

Return to

MAINE COOPERATIVE WILDLIFE  
RESEARCH UNIT  
UNIVERSITY OF MAINE  
ORONO, MAINE

(NOT FOR PUBLICATION)

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

January-March, 1951

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 - Prof. Robert I. Ashman  
Faculty Collaborator - Prof. Horace Quick  
Graduate Assistant - Robert D. Myers  
Graduate Students - Frederick C. Dean  
William R. Nicholson  
J. William Peppard  
Clerk - Maxine L. Horne

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

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RESEARCH PROJECTS

RACCOON RESEARCH

Objectives: To obtain life history data on the raccoon especially as related to the sweet corn interests in central Maine.

Assignment: J. William Peppard - Graduate Student

During the quarter, Peppard completed all laboratory work in connection with this study, and tabulated the data.

Food Habits:

As reported previously (July-September report) 15 specimens were collected during the early fall for food habits studies. It had been hoped that a reasonable number of additional specimens would be obtained from local hunters and treppers during the hunting season. Unfortunately, a very low pelt price provided little incentive for the hunters and only five specimens were collected during the season. Therefore, a total of 20 digestive tracts was available for analysis; upon examination only 14 contained sufficient food material for tabulation. Of these 14 specimens, 2 were collected in August, 7 in September, 4 in October, and 1 on the first day of November. Thus, the results should be considered as indicating trends of the late summer and early fall food habits of the raccoon.

The stomachs, small intestines, and large intestines were examined and tabulated separately. Both dry volume measurement and frequency of occurrence were used in the final compilation of the results. Although raccoon hairs were present in nearly all of the digestive tracts, they were not tabulated, as their presence was no doubt accidental and is probably more closely related to feeding habits than to food habits.

Vegetable foods proved to be of major importance in the diet of the raccoon, constituting nearly 90 per cent of the total material examined. Cherries were the most important item, as they formed almost 40 per cent of the food. Apples were second with 25 per cent, and corn was third at 13 per cent. Other vegetable foods were taken in much smaller quantities with only dogwood (Cornus amonum) and oak having any significance. It would seem that the availability of all three of the leading items must be nearly equal as they are all commonly found on the farms of the study area. Yet corn is of relatively slight importance as based on the results of this study.

Animal remains accounted for only 10 per cent of the total diet, with shrews and insects the leading materials. The former item made up 4 per cent and the latter 2 per cent. Birds, frogs, and mollusks followed in that order of importance.

Although the foregoing determinations are of interest, the number of animals available for examination is small. A larger sample should be obtained before any definite conclusions are stated.

#### Crop Damage:

The State Department of Inland Fisheries and Game repays any farmer for damage to his corn field which may have been caused by raccoons; no compensation is made for porcupine damage. Game wardens investigate all crop damage complaints that are reported, in order to determine the amount and cause of the damage. Naturally, in the past, the farmers have preferred to have their damage classified as raccoon because of the financial return. Consequently, the thought has become rather firmly established that only the raccoon commonly feeds in corn fields. The habits of the porcupine have been disregarded.

The wardens who were contacted during the present study provided some very interesting information as a result of their thorough investigations of crop damage complaints within their districts. Their records show that during the past two years crop damage payments, due to raccoons, have been extremely small. This is of particular interest because raccoons appear to be increasing in central Maine. On the other hand the wardens have observed a great deal of porcupine damage.

#### Observations by Use of Dogs:

Two types of hunting dogs were available for use during the study period. While one was a veteran raccoon dog, the other paid no attention to raccoons and persisted in chasing porcupines. This made an excellent combination as both dogs were released in the same area at the same time and a simultaneous check was obtained on the presence or absence of both raccoons and porcupines.

The results of this phase of the study showed that during a period when only two raccoons were located in a series of corn fields, 24 porcupines were found to be present in the same fields. Several of these fields had been reported to the wardens as being damaged by raccoons, and yet, when they were checked with the dogs, porcupines were found to be much more abundant than raccoons. Likewise, porcupine damage greatly exceeded raccoon damage.

In conclusion, it appears that porcupines are much more damaging to corn fields in central Maine than formerly suspected, and that raccoons cause considerably less damage than previously believed. The results of this study - which was intended to be merely preliminary - would appear to warrant a more detailed investigation.

## RUFFED GROUSE MANAGEMENT

Sub-project: Cover requirements and populations

Objectives: To determine preferred cover types and population densities.

Assignment: Howard L. Mendall, Leader

The winter grouse studies were conducted by Mendall on most of the Unit's regular check areas in northern and central Maine. Coverage was not as extensive as usual in Piscataquis County but more attention was paid to the Somerset County areas, since excellent populations of grouse were found to exist there. In addition to the information obtained during the current quarter, population data that were obtained during the last portion of the fall quarter in eastern Maine are presented at this time.

The entire winter was unusually mild. From December through March, temperatures were considerably above average, rainfall was heavier than average, and snowfall was less than for many years. A few ice storms occurred in December and the first half of January but these were of short duration and had little or no effect on grouse. Considerable amounts of bare ground could be found in the woods at almost any time in the southern half of the State. In the forested section of northern and northwestern Maine, particularly in the higher elevations, accumulated snow reached an average depth of 2-3 feet about mid-March, but even in that region the winter was extremely mild.

As a result of these weather conditions grouse appeared to enjoy a remarkably "easy" winter. Losses from climatic conditions and predation alike were probably insignificant. The birds were found in very open covers throughout the entire period. During the field checks, the utilization of coniferous, lowland covers was found to be the least of any winter since the Unit's grouse project was initiated. In fact about the only differences observed in fall and winter cover preferences this year was the decreased tendency by the birds in frequenting ridges during January and February.

Population data of late fall and winter showed rather general increases over most of the region covered by Unit checks. A fairly heavy increase was noted in comparison with last year in most of Penobscot County and in the southern portions of Aroostook, Somerset, and Franklin counties. This broad area is a very important grouse producing section of Maine and it seems likely that the status of the bird there is now the best in several years. By contrast, however, populations in many parts of eastern Maine (Hancock and Washington Counties) remain low.

## PHEASANT NUTRITIONAL STUDIES

- Objectives:
1. To determine the minimum nutritional requirements of pheasants during a Maine winter.
  2. To determine the possible effects of inadequate diets upon reproduction.

Assignment: Robert D. Hyers, Graduate Assistant

This is a new project, initiated during the past fall. Hyers' work

was conducted merely on an experimental basis this winter to determine the most practical methods for feeding and handling birds for this type of a study. Twenty-four carefully selected pheasants were furnished by the State Department of Inland Fisheries and Game. Six hens and 2 cocks were placed in each of three pens. The only shelter consisted of spruce and fir boughs. Birds in one pen received varied amounts of a commercial pheasant food; the second group was fed on corn, and the third was given apples. In the latter instance corn and commercial feed were substituted for apples when the birds approached critical stages of malnutrition.

Measured amounts of feed were placed in each pen, usually in decreasing quantities. Each bird was weighed to the nearest ounce at weekly intervals. Records were also kept of the general condition and behavior of individual birds. Daily weather records were obtained from the University weather station.

Three birds died during the winter. These specimens were autopsied by the Animal Pathologist and in each case showed symptoms of advanced starvation.

The remaining birds will be kept on the experimental diets and an effort will be made to measure the influence of the inadequate diets upon reproduction. One pen, maintained as a control will receive green foods in addition to corn. All eggs will be incubated if possible.

The major portion of this study will be conducted next winter using a larger sample and employing the techniques developed this winter. A poultry nutritionist, animal pathologist, feed analyst, and statistician are cooperating and have made many helpful suggestions that will be incorporated in next winter's experiments.

In addition to the study of penned birds, Hyers will collect natural pheasant foods from central Maine which will be analyzed as to nutritional content. He will also make observations on the wild pheasant flocks occurring in the Orono region.

#### MISCELLANEOUS STUDIES

##### Snapping Turtle - Waterfowl Relationships

**Objectives:** To determine the extent of snapping turtle predation upon waterfowl and to gather data on the ecology and distribution of snapping turtles in Maine.

**Assignment:** Malcolm W. Coulter, Assistant Leader

The 1950 field results of this seasonal project were given in the July-September report. During the past quarter the laboratory determinations were carried out and the data tabulated. Coulter was assisted in the stomach analysis work by graduate students Dean, Hyers, and Nicholson.

Seventy-two of the 87 specimens contained food material. Since the 1949 studies were of a preliminary nature only, the results obtained from those specimens have been combined with data for the 1950 season and are presented in table 1.

Table 1

Occurrence of Major Groups of Food Items in 104  
Snapping Turtles, 1949-1950

Food	Occurrence No. Turtles	Percent of Turtles
Vegetation	88	84.6
Insects	76	73.0
Fish	69	66.3
Mollusks	59	56.7
Birds	26	25.0
Amphibians	25	24.0
Annelids	1	Trace

Discussion of Food

Vegetation - Plant material was varied, but in general appeared to represent what the turtles found readily available, especially the submersed and floating species. Plants commonly found included pond woods (Potamogeton), duck weed (Spirodela) and water bulrush (Scirpus subterminalis).

In several instances turtles had taken large quantities of vegetation and very little other food. The presence of up to 3/4 of a quart of vegetation consisting of only one species would seem to indicate a preference for certain plant foods under some conditions. Throughout the examination of the turtles it became evident that specimens with large quantities of vegetation often had fed almost exclusively upon one species.

Fish - A few specimens contained fish that were practically intact, but in the majority, fish were represented merely by bones and scales. Some turtles had fed on two or three kinds of fish, whereas in others several individuals of the same species were present. Specific identification of much of the fish material has not yet been made, but those that have been verified include suckers, minnows, bullheads, eels, yellow perch, and pickerel. The above species represent those commonly found at the marshy areas where turtles were collected.

Insects and Mollusks - Small clams and snails made up the mollusk remains. In a few instances turtles had fed heavily upon small clams (sphere shell and pill clams in the family Sphaeridae). Insects were represented by a variety of forms. In many cases the insects and mollusks were present in small numbers and were mixed with large quantities of other foods suggesting that they may have been taken incidental to other feeding activities.

Amphibians - Frogs or salamanders were found in 25 specimens. Here again some turtles had fed heavily upon these forms while others revealed only scattered evidence. One turtle had consumed at least 13 salamanders and another had taken at least 6. Frog remains included adult as well as the immature (tadpole) stages, although the latter were not as commonly detected as were full grown frogs.

Birds - One of the primary objectives of this study is to determine the extent of turtle predation upon waterfowl. Trapping of turtles has been conducted only during the waterfowl brood season and only on areas where broods were common.

Data concerning the abundance of ducks, rails, grebes and other aquatic birds have also been gathered during the turtle trapping period to permit correlations with the amount of avian material in the turtles' diet.

From table 1 it is evident that 1 in every 4 turtles containing food in the digestive tract had fed upon birds. Bird remains have varied from almost complete downy young ducks and entire wings of adults, to a few fragments of feather or bone. In some cases the species and age of the duck, rail, or grebe could be determined while in others it was not possible to make any specific determination.

To date much of the avian material has consisted of young ducks and grebes. The pied-billed grebe is the only species of the latter group that was identified, and it appears to be a frequent victim of the turtle. Although grebes may have little economic significance they have a distinct esthetic value in a marsh. Diving ducks were found more often than surface feeding species, and in fact nearly as many diving ducks were identified as grebes. The ring-necked duck was taken most frequently; other ducks identified included American goldeneye, wood duck, and blue-winged teal. No black ducks were recognized with certainty although at least one of the unidentified ducks was believed to be of that species. Ducklings less than half grown were taken most often, but a surprising number of larger young - and even a few full grown birds - had been consumed. Rails, chiefly the sora, were taken occasionally.

It is impossible to state how much, if any, of the bird material represents carrion. However, as was pointed out a year ago, both circumstantial and direct evidence of turtles killing ducks has been gathered during various Unit field studies. This evidence, combined with the snapping turtle's preference for fresh food, would seem to indicate that direct predation accounted for much of the bird material detected.

Considerable variation in the amount of bird remains was found between areas and seasons in the samples available. Thirteen of 32 specimens from the Corinna area contained birds in 1949, yet only 10 of 72 from that area had fed on birds in 1950. Three of 14 specimens taken in 1950 from the Pocamoonshine area had fed on birds. It is interesting to note that in this latter case all of the birds that could be identified were grebes. During 1950 water levels at the Pocamoonshine area were higher than usual. Fewer broods were observed than had been the case in some recent years even though a comparable breeding population was present. The broods, instead of being restricted to channels, were free to move over the flooded marsh whereas the grebes appeared to remain closer to the deeper channels. At Corinna Stream high water levels also prevailed in 1950 which may account for a lower occurrence of birds in the turtle specimens.

The importance of collecting the large intestine as well as the stomach was again evident during the examination of the 1950 specimens. Table 2 summarizes data that illustrate this point.

Table 2  
Location of Food in Digestive Tracts

Year	No. Specimens Collected	No. Specimens with food	No. Specimens with food in stomach	Location of bird remains		Total Specimens with bird remains
				Stomach	Lg. Int.	
1949	35	32	12	2	12	13
1950	87	72	47	1	12	13(*)
Total	122	104	59	3	24	26(*)

(\*) This figure may ultimately be slightly higher as several bone fragments have not as yet been identified with certainty.

Thus, if stomachs alone had been collected, only 3 instead of 26 instances of turtles having consumed birds would have been found.

While results thus far have yielded data of interest and give some indication of rather significant predation upon aquatic birds by turtles, the sample is still rather small and represents only two or three habitat conditions.

Some sportsmen's clubs have expressed interest in trapping turtles. However, until further study has been conducted it seems unwise to encourage such projects from the standpoint of waterfowl relationships at least. Control efforts under some, or perhaps any, conditions may not be justified. Because a campaign of this nature may often spread from club to club it is felt that any such action should wait until more field data are available. It is hoped that further studies by the Unit will give more specific information as to conditions under which turtle trapping may be justified.

Plans for future work include:

1. Collecting of additional specimens from various areas during the waterfowl brood season.
2. Further testing of methods of collecting turtles.
3. Collecting of additional information on the abundance and distribution of snapping turtles in Maine.

4. Some consideration is also being given to the possibility of controlled experiments with penned turtles on feeding and rate of digestion of various foods as an aid in interpreting food habits data.

#### COOPERATION AND EDUCATIONAL WORK

During the late fall and winter period a considerable number of speaking engagements were taken by Unit personnel. It was the busiest winter season in this respect in several years. A total of 43 lectures was given to civic, sportsmen's, and educational groups. At these lectures the work of the Unit and of the State Department of Inland Fisheries and Game was stressed. The speaking engagements were divided as follows: Coulter - 14; Mendall - 11; Quick - 10; Hyers - 4; Peppard - 3; Dean - 1.

Mendall and Coulter contributed their usual services as technical advisers to the State's Federal Aid Program. Numerous conferences were held at Orono and Augusta in this connection.

The regular assistance was given to the State Warden Service in identifications and autopsies. Coulter and Mendall gave instruction three days at the annual Warden School in Augusta.

Unit personnel travelled to several of the professional meetings in February and March. Mendall attended the Boston meeting of the New England - New York Inter-agency conference on natural resources. Ashman, Coulter, and Mendall attended the Northeastern Wildlife Conference in Wilmington, Delaware. Mendall attended the North American Wildlife Conference and the annual Unit Leaders' Meetings in Milwaukee, Wisconsin.

#### PUBLICATIONS

An article by Coulter entitled "The Deer Herd in Maine" was published in the Maine Forester (annual, published at Orono, Maine), 1951 issue, pages 62-67.

Two articles by Mendall entitled "Waterfowl Breeding Ground Survey in Maine, 1950" and "Woodcock Census Studies in Northeastern United States, 1950" were published by the U. S. Fish and Wildlife Service in Special Scientific Report: Wildlife No. 8 - pages 221-223 and 241-246.

Respectfully submitted,

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

University of Maine  
Orono, Maine  
April 12, 1951

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# MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

## Quarterly Report

April-June, 1951

### RESEARCH PROJECTS

#### 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 devoted as much time as could be spared from other duties to obtaining the annual migration and breeding season census data, and to conducting the nesting productivity studies. Considerable assistance was given by other members of the Unit Staff. Coulter and Dean largely handled the hole-nesting duck studies, and assisted in censusing and nest-hunting on the central Maine study areas; Peppard, Nicholson, and Hyers conducted intensive studies on the Goose River and Corinna areas; John M. Dudley was employed for a week to assist on the Washington County areas.

#### Waterfowl Populations

Approximately three-fourths of the Unit's census areas had been surveyed as of June 25. Although coverage of the remaining marshes will undoubtedly result in a few changes in the final figures, nevertheless a reasonable picture of the status of the breeding ducks is believed available now.

On the basis of a 75 per cent coverage, the populations of Maine's two most numerous breeding species (black duck and ring-necked duck) continue to show a very favorable trend for the fifth consecutive year. Increases in both these ducks appear to be a certainty for 1951. By contrast, the hole-nesting ducks are showing a decrease in the studies to date. After a rather general upward trend for the wood duck since the 1947 low point, a substantial loss is likely to occur for this bird in 1951. The decline of the goldeneye, although slight, means that the species is now at the lowest point in Maine in 15 years.

The status of teal showed a reversal from 1950 - an increase for the green-wing and a decrease for the blue-wing. Yet it should be emphasized that neither species of teal is common enough in Maine to permit the Unit's census data to have any real significance.

The 1951 populations of the six species of breeding ducks (excluding mergansers) is estimated, as of June 25, as follows:

<u>Species</u>	<u>Status in 1951</u>
Ring-necked Duck	15% increase
Black Duck	10% increase
Green-winged Teal	10% increase
American Goldeneye	10% decrease
Wood Duck	25% decrease
Blue-winged Teal	40% decrease

On the basis of the foregoing data it might appear that the overall status of waterfowl was not very satisfactory, since the decreases recorded for three ducks were heavier than the increases recorded for the other three species. But it should be pointed out that the total numbers of breeding black ducks and ring-necks in Maine exceed those of all other species combined; these two ducks are present in substantially increased numbers this year.

Considerable variation as to comparative waterfowl populations was noted in the censuses from various sections of Maine. In general, the checks of the important eastern Maine marshes showed increased numbers of birds. The heaviest decreases occurred in central Maine. Populations in northern Maine showed little change from a year ago.

#### General Breeding Conditions

The 1951 spring season was advanced nearly two weeks from the average and about three weeks from the 1950 season. Nearly all lakes and streams in southern and central Maine were free of ice in early April, and even in the northern part of the State, every waterway was clear before the end of the month. This resulted in very early nesting for all ducks, especially blacks and wood ducks. Two instances of black duck hatchings occurred during the last week of April - the earliest dates recorded during the Unit's waterfowl program.

The breeding season to date appears to be at least as good as in an average year, although productivity is not likely to reach the record proportions of a year ago. Precipitation was unusually high throughout most of the spring. Water levels approached flood stage in mid-April and again in late May. Some nest losses are known to have occurred at those times.

The Unit's sample nesting study has resulted in locating 86 nests to date; most of these are of the ring-neck, black duck, and wood duck. This is disappointingly fewer than were found in the two previous years; in spite of increased numbers of black ducks and ring-necks, high water and poor weather made nest hunting very difficult this season.

During the coming quarter the population studies will be continued. All nests will be kept under observation until hatched or destroyed. Sample brood counts will be made on specified areas to obtain data on the season's productivity.

Sub-project: Waterfowl Ecology of Corinna Stream

Objectives: A study of the ecology of migratory and resident waterfowl in a cat-tail marsh in central Maine.

Assignment: J. William Peppard, Graduate Student

During the quarter, Peppard concluded all work on this sub-project. He was awarded the Master's degree in Wildlife Conservation. The following is the summary of his thesis entitled, "The Waterfowl of a Cat-tail Marsh in Central Maine":

The waterfowl of a small marsh in central Maine were studied in order to determine their use of the area, and the value of the marsh as waterfowl habitat. Records were made concerning the waterfowl during the spring migration, breeding, nesting and brood seasons, and the fall migration. Other phases of the study included food habits, snapping turtle predation, and the banding of ducklings. As a result of this study, several factors have been determined which are considered to be basic in the management of the marsh as waterfowl habitat. The conclusions which resulted from this study are as follows:

1. Spring migration

- a. Relatively large populations of waterfowl utilize the area for feeding and resting.

2. Resident populations

- a. Breeding census records for the past 12 years indicate that the area has received less use by nesting birds in recent years.

3. Nesting

- a. Nesting habitat is at a minimum due to the fluctuating water level.
- b. Two known nest losses were attributed to the change in water level in the 1950 season.

4. Brood season

- a. At least 26 broods representing six species of waterfowl were identified as present on the marsh.
- b. Snapping turtles were found to be a known cause of brood mortality.

5. Fall migration

- a. In contrast to the spring migration, relatively large populations of waterfowl used the area mainly for feeding.
- b. Low water levels reduced the food supply and the protective cover for waterfowl on the marsh.

6. Management suggestions

- a. Water level control would result in the following:
  - (1) Increased dispersion of water and marsh habitat.
  - (2) Increased nesting habitat.
  - (3) Reduced nest losses.
  - (4) Increased brood cover.
  - (5) Increased food supply.
  
- b. Abatement of pollution would increase aquatic plant growth by accomplishing the following:
  - (1) Elimination of unnatural turbidity.
  - (2) Reduction of "blank" areas.

MUSKRAT MANAGEMENT

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

Assignment: Malcolm W. Coulter, Assistant Leader

Spring muskrat checks were again conducted as in past years on several sample areas to evaluate the status of the breeding population. Each area was rated according to the amount of muskrat sign present with consideration to the quantity and quality of the habitat. The results this spring are of special interest since this is the first breeding season following the new fall trapping period. In previous years Maine has had a spring or a combination spring and autumn muskrat season.

Results of the checks for the sample areas are as follows:

Area	Town	County	Status of Breeding Population	
			1950	1951
Pushaw Stream	W. Old Town	Penobscot	Fair	Excellent
Passadumkoag Stream & Trib.	Passadumkoag	Penobscot	Fair	Excellent
Penobscot River	Lincoln	Penobscot	Fair	Good
Penobscot River	Enfield	Penobscot	Good	Excellent
Penobscot River	Passadumkoag	Penobscot	Good	Excellent
Corinna Stream	Corinna	Penobscot	Poor	Good
Corundel Lake	Corinna	Penobscot	Fair	Good
Mattanawcook Lake	Lincoln	Penobscot	Poor	Excellent
Davis-Holbrook Marshes	Eddington & Holden	Penobscot	Fair	Excellent
Goose River	Swanville & Belfast	Waldo	Poor	Good
Cobbosseecontee Stream	Gardiner	Kennebec	Fair	Excellent
Horseshoe Pond	W. Gardiner & Litchfield	Kennebec	Fair	Good
Pennamaquan River	Pembroke	Washington	Fair	Excellent
E. Machias River	Alexander & Crawford	Washington	Poor	Fair
Dog Brook	Princeton	Washington	Poor	Good
Portage Lake	Portage	Aroostook	Good	Excellent

In connection with Pennamaquan River in Washington County, the muskrats have increased in one year to the point where they are actually damaging the habitat.

Based upon examination of the above sample areas, it appears that the breeding population of muskrats is much improved this year. At specific study areas which have been under close observation since the Unit muskrat studies were initiated in 1945, the present populations are better than in any of the previous 5 years.

On two of these marshes careful estimates of the numbers of breeding animals have been made in former years. These estimates were made by a thorough cruise of the entire habitat and were believed to be fairly accurate under low or moderate population conditions. However, this season sign is so abundant and so well distributed over the areas that the accuracy of any specific estimate seems questionable when based upon the type of sign present during the spring period.

The foregoing findings have been further substantiated by reports of numerous trappers and game wardens who were contacted.

In view of Maine's long-standing controversy concerning fall vs. spring trapping and its effect upon the muskrats, many individuals are now asking whether this year's increase may be attributed to fall trapping, despite the fact that a number of specific areas yielded larger catches last fall than they had during previous spring trapping seasons. Actually, it appears possible to test this question on a large scale basis. The season for trapping muskrats in three counties (York and Cumberland in southern Maine, and Washington in eastern Maine) has been again changed by the Legislature to spring. Thus, if the trapping period is affecting the population, the muskrats in the various counties should show differing trends in the future. It will be extremely interesting to all agencies and persons concerned with muskrats in Maine to observe these trends; the results should serve as a demonstration that may help to settle part of the present controversy.

Breeding conditions for muskrats this spring have been very good. Water levels are higher than for several years and in many areas previously uninhabitable breeding sites are in use. The first litters were discovered during the first week of May, and in at least one instance the young had been born during the last week of April. It appeared that more breeding took place during May than has been recorded in recent years.

#### PHEASANT NUTRITIONAL STUDIES

- Objectives: 1. To determine the minimum nutritional requirements of pheasants during a Maine winter.
2. To determine the possible effects of inadequate diets upon reproduction.

Assignment: Robert D. Hyers, Graduate Assistant

The winter feed trials were conducted from January 16, 1951 to April 13, 1951 during which time periodic weights of all the penned birds were taken. Commercial pheasant food, corn, and apples constituted the rations fed to groups 1, 2, and 3 respectively. Group 1 received commercial pheasant food in ample quantities, group 2 received corn and native grasses, and group 3 received apples and some small quantities of corn.

These rations were fed in decreasing quantities until a starvation level was reached. Table 1 gives the initial and final average weight, as well as the date and lowest average weight during the trial. The lowest average weight coincides with the starvation level for groups 1 and 2 and coincides with the second starvation level for group 3. Group 3 approached a starvation level on February 2, and were placed on a recovery ration before being returned to their apple diet.

Table 1

Weights of Penned Pheasants

	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>
Ave. Wgt. at start	2 lb. 8 oz.	2 lb. 8 oz.	2 lb. 8 oz.
Ave. Wgt. at end	2 lb. 7 oz.	2 lb. 6 oz.	2 lb. 0 oz.
Lowest ave. wgt. and date	1 lb. 15 oz. (3/2/51)	1 lb. 12 oz. (3/13/51)	1 lb. 13 oz. (4/6/51)

A total of six birds was lost during the feed trial. One of these birds escaped and the others were diagnosed as starvation losses by an animal pathologist.

A check on the reproductive abilities of the birds was made from April 13 to June 6. At that time the remaining birds were released although egg production had not stopped. Three birds were lost during this phase of the investigation and all deaths were diagnosed as due to starvation.

During the period of the trial, 134 eggs were collected. Birds in group 1 laid 85 per cent (115 eggs); those in group 2, 6 per cent (8 eggs); and the hens in group 3, 8 per cent (11 eggs). The first egg from group 1 was found on April 23, the first egg from group 2 on May 10, and the first egg from group 3 on May 21. The peak of the laying period from group 1 was from May 11 to May 29.

The eggs were weighed prior to incubation and it was found that group 1 eggs averaged 31.3 grams, group 2 eggs averaged 26.7 grams, and group 3 eggs averaged 27.1 grams. The fertility of all eggs has not yet been determined; however a check on the first 78 eggs obtained shows that only two were infertile. Nineteen pheasant chicks hatched from this group of 78 eggs. This extremely poor hatching success (24.3 per cent) is undoubtedly attributable to the incubator trays at the poultry plant. The type of incubator available caused considerable cracking of the shells, since it was designed for hen's eggs rather than pheasant eggs.

As was pointed out in the last quarterly report, Hyors' work this season has been largely experimental. The major portion of his study will be conducted next winter.

WOODCOCK RESEARCH

Sub-project: Census study of woodcock

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

Assignment: Howard L. Mendall, Leader

From mid-April to May 20, Mendall carried out the annual woodcock census studies. Data were obtained for the 15th consecutive year on the Unit's regular check areas in central and eastern Maine. In addition, the results from cooperator areas in other parts of the New England states and New York were analyzed and tabulated.

A complete report of the 1951 census results was submitted on June 2. Only the summary of that report will be repeated at this time.

Summary

The following tabulation shows, in condensed form, the totals by states on all census areas:

State	1950 Total	1951 Total
Maine	208	185
New Hampshire	11	12
Vermont	91	95
Massachusetts	129	131
Connecticut	55	45
New York	134	133
Grand Total	628	601

From the data it may be seen that the status of breeding woodcock in northeastern United States showed a slight decrease this spring in comparison with 1950. Since the decrease amounted to only 4 per cent, it does not appear to present any very serious problems, especially in view of the favorable status of the species for the three years prior to 1951. This year's overall decrease resulted largely from losses in Maine and Connecticut.

Several interesting points were noted in an examination of the individual census data sheets and in correspondence with various cooperators. Local fluctuations always occur, but this year the changes were much more pronounced. A large number of areas showed either marked increases or heavy decreases. These abrupt changes were observed especially in Maine, Vermont, and New York.

Another fact mentioned by a number of cooperators, and observed to a surprising degree by the writer in eastern Maine, was a very unusual tendency by male birds for changing territories during the height of the breeding season. Such shifting of singing grounds, observed on repeat checks, greatly complicated the evaluation of the census data. This always occurs to a limited extent but in 1951 it was observed rather frequently on some areas. This easily could have accounted for a sampling error as large or larger than the 4 per cent decrease recorded.

#### MISCELLANEOUS STUDIES

##### Skunk Ecology

Objectives: To study the ecology of the striped skunk

Assignment: Frederick C. Dean, Graduate Student

This a short-term project that has been assigned to Graduate Student Dean. In attempting to learn something of the ecology of the skunk in central Maine, both intensive and extensive methods are being used. A small study area adjoining the University campus is being watched closely. Thirty dens have been located and activity records kept. Fifteen skunks have been live-trapped, tagged and released. In the tagging operation a chute that is a modification of the one used by Crabb in Iowa has been employed. To date 7 males and 8 females have been taken; their weights average 4.5 pounds (3.75-5.5) and 4.0 pounds (2.0-6.5) respectively. In spite of intensive trapping no recaptures have been made as yet, and in only two cases has more than one skunk been taken at the same den.

It is planned to continue this study through the next school year, with increasing emphasis on breeding and food habits phases. A special effort will be directed toward obtaining data on denning, breeding habits, population levels, and movements.

On an extensive basis notes are being made on skunks wherever possible, and carcasses that may yield food or breeding information are being collected.

#### COOPERATION AND EDUCATIONAL WORK

Mendall and Coulter contributed their usual services as technical advisers to the State's Federal Aid program. Several conferences and meetings in this connection were held during the quarter in Augusta and Orono.

The regular assistance was given by Unit personnel to the State Warden Service in identification and autopsies.

PERSONNEL CHANGES

Graduate Student, J. William Peppard completed all Unit duties in June and was awarded the Master's degree. He is now employed as Project Leader by the Federal Aid Division of the Maine Department of Inland Fisheries and Game. He is to be specifically assigned to the waterfowl and muskrat projects.

Respectfully submitted,

*Howard L. Mendall*

Howard L. Mendall, Leader  
Maine Cooperative Wildlife  
Research Unit

University of Maine  
Orono, Maine  
July 2, 1951



MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

July-September, 1951

RESEARCH PROJECTS

MUSKRAT MANAGEMENT

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

Assignment: Malcolm W. Coulter, Assistant Leader

The last quarterly report presented an appraisal of muskrat populations for several specific areas. During the summer additional observations were made, usually while conducting other studies on marshy watercourses.

Favorable water levels and weather resulted in especially good breeding conditions throughout the summer. The higher water levels, general throughout the State, allowed continued usage of preferred breeding habitat. As has been explained previously, muskrats in Maine seem to prefer dense cover in shrubby habitat for litter sites. In many seasons rapidly decreasing water levels during the summer leave much of this habitat with little or no water, resulting in a shifting of the muskrats as well as a concentration. Shifting, or concentration, during the summer increases mortality, not only from predation, but also fighting among the animals. Fighting during the rearing season, when several age classes are present, may be especially serious.

The higher water levels have continued into the early autumn. Indications are that trappers will find good populations, but that the animals will not be concentrated around channels, potholes and lake edges as heavily as they were last season. This difference is likely to result in less over-trapping in many areas.

The program for the next quarter will be directed toward gathering data during the trapping season. Points that will be emphasized include trapping pressure, time required to make the harvest, kill of other species in muskrat traps, and productivity based upon placental scar counts and age ratios. Some time will be spent with trappers on their lines to gather additional information on trapping pressure, methods, trapper attitudes and actual practice as regards provision for breeding stock, and proportion of losses through "wring-offs."

The fall studies will provide two years' information based on fall trapping to compare with data gathered during previous spring trapping periods.

HABITAT EVALUATIONS ON STATE GAME MANAGEMENT AREAS

Objectives: To obtain information on the environmental changes resulting from management practices that are being instigated on the newly acquired State marsh areas; and to determine site requirements for some of the aquatic plants of special importance in Maine.

Assignment: Frederick C. Dean, Graduate Student

During the past quarter Dean initiated field work on his thesis study which is being financed and carried out in conjunction with the Federal Aid Division of the Maine Department of Inland Fisheries and Game. One phase of the project is an investigation of some of the site requirements of four species of aquatic plants that are of considerable importance to muskrats and waterfowl in this area. The plants being studied are the floating pondweed (Potamogeton natans), burreed (Sparganium chlorocarpum), water bulrush (Scirpus subterminalis), and wild rice (Zizania aquatica). It was felt that results of such a study would be valuable in guiding planting programs such as have been carried out to a considerable extent in the past and are likely to be pursued in the future. The data should also prove valuable in appraising potential marsh management areas under consideration by the State or by sportsmens' clubs.

Inasmuch as a wide range of growing conditions for each species was desired, Dean travelled considerably throughout much of Maine. The factors measured for each station were as follows: (1) Soil (depth of organic matter, depth to hardpan, firmness, color); (2) Water (Methyl orange alkalinity, pH, depth, stability, current, color, turbidity, silting); (3) Plants (density, composition, sample dry weight per unit area); (4) Site (exposure, climate, general information). In addition, soil samples were taken which will be subjected to physical and chemical analysis. Approximately 66 plots were taken. These were distributed by counties as follows: Cumberland - 1, Franklin - 2, Hancock - 1, Kennebec - 5, Lincoln - 2, Oxford - 1, Penobscot - 30, Piscataquis - 1, Sagadahoc - 2, Somerset - 7, Waldo - 7, Washington - 7. The data obtained will be analyzed during the coming winter.

In addition to this work, Dean made checks on plots set out during 1950 on some of the State's new marsh management areas to determine vegetative changes brought about by flooding areas of different types; also to note the effect of site preparation on the rate of invasion by aquatic plants. He also resurveyed the vegetation of Barn Meadow Marsh on the Moosehorn National Wildlife Refuge. This was to obtain data which, when compared with that Gashwiler obtained in 1945 on the same area, will indicate the effect of five years of increased and stabilized water levels. In connection with this study two different methods were used as well as different intensity levels in order to make a comparison of the methods. This was done because of the desirability for a reasonably accurate, but at the same time speedy and efficient, plant inventory method applicable to management areas over the State as a whole.

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 completed the regular waterfowl productivity studies as described in the April-June report. Coulter, Dean, Hyers, and Nicholson assisted Mendall in this work.

Breeding Populations

The final tabulation of the census data showed several changes from the preliminary estimates made in June, particularly among the less numerous species. Therefore, the complete census figures are given at this time.

For the fifth consecutive year, the initial breeding population of waterfowl in Maine showed an increase. The two most abundant species (the black duck and ring-necked duck) were present in very satisfactory numbers. Eastern Maine is the most important breeding area of the State and there the increases of these two ducks were very noticeable. In fact, had it not been for decreases on a few of the central Maine study areas, the status of the black duck and ring-neck would have been much better than the tabulated data show. The green-winged teal likewise was present as a breeding bird to an increased extent.

By contrast the blue-winged teal and the two hole-nesting ducks (wood duck and goldeneye) registered decreases. Only in the northwestern part of the State can the goldeneye now be termed a common breeder.

The 1951 populations of the six species of breeding ducks (excluding mergansers) is estimated as follows:

<u>Species</u>	<u>Status in 1951</u>
Ring-necked Duck	14% increase
Black Duck	11% increase
Green-winged Teal	10% increase
American Goldeneye	10% decrease
Wood Duck	19% decrease
Blue-winged Teal	25% decrease

Considerable variation as to the status of individual species occurred in different sections of Maine. In general a heavy increase was recorded in eastern Maine, a very slight increase was found in northern Maine, and a moderate decrease was noted in central Maine. Southern Maine, which is relatively of slight importance as a breeding area, is not covered by the Unit's censuses.

### General Breeding Conditions

The early part of the 1951 spring season was advanced about two weeks from the average and about three weeks from the 1950 season. Nearly all lakes and streams in southern and central Maine were free of ice in early April, and even in the northern part of the State every waterway was clear before the end of the month. This resulted in some very early nesting by blacks, wood ducks, and goldeneyes. Four instances were actually recorded (and there were undoubtedly others) of black duck hatchings during April in central Maine - the earliest dates ever recorded during the Unit's waterfowl program.

In spite of a few remarkably early records, the hatching peaks were not as early as the ice-clearing dates would have indicated. Late April and early May produced much precipitation, low temperatures, and little sunshine; this evidently slowed the nesting cycle. The first hatching peak for black ducks (excluding re-nesting) occurred about 10 days earlier than average, and that for wood ducks and goldeneyes was about a week ahead of average. The hatching peaks for the later nesting ring-necks and teal took place only a few days earlier than in an average year.

The entire breeding season was much wetter than usual. Water levels approached flood stage three times; mid-April, the last of May, and early July. These floods were responsible for more nesting losses than usual. Of the three periods of excessive rainfall, that occurring the last of May was the most destructive as it caused some losses to all ground nesting species. The April flood affected only a few of the earliest nesting black ducks; the July flood apparently caused losses primarily to the ring-necks.

### Nesting Success

The finding of 7 July nests (in addition to those mentioned in the last report) brought the season's total to 93. Five species were represented but 87 of the nests were of three ducks - ring-neck, black duck, and wood duck, in that order. Eggs from three of the ring-neck nests were collected for shipment to the Delta Waterfowl Station; in three other instances the ultimate fate of the nests was not determined. The remaining 87 nests were kept under periodic observation until hatched or destroyed.

Based on this sample, hatching success for all species was determined as 63 per cent, considerably below the figure of the past two years. The combined success for the marsh-nesting species was 57 per cent as compared with 82 per cent for the hole-nesters. This condition reflects the excessive losses caused by the floods. High water apparently was directly or indirectly responsible for the majority of the nest losses this year. A number of nests were actually flooded. In several others - especially ring-necked ducks - the females built their nests up during incubation as the water rose, but this was done at the expense of stripping the nests of the surrounding cover; thus they were extremely vulnerable to predation from crows. The crow and the raccoon were the principle predators responsible for nest losses in 1951.

The Brood Season

Data from the brood season served to supplement the other phases of the seasonal study. The size of Class I broods was noticeably below that of last year - undoubtedly reflecting the poorer nesting season. Smaller clutches, due to renesting, were found; also more than the usual number of egg losses was noted even in successful nests. Some very late hatchings occurred and there were a few flightless young in the marshes even into October. On the other hand, based on complete counts from 61 Class III broods, juvenile mortality appeared lower than usual. Broods in this age group (approaching the flying stage) averaged 5.1 ducklings each - a figure closer than anticipated to that of the past two years (5.6 in 1950 and 5.7 in 1949). Thus, although fewer young were hatched this year a higher proportion of them appeared to reach the flying age. This situation probably can be attributed to the higher water level prevailing in the rearing marshes which made better brood cover. Although this is, of course, desirable, it comes nowhere near offsetting the overall lowered productivity resulting from excessive nest losses.

Summary and Conclusions

1. The status of breeding waterfowl in Maine at the start of the 1951 nesting season was improved for the fifth consecutive year. Appreciable increases were recorded for the two most numerous species, the ring-necked duck and the black duck. Hole-nesting ducks showed a decrease.
2. Excessive precipitation, with water levels near flood stage three times, resulted in nesting success being considerably lower than in 1950 for the marsh-nesting species.
3. Brood mortality apparently was somewhat lower this year as a result of the higher water levels.
4. Considering increased breeding populations but lowered nesting success for black ducks and ring-necks - with the reverse being true for the hole-nesting species - it is likely that the overall waterfowl productivity in Maine was about the same in 1951 as in 1950.

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During the coming quarter work on the waterfowl project will consist of obtaining fall migration data, and of conducting the annual hunter bag check studies in cooperation with the State Federal Aid personnel.

MISCELLANEOUS STUDIES

Snapping Turtle - Waterfowl relationships

A summary of previous work on this project, which is under Coulter's direction, appeared in the January-March quarterly report. Briefly, 104 of 122 specimens collected contained food. Twenty-six of these reptiles

were found to have fed upon birds, including ducks, grebes and rails.

Additional collecting was attempted during the past quarter by Coulter, assisted by Hyers and Nicholson. However, trapping success was very poor as compared to previous years. Only fifteen specimens were captured on two areas. At Corinna Stream, where 106 snapping turtles totaling 2103 pounds were collected in 1949 and 1950, 9 were taken this year. This represents a ratio of 1 turtle per 37 trap nights compared to a ratio of 1 per 3.8 trap nights in 1950. Success was no better at Plymouth Pond where 6 turtles were taken during 87 trap nights or a ratio of 1 per 14.5 trap nights.

As in past years the entire gastro-intestinal tracts were collected. These will be examined this winter.

During the quarter some information was gathered on the feeding habits of captive turtles. Data from field observations on the nesting habits of turtles were obtained along with additional information on distribution within the State.

#### Banding

The annual Unit banding program under Coulter's supervision was expanded considerably in 1951 over previous seasons. This was made possible by a special financial allotment from the Research Branch of the Fish and Wildlife Service and by personnel assistance through the courtesy of the Regional Office in Boston. New stations were opened in eastern Maine at Magurrewock Stream on the Moosehorn Refuge and on the St. Croix River. Part-time stations were in use at Corinna Stream in central Maine. The regular banding stations along the Penobscot River in north-central Maine were supplemented by the addition of several new ones.

In addition to this expansion, it was possible to begin trapping two weeks earlier than usual on the Penobscot River. At Corinna Stream banding began during mid-July and resulted in the capture of more locally reared birds than usual, many of them being flightless young.

At Corinna the banding program was conducted only on a part-time basis by graduate student William Nicholson in connection with his thesis studies on the area. A total of 100 birds was banded from mid-July until late August using from 1 to 3 traps.

The Penobscot River stations were operated full-time by Graduate Assistant Robert Hyers with the assistance of temporary labor. Using 12 to 15 traps these stations yielded 680 banded birds.

The banding in eastern Maine was conducted on a full-time basis as a cooperative venture with the Moosehorn National Wildlife Refuge. The refuge supplied floats, storage, camp facilities, part of the corn, and labor as required for moving traps and boats. Federal Game Management Agent W. B. White was detailed by the Regional Office to assist with the actual banding work.

At these stations 529 birds were banded. Of this total 119 were blue-winged teal, representing the first appreciable group of teal banded by the Unit. Of special interest was the capture of a few ring-necked ducks in conventional duck traps.

Brood drives during the summer were again attempted in an effort to band ring-necked ducks and goldeneyes - two species which have never been banded in appreciable numbers in Maine. Details of the methods employed were presented in the July-September, 1950 quarterly report. The work this season was conducted with the assistance of J. William Peppard, Project Leader of the State Federal Aid Program.

The drives were not successful. It was concluded that future drives should be conducted only under low or normal water conditions. High water this season made it very difficult to set the nets satisfactorily and to herd broods. Eight American goldeneyes and 4 ring-necked ducks were banded.

A breakdown of the total number of birds banded, including a few miscellaneous bandings of nesting females, is as follows:

Black Duck	766
Wood Duck	399
Blue-winged Teal	124
Green-winged Teal	1
Mallard	9
Pintail	2
Ring-necked Duck	10
Goldeneye	8
Hooded Merganser	3
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#### COOPERATION AND EDUCATIONAL WORK

The regular assistance was given by Unit personnel to the general public and to the State Warden Service in identifications, autopsies, and advice.

Quick conducted the wildlife courses at the undergraduate forestry and wildlife summer camp session.

Mendall and Coulter contributed their usual services as technical advisers to the State's Federal Aid program. Numerous conferences and inspection trips were made during the quarter in furtherance of this program. In this connection a new arrangement has been worked out between the State and University authorities whereby Quick, in addition to his regular University and Unit activities, is serving on a part-time basis as supervisor of some of the State's Pittman-Robertson research projects. State personnel involved on this new program are now housed at the University adjacent to the Unit quarters. The University provided office space and the Unit is furnishing laboratory, museum, and library facilities. The Unit is also giving technical assistance. This arrangement,

although adding considerably to the duties of the Unit personnel, should materially strengthen the programs of the respective organizations. State research projects which are now centered at the University include waterfowl, grouse, deer, and beaver.

PERSONNEL CHANGES

Graduate Student William R. Nicholson completed all studies leading to his Master's degree in September. Only the final write-up of his thesis remains to be finished. He has obtained a position as biologist with the Maryland Department of Game and Inland Fish and has been assigned to work on the waterfowl and muskrat projects there.

Respectfully submitted,



Howard L. Mendall, Leader  
Maine Cooperative Wildlife  
Research Unit

University of Maine  
Orono, Maine  
November 5, 1951

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(NOT FOR PUBLICATION)

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

October-December, 1951

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 - Prof. Robert I. Ashman  
Faculty Collaborator - Prof. Horace Quick  
Graduate Assistant - Robert D. Hyers  
Graduate Student - Frederick C. Dean  
Clerk - Maxine L. Horne

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

October-December, 1951

RESEARCH PROJECTS

MUSKRAT MANAGEMENT

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

Assignment: Malcolm W. Coulter, Assistant Leader

Previous quarterly reports have discussed the change in muskrat trapping regulations providing for an autumn season instead of the usual spring trapping period. The 1950 season was the first during which this change took effect. As a follow-up to last year's study, considerable time was again devoted to field work with muskrat trappers and in collecting data at fur houses. The objective of this phase of the investigation is to obtain information to compare with that previously accumulated during spring trapping.

Through the cooperation of personnel of the State's Federal Aid Division, coverage for some phases of study was more than doubled as compared with 1950. Federal Aid men contacted trappers who kept daily records of their trapping activities. Cooperating technicians were Robert Bacon, Dana Holmes, John Hunt, Wilbur Libby, Myron Smart, and Richard Parks. Data are available from 9 of the 13 counties where the season was open during November. Unit personnel likewise contacted trappers who kept daily records and also accompanied trappers on their lines, examined pelts at fur houses, and studied carcasses in the laboratory. Graduate students Hyers and Dean assisted Coulter with these phases of the work.

Trapping Conditions

November was a month of extremes in weather that made trapping difficult and uncomfortable. The unfavorable weather is reflected by remarks recorded by trappers in their daily reports by such statements as "high water and wind, 30 per cent of traps under water"; "cold, snow, freezing"; "water on river up 4 feet".

The season opened with a wet snow storm over much of the State which resulted in rapidly rising water levels on the second and third days. Many of the initial sets made when the season opened were ruined. A driving rain on November 7, followed by floods, further hampered muskrat trappers. Fairly warm weather prevailed from November 9 to 16 and afforded reasonably good trapping conditions. This was followed by freezing temperatures again. During this latter period most operations ceased, or if they were continued, the trapping was on a very minor scale.

The extremes in weather interfered with the efforts of all trappers, but those most seriously affected by fluctuating water were men working along rivers and streams. Those who concentrate in ponds and marshes sometimes benefit from rising water as this permits access to isolated potholes and sloughs generally unaccessible under average water levels.

However, the season as a whole did not afford many consecutive days of good trapping weather in any area.

#### Number of Trappers on Specific Areas

During the spring season it had been noted that individual trappers frequently shifted their endeavors to three or four areas before the season was over. Thus, little consideration was given to leaving ample breeders - each man trapped as "close" as possible with the thought that if he didn't get every muskrat, someone else would.

For 11 areas, from which complete data are available, about 18 trappers operated during 1950 and about 19 during 1951. By contrast, anywhere from 27 to 35 men had trapped these same areas each year during the three spring seasons (1946-1948) when such data were recorded.

As the figures show, fall trapping has greatly reduced much of the shifting from area to area. This has had one very desirable result. Those operators who do trap an area are generally desirous to leave sufficient breeding stock if they feel that some other trapper, who has already cropped his "home area", will not come in and remove the animals deliberately left for breeders.

#### Trapping Success

Good populations of muskrats were present in the marshes this fall and, in spite of poor weather, trapping success was good. Individual catches varied from 22 to 326 muskrats. Twenty-one cooperating trappers caught 3,072 muskrats, or an average of about 146 per trapper. This includes three men who did not trap intensively and who caught a combined total of only 85 animals.

Daily catches up to 64 animals were recorded. Several daily catches exceeding 50 muskrats were noted, generally by men using 200 to 300 traps.

The number of days that individuals trapped varied from 4 to 30 (the open season was 30 days), although the average number of trapping days per man was about 16. Among the 21 trappers for whom records are available, 2 trapped 4-5 days, 10 trapped 11-15 days, 4 trapped 16-20 days, 3 trapped 21-25 days and 2 trapped 26-30 days.

The total harvest was taken in a slightly shorter period than was the case last year. However, it should be emphasized that most men probably would have continued for several days had the weather been favorable.

#### Capture of Other Species

Previous Unit progress reports and publications have discussed the influence of spring muskrat trapping upon waterfowl, mink, and other species. In brief, 1 duck was taken accidentally, for every 13-21 muskrats (varying by years) caught during spring trapping.

During the fall of 1950, only 9 ducks were taken during the trapping of 1,010 muskrats, or about 1 duck per 121 muskrats. This season the ratio was even less; 31 ducks were caught while taking 3,072 muskrats, or 1 duck per 990 muskrats.

The greatly reduced incidence of duck captures is undoubtedly due in part to the fact that waterfowl left interior waters very early this season. Very few large flights were recorded inland during the muskrat season. Periodic aerial flights, conducted by State Federal Aid personnel, as well as the records of ground observers and hunters, showed a paucity of birds in inland waters, although quite favorable concentrations were present in Maine's numerous coastal bays.

Full-time muskrat trappers usually have little opportunity to trap mink intensively. Either type of trapping, to be successful, requires undivided effort. Occasional mink sets can be made along muskrat lines. Usually some mink are taken accidentally in muskrat sets. This season 18 mink were taken in muskrat traps during the kill of 3,072 muskrats. However, instead of being worthless, as they are in the spring, these animals add materially to the muskrat trapper's income. By way of comparison the kill of spring mink had varied from 1 per 67 to 1 per 81 muskrats.

Miscellaneous species recorded as accidental in muskrat traps in the sample included beaver (1-released), great blue herons (3), bittern (1), grebe (1), Norway rat (1), and raccoon (3).

#### Number of Kits

The number of kits was approximately the same as during the 1950 season and made up slightly under two per cent of the catch. Kits are regarded as those animals so young that little or no guard hair is present; the skin is thin and paper-like. These pelts sold for \$0.25 to \$0.45 each.

Actually, both the low percentage of kits and the over-all grading of fall muskrats has been somewhat surprising. An opportunity was afforded to record the grading of some lots. The grades are based upon the buyer's classification in each case. Buyers, of course, differ in their evaluation of a pelt, but the sample should give some indication of the quality of pelts in general. This information is as follows:

Total No. Pelts in lot	No. graded Large and Extra Large	Per cent
162	132	81.5
326	297	91.1
6096	5633	92.4
497	302	60.8
7081	6354	89.9

#### Pelt Damage

Pelt damage, resulting from cuts or wounds (not including damage from improper handling) was recorded in 10.7 per cent of 1,757 pelts examined. Damage varied from 2.9 per cent to 16.2 per cent for various areas. Most

of the damage was slight, that is, it resulted in holes less than one square inch in size and much of it was on the less valuable ventral side of the skin.

This represents slightly more damage than was recorded for the 1950 season (7.4 per cent - extremes ranged from 5.3 to 15.5 per cent). Some correlation appears evident between pelt damage, population trends, and late summer habitat conditions for specific localities.

By way of comparison, pelt damage during spring seasons had varied from 14 per cent during early April to around 40 per cent in late April. Much of the spring damage is believed to be associated with behavior during the breeding cycle.

#### Pelt Prices

As is usually the case, a noticeable spread in prices received by trappers was seen. Numerous factors govern the price the trapper receives including quality of pelts which varies noticeably from areas of unlike habitat, care in handling, time of sale, size of lot, and buyer. Some lots sold for as low as \$1.40; others brought as much as \$2.04 per pelt. The average price appeared to be between \$1.75 and \$1.80.

#### Productivity

Counts of placental scars or sites were attempted in the laboratory. Individual counts in 42 specimens ranged from 7 to 21 with an average of 12.5 per female. This is a decrease of 2.4 from the average recorded a year ago.

The ratio of subadult muskrats to adult females also may give some clue to over-all productivity. The ratio this season in a total sample of 2,107 animals was 1 female for 6.8 subadults. Thus 1.6 fewer young per female was noted this year than in 1950 when a sample of 1,808 muskrats had been examined. It is interesting to note that reproduction apparently decreased slightly as the population increased, although survival, as based upon scar counts and ratio of young at harvest time, was about the same for the two years.

#### Miscellaneous

Sex and age ratios were obtained for about 1,800 animals. The results are similar to those of 1950 in that a preponderance of males was shown. Seventy-four per cent of the total sample consisted of animals reared during the year.

Information, not completely tabulated as of this writing, indicates that muskrat trappers are making more money under fall trapping than they did in the spring. Mink trappers, who might be potential muskrat trappers as well, are losing money as they cannot effectively harvest two species at the same time. Additional details will be presented in the next quarterly report.

### Summary and Conclusions

1. Despite poor weather, trapping success was good during the fall of 1951, especially when compared with spring seasons. More muskrats probably would have been trapped had the weather been more favorable. It is believed the population could have safely withstood a somewhat larger harvest.

2. Fewer ducks were taken in muskrat traps than previously recorded in any season in Maine.

3. The proportion of kits was less than two per cent. From records of over 7,000 pelts, almost 90 per cent had been graded by buyers as large and extra large.

4. Pelt damage was slightly higher than last season, but still considerably less than during spring seasons.

5. Less shifting from area to area by trappers again resulted in more potential breeding stock being left in the marshes.

6. Prices paid to trappers ranged from \$1.40 to \$2.04 per pelt. The average was between \$1.75 to \$1.80.

### 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

The usual waterfowl field studies were conducted during the period of the fall migration and hunting season. Assistance was given by the other Unit staff members; the study was carried out in conjunction with the State Pittman-Robertson personnel who worked under the direction of waterfowl project leader J. William Peppard. Recently Mendall submitted a complete report on the season's findings and this is reproduced in full at this time.

## THE 1951 WATERFOWL HUNTING SEASON IN MAINE

### Waterfowl Populations

The population of waterfowl in Maine during the fall of 1951 was increased over that of a year ago. No great changes were noted in the status of most species, and four actually showed a decrease. However, the heavy increases recorded for the black duck and the bufflehead were very impressive. Not for many years have black ducks been as numerous in the coastal marshes and harbors and in Merrymeeting Bay as they were this fall. Buffleheads were more abundant than at anytime in the memory of the writer.

Unfortunately from the standpoint of an equitable distribution of hunting opportunities, the ducks were concentrated in a relatively small proportion of the State. Local birds left the inland breeding marshes very early - before the hunting season opened, in fact. Black ducks, ring-necks and teal largely had disappeared from a considerable portion of northern and eastern Maine by the first of October. Thus the coastal belt and the Merrymeeting Bay region held most of the waterfowl during the entire fall period.

The following listing is in no way a fall census of ducks. It merely represents the relative status of waterfowl as determined by ground checks at a few representative points and by extensive aerial checks made several times during the fall period. The breakdown by species, in comparison with 1950, of those on which sufficient data were gathered is as follows:

Increase - Black duck, bufflehead

No change - Canada Goose, wood duck, mallard, blue-winged teal, pintail, lesser scaup, goldeneye.

Decrease - Green-winged teal, ring-necked duck, greater scaup, ruddy

Surveys did not include the sea ducks, but general observations and reports of reliable individuals indicated a continuation of the high populations of eiders and old squaws. The scoters, especially white-winged scoters, appeared more numerous than a year ago.

### The Hunting Season

This was the fifth consecutive year that the sportsmen of Maine had requested a split season. This year the periods were October 5-22 and November 23-December 10. During this time personnel of the Maine Cooperative Wildlife Research Unit again joined with the Federal Aid Division of the State Department of Inland Fisheries and Game in making a bag check of duck hunters. Supervision of Unit personnel was by the writer, and the State technicians were under the direction of J. William Peppard, Waterfowl Project Leader. The following individuals participated: for the Maine Unit - Donald Collins, Malcolm Coulter, Frederick Dean, John Dudley, Norman Erickson, Robert Hyers, Blynn Merrill, Roger O'Claire, Horace Quick, and Howard Mendall; for the Federal Aid Division - Robert Bacon, Kenneth Hodgdon, Dana Holmes, W. Sidney Howe, John Hunt, Wilbur Libby, John Maasen, Jr., Richard Parks, Stephen Powell, and J. William Peppard.

All of the important waterfowl areas of the State were sampled, and coverage was believed more representative than in any previous year.

A total of 2,086 hunters was contacted. These hunters had killed 3,208 birds. An additional 56 birds from which hunting data could not be obtained were checked, making 3,264 specimens in all. This is the largest number of birds examined during the five years of conducting bag checks.

#### Hunting Success

Considering the State as a whole, and both the early and late periods, it was one of the best hunting seasons in several years. Water conditions were better than at any time in a decade. The weather was too warm and sunny during part of the October season but was still far more to the hunters' liking than a year ago. During the late period there were many days of perfect shooting weather.

Data on hunting success varied greatly throughout the State. The inland gunners of much of northern, north-central, and eastern Maine killed very few birds. By contrast hunters in the coastal belt and in Merrymeeting Bay had excellent shooting. In Merrymeeting Bay, in particular, hunting success was the highest ever recorded during the annual bag check studies. It even exceeded the figures for the early part of the 1949 season which had been hailed by Bay hunters as one of the best of recent years. The eastern Maine coastal section also produced exceptionally good October shooting.

During the late season, over-all hunting success dropped off slightly but throughout much of the coastal belt, good gunning was obtained. Considerable local variation occurred and, in general, hunting was much better along the east coast than it was west of Penobscot Bay.

Fewer hunters were in the field this year, possibly because 1950 had been such a poor season.

The compilation of the data on hunting success is presented in table 1.

Table 1 - 1951 Hunting Success

<u>Period</u>	<u>No. of Hunters</u>	<u>Man Days Hunted</u>	<u>Ducks Bagged</u>	<u>Kill per Man Day</u>
Oct. 5-22	1390	894	2141	2.4
Nov. 23-Dec. 10	696	501	1067	2.1
Both Periods	2086	1395	3208	2.3

By way of comparison hunting success a year ago was 1.8 in the early season, 1.3 in the late season, and 1.6 for the total.

Crippling Loss

An unfortunate phase of the hunting season was the high crippling loss. Figured on a basis of 2751 birds bagged, 785 others were lost as cripples. This loss amounts to 28.5 per cent - the highest figure reached in the five years of checking bags. Why it should be so high this year is not certain, but is likely to involve several factors. Water levels were higher in the inland marshes; thus more birds could be expected to drop in thick cover. Coastal storms were more prevalent during the late period and, with high seas running, hunters probably were more reluctant to attempt to retrieve birds dropped some distance from the blind. A third factor, however, is especially to be regretted but has been noted in other years - when birds are plentiful, some hunters refuse to exert themselves to go after distant cripples, feeling they will have other opportunities to fill the bag.

A certain amount of crippling loss is inevitable, but it is believed Maine hunters could materially reduce this figure if they would make a conscientious effort to retrieve every bird they drop.

Bag Composition

The tabulated kill by species of the ducks checked in the hunters' bags is presented in table 2. As in previous years, sea ducks are excluded because of the impossibility of obtaining a representative sample.

Table 2 - Kill by Species - 1951

(Exclusive of Sea Ducks)

Species	No. Checked Early Season	No. Checked Late Season	No. Checked Entire Period	Percent
Black Duck	1361	549	1910	58.5
Green-winged Teal	267	29	296	9.1
Goldeneye	13	228	241	7.4
Wood Duck	205	--	205	6.3
Blue-winged Teal	143	--	143	4.4
Bufflehead	2	139	141	4.3
Ring-necked Duck	69	4	73	2.2
Mergansers (3 species)	22	34	56	1.7
Greater Scaup	1	37	38	1.2
Mallard	32	8	40	1.2
Canada Goose	6	29	35	1.1
Pintail	27	2	29	0.9
Lesser Scaup	9	3	12	0.4
Baldpate	8	--	8	0.2
Mallard x Black Hybrid	3	5	8	0.2
Redhead	7	--	7	0.2
Ruddy Duck	6	--	6	0.2
Canvasback	2	--	2	0.05
Shoveller	1	--	1	0.05
Unidentified (*)	13	--	13	0.4
Totals	2197	1067	3264	100.0

(\*) Includes birds which were plucked and dressed when examined.

With a few exceptions the general pattern of the bag composition followed that of 1950. The black duck and the green-winged teal headed the list for the fourth consecutive year. However, the proportion of the bag occupied by the black duck (almost 59 per cent) was the highest recorded in five years. It was interesting to find that a relatively higher number of blacks was shot in the early season - 62 per cent of all the birds examined in October. In most years the highest proportion has been obtained during the late season.

For the majority of species, their place in the hunters' bag was in direct relation to their abundance. Thus black ducks and buffleheads, both materially increased in numbers over 1950, were shot in greatly increased proportions. Similarly, the green-winged teal, ring-necked duck, ruddy, and the scaups showed population decreases and were found in diminished numbers in the hunters' bags. The poor status of the lesser scaup was expected, but the decrease of greater scaup was a disappointment to many coastal hunters who count heavily on December "bluebill" shooting. Good numbers of these birds were present in a few localities, notably Frenchman's Bay, but over the State as a whole they were scarce.

#### Sex and Age Ratios

Of 3,264 birds examined, a total of 2,100 were sexed and aged. These data are presented for the leading species in tables 3,4, and 5.

In reports of previous years it has been explained that conditions during the early season in Merrymeeting Bay are considerably different from the remainder of the State (the Bay is a concentration area for adult birds). Therefore separate tabulations are presented. Explanations have also been made in previous reports of the many complicating factors to an interpretation of Maine sex and age data. It seems unnecessary to repeat these detailed discussions at this time.

Information from table 3 indicates a slightly less satisfactory adult-immature ratio this year of birds shot in October, particularly in the case of the black duck. This was expected, however, for the 1951 breeding season was less successful than 1950 and consequently fewer young birds were available. Nevertheless the proportion of adults and immature birds was not far from a desirable ratio. (In dealing with resident birds it is assumed that the killing of twice as many young as adults indicates a relatively good breeding season and a normal age class harvest.) The sex ratio is believed to be reasonably satisfactory.

The Merrymeeting Bay data, as shown in table 4, were much more encouraging than the figures of last year. Although an undue proportion of adults was taken, the discrepancy in the case of the black duck (most of which are believed to be "native" birds) was not nearly as great as in 1950.

Data from table 5 may have no real significance. As explained in reports of past years, there is little evidence to show the breeding areas that supply the waterfowl shot during the late season. In all probability very few of these are raised in Maine, and their origin is unknown. Consequently, the sex and age composition of the bag cannot be analyzed on a yearly basis. However, it was a great surprise to find the distorted ratios, with respect to both sex and age. Why two thirds of all birds examined in the late season were males, running so heavily to adults, is an interesting but unanswered question.

Table 3 - October Season - 1951

Maine - Exclusive of Merrymeeting Bay  
(Leading Species Only)

Species	Ad. ♂	Ad. ♀	Im. ♂	Im. ♀	Misc.*	Ad.-Im.	Sex Ratio	Total
						Ratio	Male-Female	
Black Duck	84	47	119	99	221	1:1.7	58:42	570
Wood Duck	26	26	40	22	70	1:1.2	58:42	184
Green-winged Teal	10	4	31	27	27	1:4.1	57:43	99
Ring-necked Duck	3	8	18	22	9	1:3.6	41:59	60
Totals (17 species)	134	89	232	199	377	1:1.9	56:44	1031

Table 4 - October Season - 1951

Merrymeeting Bay  
(Leading Species Only)

Species	Ad. ♂	Ad. ♀	Im. ♂	Im. ♀	Misc.*	Ad.-Im.	Sex Ratio	Total
						Ratio	Male-Female	
Black Duck	151	112	114	130	242	1:0.9	52:48	749
Green-winged Teal	39	20	25	18	61	1:0.7	63:37	163
Blue-winged Teal	8	8	24	24	34	1:3.0	50:50	98
Totals (16 species)	225	158	185	189	353	1:1.0	54:46	1110

Table 5 - Late Season - Statewide - 1951

(Leading Species Only)

Species	Ad. ♂	Ad. ♀	Im. ♂	Im. ♀	Misc.*	Ad.-Im.	Sex Ratio	Total
						Ratio	Male-Female	
Black Duck	168	80	77	49	175	1:0.5	65:35	549
Goldeneye	32	13	16	18	149	1:0.8	60:40	228
Bufflehead	27	5	16	16	75	1:1.0	67:33	139
Totals (14 species)	278	117	145	93	434	1:0.6	67:33	1067

\*Birds recorded by species but not sexed or aged.

### Time of the Hunting Season

For five years Maine duck hunters, after much discussion, have selected a split season. Each year the controversy has increased as individual hunters and groups of hunters have been satisfied or disappointed, as the case might be, with their own shooting endeavors. It is safe to predict that the argument will be continued this coming spring, but for different reasons than a year ago. In 1950, there was universal disappointment throughout the State. By contrast, this year finds the gunners divided into two groups - those who enjoyed unexpectedly good shooting, and those who found the season even worse than in 1950. The former group will undoubtedly press for a straight season to occur at the time when they had the best shooting this year; the latter group will want something entirely different from what was in effect in 1951!

In an attempt to view the situation objectively, the writer can only re-affirm his statements of a year ago with regard to seasons. Unless the waterfowl situation is sufficiently improved as to permit a considerable relaxation of regulations, then the split season is the only type of season that will be fair to the majority of Maine hunters. The State is too diversified climatically and geographically for any straight season that does not approach two months in length. It is difficult to imagine a 40 day season, for example, that would satisfy such varied groups of gunners as those of inland Arcostook and Washington Counties, Merrymeeting Bay, and the coastal areas. In the writer's opinion no satisfactory period of that length could possibly be established. The split season, then, would seem to be the only answer. This will curtail the number of days when it would be possible to hunt, but any real gunner would certainly prefer a couple of weeks of good shooting when birds are present in his own area to a month or six weeks of hunting the empty marshes.

As for time of opening dates of a split season, the late period this year could hardly have been any better had the coastal gunners known in advance when the waterfowl flights would occur. The November 23-December 10 season coincided almost exactly with the late flights, the winter concentrations, and with the freeze-up. If the season had opened a week earlier many birds would not have been present; had it been any later all of the salt marshes and most of the in-shore coastal bays would have been frozen.

The early split season (October 5-22) presents a different situation. As already pointed out, Merrymeeting Bay and the eastern coastal belt - both fresh water and tide water areas - were afforded superb shooting. However, many inland areas throughout the entire northern half of Maine had very little shooting at any time in 1951. The majority of the birds had left these waters by early October. This cannot be explained on a basis of exceptional waterfowl flight patterns in 1951. An examination of past records show that in the five years of bag check studies, this northern area as a whole has had only one good gunning season - 1948.

### Conclusions

1. The 1951 populations of waterfowl in Maine during the fall were improved over 1950. Heavy increases were recorded for the black duck and bufflehead.

2. Because of increased numbers of birds and more favorable weather conditions, hunting success was very high, except in the inland marshes of the northern half of the State.

3. Black ducks made up a higher proportion (62 per cent) of the early season bag than has been noted in the five years of conducting bag checks. Other species of most importance in the October season were green-winged teal, wood duck, blue-winged teal, and ring-necked duck, in that order.

4. Only 3 ducks, the black duck, goldeneye, and bufflehead, were taken in significant numbers during the late season. All other species trailed far behind these three.

5. Considering both seasons as a whole, the black duck and green-winged teal constituted the two most important species to Maine hunters, for the fourth consecutive year.

6. Sex and age ratios of birds killed in Maine were less satisfactory, from a biological standpoint, than a year ago; an improvement was noted, however, in the Merrymeeting Bay situation.

7. Considering all aspects of Maine hunting, it appears that a split season will be the most satisfactory regulation that can be accorded, as long as present restricted seasons are deemed necessary.

COOPERATION AND EDUCATIONAL WORK

Considerable assistance was given by Unit personnel to the general public and to the State Warden Service in identifications, autopsies, and advice.

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

An additional seminar, restricted to the graduate student level, was instigated this fall. It is conducted by the Unit staff.

Mendall and Coulter continued to serve as technical advisers to the State Pittman-Robertson program. Quick devoted much time to the new set-up whereby he is supervising work of the research section of the P-R division located at the University.

Several speaking engagements were given during the quarter by Unit personnel to sportsmen's and civic groups.

Respectfully submitted,

*Howard L. Mendall*

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University of Maine  
Orono, Maine  
January 21, 1952