

File Copy

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

January-March, 1968

Cooperating Agencies

Maine Department of Inland Fisheries and Game
Wildlife Management Institute
University of Maine
U.S. Bureau of Sport Fisheries and Wildlife

NOT FOR PUBLICATION

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

TABLE OF CONTENTS

	PAGE
UNIT PERSONNEL	3
RESEARCH PROJECTS	4
WATERFOWL	
A Population Analysis of Maine-banded Wood Ducks	4
RUFFED GROUSE	
Ecology of the Ruffed Grouse in Maine	4
WOODCOCK	
A Study of the Summer Behavior of the American Woodcock	5
(Financed by Maine Federal Aid in Wildlife Restoration Funds)	
BIG GAME	
Telemetry Studies of Deer Movements and Habitat Utilization at Acadia National Park	6
(Financed by Contract with National Park Service)	
Abundance and Composition of Deer-Browse in Relation to Cutting Practices on the Penobscot Experimental Forest	7
(Financed by Maine Federal Aid in Wildlife Restoration Funds)	
Behavioral Patterns of Deer on Isle au Haut	8
(Financed by Mc-Intire-Stennis Forest Research Funds)	
OUTDOOR RECREATION	
Socio-Economic Characteristics of Maine Sportsmen	9
(Financed by Agr. Exp. Sta., Hatch Act Funds)	
Current Projects Inactive During the Quarter	10
COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES	10
PUBLICATIONS AND THESES	11

Unit Personnel

Leader - Howard L. Mendall

Assistant Leaders - Malcolm W. Coulter, Associate Director in Wildlife,
School of Forest Resources(*)

Sanford D. Schemnitz, Associate Professor of Wildlife
Management(*)

University Representative - Albert D. Nutting, Director, School of Forest
Resources

Staff Collaborator - Donald F. Behrend, Assistant Professor of Wildlife
Management

Collaborators - Cooperating or assisting in current Unit studies:

J. William Peppard, Maine Dept. Inland Fisheries and Game
Kenneth Anderson, Maine Dept. Inland Fisheries and Game
Howard E. Spencer, Maine Dept. Inland Fisheries and Game
J. Franklin Witter, Head, Dept. of Animal Pathology
David C. O'Meara, Associate Professor of Animal Biology
Thomas J. Corcoran, School of Forest Resources
Harold E. Young, School of Forest Resources
Ralph Griffin, School of Forest Resources
George R. Cooper, Dept. of Botany
Gerald Dube, University Computer Center
Richard Hatch, Leader, Cooperative Fishery Unit
Eldon Clark, Moosehorn National Wildlife Refuge
Robert Wade, Moosehorn National Wildlife Refuge
Robert Pacific, Moosehorn National Wildlife Refuge
Roy W. Stamey, Park Ranger, Acadia National Park
Paul Favour, Chief Naturalist, Acadia National Park
Robert Binneweis, Acadia National Park
Carl Gruener, Div. Mgmt. & Enforce., U.S. Bur. Sport Fisheries & Wildlife
Rex Tice, Div. of Mgmt. & Enforce., U.S. Bur. Sport Fisheries & Wildlife
William D. Snow, Div. Mgmt. & Enforce., U.S. Bur. Sport Fisheries & Wildl.

Graduate Assistants - Thomas J. Allen
William B. Krohn
Robert W. Meyer
Anthony M. Rinaldi

John J. Vogler
Larry J. Roop
Vaughn D. Rasar

Graduate Student - Lawrence S. Barden

Secretary - Maxine L. Horne

(*)Professors Coulter and Schemnitz serve part time on the Unit program and
part time on the wildlife teaching staff of the School of Forest Resources.

Unit Coordinating Committee

Ronald T. Speers, Commissioner, Maine Dept. Inland Fisheries & Game
Albert D. Nutting, Director, School of Forest Resources
Howard L. Mendall, Unit Leader

QUARTERLY REPORT

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

January-March, 1968

RESEARCH PROJECTS

WATERFOWL

A Population Analysis of Maine-banded Wood Ducks

- Objectives:
- (1) To describe the migration of wood ducks banded in Maine from 1939 to 1965.
 - (2) To determine the factors affecting the size and distribution of the harvest of wood ducks breeding in Maine.
 - (3) To calculate survival rates, contribution of hunting mortality to total mortality and other related factors.
 - (4) To devise a population model for use in predicting annual population levels under varying mortality rates.

Assignment: Lawrence S. Barden, Graduate Student

Thesis Adviser: Howard L. Mendall, Leader

Consultants: Richard W. Hatch, Leader, Cooperative Fishery Unit
Howard E. Spencer, Dept. Inland Fisheries and Game

A preliminary draft of most sections of the thesis was completed.

Plans for next quarter: To complete the thesis.

RUFFED GROUSE

Ecology of the Ruffed Grouse in Maine

- Objectives:
- (1) To study population dynamics of harvested and unharvested grouse populations; and to compare mortality rates of resident non-migratory species (grouse) and migratory species (woodcock) on the same area.
 - (2) To determine cover preferences and use of forest clearings by adults and broods in spring and summer.
 - (3) To study the causes of juvenile mortality and measure the incidence of blood parasites.

Assignment: Sanford D. Schemnitz, Assistant Leader

Consultants: Eldon Clark, Biologist, Moosehorn Nat. Wildlife Refuge
Robert Wade, Moosehorn Nat. Wildlife Refuge
Robert Pacific, Moosehorn Nat. Wildlife Refuge
David C. O'Meara, Associate Professor of Animal Biology

The winter budding study of ruffed grouse was continued for the second winter by Schemnitz and senior wildlife student Patrick Corr. Observations were made primarily in the vicinity of Old Town, Orono, Blue Hill and Princeton.

Tree species, diameter, height, cover type, distance to edge and distance to nearest conifers were recorded. Number of grouse, duration of feeding period, aspect and height of feeding in trees were also tallied.

Eight species of trees were utilized by budding grouse. Staminate buds of quaking aspen (48 percent) and buds and catkins of white birch (27 percent) were fed upon most frequently. These were followed by apple, cherry and big-toothed aspen. Buds and catkins have been collected with the aid of extension pole clippers. These will be analyzed for nutritional content with assistance of personnel and equipment of the Agricultural Experiment Station.

Excellent cooperation was received from State game wardens Roland Tarr of Brooklin, Duane Lewis of Princeton, Norman Trask of Baring, and David Mercier of Orrington. Donald McPheters, Northeast Harbor and Graduate Assistant Allen also helped considerably with this study.

Plans for next quarter: Analyze the grouse budding data in detail; continue, as in past seasons, drumming site studies at Moosehorn National Wildlife Refuge and Orono.

WOODCOCK

A Study of the Summer Behavior of the American Woodcock

- Objectives: (1) To study the activities of woodcock on summer concentration fields.
 (2) To measure selected environmental factors that may influence the selection of fields, or parts of them, by woodcock during summer concentration periods.

Assignment: William B. Krohn, Graduate Assistant

Thesis Adviser: Malcolm W. Coulter, Associate Director in Wildlife,
 School of Forest Resources

Consultants: J. William Peppard, Dept. Inland Fisheries & Game
 Sanford D. Schemnitz, Assistant Unit Leader
 Howard L. Mendall, Unit Leader

This is a new project. Investigations by several workers have demonstrated that woodcock concentrate in some fields at night during the summer months, yet often only parts of these fields seem highly preferred.

An attempt will be made to determine activities of the birds by observation from blinds with the aid of an infra-red "snooper scope." Time of flights to concentration areas, magnitude of flights, activities of birds in the fields and patterns of departure will be studied.

It appears that certain characteristics of the ground cover may be

different in the prime concentration places as contrasted to lightly utilized portions of the fields. Detailed studies of ground cover will be made in and near a series of such areas. Invertebrate life will be measured on the assumption that available food is one of the major attractions to the birds.

During the quarter literature was reviewed, trials were conducted with the snooperscope, and discussions held with several people to aid in formulating specific hypotheses for testing and to help in preparing detailed study plans.

Plans for next quarter:

Complete a detailed plan for testing hypotheses. The plan will include sampling methods, time schedule for field work, and proposed methods for analysis of data.

Trials with observational techniques will continue. It is anticipated that intensive study in fields will begin during June or early July when the birds begin to use the areas. Blinds will be built near known concentration areas. Conifers may be transplanted at some sites to help in providing sites suitable for blinds.

BIG GAME

(a) Telemetry Studies of Deer Movements and Habitat Utilization of Acadia National Park

Assignment: S. D. Schemnitz, Assistant Leader
Thomas J. Allen, Graduate Assistant

Consultants: Robert Binneweis, Chief Ranger, Acadia National Park
Paul G. Favour, Chief Naturalist, Acadia National Park
Roy W. Stamey, Park Ranger, Acadia National Park

- Objectives: (1) To study the mobility and habitat utilization of deer at Acadia National Park.
(2) To intensively study critical wintering areas where cedar utilization is heavy.

An adult female deer was live-trapped and equipped with a long-life pulsed transmitter on January 26. Because of much interference from local citizen-band radios, reception of the 2 minute signals became virtually impossible. The deer was recaptured on March 12, and the transmitter replaced with one emitting a continuous signal. At present this animal is being monitored, and the data recorded. The deer's initial movement from the release site was $1\frac{1}{2}$ miles. She then settled in an area of not larger than $1/4$ square mile and has remained since, going from coniferous cover during the day to feed on nearby hardwood slopes and ridges at night. Visual observations based on tracking have been made of this animal which has been accompanied by a fawn on several occasions.

Several additional deer were live-trapped in the study area during the months of January-March. However, three of these showed extreme malnutrition and it was deemed advisable to kill them. Two were fawns, and the third a 2½ year old male. Autopsy showed one of the fawns had several broken ribs and a damaged lung and the adult male had a broken foot and liver damage, both from previous injuries not related to the study.

A critical winter deer yard bordering West Sargent Mountain was chosen as the site for a spring browse survey for several reasons. This yard, within the study area, was the trapping locales for transmitter-equipped animals. Considerable information is known about portions of the yard where the deer concentrate, and the number of animals present. It is an area where past records have indicated starvation by deer. Approximately 200, 66' x 4' permanently marked plots, randomly located on 24 belt transects are being established in a 320 acre area. These will allow measurements of current utilization of vegetation and provide a means of assessing long-range trends. Quantitative measurements of availability and utilization will be similar to those employed by McLaughlin (1968. Ecological relationships of white-tailed deer and vegetation at Acadia National Park. M.S. Thesis, University of Maine). This will allow comparisons of local intensive-browse studies with previous vegetation data collected throughout the Park.

Approximately 80 deer rumens obtained during the Acadia Park herd control program (1966-67 and 1967-68) are being analyzed by the University of Maine Agricultural Experiment Station for protein, fat, fiber, nitrogen free extract, ash, and carotene. They are being analyzed, in addition, for volatile fatty acids, by means of a gas chromatograph by personnel of the University's Department of Animal Science.

Plans for next quarter:

The tracking of the radio-equipped adult female will be continued. An attempt will be made to capture her fawn and equip it with a transmitter also.

The rumen analysis will be continued and the browse survey in the winter deer yard will be completed and the data analyzed. Experimentation with infra-red film as a census technique will also be undertaken in cooperation with Park Ranger Binneweis.

(b) Abundance and Composition of Deer-Browse in Relation to Cutting Practices on the Penobscot Experimental Forest

- Objectives:
- (1) To compare the amount of available browse produced under different cutting methods.
 - (2) To determine the chemical composition of such browse.
 - (3) To determine the relative deer use of the browse under different cuttings.
 - (4) To relate the findings to past, present, and anticipated forest land-use practices in eastern Maine.

Assignment: Anthony M. Rinaldi, Graduate Assistant

Thesis Adviser: Donald F. Behrend, School of Forest Resources

Consultants: Malcolm W. Coulter, Associate Director in Wildlife,
 School of Forest Resources
 J. William Peppard, Dept. Inland Fisheries & Game
 Francis M. Rushmore, Northeastern Forest Expt. Station

A ground reconnaissance of all compartments, strip cuttings and cleared power lines on the Penobscot Forest has been made, and each has been rated as to relative browse abundance. Specific compartments are currently being chosen for comparative study, utilizing information from recent aerial photos, a type map, a soil map and past cutting records.

Preliminary line transects are now being sampled in two compartments which represent the extremes of cutting encountered on the Forest (clear cut, selection). The twig-count method is being used to record browse. A workable tally sheet has been developed in which both plant and twig height is recorded.

Twig samples have been clipped and are awaiting analysis. The samples were from open areas and from areas of dense tree cover. If these samples show a difference in nutritional value, a more extensive sampling will be made during the study period.

A questionnaire has been developed which will aid in describing the past, present and future cutting practices in the low deer harvest region of eastern Maine. These questionnaires will be sent to the major forest land owners in this area.

Plans for next quarter: Preliminary browse samples will be completed and questionnaires will be mailed.

(c) Behavioral Patterns of Deer on Isle au Haut

- Objectives: (1) To study behavioral aspects of deer in relation to season, reproduction, and social interactions.
 (2) To correlate behavior characteristics with sex, age, and social status.

Assignment: John J. Vogler, Graduate Assistant

Thesis Adviser: Sanford D. Schemnitz, Assistant Leader

This is a new project and is, in part, a follow-up to the study by former Graduate Assistant Klataske. Deer trapping and color-marking for identification was begun in February. The clover-type net traps are being used for capture. Trapping will continue until the males begin antler growth.

At present there are 16 tagged deer known to be alive on the island, and it is estimated that there are an additional 5 to 10 tagged animals that have been reported by residents. The late winter population of deer on the island is not known; however, Klataske (M.S. Thesis, University of Maine, 1968) believed that the late summer population of 1967 was about 200 animals.

Winter trapping on the island has not been as successful as that previously conducted in the fall by Klataske. Deer movement was noted at all trap sites; however, the animals seemed reluctant to enter the traps. It is possible that they were obtaining sufficient natural food and thus not interested in entering the traps for the bait. A total of 15 deer were captured, 12 of which had been previously tagged by Klataske. Three new animals were tagged, all being male fawns. The best trapping success was obtained by using a combination of apples and cedar browse.

Body measurements and weight was recorded from all deer captured. In the case of recaptures from previous tagging, the collars were removed because of possible injury to the animals, and the original plastic ear streamers were replaced by a new type. The physical conditions of the deer trapped were good in each case but one. This was a male fawn and its physical condition was judged to be only fair because of the absence of almost all body fat. He weighed 60 pounds at the time of capture, and was approximately 10 months old.

Plans for next quarter

Trapping with the use of portable clover traps will be continued until the first week in May. A new type of net trap is being developed in which there will be 2 or 4 sliding net gates. Attempts to immobilize and capture deer through the use of the Cap-Chur gun will be continued throughout the next quarter. Observations of the travels and behavior of family groups will be initiated in May.

OUTDOOR RECREATION

Socio-Economic Characteristics of Maine Sportsmen

Assignment: Robert W. Meyer, Graduate Assistant

Thesis Advisers: Thomas Corcoran, Associate Director, Forestry and Forest Products, School of Forest Resources
Malcolm Coulter, Associate Director in Wildlife, School of Forest Resources

This is a continuation of a regional project initiated in 1965. The first phase of the Maine segment was completed as an M.S. thesis by former Graduate Assistant Charles Lobdell (summarized in Unit quarterly report, July-September, 1967).

During the past quarter much time was devoted to becoming familiar with the large amount of data available from the earlier questionnaires. The direction of the current segment will depend in part upon completion of a summary of the basic data from the region and the findings of the regional committee.

Plans for next quarter: Continue work on regional summaries and formulate specific objectives for this second phase of the overall study.

Current Projects Inactive During Quarter or for Which No Reports were Prepared:

Ecology and Behavior of the fisher - M.W. Coulter
 Waterfowl Distribution and Breeding Ecology - H.L. Mendall
 Waterfowl Hunter Bag Checks - H.L. Mendall
 Renesting and Homing of the Eider - M.W. Coulter
 Annual Production and Factors Influencing Nesting Success of the Eider - H.L. Mendall
 Woodcock Population Studies - H.L. Mendall and S.D. Schemnitz
 Ecology of White-tailed Deer in a Low Harvest Area of Eastern Maine - L.J. Roop
 Factors Affecting the Production of Ruppia and Macroinvertebrates in a Salt Marsh - V.D. Rasar
 Influences of Known Populations of Deer Upon Forest Vegetation - S.D. Schemnitz

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES

Behrend, Coulter, Schemnitz and Mendall attended the Northeast Fish and Wildlife Conference in Bedford, New Hampshire, January 14-17. Behrend was chairman of the forest-game session. Mendall presented a paper at the wetlands session describing the eider duck study being conducted jointly by the Unit and the Boston Regional Office. The paper was entitled, "An Inventory of Maine's Breeding Eider Ducks."

Mendall and Schemnitz participated in the woodcock symposium at Baton Rouge, Louisiana, January 24-26. Mendall presented a paper at the panel on future research needs.

Coulter and Mendall prepared a joint manuscript on black duck breeding ecology for presentation at the Black Duck Symposium held at Chestertown, Maryland, March 5. Coulter delivered the paper which was entitled, "Habitat and Breeding Ecology of the Black Duck in the Northeastern States." He also participated in the waterfowl technicians' meeting of the Atlantic Flyway Council held at the same time.

Mendall and Coulter participated in the annual 2-day meetings of Cooperative Wildlife Unit Leaders and cooperators held in Houston, Texas in March. They also attended the North American Wildlife and Natural Resources Conference there. In addition Mendall attended the mid-winter meeting of the Atlantic Flyway Council.

The fourth annual Game Warden Training School was held for 10 weeks on the University campus. Coulter was Director of the School and also taught the course in game biology. Schemnitz taught plant identification. Occasional assistance in laboratory sessions was provided by Mendall and several of the graduate assistants. This year's enrollment consisted of 11 Maine and 3 Vermont wardens.

Schemnitz, Coulter and Mendall participated in several woodcock program planning conferences with State and Federal personnel in connection with the Accelerated Migratory Upland Game Bird Research project. William Russell, Migratory Bird Populations Station, has been assigned by the Bureau as

woodcock biologist in Maine. He has been provided with office space and other physical facilities at the Unit.

PUBLICATIONS AND THESES

Clark, Stephen H.

1968. The breeding ecology and experimental management of the American eider in Penobscot Bay, Maine. M.S. Thesis (Unpublished), Univ. of Maine, Orono. 169 pp.

Klataske, Ronald D.

1968. An evaluation of deer census techniques, and the physical condition of deer on Isle au Haut. M. S. Thesis (Unpublished), Univ. of Maine, Orono. 159 pp.

McLaughlin, F. Loy

1968. Ecological relationships of white-tailed deer and vegetation at Acadia National Park. M. S. Thesis (Unpublished), Univ. of Maine, Orono. 106 pp.

Respectfully submitted,


Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit

April 17, 1968

File Copy

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

April-June, 1968

Cooperating Agencies

Maine Department of Inland Fisheries and Game
Wildlife Management Institute
University of Maine
U.S. Bureau of Sport Fisheries and Wildlife

NOT FOR PUBLICATION

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

TABLE OF CONTENTS

	PAGE
WILDLIFE STAFF	3
RESEARCH PROJECTS	4
WATERFOWL	
A Population Analysis of Maine-banded Wood Ducks	4
Waterfowl Distribution and Breeding Ecology	6
Eider Duck Ecology and Management	7
RUFFED GROUSE	
Ecology of the Ruffed Grouse in Maine	9
WOODCOCK	
Spring Breeding Behavior Studies of the American Woodcock	10
A Study of the Summer Behavior of the American Woodcock	11
(Financed by Maine Federal Aid in Wildlife Restoration Funds)	
BIG GAME	
Telemetry Studies of Deer Movements and Habitat Utilization of Acadia National Park	12
(Financed by Contract with National Park Service)	
Ecology of White-tailed Deer in a Low Harvest Area of Eastern Maine	13
(Financed by Maine Federal Aid in Wildlife Restoration Funds)	
OUTDOOR RECREATION	
Socio-Economic Characteristics of Maine Sportsmen	14
(Financed by Agr. Exp. Sta., Hatch Act Funds)	
CURRENT PROJECTS INACTIVE DURING QUARTER	15
COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES	15
PERSONNEL CHANGES	16
PUBLICATIONS AND THESES	16

Wildlife Staff

Howard L. Mendall, Unit Leader and Professor of Wildlife Resources
 Voit B. Richens, Assistant Unit Leader and Assistant Professor of
 Wildlife Resources
 Malcolm W. Coulter, Associate Director for Wildlife, School of Forest
 Resources and Professor of Wildlife Resources
 Sanford D. Schemnitz, Associate Professor of Wildlife Resources, School
 of Forest Resources
 Ray B. Owen, Jr., Assistant Professor of Wildlife Resources, School of
 Forest Resources

Unit Collaborators - Personnel from 11 University departments or State
 and Federal agencies are actively collaborating with the Unit.
 Individuals assisting with projects that are currently reported
 upon are listed in connection with the appropriate project summary.

Graduate Assistants - Thomas J. Allen	John J. Volger
William B. Krohn	Larry J. Roop
Robert W. Meyer	Vaughn D. Rasar
Anthony M. Rinaldi	

Graduate Student - Lawrence S. Barden

Unit Secretary - Maxine L. Horne

Unit Coordinating Committee

Ronald T. Speers, Commissioner, Maine Dept. Inland Fisheries and Game
 Albert D. Nutting, Director, School of Forest Resources
 Howard L. Mendall, Unit Leader

QUARTERLY REPORT

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

April-June, 1968

RESEARCH PROJECTSWATERFOWL(A) A Population Analysis of Maine-banded Wood Ducks

- Objectives: (1) To describe the migration of wood ducks banded in Maine from 1939 to 1965.
- (2) To determine the factors affecting the size and distribution of the harvest of wood ducks breeding in Maine.
- (3) To calculate survival rates, contribution of hunting mortality to total mortality and other related factors.
- (4) To devise a population model for use in predicting annual population levels under varying mortality rates.

Assignment: Lawrence S. Barden, Graduate Student

Thesis Adviser: Howard L. Mendall, Leader

Consultants: Richard W. Hatch, Leader, Cooperative Fishery Unit
Howard E. Spencer, Dept. Inland Fisheries and Game

The thesis was completed during the quarter and Barden was awarded the degree of Master of Science at the June commencement. His thesis summary is as follows:

An analysis of bandings and recoveries of Maine-banded wood ducks was conducted from September, 1966 to May, 1968. Banding and recovery data collected by the United States Bureau of Sport Fisheries and Wildlife from 1939 to 1965 were the basis of the study. The objectives were to tabulate and analyze banding results from 1939 to 1965, to describe routes and timing of fall migration, to determine the distribution of hunting kill of wood ducks banded in Maine, to estimate mortality rates, and to investigate the dynamics of a population of wood ducks by constructing a mathematical model of a population.

Approximately 100 programs were written and run on the University computers, an IBM 1620 and an IBM 360, to analyze the banding data. Composite-dynamic life tables were used to estimate total annual mortality, and the results of Maine were compared with those for Vermont and Massachusetts.

The following conclusions resulted from the analysis:

1. A compilation of data from 11 unpublished studies in Maine shows that nest initiation in this State occurs regularly during the last week of April, and has been recorded as early as the second and third week of that month.

2. Approximately 7,000 wood ducks were banded in Maine between 1939 and 1965. More than half of these were banded on the Penobscot River. The other stations from which such data were available were located near Sebasticook Lake, on Moosehorn National Wildlife Refuge, and in the Androscoggin and Kennebec River valleys.

3. At Moosehorn and at the Androscoggin-Kennebec stations, adult males outnumber other sex and age groups in the banding sample. These banding stations are probably important late summer congregating sites for adult males rather than major breeding areas.

4. Both male and female immatures outnumber adults in the banding sample at Penobscot, probably because the Penobscot Valley is an important breeding area, but the vicinity of the banding station is not an important congregating site for adult males in late summer. At the Sebasticook station adult and immature males were trapped in about equal numbers, indicating that the station is used both for breeding and for late summer congregating.

5. Recoveries in Maine indicate that wood ducks begin migration by flying southwest from the banding site in the fall without following river valleys.

6. After leaving Maine, southbound wood ducks migrate along the Atlantic coastal plain, rarely crossing the Appalachian Mountains.

7. According to available band recoveries, North Carolina, South Carolina, Georgia, and Florida are the wintering states for roughly 80 percent of the wood ducks banded in Maine.

8. Immature wood ducks banded after September 1 are less likely to be recovered or reported by hunters in Maine than immature ducks banded before September 1. The pre-September bandings probably consist largely of local birds which use the vicinity of the banding stations for breeding in early summer and congregating in late summer. The September banding sample, on the other hand, probably includes a large proportion of birds which have gathered at the banding station from other breeding grounds, and some of the September-banded birds may be migrants already on their way south.

9. Roughly 90 percent of recoveries by hunting in Maine of wood ducks banded before September 1 occur in the same 10 minute block or in a 10 minute block adjacent to the one where the birds were banded.

10. Recovery rates in Maine of wood ducks banded at Moosehorn are significantly lower ($P \leq .01$) than recovery rates of birds banded at other stations. Possible reasons for the difference are that waterfowl hunting is prohibited in the vicinity of the banding station and that hunting pressure is low near the Refuge.

11. More than 65 percent of the total recoveries of banded wood ducks by hunters in Maine occurred during the first three days of the hunting season.

12. Very few banding recoveries in Maine occurred after October 20. It is believed that most wood ducks have left the State by that time. This conclusion is supported by other data including harvest records.

13. Autumn migration from Maine to Florida requires about 40 to 60 days.
14. Regression analysis based on distribution of kill was not a practical technique for correlating the timing of migration with weather factors such as accumulated rainfall or degree-days since a single factor may be important one year and relatively unimportant the next.
15. Approximately half the total hunting kill of immature Maine wood ducks and 30 percent of the total kill of adults occurs in Maine.
16. The other states in which hunters take an appreciable number of Maine wood ducks are North Carolina, South Carolina, Georgia, and Florida, in that order.
17. Operation of an experimental population model under varying mortality rates shows that a moderate increase in hunting mortality (10 percent for immatures, 8 percent for adults) above present levels results in a gradual decline of the hypothetical population to very low levels.
18. It is inherent in the design of the model that when present mortality rates are applied for 30 years to several different initial populations, the final population level is the same regardless of the initial size of the population.

(B) Waterfowl Distribution and Breeding Ecology

Objectives: To obtain data on factors influencing distribution and migration of waterfowl in Maine and to determine population densities of the important breeding species, especially the black duck and ring-necked duck, under varying habitat conditions.

Assignment: Howard L. Mendall, Leader

Breeding ground appraisals were conducted on a very reduced scale again this year because of other project commitments and a lack of sufficient manpower. However, breeding pair counts were made on some of the most reliable of the Unit census areas, especially in eastern Maine. On the basis of these it is believed that both black ducks and ring-necked ducks are somewhat increased from the apparent 10-year low point of 1967.

Chronologically it has been an early nesting season. Water levels have been generally favorable for both nesting and rearing in the State as a whole. Excessive precipitation in southern Maine and a contrasting rainfall deficiency in northern Maine does not appear to have had any adverse effect on production.

Plans for next quarter: A few brood checks will be made during July and August on regular check areas.

(C) Eider Duck Ecology and Management(1) Annual Production and Factors Influencing Nesting Success

Objectives: To determine annual production and factors related to eider nesting success in breeding colonies of the Muscle Ridge Channel of Penobscot Bay.

Assignment: Howard L. Mendall, Leader

Field work on the five islands of the Muscle Ridge study area near Rockland was begun May 21. A total of 508 nests were located and marked. Mendall's wife assisted materially in the search for and subsequent rechecking of nests.

Breeding populations on the study area were substantially increased in comparison with 1967. This lends additional support to the belief that the statewide population as determined by the aerial inventory (sub-project 2) was greater than a year ago. There was some variation by islands as would be expected. Most noticeable increase was at Tommy Island; moderate increases were recorded at Garden and Fisherman's islands and a slight increase at Seal Island. Oak Island alone showed a decline, but this is a relatively new colony, small in size, and has shown marked year to year fluctuations.

Phenology was greatly accelerated at the beginning of the breeding season but then retarded by a long spell of cold, wet weather during late May and much of June. However, the early advance resulted in the earliest nesting recorded in 5 years. As of July 7 there were only 11 nests on the entire study area known to be still active--1 each on Garden and Seal islands and 9 on Fisherman's Island.

Although a few nests remain to be checked, hatching success thus far is appreciably better than in 1967. There was one exception, Tommy Island, where the presence of a large flock of sheep and numerous visits by sightseers and bird watchers (4 parties in one day!) resulted in hatching success of only 42 percent. This is in marked contrast to eider production there in 1965 and 1966, prior to introduction of sheep, when nest success was 68 and 80 percent respectively. The situation at Tommy Island is unfortunate in that, prior to this year, nesting cover was of the best quality (dense raspberries and herbs) on any of the study islands and the eider breeding population has shown a rapid and continuous increase. The vegetation is now being seriously cropped by the sheep and, since the island is close to the mainland, it is being visited by boating parties with increasing frequency.

The opposite trend prevailed on Fisherman's Island where hatching success to date is about 60 percent. Sheep were formerly pastured there, but there has been none since 1965. This has permitted 3 years recovery of vegetation with nettle and goldenrod, in particular, benefitting. The advanced early phenology of this spring resulted in much more extensive utilization of these plants by nesting eiders and less use of grass. The latter is of necessity chosen for nesting in a retarded growing season but does not provide very good cover. The interest and cooperation of the owner of the island, Maurice Duncan of Rockland, in refusing permission to pasture sheep and in discouraging sightseers, has been instrumental in the success of the Fisherman's Island birds.

As an incidental part of the breeding studies, 44 female eiders were caught on their nests. Of these, 27 were captured on Fisherman's Island with a long-handled net and the remainder were taken at Tommy Island in Weller-type nest traps (modified by Coulter for eiders as reported in previous quarterly reports). Coulter spent two days with Mendall at Tommy Island in this activity. The nest traps are much more efficient and selective when it is desired to capture specific birds. However, use of the hand net creates less disturbance to the colony as a whole, and results in fewer nest desertions and less gull predation.

Four of the captured eiders were returns from previous years' bandings, 2 from Tommy Island and 2 from Fisherman's Island. In each instance the birds were nesting in the same portion of the island where originally banded.

Plans for next quarter: To complete the season's field studies.

(2) Distribution of Eider Populations in Coastal Maine

- Objectives: (1) To locate the principal breeding colonies along the Maine coast.
 (2) To develop a satisfactory technique for aerial breeding ground inventory.
 (3) To determine the abundance and subspecific composition of fall and winter populations.

Assignment: Howard L. Mendall, Leader
 William Snow, Game Management Agent, U.S. Bureau of Sport Fisheries and Wildlife

Consultants: Rex Tice, Division of Management and Enforcement, U.S. Bureau of Sport Fisheries and Wildlife
 Carl Gruener, Division of Management and Enforcement, U.S. Bureau of Sport Fisheries and Wildlife
 Donald Blais, Game Management Agent, U.S. Bureau of Sport Fisheries and Wildlife
 Owen E. Seelye, Game Management Agent, U.S. Bureau of Sport Fisheries and Wildlife

The 1968 eider aerial survey conducted jointly by the Maine Unit and the Division of Management and Enforcement of the Boston Regional Office was carried out in early May. Four days of flying, totaling about 20 hours, was devoted to the study. The Bureau's DeHavilland Beaver plane was used and the crew consisted of Agent-Pilot William Snow, Agents Owen Seelye and Donald Blais, and Unit Leader Mendall. The same flight plan was followed as in 1967 to permit comparison of data. Also the same flight crew has participated for three consecutive years which adds to comparability of the figures.

A total of 45,652 eiders were recorded, a substantial increase over 1967 (37,538). Sex ratios, and age ratios in case of drakes, were obtained for about 20 percent of the birds. A nearly 50:50 distribution of sexes was noted as has been the case in each of the three years of the survey. Subadult

males comprised 4.7 percent of the birds and the assumption is made that there was a similar proportion of subadult females (the latter are indistinguishable from adults in the field). Subtracting the subadults from the total, it is estimated that the 1968 breeding population in Maine was somewhat in excess of 20,000 pairs.

Agents Snow and Seelye completed the general survey by boat of Maine's breeding islands, working primarily on the Washington and Hancock County coast this year. They checked 44 islands, 16 of which had breeding eiders.

In addition, 10 of the most distant offshore islands, especially those in outer Penobscot Bay, were reached by Mendall and Snow by helicopter. These islands are difficult to land on from a boat. One of these, in the Matinicus group of islands, contains the largest eider colony known in Maine. Based on the sample nest check it is estimated the population there was upwards of 800 pairs.

Plans for next quarter: Inactive.

RUFFED GROUSE

Ecology of the Ruffed Grouse in Maine

- Objectives: (1) To study population dynamics of harvested and unharvested grouse populations; and to compare mortality rates of resident non-migratory species (grouse) and migratory species (woodcock) on the same area.
- (2) To determine cover preferences and use of forest clearings by adults and broods in spring and summer.
- (3) To study the causes of juvenile mortality and measure the incidence of blood parasites.

Assignment: Sanford D. Schemnitz, Assistant Leader

Consultants: Robert Wade, Moosehorn National Wildlife Refuge
David C. O'Meara, Associate Professor of Animal Biology

Site evaluation was completed at 23 drumming sites on the Moosehorn Refuge. Ruffed grouse were caught with mirror traps and banded by Gary Donovan, a senior wildlife student who assisted in the continued study of drumming sites on the University Forest in Old Town. Nine new areas were located and 6 drumming males were banded.

Plans for next quarter: Complete drumming site evaluations on the University Forest. Continue to coordinate student efforts involving grouse trapping and banding with the woodcock banding program of the Moosehorn Refuge.

WOODCOCK(A) Spring Breeding Behavior Studies of the American Woodcock

- Objectives: (1) To study the basic behavior of breeding woodcock and their habitat utilization as they relate to the reliability of the woodcock singing ground survey.
- (2) Collect detailed information to clarify the relation between habitat, population density and climate factors that influence the onset periodicity, and peak periods of courtship performance of male woodcock.

Assignment: Sanford D. Schemnitz, Associate Professor
 Assistants: Charles Smart, Research Assistant
 Robert Meyer, Graduate Assistant

Consultants: Howard L. Mendall, Unit Leader
 William Russell, U.S. Bureau of Sport Fisheries and Wildlife

Mist-netting operations for woodcock were conducted under the direction of Schemnitz and Smart on a total of 44 active singing grounds along a 5.5 mile section of the Cardville Road in Greenbush from April 17 through May 30, 1968. A history of use of singing grounds is available through Unit studies since 1953 for this area.

By May 27 courtship had ceased almost completely, although sporadic performances were observed as late as June 12. A total of 28 woodcock were captured on 21 singing grounds plus one adult male which had been banded the previous summer. Crews made up of graduate students worked a total of 23 nights in the fields expending 2.94 man-nights per bird captured. Trapping success was 3.96 net-nights per bird captured. Nets were set perpendicular to the line of flight. Sixteen woodcock were captured ascending and 14 descending. Of the 29 birds captured 27 were males and 2 were females (1 adult and 1 subadult). Five of the males were subadults and 22 were adults.

In 6 instances woodcock previously banded this year were retaken later in the season (Table 1). All were adult males.

Table 1. Summary of Woodcock Recaptures at Greenbush

Band No.	Date Captured	Date Repeated	Weight Change	Distance from Original Trapsite
1063-91301	4/17/68	5/3/68	0	0.15 miles
1063-91301	4/17/68	5/23/68	+10 gm	0.00 miles
1063-91303	4/22/68	5/11/68	+ 3 gm	0.90 miles
1063-91307	4/28/68	5/12/68	+ 6 gm	0.15 miles
1063-91312	5/2/68	5/26/68	+ 3 gm	0.45 miles
1063-91319	5/4/68	5/6/68	0	0.10 miles

Only one bird from a previous year was recaptured on the Greenbush area. This adult male (973-37172) was banded by Maine Department of Inland Fisheries and Game personnel on August 22, 1967 as a subadult at a summer concentration field approximately 1 mile from its singing ground recapture site.

Preliminary studies were conducted using miniature radio transmitters weighing 12 and 20 grams. Various types of harnesses were tested on four female woodcock caught in the Greenbush study area, but only one was successfully tracked for a long enough period to be meaningful. This female, a subadult, was originally captured May 24 in a mist net on a singing ground. Since then she has remained relatively inactive, appearing only short distances from the capture site. On the afternoon of June 16 she was located in an alder cover 0.3 miles south of the trapsite. On the evening of June 18 she was discovered hiding in a damp lowland area under a cover composed primarily of conifers. This area was approximately 0.35 miles north of the original trapsite. On subsequent occasions she was found using the same cover to the north.

During the last half of June a series of 14 consecutive vertical, aerial photos were taken along the entire length of the Greenbush study route at a scale of 4 inches to the mile. These photographs are to be used as an aid in the location and mapping of singing ground vegetation, and in making comparisons with cover changes that have occurred since 1954.

Plans for next quarter:

1. To continue radio telemetry and tracking studies.
2. To classify vegetation present on singing grounds.
3. To continue banding activities on summer concentration fields.

(B) A Study of the Summer Behavior of the American Woodcock

- Objectives: (1) To study the activities of woodcock on summer concentration fields.
- (2) To measure selected environmental factors that may influence the selection of fields, or parts of them, by woodcock during summer concentration periods.

Assignment: William B. Krohn, Graduate Assistant

Thesis Adviser: Malcolm W. Coulter, Associate Director for Wildlife,
School of Forest Resources

Consultants: J. William Peppard, Dept. Inland Fisheries & Game
Sanford D. Schemnitz, Associate Professor
Howard L. Mendall, Unit Leader

Of the 8 concentration fields presently known to be used by woodcock during summer in central Maine, 2 have been selected as primary study areas. By the second week of June courtship activities on these 2 fields had ceased and a week later woodcock were regularly flushed from both fields at night.

Attempts to observe the activities of these birds from an elevated blind, and from the ground, with an infra-red "snooper scope" have been unsuccessful thus far. To date the birds have shown no definite preference for specific areas on either field. Instead, they have been flushed individually and in "groups" from most portions of the fields.

The study fields are being searched twice a week and the locations of all flushes marked. Detailed analysis of the vegetation on flushing sites is being made. This information will be related to data regarding invertebrate life and soil moisture.

Plans for next quarter: Intensive field work will continue until September. Analysis of the vegetation at flushing sites will be started and soil moisture data collected. Soil samples will be taken and the invertebrate life extracted and counted.

BIG GAME

(A) Telemetry Studies of Deer Movements and Habitat Utilization of Acadia National Park

Assignment: S. D. Schemnitz, Associate Professor
Thomas J. Allen, Graduate Assistant

Consultants: Robert Binneweis, Chief Ranger, Acadia National Park
Paul G. Favour, Chief Naturalist, Acadia National Park
Roy W. Stamey, Park Ranger, Acadia National Park

Objectives: (1) To study the mobility and habitat utilization of deer at Acadia National Park.
(2) To study critical wintering areas where cedar utilization is heavy.

Telemetry data are being gathered on an adult female to which a radio was attached on March 12, 1968. The deer's movements have closely followed the same daily pattern established in late March. Her total home range has been about 140 acres, 3,000 feet by 2,500 feet. The area consists of lowland grass meadows and ponds, interspersed with a dense hardwood stand. This is surrounded by ridges covered with conifers and hardwoods. There are five grassland meadows in the area, ranging from $\frac{1}{2}$ to 1.0 acre in size, which she frequently uses. These meadows, with the exception of two adjoining ones, are approximately 750 feet apart. During the last week of June, the movements of the doe became very restricted and confined exclusively to the meadows; she remained in a single meadow for as long as 48 hours at a time and was kept under close surveillance from the tracking stations during this period. Based on her behavior from tracking data, it is believed that the fawning date was between the 24th and 27th of June. Several searches have been made to locate the fawn, but have been unsuccessful to date.

The rumen samples taken during the Park herd-control program have been analyzed for VFA, protein, fiber, carotene, ash, and fat content and are presently being analyzed for frequency and abundance of food components.

Approximately 150, 4 x 66" browse plots were established in the 320-acre wintering area. The available deer browse on the plots was measured by a twig count method. Browsed twigs and pellet groups on the plots were also recorded.

Plans for next quarter: The tracking of the radio-equipped adult female will be continued. Further attempts will be made to capture its fawn and another adult deer in order that additional radio-tracking may be done. The rumen analyses will be completed and the results tabulated.

(B) Ecology of White-tailed Deer in a Low Harvest Area of Eastern Maine

- Objectives: (1) To determine the causes of the low deer kill in a block of 21 townships in Hancock and Washington counties.
 (2) To relate these findings to area management suggestions.

Assignment: Larry J. Roop, Graduate Assistant

Thesis Adviser: Sanford D. Schemnitz, Associate Professor

Consultants: J. William Peppard, Dept. Inland Fisheries and Game
 Harold E. Young, School of Forest Resources

The thesis was completed during the quarter and Roop was awarded the M.S. degree. His thesis summary is as follows:

A study was conducted in eastern Maine between September 1965 and June 1967. The objective was to determine what factors contributed to the low deer harvests in a 21 township area. Procedure was similar to that established in a previous study (Gramlich, 1965) in which 29 surrounding townships were used for comparison with the low-kill townships. Emphasis was on deer herd condition, sex and age composition of the harvested animals, condition of the winter range, and hunting patterns within the two groups of townships.

Conclusions derived from the results of this study are as follows:

1. The deer sex and age composition and productivity figures for the entire study area (low-kill and perimeter townships combined) were very similar to those for southeastern Maine and the State as a whole, except that there was an unexplainable lack of yearlings, in particular yearling females.
2. The productivity figures and age distribution of the deer in the low-kill area were comparable to those of the perimeter, but there were significantly more males in the harvest of the low-kill townships.
3. There were no significant differences in the physical measurements and weights of the deer from the two areas.
4. The average effort per hunter, success rates, and proportion of resident and non-resident hunters were the same for the low-kill and perimeter townships.

5. Hunting effort in the low-kill area was more concentrated in the second and third weeks of the seasons than in the perimeter. This could account for the differences in proportion of harvested males from these two areas, since this was the period when the highest percentage of males occurred in the statewide kill.

6. Rate of questionnaire returns from the State hunter survey showed a significant positive relationship with registered deer kill in the study area townships, and accounted for 57 percent of the variation in deer kill.

7. Hunting pressure estimates from both the State hunter survey and registered deer kill indicated a ratio of one hunter in the low-kill area for every three in the perimeter.

8. Hunter vehicle censuses revealed that there were fewer vehicles in the low-kill area and that their average distance from a blacktop road was much greater than in the perimeter. The number of vehicles in both areas dropped appreciably during the last one or two weeks of the seasons.

9. The number of vehicles traveling into these remote areas on gravel roads decreased 43 to 57 percent at a distance of 10 miles from the nearest blacktop road.

10. The overall condition of the winter deer yards in the low-kill and perimeter townships was comparable, although some variation in browse species composition and distribution occurred. The mean values of protein of several browse species from the deer yards of the two areas did not differ statistically.

11. The results of this study suggest that differences in deer kill within the study area townships are largely due to differences in the number of hunters using these areas. The findings add support to Gramlich's (1965) previous conclusion that in this area deer kill and accessibility are closely related.

OUTDOOR RECREATION

Socio-Economic Characteristics of Maine Sportsmen

Assignment: Robert W. Meyer, Graduate Assistant

Thesis Advisors: Thomas Corcoran, Associate Director, Forestry and
Forest Products, School of Forest Resources
Malcolm Coulter, Associate Director for Wildlife,
School of Forest Resources

The final draft, as well as an introduction and summary of Maine's assigned section for a regional publication, has been completed. This publication will consist of material written by each of six cooperating northeastern states.

The regional committee has developed a new computer program which will facilitate a more detailed breakdown of the various characteristics of hunters, fishermen, and combination hunters and fishermen.

Plans for next quarter: Continue work on a State publication and outline specific objectives for the thesis problem under the general direction of the regional committee.

CURRENT PROJECTS INACTIVE DURING QUARTER OR FOR WHICH NO REPORTS WERE PREPARED

Ecology and Behavior of the Fisher - M. W. Coulter
 Waterfowl Hunter Bag Checks - H. L. Mendall
 Renesting and Homing of the Eider - M. W. Coulter
 Factors Affecting the Production of Ruppia and Macroinvertebrates in a Salt Marsh - V. D. Rasar
 Influences of Known Populations of Deer Upon Forest Vegetation - S.D. Schemnitz
 Behavioral Patterns of Deer on Isle au Haut - John J. Vogler
 Deer Browse in Relation to Cutting Practices on the Penobscot Experimental Forest - Anthony J. Rinaldi

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES

The Unit participated in the University Open House during April. Coulter was chairman of the wildlife session. Behrend presented an illustrated lecture on white-tailed deer as part of the program. Coulter discussed the University wildlife program at the Pre-Forest Forum meeting held in connection with the Open House activities.

Mendall and Schemnitz conducted the annual woodcock censuses on the northeastern Maine routes at the request of the State Game Division and the Bureau of Sport Fisheries and Wildlife. A slight but not statistically significant decrease was recorded. Several new random census routes were also covered by Mendall.

Professor-emeritus Ralph King of Syracuse University was a visitor to the Unit in April. He lead a seminar discussion for wildlife seniors and graduate students. He also gave an evening public lecture sponsored by the student chapter of The Wildlife Society and the Forestry Club.

Former Idaho Unit Leader Dr. Paul Dalke spent 3 days at the Unit in May. He gave an illustrated lecture on western wildlife habitat at a faculty-graduate student dinner. He spent one day at Acadia National Park with Schemnitz and Graduate Assistant Allen. A second day was spent with Graduate Student Barden at Baxter State Park.

Coulter was named to the student affairs committee of The Wildlife Society by President Thomas Scott. He was appointed to the University of Maine library committee for a 5-year term.

Mendall attended a woodcock research planning meeting in the Boston Regional Office.

Schemnitz attended a meeting in Augusta with personnel of the Bendix Corporation to consider the use of a "thermal mapper" in censusing deer.

Schemnitz, accompanied by four graduate assistants, attended a seminar April 18 at the University of New Hampshire.

PERSONNEL CHANGES

Dr. Donald Behrend, Assistant Professor of Wildlife Resources, accepted a position as Director of the Huntington Wildlife Station, Newcomb, New York. He resigned his position in Maine effective May 15.

Two new wildlife staff members joined the Unit and University the last of June:

Dr. Voit Richens is the new Assistant Unit Leader and Assistant Professor of Wildlife Resources. He obtained the PhD degree in 1967 from Utah State University. Prior to his transfer to Maine he was a biologist with the Bureau's Denver Research Center, most recently stationed in Davis, California. His research experience has been primarily with big game and animal control.

Dr. Ray Owen, Jr. was appointed Assistant Professor of Wildlife Resources of the School of Forest Resources, effective July 1, and will serve as a Unit collaborator. He obtained the PhD degree this spring from the University of Illinois where he had both research and teaching experience. His doctoral studies were concerned with the use of telemetry in measuring avian physiology.

PUBLICATIONS AND THESES

Barden, Lawrence S.

1968. A population analysis of Maine-banded wood ducks. M.S. Thesis, Univ. of Maine, Orono. 109 pp.

Roop, Larry J.

1968. Deer hunting and herd dynamics as related to harvest in certain eastern Maine townships. M.S. Thesis, Univ. of Maine, Orono, 117 pp.

Coulter, M. W., and W. R. Miller

1968. Nesting biology of black ducks and mallards in northern New England. Bull. 68-2, Vermont Fish and Game Dept., Montpelier, Vermont. 74 pp.

Mendall, Howard L.

1968. An inventory of Maine's breeding eider ducks. Trans. Northeastern Section, Wildlife Society, 25th N.E. Fish & Wildl. Conf., pp. 95-104.

Respectfully submitted,

Howard L. Mendall

Howard L. Mendall, Leader
Maine Cooperative Wildlife
Research Unit

July 18, 1968

File copy

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

July-September, 1968

Cooperating Agencies

Maine Department of Inland Fisheries and Game
Wildlife Management Institute
University of Maine
U.S. Bureau of Sport Fisheries and Wildlife

NOT FOR PUBLICATION

TABLE OF CONTENTS

	PAGE
WILDLIFE STAFF	3
RESEARCH PROJECTS	4
WATERFOWL	
Waterfowl Distribution and Breeding Ecology	4
SALT MARSH ECOLOGY	
Factors Affecting the Production of <u>Ruppia</u> and Macroinvertebrates	4
WOODCOCK	
Patterns of Woodcock Activities on Summer Concentration Fields in Maine	6
Spring Breeding Behavior Studies of the American Woodcock.	7
RUFFED GROUSE	
Ecology of the Ruffed Grouse in Maine	8
BIG GAME	
Factors Affecting the Summer Flight Behavior of White- tailed Deer on Isle au Haut	9
Influence of Known Populations of Deer Upon Forest Vegetation	12
CURRENT PROJECTS NOT REPORTED THIS QUARTER	12
COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES	12
PERSONNEL CHANGES	14
PUBLICATIONS AND THESES	14

WILDLIFE STAFF

Howard L. Mendall, Unit Leader and Professor of Wildlife Resources
 Voit B. Richens, Assistant Unit Leader and Assistant Professor of Wildlife Resources
 Malcolm W. Coulter, Associate Director for Wildlife, School of Forest Resources and Professor of Wildlife Resources
 Sanford D. Schemnitz, Associate Professor of Wildlife Resources
 Ray B. Owen, Jr., Assistant Professor of Wildlife Resources
 Frederick F. Gilbert, Assistant Professor of Wildlife Resources

Unit Collaborators - Personnel from 12 University departments or State and Federal agencies are actively collaborating with the Unit. Individuals assisting with projects that are currently reported upon are listed in connection with the appropriate project summary.

Graduate Assistants:	William B. Krohn	John J. Vogler
	Robert W. Meyer	Vaughn D. Rasar
	Anthony M. Rinaldi	Andre Bourget

Special Student: Thomas J. Allen

Unit Secretary: Maxine L. Horne

Unit Coordinating Committee

Ronald T. Speers, Commissioner, Maine Dept. Inland Fisheries and Game
 Albert D. Nutting, Director, School of Forest Resources
 Howard L. Mendall, Unit Leader

RESEARCH PROJECTSWATERFOWLWaterfowl Distribution and Breeding Ecology

- Objectives: (1) To obtain data on factors influencing distribution and migration of waterfowl in Maine.
- (2) To determine population densities of the important breeding species, especially the black and ring-necked ducks, under varying habitat conditions.

Assignment: Howard L. Mendall, Unit Leader

Brood and population checks during late summer substantiated previous conclusions (given in the last quarterly report) that both black and ring-necked ducks were increased on Unit study areas this year. Insufficient data were obtained on other breeding species although it is likely that the wood duck population was also increased this year.

A precipitation deficiency in northern Maine during late spring and early summer became statewide by mid-summer and continued throughout September. Although gradually declining water levels appeared to have few adverse effects on production, they are likely to have a marked effect on the distribution of fall populations. Throughout September a withdrawal of birds from marsh and stream habitats toward large bodies of water and to tidal areas was noted.

Plans for next quarter: Limited population checks will be made throughout the fall.

SALT MARSH ECOLOGYFactors Affecting the Production of Ruppia and Macroinvertebrates in a Salt Marsh

- Objectives: (1) To determine factors which affect the production of widgeon grass, Ruppia maritima.
- (2) To investigate the effects of plugged ditches upon production of Ruppia and on populations of macroinvertebrates.
- (3) To investigate the effects of plugged ditches on mosquito reproduction.

Assignment: Vaughn D. Rasar, Graduate Assistant

Thesis Advisor: Malcolm W. Coulter, Professor of Wildlife Resources

Consultants: Kenneth Anderson, Regional Biologist, Dept. Inland Fisheries and Game
George Cooper, Professor of Botany
Harold Gausman, Former Professor of Soil Chemistry

Rasar completed all graduate requirements during the summer and will receive his M.S. degree at the January Commencement. The summary of his thesis is as follows:

A study to evaluate the effects of holding water in drainage ditches on the production of widgeongrass and Hydrobia was conducted on a Maine salt marsh from September 1965 to June 1967. In addition, some aspects of the ecology of widgeongrass were studied. The following conclusions resulted from the study.

1. Fifty-two percent of the pans and 33 percent of the ditches with widgeongrass growth dried during the summer of 1966. Desiccation was the most evident factor limiting widgeongrass production on the Weskeag salt marsh.
2. Widgeongrass characteristically grows best along protected margins or in other areas protected from the wind by algae. Widgeongrass does not grow well in open areas where water currents and wave action are common.
3. Field observations indicated that wave action is detrimental to newly established seedlings. A preliminary investigation using wind baffles as protection against wind action for the seedlings indicated that these structures offer a promise for establishment of widgeongrass beds in open areas of pans.
4. The growth of widgeongrass transplanted to both 8-inch and 16-inch depths of water in impounded ditches showed that the production of the plant was substantially better at 16 inches.
5. Widgeongrass transplanted in pans lacking this species failed to survive, primarily because of high water temperatures in these areas.
6. Germination tests under controlled temperatures indicated that germination was better at 65°F and 75°F than at 55°F and 85°F.
7. Controlled temperature experiments indicated that the plant will not survive temperatures of the mid-eighties and little growth was produced at 55°F. The growth of the plant was best between 65°F and 75°F.
8. Snail numbers and biomass increased during the fall of 1966 and spring of 1967 in all experimental ditches. The increase was more pronounced for the impounded ditches than the control ditches.
9. All soil and water properties investigated were within the tolerance range of widgeongrass. However, pH of the soil and water may be marginal if compared with values recorded by other investigators.
10. Plugged drainage ditches are not suitable for mosquito reproduction. Mosquito hatches occurred primarily in small quiet depressions and in places where the common mummichog was absent.

WOODCOCKPatterns of Woodcock Activities on Summer Concentration
Fields in Maine

- Objectives: (1) To test the hypothesis that woodcock come to summer concentration fields primarily to feed.
 (2) To test the hypothesis that woodcock select particular portions of summer concentration fields.

Assignment: William B. Krohn, Graduate Assistant

Thesis Advisor: Malcolm W. Coulter, Professor of Wildlife Resources

Consultants: J. William Peppard, Dept. Inland Fisheries & Game
 Sanford D. Schemnitz, Associate Professor of Wildlife Resources
 Howard L. Mendall, Unit Leader

Starting in July the two primary study fields were searched two nights a week and the locations of all woodcock flushed were marked on the fields and plotted on maps. By mid-September systematic searches of these fields were reduced to once a week and this is being continued.

Woodcock were first observed remaining on the fields throughout the night in late June, and they were more or less randomly distributed. By mid-July, however, woodcock were regularly flushed from specific areas on both fields. These preferred portions of the fields, termed "frequented areas," shifted throughout the summer. Data regarding changes in the locations of frequented areas are still being collected.

Flush sites were marked on the primary study fields for determination of frequented areas and for vegetation analysis. Randomly chosen sites were analyzed exactly as were actual flush sites to determine whether the birds select particular vegetation types or use them at random. Measurements of the vegetation were taken on square meter areas centered on the flush and random sites. These included: (1) percent ground cover by species, (2) height of herb and/or shrub layer, (3) distance to the three nearest woody plants, and (4) plant density.

Three categories of woodcock flushes were recognized; exact, general and unknown. A flush was termed exact when the bird was seen on the ground prior to flushing or where fresh droppings indicated the site. When woodcock were not observed on the ground nor a fresh dropping found, the flush was considered general if the area the bird was known to come from was not larger than a square meter. Flushes were unknown when birds left an undefined area greater than a square meter. The last category also included woodcock which were observed walking or running prior to flushing. Vegetation analysis was carried out only on exact and general flushes.

Birds were collected from four fields throughout the summer to test the hypothesis that woodcock come to summer fields primarily to feed. Intensive collecting was done on only one field from which 20 woodcock were taken at various times of night. Preliminary examination showed that food was found only shortly after they came into the field. Woodcock collected two or more

hours after arrival on the field had small stomachs containing small amounts of food. Birds taken during the middle of the night or shortly before sunrise had empty stomachs of small size.

During mid-July, when the number of woodcock using the two primary study fields was at a peak, soil samples were taken from one of the fields to extract and count soil invertebrates. Samples were 15.5 cm in diameter and 10 cm in depth. Since the invertebrates were presumably available to woodcock after sunset, all 30 samples were taken during the night. Twenty of the samples were taken at random locations while 10 were from sites where woodcock were flushed previous nights. Examination of soil samples showed that only 1 of the 30 samples contained any invertebrates, and this was a single earthworm.

Plans for next quarter: Woodcock banding and weekly searches of the primary study fields, for location of flushes will continue through the fall. Cover maps of the primary study fields will be prepared.

Spring Breeding Behavior Studies of the American Woodcock

- Objectives: (1) To study the basic behavior of breeding woodcock and their habitat utilization as they relate to the reliability of the woodcock singing ground survey.
 (2) Collect detailed information to clarify the relation between habitat, population density and climate factors that influence the onset, periodicity, and peak periods of courtship performance of male woodcock.

Assignment: Sanford D. Schemnitz, Associate Professor of Wildlife Resources

Assistants: Charles Smart, Research Assistant
 Robert Meyer, Graduate Assistant

Consultants: Howard L. Mendall, Unit Leader
 William Russell, U.S. Bureau of Sport Fisheries & Wildlife
 Ray B. Owen, Assistant Professor of Wildlife Resources

A detailed vegetation analysis of frequency and density of woody vegetation present on singing grounds was made at Greenbush by Charles Smart and Old Town-Orono by Robert Meyer. The primary singing site was marked and the dimensions of the singing field measured.

A summer concentration field was found adjacent to the University Forest. Several woodcock were banded with mist nets and night-lighting equipment. From 25-50 woodcock used the field.

Additional testing was made of various types of harnesses for attaching transmitters to woodcock with the aid of Dr. Owen.

Plans for next quarter: Order equipment and plan for 1969 field season.

RUFFED GROUSEEcology of the Ruffed Grouse in Maine

- Objectives:
- (1) To study population dynamics of harvested and unharvested grouse populations; and to compare mortality rates of resident non-migratory species (grouse) and migratory species (woodcock) on the same area.
 - (2) To determine cover preferences and use of forest clearings by adults and broods in spring and summer.
 - (3) To study the causes of juvenile mortality and measure the incidence of blood parasites.

Assignment: Sanford D. Schemnitz, Associate Professor of Wildlife Resources

Consultants: Eldon Clark, Migratory Bird Populations Station
Robert Wade, Moosehorn National Wildlife Refuge

The banding of ruffed grouse was continued as a supplement to the woodcock trapping program. A surprising upswing from 1967 occurred in the number of ruffed grouse taken in the shore-bird-type ground traps. The catch on both the Edmunds and Baring Refuge Units which totaled 40 in 1967 rose to 97 this year (Table 1) despite a dry summer and a decline in the total woodcock catch. Another paradox was that fewer broods were observed by various Refuge and University personnel than during the previous summers. Only one grouse banded in previous years was captured. In contrast to previous years no spruce grouse were captured nor observed at the Edmunds Unit.

TABLE 1. RUFFED GROUSE TRAPPING SUCCESS, MOOSEHORN NATIONAL WILDLIFE REFUGE

Unit	Number of Birds Captured				
	1964	1965	1966	1967	1968
Edmunds	64	42	8	14	30
Baring	33	57	43	26	67
Total	97	99	51	40	97

Plans for next quarter: Summarize previous grouse summer banding records to determine the feasibility of continuing this phase of the study.

BIG GAMEFactors Affecting the Summer Flight Behavior of White-tailed Deer on Isle au Haut

- Objectives: (1) To test proposed hypotheses for various aspects of flight behavior.
 (2) To study the characteristics of flight behavior of deer on Isle au Haut.

Assignment: John J. Vogler, Graduate Assistant

Thesis Advisor: Sanford D. Schemnitz, Associate Professor of Wildlife Resources

Consultants: Voit B. Richens, Assistant Unit Leader
 Frederick F. Gilbert, Assistant Professor of Wildlife Resources
 William Apgar, Assistant Professor of Animal Science

This study is an attempt to document and characterize the flight behavior of an unharvested population of white-tailed deer in Maine. Field research was begun on June 25 and continued until the second week of September. Forty-six morning and 58 evening deer observation periods were conducted in order to obtain information on the flight behavior of deer. Throughout the summer, 727 deer flights were observed.

The collection of data was systematic and use was made of a standardized data form to record all observations. Observations were taken from a 1966 Scout truck which was driven between 8 and 14 miles per hour. The sex and age (adult or fawn), flight distance, length of flight, length of time before flight, manner of flight, position of tail in flight, frequency of snorting, proportion of the animal that could be seen, number of deer in a group, location seen (determined from nearby numbered road markers), and the time of day were recorded for each deer observed. Weather data were also collected; this included temperature, relative humidity, cloud cover, wind velocity, and amount of precipitation.

A partial analysis of the data has been made and is presented in Tables 1 and 2. There was generally little difference in the mean flight distance, length of flight, and length of time before flight for all of the groups compared (Table 1). The greatest mean flight distance and the shortest mean length of time before flight were observed for adult males; however, there was little difference between males and the other groups. In Table 2 a comparison is made among sex and age classes in regard to selected flight characteristics. A total of 422 running deer flights and 236 walking deer flights were noted. Approximately 37% of the deer observed running had their tails down, and 7% of those observed walking had their tails up. The sex ratio of observed deer was about 3 females:1 male, and the adult to fawn ratio was 8:1. When adjusted sample sizes are compared for males and females in "tail up" versus "tail down" running flight the males seem to have exhibited the tail down flight more often, but again the difference is not great. Walking flight with the tail up was noted less frequently than other flight patterns, and in 12 of the 13 cases in which this was

observed the animals began running flight before they were out of sight of the observer. It will also be noted that running flight was recorded for 70% of the fawns.

TABLE 1. A COMPARISON OF FLIGHT DISTANCE, LENGTH OF FLIGHT, AND TIME BEFORE FLIGHT BY SEX AND AGE (Distance in feet, time in minutes)

	Mean Flight Distance	Mean Length of Flight	Mean Time Before Flight
Adults	114 (396)*	64 (71)	1.40 (281)
Male	126 (24)	62 (19)	1.27 (71)
Female	110 (275)	64 (52)	1.44 (210)
Fawns	115 (39)	42 (11)	1.42 (31)

* Number of Observations.

TABLE 2. A COMPARISON OF TAIL POSITIONS IN DEER OBSERVED IN FLIGHT BY AGE AND SEX CLASSES

	Tail Up	Tail Down	Totals
Running			
Adult Male	48*	37	
Adult Female	159	95	
Adult Unknown	28	7	
Fawn Male	3	8	
Fawn Female	2	--	
Fawn Unknown	25	8	
Unknown sex and age	0	2	
Totals	265	187	422
Walking			
Adult Male	3	43	
Adult Female	12	153	
Adult Unknown	--	48	
Fawn Male	--	8	
Fawn Female	--	2	
Fawn Unknown	1	10	
Unknown sex and age	--	--	
Totals	16	220	236

* Number of Observations.

There is a general similarity between mean flight distance, length of flight, and length of time before flight in the adult female or adult male groups when compared to observations of the entire sample of females and males.

Records of two fawns (fawns of D-3, Table 3) present a different picture; their mean flight distance was 162 feet as compared to 115 feet for the entire sample of fawns and the mean length of time before flight was 0.00 minutes (they took flight immediately in all observations). For all fawns the mean length of time before flight was 1.42 minutes. Seven observations were made in which doe D-3 and both fawns were present, and in five of these the latter took flight first while the doe remained behind. This tendency of fawns to take flight before their mothers was noted in several observations of unmarked fawns and their mothers. It is believed this response in newborn fawns to be a direct result of inexperience in situations of human disturbance.

TABLE 3. A COMPARISON OF THE MEAN FLIGHT DISTANCE, LENGTH OF FLIGHT, AND LENGTH OF TIME BEFORE FLIGHT AMONG KNOWN DEER* (Ranges are in parentheses).

Deer No.	Flight Distance (ft)	Length of Flight (ft)	Time of Flight (min)
B-7 Adult Female	110 (15-298)	38 (30-45)	0.50 (0.00-2.00)
D-3 Adult Female	113 (34-190)	113 (35-240)	1.21 (0.00-2.51)
Fawns (of D-3)	162 (110-278)	90	0.00
A-4 Adult Male	120 (75-182)		0.71 (0.00-1.49)
C-1 Adult Male	118 (30-216)	81 (58-100)	1.03 (0.00-2.88)

* Seven or more observations.

There are known to be 24 animals in the population that are marked with colored ear streamers and can be individually identified. These animals are considered to be of special importance in this study because of the insight they provide on individual flight behavior, changes in flight behavior, and variation in flight response of unmarked deer observed. The flight responses of five known animals for the entire summer are shown in Table 3.

With the aid of faculty and students from the University, four strip censuses were conducted in early September to determine the approximate number of deer present on Isle au Haut. It is believed that the deer population is essentially the same as given by Klataske for late summer 1967, 20 deer per square mile or a total of 200 animals.

Plans for next quarter: A thorough analysis of the data will be made. Deer traps have been placed and pre-baited so that trapping may be conducted during December in order to have a larger number of color-marked deer in the population.

Influence of Known Populations of Deer Upon Forest Vegetation

- Objectives: (1) To measure the influence of a known population of deer upon forest vegetation.
 (2) To develop and test more adequate deer census methods than those currently available.

Assignment: Sanford D. Schemnitz, Associate Professor of Wildlife Resources

Consultants: Malcolm W. Coulter, Professor of Wildlife Resources
 J. Franklin Witter, Dept. of Animal and Veterinary Sciences

The two radio-equipped deer at Outer Heron Island were located on July 9. However, because of an undetermined cause, one of the transmitters was not functioning.

A re-evaluation of the permanent vegetation plots was made with the assistance of Thomas Allen on September 9-11.

Plans for next quarter: Analyze deer browse data collected at Outer Heron Island.

CURRENT PROJECTS NOT REPORTED THIS QUARTER

Eider Duck Ecology and Management - H. L. Mendall
 Ecology and Behavior of the Fisher - M. W. Coulter
 Telemetry Studies of Deer Movements and Habitat Utilization of Acadia National Park - S. D. Schemnitz and T. J. Allen
 Deer Browse in Relation to Cutting Practices on the Penobscot Experimental Forest - A. J. Rinaldi
 Socio-Economic Characteristics of Maine Sportsmen - R. W. Meyer

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES

Maine Unit Moves to New Building

The Research Unit, as well as all other campus wildlife programs, are now centered in the \$1,300,000 Forest Resources Building. This building has been widely publicized as a model of wood architecture.

Dedication ceremonies were held during an all-day program August 22. John Gottschalk, Director of the Bureau of Sport Fisheries and Wildlife was one of the featured speakers. Others included John McGuire, Deputy Chief of the U. S. Forest Service, Edward Crafts, Director of the U. S. Bureau of Outdoor Recreation, Edward Hummel, Deputy Director of the National Park Service, several State department heads, including Fish and Game Commissioner Ronald Speers, Forest Commissioner Austin Wilkins and Park and Recreation Commissioner Lawrence Stuart; also Governor Kenneth Curtis. Among several distinguished natural resource people from out of state who attended were

Richard Griffith, Boston Regional Director of the Bureau of Sport Fisheries and Wildlife, Philip Barske, Northeastern Representative of the Wildlife Management Institute and Richard McArdle, former Chief, U. S. Forest Service.

For the first time since the early days of the wildlife program (when 2 staff, a secretary and graduate students were housed in one basement room in Coburn Hall), all wildlife personnel are located on the upper floor of the north wing in the new building. In addition to individual staff offices, wildlife facilities include 5 laboratories, a museum room, seminar room and an autopsy lab equipped with a walk-in deep freeze. Many other facilities of importance to wildlife training and research are available in other sections of the building including darkroom, data processing equipment, histology laboratory, environmental chambers and others.

The new Unit address is: 240 Forest Resources Building
University of Maine
Orono, Maine 04473

The phone number is: 207/866-7386.

Miscellaneous Activities

Following dedication of the new Forest Resources Building (described above), Mendall accompanied John Gottschalk, Director of the Bureau of Sport Fisheries and Wildlife on a two day inspection trip of Penobscot Bay. Emphasis was placed on the Unit's eider duck study area in the Rockland region.

Mendall was reappointed as a member of the editorial board of the Journal of Wildlife Management by the new editor, Dr. Tony Peterle. Mendall has now served in this capacity under four editors.

Schemnitz instructed the Junior Forestry Institute students in wildlife management at Princeton and Orono, August 20, 24, and 27. Owen lectured on Wildlife Ecology and Coulter lectured on Career Opportunities.

Schemnitz, Richens, Vogler, Rinaldi and Allen attended the Northeast Deer Study Group Meeting, Albany, New York, August 11-14. Schemnitz served as a discussion leader.

Coulter, Owen and Schemnitz attended the Wildlife Teaching Subcommittee, Northeast Section, Wildlife Society meeting at the University of Massachusetts, Amherst, August 25-26. Schemnitz served as chairman and Owen was recording secretary.

Schemnitz and Owen helped supervise the University student woodcock banding crew at Moosehorn National Wildlife Refuge. Usually a trip was made each week to spend a day with the crews.

PERSONNEL CHANGES

Dr. Frederick F. Gilbert, a native of Ontario, has been appointed Assistant Professor of Wildlife Resources and is under contract to conduct white-tailed deer research for the Maine Fish and Game Department. He will also serve as a Unit collaborator. Gilbert received a Bachelor's degree at Acadia University in Nova Scotia and Master's and Ph.D. degrees in wildlife from the University of Guelph, in Guelph, Ontario. He replaces Dr. Donald Behrend who left this spring to accept the position of Director of the Huntington Wildlife Research Station in Newcomb, New York.

Andre Bourget is a new graduate assistant who began his work this quarter. He was graduated, with distinction, from Laval University in June, majoring in wildlife biology. He has had 3 summers of waterfowl experience in Quebec with the Federal and Provincial governments. His thesis study will be on the eider duck project under the supervision of Mendall.

Unit personnel were saddened by the death in August of Kenneth Hodgdon, Chief of the State Game Division. Ken was one of the early University of Maine wildlife graduates and was a long-time associate and friend of the Unit. He has been succeeded by Howard Spencer, former State waterfowl project leader. Spencer's position in turn has been filled by J. William Peppard, former regional biologist. Both Spencer and Peppard are University of Maine graduates and have been Unit collaborators for several years.

PUBLICATIONS AND THESES

- Coulter, M. W. 1968. The Ancient Snapper. Maine Fish and Game, X(3):16-17.
- Rasar, Vaughn D. 1968. Factors Affecting the Production of Ruppia and Macroinvertebrates in a Salt Marsh. M.S. Thesis, Univ. of Maine, Orono. 100 pp.


 Prepared by: Voit B. Richens
 Assistant Leader, Maine Cooperative
 Wildlife Research Unit, University
 of Maine, Orono.

October 30, 1968

file copy

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

October-December, 1968

Cooperating Agencies

Maine Department of Inland Fisheries and Game
Wildlife Management Institute
University of Maine
U.S. Bureau of Sport Fisheries and Wildlife

NOT FOR PUBLICATION

TABLE OF CONTENTS

	PAGE
WILDLIFE STAFF	2
RESEARCH PROJECTS	4
WATERFOWL	
Interrelationships of Breeding Eiders, Herring Gulls and Black-backed Gulls (Unit Financed)	4
OUTDOOR RECREATION	
Some Aspects of Hunting and Fishing in Maine in Relation to Participant Attributes (Financed by Agr. Exp. Sta., Hatch Act Funds)	5
BIG GAME	
Factors Affecting Summer Flight Behavior of White-tailed Deer on Isle au Haut (Financed by McIntire-Stennis Forest Research Funds)	5
Telemetry Studies of Deer Movements and Habitat Utilization at Acadia National Park (Financed by Contract with National Park Service)	6
Production of Deer Forage Following Clear-Cutting on the Penobscot Experimental Forest (Financed by Maine Federal Aid in Wildlife Restoration Funds)	8
WOODCOCK	
Patterns of Woodcock Activities on Summer Concentration Fields in Maine (Financed by Maine Federal Aid in Wildlife Restoration Funds)	11
CURRENT PROJECTS NOT REPORTED THIS QUARTER	13
COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES	13
PUBLICATIONS AND THESES	14

WILDLIFE STAFF

Howard L. Mendall, Unit Leader and Professor of Wildlife Resources
 Voit B. Richens, Assistant Unit Leader and Assistant Professor of Wildlife Resources
 Malcolm W. Coulter, Associate Director for Wildlife, School of Forest Resources and Professor of Wildlife Resources
 Sanford D. Schemnitz, Associate Professor of Wildlife Resources
 Ray B. Owen, Jr., Assistant Professor of Wildlife Resources
 Frederick F. Gilbert, Assistant Professor of Wildlife Resources

Unit Collaborators - Personnel from 12 University departments or State and Federal agencies are actively collaborating with the Unit. Individuals assisting with projects that are currently reported upon are listed in connection with the appropriate project summary.

Graduate Assistants:	William B. Krohn	John J. Vogler
	Robert W. Meyer	Vaughn D. Rasar
	Anthony M. Rinaldi	Andre Bourget

Special Student: Thomas J. Allen

Unit Secretary: Maxine L. Horne

Unit Coordinating Committee

Ronald T. Speers, Commissioner, Maine Dept. Inland Fisheries and Game
 Albert D. Nutting, Director, School of Forest Resources
 Howard L. Mendall, Unit Leader

RESEARCH PROJECTSWATERFOWLInterrelationships of Breeding Eiders, Herring Gulls and Black-backed Gulls

Objective: To determine the effects of the presence of gulls on eider ducks nesting in mixed colonies.

Assignment: Andre A. Bourget, Graduate Assistant

Thesis Adviser: Howard L. Mendall, Unit Leader

During the summer of 1968, observations from a blind and bird marking experiments were carried out at Ile aux Pommes in the St. Lawrence Estuary, Quebec, Canada. These studies were conducted while employed by the Quebec Wildlife Service, in preparation for subsequent thesis studies in Maine.

A total of 14 female eiders and 2 herring gulls were captured with two different types of traps, and with fish netting. The birds were banded with regular U.S. Fish and Wildlife bands and with colored plastic leg bands.

Sliding-door automatic nesting traps, successfully used in Maine, were found to work well on eider ducks in Quebec. Gulls, however, triggered the trap before they were inside due to the low trap entrance. Eight female eiders and 1 herring gull were captured by this method. Another type, the bow-trap, was set beside the nest, and when triggered, covered the nest entirely. Its advantage is that it can be used with eiders as well as gulls. Because of the noise made when the trap shuts, this method was tried only twice with a capture of one herring gull. The fish netting was used specifically to catch eiders. These nets were 30 feet long and were put across a ravine heavily utilized by eiders. The advantage of this method was the capture of many birds at one time. Unfortunately, the exact location of the hens' nests were not known, unless the marked bird was located on her nest later.

One method used to identify gulls was to sprinkle blue, green or red dyes on their eggs. The red color gave better results because it was more conspicuous against the gull's white plumage. This eliminated handling of the birds, but the colored pattern made by the dye on the belly of the gull did not last more than one week. Eggs in nests of four herring gulls and two black-backed gulls were treated with the powdered dyes.

Thirteen hours of blind-observations were made to study postures and calls, and special attention was given to agonistic displays and predatory behavior. The objective was to better understand the relationships between eiders and gulls nesting in mixed colonies.

Activities during the past quarter have consisted of a partial review of the literature (on eider and gull breeding biology, and duck and gull behavior) and the preparation of a preliminary thesis outline.

Plans for next quarter: Further literature search and preparations for next spring and summer field work will be made. In addition, a revised thesis outline will be prepared.

OUTDOOR RECREATION

Some Aspects of Hunting and Fishing in Maine in Relation to Participant Attributes

- Objectives: (1) To characterize several types of Maine sportsmen (resident and non-resident hunt only, resident and non-resident fish only, resident and non-resident hunt and fish) by their socio-economic attributes.
- (2) To use selected socio-economic characteristics of Maine sportsmen as indicators of future trends in hunting and fishing demand in Maine.

Assignment: Robert W. Meyer, Graduate Assistant

Thesis Advisers: Thomas J. Corcoran, Professor of Forest Resources
Malcolm W. Coulter, Professor of Wildlife Resources

Consultants: A. D. Nutting, Director of Forest Resources
James C. Whittaker, Assistant Professor of Forest Resources
Ray B. Owen, Jr., Assistant Professor of Wildlife Resources

Respondents to the 1965 regional questionnaires were divided into six categories. These categories (resident and non-resident hunters, resident and non-resident fishermen, residents and non-residents who both hunt and fish) were based upon types of licenses purchased by the sportsmen.

The data cards for each of these six groups of sportsmen were run through the University's IBM 360 computer which was programmed to tabulate responses given for each question. Further summarization of basic data was then accomplished manually.

Some earlier data from this project were included in the following publication: Bevins, M. I., R. S. Bond, T. J. Corcoran, K. D. McIntosh, and R. J. McNeil. 1968. Characteristics of Hunters and Fishermen in Six Northeastern States. N.E. Regional Research Publ., Agr. Exp. Sta. Bull. 656, Univ. Vermont. 76 pp.

Plans for next quarter: To complete data analysis and begin thesis write-up.

BIG GAME

Factors Affecting the Summer Flight Behavior of White-tailed Deer on Isle au Haut

Objective: To study the characteristics of flight behavior of deer on Isle au Haut.

Assignment: John J. Vogler, Graduate Assistant

Thesis Adviser: Sanford D. Schemnitz, Associate Professor of Wildlife Resources

Consultants: Voit B. Richens, Assistant Unit Leader
 Frederick F. Gilbert, Assistant Professor of Wildlife Resources
 William Apgar, Assistant Professor of Animal Science

Twelve deer were tagged with colored ear streamers in live-trapping operations conducted from December 21-31; 11 Clover net traps were used in their capture. Streamers of "Armor Tite" material of two colors placed either one above the other or side by side were fastened to each ear of trapped deer. These ear streamers should make it easy to identify the animal because it eliminates the use of numbers or symbols. Only streamers of one ear must be seen for positive identification of marked deer.

The average live weight of 5 female and 3 male fawns that were captured was 50.4 and 61.7 pounds, respectively. By comparison the average live weight of 2 female fawns and 2 male fawns captured in November of 1966 was 46.5 and 72.0 pounds, respectively. Of the deer trapped only a 5½-year old doe weighing 98 pounds was considered to be in poor condition. This doe weighed 119 pounds and was in good condition when previously captured by Klataske (in November 1966).

It is hoped that the 12 newly-tagged deer in the population will provide additional data on the flight behavior of individual animals during the summer of 1969.

Plans for next quarter: A computer program will be developed for the analysis of data collected during the summer of 1968.

Telemetry Studies of Deer Movements and Habitat Utilization at Acadia National Park

Assignment: S. D. Schemnitz, Associate Professor of Wildlife Resources
 Thomas J. Allen, Research Assistant

Consultants: Robert Binneweis, Chief Ranger, Acadia National Park
 Paul G. Favour, Chief Naturalist, Acadia National Park
 Roy W. Stamey, District Park Ranger, Acadia National Park

Objectives: (1) To study the mobility and habitat utilization of deer at Acadia National Park.
 (2) To study critical wintering areas where cedar utilization is heavy.

Movements of an adult female deer, equipped with a radio transmitter, (March 12, 1968) were monitored for 187 consecutive days before the signal was lost. The animal's home range during this period was 210 acres.

A new trap site (Figure 1) was selected where deer activity was heavy, and trapping was again resumed. The new location was surrounded by mountains dominated by a mixed softwood cover, and was centered around a 3-acre open grass field containing a few apple trees. Four deer (Figure 1) were subsequently captured, radio-equipped and released. The transmitter mounted on the yearling male was constructed with a rubber expanding section to permit enlargement of the neck during the rut. This animal was monitored until the collar was recovered after it was lost by the deer. Movement data collected on this yearling showed a total area coverage of 190 acres during the 7 days of radio-tracking (Figure 1). The doe was captured with apples baited with Tranimul, a tranquilizing drug. The female fawn was fatally injured when it fell from an ice-covered ledge on Triad Mountain; the transmitter was recovered. Movements of this deer covered an area of 80 acres, and were confined mainly to the ridges of Day Mountain with some utilization of the field during the night (Figure 1).

The movements of the adult female and the male fawn suggested heavy utilization of the area from sunset until late evening during the months of October, November, and early December. The remainder of this period was spent in the surrounding lowland softwood cover or on Day Mountain. Following accumulations of 3-6 inches of snow, activity was confined to Day Mountain and the Triad Mountains. A heavily sheltered pass between the peaks of the Triad Mountains was used during inclement weather. Based on track and sight observations, this pass appeared to be the yarding location for 4-6 deer. To date the home range pattern of the doe and fawn above has covered approximately 440 acres (Figure 1).

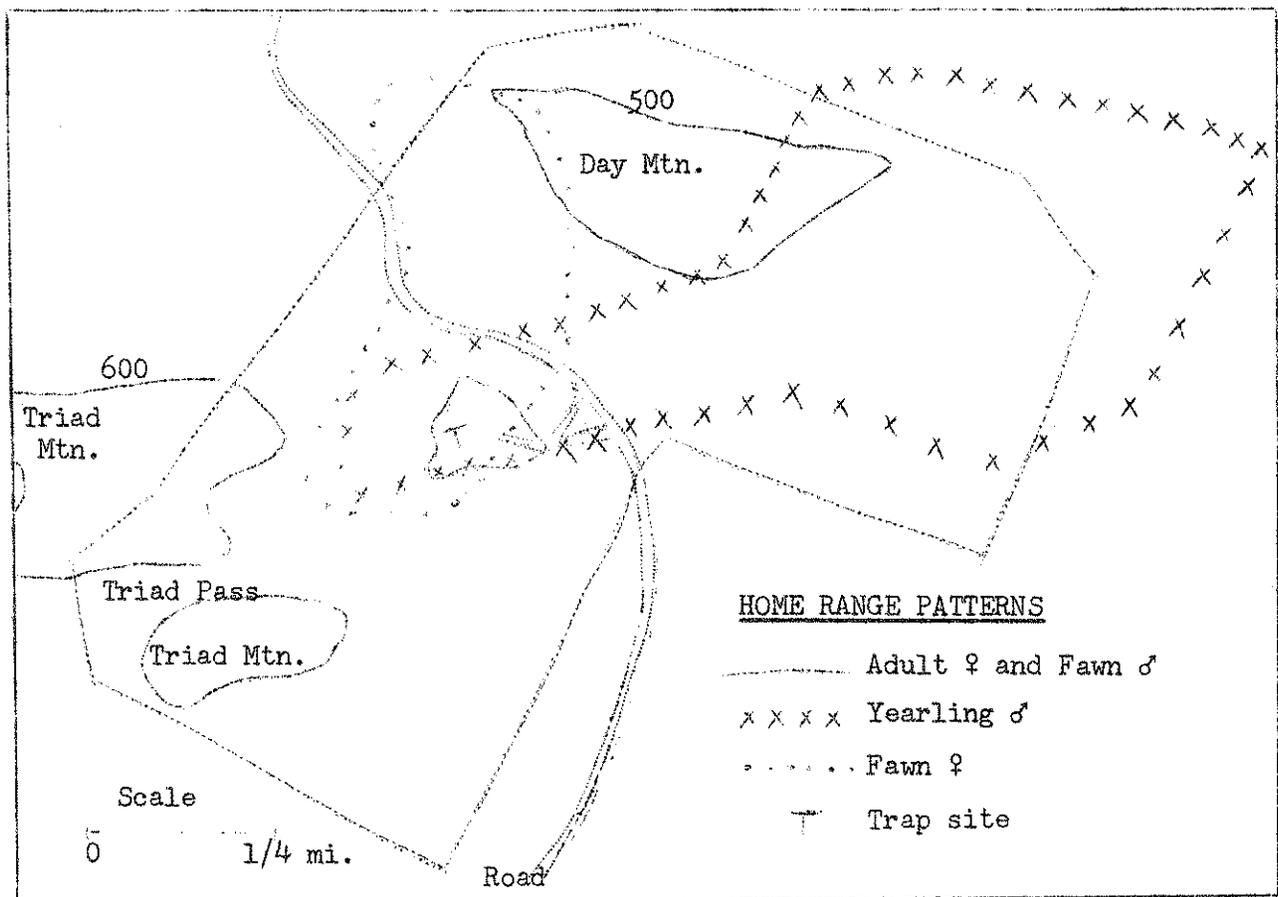


FIGURE 1. HOME RANGE PATTERNS OF RADIO-EQUIPPED DEER AT ACADIA NATIONAL PARK.

Plans for next quarter: Additional tracking data will be collected on the two radio-equipped animals. Attempts will be made to capture and radio-equip additional deer in a heavily used wintering area.

Production of Deer Forage Following Clear-Cutting on the Penobscot Experimental Forest

- Objectives: (1) To determine the amount and species composition of deer forage produced following clear-cutting in strips with logging slash treated in various ways.
 (2) To determine deer and hare use of the forage produced.
 (3) To relate findings to forestry practices in Maine.

Assignment: Anthony M. Rinaldi, Graduate Assistant

Thesis Adviser: Voit B. Richens, Assistant Unit Leader

Consultants: Malcolm W. Coulter, Professor of Wildlife Resources
 J. William Peppard, Dept. Inland Fisheries and Game
 Robert M. Frank, Northeastern Forest Experiment Station

A series of strips were clear-cut on the Penobscot Experimental Forest in 1964-65. Three different widths (1, 2 and 3 chains) and three different logging slash treatments (cutting and burning, cutting and removing and cutting and rowing) were replicated to give a total of nine clear-cuts. These were oriented parallel to each other and were spaced by leaving interposing 2-chain-wide swaths of uncut forest. The particular locations of the different strip widths and treatments within strips were randomly chosen.

A total of 864 quarter mil-acre plots on the strips was sampled for vegetation during the summer and early fall of 1968. Hardwood trees, shrubs and herbaceous vegetation was recorded. Browsing by deer and hare, and a pellet count for these species was also recorded. Data on tree species will be related to similar data that was collected by the Forest Service prior to, and twice following the cutting.

No statistical tests have been made as yet but the totals suggest that forage production (Table 1) is highest in the second replicate, in the 2-chain-wide strips, and in the burned slash treatments. Softwood deer browse was sparse and no utilization of it was observed. Deer utilization (Table 2) was slight on the study area, but there does appear to be a summer preference for certain species, especially bush honeysuckle.

Hare browsing has not been fully summarized but it appears to be much more intensive than deer use.

Plans for next quarter: Data collected will be summarized and the analysis begun.

TABLE 1. NUMBER OF HARDWOOD STEMS COUNTED ON SAMPLE PLOTS ON DIFFERENT STRIPS AND SLASH TREATMENTS, PENOBSCOT EXPERIMENTAL FOREST.

Plant Species	Replicate			Strip Width (Chains)			Slash Treatment*		
	I	II	III	1	2	3	B	R	N
Gray Birch	851	709	471	645	795	602	862	798	382
White Birch	132	368	84	168	288	139	249	171	175
Quaking Aspen	341	353	75	69	482	360	446	265	37
Bigtooth Aspen	3	11	28	58	31	11	49	27	24
Red Maple	198	110	94	255	102	127	68	203	240
Willow	46	57	2	7	52	46	59	27	17
White Ash	32	7	--	10	23	10	4	11	29
Pin Cherry	14	9	16	10	10	20	22	11	7
Red Oak	1	11	24	15	22	4	2	31	8
Tree Total	1618	1635	794	1237	1810	1319	1761	1544	919
Sweet Fern	56	95	192	147	112	84	286	44	13
Beaked Hazel	50	129	296	157	261	131	70	323	156
Bush Honeysuckle	56	143	60	61	108	90	153	76	30
Canada Fly Honeysuckle	25	22	3	23	19	8	--	13	37
Holly	19	14	--	20	7	9	1	16	19
Spirea	8	4	3	6	7	2	4	7	4
Alder	37	5	7	4	44	--	--	44	5
Shrub Total	251	412	561	418	553	324	514	523	264
Grand Total	1869	2047	1355	1655	2363	1643	2275	2067	1183

* B = Logging slash burned.
 R = Logging slash removed.
 N = Logging slash left.

TABLE 2. NUMBER OF HARDWOOD STEMS BROWSED BY DEER ON SAMPLE PLOTS OF THE DIFFERENT STRIP WIDTHS AND SLASH TREATMENTS, PENOBSCOT EXPERIMENTAL FOREST.

Plant Species	Replicate			Strip Width (Chains)			Slash Treatment*		
	I	II	III	1	2	3	B	R	N
Gray Birch	1	4	3	2	6	0	7	0	1
White Birch	5	12	2	9	6	4	6	10	3
Quaking Aspen	5	13	3	5	13	3	4	14	3
Bigtooth Aspen	0	3	7	9	1	0	8	2	0
Red Maple	5	1	1	2	0	5	4	2	1
Willow	1	7	0	2	5	1	4	2	2
White Ash	1	4	0	1	0	4	0	4	1
Pin Cherry	2	2	1	2	0	3	3	2	0
Red Oak	0	0	0	0	0	0	0	0	0
Tree Total	20	46	17	32	31	20	36	36	11
Sweet Fern	0	0	0	1	0	0	1	0	0
Beaked Hazel	1	0	0	0	1	0	0	1	0
Bush Honeysuckle	17	8	16	14	9	18	41	0	0
Canada Fly Honeysuckle	0	0	0	0	3	0	0	1	2
Holly	2	3	0	0	3	2	0	5	0
Spirea	0	1	0	0	1	0	0	1	0
Alder	1	0	0	0	1	0	0	1	0
Shrub Total	21	12	16	15	18	20	42	9	2
Grand Total	41	58	33	47	49	40	78	45	13

* B = Logging slash burned.
R = Logging slash removed.
N = Logging slash left.

WOODCOCKPatterns of Woodcock Activities on Summer Concentration Fields in Maine

- Objectives: (1) To test the hypothesis that woodcock come to summer concentration fields primarily to feed.
 (2) To test the hypothesis that woodcock select particular portions of summer concentration fields.

Assignment: William B. Krohn, Graduate Assistant

Thesis Adviser: Malcolm W. Coulter, Professor of Wildlife Resources

Consultants: J. William Peppard, Dept. Inland Fisheries and Game
 Sanford D. Schemnitz, Associate Professor of Wildlife Resources
 Howard L. Mendall, Unit Leader

The two study fields, mentioned in the July-September quarterly report, were searched weekly throughout the fall. Noticeable changes in the number of birds using the areas did not occur until the last week of October when the number of woodcock flushed per night dropped from the four month averages of 11 and 9 to 3 and 4, respectively. On the night of November 2 only 2 woodcock were flushed from one field while none was observed on the second. One of the 2 woodcock, an immature male, was the last bird of the season to be captured and banded. No birds were found during searches made after November 2.

Termination of woodcock usage of other fields used for banding showed the same pattern as the study fields. Marked fluctuations in the number of birds, as might happen if migrating woodcock were to use concentration fields, did not occur. Instead, usage rapidly tapered off and by the first week of November woodcock were no longer flushed from fields at night.

During the past summer and fall a total of 226 woodcock were banded on concentration fields in central Maine in cooperation with the Maine Department of Inland Fisheries and Game. The sex and age composition of these birds, by fields, is given in Table 1. Approximately 70% of those captured were immatures and 30% were adults (Table 1). Immature males made up about 43% of all birds banded. Reasons for the predominance of immature males on concentration fields are not yet clear. Similar results, however, have been obtained from studies in other parts of Maine as well as in Massachusetts and Michigan.

In Table 2 the sex and age composition of the banded birds is presented by 14-day intervals. Although the sample size is small for some of the intervals, no outstanding variation appears and the sex and age composition presumably remained relatively constant throughout the season. Assuming the captured birds to be representative of all woodcock coming into concentration fields, no evidence was found to indicate that the sex or age composition shifted between initiation and termination of field usage.

Plans for next quarter: Final analysis of the data will be made and the thesis written.

TABLE 1. AGE AND SEX CLASSES OF BANDED WOODCOCK BY FIELDS.

Concentration Field	Adults		Immatures**	
	♂	♀	♂	♀
Grand Falls	5	7	21	17
Greenbush	1	7	14	4
Maxfield*	2	4	6	5
Pea Cove	5	7	25	7
Rebel Hill	3	6	6	5
Sunkhaze*	5	8	20	15
Others	3	4	4	8
Totals	24	43	96	61

* Excluding one unknown each.

** Includes subadults.

TABLE 2. AGE AND SEX CLASSES OF BANDED WOODCOCK BY 14-DAY INTERVALS.

Period	Adults		Immatures**	
	♂	♀	♂	♀
6/20-7/3	3	4	12	8
7/4-7/17	0	1	4	0
7/18-7/31	6	4	21	8
8/1-8/14	0	2	2	1
8/15-8/28	2	6	6	9
8/29-9/11	2	7	14	13
9/12-9/25*	4	6	23	8
9/26-10/9	3	3	5	8
10/10-10/23	2	6	3	5
10/24-11/2	2	4	6	1
Totals	24	43	96	61

* Excluding two unknowns.

** Includes subadults.

CURRENT PROJECTS NOT REPORTED THIS QUARTER

Waterfowl Distribution and Breeding Ecology - H. L. Mendall

Eider Duck Ecology and Management - H. L. Mendall

Ecology and Behavior of the Fisher - M. W. Coulter

Spring Breeding Behavior Studies of the American Woodcock - S. D. Schemnitz

Ecology of the Ruffed Grouse in Maine - S. D. Schemnitz

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES

The fall meeting of the Unit Coordinating Committee was held in the offices of the State Department of Inland Fisheries and Game at Augusta on November 6. Director Nutting of the School of Forest Resources and Mendall attended from Orono. Commissioner Ronald Speers represented the State. Also in attendance for part of the meeting were two of the State Division Chiefs--Howard Spencer of the Game Division and Keith Miller, Business Manager.

Mendall and Coulter were invited guests at the annual banquet of the Maine Chapter of Ducks Unlimited held in Portland November 8.

Unit staff and graduate assistants conducted several hunter performance surveys during the waterfowl season at the request of Game Management Agent William Snow.

Mendall and Coulter participated in a waterfowl planning meeting at Winthrop November 18 with Fish and Game Department personnel and with one of the State legislators who is a member of the Fish and Game Committee. The Fish and Game Department's overall waterfowl management program and legislation relating to waterfowl at the current session of the Maine Legislature were discussed.

Schemnitz, Gilbert, and Regional Biologist Anderson visited Monhegan Island upon request to evaluate deer range and herd conditions October 9. A report was prepared by Gilbert and forwarded to the Augusta office of the Fish and Game Department.

On October 17 Schemnitz and David Allan, Soil Conservation Service Biologist, checked germination and establishment of an experimental flat pea seeding on log roads of the University Forest.

Schemnitz, Coulter, and Gilbert attended a deer research discussion meeting October 18 with National Park Service personnel at Acadia National Park.

Schemnitz and Owen conferred with Massachusetts Institute of Technology electrical engineering personnel at Cambridge, Massachusetts on November 19, to examine telemetry-equipment improvements.

PUBLICATIONS AND THESES

Bongardt, H., V. B. Richens and W. E. Howard

1968. Serum protein patterns in pocket gophers. J. Mammal., 49:
544-547.

Owen, R. B., Jr.

1968. Premigratory behavior and orientation in blue-winged teal
(Anas discors). Auk, 85:617-632.

Schemnitz, S. D.

1968. Ruffed grouse--what do they eat? Maine Fish and Game, 10(4):
12-13.

February 5, 1969