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THE FEASIBILITY OF REINTRODUCING SPRUCE GROUSE TO ACADIA NATIONAL PARK MOUNT DESERT ISLAND MAINE

by

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Acadia National Park

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Not For Publication

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INTRODUCTION

Hikers on trails in Baxter State Park in northern Maine occasionally stumble across, figuratively and almost literally, a grayish bird about half the size of a chicken. Indeed, the bird, called a spruce grouse or Canada grouse (Canachites canadensis), looks like a small gray chicken. The spruce grouse has also been nicknamed "Fool Hen" because of its unwariness around humans. In fact, one Maine sportsman (Rich, 1879) made a business of capturing spruce grouse with a slip-noose on the end of a long pole and selling them in pairs.

The cock is strikingly marked with white spots on a black breast (Figure 1). A red comb of bare skin over the eyes of the male swells during courtship, and when he fans his tail, he displays a bouquet of cinnamon-tipped tail feathers or rectrices and white-tipped undertail feathers or coverts. The female is rusty brown with a blackish tail. The tail of both sexes has a chestnut band on the tip, in contrast to the ruffed grouse whose tail feathers end in a black band and a grey tip.

Spruce grouse once resided on Mount Desert Island within the present borders of Acadia National Park (Hallock, 1899; Fahey, Appendix A). Their extirpation in settled areas such as Mount Desert Island has generally been attributed to human activities (Bent, 1932;



FIGURE 1. MALE SPRUCE GROUSE

Taverner, 1934; Palmer, 1949). Therefore, the species is a candidate for reintroduction to Acadia National Park since it is a policy of the National Park Service to restore, when possible, natural biotic communities which have been altered by man (U. S. Department of the Interior, 1968, p. 17, 92).

The purpose of this study is to determine the desirability and feasibility of reintroducing spruce grouse to Acadia. Objectives of study are:

1. To determine where spruce grouse formerly lived on Mount Desert Island,
2. To suggest reasons why spruce grouse did not survive on the Island,
3. To review the habitat required by the species,
4. To survey suitable habitat available on Mount Desert Island, and, if a reintroduction is recommended,
5. To plan the most feasible method of reintroducing the species.

I wish to express sincere gratitude to Mr. Francis E. Fahey for gathering historical information from older outdoorsmen of Southwest Harbor and nearby towns. Mr. Fahey has had a lifelong interest in spruce grouse, and he often discussed the species with former market hunters and other outdoorsmen when he moved to Southwest Harbor 33 years ago.

To the park staff I again express my appreciation for supporting this second resource management study with time and money. The University of Maine Library staff kindly ordered photostats of old references from Dartmouth College. My wife, Louise, aided in photographic work and edited the manuscript.

THE LIFE OF THE SPRUCE GROUSE

Habitat

Habitat requirements of spruce grouse in Maine and the Maritime Provinces have never been seriously studied. However, general observations in the northeast indicate that the birds live in typical lowland coniferous forest interspersed with occasional openings such as bogs, marshes and small upland ridges (Brewster, 1925; Forbush, 1929; Palmer, 1949; Coulter and Mendall, 1966). These forests consist of black spruce, cedar, tamarack and fir. In summer the birds prefer borders or edges where spruce or tamarack adjoin bogs and marshes (Palmer, 1949). However, Palmer (1949) reports sightings up to 3,400 feet on Mount Katahdin.

Spruce grouse usually nest in open, sunlit clearings near or in sphagnum bogs or marshes (Tufts, 1961). Often, the nests are built on Sphagnum (Palmer, 1949).

In Ontario and Michigan spruce grouse prefer a habitat of mixed jack pine and black spruce (Amman, 1963; Lumsden and Weeden, 1963; Robinson, 1969), but also live in open bogs with scattered black spruce and tamarack (Amman, 1963). In jack pine barrens of northern Michigan, spruce grouse did not favor mature black

spruce-jack pine stands in summer but moved into younger stands where live branches of trees still reached the ground and where blueberries grew (Robinson, 1969).

Food

General observations in Maine (Hardy, 1910; Brewster, 1925; Schemnitz, in conversation, 1970) indicate that the diet of spruce grouse consists primarily of needles and buds of fir, spruce and tamarack. During summer the birds vary their diet with leaves and fruit of blueberry. A favorite food during summer and fall is tamarack needles which are, of course, not available in winter. Spruce grouse elsewhere in North America have a similar diet except that jack pine needles are the most common food (Martin, Zim and Nelson, 1951; Crichton, 1963; Jonkel and Greer, 1963; Ellison, 1966). Jack pine occurs at a few scattered locations in Maine, but it is not a common tree (Maine Forestry Department, 1968). It is not known whether birds on Mount Desert Island would substitute pitch pine for jack pine in their diet. Pitch pine is common near Seawall Bog which will be described in detail in a later chapter, Survey of Available Habitat.

Breeding

In April and May male spruce grouse attract females by "drumming" the air with their wings. Unlike the ruffed grouse which drums while perched on a log or rock, the spruce grouse beats the air sharply while flying between a tree and the ground (Lumsden, 1961).

Spruce grouse lay relatively small clutches of eggs, usually four to seven, compared with eleven eggs per average clutch for ruffed grouse (Palmer, 1949). Normally, laying begins about the middle of May in Nova Scotia (Tufts, 1961). The eggs hatch in early summer after about twenty-four days of incubation; by August the young grow independent of the hen (Palmer, 1949).

SPRUCE GROUSE ON MOUNT DESERT ISLAND

The only published evidence that spruce grouse formerly lived on Mount Desert Island is Charles Hallock's (1899) statement that "I started a spruce partridge yesterday in the woods. They are seldom seen on Mount Desert Island, but the timber grouse Bonasa umbellus are common."

To support this account, Mr. Francis E. Fahey, a resident of the Island since 1937, gathered information from old friends who have lived and hunted on Mount Desert Island since the early 1900's. The following paragraphs summarize that information. Mr. Fahey's memorandum and a biographical note are included in Appendix A.

George Dolliver (1890-1963) told Mr. Fahey that spruce grouse had survived on Mount Desert Island until the early depression years. Mr. Dolliver, a former market hunter and close friend of Mr. Fahey for twenty-five years, hunted throughout his life on southwestern Mount Desert Island. He told Mr. Fahey that spruce grouse were relatively common until 1910, then gradually declined in numbers until his last observation about 1930. He said the grouse had lived around Bass Harbor Marsh and in Great Heath (Seawall Bog).

To corroborate Mr. Dolliver's observations, Mr. Fahey talked with other hunters during March, 1970 (Appendix A). Five of these hunters, each between 64 and 77 years old and each a lifelong

resident of Mount Desert Island, gave Mr. Fahey similar information from their own hunting experience. All of them described the former range as Bass Harbor Marsh and said they had last seen spruce grouse on the Island in the early 1930's.

The reason for the disappearance of spruce grouse from Mount Desert Island can never be proved. However, several men with whom Mr. Fahey talked blamed hunting. Palmer (1949) notes that the species disappeared early around settled areas of Maine and attributes this to small brood size and unwariness of the species. Other authors have also noted the incompatability of spruce grouse and human settlement (Bent, 1932; Taverner 1934). A factor which has not been noted in published works is that repeated logging and burning have converted much former habitat to hardwood forest. Such habitat alterations, in conjunction with overhunting and small brood size, probably caused the species' extirpation on Mount Desert Island.

Since the late 30's, however, most former habitat of spruce grouse on Mount Desert Island has been added to Acadia National Park where hunting and logging are prohibited. Under these new conditions, spruce grouse may once again be able to survive as a resident species.

Over the last 20 years there have been a few reported sightings of spruce grouse on Mount Desert Island. For example, William C. Townsend (in conversation, 1970), a seasonal naturalist and experienced birder, believes that he saw a road kill on Route 233 near McFarland's Hill several years ago. However, none of these reports have been verified nor have they been accepted by Paul G. Favour (in conversation, 1970) or James Bond (personal correspondence, 1970) as definite records.

Isle au Haut

The question has been raised whether this study should also consider a reintroduction of spruce grouse to Isle au Haut where the park owns about 4,000 acres. Indeed, Isle au Haut has many sphagnum bogs and marshy areas which would be ideal habitat (Manville, 1964). However, Amman (1963) reports that, although spruce grouse reside throughout northern Michigan, there is no evidence that the species has ever reached Isle Royale or any other island in Lake Superior more than one mile from the mainland. Isle au Haut lies five miles from mainland, and a gap of one mile separates two of the smaller "stepping-stone" islands between mainland and Isle au Haut. Thus, the distance over water suggests spruce grouse have never reached Isle au Haut. Even the ruffed grouse is absent from Isle au Haut according to Schemnitz (in conversation, 1970) who conducted intensive deer censusing for several years, during which time

observers walked more than 1,000 man-miles along census lines which crossed the island in several places. However, none of this evidence conclusively shows whether spruce or ruffed grouse once inhabited Isle au Haut since there were more than 800 people living there a century ago. Both species might have been eliminated then.

SURVEY OF AVAILABLE HABITAT

Acadia National Park consists primarily of well-drained hills and valleys, donated to the park because of their scenic value. However, the park has also acquired most of Bass Harbor Marsh and Seawall Bog on southwestern Mount Desert Island (Figure 2). Bass Harbor Marsh, stretching nearly three miles from Western Mountain to Seawall Bog, is the largest salt water marsh on Mount Desert Island. Seawall Bog, which borders the southern arm of Bass Harbor Marsh, covers roughly 500 acres and supports bird species found nowhere else on the Island (Bond, 1968). Together, these lowlands offer the only extensive habitat in the park suitable for spruce grouse.

The sites which appear most desirable for a reintroduction attempt are (1) the confluence of Marshall Brook, Lurvey Brook and Heath Brook at the north end of Bass Harbor Marsh (area A on Figure 3) and (2) Seawall Bog at the south end of Bass Harbor Marsh (area B on Figure 3). The vegetation at each of these sites was mapped in the field using aerial photos as base maps and following Kuchler's (1967) method of vegetation mapping. A more detailed listing of vegetation by species, coverage and layer is included in Appendix B, along with a description of the mapping method.

ACADIA NATIONAL PARK

MAINE





FIGURE 3. MAP OF SOUTHWESTERN MOUNT DESERT ISLAND

Description of Vegetation of Area A (Figure 4) at the North End of Bass Harbor Marsh.

The following numbers refer to numbered areas on Figure 4.

1. Drained marshland. Alders and grass predominate with scattered patches of tamarack less than fifteen feet high. Dead snags indicate a more extensive forest in the past (Figure 5).
2. Mature upland hardwood forest; understory of spruce and fir (Figure 6). Probably a result of logging 40 to 50 years ago. Forest floor covered with hardwood leaves.
3. Softwood or softwood-hardwood forest. Varies from mixed softwoods with a small percentage of hardwoods to mature spruce forest.

Thus, Figure 4 shows that large sections of forest surrounding the north end of Bass Harbor Marsh are in the hardwood stage of succession. However, the understory is almost all coniferous, and in several decades the forest will consist primarily of spruce and fir. This trend in succession will favor spruce grouse.

Description of Vegetation of Area B (Figure 7), Seawall Bog

1. Sphagnum bog. Early transition stage in succession from open water to mature spruce forest (Figure 8). Small ponds in center.

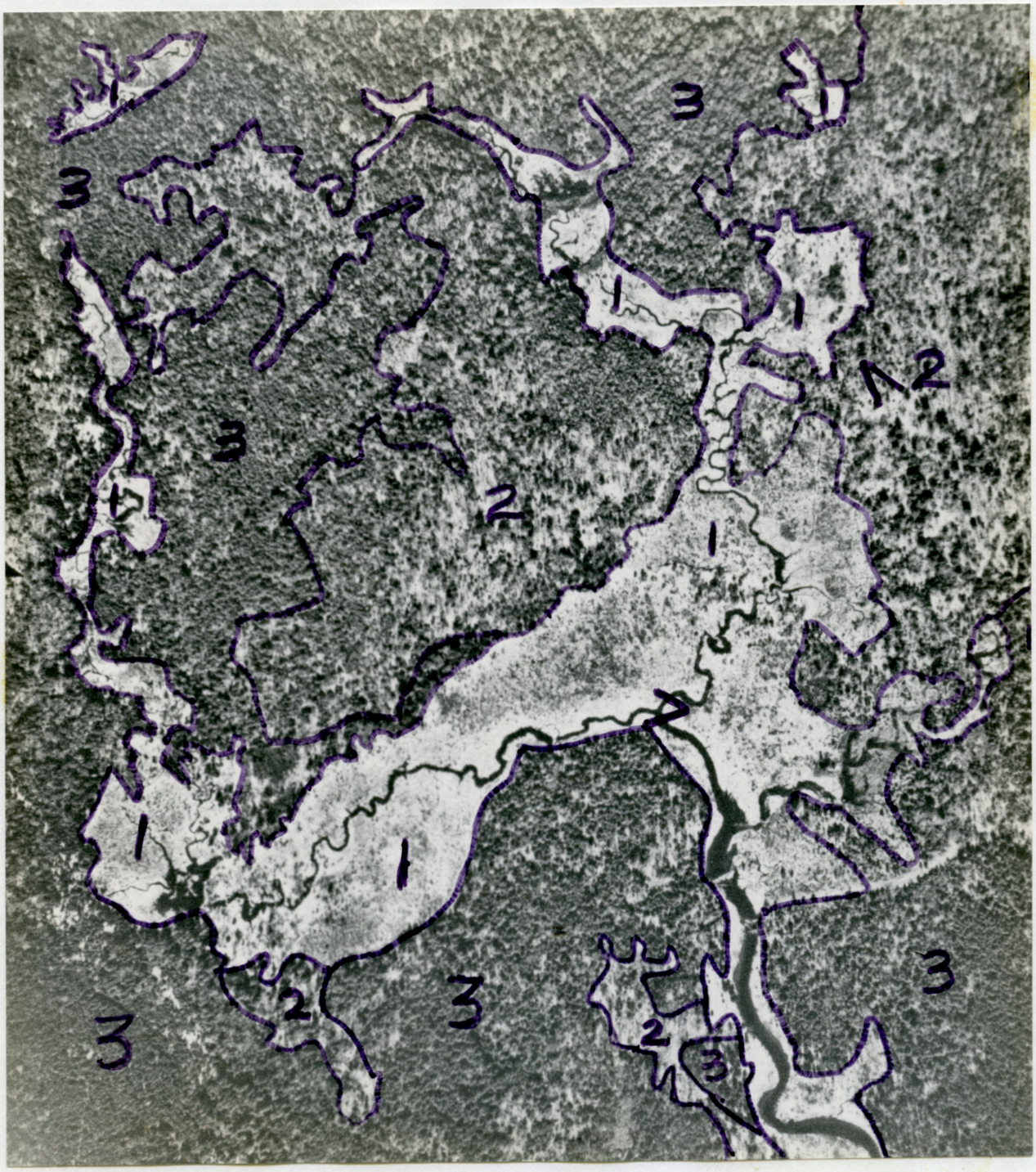


FIGURE 4. AERIAL PHOTO OF AREA A, NORTH END OF BASS HARBOR MARSH

(Numbers refer to vegetation description in text and in Appendix B
Scale: 1 inch = 500 feet)



FIGURE 5. VIEW OF BASS HARBOR MARSH

(Taken at the V mark in area 1, Figure 4)

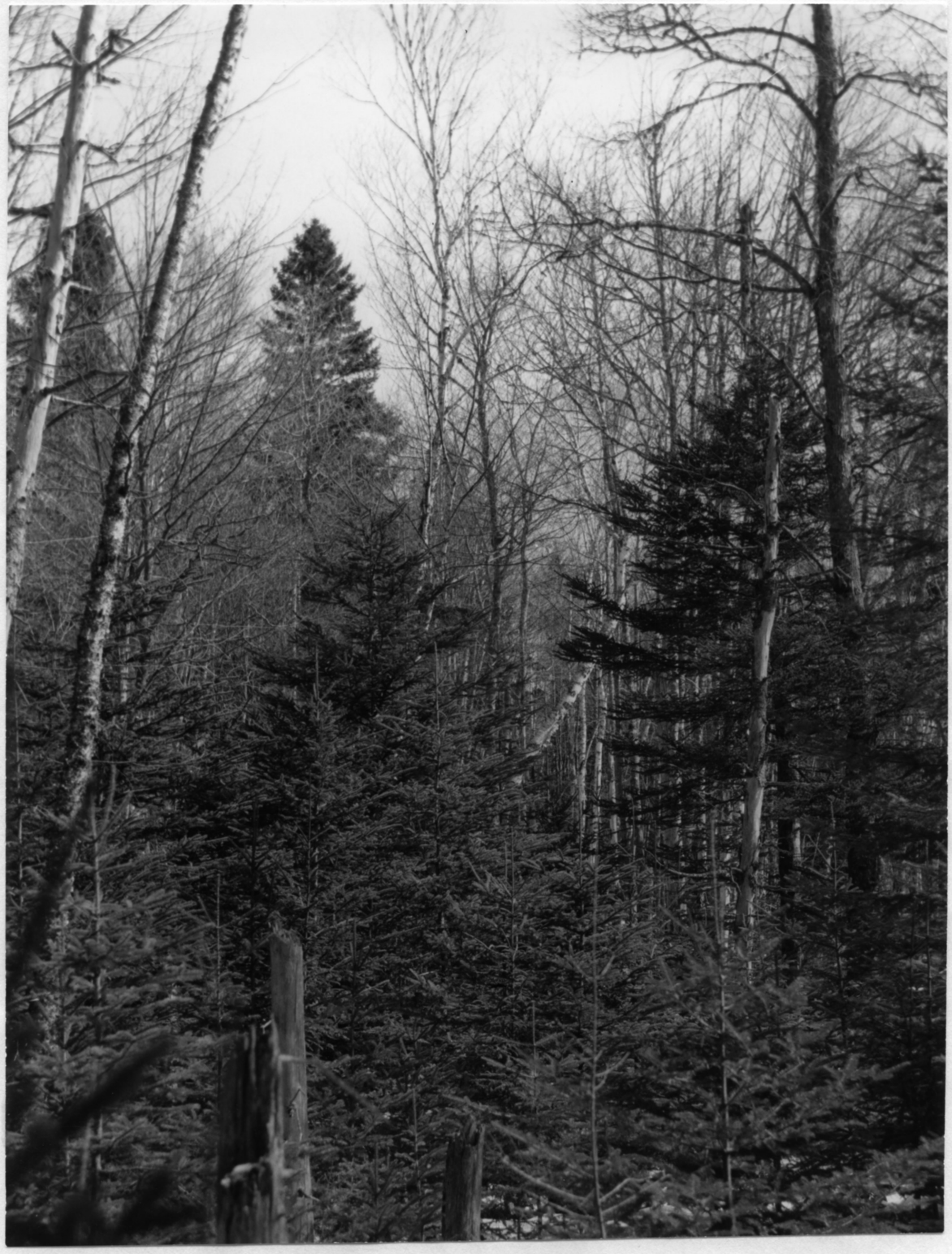


FIGURE 6. HARDWOOD FOREST WITH AN UNDERSTORY OF SPRUCE AND FIR, NEAR BASS HARBOR MARSH

(Photo taken at V mark, area 2 in Figure 4)

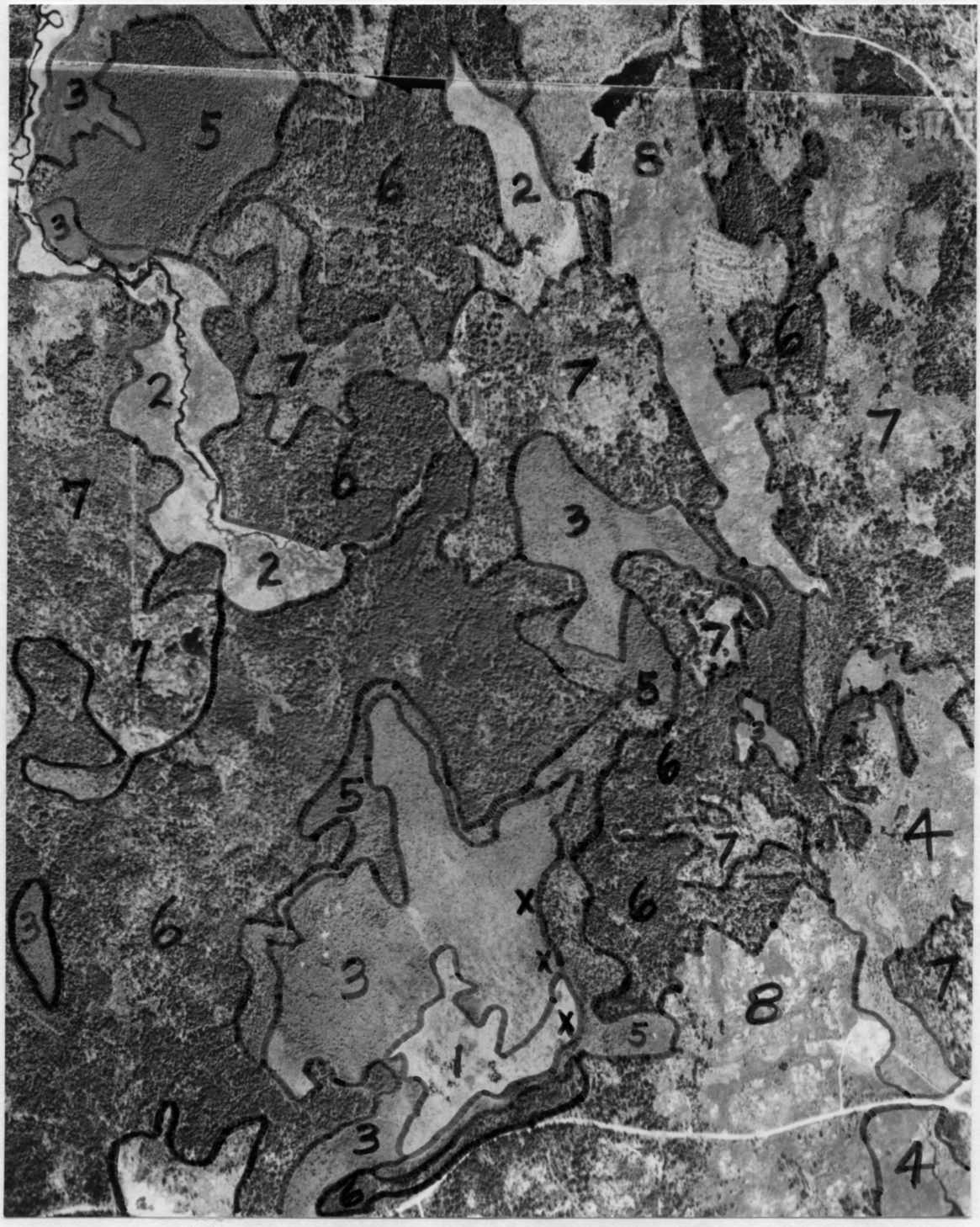


FIGURE 7. AERIAL PHOTO OF AREA B, SEAWALL BOG

(See Figure 3 for location of this area. Numbers on photo refer to vegetation description in text and in appendix C. Scale: 1 inch = 1000 feet)



FIGURE 8. VIEW OF SEAWALL BOG, EARLY TRANSITION STAGE IN FOREGROUND

(Area 1 in Figure 7)

2. Marsh. Treeless except for occasional dead snags or tamarack; bordered by tamarack and red spruce, drained, tidal at low elevation. Vegetation very similar to that previously described for north end of Bass Harbor Marsh (Vegetation type No. 1 in Area A).
3. Sphagnum bog. Intermediate transition; scattered to dense black spruce (Figure 9).
4. Marsh. Poorly drained; dense hardwood shrubs.
5. Bog. Advanced transition; forest of tamarack, black spruce and red spruce; usually dense vegetation.
6. Upland spruce-fir forest. Shallow soil moderately drained; small percentage of hardwoods.
7. Hardwood-softwood forest. Cut during last 30 years, will undergo succession to spruce-fir.
8. Open upland. Cut or burned frequently before it became park land; undisturbed for about 20 years. Shallow soil with extensive bedrock outcropping. May have been a blueberry barren at one time (Figure 10).

The survey shows that along the edges of area B and in portions of its interior the forest is mixed softwood-hardwood which is undergoing succession toward spruce-fir. However, most of area B, in particular the scattered bogs or bog-like areas, matches closely published descriptions of spruce grouse habitat in Maine and the Maritime Provinces (Brewster, 1925; Palmer, 1949; Tufts, 1961). The suitable



FIGURE 9. SEAWALL BOG, INTERMEDIATE TRANSITION STAGE IN FOREGROUND

(Area 3 in Figure 7)



FIGURE 10. OPEN UPLAND NEAR SEAWALL BOG

(Area 8 in Figure 7)

habitat covers roughly one square mile. Thus, Seawall Bog and the south end of Bass Harbor Marsh offer better habitat for spruce grouse at present than does the north end of Bass Harbor Marsh. However, as forest succession advances toward spruce-fir around the north end of the marsh, habitat there will improve for spruce grouse. This change will take several decades.

Predators

Fox tracks were common along frozen channels of Bass Harbor Marsh in late winter, 1970, but were scarce further south in Seawall Bog. At present snowshoe hare are much scarcer than they were 3 years ago (Norman Roy, Roy Stamey, in conversation, 1970). This scarcity of hare encourages fox to feed on other prey such as mice or birds. The vulnerability of spruce grouse to such predation is unknown, but the apparent absence of fox tracks at Seawall Bog supports the choice of this area for a reintroduction.

METHOD OF REINTRODUCTION

The release site should offer cover and food which will hold birds and reduce their subsequent scattering. Such a site lies along the east side of Seawall Bog where the forest borders the bog (marked X in Figure 7). Spruce and tamarack dominate the forest and small tamarack and cranberries grow in the bog. The adjacent upland coniferous forest to the east contains some blueberry and huckleberry. Further east about 500 feet is a semi-open upland where blueberries cover nearly half of the ground (area 8 in Figure 7, pictured in Figure 10). This site is about one quarter mile from a road, and is easy to reach on foot.

Mendall (in conversation, 1970) suggests that the most feasible way to introduce birds is to trap and release during late July or August after young are independent of the hen. As many birds as possible, up to 40, should be released. If less than a dozen birds can be trapped in one year, then the release should be repeated a second year. Finding enough birds is likely to be a difficult and expensive task.

The reintroduction must be followed by systematic searches the following spring and summer to find out whether grouse are breeding - the important test of success or failure. Arrangements should be made with University of Maine or State personnel to cooperate in these searches.

The crucial problem is who will supply the birds. After the findings and recommendations of this study have been reviewed by several professional biologists, the park staff will meet with personnel of Maine Inland Fisheries and Game Department to seek their cooperation and to discuss trapping, transporting, and reintroducing spruce grouse. We can then determine costs and plan the logistics of the project. Hopefully, the Park Service will be able to provide enough money to successfully reintroduce spruce grouse to Acadia.

SUMMARY

Spruce grouse live in lowland coniferous forests of spruce, fir, cedar and tamarack, interspersed with openings such as bogs or marshes. Needles and buds of these conifers are the basic food of spruce grouse, but the birds also eat leaves and fruit of plants such as blueberry and cranberry during summer.

Spruce grouse lived on southwestern Mount Desert Island until about 1930, according to six older hunters who have lived and hunted in that area since the early 1900's. The grouse were most numerous around Bass Harbor Marsh and Seawall Bog, but the species declined in numbers after 1910. It disappeared from the Island about 1930. Presumably, overhunting and changes in forest composition following logging and fire caused the decline and extirpation of the species.

Bass Harbor Marsh and Seawall Bog offer suitable habitat and protection for spruce grouse at present since logging and hunting are prohibited in Acadia National Park. The vegetation around Seawall Bog consists of about one square mile of coniferous forest or bog in transition to coniferous forest. The forest around Bass Harbor Marsh, on the other hand, contains a substantial percentage of hardwoods, apparently as a result of

logging or burning. This forest will gradually revert to spruce-fir as the coniferous understory matures, but, at present, Seawall Bog seems preferable for a reintroduction.

Since spruce grouse were once native to southwestern Mount Desert Island, and since their former habitat is now protected in the park, the chance of successfully reintroducing the species seems very good.

As many birds as possible, up to 40, should be released in habitat which offers food and shelter. Such habitat exists along the forest-bog ecotone on the eastern edge of Seawall Bog. If a dozen or fewer birds are released, then a second release should follow the next year. The most feasible way to introduce spruce grouse is to trap and release during late July or August after young are independent of the hen.

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APPENDIX A. HISTORICAL NOTES

Mr. Francis E. Fahey who gathered the historical information on the spruce grouse on Mount Desert Island, is 64 years old and is employed at Jackson Laboratory, Bar Harbor. He grew up near the headwaters of the Penobscot River in Maine. He has hunted and fished all his life until recently. Now he hunts with a camera.

Mr. Fahey is an articulate conservationist and an excellent naturalist. He has within the last year organized an eastern Maine chapter of the Maine Audubon Society; he also helped organize the new Maine Sierra Club recently.

Mr. Fahey moved to Southwest Harbor, on Mount Desert Island, in 1937. Since he had grown up hunting in the forests of northern Maine, he quickly made friends with local hunters. During World War II, he supervised Hinckley Boat Yard in Southwest Harbor where more than one hundred men were employed. From the friends he has known over the last thirty years, Mr. Fahey gathered the historical information in the following memorandum.

Of the six men mentioned in the memorandum, only Dolliver and Norwood were limited in their hunting territory to Mount Desert Island. Mitchell and Sinclair owned a hunting camp on the Fifth Lake of the Machias River opposite a large bog where spruce grouse were common. Robinson owned a permanent guiding camp on the

Union River at the present site of Graham Lake and guided for many years throughout the Union River watershed. Carroll has had numerous hunting camps in Washington and Hancock counties, primarily on the Machias River, as well as other camps in Alaska, Labrador, and elsewhere in Canada. He has had far more time to hunt and trap than most men because of his relative financial independence. Thus, at least four of these men had ample opportunity to become acquainted with the spruce grouse, and to know the difference between it and the ruffed grouse.

MEMORANDUM

March 19, 1970

To: MR. LAWRENCE BARDEN

From: F. E. FAHEY

Subject: SPRUCE PARTRIDGE RESEARCH PROJECT - ACADIA NATIONAL PARK

In response to your request for information concerning the last authentic record of spruce partridge on Mount Desert Island, the following data are submitted:

I came to the Island in 1937 and, having originated in hunting areas in the northern part of the state, naturally tended to early association with hunting societies here.

The spruce partridge were seemingly extinct on the Island at the time of my arrival, but it seems certain that limited numbers were in existence here several decades after the last specimen recorded in the literature in late 1890. I find nothing unusual in such a circumstance. Persons tending to record such vital matters are often transient to an area or otherwise limited in their knowledge thereof. Native hunters with an extensive knowledge of a subject area or species are generally not prone to maintain records.

The following six men were or now remain my close friends, and each had or has an extensive knowledge of the Island's forests and fauna as they existed several decades ago. Each of the four would be meticulous in relating his experiences to me and each had intimate knowledge of spruce partridge from long-term observation both on and off this Island.

George Dolliver. Deceased 9 March 1963, age 73 years. Born at Seawall (Manset) 20 March 1890.

This man possessed an extraordinary knowledge of wildlife generally and was perhaps the last of the great market hunters of sea birds in this area.

He told me that - coming as I did in 1937 - I had just missed seeing the last of the spruce partridge for he placed their extinction at approximately 1930. Cause attributed to overhunting. Though they were never truly numerous in his lifetime, he considered them relatively common until 1910, then steadily declining until his last observation in approximately 1930.

The area of greatest numbers appears to have been the perimeter of Bass Harbor Marsh, the Great Heath (across from Ship Harbor), and running generally north from Southwest Harbor (Ben Worcester's gravel pit) to Seal Cove Pond.

Lewis Norwood. This man, still a resident of Southwest Harbor, was born and reared adjacent to Bass Harbor Marsh. He is now approximately 77 years old, providing a birth date of 1892. In his early years, like Mr. Dolliver, he was essentially a professional hunter with the difference that his hunting was primarily to provide food for many brothers and sisters in a poor family.

In complete corroboration of Mr. Dolliver's statements, and covering the identical area, he recalls the birds as fairly common in 1905 to 1910, then declining steadily. His last specific observation was a male bird on the east side of Bass Harbor Marsh. He thinks this was in 1915, possibly a year more or less. He is not certain of the cause of the decline, but accepts overhunting as a major factor. He was employed in town work after 1915 and thereafter did not travel the partridge area with great frequency, so does not necessarily consider his last observation as representing the last of the species.

Julius Mitchell. A present resident of Southwest Harbor, age approximately 64, providing a birth date of 1906.

This man was a natural hunter of many species, but primarily concerned with fox hunting and the use of a trail hound. Although he hunted widely, both on and off the Island, we are concerned here with his experience and knowledge of the Bass Harbor Marsh, Western Mountain area, and adjacent lowlands.

Mr. Mitchell informs me that although the birds were always rare during his hunting years, they were present. He had one famous fox hound, in his prime from 1928 to 1932, and during those years he saw a few birds each hunting season. At that date the birds were so few that no attempt was made to explain their decline. He realized that they were close to extinction and never killed any.

Harvard Sinclair. This man, still living at Southwest Harbor, is approximately 64 years old, having a birth date of 1906. He was never a professional hunter, as all of the others named were, but he was an ardent sportsman, hunting widely both on and off the Island.

The last record of a direct observation of spruce partridge on this Island, which I can consider authentic as of this date,

occurred in the presence of this man in company with the above-named Julius Mitchell. The place of observation was the east side of the Bass Harbor Marsh almost up to the Southwest Harbor - Seal Cove Road. The date was between 1930 and 1932, primarily being determined as occurring during the peak hunting period of the fine Mitchell fox hound. Mr. Mitchell cannot determine theyear, but Mr. Sinclair fixes it as being 1932, as he was unemployed that winter and hunted frequently with Mr. Mitchell. Both men insist that there can be no question of species identification as they were within several feet of the bird, described as a beautiful fully mature male. He was not killed.

Byron Robinson. Will be 70 in June, 1970. Resident in Southwest Harbor. Every winter until the depression years he saw several spruce grouse while he was hunting.

Charles Carroll. About 65 years old, lives in Southwest Harbor. He has hunted both here and in Alaska, and knows the grouse and ptarmigan species well.

He sighted spruce grouse fairly frequently until 1920 when the numbers dwindled. He believes he saw one last in the early 1930's. He found the birds from Somesville west to the coast and south through Bass Harbor Marsh.

These are the only observation accounts I have been able to obtain to date from sources which I consider fully competent to determine the species and to provide accurate data as to date and place of observation.

I place full credence in these observations, as presented, and therefore conclude that spruce partridge were present in low numbers, but with consistent sightings, until at least 1915, and thereafter continued on the extinction threshold until at least the last sighting described as approximately 1932.

APPENDIX B. DETAILED DESCRIPTION OF VEGETATION

Method of Mapping Vegetation

Two areas which seemed suitable spruce grouse habitat were chosen for mapping (A and B on Figure 3). Aerial photographs were available for both areas (Bass Harbor Marsh was photographed at 1:6000 on April 21, 1964; Seawall Bog was photographed at 1:12000 on April 9, 1955). Photographic copies were made at the same scale as the original so that vegetation types could be delineated on the copies under a stereoscope.

These photographs with boundaries of vegetation types drawn on them were used as base maps in the field. The floristic composition, physiognomy and structure of vegetation within each delineated area were noted on forms suggested by Kuchler (1967, 196-199). It was not necessary for this study to lay out sample plots. Rather, the important species, physiognomy and structure of vegetation were recorded at two or three locations within each delineated area on the base map. Even this simplification of Kuchlers (1967) method gave results more detailed than necessary; several vegetation types on the original base map had to be combined to avoid unneeded complexity in the report.

Area A on Figure 3, Aerial Photo-Figure 4

1. Tree Layer, 5--10 meters tall

Tamarack	Less than 5% coverage, scattered single trees.

Shrub layer, 0.5-5 meters

Tamarack	50-100% coverage in scattered patches.
Alder	50-100% coverage in extensive patches, predominate shrub in most of marsh.
Balsam fir	Less than 1% coverage, scattered single saplings.
Red spruce	Less than 1% coverage, scattered single saplings.

Forb layer, less than 0.5 meters tall

Grass	100% coverage in meadows, otherwise scattered throughout the alders and larch.
Cattails	Less than 1% coverage
Spirea	Less than 1% coverage

2. Tree layer, 10-20 meters

Red maple	26-50% coverage
Paper birch	1-5% coverage
Ash	Less than 1% coverage
Aspen	Less than 1% coverage
White pine	Less than 1% coverage
White spruce	Less than 1% coverage

Shrub layer, 0.5-5 meters

Balsam fir	6-25% coverage
Red spruce	1-5% coverage

Forb layer, less than 0.5 meter

Forest floor covered with hardwood leaves; little herbaceous growth visible (March, 1970).

3. Tree layer, 5-20 meters

Red spruce	25-75% coverage
Balsam fir	1-25% coverage
Cedar	1-5% coverage
Paper birch	Less than 5% coverage

Shrub layer, 0.5-5 meters

Red spruce	6-25% coverage
Balsam fir	6-25% coverage

Forb layer, less than 0.5 meter

Bracken	6-25% coverage
Lichens and Mosses	6-25% coverage, sphagnum in moist hollows

Area B on Figure 3, Aerial Photo - Figure 7

1. Tree layer, 2-5 meters

Black spruce	Less than 1% coverage
Shrub layer, 0.5-2 meters	
Black spruce	1-5% coverage
Tamarack	1-5% coverage
Forb layer, less than 0.5 meter	
Sphagnum and Cladonia	100% coverage
Cranberry	51-75% coverage
Lambkill and Leatherleaf	26-50% coverage
Grass	26-50% coverage
Pitcher plants	Less than 1% coverage

2. Marsh vegetation very similar to that previously described as No. 1, Area A, at north end of Bass Harbor Marsh.

3. Tree layer, 2-5 meters

Black spruce	1-50% coverage, 6-25% coverage (average)
Tamarack	1-5% coverage
Shrub layer, 0.5-2 meters	
Black spruce	6-25% coverage
Tamarack	1-5% coverage
Leatherleaf and Lambkill	26-75% coverage

Forb layer, less than 0.5 meter

Sphagnum	100% coverage
Cranberry	6-25% coverage

4. Tree layer, 2-10 meters

Tamarack	6-25% coverage
Black spruce	1-5% coverage

Shrub layer, 0.5-2 meters

Alder, viburnum, leatherleaf, lambkill, and other hardwood shrubs	100% coverage, dense

Forb layer, less than 0.5 meters

Grass	26-50% coverage
Sphagnum	76-100% coverage

5. Tree layer, 2-5 meters

Black spruce	1-50% coverage, average 6-25%
Tamarack	6-25% coverage
Red spruce	1-5% coverage

Shrub layer, 0.5-2 meters

Lambkill	26-50% coverage
Leatherleaf	6-25% coverage
Viburnum	1-5% coverage
Other deciduous shrubs	6-25% coverage

Forb layer, less than 0.5 meter

Sphagnum	More than 75% coverage
Pitcher plants	Less than 1% coverage

6. Tree layer, 2-20 meters

Red spruce	26-75% coverage
Balsam fir	6-26% coverage
Tamarack	1-5% coverage
Paper birch	1-5% coverage
Red maple	1-5% coverage

Shrub layer, 0.5-2 meters

Red spruce	26-50% coverage
Balsam fir	1-6% coverage
Viburnum	Less than 1% coverage
Lambkill and Leatherleaf	6-25% coverage

Forb layer, less than 0.5 meter

Lichens and Mosses	More than 75% coverage
Bracken	Less than 1% coverage
Blueberry and Huckleberry	Less than 1% coverage

7. Tree layer, 2-10 meters

Red maple	26-50% coverage
Paper birch	26-50% coverage
Red spruce	6-25% coverage
Balsam fir	6-25% coverage

Shrub layer, 0.5-2 meters

Spruce-fir	26-50% coverage
Maple-birch	6-25% coverage

Forb layer, less than 0.5 meter

Blueberry and Huckleberry	6-25% coverage
Bracken	6-25% coverage

(Species composition for number 7 very roughly estimated)

8. Tree layer, 2-10 meters

Red spruce	1-25% coverage, 1-5% average
Red maple	1-5% coverage
Paper birch	6-25% coverage
Red, white, pitch pine	1-5% coverage
Balsam fir	Less than 1% coverage

Shrub layer, 0.5-2 meters

Red spruce	1-5% coverage
Viburnum	1-5% coverage
Lambkill	26-75% coverage

Forb layer, less than 0.5 meter

Blueberry	26-50% coverage
Lichen (Cladonia)	51-75% coverage

APPENDIX C. SCIENTIFIC NAMES

Animals

Fox	*Vulpes fulva*
Ruffed grouse	*Bonasa umbellus*
Snowshoe hare	*Lepus americanus*
Spruce grouse	*Canachites canadensis*

Plants

Alder	*Alnus sp.*
Ash	*Fraxinus sp.*
Black spruce	*Picea mariana*
Blueberry	*Vaccinium sp.*
Bracken	*Pteridium aquilinum*
Cattails	*Typha latifolia*
Cedar	*Thuja occidentalis*
Cranberry	*Vaccinium oxycoccus*
Fir (balsam)	*Abies balsamea*
Huckleberry	*Gaylussacia sp.*
Jack pine	*Pinus banksiana*
Lambkill	*Kalmia angustifolia*
Leatherleaf	*Chamaedaphne calyculata*
Paper birch	*Betula papyrifera*
Pitch pine	*Pinus rigida*
Pitcher plant	*Sarracenia purpurea*

Red maple	*Acer rubrum*
Red spruce	*Picea rubens*
Sphagnum	*Sphagnum sp.*
Spirea	*Spirea sp.*
Tamarack	*Larix laricina*
Viburnum	*Viburnum sp.*
White pine	*Pinus strobus*
White spruce	*Picea glauca*

Larry:

~~Newspaper sent down by Connie Tolliver, Ref. to~~
~~pg 36.~~

Yesterday, July 27th at 3:15 PM. I observed a Spruce Grouse on Baker Island. I had an excellent view from 8-10 ft. away and am absolutely positive of the identification. It was in thick Spruce forest, between the pond and exit of the trail that exits from the main trail to the west beach.

Bird remained motionless and acted typically tame. I approached until it flew off.

Bill Burnard.

Naturalist, 1970

THE ACADEMY OF NATURAL SCIENCES

NINETEENTH AND THE PARKWAY, PHILADELPHIA, PENNSYLVANIA 19103 Phone LO 4-3921 Area Code 215

February 24, 1970

Mr. Lawrence S. Barden
Acadia National Park
Halls Cove, Maine 04644

Dear Mr. Barden:

Frankly I doubt if the Spruce Grouse ever inhabited Mt. Desert. There are several sight records all by bird watchers but neither I nor any of my friends who have shot partridges on the island for 50 years or more have ever encountered this species. However, I have often seen it on the mainland of Hancock County, and have shot many by mistake as well as several for use as study skins.

In my opinion the most favorable habitat for spruce grouse on Mt. Desert would be along Marshall's Brook. Almost all of this area is outside of the park.

Yours sincerely,

James Bond

JB:hm

 G.E. Street.

through several islands; thence by course West by South to Holt Island [Isle au Haut], ten leagues from Mt. Desert Harbour. At half past one wind fell to a fair breeze; passed Martinicus Island at 5, Metennick Island at 12; bright, fine, and calm.

"Oct. 10. Sloop rolled very much till 5. When passing Segwin Island a fresh breeze came from Northeast. Arrived at Falmouth channel half after eight, just twenty-four hours from Mt. desart. rained hard. We came to anchor at Falmouth half after ten. I went on shore, dined at Col. Waldo's and lay there.

"Oct. 11. We went about the town, a very growing place, some fine houses, three building, many vessels, among which were some ships upon the stocks. Were saluted by the Fort with five guns and by a ship in the harbor with seven. Our sloop returned five guns. We dined at Col. Waldo's, slept at Capt. Rosses and went on board at half past ten.

"Oct. 12. We weighed anchor at half past eight, saluted the town with five guns, kept within sight of the shore all the way, and anchored near the Fort island in Piscataway about three miles from Portsmouth at five o'clock. The Fort hailed us to know if I was on board. At six Gov. Wentworth's barge came alongside to carry me to his house about three miles from the sloop and two from Portsmouth.

"Oct. 13. I went to Portsmouth in my own boat, the boats crew being in their uniform of red faced with blue; was received at the wharf by several gentlemen and conducted to Mr. Wentworth's house. At 3, Mrs. Bernard arrived in the charriot.

"Oct. 14. We passed an agreeable day at Portsmouth. The 15th, set out in the charriot for Boston." [1]

[1] Besides this journal, the Bernard papers in the Harvard College Library contain a description of Mount Desert at the time of the governor's visit. It is written in Latin and ascribed to "an officer of the Cygnet," doubtless a naval officer in the governor's suite. The translation runs as follows: —

"Mount Desert is a large mountainous island lying 10 leagues west from the Island of Grand Mannan in the mouth of the Bay of Funday, it is in the Lattitude 44, 35 North, and Longitude 67, 20 West. It appears as the Continent from the Sea, but is divided from it by an arm running between it and the Main, but at low water may be crossed by a narrow neck near the West end as the Inhabitants report. Its natural Productions are Oak, Beech, Maple, and all sots of Spruce and Pines to a large Dimention, viz: 34 inches diameter. Ash, Poplar, birch of all sorts, white Cedar of a large Size, Sasafrass, and many other sorts of wood, we know no name for a very great variety of Shrubbs, among which is the Filbert. Fruits, such as Rasberrys, Strawberrys, Cranberrys of two Sorts, Gooseberrys and Currants. It has all sots of soil, such as dry, wet, rich, poor and barren; with great Quantitys of Marsh, a number of Ponds, with runs fit for mills. Quantitys of Marble, and its generally thought from the appearance of many Parts of the Land there are Iron and Copper Ore. Its Inhabitants of the Brute Creation are Moose, Deer, Bear, fox, Wolf, Otter, Beaver, martins, Wild Cat, and many other Animals of the fur kind, all kinds of wild fowl, Hares, Partridges brown and black. But the most valuable part of this Island is the extraordinary fine Harbour in it, which is formed by the Islands as described on the annext Sketch of it. Codfish

First published report of spruce grouse.

Street, G. E. 1905. Mount Desert.