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MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

January-March, 1962

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  
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University Representative - Prof. Robert I. Ashman  
Faculty Collaborator - Prof. Horace Quick  
Graduate Assistant - Robert D. Hyers  
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MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

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RESEARCH PROJECTS

MUSKRAT MANAGEMENT

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

Assignment: Malcolm W. Coulter, Assistant Leader

In the last quarterly report Coulter discussed some aspects of the fall trapping season and presented preliminary comparisons of data obtained during spring and fall trapping. During the current quarter, he completed tabulation of this information and wrote up the essential features as a paper for presentation at the Northeastern Wildlife Conference in West Virginia. The paper is reproduced in full at this time.

The muskrat study is now considered to be completed as a major Unit project. Considerable data still remain to be tabulated and analyzed and it is anticipated that one or more publications will result.

A COMPARISON OF SPRING AND AUTUMN MUSKRAT TRAPPING  
IN MAINE\*

By

Malcolm W. Coulter  
Maine Cooperative Wildlife Research Unit

The season for trapping muskrats (Ondatra zibethica zibethica) in Maine has changed frequently between spring and fall during the past decade. Winter trapping has been considered, but does not appear feasible under Maine conditions. In some years spring trapping was permitted; at other times combinations of fall and spring seasons were in effect, and, more recently an autumn season only was provided by the State Legislature. An opportunity was thereby presented to study the biological and economic aspects of both spring and fall trapping.

These frequent changes in the regulations have been the result of varied opinions among trappers as to when muskrats should be harvested. The trappers are split into two distinct groups in their thinking; their reasons for advocating their choice of a season are many, but may be condensed and listed as follows:

In favor of spring trapping --

1. Spring pelts are fully prime and command top prices.
2. Spring trapping does not result in over-harvesting.
3. Early spring is otherwise a slack period for most trappers and outdoorsmen.
4. The weather is much more favorable during spring trapping.

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\* Contribution from the Maine Cooperative Wildlife Research Unit, Orono, Maine; Maine Department of Inland Fisheries and Game, University of Maine, Wildlife Management Institute, and U. S. Fish and Wildlife Service, cooperating.

The data for the period 1946 to 1948 were collected in part by former Assistant Leader Jay S. Gashwiler; some phases of that work have been previously published in detail. Thanks are herewith expressed to Howard L. Mendall, Unit Leader, for assistance and suggestions, and to several members of the State P-R Division, students, State Game Wardens, trappers and fur buyers for assistance in collecting field data.

In favor of fall trapping ---

1. Increased catches, possible during autumn, will offset the lower value of pelts.
2. Muskrats should be harvested before the critical winter period.
3. The accidental kill of mink (Mustela vison) in spring muskrat trapping is excessive.
4. Fall trapping does not conflict with the reproductive season for muskrats.

Various other arguments were advanced, but the above constitute the points around which most groups center their discussions. It is evident that factors other than muskrats influence the picture.

Before discussing this study, it may be well to point out that the annual reported take of muskrats has ranged from 12 thousand to 42 thousand since 1934. In view of the 2,000 or more square miles of inland water, and bog or swamp that any standard atlas will list for Maine, in addition to countless unmapped beaver flowages, the annual take would indeed seem low. However, much of this area consists of deep, rocky lakes and unproductive sphagnum bogs. The marshes are typical acid sedge-meadows for the most part, and are not capable of supporting the high muskrat populations characteristic of inland bulrush or cattail marshes in the more fertile sections of the northeast. The streams and rivers are the highways for transporting wood products as well as a source of power for mills and hydro-electric companies. The seasonal usage by these interests results in great fluctuations of water levels, not conducive to high muskrat populations.

While the beaver (Castor canadensis) is by far the leading furbearer, the muskrat usually ranks second in economic importance to Maine trappers. Occasionally it is exceeded in value by the mink. From trappers' reports we know that at least fifteen hundred men generally participate in the annual

muskrat harvest.

Study of the trapping seasons began in 1946 and was carried out concurrently with an investigation of the life history and ecology of the muskrat in Maine. The data are based largely upon intensive field studies. Of the study methods in this portion of the investigation, that of accompanying trappers over their lines was the most productive. In some instances it has been possible to work with the same men on the same areas for several consecutive years. During the later phases of the study other trappers cooperated by keeping detailed daily accounts of their muskrat trapping activities. These were kept on previously prepared forms and were attached to a manila folder. It was found that provision of a form in some sort of a booklet increased the chances that the data would be recorded and that the forms would not be lost, soiled or discarded. Using these methods and by working closely with the men, it was possible to gather detailed information from 6 to 23 trappers each season. General information from many more trappers was also recorded each year. Some laboratory work was necessary in connection with studies of reproduction, mortality, and pelt primeness.

Spring trapping began on a major scale when the ice left the waterways even though the legal opening might be earlier than the ice out date. At this season muskrats wander more extensively than at any other period. Recoveries of tagged individuals indicate that dispersals from 1/2 to 3 miles are common. Logs, and other objects protruding above the water are used by muskrats much more frequently than in the fall. Therefore, trapping methods are adapted to these conditions. Eighty to 90 per cent of all sets are made on logs, planks, stumps, or artificial floats. Trappers depend upon making large numbers of sets and attempt to trap every object upon which a muskrat has climbed, or is likely to use.

Since streams and rivers are ice free before the marshes and larger lakes, trappers concentrate at these places first. They rapidly move into the other areas as the season progresses. The density of trappers, and of traps, is very high. In some places it was possible to count 100 to 150 traps along a mile of stream. Even higher concentrations were occasionally recorded along the more productive reaches of shoreline.

Under these conditions and methods the harvest was accomplished in a short period (Table 1). About 90 per cent of the total catch was made in the first 10 or 12 days. During 1949, 94.6 per cent of the catch of nine trappers was made in 10 days or less. In 1948 one trapper took three-fourths of his season's catch in the first five days. This means that during the remaining 10 to 30 days only a small part of the trapper's total harvest was made, yet that often represented what should have been left as breeding stock.

The long season encouraged trappers to shift from area to area; this practice also increased competition and stimulated over-trapping. Since it was possible to harvest the bulk of the crop in a few days, there was a tendency for many to attempt to harvest several areas, most of which already had been trapped or were in the process of being trapped. For example, at 11 areas from which data are available a total of from 27 to 35 men trapped for varying periods during years of spring trapping.

Fall trapping presents an entirely different problem. Muskrats are fairly well established by November and are repairing houses and dens. Feed beds, or feeding platforms, are used frequently. Most sets are made at these stations which consist of floating mats of vegetation accumulated from previous feeding activity. Freezing weather or changes in water levels render many sets useless. It took longer to harvest the crop, not only because of muskrat activity and weather, but also because many more animals

were present. Usually about 70 per cent of the total harvest was taken by the 10th or 12th day and trappers often made good catches as long as they were able to trap. During the two years of fall trapping, weather, rather than decreasing catches, was often the reason that men stopped trapping by the 20th to 24th day of the 30-day season.

There was little opportunity to crop one area and move to the next in the fall. At the same 11 areas referred to above only 18 to 19 trappers were present. Few trappers visited other areas. Trappers were thereby able to leave breeders without the fear that some other person was likely to begin trapping and remove the breeding stock.

Mortality to other species was higher in the spring (Gashwiler, 1948 and 1949). One loss that reached serious proportions was the accidental kill of mink - mink have worthless polts at this season, and represent breeding animals left from the usual November trapping season. With large numbers of traps covering almost every object throughout the waterways, it is impossible to prevent this loss. During the 1946 spring season, one mink was caught for every 67 muskrats; in 1947 the ratio was 1 mink per 81 muskrats. The estimated accidental kill of mink in the spring of 1947 was 22 per cent of the harvest taken during the legal open season in the fall.

Fall muskrat trapping, which coincided with the mink season, resulted in a lesser number of accidental captures of mink, probably because of the type of muskrat sets used. However, those that are killed in the fall add to the muskrat trapper's income. Twenty-two trappers caught 18 mink, accidentally, while in the process of taking over 3,000 muskrats, or a ratio of about one mink per 166 muskrats.

It is to be expected that waterfowl will suffer varying degrees of mortality from muskrat trapping. In the spring the migration peaks for some species occur during the trapping season in late March or April.

Unfortunately, some ducks, especially the surface feeding species, make frequent use of logs and stumps for loafing and preening sites; those same objects are favorite muskrat trap sites. Data recorded during three spring seasons show that an average of one duck was taken for every 11 muskrats; the ratio varied from one duck per 8.4 muskrats to one duck per 13 muskrats. Estimated conservatively on a state-wide basis these data indicate a total accidental waterfowl catch of 1,000 to 3,600 ducks. About half of these are released with various injuries; the remainder are killed by the traps. Over 40 per cent of the birds are black ducks (Anas rubripes) with wood ducks (Aix sponsa) and teal (Anas spp.) occupying second and third places. These birds have successfully evaded the gunner, survived the winter and are about to nest. As a matter of fact, autopsies revealed that some black ducks contained well formed eggs that would have been laid within a matter of days.

Waterfowl mortality has been much less during fall trapping. Two reasons probably account for this. First, by November most ducks, and especially the surface feeding group, have left the inland waters in Maine. Second, ducks do not make frequent use of the wet, half-floating muskrat feeding platforms. During the fall of 1950 only 9 ducks were taken during the trapping of over 1,000 muskrats; in 1951 31 ducks were caught while taking about 3,000 muskrats. Thus, for comparison, while one duck was caught per 8 to 13 muskrats during various years in the spring, the fall ratios were only one duck to 121 one year and one duck per 99 muskrats the next year.

Other species are taken in muskrat traps, especially beaver, raccoon (Procyon lotor), and aquatic birds. The frequency of mortality of these animals is much less than that for mink or waterfowl. However, in all cases the loss has been greatest during the spring.



Criticism that the spring season takes muskrats during their breeding season is justified. About 9 per cent of all female muskrats trapped in April contain embryos visible by gross examination. The percentage rises rapidly after mid-April (Gashwiler, 1950). During three years when trapping extended into May, litters were found in houses before the trapping season was over. Evidence at hand indicates that, in Maine, muskrats begin their first breeding cycle in late March and April. Some early litters are occasionally produced in April, but generally not until early May.

There is of course no question concerning the superior quality of muskrats caught in the spring. They are fully prime, slightly larger, and possess the best quality leather. Records from the sale of pelts taken in the State indicate that fall pelts bring from 10 to 30 per cent less. Sometimes the prices are quite close - in other seasons the difference is greater, apparently depending upon the demands of the fur market.

However, the assertion that a large proportion of fall-trapped animals are kits is not borne out by the data. In a sample of 10,589 pelts, slightly under two per cent were graded by fur buyers as kits.

Pelt damage, resulting from fighting among the animals, is greater in the spring. In early April, 15 per cent of the pelts may show some damage; by late April about 40 per cent are damaged. This agrees with other studies in New York (Kellogg, 1947) and in South Dakota (Aldous, 1947). Fall damage ranged from 2.9 per cent to 16.2 per cent in individual lots, but for 1950 averaged 7.4 per cent, and for 1951 10.7 per cent. Samples each year exceeded 1,000 pelts. In analyzing pelt damage for specific areas there is some correlation between pelt damage in the fall and population densities.

A logical question at this point might be: What is the comparative economic return under the two systems of trapping?

This has been one of the more difficult phases of the study to evaluate. Few trappers keep records. Not many are willing to divulge details concerning their total income, especially immediately after the season when their information would be the most accurate. However, for eight areas it has been possible to maintain a fairly complete record for five years. These data indicate that despite the lower value of fall pelts, the total return has been higher in the autumn (Table 2). During three spring trapping periods the value of the catch varied from \$1,311.04 to \$1,666.50. The return during each of two fall seasons was \$1,759.50 and \$2,292.00. The total value of pelts during the year of maximum income under spring trapping was \$93.00 less than that for the year of minimum income during autumn trapping. The spread between the two highest years of spring and fall trapping was \$626.00. These figures are for the muskrat crop only. They do not include the return from other furs taken in muskrat traps during the fall when they can be marketed.

The greatest increase in the catch has been on the larger rivers. Extreme water level fluctuations are common on the rivers. On these areas muskrat houses are numerous during late autumn. By mid or late December they have been washed away and the animals must resort to dens. Mid-winter fluctuations cause additional shifting by muskrats and the resulting mortality is high. The catch has increased as much as 145 per cent by harvesting prior to this critical winter period. Smaller ponds and marshes, which are generally more stable muskrat habitat, have also shown noticeable increases in the total catch during the autumn harvest.

The higher income from muskrats during the fall has been further augmented by the catch of other marketable furs along the muskrat trap line. Mink, for example, taken accidentally in the spring add little or nothing to the trapper's return. During the fall they represent a welcome

addition to his profits. The economic return may be further illustrated by presenting the actual income over a five-year period for one case that follows the general trend so far as the full time trapper is concerned (Table 3).

The trapper operated on a full time basis each season. Three years of spring muskrat trapping grossed from \$280.50 to \$544.20 per year. Trapping took place on several areas.

During the first autumn season his earnings from muskrats were \$594.00, or \$49.80 higher than his income for his best spring season. But in addition, he took enough mink and raccoon on his muskrat line to increase his income to \$911.50. He earned \$367.30 more than he did in any one year of spring trapping; also, instead of operating in several areas, his trapping was confined to one area. For the second year's harvest in the autumn he received \$604.25 for muskrats, and a total of \$855.00 for all fur taken during the month of November. Thus, three years of April trapping resulted in 435 muskrats worth \$1,192.70, and two years of November trapping netted 622 muskrats valued at \$1,198.25 in addition to the pelts of other valuable species.

Not all trappers have benefited in this manner. Those who specialize in mink trapping during November are losing the opportunity for part of their annual fur income. A man who specializes in mink, and may catch from 25 to 40 in a season, cannot effectively trap muskrats at the same time. Under spring muskrat trapping he can harvest mink in November and concentrate on muskrats in April. Actually, however, the number of full time mink trappers is comparatively small. Some feel that mink trappers will ultimately benefit by the elimination of mortality to mink in the spring. This is a theoretical aspect that will be difficult to measure.

### Summary

A study covering three years of spring muskrat trapping and two years of fall trapping indicates that:

1. The harvest is made in a short period during the spring. Because of this and also because of differences in ice clearing dates in various types of habitat, trapping is concentrated and trappers frequently shift from area to area.

2. The resulting excessive competition destroys the incentive to leave breeding stock.

3. Spring trapping resulted in much higher mortality to mink, waterfowl and other wildlife.

4. The first reproductive cycle of the muskrat coincided with the spring trapping period.

5. During fall trapping, a longer period is required to make the harvest because of higher muskrat populations and weather conditions. The result is less shifting of trappers and decreased competition. More breeding stock is left.

6. Higher annual catches were made on specific areas during fall trapping. The greatest increases were on areas where winter habitat conditions were very unstable.

7. Fall pelts were less valuable than spring pelts, but because of larger harvests, the monetary return from 8 areas was higher in the fall.

Table 1

Percentage of Total Catch Taken in Ten Days or Less

Year	No. Trappers	Catch First 10 Days or Less	Per Cent	Total Catch For Season
<u>Spring Trapping</u>				
1947*	5	224	72.0	311
1948	6	233	96.2	242
1949	<u>9</u>	<u>424</u>	<u>94.6</u>	<u>448</u>
Total	20	881	88.0	1001
<u>Fall Trapping</u>				
1950	7	465	70.9	655
1951	<u>13</u>	<u>1589</u>	<u>71.8</u>	<u>2213</u>
Total	20	2054	71.6	2868

\*Unusually late spring.

Table 2

Value of Annual Catch for Eight Areas from 1946 to 1951

Area	Spring Trapping				Fall Trapping			
	1946		1947		1948		1950	
	Total Catch	Value (3)	Total Catch	Value	Total Catch	Value	Total Catch	Value
Large Marsh	146	\$ 401.50	67	\$ 182.24	74	\$ 212.38	115	\$ 195.50
Large Marsh	82	225.50	53	144.16	44	126.28	100	170.00
Pond	3	8.25	16	43.52	26	74.62	68	115.60
River (slow)	(250)	687.50	(250)	680.00	(250)	717.50	525	892.50
Pond	50	137.50	23	62.56	21	60.27	80	136.00
Combination Pond and Beaver flowage	23	63.25	21	57.12	1	2.87	58	98.60
Pond	(12)	33.00	(12)	32.64	(12)	34.44	No Data	
River (fast)	(40)	110.00	(40)	108.80	(40)	114.80	89	151.30
Totals	606	\$1,666.50	482	\$1,311.04	468	\$1,343.16	1035+	\$1,759.50+
							1310+	\$2,292.50+

(1) Parentheses indicate approximate figures

(2) Unable to obtain complete data

(3) Value calculated by using average price for season

Table 3

Example of Trapper Income from  
Muskrat Trapping 1947-1951

(An actual record from one trapper who traps full time each season)

Year	Muskrat Catch	Income Received	Other fur taken during muskrat season	Total Income for muskrat season	Number areas trapped
<u>Spring Trapping</u>					
1947	196	\$544.20	None	\$544.20	Several
1948	137	368.00	None	368.00	Several
1949	102	280.50	None	280.50	Several
<u>Fall Trapping</u>					
1950	303	594.00	11 mink 7 coon \$317.50	911.50	One
1951	319	604.25	11 mink 4 coon \$250.75	855.00	One

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Aldous, Shaler E.

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Gashwiler, Jay S.

1948. Maine muskrat investigations. Bull. Maine Dept. Inland  
Fisheries and Game, Augusta, Maine. 1-38 pp.
1949. The effect of spring muskrat trapping on waterfowl in Maine.  
Jour. Wildlife Mgt., 13(2):183-188.
1950. A study of the reproductive capacity of Maine muskrats.  
Jour. Mamm., 31(2):180-185.

Kellog, Charles E.

1947. Muskrat pelts: sectional and seasonal effects on grades.  
Jour. Wildlife Mgt., 11(2):153-161.



### 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

During the quarter Hyers completed all field work on this study. He is now engaged in writing his thesis, which will be summarized in the next quarterly report.

### ECOLOGY OF AQUATIC PLANTS

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

Dean has now completed this study and is preparing his thesis. This will be summarized in the next quarterly report.

### RUFFED GROUSE MANAGEMENT

Sub-project: Cover requirements and populations

Objectives: To determine preferred cover types and population densities.

Assignment: Howard L. Mendall, Leader

Due to pressure of other duties, the winter grouse studies were curtailed this year. Mendall made a few checks, however, on those areas which have been maintained for a considerable period of time, in order that there might not be a complete gap in comparative annual data. Most of the checks were made in Penobscot, Piscataquis, and Somerset Counties.

The winter produced about average temperatures, but precipitation was considerably above average with heavier snowfall than for many years. Most of the snow came in December and February. Considerable rain and sleet occurred in January.

In spite of severe storms and excessive snow depth, particularly in February, no evidence was found that grouse were suffering more than normal winter losses. Most of the snow was of a dry type. Even though several ice storms occurred in January, each was of very short duration and probably had little effect on the birds.

An unusual instance of mortality was noted near the coast in Hancock County with the finding of five dead grouse by wood cutters within a relatively small tract of woodland. Two of the birds were sent to the Unit for autopsy and were found to have died from mechanical injury - presumably from flying into obstructions. This is unusual among grouse at this time of year (January). A possible explanation might lie in the fact that a very dense coastal fog prevailed at the time. Since the crops of both birds were filled with buds, the combination of gathering darkness and fog may have been responsible for death as the grouse flew from their "budding trees" to cover at the close of their evening feeding.

Population checks showed few changes from a year ago in the areas covered, with relatively good numbers of birds.

#### WATERFOWL DISTRIBUTION AND MANAGEMENT

Sub-project: The American Goldeneye in Central New Brunswick

Objectives: To conduct a general life history study with the aim of determining specific phases that might be applicable in a management plan for the species.

Assignment: Brian C. Carter, Graduate Student

During the winter Carter completed his thesis under the above title and was given the oral examination. His work at the Unit is now finished and he will receive the M. S. degree at the June Commencement. He is employed by the Northeastern Wildlife Station at Fredericton, New Brunswick. Carter's thesis summary is as follows:

A study of the American goldeneye (Bucephala clangula americana, Bonaparte) in central New Brunswick was made over a five year period, 1946 to 1950, and was carried out in conjunction with a black duck study. The goldeneye is present on the study area from March until December.

The species is widely distributed. During the spring and summer months, it is found in parts of all ten Provinces of Canada and parts of all the northeastern, north mid-western, and the northern Pacific States. It may be found also in some of the treeless areas of the northern portions of the continent. In the winter, goldeneyes are concentrated on the eastern coast from Labrador to as far south as North Carolina, and on the western coast from the Alaskan Peninsula south to northern California. They also frequent the ice-free waters adjacent to these coasts and the Great Lakes.

Throughout the year, goldeneyes are predominantly animal feeders as are most of the diving ducks. Only in the spring and early fall did the amount of vegetable food exceed that of animal food. The highest amount of animal food was consumed in July.

A 32,500 acre area on the estuary of the Saint John River was used for the detailed work of this study. This area includes lakes, river islands, marshes, cultivated lands, creeks, sloughs, and the main river itself. The area is flooded annually to a depth of about ten feet.

Goldeneyes arrived on the area about the end of March, by the third week of April the peak of the northward migration had arrived. After this date the number declined until only the residents remained. Seventy-nine per cent of the goldeneyes were paired on arrival, but this percentage decreased as immature, unpaired birds arrived. The sex ratio during the spring flight was 160 males to 100 females.

The drake goldeneye did not appear to establish a true territory but rather a waiting area.

Goldeneye nests are found in cavities of rotten trees, or in holes excavated by woodpeckers. Other nesting sites are unused chimneys, deserted buildings and the occasional nesting box. In special circumstances, such as the far north, it will apparently nest on the ground.

Completed clutches observed on the study area averaged nine eggs per clutch. Infertility accounted for 3.6 per cent of all the eggs found.

After hatching the ducklings spent the first week in the vicinity of the nest; later they were found along the shores of the larger bodies of water where the emergent vegetation provided cover.

The first goldeneye broods appeared on the study area about the third week in May and few were seen after the second week in August. The average brood size for 1945 to 1950 is for Class I ducklings 6.2; for Class II 4.7; and for Class III 4.8. From the age of one week to attaining flight, there was a reduction in brood size of 22.5 per cent: the total loss from the time that the successful clutch was completed until the brood was flying was 47 per cent. The data indicate that young goldeneyes were 50 to 65 days old when flight was attained.

About the beginning of the brood season, the drakes left the females and gathered in small flocks to moult. The females did not moult until later when most of the broods were a-wing.

The goldeneyes were late fall migrants and stayed on the study area until the ice drove them out. The general direction of their migration was southward and southeastward and from the inland waters to the coast.

The average for 1946 to 1950 showed that goldeneyes made up 19 per cent of the hunters' bag in central New Brunswick. Of this 19 per cent, 32 per cent were adults and 60 per cent were males.

An annual census of the study area were carried out in order to obtain a species trend from year to year. This census showed that the goldeneye population reached a peak in 1947, declined to 1949 and recovered slightly in 1950.

The annual productivity of the study area was low. One goldeneye at flying age was produced for every 43 acres of breeding habitat.

Factors which appear to limit in varying degrees the goldeneye population of the study area were hunting, accidents, predation, and parasites.

Recommendations for future studies that may be of aid in management of the goldeneye include: a banding program to determine much needed migration data; a study to determine whether the number and condition of the natural cavities constitute a limiting factor in the number of nesting pairs; an intensive food habits study particularly on freshwater habitats; a predation study with special emphasis on brood losses; a study of nest losses; more research on the life history of the species; and hunter bag checks.

#### MISCELLANEOUS STUDIES

##### FISHER STUDY (Under the Supervision of Assistant Leader Coulter)

Earlier work with the fisher has been discussed in previous quarterly reports. Since the last open season in January 1950, nine additional carcasses have been submitted to the Unit laboratory for examination. These specimens were from animals taken accidentally in sets for other species. To date a total of 60 specimens has been examined.

Several days of intensive field work during March in three townships in northern Somerset and Piscataquis counties yielded some very interesting observations on hunting habits, utilization of kills, abundance, and habitat preferences. Several coats were also collected.

It appeared from the observations made that the animals deliberately sought red and flying squirrels as food. On several occasions fisher passed through thickets where snowshoe hare were present, but there was no sign that any attempt had been made to pursue them. However, in areas where fresh squirrel sign was abundant, evidence of increased hunting activity was found. Old root systems, hollow trees, and stumps were carefully investigated. At kills of squirrels, the fisher had consumed the entire prey except portions of the intestine and the last inch or so of the tail.

In general, hunting was conducted in rather dense stands consisting of spruce, fir and northern hardwoods. The animals frequently crossed open hardwood ridges, but rarely hunted in those areas. It is interesting to note that fisher were as numerous in areas that were heavily cut over 10 or 15 years ago as they were in older stands of timber.

Based upon limited field work, reports from State Game Wardens and trappers, and reports from other technicians, a relatively high fisher population exists in northern and northwestern Maine. In some parts of the Russell Pond study area, fisher tracks were recorded as frequently as one per mile. In north-central Maine fisher sign is generally common. One farmer caught four behind his barn while attempting to trap porcupines. In Aroostook County, Federal Aid technicians conducting a game inventory there have recorded fisher in many areas. It is not uncommon to hear older trappers and guides state that more fisher sign is now present than at any time within their memory.

#### COOPERATION AND EDUCATIONAL WORK

Unit personnel continued to serve as technical advisers to the State Pittman-Robertson program.

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

A total of 32 speaking engagements were taken during the late fall and winter season by Unit personnel. These were divided as follows: Coulter - 16, Mendall - 8, Quick - 6, and Hyers - 2.

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

Mendall attended the North American Wildlife Conference and annual Unit Leaders' Meetings in Miami, Florida. Coulter attended the Northeastern Wildlife Conference in Jackson's Mill, West Virginia. He delivered a paper at this conference and also served as a member of the fur-bearer discussion panel.

#### PUBLICATIONS

Recent Unit publications are as follows:

Coulter, Malcolm W. A comparison of spring and autumn muskrat trapping in Maine. Proceedings of 1952 Northeastern Wildlife Conference.

Mendall, Howard L. Waterfowl breeding ground survey in Maine, 1951. U. S. Department of the Interior and Canadian Department of Resources and Development, Special Scientific Report - Wildlife No. 13, pp. 226-228.

Mendall, Howard L. Woodcock census studies in northeastern United States. U. S. Department of the Interior and Canadian Department of Resources and Development, Special Scientific Report - Wildlife No. 14, pp. 19-22.

Rearden, Jim D. Identification of waterfowl nest predators. Journal of Wildlife Management, Vol. 15, pp. 386-395.

Respectfully submitted,

*Howard L. Mendall*

Howard L. Mendall, Leader  
Maine Cooperative Wildlife  
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University of Maine  
Orono, Maine  
April 28, 1952

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QUARTERLY REPORT

April-June, 1952

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 Students - Frederick C. Dean  
Clerk - Maxine L. Horne

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

Quarterly Report

April-June, 1952

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

The regular waterfowl studies were conducted by Mendall during the quarter. He was assisted throughout the period by Coulter. Considerable data were supplied by J. William Peppard, waterfowl project leader of the Maine Department of Inland Fisheries and Game. During the nest hunting activities John M. Dudley of Calais was employed for nearly a week as field assistant on the Washington County areas.

The present progress report is not restricted entirely to work of the current quarter, and is based upon findings up to mid-July.

Coverage and techniques have been the same as in previous years. A count of territorial males and pairs was made on specific study areas prior to and during the early stages of breeding. A nesting study was conducted to determine nesting success. Brood checks have been carried out since the beginning of the hatching period.

Although many of the findings based upon brood data are still only tentative (the height of the brood season in Maine is from early July to mid-August), the census data are about 90 per cent complete and the nesting studies are far enough advanced to permit reasonable predictions as to the season's success.

Breeding Populations

For the sixth consecutive year, the initial breeding population of waterfowl in Maine is showing an increase. The black duck, most numerous and most important species to the hunters, now appears to be at its highest population level in about ten years. Although the 1952 increase is slight (less than 10 per cent), the species has shown steady improvement ever since its 1946 low point.

The other species of breeding ducks are showing few changes from last year. A slight increase has been recorded for the wood duck. The ring-necked duck, second in numbers to the black duck in the State, is present on Unit census areas in practically identical populations to those of a year ago.

The American goldeneye and the two teal likewise are exhibiting little change from 1951; in connection with the latter, a slight increase in the blue-wing is balanced by a slight decrease in the green-wing.

Thus, while no important gains are being shown by any of Maine's breeding waterfowl in 1952, the overall population is a little better than a year ago, which indicates continuation of a favorable trend.

#### General Breeding Conditions

To date the 1952 breeding season has been very satisfactory. The break-up of ice, as well as the general phenology, was close to the average. Water levels have been more constant than a year ago. Although flash floods occurred the first week of June, these were largely confined to northern and eastern Maine. Moreover, since the nesting cycle was progressing at near average dates, the floods caused far fewer losses than those of 1951. This year the peak of the black duck hatch had already occurred when the worst of the two floods took place on June 7. In the cases of the late nesting ducks (ring-necks and teal) their nesting cycle was in a sufficiently early phase to permit re-nesting by a considerable number of those birds which did lose nests.

#### Nesting Success

During the Unit's sample nesting study a total of 107 nests was found, 105 of which were of three species - ring-necked duck, wood duck, and black duck. As of July 15, there were 15 nests on which females still were incubating or which had not been re-checked.

Based on the 92 nests already hatched or destroyed, this year's nesting success is running higher than a year ago. At present it stands at approximately 65 per cent, which is close to the long-term average in Maine. There is some variation by species and it is highest for the ring-necked duck. For the black duck it is 60 per cent at present, a very favorable contrast from 1951, when nesting success was only 50 per cent.

Although flood losses were not nearly as serious as a year ago, this factor again was important as a source of nest loss. Principal predation losses so far this year have been by the raccoon, mink, and crow; in this connection it has been interesting to note that predation by crows and foxes has been considerably less than in 1951.

#### The Brood Season

Brood data are very incomplete at this time since this phase of the study is still being conducted. Rearing conditions in most of the important marshes of Maine are very good this summer and there is no reason to anticipate any unusual losses to ducklings between hatching and the time the flying age is reached.

#### Summary and Conclusions

1. The status of breeding waterfowl in Maine at the start of the 1952 nesting season was improved for the sixth consecutive year. Slight increases were recorded for the black duck and the wood duck. Ring-necked ducks and American goldeneyes showed no appreciable change from 1951. Blue-winged teal



appeared to be slightly increased while the green-winged teal registered a slight decrease.

2. Breeding conditions were quite favorable in 1952, with fewer flood losses than a year ago. The 1952 season was not nearly as advanced as last year and most species nested at dates corresponding to the long-term average in the State.

3. It is expected that final figures on both nesting success and brood success will be close to the average. This, on top of favorable initial populations, should result in good waterfowl productivity in Maine's marshes for the 1952 season.

During the coming quarter, the season's productivity studies will be concluded.

#### 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

During the coming quarter Hyers completed all duties at the Unit and was awarded the Master's degree in June. His thesis summary is as follows:

The nutritional effects of eight rations upon the maintenance of penned pheasants during the winter were studied. The effects of three of these rations upon reproduction were also studied. Maintenance was determined by body weights, general behavior observations, and pathological examinations. Egg production, fertility and length of the laying season were criteria for the reproductive phase. The following conclusions were derived from this study:

##### 1. Rations

- a. Rations of excellent quality for wintering penned pheasants include Unity Feed, scratch feed, and ration 1 (or turkey grower).
- b. Winter rations of suitable quality, although not as good as the above for extended periods, include corn and ration 2.
- c. Rations of no value as a winter food, except for short periods in extreme emergencies, include sunnec, apples, and ration 3.

##### 2. Quantity and quality required for existence

- a. Two ounces of Unity Feed or ration 1 will provide sufficient nutrients to maintain a pheasant for one day.

- b. A feed with a protein level of 20 to 26 per cent, a fat level of 3 per cent and a carbohydrate level of 50 to 55 per cent is ideal. Lower percentages of protein and fat, as exemplified by corn, scratch feed and ration 2, are slightly less satisfactory.

### 3. Effects on reproduction

- a. The data indicate that good rations, balanced and containing sufficient minerals and vitamins, are reflected in egg production.
- b. Pheasants on a good ration began laying at an earlier date and laid more eggs than did birds on poor rations. A ration upon which pheasants may successfully winter is not necessarily adequate for reproduction.
- c. The fertility of eggs apparently was different between rations of corn and green feed, and apples and corn. This may be a reflection of a vitamin deficiency or it may be due to the sample size.

## ECOLOGY OF AQUATIC PLANTS

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 quarter Dean completed all duties at the Unit and was awarded the Master's degree in June. He has now enrolled at Syracuse University to work toward a Doctorate. Dean's thesis summary is as follows:

1. Five widely distributed aquatic plants of importance to waterfowl and muskrats were studied with relation to several site factors. These plants were the bur-reeds, Sparganium americanum and S. chlorocarpum; floating-leaf pondweed, Potamogeton natans; wild rice, Zizania aquatica var. angustifolia; and water bulrush, Scirpus subterminalis.

2. Data were gathered on soil and water factors at 67 plots during the summer of 1951. Field information was supplemented with chemical analyses of soil samples. Correlation of vegetative growth with the site factors was investigated by the technique of regression analysis.

3. Data from these plots did not result in equations quantitatively expressing the relationships of the site factors to growth. However, in the cases of the bur-reeds and water bulrush definite indications were present.

4. The following factors were found to have the most influence on the vegetative growth of the bur-reeds: the square of the number of growing days and the alkalinity and the depth of the water. Most bur-reeds were found on the richer types of soil. Factors conducive to good fruiting appear to

be relatively firm soil and less than 20 inches of water with a stable or decreasing level.

5. The floating-leaf pondweed grows well over an extremely wide range of conditions; it is probable that a large series of data would be required to produce a growth equation in this case. Generally the species grows well in 24 to 30 inches of water in sheltered situations.

6. No definite conclusions could be drawn from the seven samples of wild rice. A review of the literature on the requirements of this plant indicate that Maine conditions are marginal at best. One important reason is apparently the low alkalinity of the waters in this region. Water level fluctuations, even though small, have adverse effects on this species.

7. No equation could be derived from water bulrush in spite of the fact that more than three quarters of the total variation in the growth was accounted for. Potassium and calcium content of the soil and the depth of the water are important factors. This plant does best on rich soils in clear water which has noticeable current.

8. A study was made of the reaction of existing vegetation to flooding and the colonization by aquatic plants of new impoundments, primarily on State waterfowl management areas.

9. Complete inundation of herbaceous and many woody plants results in their rapid death. This is true of plants characteristic of dry land, moist soil, and very shallow water. Willows apparently survive periodic flooding if sufficient portions of their crowns remain above water.

10. The only rooted aquatic plant common in newly flooded parts of one waterfowl management area in 1951 was water smartweed (Polygonum amphibium). These may have been modified forms of pre-existing plants. A brief review of the literature on the germination and distribution of the seeds of aquatic plants is presented and the material is related to the colonization of newly flooded areas.

11. Observations were made on the plant colonization of artificial islands in the season following construction.

12. A discussion of conditions which will result in optimum plant growth resulted in recommendations embodying the following points: (a) Water level planning should be based on a detailed concept of the primary purpose of the area. (b) Excess organic matter should be removed prior to flooding, and the soil should be plowed, disced or scraped. (c) Pre-flooding soil fertilization needs testing. (d) Artificial islands should be constructed with gently sloping sides and provided with vegetation which will furnish nesting cover and reduce erosion by wave action. (e) For maximum production of aquatic food plants most of the water should be less than 30 inches deep and much of it less than 20 inches in depth. Fruit production is best if no rise in water level occurs during the flowering and early fruiting stages.

MISCELLANEOUS STUDIES

Woodcock Census

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

During the quarter Mendall and Coulter conducted the annual woodcock studies on the Unit's regular census areas. In addition Mendall served as regional coordinator of the census work that was carried out in the New England States and New York. The summary of his report, previously submitted, is as follows:

The following tabulation shows the totals by states for all census areas:

State	1951	1952	Per cent of change in 1952
Maine	132	122	8% decrease
New Hampshire	12	13	8% increase
Vermont	89	87	2% decrease
Massachusetts	156	130	17% decrease
Connecticut	51	63	24% increase
New York	106	109	3% increase
Totals	546	524	4% decrease

From the data it may be concluded that the status of breeding woodcock in the region as a whole was not materially changed from 1951, although this was primarily due to a substantial increase in Connecticut. The situation elsewhere was much less favorable. Maine and Massachusetts both registered moderate decreases, while Vermont and New York showed little appreciable change as measured by the censuses. In New Hampshire a moderate increase was apparent but this is based on only a very small sample.

In Maine, the 8 per cent decrease follows an even heavier decrease of a year ago. It was most noticeable in the extensive breeding areas of the eastern part of the State. Decreases have occurred in Maine in 3 of the last 4 years. Heaviest decreases in Massachusetts took place on the Prescott Peninsula and Newburyport areas. This year's decrease in Massachusetts follows 3 consecutive years of increased populations. Connecticut's gains were rather general over much of the State but were most striking in Middlesex County; by contrast all of the Hartford County areas had lower populations in 1952.

COOPERATION AND EDUCATIONAL WORK

Unit personnel continued to serve as technical advisers to the State Pittman-Robertson program. Numerous conferences were held in this connection during the quarter.

Quick conducted the undergraduate wildlife courses and the seminar.

The regular assistance was given to the State Warden Service and to the general public in identifications, autopsies, and in answering inquiries. Several speaking engagements were given by Unit personnel.

#### PUBLICATIONS

Two publications by Mendall came out during the quarter:

1. Maine's New Citizen - the Ring-necked Duck. Bulletin of the Maine Audubon Society, Vol. 8, pp. 22-25, April, 1952.
2. A Review of "A Reproduction Study of Northern White Cedar" (by Thomas C. Wilson). Journal of Wildlife Management, Vol. 16, p. 220, April, 1952.

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During the quarter Coulter prepared a manuscript on big game and fur animals of Maine, which is to be published as a circular of the Maine Extension Service.

Respectfully submitted,

*Howard L. Mendall* (H)

Howard L. Mendall, Leader  
Maine Cooperative Wildlife  
Research Unit

University of Maine  
Orono, Maine  
July 21, 1952

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MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

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July-September, 1952

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# MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

## Quarterly Report

July-September, 1952

NOTE: The Unit was without graduate students from June until September. For this reason the research activities of Coulter and Mendall were devoted primarily to the waterfowl project. No report will be made on other studies at this time.

## 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

A preliminary discussion of the Unit's annual waterfowl productivity study was given in the last Quarterly Report. During July and August the season's work was concluded and Mendall submitted a report to the Washington Office. That report is reproduced at this time. Although it covers more than the current quarter and contains some repetition (from the April-June Quarterly Report) it was believed that the entire text would give those interested a better understanding of the 1952 breeding season in Maine. The report is as follows:

This report summarizes the results of the 1952 waterfowl breeding studies in Maine. The work is conducted annually by the personnel of the Maine Cooperative Wildlife Research Unit from April until mid-September. This year's investigations were under the supervision of the writer, assisted by Malcolm W. Coulter. During the nest hunting activities John M. Dudley of Calais was employed as field assistant. Considerable additional data for this report were supplied by J. William Peppard, waterfowl project leader of the Maine Department of Inland Fisheries and Game.

### Coverage and Techniques

The waterfowl breeding habitat in Maine was described in the 1948 report of this series. Coverage and techniques this year were essentially the same as in previous years, so the data are comparable. One change was made, however, in tabulating the population figures; calculated percentages of increase or decrease were used only for the three most numerous breeding species - black duck, ring-necked duck and wood duck. Three additional game ducks regularly breed in Maine (American goldeneye, blue-winged teal, and green-winged teal) but their numbers in any given year are very low in comparison with the other ducks mentioned. So few

data have been obtained on the Unit census areas in recent years for teal and goldeneyes that it seemed advisable to exclude them from the percentage tabulations. This situation was discussed in more detail in last year's report.

### Breeding Populations - 1952

The number of breeding pairs of black ducks, ring-necks and wood ducks is given by census areas in table 1. For the sixth consecutive year, the initial breeding population of waterfowl in Maine showed an increase. The black duck, most numerous and most important species to the hunters, now appears to be at its highest population level in about ten years. Although the 1952 increase was slight, the species has shown steady improvement ever since its 1946 low point.

The other breeding ducks showed but few changes from last year. A moderate increase was recorded for the wood duck. The ring-necked duck, second in numbers to the black duck in the State, was present on Unit census areas in practically identical populations to those of a year ago. Although specific measurements were not made for the American goldeneye and the two teal, these ducks apparently exhibited little change from 1951; in connection with the latter, a slight increase in the blue-wing was balanced by a slight decrease in the green-wing.

Thus, while no important gains were shown by any of Maine's breeding waterfowl in 1952, the overall population was a little better than a year ago, which indicates continuation of a favorable trend.

The status at the start of the nesting season of the six species of breeding game ducks is given in the following listing:

<u>Species</u>	<u>Status in 1952</u>
<u>Measured on Census Areas</u>	
Wood Duck	13% increase
Black Duck	6% increase
Ring-necked Duck	1% decrease
<u>Estimated</u>	
Blue-winged Teal	Slight increase
American Goldeneye	No change
Green-winged Teal	Slight decrease

### General Breeding Conditions

The 1952 breeding season was very satisfactory. The break-up of ice, as well as the general phenology, was considerably later than in 1951 and was close to that of an average year. Water levels were more constant than a year ago. Although flash floods occurred the first week of June, these were largely confined to northern and eastern Maine. Moreover, since the nesting cycle was progressing at near average dates, the floods caused far



fewer losses than those of 1951. This year the peak of the black duck hatch had already occurred when the worst of the two floods took place on June 7. In the cases of the late nesting ducks (ring-necks and teal) their nesting cycle was in a sufficiently early phase to permit re-nesting by a considerable number of those birds which did lose nests.

#### Nesting Success

During the nesting study a total of 108 nests was found, nearly all of which were of three species - ring-necked duck, wood duck, and black duck. In all but three instances these nests were kept under observation until hatched or destroyed.

Based on the sample of 105 nests, hatching success for all species was 66 per cent. This is higher than a year ago although it is lower than in the record year of 1950. It is close to the long-term average in Maine. Of special interest, however, was the high black duck success (64 per cent). This is considerably better than in an average year for this duck, which ordinarily suffers greater nest losses than any other species in the State.

Although flood losses were not nearly as serious as last year, this factor again was important as a source of nest loss - especially to the ring-necked duck. Principal predation was by the semi-aquatic mammals, the raccoon and mink. Raccoon depredation was much higher than usual. By contrast the crow (ordinarily of considerable importance) was a minor factor in nest losses during 1952. For the first time in several years, not a single nest loss could be attributed to the red fox.

#### The Brood Season

Ducklings in Maine experienced one of the best rearing seasons since the Unit's waterfowl studies were initiated. Water levels were quite high at hatching time, and, although a drought prevailed through all of July, the drop in water levels was very gradual. This resulted in excellent cover conditions on most of the breeding marshes.

Clutch sizes were larger than a year ago, undoubtedly due, in part at least, to less re-nesting. Brood sizes, as based on 119 records of complete broods, were not only much higher than in 1951 but were higher than the long-term average, especially for birds approaching the flying age. The size of Class I broods averaged 7.4 ducklings each, while young in the Class III age averaged 6.1 -- a record high figure during the Maine studies. This would indicate an unusually successful rearing season.

#### Summary and Conclusions

1. The status of breeding waterfowl in Maine at the start of the 1952 nesting season was improved for the sixth consecutive year.
2. More constant water levels and slightly lessened predation resulted in higher nesting success than a year ago.
3. Rearing success of broods was much higher than in 1951.

4. Considering slightly increased breeding populations, slightly higher nesting success, and greatly increased rearing success, it is believed that the overall waterfowl productivity in Maine during 1952 was substantially improved over last year.

Table 1

Waterfowl Census Data - Number of Breeding Pairs

Study Area	Black Duck Pairs		Ring-neck Pairs		Wood Duck Pairs	
	1951	1952	1951	1952	1951	1952
St. John River, Van Buren	10	9	--	--	--	--
Portage Lake	6	5	16	17	5	3
Meduxnekeag Stream, Hodgdon	6	4	--	--	4	2
Musquash Stream, Grand Lake Stream	12	11	10	9	--	--
Pocamoonshine-Crawford Lakes	36	40	65	80	5	11
St. Croix River, Baring	9	10	--	--	4	5
Moosehorn Refuge, Calais	25	31	12	9	--	--
Pennamaquan R., Pembroke	4	5	22	12	--	--
Mattanawcook Lake, Lincoln	2	3	3	4	--	--
Penobscot R., Lincoln- Enfield	14	15	--	--	8	10
Pushaw Stream, Orono-Old Town	3	4	--	--	2	3
Davis-Holbrook Thorofare, Eddington	4	5	3	4	--	--
Corinna Stream, Corinna	9	8	15	10	12	9
Goose R., Belfast-Swanville	12	11	15	15	--	--
Snake Pond, Brooksville	--	--	3	2	--	--
Boyden Lake, Perry	--	--	--	--	3	2
Ruffingham Meadow, Searsmont	--	--	--	--	7	10
Seammon Marsh, Eastbrook	--	--	--	--	4	6
Totals	152	161	164	162	54	61

## MISCELLANEOUS STUDIES

### Banding

The regular Unit waterfowl banding program was conducted under Coulter's supervision. This year the study was carried out in cooperation with the State Pittman-Robertson banding project of which J. William Peppard is in charge. Instead of maintaining separate banding stations, personnel of both the Unit and the State combined efforts and concentrated on the Penobscot and St. Croix Rivers and Cranberry Lake at the Moosehorn National Wildlife Refuge. A special financial allotment from the Research Branch of the Fish and Wildlife Service and the assignment by the Regional Office in Boston of Game Management Agent W. B. White enabled the Unit to continue summer and early fall banding on a larger scale than would otherwise have been possible. State regional biologists Walter Buckley, Henry Carson, and William Fitzpatrick assisted at various times. The Moosehorn National Wildlife Refuge made available a camp and storage facilities for banding on the refuge and the St. Croix River.

Six to 18 traps were operated from August 1 to September 14, resulting in the capture of 1242 ducks. On the Penobscot River several new stations were added about five miles upstream from the usual stations. Banding there commenced August 1, two weeks earlier than in previous years. The earlier banding this season was very successful and resulted in the capture of many young birds, particularly black ducks, which were flightless or only beginning to fly. As a result a much larger percentage of this year's catch on the Penobscot River is believed to represent locally reared birds. Observations made during late July indicated that it would be possible to begin banding black ducks there even one or two weeks earlier with possibilities for good results. A total of 902 birds was banded at these stations.

Banding began on August 21 at the St. Croix River and in Cranberry Lake at the Moosehorn National Wildlife Refuge. Extremely low and fluctuating water hampered operations on the St. Croix River. Three hundred and forty birds were banded at these stations.

The breakdown by species, sex, and age for the 1242 ducks banded at all stations is as follows:

Species	Adult		Immature		Age or Sex Undetermined	Species Total
	Male	Female	Male	Female		
Black Duck	8	28	354	341	2	733
Wood Duck	74	15	161	118	3	371
B.W. Teal	11	5	44	54	2	116
Mallard	1	1	5	10		17
Pintail			2	2		4
G.W. Teal				1		1
Totals	94	50	566	526	7	1242

COOPERATION AND EDUCATIONAL WORK

The usual service as technical advisers to the State's Pittman-Robertson program was given by Unit personnel.

Quick gave the wildlife instruction at the summer camp session; also conducted the fall undergraduate wildlife courses and the seminar.

PERSONNEL CHANGES

Claude Z. Westfall reported to the Unit in September as Graduate Assistant. Westfall is a graduate of West Virginia University where he majored in wildlife and forestry. He will be assigned to the woodcock project for his thesis study.

David C. O'Meara enrolled as Graduate Student in September. He is a graduate of Bates College, specializing in biology. O'Meara's thesis is expected to deal with a food habits study of mammals.

One Graduate Assistantship at the Unit is still open but it is hoped this vacancy can be filled at the start of the February semester.

Respectfully submitted,

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

University of Maine  
Orono, Maine  
November 15, 1952

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RESEARCH PROJECTS

RUFFED GROUSE MANAGEMENT

Sub-project: Cover requirements and populations

Objectives: To determine preferred cover types and population densities.

Assignment: Howard L. Mendall, Leader

Throughout the fall, whenever the opportunity was afforded, data were obtained on grouse populations in various sections of the State. During December the winter cover preference study was initiated and Mendall spent several days on this phase of the project.

Considering grouse populations in the State as a whole, a slight improvement was evident in comparison with a year ago. Good numbers of birds appeared to be present in many portions of southwestern, southern, and south-central Maine; also in the coastal belt. Little change was noted in north-central and eastern Maine. No data have as yet been obtained this season from northwestern and northern Maine but most reports of wardens and sportsmen in those regions indicate a decrease in population.

So far this season, a remarkably mild winter has prevailed. Temperatures have been greatly above normal and snowfall has been much less than usual. Several sleet storms have occurred but have been of very short duration. From this standpoint no adverse effects of weather on grouse have been noted. Cover preference data, although limited at the present time, show a much higher usage of open, hardwood covers than is generally the case during the winter season.

During the coming quarter the studies on cover preferences and effects of weather on grouse will be continued.

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

Work on the waterfowl project during the quarter was centered around the fall migration and the hunting season. The entire Unit staff participated in conducting the hunter bag checks, which were carried out in cooperation with the State Federal Aid Division. Mendall's seasonal report on this phase of the waterfowl work, recently submitted, is as follows:

## The 1952 Waterfowl Hunting Season in Maine

By

Howard L. Mendall

For the sixth consecutive year Maine was granted a split season. The 1952 hunting periods were October 1-22 and November 19-December 10. 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. Unit personnel worked under the supervision of the writer, with the State technicians being under the direction of J. William Peppard, waterfowl project leader. Participating individuals were as follows: *Anclair* for the Unit - Malcolm Coulter, John Dudley, Roger ~~Coulter~~, David O'Meara, Claude Westfall, and the writer; for the State - Robert Bacon, Harold Blanchard, Walter Buckley, Henry Carson, Francis Dunn, Nathan Fellows, Jr., William Fitzpatrick, Stephen Gendell, Kenneth Hodgdon, Roger Hoffman, Dana Holmes, W. Sidney Howe, John Hunt, John Maasen, Jr., Richard Parks, Stephen Powell, Howard Spencer, and J. William Peppard.

All of the important waterfowl areas of the State were sampled. A total of 2781 hunters was contacted and 4577 ducks were examined. This is a larger sample than in any previous year of the bag check studies.

### Waterfowl Populations

The population of waterfowl within the State during the fall of 1952 was increased over that of both the past two years. With most species no great change in status was apparent but in three cases very marked increases were noted. These were the Canada goose, greater scaup, and blue-winged teal. The blue-wings, especially, were more numerous than for several years; also they remained much later than usual. Three birds (goldeneye, wood duck, and ring-necked duck) showed a decrease. The ring-necks migrated very early this year and few were present within the State by the time the hunting season opened.

The following listing is not intended as a fall census of waterfowl, but indicates the relative abundance in comparison with 1951 of the birds during the period covered by the hunting seasons. It is based upon ground counts at a few representative areas and by aerial counts made over extensive sections of the State during September, October and November.

Increase: Canada goose, greater scaup, blue-winged teal, mallard, baldpate.

No change: Black duck, green-winged teal, pintail, ruddy, lesser scaup, bufflehead.

Decrease: Wood duck, goldeneye, ring-necked duck

A survey of sea ducks is not included in the study but general observations and reports of reliable individuals indicate a continuation of high populations in all parts of the Maine coast of eiders, old squaws, and white-winged scoters. These birds have shown little annual fluctuation in recent years and their status appears very satisfactory.

### Hunting Success

An analysis of the 1952 hunting season can best be accomplished by considering Merrymeeting Bay as a separate entity. During the early period the hunter success data for the Bay were even better than the record figures of a year ago. Duck hunting was excellent throughout all of the October period, and during the last week of hunting large flights of geese came in, with ideal gunning conditions for them. It was the almost unanimous opinion of the guides and veteran hunters that Merrymeeting Bay produced the finest duck and goose shooting that had occurred in a great many years.

Surprisingly enough, even at the beginning of the late November season, perfect hunting conditions still prevailed in Merrymeeting Bay. The first three days of this period produced many limit bags of ducks. Goose hunting was excellent at this time, also.

By contrast, the remainder of the State had a very poor hunting season. During the October period, hunting success at inland areas of northern, eastern, and central Maine was only slightly higher than during the unsatisfactory season of 1951. The eastern coastal section, which had enjoyed excellent hunting in October a year ago, registered a big drop in the average daily bag for 1952. In southwestern Maine, the figures showed a slightly higher success ratio than in the other sections, but they were far below those of Merrymeeting Bay.

With increased populations of birds present, coastal hunters looked forward eagerly to the late shooting period (November 19 to December 10), but hunting conditions were even worse than in October. The entire coastal belt yielded little but disappointment. Unprecedented warm and calm weather, with an almost complete lack of storms, held throughout the whole of the late period. To make matters worse a solid week of bright moonlight nights shortly after the season opened permitted unrestricted night-time feeding by the birds. Thousands of ducks were rafted in the open bays day after day, but they seldom came near land during daylight hours. There were only two days during the entire period when anything resembling good hunting weather occurred. Moreover, during most of this late season many inland waters were open and many birds that would normally have been in coastal concentration spots were scattered about the State in small flocks. Locally, in a few areas of central and southern Maine, some fairly good inland shooting was thus unexpectedly provided. Few gunners hunted the interior, however, at that time of year.

As an example of the unusual and unexpected weather situation that prevailed, the writer observed approximately 100 black ducks and 4 mallards on the Penobscot River, nearly 50 miles from tidewater on December 18. These birds were thus still far in the interior of the State over a week after the season had closed. Normally that portion of the river would have been frozen for at least 3 weeks.

It was apparent that many more hunters were in the field at the start of the October season than was the case last year. Opening day for both periods found what well may have been a record number of gunners. But in view of the unsatisfactory shooting conditions many hunters soon gave up their endeavors to await the "duck weather" that was not forthcoming. In this connection the bag check data showed an increase in the number of gunners contacted but a decrease in the number of man days that they hunted.



### Crippling Loss

Data obtained on crippling loss showed an improvement over 1951. Figured on a basis of 4059 ducks bagged, 1011 others were lost as cripples. This is approximately 25 per cent, as against over 28 per cent a year ago. It seems likely that with ducks harder to get this year, gunners made more of an effort to retrieve those that they did drop. The mild weather also made it easier to retrieve birds that dropped in currents.

As is usually the case, crippling loss was heaviest during the first two days of the October season and, geographically, in central Maine. It varied by localities from a low of 8 per cent to a high of 51 per cent.

### Bag Composition

The kill by species of the birds that were checked in the hunters' bag is presented in table 1. As in previous years, sea ducks are not included in the studies.

Table 1 - Kill by Species - 1952

(Exclusive of Sea Ducks)

Species	No. Checked Early Season	No. Checked Late Season	No. Checked Entire Period	Percent
Black Duck	1975	497	2472	54.0
Blue-winged Teal	676	4	680	14.9
Green-winged Teal	342	54	396	8.6
Wood Duck	186	--	186	4.1
Bufflehead	15	135	150	3.3
Goldeneye	16	127	143	3.1
Canada Goose	52	90	142	3.1
Ring-necked Duck	74	1	75	1.6
Mallard	50	12	62	1.4
Greater Scaup	24	20	44	1.0
Mergansers (3 species)	16	28	44	1.0
Pintail	34	7	41	0.9
Ruddy	15	23	38	0.8
Lesser Scaup	19	12	31	0.7
Baldpate	20	3	23	0.5
Black x Mallard	4	2	6	0.1
Canvasback	--	4	4	0.1
Shoveller	1	--	1	--
Unidentified(*)	32	7	39	0.8
Totals	3551	1026	4577	100.0

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

A study of the table will reveal some very interesting findings. For the first time in the six years of conducting bag checks, the blue-winged teal assumed a position of major importance to the hunters of Maine. Previously it had not made up more than 4 per cent of the seasonal bag, but this year it rose to approximately 15 per cent. A combination of factors, rather than any one, is probably responsible. The earlier opening (October 1) would naturally be conducive to a somewhat higher kill of this early migrating species. But the birds themselves were present in very large numbers in 1952, and, due probably to the unusually warm weather, they remained in Maine very late (4 were tallied in the late season bag). Last, but by no means least, hunting conditions favored a kill of teal. With black duck hunting so disappointing, hunters shot teal when a year ago they would have passed them up to wait for blacks. Also the warm, calm weather caused many gunners to forsake blinds and decoys and turn to jump shooting - in Maine this type of hunting generally produces more teal and wood ducks than other species.

In spite of trailing far behind the blue-wing, the green-winged teal showed little change, percentagewise, from its proportion in the bag of a year ago.

Most spectacular change in the 1952 bag composition was the increase shown by the Canada goose, thanks to the excellent goose shooting in Merrymeeting Bay. More geese were tallied this year than in the 5 previous years combined.

Principal decreases in this year's bag were registered by the black duck, wood duck, and goldeneye. Black ducks were present in about the same numbers as a year ago - possibly even greater - but the weather favored the species rather than the gunner. Even so the black was still taken in proportions larger than all other species combined.

In the cases of the wood duck and goldeneye, these birds were present during the fall in fewer numbers than a year ago. Furthermore most goldeneyes are taken in the late season and this year the weather did not favor goldeneye or "whistler" shooting, regardless of their abundance. This was strikingly shown in the case of another open water diving species - the greater scaup. Although the bird showed a very noticeable population increase in 1952 it actually occupied a smaller proportion of the bag.

Other species showed little change in bag composition this year. A substantial increase occurred for the baldpate, but this is a very minor species in Maine in any year.

#### Sex and Age Ratios

Of the 4577 ducks that were examined in the hunters' bag, a total of 2375 were sexed and aged.

In reports of previous years such data have been tabulated separately by regions and seasons because of wide variation in flock composition. This year such variation was not so apparent. The figures from Merrymeeting Bay were much more in accord with those for the rest of the State, in that October shooting was predominately on immature birds. During the late season, on the coast, adults predominated slightly. Considering the overall data, as presented

in table 2, only two instances could be taken as indicating undue hunting pressure on any one age or sex class. With the bufflehead, a very high proportion of adult females was recorded. Female blue-winged teal, largely young, also appeared in higher numbers than might be expected.

Table 2 - Sex and Age Ratios - 1952

(Leading Species Only)

Species	Ad. ♂	Ad. ♀	Im. ♂	Im. ♀	Total	Ad.-Im. Ratio	Sex Ratio Male-Female
Black Duck	175	161	543	442	1321	1:2.9	54:46
Blue-winged Teal	25	20	97	142	284	1:5.3	43:57
Green-winged Teal	36	22	84	60	202	1:2.5	59:41
Bufflehead	23	41	11	30	105	1:0.6	32:68
Wood Duck	22	11	31	25	89	1:2.0	60:40
Goldeneye	15	21	21	19	76	1:1.1	47:53
Canada Goose	14	13	23	18	68	1:1.5	54:46
Ring-necked Duck	3	7	22	18	50	1:4.0	50:50
Totals of 21 species	333	315	909	818	2375	1:2.7	52:48

Time of the Hunting Season

In view of the very poor hunting season of 1952 over practically all of the State except Merrymeeting Bay, it may be anticipated that the controversy of the past six years as to straight season versus split season, as well as to opening dates, is certain to continue in the coming months.

Each year at the close of the hunting season, the writer has attempted to analyze objectively the Statowide waterfowl situation. This year such an analysis is extremely difficult. From a statistical as well as a logical point of view the split season with the opening and closing dates that were assigned to Maine for 1952 should have afforded maximum hunting opportunities over the widest possible area of the State. The October 1 opening was the earliest since 1945. That could logically have been expected to materially improve the poor hunting that had prevailed in recent years in the interior of northern, eastern, and central Maine. Yet the improvement was very slight and such little as did occur can be attributed mainly to the increased number of migrating blue-winged teal. Despite excellent breeding conditions and increased production in the summer of 1952, local black ducks, wood ducks, and ring-necks had largely left northern and eastern Maine well in advance of opening day. In fact this departure was evident even by the middle of September. Furthermore, with the

exception of the teal, the pattern followed that of recent years in that no migrants from Canada arrived to replace the departing local birds.

From the hunters' viewpoint the situation just described was further aggravated by the fact that the early departure of birds from the northern half of the State did not result in any appreciable build-up along the coast as a whole, although it did in a very few areas. Apparently the early migrating birds concentrated only in Merrymeeting Bay or at points beyond the Maine border.

On the basis of average expected weather conditions and migrating times of waterfowl in Maine, the dates selected for the late season (November 19 - December 10) should have coincided both with the time when maximum numbers of ducks were in the State, and with most favorable coastal hunting conditions; i.e., most inland waters would be frozen but salt marsh and mud flat areas would be open.

The ducks were present in very satisfactory numbers, as has already been pointed out. It seems likely that the unseasonable weather can be considered almost solely as the reason for the poor hunting during the late season on the coast. Warm, calm days and moonlight nights are not associated with good coastal shooting of black ducks and the deep water divers such as goldeneyes and scaups.

#### Conclusions

1. The populations of waterfowl in Maine during the fall of 1952 were very satisfactory and were improved over 1951. Heavy increases were recorded for the Canada goose, blue-winged teal, and greater scaup.
2. During the October portion of the split season, Merrymeeting Bay duck hunters had their best season in many years.
3. Throughout the remainder of the State, October shooting was only slightly improved over the unsatisfactory season of a year ago.
4. During the late portion of the split season all sections of the State had very disappointing hunting, except for a few days in Merrymeeting Bay.
5. Goose hunting in Merrymeeting Bay was the best that it has been for a very long time.
6. Although decreased in the bag from 1951, the black duck still made up over half of the entire proportion of birds tallied.
7. For the first time in six years, the blue-winged teal was of major importance to the hunters. The species ranked second to the black duck, being far ahead of the green-winged teal which was in third place.
8. Sex and age ratios of most species were much more satisfactory, from a biological standpoint, than a year ago.

9. The poor hunting that prevailed in 1952 over such a large section of the State cannot be attributed to the fact that Maine had a split season or to the dates of the hunting periods. It appears to be due almost entirely to two factors: (1) a very early departure of local birds from northern, central and eastern Maine; and (2) a prolonged and unusual period of warm, calm weather in late November and early December.

#### SUMMER FOOD HABITS OF THE SNAPPING TURTLE

Objectives: To determine some of the important aspects of the food habits of the common snapping turtle during the summer months, with special reference to possible predation on waterfowl.

Assignment: Malcolm W. Coulter, Assistant Leader

In the quarterly report for January-March, 1951 Coulter discussed the bird remains found up to that time in snapping turtle stomachs. Also a general breakdown of other food materials was presented. During the past quarter Graduate Assistant Westfall examined the fish remains which had been saved for detailed study. This was carried out under the direction of Dr. W. Harry Everhart of the Zoology Department.

Identification of fish was based upon examination of scales. These were mounted dry, or in Berlese's media, keyed out to family and compared with known samples for more specific classification. The work does not represent a complete listing of all fish taken since bones, spines and other material have not yet been studied. In addition, some fish known to be taken in at least a few instances would not be detected in the present examination because of their lack of scales (for example, the brown bullhead Ameiurus nebulosus).

Sixty-nine turtles (66 per cent of those examined) contained fish remains, with scales being present in 36. Previous reports have discussed the importance of the large intestine as a source of bird material. A similar situation was found with fish scales. Of the 36 specimens, 29 contained scales in the large intestine whereas scales were present in only 10 stomachs and five small intestines.

The frequency and percentage frequency of occurrence of fish found in the 36 gastro-intestinal tracts are shown in the following table:

Species	Frequency	Percentage
White perch ( <u>Morone americana</u> )	21	58.3
Golden shiner ( <u>Notemigonus crysoleucas</u> )	11	30.6
Pickrel ( <u>Esox niger</u> )	4	11.1
Yellow perch ( <u>Perca flavescens</u> )	4	11.1
White sucker ( <u>Catostomus commersoni</u> )	1	2.8
American eel ( <u>Anguilla rostrata</u> )	1	2.8
Family Centrarchidae	1	2.8
Misc. (Not identifiable)	4	11.1

## ECOLOGY OF THE FISHER

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

Assignment: Malcolm W. Coulter, Assistant Leader

Since the last summary report on the fisher study (January-March, 1952 quarterly report), three additional specimens have been submitted for study. One large female was prepared as a study mount for the Unit's collection. Several observations and records from reliable cooperators yielded further information on the distribution of fisher in Maine. It appears that a relatively high population now exists over most of the northern and western portions of the State. There is some indication that the animals have extended their range to some of the heavily timbered country east of the Penobscot River. What were believed to be old fisher tracks have been found in this area on two occasions. Attempts to verify these will be made as soon as snow conditions permit good tracking and observations.

During February and March field trips will be made to the Russell Pond study area to obtain further information on populations, winter activity and food habits.

## COOPERATION AND EDUCATIONAL WORK

Unit personnel continued to provide technical advice to the State Department of Inland Fisheries and Game. Several conferences were held in this connection during the quarter at Orono and Augusta.

Several speaking engagements were given by Unit staff members during November and December.

Quick conducted the undergraduate wildlife courses and the seminar. He also provided technical supervision on some of the State Pittman-Robertson projects.

## PUBLICATIONS

A 32-page non-technical bulletin by Coulter entitled "Big Game and Fur-Bearing Animals of Maine" was published in December as Bulletin 425 of the Maine Agricultural Extension Service.

Respectfully submitted,

*Howard L. Mendall*

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Maine Cooperative Wildlife  
Research Unit

University of Maine  
Orono, Maine  
January 26, 1953

Memorandum to all Game Division Personnel

At the request of the Augusta office you are being placed on the mailing list to receive our Unit quarterly reports. These are being sent to you for your personal information in order that you may be kept informed as to Unit activities.

Please bear in mind that, for the most part, the project summaries represent progress reports only - conclusions reached in one report may be superseded by new data compiled later. For this reason please do not quote from our quarterly reports in any publications, press releases, or in talks which you may give in public, without obtaining approval in advance from the Unit Leader.

We are including, at this time, some Unit publications that may be of interest to you.

Howard L. Mendall, Leader  
Maine Cooperative Wildlife  
Research Unit

January 26, 1953