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MAINE COOPERATIVE WILDLIFE
RESEARCH UNIT
UNIVERSITY OF MAINE
ORONO, MAINE

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

January-March, 1954

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 - Malcolm W. Coulter
University Representative - Robert I. Ashman
Faculty Collaborator - Horace F. Quick
Graduate Assistants - Claude Z. Westfall
 Robert B. Weeden
 Richard E. Marquardt
Graduate Students - Denis A. Benson
 David C. O'Meara
Clerk - Maxine L. Horne

NOT FOR PUBLICATION

The quarterly reports are usually statements of progress. The data presented often are incomplete and the conclusions reached may not be final. Consequently, permission to publish any of the information contained herein is withheld pending special permission from the Research Unit.

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report
January-March, 1954

RESEARCH PROJECTS

FUR ANIMAL RESEARCH

Ecology of the Fisher

Objectives: To obtain data on the distribution, habitat preferences and winter food habits of the fisher.

Assignment: Malcolm W. Coulter, Assistant Leader

Fifteen specimens were skinned and examined during the quarter. These fisher were submitted by members of the warden service in cooperation with the regional biologists of the Department of Inland Fisheries and Game.

Only one female was present in this series of specimens. It was a young animal that showed no indication of past breeding history. However, enlarged follicles in the ovaries suggested that she was approaching breeding condition.

The animals varied from 3.5 to 12.5 pounds. In nine of the 14 males porcupine quills were found throughout the skin and muscles. In one a total of 86 quills was counted. Most specimens were in excellent condition. Some had up to 3/8" subcutaneous fat and in many the internal organs were encased in fat.

Stomachs, intestinal tracts, reproductive organs, skulls and bacula of all specimens have been saved for further study. A sizeable backlog of this material has now been collected and more detailed analysis of food materials, reproduction, and use of skulls as indicators of age will be made this year.

A few new distribution records were obtained. The most interesting was received from Regional Biologist George D. Aiken and Warden Clyde Speed, who tracked a fisher in Enfield, Penobscot County, Maine, after it was reported seen crossing a highway. Fisher have been present on the west side of the Penobscot River for several years, but this is the first positive indication that they have invaded the more settled area east of the river in that region.

Two field trips were made to northern Maine through the cooperation of the Wildlife Research Division of the Department of Inland Fisheries and Game. In February a trip was made to the vicinity of Caucomagomac Lake (T7-R15), Piscataquis County. The second trip, during late March, was to the Unit's Russell Pond study area, T5-R16, in Somerset County. This was the fifth consecutive winter that data have been gathered at the Russell Pond area.

Food:

Although fisher have been reported to feed upon nuts and berries, the first evidence of this in Maine was noted at Caucomagomac. Fisher were found feeding upon beech nuts dug from caches stored by red squirrels. One individual dug out six caches in a distance of about two and one half miles.

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Two field trips were made to northern Maine through the cooperation of the Wildlife Research Division of the Department of Inland Fisheries and Game. In February a trip was made to the vicinity of Caucomagog Lake (T7-R15), Piscataquis County. The second trip, during late March, was to the Unit's Russell Pond study area, T5-R16, in Somerset County. This was the fifth consecutive winter that data have been gathered at the Russell Pond area.

Food:

Although fisher have been reported to feed upon nuts and berries, the first evidence of this in Maine was noted at Caucomagog. Fisher were found feeding upon beech nuts dug from caches stored by red squirrels. One individual dug out six caches in a distance of about two and one half miles.

In each case the debris excavated was scattered up to three feet from the hole except for the remains of the beech nuts. The partially broken and chewed hulls with some seeds were left in a low pile beside a depression in the snow where the fisher had remained while eating. Scats from the same area also contained hulls from beech nuts.

The field work to date seems to indicate that the red squirrel is a staple food of the fisher. It is rather interesting to note that not only the squirrel, but also food that the squirrel has stored, may be utilized by fisher.

In another instance a fisher was feeding upon carrion (moose buried beneath 36" of snow). One animal dug through 40" of snow and found a frog. It is quite apparent that a variety of foods may be eaten during the winter.

Populations:

At the Russell Pond study area it is believed that a population of at least one fisher per four to five square miles is present. This does not mean that an individual is limited to an area of four or five square miles. There is no question that the ranges of some individuals overlap, as has been demonstrated several times when tracking individuals. An evaluation of sign at the study area indicates that eight to 10 animals per township are present.

In general, one fisher track has been crossed for every mile of line at Russell Pond. In the late spring, when the animals begin to travel in pairs and when the routes of travel are more irregular, the density of tracks in some sections is much higher.

General:

Further evidence of fisher travelling in pairs was obtained during late winter. Although these animals may hunt and live alone part of the winter, instances of two or more together are common in late winter. This tendency is more pronounced after mid-March and is believed to be associated with the breeding season. The change in behavior is an important consideration when attempting to estimate range or numbers.

Plans for next quarter: Inactive.

WATERFOWL RESEARCH

Waterfowl Distribution and Management

Objectives: To obtain 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 breeding species, especially the black duck and the ring-necked duck.

Assignment: Howard L. Mendall, Leader

Inactive during quarter.

Plans for next quarter:

Resume annual studies of migration, breeding populations and nesting success on permanent sample areas.

Snapping Turtle-Waterfowl Relationships

Objectives: To study the extent and influence of snapping turtle predation upon waterfowl broods.

Assignment: Malcolm W. Coulter, Assistant Leader

The gastro-intestinal tracts of the snapping turtle specimens collected last summer were examined during the quarter. The results are similar to those obtained in previous years. Approximately 33 per cent of the specimens contained remains of aquatic birds, primarily ducks, grebes, and rails.

The results from work in previous seasons suggested that the incidence of birds in turtles might be related to water levels. A slightly higher proportion of bird remains was found when the water was low. To test this possibility further, 25 turtles were collected at Scammon Marsh, a State waterfowl management area. The water was maintained at a level considered optimum for broods.

Incidence of birds in turtles was not much less than from samples taken from other areas with unfavorable habitat conditions for broods. Seven turtles (28 per cent) contained birds; two others had eaten young muskrats.

A summary of the data accumulated thus far follows:

Year	No. Turtles with Food	No. with Birds	Per cent with Birds
1949	35	13	37.1
1950	87	13	14.9
1951	13	3	23.0
1953	36	12	33.3
Totals	171	41	23.9

The overall tabulation of other food materials is similar to that presented in the January-March, 1951 report. Vegetation, insects, annelids, mollusks, amphibians and birds and mammals were recorded. The bulk of the food consisted of vegetation.

To gain some idea as to how long bird remains might be retained in turtles, four captive specimens were fed dead ducks, after which they were killed at intervals of three to 12 days. Prior to this experimental feeding the turtles were held in pens constructed of one-quarter inch wire mesh for about four weeks. During that period the reptiles were fed lettuce, bread, fish and other table scraps.

Each specimen received one half of a black duck that had been killed a few hours previously by predators at banding sites. The results of the

examination of the gastro-intestinal tracts of these turtles are presented below:

Turtle No.	Days since Feeding on Ducks	Remains in Stomach and Colon
1	3	Stomach: Full. Feathers & flesh. Colon: 4 feathers, 3 bone fragments.
2	6	Stomach: Full. Leg, foot, flesh and feathers - partly digested. Colon: Feathers and bone fragments.
3	9	Stomach: Empty. Colon: About 150 small feathers. No bones. Miscellaneous fragments of vegetation.
4	12	Stomach: Empty. Colon: 21 small feathers. No bones. Miscellaneous fragments of vegetation.

The above suggests that feathers may be retained up to a week in the stomach and for a longer period in the colon. It is possible that in turtles in the wild where they could feed at will, the passage of food might be somewhat more rapid.

Plans for the next quarter include further study of the identification of some of the bird remains and tabulation of all data thus far accumulated.

Waterfowl productivity studies

Objectives: To make a detailed study of waterfowl productivity on an unmanaged sedge-meadow marsh.

Assignment: Richard E. Marquardt, Graduate Assistant

Two observation towers were constructed at the Goose River study area in Swanville and Belfast, Waldo County. Reference markers to aid in accurately plotting observations were also erected and three water gauges were installed. Marquardt was assisted by Weeden in this work.

Through the cooperation of Mr. Ralph Grant, Soil Conservation Service Agent, at the Belfast District Headquarters, Marquardt obtained aerial photographs of the study area. From these photographs a series of outline maps, including major plant zones, was made. More detail will be added to the maps as vegetation develops during the spring and summer. It is anticipated that the maps will be used to plot observations of breeding territories, nest sites, and the seasonal use of various habitat types for feeding, loafing, courtship and other activities.

Plans for next quarter:

Begin detailed study of territorial pairs and nesting. An attempt will also be made to color mark resident birds.

Blood Parasites in Maine Waterfowl

Objectives: To determine the incidence of blood parasites in wild ducks in Maine.

Assignment: David C. O'Meara, Graduate Student

O'Meara completed his examination of blood smears, and tabulated and analyzed much of his data during the quarter. Since this study is nearing completion, a summary of the thesis will be presented in the next quarterly report.

Plans for next quarter:

Conclude analysis of data and complete preparation of thesis.

Waterfowl Banding

Objectives: To study the movements and migration routes of waterfowl in Maine.

Assignment: Malcolm W. Coulter, Assistant Leader

Inactive during quarter.

Plans for next quarter: Inactive.

Waterfowl Hunter Bag Check

Objectives: To determine hunter success, crippling loss and species, sex and age composition of the kill.

Assignment: Howard L. Mendall, Leader

Inactive during quarter.

Plans for next quarter: Inactive.

WOODCOCK RESEARCH

Woodcock Census Studies

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

Assignment: Howard L. Mendall, Leader

Plans and preparations were made for conducting the annual census during the next quarter. All cooperators were supplied with forms and instructions. A discussion of the 1954 census results will be presented in the next quarterly report.

Plans for next quarter:

Conduct annual census and analyze results from areas in the northeast.

Woodcock Populations and Territories

Objectives: To study in detail the behavior of woodcock on the breeding grounds as related to populations and census techniques.

Assignment: Claude Z. Westfall, Graduate Assistant

Westfall made a statistical analysis of some of the data previously gathered and also carried out laboratory studies concerning sex and age determinations. His work is nearing completion and will be discussed in detail in the next report.

Plans for next quarter:

Conclude field studies and complete preparation of thesis.

Woodcock Productivity Studies

Objectives: To study in detail the cover requirements of breeding woodcock from the onset of courtship to the conclusion of the brood season.

Assignment: Robert B. Weeden, Graduate Assistant

Weeden, with the assistance of O'Meara, constructed an automatic device for recording the activities of incubating woodcock. He also selected a study area in Greenbush, Penobscot County, and made several trips to the area for studies preliminary to intensive work during the coming quarter.

Plans for next quarter:

Begin observations of courtship, nesting and use of various types of cover.

UPLAND GAME BIRD RESEARCH

Ruffed Grouse Cover Requirements and Populations

Objectives: To determine preferred winter cover types and population densities.

Assignment: Howard L. Mendall, Leader

Only a minimum of field work was possible on the grouse project during the winter. Four brief trips were made to check areas in Somerset and northern Penobscot Counties.

Climatic conditions during much of the season were more severe than in the past few winters. A noticeable difference in the habitat frequented by grouse was recorded. This winter heavy utilization was made of lowland covers, particularly mixed growths with conifers predominating. Likewise the birds were more frequently found concentrated in loose flocks. Such trends are in line with observations of past years.

Little specific data were obtained on population fluctuations. Such as were available indicated relatively little change in status from a year ago.

Plans for next quarter: Inactive.

BIG GAME RESEARCH

Studies of Moose Disease in Nova Scotia

Objectives: To study the causes and effects of disease among moose in the Province of Nova Scotia, Canada.

Assignment: Denis A. Benson, Graduate Student

Benson is in the process of analyzing his case histories. Some material, submitted to specialists, has not yet been returned. It is anticipated that this study will be terminated soon and a full report will be made in the near future.

Plans for next quarter:

Continue analysis of case histories and preparation of material for use in a thesis.

COOPERATION AND EDUCATIONAL WORK

Unit personnel furnished technical aid to the State Pittman-Robertson Program. Several conferences and meetings were held both in Augusta and Orono with members of the P-R staff.

Quick conducted the undergraduate wildlife courses and the general wildlife seminar. He also supervised a special extension course by request of the School of Education. This course in conservation is designed for secondary school teachers, and was conducted in Portland with the cooperation and aid of several guest lecturers.

Fifty speaking engagements were met during the late fall and winter. Included were programs for fish and game clubs, bird clubs, civic organizations, and Boy Scout troops. Speaking assignments were divided as follows: Coulter 17, Quick 16, Mendall 10, Weeden 2, O'Meara 2, Marquardt 2 and Westfall 1.

Assistance was given to members of the warden service in examining specimens and furnishing technical information. Coulter, Quick, and Mendall also gave considerable instruction at the annual warden's school held at Camp Keyes, Augusta.

During February a special program, called Maine Sportsman's Day, was held at the University of Maine. This first program, designed to acquaint sportsmen with the work being conducted in wildlife conservation, consisted of six demonstrations of techniques employed by biologists to study fisheries and wildlife problems. Three demonstrations concerned with techniques used in game research were conducted by the Unit staff; three others involving fisheries research were handled by fisheries personnel of the Department of Inland Fisheries and Game. About 200 keenly interested sportsmen attended and participated in these meetings. The reaction was enthusiastic and plans are now underway for another Sportsman's Day next winter. The program was made possible through the joint efforts of the Maine Sportsman's Association, Department of Inland Fisheries and Game, University of Maine, and the Unit.

Coulter and Mendall attended the annual meeting of the Cooperative Wildlife Research Units and the North American Wildlife Conference in Chicago. Quick attended the North American Wildlife Conference in Chicago and the meetings of the Northeast Section of the Society of American Foresters in Boston.

PUBLICATIONS (Not previously reported)

- Coulter, Malcolm W., 1953. Mallard nesting in Maine. The Auk, 70:490.
- Coulter, Malcolm W., 1953. Summary of furbearer discussion group. Proceedings of 1953 conference, Northeast Section of the Wildlife Society.
- Mendall, Howard L., 1953. Summary of the waterfowl discussion group. Proceedings of 1953 conference, Northeast Section of the Wildlife Society.
- Mendall, Howard L., 1953. Woodcock census studies in Northeastern United States. Special Scientific Report: Wildlife No. 19, U. S. Fish and Wildlife Service & Canadian Wildlife Service. pp. 17-20.
- Mendall, Howard L., 1953. Waterfowl breeding ground survey in Maine. Special Scientific Report: Wildlife No. 21, U. S. Fish and Wildlife Service & Canadian Wildlife Service. pp. 286-289.
- Quick, Horace F., 1953. Occurrence of porcupine quills in carnivorous mammals. Jour. Mammalogy 34(2):256-259.
- Quick, Horace F., 1953. Wolverine, fisher and marten studies in a wilderness region. Trans. 18th N. A. Wildlife Conf. pp. 513-533.

Quick, Horace F., 1954. Small mammal populations on the University forest. Technical Notes No. 28, Univ. of Maine Forestry Dept.

Respectfully submitted,

Howard L. Mendall

Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit

University of Maine
Orono, Maine
May 6, 1954

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

April-June, 1954

RESEARCH PROJECTS

FUR ANIMAL RESEARCH

Ecology of the Fisher

Objectives: To obtain data on the distribution, habitat preferences and winter food habits of the fisher.

Assignment: Malcolm W. Coulter, Assistant Leader

Inactive during quarter.

Plans for next quarter: Inactive.

WATERFOWL RESEARCH

(a) Waterfowl Distribution and Management

Objectives: To obtain 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 breeding species, especially the black duck and the ring-necked duck.

Assignment: Howard L. Mendall, Leader

During the quarter Mendall supervised the breeding ground studies which are conducted annually. He was assisted by all members of the Unit staff. In addition, service was rendered during the nest hunting phase of the study by the following: Howard Spencer, Jr., waterfowl project leader of the State Department of Inland Fisheries and Game, State regional biologists Aiken, Blanchard, Carson and Holmes, game warden Lawrence Caron, John Dudley of Calais, and Eldon Clark of the Moosehorn National Wildlife Refuge.

Coverage and techniques were essentially the same as in previous years. During the past two years a few minor changes have been made in the census areas to permit better coverage within the allotted time. When old areas are abandoned or new ones added, figures from earlier years are adjusted accordingly. Thus the 1954 data are comparable.

A count of pairs and territorial males was made on the regular study areas prior to and during the early part of the breeding season. A nesting study was made to determine nesting success. Commencing with the hatching period brood checks have been conducted. Since the brood studies are still in a preliminary stage, most of the conclusions in this report are based upon the census and nesting studies.

Breeding Populations:

All species of breeding game ducks in Maine appeared to be somewhat decreased in 1954. In the case of the important black duck this was of little significance since it amounted to only 4 per cent; moreover, last year's black duck population was very satisfactory. With the ring-necked duck and the wood duck, however, this year's loss came after decreases of last year as well. The wood duck dropped 31 per cent a year ago and 18 per cent this year. The two teal and the American goldeneye probably were less numerous than in 1953 although their numbers are not sufficiently high on the census areas to permit accurate measurement.

The status of the initial population of the six species of breeding ducks is as follows:

<u>Species</u>	<u>Status in 1954</u>
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Measured on Census areas:

Black Duck	4% decrease
Ring-necked Duck	15% decrease
Wood Duck	18% decrease

Estimated:

American Goldeneye	Slight decrease
Green-winged Teal	Slight decrease
Blue-winged Teal	Slight decrease

General Breeding Conditions:

Heavy snows and sub-zero temperatures during the last week of March heralded the beginning of the most backward spring and summer season that Maine has experienced in many years. Temperatures have been below average and precipitation has been above average for the entire period. It was the wettest May in the history of the Portland Weather Bureau, with rain occurring on 24 days. Three periods of floods prevailed as follows: (1) April 16-18, very heavy and statewide; (2) May 9-11, minor, being heaviest in southern and central Maine; (3) June 27-28, of major proportions in northern Maine.

The growing season for both terrestrial and aquatic plants is currently retarded by more than two weeks. Waterfowl chronology likewise has been retarded ever since migration, which occurred about 2 or 3 weeks late for the early migrants and a week to 10 days behind schedule for the later arrivals such as ring-necks and teal.

Judging by the data compiled thus far, the nesting season and hatching peaks for the early breeding species have been the latest since 1940. Black duck hatching was nearly 3 weeks later than last year and at least 10 days later than the 15 year average. On the Unit study areas only a small proportion of the nests hatched during May; this is in sharp contrast to 1953 when over half of all black duck nests hatched before June 1. Several July hatchings have already been recorded for the black duck - an unusual situation - and it is likely that others will be noted during the remainder of the brood checks. The late migration and the retarded season delayed nesting for many of the birds. Also the April flood undoubtedly

wiped out the majority of nests in existence at the time; although it is likely that many of the birds so affected were able to re-nest, they probably did not produce young until sometime in June. On the other hand, the normally later nesting teal and ring-necked ducks were much closer to their usual schedule. Ring-necks nested only about a week later than a year ago and at close to the 15-year average dates.

Nesting Success:

During the nesting study a total of 85 nests was located, 77 of which were of two species - black duck and ring-necked duck.

At the present time there are 8 nests on which females are still incubating or which have not been re-checked. Based on the 77 already hatched or destroyed, it is likely that the 1954 nesting success will be similar to that of last year, possibly a little higher. At present it is 61 per cent as compared with 59 per cent in 1953. This is still below the long-term average. Black ducks are showing the best hatching success so far (64 per cent, with only one nest still un-checked); this is rather unusual since ring-necks and wood ducks generally are more successful at nesting than blacks. Nest failures were attributed to several causes but over one-third of all losses this year were the result of mink predation. More losses have been charged to mink than at any time in the past 16 years. For the third consecutive year crow predation was very light. Flood losses among the nests under observation were somewhat lower than expected. However, the figures may not reveal the true importance of this factor because several sections of Maine which were hardest hit by floods are not included in the areas where the nesting studies were conducted. Furthermore, during nest hunting it is purely accidental to discover a nest that has already been flooded. More than the usual number of unattached female ducks were encountered during late June and early July - birds which did not appear to have either nests or broods under their care. This would indicate nest losses under conditions where re-nesting did not take place, at least successfully. It is probable that the black duck suffered more heavily from floods than any other species, and that northern and eastern Maine was affected more adversely than other parts of the State.

The Brood Season:

Data from brood counts are inconclusive at this time, particularly in view of the late nesting dates. So far the figures are running very similar to those of 1953, except that there is less spread between broods of Class I (downy young) and Class III (birds about 2/3 grown or older). This indicates better rearing conditions than last year. There are only a few Class III broods upon which to base this supposition but if the trend holds during the remainder of the summer, part of the lowered productivity through nest losses will be offset.

Plans for next quarter:

To continue the breeding studies described in this report.

(b) Snapping Turtle-Waterfowl Relationships

Objectives: To study the extent and influence of snapping turtle predation upon waterfowl broods.

Assignment: Malcolm W. Coulter, Assistant Leader

Further study of unidentified food materials was made by Coulter and a tabulation of all accumulated data was started.

Plans for next quarter:

To conduct further experiments on the length of time that bird feathers and bones may be retained in the gastro-intestinal tracts (see January-March report for details of this phase of the study).

(c) Waterfowl Productivity Studies

Objectives: To make a detailed study of waterfowl productivity on an unmanaged sedge-meadow marsh.

Assignment: Richard E. Marquardt, Graduate Assistant

This new project, initiated last quarter, occupied the major part of Marquardt's time during the spring. It may very well prove to be of considerable practical importance in waterfowl management in Maine. It is aimed (among other objectives) at obtaining specific measurements of the effect of fluctuating water levels on both marsh vegetation and nesting ducks. Since the study area is an unmanaged marsh the forthcoming data should fit in very well with the extensive Unit studies made in the past under more stable and managed conditions in eastern Maine. An unusual opportunity was afforded Marquardt this year since initial breeding populations on his study area were the highest for several years; also water level fluctuation has been even more pronounced than usual. An abstract of Marquardt's progress report to date follows:

The Study Area:

The area under study, Goose River, is located in the towns of Belfast and Swanville in Waldo County, Maine. The water area consists of three ponds connected by a meandering stream of low gradient. The ponds vary in size from 15 to 65 acres and the stream has an average width of approximately 25-30 feet. The water source of Goose River is Swan Lake, a large reservoir to which the water rights are privately owned. The study area encompasses slightly over 400 acres.

The marsh edge varies in extent from nothing to 300 yards and in composition from the floating sedge mat at the channel to the thick willow, alder, and maple growth near the woods. Practically all of the marsh area is interspersed with muskrat runs; many are in use at present, others abandoned.

Study Procedure:

To facilitate the gathering of information, particularly that concerned with courtship, territorialism, and nesting, two treehouse type observation structures were built on the study area last winter and early this spring. These observation structures have proven very valuable in the work so far.

Water gauges were placed at three representative locations on the river and regular records kept beginning April 1. It is hoped that by the end of the nesting season definite information will be forthcoming as to the water conditions required to flood out nesting birds.

An attempt has been made to keep a weekly phenological record of events on the marsh to be used to correlate this study with future studies on the same area. Daily records of the waterfowl populations were kept well into the nesting season at which time they were concluded because of unavoidable inaccuracies.

Observations:

The peak of the black duck migration occurred on April 5 when 94 black ducks were censused. Sixty-eight per cent of these birds were paired. The earliest black duck nest was begun on or about April 4. This nest was destroyed by flood April 18. The earliest successful black duck nest was begun approximately April 27-28.

Ring-necked ducks arrived on the study area April 9. It could not be ascertained that any of these birds were paired. At this time most of the ice had cleared from the ponds and the small tributary streams were open. The spring migration of the ring-necked duck showed two definite peaks, the first occurring April 24 and the second on May 8. Approximately 86 per cent of the birds were paired at that time. The earliest successful ring-necked duck nest was begun on or about May 10.

Of the other, but less important, species of waterfowl frequenting the study area during the spring migration the goldeneyes had departed by April 18, the last buffleheads departed May 9, and American mergansers had left by May 16. Only a few blue-winged and green-winged teal used the area. It is believed that a pair or two may have remained to breed but neither nests nor broods have been recorded to date.

As of June 30, 20 nests have been found on the study area; 6 of the black duck and 14 of the ring-necked duck. Of these, 2 black duck nests were destroyed: 1 by flood and 1 by an unknown predator (probably a fox). Five of the ring-necked duck nests were destroyed: 2 by raccoon, 1 probably by mink, 1 probably by fox, and 1 by an unknown predator. Positive identification of the predation by raccoon has been made in the laboratory. The other identifications are tentative, based on field appearances, and await further study in the laboratory.

As of June 30 there were 23 known broods on the study area. This total is represented by 12 black duck broods and 11 ring-necked duck broods.

Plans for next quarter:

The study will be continued on an intensive basis throughout the summer.

(d) Blood Parasites in Maine Waterfowl

Objectives: To determine the incidence of blood parasites in wild ducks in Maine.

Assignment: David C. O'Meara, Graduate Student

O'Meara completed his thesis entitled, Blood Parasites of Maine Waterfowl, Especially Leucocytozoon spp. He was awarded the Master's degree in June and has joined the staff of the Department of Animal Pathology at the University of Maine. A summary of his thesis follows:

The incidence of blood parasitism was studied by examining blood smears taken from 408 black ducks and 345 wood ducks. A limited sample was obtained from other species of ducks occurring in Maine. The smears were made from blood let from the web of the foot or from veins on the under side of the wing of seemingly healthy, live birds. The slides were air-dried and fixed with a solution of absolute methyl alcohol. They were stained with National Aniline Company Giemsa stain.

Blood smears were examined by using a compound microscope equipped with a mechanical stage and a substage condenser. The entire smear was read on each slide.

Blood parasitism was very high, especially for Leucocytozoon. Only 15.1 per cent of the wood ducks, and 17.6 per cent of the black ducks were negative. In the remaining slides evidence of Leucocytozoon spp., Microfilaria spp. or Haemoproteus spp. or combinations of these parasites were found. Double and triple infections were noted. With black ducks the Leucocytozoon-Microfilaria combination was most frequent and was found in 19.4 per cent of the sample. In wood ducks this double infection amounted to only 6.7 per cent of the sample, but the Leucocytozoon-Haemoproteus combination occurred in 16.2 per cent of these birds. Black duck and wood duck populations from the areas that were sampled were found to be heavily infested with Leucocytozoon parasites. However, wood ducks from the Penobscot River areas were more frequently infected with Leucocytozoon and less frequently infected with Haemoproteus than were those on Corinna Stream, only 32 air miles distant.

Duplicate blood smears were taken at random in 73 birds. Only 33 duplicates were in agreement. Thus, it appears that diagnosis based upon only one smear per bird is subject to considerable error. Parasitism is very likely much higher than indicated by the examination of a series of single smears per specimen.

Blood smears taken from dead birds killed during the autumn hunting season were taken when possible. Blood taken from the heart revealed a high incidence of microfilarial infection.

Four species of ducks, believed to be unreported hosts for the blood parasites indicated in North America were found to be infected, as follows:

Bufflehead	<u>Leucocytozoon</u> spp.
Blue-winged Teal	<u>Haemoproteus</u> spp.
American Goldeneye	<u>Haemoproteus</u> spp.
Blue-winged Teal	<u>Microfilaria</u> spp.

Since a high rate of blood parasitism has been found in a sample of 859 wood ducks and black ducks during four seasons in Maine it is suggested that future study center around the influence of these parasites upon the ducks. It is recommended that a study be conducted using two large groups of birds from wild stock. One group should be kept in fly proof cages; the other group should be exposed to insects, especially black flies. The two groups could then be studied from the standpoint of mortality or possible debilitating effect from these parasites.

(e) Waterfowl Banding

Objectives: To study the movements and migration routes of waterfowl in Maine.

Assignment: Malcolm W. Coulter, Assistant Leader

Plans were made to operate banding stations on the Penobscot and St. Croix Rivers. Preliminary arrangements were also made to conduct a training session on banding techniques for U. S. Game Management Agents who are to be assigned to banding stations in western Maine.

Plans for next quarter:

Operate banding stations and conduct training session.

(f) Waterfowl Hunter Bag Check

Objectives: To determine hunter success, crippling loss, and species, sex and age composition of the kill.

Assignment: Howard L. Mendall, Leader

Inactive during quarter.

Plans for next quarter: Inactive.

WOODCOCK RESEARCH

(a) Woodcock Census Studies

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

Assignment: Howard L. Mendall, Leader

The 1954 woodcock census data for the New England States and New York were compiled by Mendall who again served, as in previous years, as coordinator for the northeastern region. Mendall also supervised the census work on that portion of the Maine study areas which are covered by Unit personnel;

the investigations in Maine are conducted cooperatively by the Unit and the State Federal Aid Division under the direction of W. R. DeGarmo.

Changes in census techniques were initiated last year whereby a sample, rather than a complete count, was obtained on each census route. By this method the population index is taken as the number of woodcock per stop per route. The 1953 data could not be compared with previous figures, but permitted the establishment of a base for use this year and in succeeding years.

An examination of the 1953 and 1954 data indicate that there has been no measurable change in the trend of the woodcock population of the northeast. A slight increase in Vermont was offset by a slight decrease in Massachusetts. In Maine, Connecticut, and New York, no significant change was apparent, while the New Hampshire data were based on a very small sample.

Since a complete report on this work has already been submitted the details will not be repeated at this time. The comparative summary by states is given as follows:

Comparative Census Data by States, 1953 and 1954
(Only routes censused during both years)

State		Total Stops All Trips	Total Birds All Trips	Av. No. Birds Per Stop Per Trip
Maine	1953	1138	906	0.80
	1954	1156	930	0.80
New Hampshire	1953	16	14	0.88
	1954	22	15	0.68
Vermont	1953	206	216	1.05
	1954	144	185	1.28
Massachusetts	1953	207	240	1.16
	1954	200	197	0.99
Connecticut	1953	254	147	0.58
	1954	249	127	0.51
New York	1953	69	55	0.80
	1954	103	79	0.77
Totals	1953	1890	1578	0.83
	1954	1874	1533	0.82

Plans for next quarter: Inactive.

(b) Woodcock Populations and Territories

Objectives: To study in detail the behavior of woodcock on the breeding grounds as related to populations and census techniques.

Assignment: Claude Z. Westfall, Graduate Assistant

Westfall completed his thesis entitled, A Study of Woodcock Behavior on Their Breeding Grounds in Central Maine, and was awarded the Master's degree in June. He is employed for the summer by the Department of Entomology, and will join the staff of the Engineering Graphics Department of the University of Maine in September. A summary of his thesis follows:

This study was made on an area of about two and one quarter square miles of abandoned farm land, blueberry fields, and mixed second growth hardwood forest in Greenbush, Penobscot County, Maine. The behavior of the birds on the singing grounds was studied in detail by trapping, color-marking and releasing individual males. Observations of marked birds, recaptures of banded birds and frequent census counts were made to obtain information on the birds' behavior under different climatic conditions. Particular attention was devoted to any tendency for the birds to shift territories.

Live trapping was conducted with traps designed by Dr. William Sheldon of the Massachusetts Cooperative Wildlife Research Unit. Plastic markers, similar to those used by Wint (1951 - Bull. Oklahoma A & M College, 48 (3):1-7) were used and found to be satisfactory for field identification of individual woodcock. The following conclusions resulted from the study:

1. The daily courtship activity of woodcock, upon which annual census counts are based, is decreased by winds over 12 miles per hour, temperatures below 27 degrees Fahrenheit and heavy rain. The behavior during periods of full moon is not typical and counts may be less reliable due to the more erratic activity of the birds.
2. The duration of the courtship period during the height of the breeding season averaged 37 minutes.
3. Censuses taken between April 15 and 26 and May 8 and 17 were found to be reliable. Analysis of the data indicate that three checks during these periods will give accurate results. Counts obtained between April 27 and May 8 were low and are considered unreliable.
4. A comparison of the census methods using stop intervals of four-tenths of a mile and stop intervals frequent enough to obtain complete counts revealed that 82 to 90 per cent of the known number of birds could be obtained by the former method.
5. Two observations were made of females peenting. This behavior is believed to occur rarely and would therefore not affect the accuracy of the census technique.

6. The shifting of singing grounds during the breeding season was not common. Only four birds were recaptured on sites different from those where they were initially caught. Disturbance from trapping may have been a contributing factor to shifting. The limited data which were obtained seem to indicate stability on the singing grounds once the males are established on breeding territory.
7. Six of 23 males banded in 1953 were recaptured on the study area in 1954. These data suggest that males may often return to the same general vicinity to breed.
8. In connection with the behavior study, advantage was taken of the opportunity to analyze statistically a recently reported technique for sexing woodcock. This method involves the measurement of the tenth primary feather. Feather measurements are difficult to make and a wide range of variation was obtained when the feathers were measured by different individuals. Therefore, this technique has limited value for general use by field biologists.

(c) Woodcock Productivity Studies

Objectives: To study in detail the cover requirements of breeding woodcock from the onset of courtship to the conclusion of the brood season.

Assignment: Robert B. Weeden, Graduate Assistant

(This is a new project and should result in data having a direct bearing on woodcock management.) During the quarter Weeden conducted intensive field investigations on his thesis study. The period of April 1 to May 15 was spent on the Greenbush study area with graduate assistant Westfall, who carried out an intensive trapping and marking program with adult male woodcock, as discussed above. From May 15 to June 1 the live-trapping program was continued on a reduced scale by Weeden. The location and study of diurnal territories, nesting sites, and brood covers was carried on from April 20 through the end of the quarter.

The Study Area:

The study area is the same as was used by Westfall during 1953 and 1954. It is located in the town of Greenbush, Penobscot County, approximately 18 miles north of the University of Maine campus.

The area is three and one half miles long and from one quarter to one half mile wide. It consists of both slopes of a low, narrow ridge bordered on each side by extensive stands of conifer or conifer-hardwood growth. The semi-isolated area of good woodcock cover thus formed is very favorable for productivity and behavior studies.

For the most part, there is a good interspersion of cover types throughout the area. Abandoned farm land, pastures, and blueberry fields make up

the open areas. The wooded portions vary from dense stands of upland hardwoods to open stands of alder, aspen, grey birch, and various conifers.

Land use of the area includes blueberry growing, pulp production, livestock raising, and gardening - listed in order of decreasing importance. Most of these activities have no harmful effect on woodcock populations, and some, such as grazing and pulp cutting, may be of value in producing desirable woodcock habitat.

Plan and Scope of Study:

The present study was undertaken in an attempt to increase our knowledge of the cover requirements of breeding woodcock, which is a prerequisite to the environmental management of this game bird.

The three main types of cover under study are diurnal territories, nesting sites, and brood covers. Relationships between these three types, changes in usage throughout the spring and early summer, and evidence of the presence or absence of territorialism in activities of breeding woodcock, were noted particularly in this quarter.

Diurnal Territories:

Three methods were used to locate diurnal territories, usually in conjunction with each other: (1) observations of males calling before the singing period and the direction of flight of the males onto their singing grounds, (2) flushes of males during the day both with and without the use of bird dogs, and (3) observations of droppings and probings in suitable woodcock cover.

Diurnal territories of 12 woodcock were found out of a known population of 21 singing males. Of the remaining 9 "diurnals", several were tentatively located, but time during the quarter did not permit a sufficient number of observations to establish them definitely. The average distance from a diurnal cover to the nearest singing ground was approximately 87 yards.

In order to standardize descriptions of covers used by woodcock, each species in the stand was expressed in terms of the percentage of the area which it covered. On this basis it was found that the average composition of the 12 diurnal territories was as follows: alder, 44%; birch, 24%; larch, 9%; aspen, 8%; red maple, 6%; miscellaneous conifers, 7%; miscellaneous hardwoods, 2%.

In five of the diurnal covers, alder made up more than 50 per cent of the stand. This species was present in all but two of the 12 diurnals, and the two containing no alder were abandoned by the end of the courtship season. Grey birch was found in all but two, but in less amounts than the alder.

Nests:

A total of four nests was studied during the spring of 1954. This is only about 20 per cent of the probable breeding population on the area, assuming one nesting female for every singing male. The small number found emphasizes the difficulty of locating woodcock nests, due to the inconspicuous

nature of the nest itself, the difficulty in flushing the female from the nest, and the large amount of available nesting cover present on the area.

Of the four nests studied, two hatched successfully (May 7 and May 14), one was deserted, and one was destroyed by a predator, believed to be a red squirrel. Judging from nests and broods observed, the earliest nest was begun on April 13 or 14, and the latest on May 1.

Nesting cover is of quite different composition from diurnal cover. The average percentage of each species making up the nesting covers is as follows: birch, 51%; alder, 15%; aspen, 12%; larch, 9%; spruce, 8%; maple, 5%. The only species to appear in every nest cover was grey birch, which in one case made up 75 per cent of the stand. Alder was found to be a major component in only one site. The remaining four species were found in small amounts in almost every nesting cover. Nest sites were generally less moist than diurnal covers.

Broods:

Six broods were observed from May 8 to June 14. Sixteen young woodcock from five broods were banded during this period. The sixth brood was not captured, since it was of flying age when found.

In general, broods utilized covers quite close to the nesting sites; 50 yards was the average distance between the two. On three occasions broods utilized the same cover that male woodcock had been using for diurnals since early spring. According to observations made in the late spring, there is little evidence of any tendency for one brood to isolate itself from another. Each of two covers on the study area contained two broods, which appeared to move freely throughout the entire cover without regard for contact with the other brood.

An analysis of the covers used by broods in 1954 shows the following average percentage composition by species: birch, 45%; alder, 40%; spruce, 6%; larch, 5%; aspen, 2%; maple, 2%. Grey birch appeared in all covers and was a major component in all but one. Alder made up at least 25 per cent of the stand in all covers except one, where it was absent.

To facilitate flush data, Messrs, George Bucknam, Deputy Commissioner, W. Sidney Howe and Dana Holmes, Regional Biologists, all of the Maine Department of Inland Fisheries and Game, and Warren S. Lucas of the Mathematics Department of the University of Maine contributed time and the use of their dogs in locating broods and adult male woodcock on the study area.

Plans for next quarter:

Occasional trips to the study area will be made throughout the summer, for the purpose of determining what habitat changes occur which might cause woodcock to shift feeding grounds.

UPLAND GAME BIRD RESEARCH

Ruffed Grouse Cover Requirements and Populations

Objectives: To determine preferred winter cover types and population densities.

Assignment: Howard L. Mendall, Leader

Inactive during the quarter.

Plans for next quarter: Inactive.

BIG GAME RESEARCH

Studies of Moose Disease in Nova Scotia

Objectives: To study the causes and effects of disease among moose in the Province of Nova Scotia, Canada.

Assignment: Denis A. Benson, Graduate Student

Benson continued work on his thesis. A more complete report will be made at a later date.

Plans for next quarter:

To continue analysis of case histories and preparation of thesis material.

COOPERATION AND EDUCATIONAL WORK

Unit personnel furnished technical aid to the State Pittman-Robertson program. Several conferences and meetings were held in Augusta, Orono, and at various points in the field.

The regular assistance was given to the warden service and to the public in examination of specimens and furnishing technical information.

Special cooperative assistance was given by Mendall and Coulter to the Boy Scouts of America in connection with their Scout conservation projects which are being emphasized in 1954.

Respectfully submitted,

Howard L. Mendall
Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit

University of Maine
Orono, Maine
July 29, 1954

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

July-September, 1954

RESEARCH PROJECTS

FUR ANIMAL RESEARCH

Ecology of the Fisher

Objectives: To obtain data on the distribution, habitat preferences and winter food habits of the fisher.

Assignment: Malcolm W. Coulter, Assistant Leader

Inactive during quarter.

Plans for next quarter:

Inspection of a new study area closer to Orono will be made during November. Analysis of food materials from previously collected scats and stomachs will be initiated.

WATERFOWL RESEARCH

(a) Waterfowl Distribution and Management

Objectives: To obtain 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 breeding species, especially the black duck and the ring-necked duck.

Assignment: Howard L. Mendall, Leader

During the quarter Mendall concluded the annual waterfowl breeding ground studies which were discussed in detail in the last quarterly report. Two late re-nests, located in July, raised the total from the figure previously reported to 87.

Final nesting success for the season was 63 per cent. This is a little higher than a year ago but still below the long-term average. Differing from the usual condition, black ducks, in 1954, showed the highest success at 65 per cent.

Brood studies were carried out until the latter part of August. Data were obtained on 160 complete broods classified by age. Averages from Class I and Class II broods (7.3 and 6.0 respectively) are not significantly different from those of 1953. However, the overall Class III average (5.5) is substantially higher than the 4.9 figure of a year ago. This indicates better rearing conditions this year. The excessive precipitation was an adverse factor for nesting but it did prove beneficial for rearing young.

The seasonal summary covering the work of the last two quarters is given as follows:

1. All species of breeding game ducks were decreased at the start of the 1954 nesting season. Heaviest losses were recorded for the ring-necked duck and the wood duck.

2. It was the most retarded and prolonged nesting season since 1940. Excessive precipitation and below average temperatures prevailed throughout the entire spring and summer.

3. Three periods of floods are believed to have caused more nest losses than usual. Mink predation on nests was the highest in 16 years. Nevertheless a relatively large proportion of birds, particularly in central and southern Maine, appeared to have re-nested successfully, and overall nesting success is believed to be little different from a year ago.

4. Because of the consistently high water of July and August, rearing conditions for broods were better than last year.

5. In considering all aspects of the 1954 breeding season, the improved rearing conditions for broods, as well as a considerable amount of successful re-nesting, partially offset the initial population decreases and the heavy early nest losses. It is believed that the ultimate productivity of Maine's marshes was only slightly lowered from that of 1953. Nevertheless this marks the second consecutive year of a general decline.

Plans for next quarter:

To obtain the usual migration data throughout the fall period.

(b) Snapping Turtle-Waterfowl Relationships

Objectives: To study the extent and influence of snapping turtle predation upon waterfowl broods.

Assignment: Malcolm W. Coulter, Assistant Leader

Inactive during quarter.

Plans for next quarter:

It is hoped to complete the examination of unknown material that has been saved and to tabulate all data previously compiled preparatory to writing a final report.

(c) Waterfowl Productivity Studies

Objectives: To make a detailed study of waterfowl productivity on an unmanaged sedge-meadow marsh.

Assignment: Richard E. Marquardt, Graduate Assistant

Marquardt devoted most of the quarter to intensive observation at his Goose River study area. He concluded the breeding productivity investigations which were discussed in considerable detail last quarter. A total of 23 nests was studied. Nine were destroyed or flooded before hatching. Nesting success for black ducks was 67 per cent and for ring-necked ducks 59 per cent.

Sixty-eight observations were made of complete broods of various age classes. These observations indicated that overall rearing was quite successful, despite heavy rainfall and fluctuating water levels during much of the summer.

From August 1 until September 10 an attempt was made to band as many of the resident ducks as possible. Sixty-three birds were banded, including 40 black ducks, 18 ring-necked ducks, and five wood ducks. The ring-necked ducks were taken in a conventional, single funnel duck trap using whole corn as bait.

Much time was devoted to an analysis of cover types on the area. This work has been aided by the use of aerial photographs made available by Mr. Ralph Grant, Soil Conservation Agent, Belfast, Maine.

Plans for next quarter:

Occasional trips will be made to the study area during October and November to determine the progress of migration and the effects of the hunting season.

(d) Waterfowl Banding

Objectives: To study the movements and migration routes of waterfowl in Maine.

Assignment: Malcolm W. Coulter, Assistant Leader

The summer banding program was conducted between July 13 and September 12 under Coulter's supervision. A special allotment from the Research Branch of the Fish and Wildlife Service, in addition to the assignment for several weeks of Game Management Agent W. B. White, permitted operation of stations on both the St. Croix and Penobscot watersheds. However, only one man, Graduate Assistant Weeden, was available for full time work on the Penobscot stations; some curtailment of the work from last year was thus necessary.

In addition to the regular stations, Graduate Assistant Marquardt operated two traps at the Goose River study area in connection with his thesis study of waterfowl productivity on an unmanaged sedge meadow.

Merton Radway, Refuge Manager of the Moosehorn National Wildlife Refuge, provided most of the bait and made available storage facilities and labor when needed for the St. Croix stations. One banding station was located on the Refuge and was operated in cooperation with Refuge personnel.

A total of 870 ducks was banded. Included were 483 black ducks, 252 wood ducks, 19 blue-winged teal, and 19 ring-necked ducks.

This season's total is about 650 less birds than were banded during 1953. Fewer traps were in operation this season and weather conditions were unfavorable for successful banding. Because of very high water levels, banding on the Penobscot River was halted on two occasions. In September precipitation accompanying a hurricane resulted in flood conditions on all waterways and banding operations ceased before the expected closing date. Several duck traps, as well as live traps and steel traps for mammals, were lost because of the storm.

As was the case in 1953, banding during early July proved to be very worthwhile. It was possible to catch many flightless young ducks; sometimes all or part of a brood, along with the hen, was taken. Of special interest was the capture of hens that had been banded as flightless young during the previous season.

The number of flightless birds taken has been somewhat surprising when compared with brood counts made on the banding areas prior to trapping. Many more young have been banded than were indicated as being resident by brood counts. It has often been felt that brood drives or the use of well trained dogs were necessary to band numbers of flightless young. However, it appears that, under Maine conditions, conventional duck traps placed in good breeding areas may be more effective for young surface feeding ducks. It is almost impossible to drive these birds through heavy cover.

Plans for next quarter: Inactive.

(e) Waterfowl Hunter Bag Check

Objectives: To determine hunter success, crippling loss, and species, sex and age composition of the kill.

Assignment: Howard L. Mendall, Leader

Inactive during quarter.

Plans for next quarter:

The regular hunter bag checks will be conducted on a statewide basis in cooperation with personnel of the Department of Inland Fisheries and Game.

WOODCOCK RESEARCH

(a) Woodcock Census Studies

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

Assignment: Howard L. Mendall, Leader

Inactive during quarter.

Plans for next quarter: Inactive.

(b) Woodcock Productivity Studies

Objectives: To study in detail the cover requirements of breeding woodcock from the onset of courtship to the conclusion of the brood season.

Assignment: Robert B. Weeden, Graduate Assistant

Although this is primarily a project of spring and early summer, Weeden made several trips to the Greenbush study area during July and August to observe the cover types used by woodcock in mid-summer. Possibly due to the wetness of the season, the birds continued to utilize the same or nearly the same areas as they had in spring.

In late September there appeared to be a tendency for the woodcock to be found in more open places, particularly in open stands of young birch, aspen and alder, often in moist depressions. The dense covers that had been used in early summer by broods were not so frequently utilized later on. Up to the end of the quarter the study area was very moist, with soil conditions favorable for feeding in all sections.

Plans for next quarter: Inactive.

UPLAND GAME BIRD RESEARCH

Ruffed Grouse Cover Requirements and Population

Objectives: To determine preferred winter cover types and population densities.

Assignment: Howard L. Mendall, Leader

Inactive during the quarter.

Plans for next quarter: Inactive until mid-December when the seasonal observations on regular check areas will be resumed.

BIG GAME RESEARCH

Studies of Moose Disease in Nova Scotia

Objectives: To study the causes and effects of disease among moose in the Province of Nova Scotia, Canada.

Assignment: Denis A. Benson, Graduate Student

Benson made further progress in compilation of data and his thesis write-up. This will be continued during the next quarter.

COOPERATION AND EDUCATIONAL WORK

Coulter and Mendall devoted a total of about 2 weeks during July, August and September to a special study of waterfowl food conditions in Merrymeeting Bay. This study was made at the request of Roland H. Cobb, Commissioner of Inland Fisheries and Game, following discussions with representatives of the four Sagadahoc County sportsmen's clubs. In addition to the field determinations, two inspection trips were made with representatives of the sportsmen's clubs. A complete report of the study is being prepared for distribution to sportsmen.

During late July and early August Coulter, with assistance from Weeden, conducted a special twelve-day training session in waterfowl trapping and banding techniques and a review of waterfowl identification for Federal game management agents. Most of the instruction was held in the field at banding stations in operation on the Penobscot River. One half day was spent at the Unit laboratory examining the collection of ducks and shorebirds.

Graduate Assistant Robert B. Weeden conducted one week's instruction at the Forestry-Wildlife Summer Camp session held at Princeton, Maine. Merton Radway, Manager of the Moosehorn National Wildlife Refuge assisted Weeden during one day which was spent examining research and management projects on the Refuge.

Coulter and Mendall furnished technical aid to the State Pittman-Robertson program. Several meetings were held in Augusta and Orono in addition to inspection trips in the field.

The regular assistance was given to the warden service and to the public in the examination of specimens and answering varied inquiries for technical information.

PUBLICATIONS

- Coulter, Malcolm W., 1954. Some observations of mallards in central Maine. Bull. Maine Audubon Soc., 10:20-23.
- Mendall, Howard L., 1954. Woodcock census studies in northeastern United States, 1953. Special Scientific Report: Wildlife No. 24, U. S. Fish and Wildlife Service and Dominion Wildlife Service. pp. 21-26.
- Mendall, Howard L., 1954. Waterfowl breeding ground survey in Maine - 1953. Special Scientific Report: Wildlife No. 25, U. S. Fish and Wildlife Service and Dominion Wildlife Service. pp. 245-247.

Respectfully submitted,

Howard L. Mendall

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Maine Cooperative Wildlife
Research Unit

University of Maine
Orono, Maine
November 9, 1954

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

October-December, 1954

RESEARCH PROJECTS

FUR ANIMAL RESEARCH

Ecology of the Fisher

Objectives: To obtain data on the distribution, habitat preferences and winter food habits of the fisher.

Assignment: Malcolm W. Coulter, Assistant Leader

During the quarter six complete specimens were received. These were animals trapped accidentally in sets intended for bobcats or other species. All of these specimens came from areas within the known fisher range.

In view of the present data on distribution and abundance, an open season of about 30 days for trapping has been recommended - the month of December 1955 being suggested. It was further recommended that trapping be permitted only where fisher are known to be well established at present. This area consists of large blocks of wooded country (comprising over 50 per cent of the State) in western and northwestern Maine.

The reason for the latter recommendation is that in several areas south and east of the known, established fisher range, scattered animals have been recorded during the past three years. They have recently invaded other large wooded areas that may in time support good populations. The animals are easy to trap and unless they are protected in new areas, their continued range expansion may be retarded.

There is some feeling among trappers that a 60-day season should be provided. This feeling is prompted in part by the generally increased abundance of fisher, plus the rather unattractive prices for many other furs, including the mainstay of Maine trappers, the beaver. However, it would seem unwise to be too liberal without more thorough knowledge of the influence of trapping upon the animals. With the exception of a 30-day January season in 1950, fisher have been protected since 1937. The 1950 season was not typical in that fisher prices were low while prices for beaver fur were reasonably attractive. Therefore, few people made a special effort to trap fisher, such work being largely incidental to beaver trapping. Thus, there was no good indication at that time as to the influence of an open season. It is likely that more trappers will make a specific effort to take fisher during the next season. More people are aware of the presence of numbers of the animals. In addition, prices for raw beaver fur are not as good as during 1950. Under favorable circumstances, there could be considerable trapping pressure directed toward fisher in many parts of the State. In the interests of both trappers and fisher it would seem best to relax restrictions by stages and with caution. It is believed that a 30-day season will provide ample opportunity for a reasonable harvest, yet will not seriously reduce the stock.

It should also be pointed out that a season that ran much under 30 days will only permit limited trapping activity, because of the winter habits of fisher and the difficulties encountered in semi-wilderness trapping. It requires several days to set up a suitable line of traps in good working order. Fisher travel long distances or circuits and have a habit of returning to specific crossings or hunting areas at intervals of from 5 to 15 days. A season that was too short would so reduce the chances for a reasonable catch that few experienced men would make an effort to trap.

Plans for next quarter:

Several field trips will be made to areas of fisher abundance. Analysis of accumulated stomachs and scats will be conducted in the laboratory.

WATERFOWL RESEARCH

(a) Waterfowl Distribution and Management

Objectives: To obtain 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 breeding species, especially the black duck and the ring-necked duck.

Assignment: Howard L. Mendall, Leader

Population data were obtained throughout the fall period. This information is included in the report that will follow under project (e) Waterfowl Hunter Bag Checks.

Plans for next quarter: Inactive.

(b) Snapping Turtle-Waterfowl Relationships

Objectives: To study the extent and influence of snapping turtle predation upon waterfowl broods.

Assignment: Malcolm W. Coulter, Assistant Leader

The analysis and final tabulation of all turtle data was completed during the quarter. A summary of Coulter's completion report will appear in the next quarterly report.

(c) Waterfowl Productivity Studies

Objectives: To make a detailed study of waterfowl productivity on an unmanaged sedge-meadow marsh.

Assignment: Richard E. Marquardt, Graduate Assistant

This project is primarily concerned with breeding productivity. However, to supplement that data, Marquardt made a few trips to the Goose River study area during the fall.

At the opening of the waterfowl season there were only about 50 birds remaining on the study area. This total was made up largely of ring-necked ducks and baldpates. Also seen on the area on opening day were about six or seven wood ducks and perhaps nine or ten black ducks. Probably most of the ring-necked ducks were resident birds. As has been noted by observers in the past the hunting pressure on this area is very light and only four hunters were recorded on the river although it is believed there may have been a fifth hunter who was not contacted. Hunting success was relatively low.

All waterfowl hunting recorded for Goose River this year occurred during the first half of the split season. By the middle of November ice was forming on the edges of the ponds and only occasional birds were seen. The ponds and main channels froze solid December 3.

Plans for next quarter:

Repairs will be made to the observation tower that was blown down during the September hurricane. Spring migration studies will be initiated during the latter part of March.

(d) Waterfowl Banding

Objectives: To study the movements and migration routes of waterfowl in Maine.

Assignment: Malcolm W. Coulter, Assistant Leader

Inactive during quarter.

Plans for next quarter: Inactive.

(e) Waterfowl Hunter Bag Checks

Objectives: To determine hunter success, crippling loss, and species, sex and age composition of the kill.

Assignment: Howard L. Mendall, Leader

During the waterfowl hunting season the entire Unit staff participated in the annual hunter bag check studies, which are conducted jointly with personnel of the Game Division of the State Department of Inland Fisheries and Game. Mendall's report on this study, which was recently submitted, is reproduced in full at this time:

The 1954 Waterfowl Hunting Season in Maine

By

Howard L. Mendall

In accordance with the recommendation of the Maine Waterfowl Council, a split season was selected for the State in 1954 with dates of October 4 to 30, and November 19 to December 15. During these periods personnel of the Maine Cooperative Wildlife Research Unit and the Game Division of the Department of Inland Fisheries and Game conducted bag check studies among the hunters. Unit personnel were under the supervision of the writer and State biologists were directed by Howard Spencer, Jr., waterfowl project leader. The following men participated: for the Unit - Malcolm Coulter, John Dudley, Richard Marquardt, Horace Quick, Robert Weeden, Claude Westfall, and the writer; for the State - George Aiken, Donald Allison, Chester Banasiak, Harold Blanchard, Henry Carson, W. Russell DeGarmo, Francis Dunn, Nathan Fellows, Jr., Kenneth Hodgdon, Dana Holmes, W. Sidney Howe, John Hunt, John Maasen, Jr., Richard Parks, Stephen Powell, and Howard Spencer, Jr.

Coverage was essentially the same as a year ago with all important waterfowl areas being sampled. A total of 2773 hunters was contacted and 3220 birds were examined. In the early season, 1959 men had hunted 1212 man-days, killing 2128 birds; for the late season, 814 men had hunted 550 man-days and shot 1092 birds.

Waterfowl Populations

Judging from available data, waterfowl were somewhat decreased in Maine this fall. This was particularly noticeable during the early part of the hunting season. Part of this probably was due to less favorable breeding conditions in 1954 in Maine and New Brunswick, with a corresponding decreased production of young birds. To a large extent, however, the lowered October population was attributed to early migration from inland Maine. With a retarded nesting season it had been anticipated that birds might remain later on the breeding marshes this year but such was not the case. A very heavy departure of local birds took place shortly after Maine's second hurricane on September 11. The excessive rainfall accompanying the hurricane left most inland waterways of the State at flood level. As a result many of the usual waterfowl feeding areas were too far under water to receive use by surface feeding ducks such as blacks, teal, and wood ducks. The flood waters receded very slowly and were still unusually high by early October. Thus, inland marshes held comparatively few ducks when the season opened.

Most of October was very mild. Practically no flights of northern birds into Maine occurred until just before the close of the first hunting season. The last few days of October and the first two weeks of November found large flocks of black ducks, as well as smaller groups of other species, passing through the interior of the State, but unfortunately for the hunters the season was closed during most of this time.

There was little migration in evidence during the first portion of the late hunting season, but a cold wave during the first few days of December brought heavy flights of birds into the coastal areas. Black duck populations, particularly, built up rapidly from then until mid-December.

Most noticeable declines in numbers of birds this fall were with the two species of teal and the goldeneye. Teal were reported as less numerous in all parts of the State. Although goldeneyes were reported by the biologists in western Maine as being about as numerous as a year ago, they were heavily decreased in the eastern part of the State.

Hunting Success

An examination of the bag check data indicate that the 1954 season provided some extremely varied and erratic hunting. The tabulated figures on hunting success for all areas was 1.8 ducks per man-day of hunting in the early season and 2.0 for the late season. This represents even lower hunting success than in 1953 which was regarded as a poor season. However, on a regional basis there was much more variation than a year ago, and in a few areas excellent gunning prevailed. In general, the October duck season was very poor except in scattered localities. Over wide areas of the State it was the poorest early-season shooting in many years. In fact, had it not been for the flight birds coming in during the last week of October, the season would have been considered virtually a failure. Even in Merrymeeting Bay, which usually leads all sections of the State in hunter success, the gunning was disappointing except for the first and last few days of the October season.

By contrast to the generally unsatisfactory hunting just described, goose shooting in October probably reached an all-time high. Although most of the geese were bagged in Merrymeeting Bay, more than the usual number were killed in other sections of Maine.

For the first 10 days of the late season, mild weather prevailed; many birds were still scattered in inland waters, and poor shooting was the rule. However, with the advent of "winter" about the first of December, conditions improved rapidly and during the final 12 days of the season some excellent coastal hunting was obtained. Black duck shooting during this time was the best since 1951, and many limit bags were recorded.

Crippling Loss

Figures on crippling loss were computed on the basis of 3172 ducks bagged and 776 which were lost. This is 24.5 per cent, a little higher than last year. As is generally the case it was highest during the first few days of the early season.

Bag Composition

The kill by species of the birds examined in the hunters' bag is presented in table 1. The true sea ducks (eiders, old squaws, and scoters) are not included because the study does not give a representative sample of this type of hunting.

Table 1 - Kill by Species - 1954
(Exclusive of Sea Ducks)

Species	No. Checked Early Season	No. Checked Late Season	Total	Per Cent
Black Duck	1110	677	1787	55.5
Green-winged Teal	225	15	240	7.4
Wood Duck	209	2	211	6.6
Blue-winged Teal	208	---	208	6.5
Goldeneye	17	169	186	5.8
Ring-necked Duck	126	2	128	4.0
Mergansers (3 species)	71	38	109	3.4
Greater Scaup	10	87	97	3.0
Bufflehead	18	61	79	2.4
Mallard	24	17	41	1.3
Canada Goose	33	5	38	1.2
Pintail	23	3	26	0.8
Baldpate	15	4	19	0.6
Lesser Scaup	6	6	12	0.4
Ruddy Duck	8	---	8	0.2
Mallard X Black Hybrid	2	---	2	---
Redhead	1	---	1	---
Unidentified(*)	22	6	28	0.9
Totals	2128	1092	3220	100.0

(*)Chiefly birds that were plucked and dressed when examined.

The 1954 bag composition showed many changes from that of 1953. A heavy increase occurred for the black duck which rose from 41 per cent a year ago to over 55 per cent this year. This is attributed largely to the greatly improved coastal hunting of the late season although a larger proportion of blacks were killed this year during October in Merrymeeting Bay. Slight increases were also shown this year for the ring-necked duck and the greater scaup. Of particular interest in this connection was the increased number of ring-necks present in the bag. The species made up nearly 30 per cent of the total kill in Aroostook and inland Washington counties during October. More than usual were killed in the Merrymeeting Bay region also.

Appreciable declines in bag composition were recorded for the green-winged teal, the goldeneye, and the bufflehead. With the two former, this kill reduction correlates well with the lowered population of the birds. The decreased bufflehead kill probably has little to do with the relative numbers of the species; it attests to the improved coastal black duck shooting that prevailed this year. Few gunners are interested in buffleheads when blacks are available.

With other duck species relatively slight changes in the bag were recorded from last year. More baldpates were recorded, while the ruddy duck reached an all-time low, but these are minor species in Maine.

The figures for the Canada goose are misleading. They show an apparent decrease from 1953. Yet, it is the almost universal opinion of biologists, wardens, and veteran hunters that 1954 provided the best goose hunting for a great many years. The answer to the discrepancy is believed to lie in the way the Merrymeeting Bay bag check sample was obtained. The study is designed to contact the largest number of hunters possible. Since goose hunting as generally conducted in Merrymeeting Bay is a specialized sport, it is probable that this year a much higher proportion of the Bay's duck hunters than goose hunters were contacted; this explanation seems reasonable in view of the fact that the goose kill as tabulated for the remainder of Maine showed an increase over last year as expected.

Sex and Age Ratios

Over half of all birds checked were sexed and aged. These data are presented in tables 2 and 3. In the hunting season reports of previous years it has been pointed out that such information should be analyzed over a period of several years and also should be combined with similar data from neighboring states and provinces to have much significance. Nevertheless, the early season sample of black ducks is sufficiently large to permit a few conclusions for this species at least. In the October season it may be assumed that a large part of the black ducks shot were Maine-reared. The ratio of adults to immature birds was only 1 to 1.4. This further substantiates the conclusions of the summer breeding studies that nesting productivity was lower than usual in 1954 (adult:immature ratios should be at least 1:2 to indicate a successful rearing season). Sex ratios of black ducks obtained during October showed a normal situation in that a very slight excess of males was taken.

Table 2 - Sex and Age Ratios - 1954
Early Season
 (Leading Species Only)

Species	Ad.♂	Ad.♀	Im.♂	Im.♀	Total	Ad.-Im. Ratio	Sex Ratio (Per Cent) Male-Female
Black Duck	149	147	225	179	700	1:1.4	53:47
Wood Duck	30	17	42	45	134	1:1.9	54:46
Blue-winged Teal	28	30	38	55	151	1:1.6	43:57
Green-winged Teal	24	40	47	49	160	1:1.4	44:56
Ring-necked Duck	7	6	36	35	84	1:5.5	51:49
Totals of all bag check data (18 species)	254	263	435	423	1375	1:1.7	50:50

Table 3 - Sex and Age Ratios - 1954
Late Season
 (Leading Species Only)

Species	Ad.♂	Ad.♀	Imm.♂	Imm.♀	Total	Ad.-Im. Ratio	Sex Ratio (Per Cent) Male-Female
Black Duck	155	77	57	81	370	1:0.6	57:43
Goldeneye	57	21	18	10	106	1:0.4	71:29
Greater Scaup	11	13	6	8	38	1:0.6	45:55
Bufflehead	15	9	7	14	45	1:0.9	49:51
Totals of all bag check data (15 species)	255	128	99	125	607	1:0.6	58:42

Time of the Hunting Season

As in the past, the 1954 season did not settle the split season versus straight season controversy that Maine duck hunters have participated in for the past 8 years, although it did provide strong evidence to support the coastal gunners' desires for December hunting opportunities. The best duck hunting of the year in the coastal belt occurred from December 3 to 15. On the other hand, waterfowl populations in the interior reached their peak during early November, when the season was closed between the two split periods.

Weather conditions and migratory movements of the birds themselves determine success or failure of the hunting season to a greater extent than length of season, type of season, opening or closing dates. It is impossible to predict weather when determining the hunting regulations. It is nearly as impossible to predict the times of flight of the birds, since they are related not only to immediate weather conditions in Maine, New Brunswick and Quebec, but also to seasonal climatic factors, water levels, and other environmental changes occurring in summer on the breeding grounds.

Summary

1. Populations of waterfowl in Maine during the fall of 1954 showed a slight decline from 1953 when considered as a whole. Most apparent decreases were with teal and the goldeneye.

2. With a few local exceptions, most of the October portion of the duck season was very disappointing. The tabulated hunter success figures were even lower than during the poor season of 1953.

3. During the first part of the late season hunting conditions showed very little improvement from October. During the final two weeks, however, excellent gunning was enjoyed on the coast.

4. In contrast to duck hunting, goose shooting apparently was the best in modern times, not only in Morymeeting Bay but in several other portions of the State as well.

5. Black ducks showed a marked increase in the bag composition this year making up more than 55 per cent of the kill.

6. Substantial declines in bag composition were shown by the green-winged teal, the goldeneye and the bufflehead. Nevertheless, the green-wing still retained its usual second place in the kill. Goldeneyes dropped to fifth place in 1954 and made up less than 6 per cent of the hunters' bag.

7. Crippling loss was slightly higher than in 1953.

8. Sex ratios of black ducks killed in October were satisfactory. Age ratios ran heavier than usual to adults. This further substantiates earlier beliefs that productivity of young birds was low in 1954.

Plans for next quarter: Inactive.

WOODCOCK RESEARCH

(a) Woodcock Census Studies

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

Assignment: Howard L. Mendall, Leader

Inactive during quarter.

Plans for next quarter: Inactive.

(b) Woodcock Productivity Studies

Objectives: To study in detail the cover requirements of breeding woodcock from the onset of courtship to the conclusion of the brood season.

Assignment: Robert B. Weeden, Graduate Assistant

During the fall quarter, Weeden made several trips to the Greenbush study area to note the condition of the cover and the distribution of woodcock. In addition some data were obtained on cover preferences of woodcock from sportsmen hunting in several central Maine covers adjacent to or near the study area.

Plans for next quarter:

During the winter Weedon will analyze the data obtained during 1954, and will begin the writing of his thesis. In March it is hoped that some trips can be made to the study area to gather more complete data on stand composition and age in some diurnal, nesting, and brood covers.

UPLAND GAME BIRD RESEARCH

Ruffed Grouse Cover Requirements and Population

Objectives: To determine preferred winter cover types and population densities.

Assignment: Howard L. Mendall, Leader

Inactive during the quarter.

Plans for next quarter:

The winter observations on regular check areas will be carried out.

BIG GAME RESEARCH

Studies of Moose Disease in Nova Scotia

Objectives: To study the causes and effects of disease among moose in the Province of Nova Scotia, Canada.

Assignment: Denis A. Benson, Graduate Student

Benson made further progress in compilation of data and his thesis write-up. This will be continued during the next quarter.

COOPERATION AND EDUCATIONAL WORK

The usual assistance was given to the warden service and to the public in examining specimens, arranging for autopsies, and in answering inquiries for technical information.

Coulter and Mendall furnished technical aid to the State Pittman-Robertson program.

Quick conducted the regular undergraduate wildlife courses and the wildlife seminar.

Unit staff members handled several speaking engagements during the quarter.

University of Maine
Orono, Maine
January 29, 1955

Respectfully submitted,

Howard L. Mendall
Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit