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MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

January-March, 1969

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NOT FOR PUBLICATION

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RESEARCH PROJECTS

BIG GAME

Telemetry Studies of Deer Movements and Habitat Utilization at 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 white cedar utilization is heavy.

Assignment: Thomas J. Allen, Research Assistant

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

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

Two adult male deer were equipped with radio transmitters in a heavily-used wintering area at Hadlock Pond in January. Radio transmission from the yearling male was lost on February 15 after three weeks of tracking. The other male remained in the yarding area until the end of March when shallow snow permitted its movement to the tops of the adjoining mountains. During the period of January through March, 2 feet of snow confined movements of both animals to less than 100 acres.

The adult female and her fawn in the Triad Mountain area, radio-equipped last fall, remained in the yarding location during this quarter; an area extending from Triad peak to its lower western slope, about 50 acres in size. The yard cover was predominately spruce and white cedar.

All animals remained in the dense coniferous cover during periods of intense cold and snow storms. During mild sunny weather, deer utilized southwestern exposures for bedding. When the snow packed and crusted in mid-March, the deer began using peripheral areas along the mountain slopes for feeding. As traveling conditions became easier deer moved farther from the yard and up the adjacent mountain slopes.

Plans for next quarter: Tracking data will be collected on the three remaining animals to determine spring and summer range.

Vegetation sampling will be conducted to determine cover types in those areas utilized by the radio-equipped deer.

Influences of Known Populations of Deer Upon Forest Vegetation

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

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

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

On January 23, 1969, a visit was made to Outer Heron Island. With the aid of a good tracking snow, the island was thoroughly searched. No sign of the recent presence of deer was found. Later in January and February, 1969, sight observations of the two collared deer were made on the mainland near Ocean Point, East Boothbay. These observations were confirmed with the aid of Maine Wardens Dean Jordan and Leo Summons. This represented an over-water movement of $2\frac{1}{2}$ miles.

Plans for next quarter: Discontinue deer studies at Outer Heron Island and summarize data previously collected.

UPLAND GAME

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.
 (4) To study the fall and winter food habits of ruffed grouse.

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

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

A total of 80 evening observations were made on budding ruffed grouse near Orono, Ellsworth, Blue Hill, Bar Harbor, and Moosehorn National Wildlife Refuge during the quarter. Some state game wardens and personnel of the Moosehorn Refuge assisted by marking trees where grouse were observed to feed. Information was collected on tree species, diameter, dominance class, height, stand type, distance to woodland edge, distance to conifers,

geographic location, aspect of feeding in tree, age of tree and number of grouse in tree. Male aspen trees were used by grouse most frequently. Data on winter-budding habits have been collected for the third consecutive year.

Plans for next quarter: Complete field observations and summarize 3 years of winter-budding data. Collect information on grouse drumming activity and sites.

WATERFOWL

Interrelationships of Breeding Eiders, Herring Gulls and Black-backed Gulls

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

Assignment: Andre A. Bourget, Graduate Assistant

Thesis Advisor: Howard L. Mendall, Unit Leader

Consultants: Frederick F. Gilbert, Assistant Professor, Wildlife Resources
Ray B. Owen, Jr., Assistant Professor, Wildlife Resources
Malcolm W. Coulter, Professor, Wildlife Resources

A revised thesis study proposal was prepared during the winter. Emphasis will be placed on the following aspects of eider-gull behavior:

1. Which species of gull (when both occur with eiders), is the most serious predator of eider nests, and does predator pressure shift by species during the season?
2. What is the relationship of territorial defense by either or both gulls to eiders nesting in the vicinity?
3. What triggers the predation act by a gull? [Is it related to eiders' behavior towards the gulls, or is it mostly dependent on gulls' activity, related or not to environmental factors at that particular time?]
4. Is egg predation by gulls an individual or a group response?

The study area will consist of three islands near Islesboro in Penobscot Bay: Robinson Rock, Goose Island, and Mouse Island. The latter will serve as the principal study island but supplementary data will be obtained on other nearby islands. These islands were part of the study area used in previous years by former Graduate Assistants Choate and Clark. They have been cover-mapped and also have a known history of eider and gull use.

Study will involve detailed observations from blinds, supplemented if possible by an automatic movie camera. Some gulls will be color-marked for individual recognition.

During the quarter, the literature review was completed and preparations for spring field work were made. A permanent blind was built of lumber and canvas on Mouse Island. The Maine Department of Sea and Shore Fisheries cooperated in transporting supplies and personnel to the island for this purpose, since the Unit boat was still in winter storage.

Plans for next quarter: Field work will be started on the study area the third week of April.

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

Work on the distribution of the breeding population and classification of nesting islands is nearly completed. Mendall submitted a detailed report in January entitled: Classification and Management of Eider Nesting Islands in Maine. The summary of the report is as follows:

1. A 3-year study has been made of the distribution and abundance of breeding eiders on the Maine coast. A population of at least 20,000 pairs in 1968 was distributed from Little Machias Bay in the east to slightly beyond Casco Bay in the west. Center of the population is Penobscot Bay and adjacent offshore islands.
2. Aerial reconnaissance was made of 567 islands and more detailed ground surveys were conducted on 249 of these.
3. Eiders are now known to breed on 145 islands of the Maine coast and probably nest on at least 25 others. Thirty-six of the known colonies are considered moderate or large in size, that is, they have more than 75 pairs of breeding birds each--20 are in excess of 125 pairs.
4. Data from breeding islands were tabulated and analyzed. Each island was rated as to importance according to 5 categories believed to be of significance.
5. A primary list of 20 islands or clusters of islands (total of 30) are recommended in order of priority for public agency acquisition or control. A secondary list of 20 additional islands are similarly recommended but pending further study or consideration.

6. Since the most reliable available source lists 1,700 vegetated islands in Maine of which 400 exceed 1,100 acres in size, it does not appear that other human uses or needs of Maine's coastal habitat would be seriously curtailed by affording the eider the recommended protection. Even if all 30 islands on the primary list were acquired, less than 225 acres would be involved. Numerically these islands represent less than 2 percent of the number of vegetated islands on the Maine coast; on an area basis, even much less than that.

Plans for next quarter: Conduct spring aerial inventory flights, with emphasis on testing accuracy of visual sex and age estimates.

CURRENT PROJECTS NOT REPORTED THIS QUARTER

Some aspects of hunting and fishing in Maine in relation to participant attributes - R. W. Meyer.

Factors affecting summer flight behavior of white-tailed deer on Isle au Haut - S. D. Schemnitz.

Production of deer forage following clear-cutting on the Penobscot Experimental Forest - A. M. Rinaldi.

Patterns of woodcock activities on summer concentration fields in Maine - W. B. Krohn.

Spring breeding behavior studies of the American woodcock - S. D. Schemnitz.

Ecology and behavior of the fisher - M. W. Coulter.

Waterfowl distribution and breeding ecology - H. L. Mendall.

Eider duck ecology and management - H. L. Mendall.

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES

Coulter was installed March 3 as Regional Representative, Region I, of The Wildlife Society at the annual meeting held at Washington, D. C.

Wildlife staff and graduate students from the Universities of Maine and New Brunswick met for an all day seminar at the Visitors Center, Moosehorn National Wildlife Refuge, March 14. Funds to assist in making the seminar were provided by the University of Maine through the New England-Atlantic Provinces-Quebec Study Center. It is anticipated that this mutually stimulating seminar will become an annual affair.

Mendall and Coulter met in Boston during January with Bureau and State personnel to make preliminary plans for the 1969 national woodcock workshop. This year's symposium is to be held at the University of Maine June 30-July 2 with the University and the Maine Department of Inland Fisheries and Game as hosts. Several planning meetings with the local committee were subsequently held in Orono.

Coulter, Mendall, Schemnitz, Owen, Gilbert, and Director Nutting of the School of Forest Resources participated in the annual Unit meetings and the North American Wildlife and Natural Resources Conference in Washington, D. C., February 27-March 5.

The University of Maine team of the student chapter, the Wildlife Society won the trophy at the Wildlife Bowl held at the First Eastern Student Conclave, at the Northeast Fish and Wildlife Conference, White Sulphur Springs, West Virginia during February. Team members were Alan Hutchinson, David Galinat, Cleveland Cowles and William Krohn.

Coulter and Nutting attended the national symposium on Forest Resources, Undergraduate Education at Roanoke, Virginia, February 12-13.

Coulter and Schemnitz attended the Northeast Fish and Wildlife Conference, White Sulphur Springs, West Virginia, February 9-12. Coulter served as program chairman for the Wetlands Migratory Game session. Schemnitz was chairman at the meeting of the wildlife teachers subcommittee.

Staff and graduate students spoke to several civic groups and schools. Coulter prepared a half-hour TV program on forest animals.

The deer research program in Maine was discussed in several meetings with visiting Canadian scientists including Bruce Stephenson (Quebec Service de la Faune), William Prescott (ARDA, Fredericton, New Brunswick), Paul Tufts (Regional Biologist, Nova Scotia), and Art Patten (Big Game Biologist, Nova Scotia) at the Orono Campus. Trips were also made to several nearby deer yards.

Gilbert visited Acadia University February 21-22 to discuss participation of Maine in the Canadian Society of Wildlife and Fisheries Biologists.

Schemnitz and Coulter taught Game Biology and, Richens and Owen taught plant identification at the 10-week annual Fish and Game Warden School at the University of Maine, Orono.

Schemnitz, Coulter and Owen attended the First Environmental Congress sponsored by the Natural Resources Council of Maine on March 15 at Augusta.

PUBLICATIONS AND THESES

- Coulter, M. W., and H. L. Mendall. 1969. Habitat and breeding ecology of the black duck in the northeastern states. In Black Duck Symposium [1968], Atlantic Waterfowl Council and Wildlife Mgmt. Institute, pp. 90-101.
- Gilbert, F. F., and E. D. Bailey. 1969. Visual isolation and stress in female ranch mink, particularly the reproductive season. *Canad. J. Zool.*, 47:209-212.
- Lobdell, C. H., R. Meyer, M. W. Coulter, and T. J. Corcoran. 1969. The Maine sportsman--characteristics of hunters and fishermen. Misc. Report #124, Maine Agr. Exp. Sta., Univ. of Maine, Orono. 28 pp.

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April-June, 1969

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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 14 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
Robert W. Meyer
Anthony M. Rinaldi
Andre Bourget

Graduate 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 PROJECTSBIG GAMETelemetry Studies of Deer Movements and Habitat Utilization at
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 white cedar utilization is heavy.

Assignment: Thomas J. Allen, Graduate Student

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

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

By the first of April the two marked deer in the Triad Mountain area had left the wintering yard and moved onto an adjoining mountain covered mainly by hardwoods. Their use of the area began to follow patterns similar to those reported last fall. As herbs began to appear in the field the deer descended the mountain daily to feed. On April 19 dogs killed the marked fawn and the transmitter on the adult doe ceased to function the 2nd week in June. Observations by tourists indicated that the doe gave birth to twin fawns the latter part of June.

The marked adult male on Sargent Mountain has remained there. He has utilized grassland meadows and hardwood areas of the north facing slope, areas which were used for wintering. The spring and early summer range has been confined to less than 200 acres. The signal from the male deer was lost in mid-June.

Plans for next quarter: Vegetation sampling will be conducted to determine cover types in those areas utilized by radio-equipped deer.

An analysis of the data collected over the last two years will be started.

OUTDOOR RECREATIONSome Aspects of Hunting and Fishing in Maine in Relation
to Participant Attributes

Assignment: Robert W. Meyer, Graduate Assistant

Thesis Advisors: Thomas Corcoran, Professor, Forest Resources
 Malcolm W. Coulter, Professor, Wildlife Resources

The thesis was completed and Meyer was awarded the M.S. degree in June. A summary follows:

Data for this study were obtained from a questionnaire survey conducted in 1965. Objectives were to characterize those Maine sportsmen (designated "pure" hunters or fishermen), both residents and non-residents, who only hunt or fish by their socio-economic attributes, leisure time patterns, background in sporting activities, and preferred sporting activities. A secondary objective was to determine the possible effect of current recruitment patterns on future levels of participation in hunting and fishing.

Differences between "pure" hunters and fishermen showed hunters to be older at the time of their first solo sporting experience, more likely to participate in both hunting and fishing as children, and less likely to take children on sporting trips.

Resident "pure" hunters differed from the other license types by being younger and by having twice as many respondents, proportionately, in the one to ten years of sporting experience class.

Non-resident "pure" hunters were distinguished from the other license types by having the highest ratio of males to females, most likely being between the ages of 31 and 51, and most likely earning between five and 11 thousand dollars a year. These hunters were also more likely to read sportsmen's magazines and to belong to sportsmen's clubs than were the other sportsmen.

Resident "pure" fishermen were characterized by having the lowest male to female ratio and having an age distribution which showed no particular peaks in any age class in contrast to the other license types. In addition these fishermen were less likely to extensively utilize their vacations for pursuit of their respective sport.

Non-resident "pure" fishermen differed from the other license types by having an age distribution with two peaks, higher levels of education, higher incomes, and longer vacations.

Under the assumption that the recruitment patterns of tomorrow's resident will resemble those of today's non-resident, a comparison of the non-residents with the residents was used to provide an indication of the flexibility of sportsmen's recruitment patterns. Recruitment to hunting did not appear to be dependent upon any particular source of introduction or rurality during youth, but initial experience at an early age (prior to 21) seemed to be a relatively rigid requirement. Fishermen apparently were more adaptable than hunters evidencing flexibility with respect to source of introduction, age at first solo sporting experience, and place of childhood origin (rural or urban).

UPLAND GAMEPatterns of Woodcock Activities on Summer Concentration Fields in
Central Maine

Assignment: William B. Krohn

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

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

Krohn has just completed his thesis toward an M.S. degree. The summary follows:

Certain aspects of woodcock usage of summer fields were studied in central Maine from June to November, 1968. The objectives were: (1) to measure the seasonal and nocturnal use of summer fields, (2) to determine if certain parts of summer fields were selected by woodcock and (3) to study some environmental factors that may influence the use of fields. The major findings were as follows:

1. Woodcock started using certain fields throughout the night during the second week of June when courtship activities of the males were irregular and soon to end for the season. Usage continued until the first week of November. However, the number of woodcock using fields began to decline after mid-October, presumably at the start of the fall migration.
2. Two fields, each searched during 32 nights between July and November, averaged 8.36 ± 0.69 (+S.E.) and 10.52 ± 1.33 woodcock flushed per search. A drop in the number of birds using summer fields occurred in August. Although further study is required, it is postulated that this drop coincided with the peak of the woodcock's summer molt.
3. Evening flights into summer fields occurred 30 to 40 minutes after sunset and were from 3 to 24 minutes in length, averaging 10.5 ± 1.9 minutes. Birds remained on the fields throughout the night and were observed flying from the fields before sunrise. While most woodcock entered and left fields by flying, there was circumstantial evidence that some walked.
4. Certain areas of the fields were more regularly and heavily used by woodcock than others. These frequented areas were not static in size nor location but changed throughout the season. Their size appeared to be proportional to the number of woodcock using a field while seasonal changes in vegetative cover seemed to be the factor controlling changes in location.
5. A comparison of stomach contents from woodcock collected before and after alighting on summer fields showed that birds feed heavily prior to entering fields. However, no evidence was found to indicate that any substantial amount of food was eaten by birds which remained on the fields throughout the night. The homogeneity in the availability and abundance of woodcock foods in soil samples located randomly and at flush sites indicated

that the birds were not selecting sites on the basis of food. Since woodcock were not found to feed extensively, if at all, on summer fields, the similarity between the amounts and kinds of woodcock foods found in soil samples taken from flush and random sites was predictable.

6. A comparison of four vegetative characteristics on sites used by woodcock and randomly chosen sites showed that certain types of cover were selected by the birds. Woodcock preferred areas on the ground with only a sparse or medium vegetative cover surrounded by denser and taller vegetation. The sites selected by woodcock on summer fields were vegetatively similar to sites used at night by a number of other ground-roosting game birds.

7. Two hundred and twenty-four woodcock were banded on 10 summer fields. Immature males (including subadults) made up approximately 43 percent of this total. Although similar results have been reported from summer fields in other geographical regions, an explanation of why immature males predominated over all other age and sex classes can not presently be given.

8. Limited band recoveries suggest that woodcock remain near the summer field on which they were banded throughout the season. Shifting from one field to the next was not noted. Recapturing banded birds on one summer field indicated that individual woodcock did not return night after night to the same site within a field.

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, Wildlife Resources
Charles Smart, Research Assistant
Gary Donovan, Research Assistant

Consultants: Howard L. Mendall, Leader
Ray B. Owen, Assistant Professor, Wildlife Resources
Malcolm W. Coulter, Professor, Wildlife Resources

Small radio-transmitters (3.6-7.0 gm) were attached to 9 male and 2 female woodcock. Several of the males flew well during diurnal flights but none performed evening courtship flights. Several methods of transmitter attachment were tested with none being entirely satisfactory.

Small "islands" of aspen and birch with an understory of small conifers surrounded by partially flooded alders were frequently occupied by radio-equipped woodcock. Females with radios tended to flush wildly when approached by observers while males "froze" and were difficult to observe on the ground.

Analysis of occupied singing fields at Greenbush was completed by Smart. Fields averaged 6.9 acres and ranged from 0.8 to 30.0 acres. Singing males were seen performing simultaneously at distances of less than 50 yards on several fields. Height and composition of border vegetation around singing fields was variable. However, males were often noted to use low border sections as routes for their take off during mating flights.

Four (15%) of 26 males banded in 1968 were recaptured in 1969. Thirty-four males (17 adult and 17 subadults) were banded with mist nets during the spring of 1969 at Greenbush.

Based upon numbers of active singing grounds, the size of the Greenbush woodcock population appears to have remained relatively stable over a 15-year period as follows:

<u>Year</u>	<u>No. of Singing Grounds</u>	<u>Investigator</u>
1953-54	32	Westfall
1955	29	Weeden
1968	36	Smart
1969	33	Smart

Plans for next quarter: Further testing of various woodcock transmitter harnesses will be attempted.

WATERFOWL

Interrelationships 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 Advisor: Howard L. Mendall, Unit Leader

Consultants: Frederick F. Gilbert, Assistant Professor, Wildlife Resources
Ray B. Owen, Jr., Assistant Professor, Wildlife Resources
Voit B. Richens, Assistant Unit Leader

Field work started April 25 and ended July 15. During this period, about 180 hours were spent observing eiders and gulls from a portable blind set on an island or an adjacent ledge, from the permanent blind previously described and, at times, from a boat. Professors Owen, Gilbert, Richens and Mendall, of the Staff, helped in observations of bird behavior, as did several graduate students. Special thanks are due to former wildlife student William Noble and senior William Sheldon (a summer employee of the School of Forest Resources), who respectively spent 1 and 4 weeks in the field this summer with Bourget.

The following information was obtained by means of a tape recorder and data forms:

- (a) number of predations per visit by each gull,
- (b) the species that preyed and were preyed upon,
- (c) nests from which eggs were taken and where they were eaten,
- (d) which member of a gull pair preyed if both were not involved,
- (e) encounters between black-backed gulls, herring gulls, and eiders,
- (f) any relationships that the above species had with two other less numerous nesting seabirds: the double-crested cormorant and the black guillemot.

Nest checks were made on each of four islands (Table 1) at about 10-day intervals. About 1/3 to 1/2 of all nesting attempts of both gull species and eider ducks were studied. These were followed until their fate was known.

On two of the islands, powdered dye (blue, violet and black) was sprinkled on nests of both gull species to try to determine if predation involved mainly neighboring gulls or non-breeding gulls. Disappointing results were obtained by this method, primarily because of lack of displays by the marked birds. Also, use of the automatic movie camera, mentioned in the last Quarterly Report, did not prove feasible.

The season's data are not yet tabulated and analyzed. However, some of the general findings and impressions are presented in the following tables and text:

Table 1: Estimated Breeding Pairs by Islands

	Black-backed Gulls	Herring Gulls	Eider Ducks
Mouse Island	45	32	110
Goose Island	12	40	60
East Goose Rock	7	50	30
Robinson Rock	17	105	100

Table 2: Estimated Nesting Success of Eiders*

	Mouse	Goose	East Goose Rock	Robinson Rock
No. nests checked	57	47	14	79
Nesting success	56%	47%	14%	41%

* These estimates are not representative of typical nesting conditions, because more than 40% of the sample included nests located under artificial shelters; there the predation rate was much lower than in vegetation.

The lower nesting success for eiders on East Goose Rock was due to smallness of the island; this made the ducks reluctant to return to any section of it while the observers were working. The higher ratio of total gulls/ducks in contrast to the ratio on the other islands, reduced nesting success on both East Goose and Robinson rocks.

Nesting started around April 22 for black-backed gulls. However, herring gulls did not start to nest until the last week of May on Robinson Rock and Mouse Island and the third week of May on Goose Island (information for East Goose Rock is lacking). Eider ducks first started to nest on Mouse Island by April 18, and on Goose Island and Robinson Rock by the last days of April. The latest known nests to be initiated were on Robinson Rock during the first week of July. Although most of the early nests were situated under nesting shelters, eider nesting chronology tended to follow the phenology on each island which was considered to be retarded. The chronology of herring gulls and eider ducks on Mouse and Goose islands, and Robinson Rock were compared in mid-May to those of two other islands (Flat and East Goose) that had not been visited previously (see Table 3). In addition, it is believed that the breeding cycles of each species on the 3 major study islands were delayed by about one week because of the observers' interference. Also, further evidence was added with a sample of aged embryos from the two new islands.

Table 3: Number of Active Nests between May 12 and May 15 on 5 Islands in Penobscot Bay, Maine

	Approximate Size of the Island	Eiders	Herring Gulls
Mouse	1.25 acres	18	0
Goose	0.25	25	0
Robinson	0.75	52	6
East Goose	0.2	25	17
Flat	4.0	191	164

Although herring gulls were more numerous than black-backed gulls on three of the study islands (see Table 1), the latter seemed to take a heavier toll of eider eggs; their much longer breeding season as mentioned previously, and their tendency to roam out of their territories in an "upright" attitude during this exploratory behavior, gave them more opportunity to find unattended eider nests.

Plans for next quarter: Tabulation and analysis of the data will be started.

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

The 1969 eider aerial surveys, conducted jointly by the Unit and the Division of Management and Enforcement of the Bureau of Sport Fisheries and Wildlife, were carried out April 30-May 2 with about 15 hours of flying. The Bureau's DeHavilland Beaver was used, piloted by Agent William Snow. Agent Donald Blais and Unit Leader Mendall comprised the remainder of the crew.

A complete population estimate of the State was not made this year, as in 1968, since previous studies indicated a census in alternate years would be sufficient to determine general population trends. The main objective of the 1969 flying was to test the accuracy of visual sex and age estimates as made during regular census flights. Visual counts and estimates were made in the usual manner and photographs of the same groups of birds were obtained with both black and white and color film. The sample consisted of nearly 6,000 birds and was obtained as randomly as feasible in all parts of the coast--roughly in proportion to the counts from 1968. Analysis of the photographs and correlations with the counts will be made this winter. However, a comparison of the data obtained visually with that of 1968 showed a significant change in the proportion of subadult males in the sample. This group made up 9 percent of the birds tallied, the highest in 4 years.

In Penobscot Bay, where the Unit's two ground study areas are located, complete aerial population checks were made in addition to the sample counts as described. Results suggest a decrease in the breeding population from the peak reached a year ago.

Mendall, assisted by Graduate Assistant Bourget, spent 2 days by helicopter making ground-nesting checks on some of the offshore islands. Also, on these flights, tests were made with infra-red aerial photography to obtain vegetative data and to aid in further interpretation of sex and age composition of flocks.

Plans for next quarter: Inactive.

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

Seasonal work on the 5 islands of the Muscle Ridge study area near Rockland was begun May 19. A total of 440 nests were located and marked. Mendall's wife provided much assistance in the search for and the subsequent rechecking of nests.

Phenology was considerably retarded this year, both by comparison with 1968 and with the 5-year average. Nevertheless, breeding chronology was actually accelerated, probably because of two periods of unusually warm, sunny weather that occurred in mid-April and the first week of May. Apparently eiders were stimulated toward early nesting even though concealing cover was very slow in developing. There was, however, variation by islands. On Seal Island, for example, where plant cover is sparse even in an average year, both eiders and gulls were much later than a year ago in commencing to nest. Also, the situation is somewhat in contrast to Graduate Assistant Bourget's findings on the Islesboro study area.

In spite of earlier dates of both nest initiation and nesting peaks on most islands, the overall breeding season was more prolonged than in 1968. This is attributed to lowered hatching success and consequently a greater amount of renesting. Nesting success declined on all of the Muscle Ridge study islands and was the lowest in the 5 years of the project. Excluding Fisherman's Island, where an unusual situation existed, there is no clearly attributable reason. Undoubtedly, the relatively poor cover conditions associated with the retarded phenology was partly responsible for increased gull predation. However, a difference in predation rates may also have occurred this year. It is becoming increasingly apparent that there is a relationship between nesting success and the synchronization of the breeding cycles of the eider, black-backed gull and herring gull on any given island.

In contrast to previous years, the human disturbance factor did not seem related to low nesting success this year on any of the study islands except Fisherman's. This is the largest of the Muscle Ridge eider islands and also supports the largest colony. A summer dwelling was constructed in the center of the island this spring, with subsequent clearing of a path to the shore and erection of a wharf. Even though the owner of the island used extreme care to disturb the birds as little as possible, a noticeable decrease in populations and in nesting success of both eiders and herring gulls occurred. Eiders dropped from an estimated 325 pairs in 1968 to about 200 this year. Only black-backed gulls, which nest primarily on the ends of the island, seemed little affected.

The ultimate effect of the building on the Fisherman's Island colony may not be as serious as at first believed, especially in view of the owner's concern for the eiders. Late nesting efforts were relatively successful. Also, eiders to some extent, but especially the gulls appeared to be developing a tolerance to human activity; the latter indirectly benefitted eiders because of a decrease in gull "upflights" and alarms. Undoubtedly, the eider population will never reach its peak of 1968 but a fair-sized colony can likely be maintained with moderate nesting success. There is not as good quality nesting cover at the ends of the island as in the lush growth of nettle-grass in the center. As long as the island remains under its present ownership it is likely that the welfare of the eiders will be given consideration.

During the breeding studies, 70 female eiders were caught on their nests for banding, 20 on Tommy Island and 50 on Fisherman's Island. About 3/4 of these were caught in automatic nest traps and the remainder with long-handled nets. During the peak of nest-trapping efforts, Coulter spent 2 days with Mendall working on Tommy Island. At Fisherman's Island, assistance was given for one day by Graduate Assistant Bourget and by student summer assistant William Sheldon.

Ten of the captured eiders were returns from previous years' bandings, 3 from Tommy Island and 7 from Fisherman's Island. All but one bird was retaken in the same portion of the island where originally caught. The exception was a duck that nested last year near the present location of the house on Fisherman's Island. This year she was at the extreme south end of the island. One female has been caught during 3 consecutive seasons in the identical patch of nettle. In addition to providing data on migrational homing, the banding returns have resulted in very useful information on annual plumage changes--a subject that is very inadequate in existing eider duck literature.

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

CURRENT PROJECTS NOT REPORTED THIS QUARTER

Factors affecting summer flight behavior of white-tailed deer on Isle au Haut - S. D. Schemnitz.

Production of deer forage following clear-cutting on the Penobscot Experimental Forest - A. M. Rinaldi.

Ecology and behavior of the fisher - M. W. Coulter.

Waterfowl distribution and breeding ecology - H. L. Mendall.

Ecology of the ruffed grouse in Maine - S. D. Schemnitz.

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES

Unit staff and collaborating University faculty participated in the Third Woodcock Workshop, held at the University of Maine June 30-July 2. This was sponsored by the Bureau, the Maine Department of Inland Fisheries and Game, the University, and the Wildlife Management Institute. Mendall and Coulter were members of the program committee and J. William Peppard, migratory bird project leader of the State Game Division was chairman. In addition, Coulter served as discussion leader at one of the 3-day sessions and Mendall was the workshop summarizer. Other staff who presented papers or arranged field demonstrations included professors Schemnitz and Owen, assisted by both graduate and undergraduate students.

Mendall and Howard Spencer, Chief of the Maine State Game Division, conferred with Charles Bradford, Regional Representative of the Nature Conservancy, relative to preservation of islands used by breeding eider ducks and other colonial seabirds. The increasing human use and development of coastal islands has become a matter of serious concern.

At the request of the Bureau and State Game Division, Mendall conducted woodcock census studies on the management routes in Washington County; he also ran a random census route in the Owls Head area of Knox County.

The annual 3-week forestry summer camp for undergraduates was held at Princeton, Maine June 1-7. Schemnitz taught wildlife ecology and Owen field problems. Several wildlife graduate students also assisted.

Schemnitz, Gilbert, Allen, Rinaldi and several undergraduate wildlife students participated in a search for dead deer with Ben Day, Chief of Game, Vermont Fish and Game Department, Roxbury, April 25-27. This is an annual event to check deer winter mortality as an aid to deer herd management in Vermont.

Staff members and graduate students attended the annual University Open House at the Orono campus on April 1. Schemnitz was chairman of the section, Environmental Quality--Wildlife and People. The wildlife program was as follows: John Good, Superintendent of Acadia National Park, presented an illustrated talk "Maintaining an Attractive Flora and Fauna in the Face of Human Pressures," "Experiences in Planning for Wildlife Environments" was presented by Keith Hay, Assistant Chief, Office of Conservation Education, U.S. Bureau of Sport Fisheries and Wildlife, Washington, D. C. The closing address, "Approaches for Keeping People Aware of Environmental Conservation Programs" (illustrated with slides) was given by William Bechtel, Education Director, Maine Audubon Society and Portland Society of Natural History.

PUBLICATIONS AND THESES

- Krohn, W. B. 1969. Patterns of woodcock activities on summer concentration fields in central Maine. M.S. Thesis, Univ. of Maine, Orono.
- Meyer, R. W. 1969. Some aspects of hunting and fishing in Maine in relation to participant attributes. M.S. Thesis, Univ. of Maine, Orono. 102 pp.

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MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

July-September, 1969

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

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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 14 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
 Myrtle C. Bateman
 Andre Bourget
 David E. Capen
 Robert D. Dunford
 James M. Ramakka

Graduate Students: Thomas J. Allen
 Victor S. Balinga
 Anthony M. Rinaldi
 William R. Whitman

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 PROJECTSBIG GAMEFactors Affecting 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: Sanford D. Schemnitz, Associate Professor, Wildlife Resources
William Stevens, Research Assistant

This study was continued for the second summer using the procedure developed by John Vogler, former graduate assistant assigned to this project. An additional 465 observations were made by Stevens from June 24 until September 2, 1969 making a total of 1,191 observations for the two summers.

Plans for next quarter: The field data will be coded and transferred to punch cards for analysis.

Effects of Three Cover Conditions on Behavior and Physiological Responses of Pinned White-tailed Deer

- Objectives: (1) To compare behavior of deer in clear-cut pens, pens with artificial wind shelter, and pens with natural cover.
- (2) To determine certain physiological responses, primarily heart rate and respiratory rate, of deer penned under the three cover conditions.

Assignment: Myrtle C. Bateman, Graduate Assistant

Thesis Advisor: Frederick F. Gilbert, Assistant Professor, Wildlife Resources

Consultants: Ray B. Owen, Jr., Assistant Professor, Wildlife Resources
Charles W. Major, Associate Professor, Dept. of Zoology

Deer subjected to different intensities of environmental stress vary in metabolic rate, hence three levels of metabolism should occur in deer penned under three different environmental conditions. It is hoped that variations in heart rate will reflect the differences in metabolic rate.

To determine heart rate of penned deer a 3-battery transmitter was designed for subcutaneous insertion in the abdominal region. One such unit, weighing 111 grams prior to coating with a silicone rubber sealant, was inserted in a doe September 24. The unit apparently had no adverse effect on the animal but failed to transmit heart rate due to a broken electrode, as noted when removed on October 3.

Plans for next quarter: Deer-holding facilities will be completed and weather stations and observation towers will be set up. Also, tests of the present transmitter will be conducted in situ and needs for its modification evaluated.

Deer-Snow Relationships in Maine

- Objectives: (1) To obtain continuous winter weather records of a deer yard by cover type.
 (2) To investigate winter-yard snow characteristics.
 (3) To observe reactions of deer to snow and weather.
 (4) To formulate meaningful deer-snow relationships as an aid to deer herd management in Maine.

Assignment: Voit B. Richens, Assistant Leader

Consultants: John H. Hunt, Maine Dept. Inland Fisheries and Game
 William O. Pruitt, Jr., Memorial University of Newfoundland
 Edmund S. Telfer, Canadian Wildlife Service

Background: This is a new Unit project on which preliminary work was initiated in January of 1969. Richens and Hunt chose the Black Brook deer yard and vicinity, near Flagstaff Lake in western Maine, as the area of study. This choice was based on winter conditions usually present, occurrence of active deer yarding, availability of living quarters for researchers, and the excellence of the cooperation of Fish and Game and Scott Paper Company personnel in the area.

Richens subsequently surveyed the yard and vicinity for information on deer trails, tracks and beds. During the past summer and fall data have been gathered on plant cover types, canopy closure, stand composition and density, phenology of important woody plants, and abundance and distribution of small mammals.

This general project will be subdivided into several specific but related studies, each devoted to a specific problem and suitable for a staff member or a student assistant. This approach will better allow for a unified in-depth research over several years by various students and staff. Future progress reports will be by subproject.

Study Needs and Value: Snow plays an important role in deer welfare in Maine; it has figured prominently in past deer die-offs and non-fatal losses such as decreased fawn production. Snow commonly confines deer to areas of heavy cover but little food. Deer are Maine's most important game animal and provide a vital source of state income each year. Income is maximized in the long run by reducing die-offs and increasing hunter-take. There have been few studies on deer-snow relations in northeastern United States despite the importance of snow to deer survival and health. Such a study is urgently needed.

Results of this project will give an additional insight into deer winter yard characteristics and wintering problems of deer, and should yield new concepts and/or approaches to deer yard management, needed by the State. This study is designed to complement the extensive but less detailed projects of the State Game Division.

Plans for next quarter: Weather and snow study stations will be set up and two subprojects initiated.

UPLAND GAME

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, Associate Professor, Wildlife Resources

Consultant: Robert Wade, Moosehorn National Wildlife Refuge

The ruffed grouse population at Moosehorn Refuge, based on trapping success, took a precipitous drop from a sample of 97 in 1968 to 32 in 1969. The decline was most pronounced at the Baring Unit, decreasing from 67 grouse captured in 1968 to 13 in 1969. In contrast, the woodcock population as measured by trapping success was similar in both summers. Three recaptures of ruffed grouse from previous years were made; all of these birds were females banded as immatures in 1968.

The low population of grouse at Moosehorn Refuge seemed to correspond to reports from several state game wardens in eastern Washington County.

Plans for next quarter: A more detailed analysis of summer grouse banding records will be made.

Woodcock Nocturnal Habitat Utilization in Relation to Sex, Age, and Molt

- Objectives:
- (1) To explore the feasibility of banding woodcock in their "diurnal cover" at night.
 - (2) To study the molt chronology of woodcock throughout the summer and fall.
 - (3) To compare the age, sex, and molt of woodcock remaining in the "diurnal cover" at night with those utilizing summer fields.
 - (4) To investigate the use of telemetry as a tool for locating woodcock nocturnal habitat.

Assignment: Ray B. Owen, Jr., Assistant Professor, Wildlife Resources

Consultants: Malcolm W. Coulter, Professor, Wildlife Resources
 J. William Peppard, Dept. Inland Fisheries and Game
 William B. Krohn, U.S. Bureau of Sport Fisheries and Wildlife

Background: This is a new project initiated in June 1969 supported by the Bureau of Sport Fisheries and Wildlife. During a detailed study on the use of summer fields by woodcock in Maine, Krohn (1969, M.S. Thesis, Univ. of Me.) observed a drop in use of fields during August. This results in a low catch per unit effort for banding crews during this period. During August adult birds are undergoing a heavy post-nuptial molt. Birds with flight feathers nearly full grown were observed to be poor fliers and were easily caught by night-lighting crews. This suggests that birds undergoing heavy molt may remain in their "diurnal cover" during the night, resuming crepuscular flight activity after molt is almost completed.

In addition to molt, there may be other factors affecting summer field use. The 1968 and 1969 banding records for Maine suggest differential utilization of these fields by sex and perhaps by age. There is a high proportion of first year males using the fields which may reflect an innate attraction to an area similar to one which will be used as a singing ground in subsequent years. Since most of the woodcock banding is done at night on these fields it has been difficult to obtain enough birds in each age and sex category for analysis of the population.

If banding on summer fields is justified and is the most feasible way to band woodcock in Maine, additional concentration areas need to be located. The state banding crews have found that less than 10 percent of the fields searched contain enough woodcock to make banding worthwhile. Thus, considerable time and effort is expended to locate new areas.

Results: Detailed molt data were taken on 175 woodcock captured on summer fields. State and federal banding crews obtained selected molt information from 300 additional birds. Some adult females were molting heavily by the fourth week in June and both adults and juveniles were still molting at the end of September.

Three woodcock were radio-equipped successfully. Each carried a radio for about two weeks and averaged 17 crepuscular flights of about 1/3-mile each during this period. The birds exhibited greater fidelity to diurnal locations than to nocturnal ones. Four new fields used by woodcock were located as a result of these radio trackings. One of the two birds recaptured had considerable skin abrasions from the radio.

Attempts to locate birds which remained in the "diurnal cover" at night were unsuccessful. Strips cleared in these covers to concentrate birds were unused.

Plans for next quarter: Data on molting will be compiled and analyzed, and an attempt will be made to develop a better harness for the radio transmitter.

WATERFOWLInterrelationships 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 Advisor: Howard L. Mendall, Unit Leader

Consultants: Ray B. Owen, Jr., Assistant Professor, Wildlife Resources
 Frederick F. Gilbert, Assistant Professor, Wildlife Resources

Preliminary tabulation was made of observed predation and conflicts or encounters between the three species of breeding birds. A total of 43 observation periods under conditions of minimal disturbance by humans were carried on during 175 hours of observation from a blind. Sixty cases of predation were observed, involving mostly the black-backed gull as the predator and the eider as the prey species (Table 1). Table 2 shows that half of the destroyed eggs were eaten on the prey nest site. Most of the eggs under "spot-and-territory" categories were destroyed by gulls having their territories adjacent to or very near the destroyed nest, while predators carrying eggs to "clubs"^{1/} were strangers to the section of the colony under observation. The total number of encounters and predatory acts were plotted by weekly periods. It was found, in general, that the number of predatory acts tend to be proportional to the number of encounters between the three nesting species. However, during the first week of June, the number of predation incidents dropped while the number of conflicts increased. This was due to the much higher proportion of eiders triggering conflicts (63.4% of conflicts that week). This aggressive behavior affords a better protection to duck nests. This may be related to the stage of nesting chronology at this period, although these data have not yet been tabulated.

An intensity-value table is being prepared for conflicts between all the nesting species. It should provide better insight of dominant species, period of high intensity aggressiveness as related to breeding chronology, and a picture of the tempo of the colony throughout the nesting season.

Plans for next quarter: Tabulation and analysis of the data will be continued.

^{1/}A relatively neutral area of a nesting island where no territories are defended, although birds may attack each other.

Table 1. Summary of Nest Predation by Black-backed and Herring Gulls.

Number and Species of Predator	Number and Species of Prey Related to Each Predator		
	Number of Nests/Species	Number of Nests Destroyed	Number of Young Killed
BB: 43	BB: 8	5	3
	H: 0	0	0
	E: 33	37	0
	C: 2	12	0
Sub-total = 43	43	54	3
H: 17	BB: 0	0	0
	H: 2	2	0
	E: 14	14	1
	C: 1	2	0
Sub-total = 17	17	18	1
Grand Total = 60	60	72	4

BB = Black-backed Gull
H = Herring Gull
E = Eider Duck
C = Double-crested Cormorant

Table 2. Fate of Eggs Lost to Predation.

	Eaten on the Spot	Carried to Territory	Carried to "Club"	Brought to Partner	Predation Act Attracting Other Gulls
Number	38	18	20	6	16
Percent	50	23.6	26.4	7.9	21

CURRENT PROJECTS NOT REPORTED THIS QUARTER

Waterfowl distribution and breeding ecology - H. L. Mendall.
 Eider duck ecology and management - H. L. Mendall.
 Production of deer forage following clearcutting on the Penobscot
 Experimental Forest - A. M. Rinaldi.
 Ecology and behavior of the fisher - M. W. Coulter.
 Influences of known populations of deer upon forest vegetation - S. D.
 Schemnitz.

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIESMeetings Attended

Schemnitz and Richens attended the Wildlife Teacher's Subcommittee Meeting, Northeast Section of the Wildlife Society at Syracuse University, August 24-27.

Coulter and Schemnitz described deer research and the wildlife program of the University of Maine at the annual McIntire-Stennis Research Review Meeting at Orono, August 21.

Schemnitz presented an illustrated talk to the Orono Kiwanis Club on woodcock research and management on August 27.

Coulter attended a workshop on teaching effectiveness held at Cornell University, July 8-10.

Mendall was an invited participant at the 10th Waterfowl Behavior Seminar held at the Delta Waterfowl Research Station in Manitoba August 7-9. He served as chairman of the first afternoon session. Following the seminar he spent two days visiting various field projects, including those in the famed Minnedosa pothole country.

The fall meeting of the Unit Coordinating Committee was held in the State Office Building in Augusta, September 22. Representing the University and the Unit were A. D. Nutting, Director of the School of Forest Resources, and Mendall. Commissioner Ronald T. Speers and Howard Spencer and Robert Boettger of the Game Division, represented the Department of Inland Fisheries and Game.

Mendall and Schemnitz attended the annual meeting of the Maine Waterfowl Council held in Augusta on August 22.

Gilbert and Owen attended the AIBS meetings at the University of Vermont, August 17-22. Owen presented a paper at the Ecological Society Meeting, also being held at the University of Vermont, entitled "A method of estimating the energy requirements of animals in the field."

The annual Northeast Deer Study Group Meeting was held at the University of Maine, September 9-11. Current and proposed deer research in Maine was presented by members of the Wildlife Resources staff, and by graduate students.

John Hunt of the Maine Department of Inland Fisheries and Game and Gilbert were co-chairman of the meeting. A tour was conducted of the Scott Paper Company mechanical-harvest cutting operation at Greenville, Maine the last day of the meeting.

Other Activities

Gilbert conferred with Dr. R. Anderson at the University of Guelph, concerning meningeal worms of deer, August 23.

Mendall attended the annual staff banquet of the Maine Department of Inland Fisheries and Game on August 21 at Orono.

Charles Drolet, biologist with the Canadian Wildlife Service at New Brunswick spent $2\frac{1}{2}$ days at the University of Maine and elsewhere in the state observing telemetry studies on deer and moose.

Schemnitz accompanied Dr. M. R. Tanton, a visiting wildlife ecologist from the Australian National University, Camberra on tours of the Penobscot Experimental Forest, Baxter State Park, and the University of Maine Forest, September 4-6.

Coulter was appointed to the Steering Subcommittee of the Penobscot River Oil Pollution Abatement Committee. The group is composed of representatives from industry, conservation and public safety organizations. Objectives of the committee are to prepare plans for quick action following accidental oil spills and to study ways to reduce the incidence of spills in the Penobscot Estuary.

Regional Director Griffith and Mendall conferred in Orono on September 24 relative to the status of eider duck breeding islands in Maine and problems of preservation of some of the more important eider colonies.

Regional Director Griffith and George Balzer of the Boston Regional Office staff met in Orono, September 24, with personnel of the Maine Unit and the University's School of Forest Resources to discuss a research proposal for studying the effects of snowmobiles on wildlife and their habitat.

PERSONNEL CHANGES

Graduate Assistant William Krohn completed all requirements for the Master of Science degree which he was awarded at the August commencement. He is employed as a biologist with the Migratory Bird Populations Station of the Bureau of Sport Fisheries and Wildlife. Krohn is headquartered at the University of Maine and assigned to the Bureau's woodcock studies.

Six new graduate students began their programs for advanced degrees at the University of Maine in September. They are as follows:

Victor S. Balinga - B.S., 1967, University of Nigera, Nsukka.
 Myrtle C. Bateman - B.Sc., 1968, University of New Brunswick, Fredericton.
 David E. Capen - B.S.F., 1969, University of Tennessee, Knoxville.
 Robert D. Dunford - B.S., 1969, University of Florida, Gainesville.
 James M. Ramakka - B.S., 1969, Cornell University, Ithaca, N.Y.
 William R. Whitman - B.S., 1964, University of Maine; M.S., 1966,
 University of Rhode Island, Kingston, on leave from the Canadian
 Wildlife Service.

PUBLICATIONS AND THESES

- Gilbert, Frederick F. 1969. Analysis of basic vocalizations of the ranch
 mink. J. Mammal., 50(3):625-627.
- _____. 1969. The life of the white-tail. Maine Fish and Game,
 11(3):2-5.
- Mendall, Howard L. 1969. Maine's waterfowl laws: The old, the new. Maine
 Fish and Game, 11(3):26-28.

November 3, 1969

Files

MAINE COOPERATIVE WILDLIFE RESEARCH UNIT

University of Maine

Orono, Maine

QUARTERLY REPORT

October-December, 1969

Cooperating Agencies

Maine Department of Inland Fisheries and Game
Wildlife Management Institute
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 Howard L. Mendall, Unit Leader

RESEARCH PROJECTSBIG GAMEDeer and Hare Forage Following Strip Clearcutting and Slash Disposal on the Penobscot Experimental Forest, Maine

Assignment: Anthony M. Rinaldi

Thesis Advisor: Voit B. Richens, Assistant Unit Leader

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

Rinaldi has completed his thesis toward an M.S. degree. The abstract follows:

An alternate strip clearcut of a spruce-fir-hardwood stand in the Penobscot Experimental Forest in Maine was studied from August through October, 1968. The objectives were to measure the production of forage and its use by white-tailed deer and snowshoe hare following clearcutting of strips 15 chains long by 1, 2, and 3 chains wide that were subjected to three different slash treatments namely: burned in place, removed, and left in place. The cutting, which was done in 1964-1965 by the U.S. Forest Service, attempted to simulate seedbed conditions that might be created by various types of mechanical tree harvesters. Data were collected on 648 quarter-acre plots in clearcut strips and 216 plots in alternate (2-chain-wide) uncut strips.

Strip clearcutting increased the number of species and quantity of deer and hare forage. Strips 2 chains wide yielded more forage than those either 1 or 3 chains wide. The amount of hardwood, shrub and herbaceous forage was greater for the burned and slash-removed treatments than for the slash-left treatments. By the fourth growing season softwoods over 6 inches tall had failed to become established on burned treatments, occurred in small numbers on the slash-removed treatments, and exceeded pre-cut levels on the slash-left treatments. Browse was shortest on the burned treatments and was about the same height on the slash-removed and slash-left treatments.

Animal utilization of the available forage was greater on the uncut than on the clearcut strips. Clearcut strips 2 chains in width received more foraging than strips of other widths. The three slash treatments had approximately equal feeding pressure. On slash-left treatments more herbaceous than woody stems were foraged. Deer fed primarily on herbaceous plants while hares foraged mostly on hardwoods. Deer pellet counts were greatest on the 1-chain-wide clearcut strips and on the slash-removed treatments, whereas hare pellets occurred most frequently on the 1- and 2-chain-wide clearcut strips and on the burned slash treatments. Both deer and hare pellet counts were higher on the uncut than on the clearcut strips.

Deer-Snow Relationships in Maine

- Objectives: (1) To obtain continuous winter weather records of a deer yard by cover type.
 (2) To investigate winter-yard snow characteristics.
 (3) To observe reactions of deer to snow and weather.
 (4) To formulate meaningful deer-snow relationships as an aid to deer herd management in Maine.

Assignment: Voit B. Richens, Assistant Leader

Consultants: John H. Hunt, Maine Department of Inland Fisheries and Game
 William O. Pruitt, Jr., Memorial University of Newfoundland
 Edmund S. Telfer, Canadian Wildlife Service

Sites for weather stations have been chosen in each of the five cover types of the deer winter yard. A stand and instrument weather shelter were placed at each site. Since not all of the instruments ordered have arrived, the stations are not yet fully functional. However, totalizing anemometers, wind vanes, and one barograph, two hygrothermographs and one pyrliograph are in operation.

Richens and Carrol Madden of the Engineering Department of the University of Maine are developing a snow analyzing kit for study of basic snow characteristics. The kit will be a highly-modified version of the snow kit of the Canadian National Research Council, used in Canada for many years but not available to us for purchase or loan.

Two snowmobile routes, each six miles long, have been established for animal and track observations. The routes are numbered at 0.5-mile intervals for easier study.

Plans for next quarter: Additional equipment will be installed, snowshoe traverses and an additional snowmobile route will be established, and data will be gathered.

UPLAND GAME

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, Associate Professor, Wildlife Resources

Consultant: Robert Wade, Moosehorn National Wildlife Refuge

A paper was prepared for presentation at the 1970 Northeast Fish and Wildlife Conference to be held in Delaware in January. The title is Fall and Winter Feeding Activities and Behavior of Ruffed Grouse in Maine.

Blood smears were collected from grouse of the Moosehorn National Wildlife Refuge during the summer of 1969. These samples were analyzed with the assistance of Dr. Gordon R. Bennett, Department of Biology, Memorial University, St. Johns, Newfoundland. The incidence of blood parasites in these 1969 samples was low when compared with that of past years. Dr. Bennett suggested that the unusually wet weather may have adversely affected the insect vector population, hence the observed incidence of the parasites.

Plans for next quarter: The study of winter budding by grouse will be continued.

WATERFOWL

Interrelationships 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 Advisor: Howard L. Mendall, Unit Leader

Consultants: Ray B. Owen, Jr., Assistant Professor, Wildlife Resources
Frederick F. Gilbert, Assistant Professor, Wildlife Resources

Tabulation and analysis of the season's data were continued. The relation of conflicts between species and acts of predation (described in the July-September report) appear strongly correlated with differences in breeding cycles of the three species studied. The black-backed gull is a more pugnacious species than the herring gull, and tends to perform aggressive behavior during most of the breeding season. Nevertheless, its predation activities took a heavier toll of other species' eggs during the last half of its incubation and at hatching time of its own eggs. Herring gulls tend to have a period of aggressiveness at the peak of egg laying, when most of the predation acts by this gull species were witnessed.

In addition, a secondary period of aggressiveness began a week or so before hatching time and progressed as the young gulls grew older and provoked frequent territorial clashes. Eiders had two peaks of aggressiveness; one at nest initiation and one at hatching time. There was a low in agonistic behavior of eiders the week that nest predation was the highest.

Hatching-success data from the sample of 200 eider nests showed that one or more eggs hatched in 44 per cent of the nests. There was a marked difference, however, in nests located in natural vegetation and those under artificial nest shelters. The latter were erected by former Graduate Assistant Clark in an effort to reduce gull predation. He found that although nest success was greater under the shelters there was still a rather high proportion of destroyed nests. During the present study, the shelters were modified prior to nesting. The height of the entrance was lowered and this evidently made it more difficult for gulls to rob the nests. Under-shelter hatching success was more than twice that of nests in vegetation, in 1969.

CURRENT PROJECTS NOT REPORTED THIS QUARTER

Woodcock Nocturnal Habitat Utilization in Relation to Sex, Age, and Molt - R. B. Owen.

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.

Influences of Known Populations of Deer Upon Forest Vegetation - S. D. Schemnitz.

Factors Affecting Summer Flight Behavior of White-tailed Deer on Isle au Haut - S. D. Schemnitz.

Effects of Three Cover Conditions on Behavior and Physiological Responses of Pinned White-tailed Deer - M. C. Bateman.

COOPERATION, EDUCATIONAL WORK AND MISCELLANEOUS ACTIVITIES

Mendall had numerous conferences during the quarter with representatives of the Bureau of Sport Fisheries and Wildlife, the Maine Department of Inland Fisheries and Game, the Nature Conservancy and the Natural Resources Council relative to preservation and acquisition of eider duck breeding islands on the Maine coast.

Graduate Assistant Bourget attended a waterfowl seminar in Québec City during late November. This was an informal meeting of Federal, Provincial and University biologists interested in wetland problems of Quebec. Bourget described the general program of the Maine Cooperative Wildlife Research Unit and his eider duck thesis project.

Dr. Gardiner Bump, in charge of Foreign Game Importation of the Bureau of Sport Fisheries and Wildlife, was guest speaker at a seminar of wildlife staff and graduate students at the University of Maine in December.

Schemnitz, Coulter and Gilbert attended the annual meeting of the Canadian Society of Wildlife and Fishery Biologists at St. John's, Newfoundland, Nov. 6, 1969. Schemnitz presented a paper, Spectrographic Analysis of Deer Hair - A Valuable Research Tool? A paper, Ecology and Biology of the Fisher, was presented by Coulter. Gilbert was chairman of a panel, Moose Management in the Atlantic Region. Gilbert and Schemnitz prepared demonstrations and led discussions on aging techniques. Gilbert handled deer aging and Schemnitz--aging of grouse and woodcock.

Schemnitz, Allen and Rinaldi assisted personnel of the Acadia National Park Service in analyzing vegetation at a new deer exclosure at Aunt Betty's Pond in October.

Schemnitz, Ramakka, Balinga and 25 senior wildlife students assisted the Game Division, Maine Department of Inland Fisheries and Game, with the opening-day waterfowl bag check.

Gilbert participated in a television program on the "Bud Leavitt Show" in October. The objective was to publicize deer hunter check stations instituted in Maine in the fall of 1969.

Regional representative, Coulter, attended a Wildlife Society Council meeting at St. Paul, Minnesota during early December.

Coulter taught an 8-week course, Conservation of Natural Resources, to education majors that had just completed practice teaching.

PERSONNEL CHANGES

Graduate Assistant, Anthony M. Rinaldi, completed all requirements for the Master of Science degree which he will receive in the January 1970 commencement. Rinaldi has been accepted for training in Officers Candidate School in the armed forces.

PUBLICATIONS AND THESES

Gilbert, Frederick F. 1969. Physiological effects of natural DDT residues and metabolites on ranch mink. *J. Wildl. Mgmt.* 33(4): 933-943.

_____ and E. D. Bailey. 1969. The effect of early weaning on the sexual behavior and reproductive success of ranch mink. *J. Mammal.* 50(4): 742-747.

Owen, Ray B., Jr. 1969. Heart rate, a measure of metabolism in blue-winged teal. *Comp. Biochem. Physiol.* 31: 431-436.

Schemnitz, Sanford D. 1969. Homing behavior of displaced male woodcock in Maine. *Special Sci. Rept., Wildlife No. 123.* U.S. Fish and Wildlife Service. pp 28-30.

January 30, 1970