maine. This work was done during December and the marshes are as follows:

Area	Township	County
Spruce Pond	Parsonfield	York
Robert's Pond	Lyman	York
Rich's Bog	Standish	Cumberland
Hayden's Bog	Standish	Cumberland
Brownfield Bog	Brownfield-Fryeburg	Oxford
Clary Pond	Whitefield	Lincoln
Great Pond	Plantation 33	Hancock

A further expansion of check areas will be made as soon as weather conditions permit, and coverage will be given to the Augusta-Gardiner section of Kennebec County and also to Franklin County in western Maine. This work had been planned for late December but had to be postponed because of the heavy snowfall that occurred at that time.

Sub-project: Muskrat habitat study

Objectives: To determine the seasonal use of specific muskrat habitat types and to analyse the data thus obtained as the management applications.

Assignment: Malcolm W. Coulter, Graduate Assistant.

During the fall Coulter completed all field work on this sub-project. At present he is tabulating the data and writing his thesis. Since the completion report on this study will be available in the very near future, no summary will be presented at this time.

DEER MANAGEMENT

Sub-project: Winter deer yard studies

Objectives: To determine the amount of available food in several typical deer yards; to determine the preferences and utilization of the food by deer; and to obtain all possible information on the activities and mortality of deer while in the yards.

Assignment: Leslie L. Glasgow, Graduate Assistant

With the warm, mild fall and an almost complete absence of snow in most of the State until mid-December, Glasgow's winter yard checks were not initiated until near the end of the month. Even at that time deer movements were only slightly restricted in the Chesterville study area. A total of about 15 inches of snow was on the ground there by December 31 so the next appreciable snowfall will probably cause yarding to begin in earnest.

Three parties are cutting pulp in the yard area this winter and the deer are feeding heavily on the tops of the hardwoods and cedar as fast as they are knocked down. The cuttings are in the thickest of the softwood growth, and so the removal of the spruce and fir from these sections will probably constitute an improvement in the yard.

Glasgow spent two days assisting the Department of Inland Fisheries and Game at a warden "road block" in southern Maine. Data were obtained on sex, age, hind foot measurements, and general physical condition of 322 deer which were inspected.

Data on sex and age ratios proved very interesting and are presented in the following table:

Deer Sex and Age Data - Yarmouth Road Block - 1947

Age in years	No. males	No. females	Total	Per Cent
0.5	29	49	78	24.2
1.5	45	34	79	24.5
2.5	32	31	63	19.6
3.5	34	11	45	14.0
4.5	29	4	33	10.2
5.5	14	0	14	4.3
6.5	5	0	5	1.6
7.5	5	0	5	1.6
Totals	193	129	322	100.0%

It may be seen that approximately 60% of the animals checked were bucks, giving a sex ratio of the kill of about 1 male to 0.7 female. It was of special interest to note that does predominated in the younger age classes, while among the older animals the bucks were chiefly shot.

During the coming quarter Glasgow will devote all the time that can be spared from his scholastic duties to an intensive study of the mid-winter yard conditions.

WATERFOWL DISTRIBUTION AND MANAGEMENT

Objective: To obtain all possible data on the abundance, distribution, and migration of waterfowl species in Maine; and to conduct research that will assist in the management of the important species breeding in Maine, especially the ring-necked duck and the black duck.

Assignment: Howard L. Mendall, Leader

In view of the current waterfowl situation, an urgent request was made by the Fish and Wildlife Service to obtain as much specific information as possible this year on waterfowl populations and the effects of the hunting season. During the past quarter, Mendall devoted all the time that could be spared from other duties to field work on this project. Population checks were made throughout the fall, during open and closed seasons alike. Work in Maine was supplemented by 5 days of investigation in western New Brunswick. Assistance in bag checks during the hunting season was given to Mendall in various parts of the State by the other members of the Unit personnel; also in the Merrymeeting Bay area by Stephen E. Powell of the State's Swan Island Refuge. Through the excellent cooperation of sportsmen and wardens, over 300 specimens in hunters' bags were accurately identified and tallied. Although this figure is not impressive, it constitutes the first data of this nature to be assembled on a statewide basis.

Waterfowl Populations

An overall waterfowl picture is usually difficult to obtain in the fall and this year proved no exception. Low water levels, unusually warm and dry weather throughout the first half of the fall, and the absence of hunting for 6 weeks during the migration period, all combined to add to the difficulties of accurate evaluation of numbers. Ducks concentrated in some areas for an unusually long period and in large numbers; in other marshes they were conspicuously and alarmingly absent. In spite of these problems enough data were obtained over the State as a whole to permit a general comparison of this year's migration with that of 1946.

Waterfowl flights through Maine as a whole appeared to be somewhat better than in 1946. The population during the early migration of all species except the ring-necked duck was disappointing, although not entirely unexpected, for it reflected the rather mediocre breeding season in many parts of Maine and New Brunswick. Although good concentrations of black ducks and teal were found early in October in some of the tidal marshes, this situation was offset by almost barren marshes in many sections of inland Maine. But the later flights were more encouraging, particularly in the case of the black duck. Any reduction of black duck numbers in the central part of the breeding range in 1947 apparently did not carry through to the far north, for the November and early December flights were heavier than for several years.

The warm, dry fall retarded migration a great deal but even allowing for this factor, the fall population of black ducks in Maine was greater than in 1946. Pintails were also more numerous than last year, and for the first time in 5 years an increase was noted in the lesser scaup. The numbers of other ducks were not as satisfactory and two species showed a decrease.

Piecing together the varied migration pattern of the entire season, the following is, as accurately as can be determined, the status of those species on which enough data were available to make comparisons:

Increase - black duck, pintail, lesser scaup.

Little or no change - green-winged teal, ring-necked duck, goldeneye, bufflehead, greater scaup.

Decrease - wood duck, blue-winged teal.

The Hunting Season

The state of Maine, at the request of the sportsmen's waterfowl committee, chose the split season alternative, which ran from October 7-18 and December 2-13. Since this was entirely new in Maine's hunting history, an effort was made to obtain as much information as possible on the effects of such a season on waterfowl.

The kill of ducks was materially cut down from that of 1946. Hunting conditions during the October period, after the opening day, were the poorest in many years. Ducks were rather scarce and "bluebird" weather prevailed for the entire period. All October Weather Bureau records for heat and lack of precipitation were broken. Moreover, there were fewer hunters in the marshes than in 1946. Several factors apart from poor hunting were probably responsible for this--publicity relative to the general waterfowl decline, the shortened season and reduced bag, and the fact that the upland season was open. In December, hunting conditions were greatly improved but shooting was confined entirely to the coastal areas and the weather was so cold that many would-be hunters were discouraged from venturing forth. Those who did go found fairly good shooting. Goldeneye or "whistler" shooting was especially good and relieved much of the pressure on black ducks.

Coastal sea duck hunting was excellent this year. The special scoter season ran between the regular split season and afforded considerable sport. Since this hunting appeals to only a limited number of gunners, no efforts were made to obtain specific data on the hunting results. It was felt that the time could be more profitably spent gathering all possible information on the populations of the more valuable game species, especially since none of the sea ducks are showing any apparent reduction in numbers.

Maine hunters worked hard for the ducks they killed during the October season as the following tabulation (table 1) shows.

A matter of particular interest is the fact that the opening day success during Maine's October season was only a fraction of a bird higher than the seasonal average. For comparison, figures obtained during the first 4 days of the season in New Brunswick's Zone 2 are included.

Table 1

Hunting Success - 1947

Western New Brunswick, Oct. 1-4 (Legal bag limit - 7)

Man-days of hunting	16	
No. ducks bagged	70	
Av. no. ducks per hunting day	4.4	(Percentage of legal limit--63%)

Maine, Oct. 7-18 (Legal bag limit - 4)

Man-days of hunting	98	
No. ducks bagged	127	
Av. no. ducks per hunting day	1.3	(Percentage of legal limit--33%)

Maine, Dec. 2-13 (Legal bag limit - 4)

Man-days of hunting	61	
No. ducks bagged	134	
Av. no. ducks per hunting day	2.2	(Percentage of legal limit--55%)

Crippling Loss

To obtain specific information on crippling loss, a study was made of this phase of hunting mortality to ducks. The results are shown in table 2.

Table 2

Waterfowl Crippling Loss - 1947

	New Brunswick Oct. 1-4	Maine Oct. 7-18	Maine Dec. 2-13	Totals
No. Ducks Bagged	41	84	61	186
No. Cripples Lost	10	17	16	43
Loss in Percent	24%	20%	26%	23%

As serious as the foregoing figures show crippling loss to be,

this study probably underemphasized the true importance of this mortality factor. Over 1/3 of the data were obtained from hunters who were using trained dogs as retrievers. Actually the number of duck hunters in Maine and New Brunswick who use dogs is a great deal less than 1/3. The importance of this point is clearly shown in the following tabulation, which includes both New Brunswick and Maine.

	Without Dogs	With dogs
No. Ducks Bagged	74	68
No. Cripples Lost	26 (35%)	8 (12%)

Hunters' Bag Checks

The ducks that were tallied in hunters' bags gave interesting figures as to the species composition which are taken by duck hunters in the State. This information is shown in table 3. The sample is small, and no claims are made that it is truly representative of the total kill. Some species are undoubtedly not shown in their proper degree of importance especially those where only a few specimens were checked. Figures for the teal are probably too low, but the relative importance of the first seven species of table 3 is believed to be fairly representative.

It was surprising to find that 14 species comprised the October bags as against only 4 in December. The importance of the wood duck in October was especially surprising and may possibly be viewed with some alarm since this duck has shown an unsatisfactory population trend in the past few years.

A total of 74 additional birds were tallied during hunting checks in western New Brunswick. The data are believed to be from too limited areas for presentation at this time, as they may not be typical for the Province as a whole. It may be said, however, that the black duck and ring-necked duck predominated in the bags examined.

Tables 4 and 5 show the results of the sex and age data obtained. The total number is less than in table 3. Because of the difficulties in correctly sexing and aging birds, this material was confined to that which the Unit personnel obtained.

Table 3

Waterfowl Bag Checks - 1947

(Exclusive of Sea Ducks and Mergansers)

Maine - Oct. 7-18 and Dec. 2-13

Species	Birds killed in Oct.	Per Cent	Birds killed in Dec.	Per Cent	Totals	Percent
Black Duck	68	43.9	70	46.7	138	45.2
Goldeneye	2	1.3	67	44.7	69	22.6
Wood Duck	23	14.8	--	--	23	7.5
Green-winged Teal	19	12.3	--	--	19	6.2
Ring-necked Duck	13	8.4	--	--	13	4.3
Blue-winged Teal	10	6.5	--	--	10	3.3
Bufflehead	1	.6	9	6.0	10	3.3
Pintail	8	5.2	--	--	8	2.6
Lesser Scaup	1	.6	4	2.6	5	1.6
Ruddy	3	1.9	--	--	3	1.0
Greater Scaup	2	1.3	--	--	2	.7
Mallard	2	1.3	--	--	2	.7
Atlantic Brant	2	1.3	--	--	2	.7
Canada Goose	1	.6	--	--	1	.3
Totals (14 species)	155	100.0	150	100.0	305	100.0

Table 4

Waterfowl Sex and Age Ratios - 1947

(Exclusive of sea ducks and mergansers)

Western New Brunswick, Oct. 1-4

Species	Total No.	Ad. ♂	Ad. ♀	Im. ♂	Im. ♀	Total Ad.	Total Im.	Total ♂	Total ♀
Ring-necked Duck	12	--	1	3	8	1	11	3	9
Black Duck	5	1	2	2	--	3	2	3	2
Wood Duck	5	2	2	--	1	4	1	2	3
Green-winged Teal	5	1	1	1	2	2	3	2	3
Blue-winged Teal	2	--	1	--	1	1	1	--	2
Goldeneye	2	--	--	1	1	--	2	1	1
Totals	31	4	7	7	13	11	20	11	20

Maine, Oct. 7-15

Species	Total No.	Ad. ♂	Ad. ♀	Im. ♂	Im. ♀	Im. Unsexed	Total Ad.	Total Im.	Total ♂	Total ♀
Black Duck	29*	2	5	13	7	2	7	22	15	12
Wood Duck	11*	2	2	2	3	2	4	7	4	5
Ring-necked Duck	9*	--	1	3	4	1	1	8	3	5
Green-winged Teal	6	1	--	3	2	--	1	5	4	2
Pintail	4	--	--	2	2	--	--	4	2	2
Blue-winged Teal	3	--	--	3	--	--	--	3	3	--
Totals	62	5	8	26	18	5	13	49	31	26

Maine, Dec. 2-13

Species	Total No.	Ad ♂	Ad ♀	Im ♂	Im ♀	Total Ad.	Total Im.	Total ♂	Total ♀
Black Duck	42	12	6	9	15	18	24	21	21
Goldeneye	23	10	5	3	5	15	8	13	10
Bufflehead	5	2	1	--	2	3	2	2	3
Lesser Scaup	2	--	--	1	1	--	2	1	1
Totals	72	24	12	13	23	36	36	37	35

* More ducks of this species were aged than sexed

Table 5

Waterfowl Sex and Age Ratios, 1947

(Combined compilations of table 4)

New Brunswick, Oct. 1-4
Maine Oct. 7-15
Maine Dec. 2-13

Species	Total No.	Ad. ♂	Ad. ♀	Im. ♂	Im. ♀	Im. Unsexed	Total Ad.	Total Im.	Total ♂	Total ♀	Ratio of Ad to Im
Black Duck	76*	15	13	24	22	2	28	48	39	35	1 to 1.7
Goldeneye	25	10	5	4	6	--	15	10	14	11	1 to 0.7
Ring-necked Duck	21*	--	2	6	12	1	2	19	6	14	1 to 9.5
Wood Duck	16*	4	4	2	4	2	8	8	6	8	1 to 1
Green-winged Teal	11	2	1	4	4	--	3	8	6	5	1 to 2.7
Blue-winged Teal	5	--	1	3	1	--	1	4	3	2	--
Bufflehead	5	2	1	--	2	--	3	2	2	3	--
Pintail	4	--	--	2	2	--	--	4	2	2	--
Lesser Scaup	2	--	--	1	1	--	--	2	1	1	--
Totals	165	33	27	46	54	5	60	105	79	81	

* More ducks of this species were aged than sexed.

It would be premature to draw definite conclusions from the limited sex and age data obtained this year, although a few points may be mentioned as possible trends. The ratio of males to females and adults to immatures in the case of the important black duck appear reasonably satisfactory, even though a much higher percentage of adults were shot in December than in October. The adult-immature ratio appears especially satisfactory for ring-necks and teal. With the goldeneye and wood duck, however, a different situation exists and it is to be hoped that the limited data are not typical of results throughout the ranges of these birds. Sex ratios were not far out of line in any species except the ring-neck, where 14 of the 20 birds examined were found to be females.

In conclusion it may be stated that--as far as can be determined--the hunting regulations, irregular migratory flights, mild weather, and reduced number of hunters all combined to materially reduce the waterfowl kill in Maine this season from that of 1946. In spite of a rather poor degree of hunting success (except in a few areas chiefly during the December period) the majority of the gunners who were personally contacted expressed less dissatisfaction than usual about the regulations. The widely separated split seasons gave both inland and coastal shooters a brief chance to hunt and while the former group did not capitalize to a very great extent, they realized it was due to unfavorable duck populations and summer-like weather, not regulations. Few complaints were registered about the noon opening on the first day of each period and violations of this restriction were surprisingly few. More dissatisfaction was expressed on the bag limit than on any other point, although few save coastal hunters at favored spots had many opportunities to exceed the limit. The "hour before sunset" closing was likewise unpopular and was often violated during the December period.

The late opening date--October7--proved to be a real duck saving measure this year. Even with the excessive amount of late renesting because of spring floods, the local breeding birds had a chance to become well dispersed before shooting started.

MISCELLANEOUS STUDIES

Relationships of the 1947 Maine Forest Fires to Wildlife

In mid-October, following two months of higher than average temperatures and unprecedented drought conditions, a series of forest fires broke out in practically all parts of Maine. Upwards of 50 separate fires occurred, each ranging in area from a few acres to many square miles. Although complete tabulations are still unavailable, the latest official estimates, as released through the Associated Press, place the damage at 200,000 acres of woodland burned, over 1000 homes destroyed; 16 lives lost, and property damage of $30,000,000. Although one or more fires occurred in each county of the State, York and Oxford counties in southwestern Maine, and Hancock and Washington counties in eastern Maine were hardest hit.

In an effort to obtain specific information as to the effects of the forest fires on wildlife, the Maine Unit undertook a special survey. Gashwiler was detailed to take charge of this task. Graduate Assistants Coulter and Glasgow were assigned to work with him. Prof. Kutz of the University faculty and James Reilly, a Graduate Student, assisted them in the Bar Harbor area. Floyd Johnson of Brownfield, assisted in the Frost Mountain area.

The decision as to areas to be checked and the itinerary to be followed was made by Mendall, following consultation with various wardens and fire officials. Mendall obtained general information on brief trips to several of the fires, and flew over a number of the burned areas. This section of the report, however, consists entirely of specific data obtained by the survey crew.

The survey party was in the field almost constantly from October 25 to November 3 inclusive; although Glasgow left on October 31 to assist Merwin Marston, State Federal Aid Coordinator, who wished to make a special browse study in western Maine.

Since the fires were large, the crew small, and the time limited, it was decided to survey a few representative areas on a sampling basis. These areas were chosen to include sections where serious fires had occurred and at the same time to take in good game country--when possible the sample areas were located within tracts of forest land which had been completely burned.

Cruise lines were run through the burned areas. These were spaced at 20 chain intervals in most cases. The lines were run on a compass bearing and all distances were paced, paces being recorded on a tally counter.

Records were kept on both live and dead animals, and tracks; also on the type of woodland and extent of the burn.

The following table summarizes the results of the study as tabulated and analized by Gashwiler.

Place	Date	Cruise line in feet	Deer		Grouse	Snowshoe Rabbit		Raccoon		Porcupine	
			Alive	Tracks	Alive	Alive	Dead	Alive	Dead	Alive	Dead
McFarland Mt. Area Bar Harbor, Hancock Co.	10/30/47	81,961	4	66	3						
Sargent Mt. Area Bar Harbor, Hancock Co.	10/29/47	99,442	4	55	2						
Madison Area Madison, Somerset Co.	10/27/47	40,377	1	14	11	1				1	
Saco Valley Area Brownfield, Oxford Co.	10/25/47	42,275	3	11	4	2	1				
Frost Mt. Area Brownfield, Oxford Co.	10/26/47	83,578	2	15	12	3	1	1	1		
Little Ossipee Pond Area Waterboro, York Co.	11/2/47	22,140		4	1						
Bunganut Pond Area Waterboro and Lyman York Co.	11/3/47	38,933	1	46			1				1
Lyman Area Lyman, York Co.	11/1/47 11/2/47	94,293		33	3	1	1			1	1
Total		503,059	15	244	36	7	4	1	1	2	2
No. ft. per animal or track			33,537	2,062	13,974	71,865	125,765	503,059	503,059	251,529	251,52
Approx. no. miles per animal or track		95.3	6.4	0.4	2.7	13.6	23.8	95.3	95.3	47.6	47.6

	Porcupine		Gray Squirrel	Red Squirrel	Chipmunk	Red Fox	Woodcock	Snakes
ıd	Alive	Dead	Alive	Alive	Alive	Alive	Alive	Alive
			1	5				
				13		1	1	
				11	2			
	1							
						1	1	
			1					
				1	2			1
		1						
	1	1		5	1			3
1	2	2	2	35	5	2	2	4
059	251,529	251,529	251,529	14,373	100,612	251,529	251,529	125,765
.3	47.6	47.6	47.6	2.7	19.1	47.6	47.6	23.8

From the foregoing chart it may be noted that 15 live deer were recorded on the cruise lines; this represents about one deer per 6.4 miles of line. Of the 15 deer, 12 were actually seen and 3 were heard running--of these 3 the fresh tracks were studied. One of the animals seen had its left hind quarter badly singed and was limping. This represents 8.4% of the observed animals but if we include those which were heard running and which were apparently in good health, the percentage falls to 6.7%. In either case the damage inflicted on the deer population was light and should not materially affect the herd. Of particular interest was the number of deer tracks found in the burned sections. Many of the areas had spots which were still actually ablaze at the time of the check, yet deer had been over them. An average of one deer track for each 0.4 mile was recorded for the areas cruised.

A total of 36 live ruffed grouse in apparent good health were flushed from the cruise lines--no sign of any dead or injured birds was found. The average was one bird to each 2.7 miles of line which is a good number of grouse for the type of habitat cruised. The data would indicate that ruffed grouse suffered little or no direct mortality due to the fire.

Four snowshoe rabbits were found which had been killed by the fire--this loss represented one animal for every 23.8 miles of cruise line. Seven live rabbits in apparent good health were also recorded--they averaged one animal for every 13.6 miles of line. Several rabbit tracks were also noted on the burns. It seems likely that those rabbits which escaped the fire either found sanctuary in dens or in some of the unburned spots which dot the fire areas.

One dead raccoon was found--it was so badly burned that it was necessary to examine the skull for identification. Another raccoon was found which was alive although its feet were burned and part of its body singed.

Two porcupines were found which had been killed by the fire. Another one was noted which had been blinded by the fire and was badly singed although still alive. Only one normal live porcupine was found.

Gray squirrels, red squirrels, chipmunks, red foxes, woodcock and snakes were found alive and healthy on the burned areas. The presence of such non-mobile species as the gray squirrels, red squirrels, chipmunks and snakes is considered to be of especial interest. The number of red squirrels was noteworthy; they averaged one individual for each 2.7 miles of line cruised.

A recapitulation of the data reveals that snowshoe rabbits, raccoon, and porcupines suffered the greatest direct mortality from the fires. Deer sustained some damage but this is not considered serious. The ruffed grouse, gray squirrels, chipmunks, red foxes, woodcock and snakes were not found to have suffered any damage.

Browse Study Near Burned Areas

At the request of the Department of Inland Fisheries and Game, Graduate Assistant Glasgow was assigned to organize and direct a browse study conducted by the Federal-Aid personnel along the perimeter of the principal York County fire in southern Maine. Immediate data were needed because of some uncertainty as to whether or not enough food remained near the burned areas to carry the deer herd through the winter. The first week of November was spent on this work. The survey method was similar to that which Glasgow is using on his regular deer yard surveys in northern and central Maine--being essentially that devised by Shaler Aldous. His report follows:

Preliminary work consisted of selecting areas in which deer were known to have concentrated in previous years. After visiting 17 areas, six were chosen for the survey which were representative of the surrounding winter deer habitat. These areas were fairly evenly distributed on the north and south sides of the burn.

A percentage sample survey of the browse and degree of utilization was taken. The plant species recorded were restricted to deer browse species. Only those within reach of deer were tallied. Sampling consisted of surveying 1/100 acre plots at 300 foot intervals on lines 400 feet apart. These lines were run perpendicular to contour lines. All distances were paced.

Limerick Area

In the Limerick Area, hemlock, which was more abundant than any other species, furnished 12 per cent of the food and comprised 30 per cent of the available remaining browse. Red maple provided 27 per cent of the food eaten and made up 15 per cent of the available browse supply. Witherod, which is a very palatable deer food, made up 7 per cent of the food eaten and comprised 9 per cent of the remaining browse. The remainder of the food eaten and the available supply was distributed rather evenly over 19 other species. Since the browsing was found on both hardwoods and softwoods on such a variety of plant species, it indicates that the deer were getting an adequate variety in their diet. Also it was found that none of the browse species were being over-browsed, indicating that the deer were getting a sufficient amount of food.

None Such River Area

Balsam fir provided 10 per cent of the food eaten and 27 per cent of the remaining browse. Berry vines, which are a temporary source of food, made up 6 per cent of the food eaten and 15 per cent of the browse supply. Nine per cent of the deer's diet consisted of hemlock and this species made up 9 per cent of the food supply. Ground hemlock (yew) made up 35 per cent of the food eaten and 8 per cent of the available browse. Red maple was eaten to the extent of 7 per cent and comprised 6 per cent of the remaining browse. Twenty-three species provided the

remainder of the food supply. Ground hemlock or yew is among the most palatable of the deer foods. Although it was over-browsed, there were other conifers which could be utilized in its place. Since there was such an abundance of species which were only slightly browsed, it was evident the yard was in a good condition.

Killick Heath Area

In the Killick Heath the following foods and percentages of each were obtained from the survey: red maple-30, holly-18, hemlock-5, witherod-7 and balsam fir-9. The same species made up the following percentages of available browse: red maple-14, holly-27, hemlock-9, witherod-7 and balsam fir-6. In this yard no species was over-browsed. There were 19 other species furnishing food.

Parsonsfield Area

Prostrate juniper constituted 33 per cent of the food eaten and 27 per cent of the remaining browse. Red maple provided 17 per cent of the food and 15 per cent of the browse which remained. White pine made up 23 per cent of the food and 11 per cent of the remaining browse. Red oak provided 6 per cent of the food and 6 per cent of the browse supply.

Seventeen other browse species were found in the Parsonfield yard. The condition of the yard was somewhat more questionable than the others. There were many acres of prostrate juniper, considerable red maple, and many minor browse species present. From this area the deer travel to an adjacent beaver flowage and follow down a small stream. In view of these facts the general yard conditions were considered satisfactory.

Sanford Area

In the Sanford Area, red maple was the most important food. This species made up 15 per cent of the food eaten and 16 per cent of the available browse. Witherod furnished 15 per cent of the food eaten and made up 8 per cent of the remaining browse supply. Yew provided 6 per cent of the food and 8 per cent of the available browse. Balsam fir was eaten to the extent of 5 per cent and made up 7 per cent of the remaining browse. There were 21 other species in the area

SUMMARY

1. Six winter deer concentration areas were surveyed.
2. The chief browse species were yew, prostrate juniper, hemlock, balsam fir, red maple, witherod, and red oak.
3. There were approximately 20 or more minor species utilized in each area.
4. Only one case of over-browsing was observed.
5. It is believed that all the yards were in a good condition and could be expected to safely winter more deer than were present in previous years.

Miscellaneous Observations

In November, some instances of damage to deer from the fires came to light which had not been revealed during the surveys. Several deer were noted at some of the York County tagging stations which had severely burned hoofs. Five of these were collected by Glasgow. Although the deer had been shot during the open season and the hunters stated they noticed nothing unusual in the animals' behavior, some of the hoofs were so badly burned that locomotion must have been seriously impeded.

In one of the heavily burned areas of Washington County, the local warden reported 17 burned deer carcasses late in the fall. These were all in a remote section and the warden's attention was attracted to the locality by an unusual concentration of crows and ravens.

In concluding this report it should be pointed out that the fires were not without a few beneficial aspects. For the next 10 to 20 years there is certain to be an abundance of deer food in the burned areas because of new sprout growth. Likewise, except in those localities where the fires may have burned through to mineral soil, some excellent new grouse and woodcock habitat will be created.

The most important direct benefit to wildlife was in the number of grouse and woodcock saved during the hunting season. Only two weeks of the grouse season was open before all woods travel and hunting was banned. During the time the season was open the foliage was so thick, due to the unusually warm fall, that few birds were killed. When the hunting ban was finally lifted on November 10, only 5 days of the grouse season remained. Since the deer season was so abbreviated, very few hunters spent any time grouse shooting. This proved to be a real "break" for the birds which badly needed it in view of their unsatisfactory population over many sections of Maine. The woodcock benefited even more than the grouse from the hunting ban. Although much of the season in Zone 1 occurred before the woods were closed, foliage was too thick and weather was too hot for good hunting and very few birds were shot. In Zone 2, which includes the coastal counties where the bulk of the woodcock hunting occurs anyhow, only one day of shooting was available before the woods were closed. Maine laws prevent any extension of seasons so time lost because of the fires could not be extended after the woods were opened to travel.

PUBLICATIONS

An article by former Graduate Assistant Michael J. Takos was published in the October issue of the Journal of Wildlife Management. It was entitled, "A Semi-quantitative Study of Muskrat Food Habits" and was based upon work which Takos did while at the Unit on the Corinna Study area.

During the fall Mendall completed the work on the lengthy manuscript dealing with the Unit's 9 year study of black duck food habits. The

results of the analysis of 605 stomachs are tabulated by seasons and by habitat types, and specific management recommendations are made. The manuscript is entitled "Food Habits in Relation to Black Duck Management in Maine". It has been submitted to the Central office for publication approval.

COOPERATION AND EDUCATIONAL WORK

Unit personnel continued to serve as technical advisors to the State Pittman-Robertson program. Gashwiler and Mendall participated in several conferences with the State Coordinator, Merwin Marston. In October, Coulter spent several days making habitat surveys for Marston on the proposed Ruffingham Meadow Refuge near Belfast.

Glasgow spent over a week assisting the technical staff of the State Department of Inland Fisheries and Game in the forest fire browse study and in the deer examinations at the warden road blocks.

At the request of Commissioner Stobie and Merwin Marston, three members of the Unit personnel (Gashwiler, Glasgow, and Mendall) participated in the forest fire conference at the meeting of the New England Game Commissioners. This meeting was held at Portland in December.

Dr. Kutz, faculty collaborator, conducted the regular undergraduate course in Game Management during the fall semester. He also organized and is conducting a very successful Wildlife Seminar this year--the first formal seminar of this type to be held here.

In October Mendall participated in the special waterfowl conference called by the Wildlife Management Institute and held in Bridgeport, Connecticut. The meeting was for the purpose of better coordinating the various waterfowl studies in the northeastern region.

The usual assistance was given to State wardens in performing autopsies, and to the general public. Several public lectures were given during the quarter by Unit personnel.

Respectfully submitted,

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