

Biological Studies and Surveys within and around the Area of Acadia National Park 1899-1947.

By Kristen Ober and Jack Shaida



Today, Acadia National Park is one of the most frequently visited National Parks in the US. More than 2.35 million people find their way to the park in 2013, making it the 9th most visited National park. However the first 30 years of Acadia National Park existence were relatively quiet. Summer vacationers were the primary visitors to the park . In 1919 only 64,000 people visited the park, climbing to 409,961 by 1940. The relatively small staff that consisted primarily of superintendent George Dorr, an assistant superintendent, a few rangers, and later a few naturalists. The early park officials were primarily concerned with maintaining (and creating) trails, and roads and maintaining the scenic beauty of the landscape in the park. At that time the NPS as a whole spent more time and money promoting the parks, than actively managing the ecosystems within the park. The park staff at Acadia simply did not have same resources as they do today, and thus were unable to continually study all the wildlife in the park. However the Dorr and his staff did see the need to actively manage the ecology of the park, and launched certain studies in order to scientifically inform those management decisions.

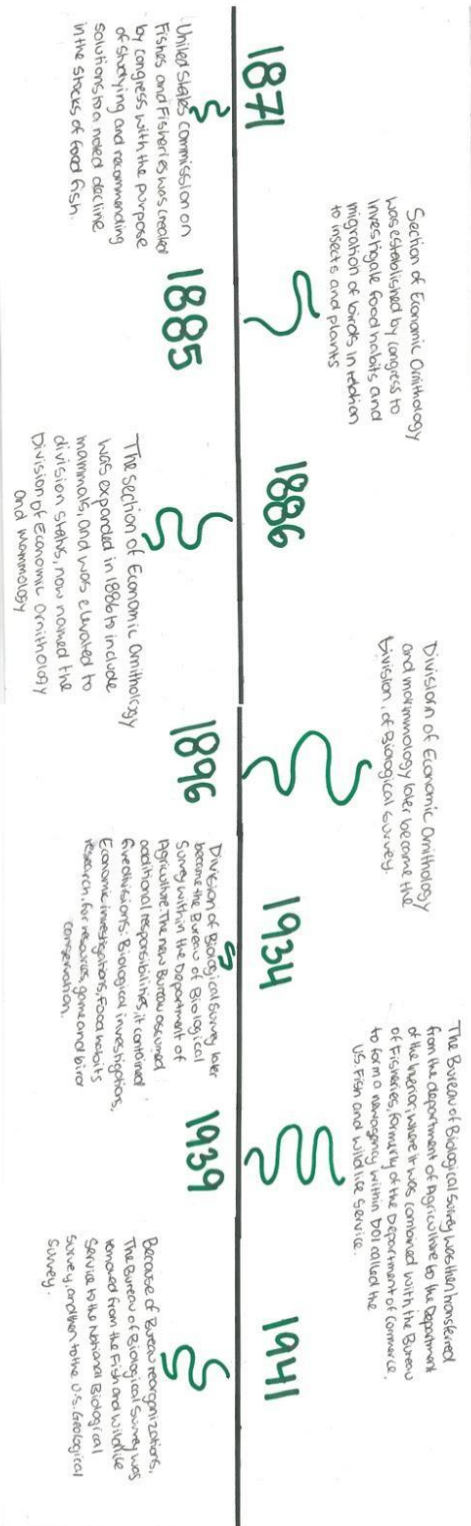
There were many early scientific wildlife studies conducted within the park, or the surrounding areas, between 1889-1947. Before the park was created and in its first fifteen years of infancy the park service conducted very few surveys and studies compared to citizens and private organizations. Other federal and state agencies such as the U.S. Geological Survey, and Department of Agriculture conducted studies in the park, sometimes even without coordination with the park service. As the park aged, and its budget, staff, and visitation increased, the park service began to conduct more studies, and coordinate more frequently with other agencies and individuals. Most of these studies and surveys aimed to find out what, how many, and where various species of birds, fish, mammals, amphibians, insects, plants, and other organisms lived in the park. Some studies of these studies informed larger management initiatives, such as programs to control invasive and harmful species.

This report seeks to shed light on the science that occurred during the dawn of the park. The reports, letters, and articles from the time period between 1899-1947 are organized by the type of wildlife that they study. Timelines of the studies are included for the purpose of showing the progression of science in the park over time three maps show the approximate locations of each study within the Mount Desert Island, the surrounding Islands, Frenchman bay, the Schoodic Peninsula, and Isle au Haut. Not every document included the specific area in which the study was conducted, and some studies were island wide. The maps simply reflect the general areas, not specific locations, that the studies occurred in. Finally all the studies were summarized, to give the reader a specific summary of said study, survey, or article.

This research project was started with the goal to find and gather together information and documents about US Biological Survey. The Biological Survey was a prominent US ecological research organization. To better understand the organization a summary of the

history of the organization was created. However it appears that no USBS activities occurred in Acadia National park during the time period between 1899 and 1941, when the USBS was dissolved. The report moved from focusing on USBS work to any scientific studies and surveys of the Parks biology conducted in the park during its infancy. The history of the Biological Survey is included in order to give the reader of this report context to the process and

Timeline of USBS History



In 1871, United States Commission on Fishes and Fisheries was created by congress with the purpose of studying and recommending solutions to a noted decline in the stocks of food fish. Spencer Fullerton Baird was appointed its first commissioner (USGS Patuxent Wildlife Research Center).

In 1885, Section of Economic Ornithology was originally proposed by the American Ornithologists' Union and the Smithsonian Institution, was established by Congress to investigate food habits and migration of birds in relation to insects and plants (USGS Patuxent Wildlife Research Center).

In 1886, Division of Economic Ornithology and Mammalogy, under the leadership of C. Hart Merriam, was expanded in 1886 to include mammals, and was elevated to division status. Its general function was to provide information on pests to the rapidly expanding farm industry, and for the first few years studies of food habits were emphasized. Merriam, however, was more interested in plant and animal distributions and in the physical and climatic factors that influence them than he was in crop pests and feeding habits (USGS Patuxent Wildlife Research Center).

As a result, the Division began conducting general surveys of bird, mammal, and other biotic community distributions, plotted the results and used them to construct life zone maps. Merriam perceived this information to be of value to agriculture, and he established several series of publications for the transmission of this information to farmers and other interested parties (USGS Patuxent Wildlife Research Center).

In 1896, Division of Economic Ornithology and Mammalogy later became Division of Biological Survey. The name of the division was changed to reflect more accurately the work being done. Employees of the Division including Edward W. Nelson, Edward A. Goldman, Vernon Bailey, Theodore S. Palmer, Harry C. Oberholser, Wilfred H. Osgood, and Albert K. Fisher continued to conduct faunal surveys for the next several years. Gradually, however, as commercial agriculture continued to expand, Division personnel were compelled to spend more time on the "economic" aspects of birds and mammals. Using information gained through survey work, the Division addressed many questions of economic importance and provided sound advice concerning the management of injurious as well as desirable species of wildlife. Although survey work did not stop, application of the knowledge gained from earlier surveys dominated the Division's work (USGS Patuxent Wildlife Research Center).

In 1934, the Division of Biological Survey later became the Bureau of Biological Survey. Passage of the Lacey Act in 1900, which made interstate shipment of game taken in violation of state laws a federal offense and imposed federal restrictions on importation of exotic wildlife, added further responsibilities, and in 1905 the Division became a bureau within the

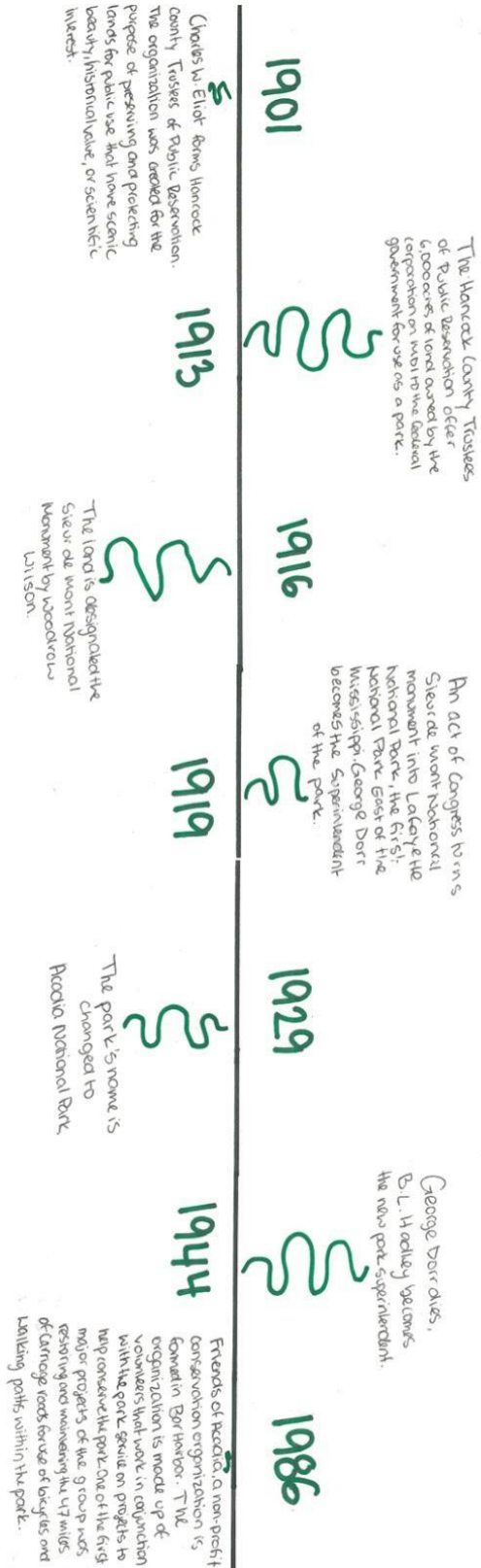
Department of Agriculture (USDA). The new Bureau of Biological Survey continued to grow and assumed additional responsibilities, and by 1929 it contained five divisions: 1) Biological Investigations, 2) Economic Investigations, 3) Food Habits Research, 4) Fur Resources, and 5) Game and Bird Conservation (USGS Patuxent Wildlife Research Center).

The Bureau was reorganized and several of its divisions were united to form the Division of Wildlife Research. The responsibilities of the Division of Biological Investigations were assumed by a Section of Mammalogy in the Division of Wildlife Research. The responsibilities of the new Section included studies of life history, taxonomy and distribution of wildlife, game management planning surveys, cooperative research in wildlife, investigations of wildlife resources in Alaska, and research on forest wildlife. Although the responsibilities remained essentially the same, in 1936 the Section of Mammalogy became known as the Section of Wildlife Surveys, with Hartley H. T. Jackson in charge (USGS Patuxent Wildlife Research Center).

In 1939, the Bureau Biological Survey was then transferred from Department of Agriculture to Department of the interior; where it was combined with the Bureau of Fisheries, formerly of the Department of Commerce, to form a new agency within DOI called the U.S. Fish and Wildlife Service (USGS Patuxent Wildlife Research Center).

In 1941, The Biological Survey Unit (BSU), because of Bureau reorganizations, was removed from the Fish and Wildlife Service (FWS) to the National Biological Survey (NBS) and thence to the U. S. Geological Survey (USGS) (USGS Patuxent Wildlife Research Center).

Timeline of the Acadia History



A brief summary of important events in the history of Acadia National Park is included to provide background on the time period this report focuses on.

In 1901 Charles W. Eliot forms Hancock County Trustees of Public Reservation. The organization was created for the purpose of preserving and protecting lands for public use that have scenic beauty, historical value, or scientific interest.(Mazur, 186)

In 1913 The Hancock County Trustees of Public Reservation offer 6,000 acres of land owned by the corporation on MDI to the federal government for use as a park. (Mazur, 186)

In 1916 The land is designated the Sieur de Mont National Monument by Woodrow Wilson. (Mazur, 186)

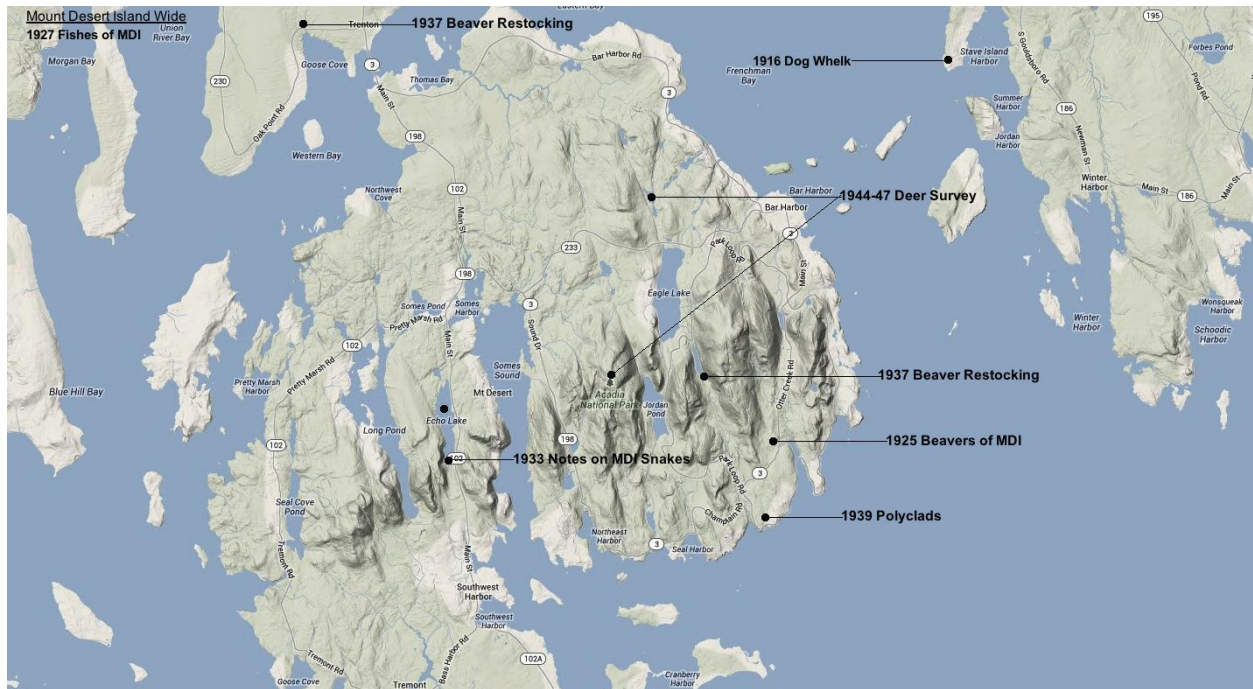
In 1919 Congress acts turns Sieur de Mont National Monument into Lafayette National Park, the first national park east of the Mississippi. George Dorr becomes the superintendent of the park. (Mazur, 186)

The Park's name is changed to Acadia National Park in 1929.

George Dorr died in 1944, B.L Hadley becomes the new park superintendent.

Friends of Acadia, a non profit conservation organization, is formed in Bar Harbor in 1986. The organization is made up of volunteers that work in conjunction with the park service on projects to help conserve the park. One of the first major projects of the group was restoring and maintaining the 47 miles of Carriage roads for use as bicycle and walking paths within the park. (Mazur, 186)

Map of Mammal, Amphibian, and Aquatic Life Surveys¹



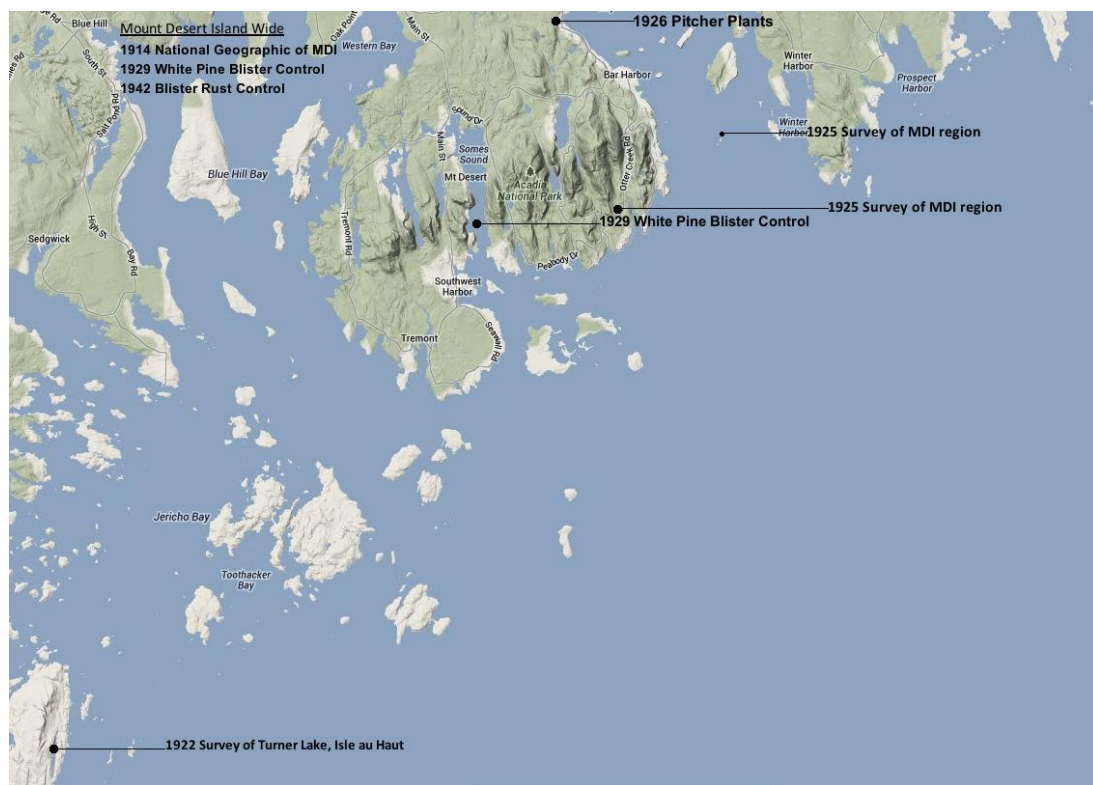
Map of Bird Survey Locations



¹ (Google Map, 2014. Locations by Jack Shaida using data compiled from IRMA)

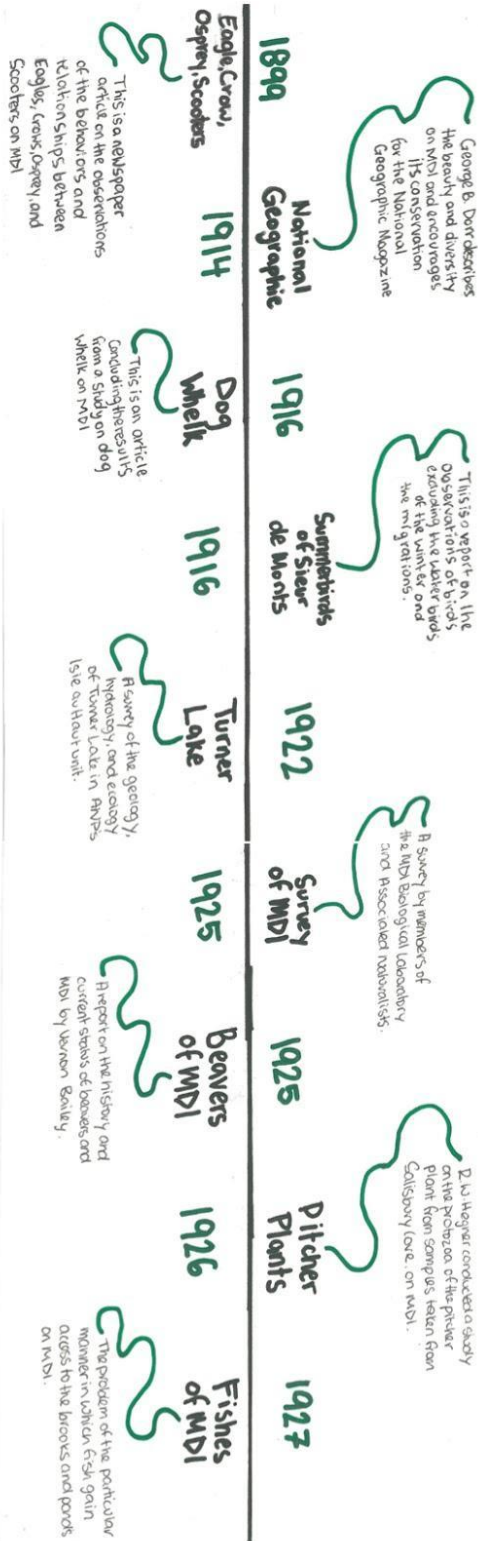
(Google Map, 2014. Locations by Jack Shaida using data compiled from IRMA)

Map of Plant and Geological Surveys



(Google Map, 2014. Locations by Jack Shaida using data compiled from IRMA)

Timeline of Surveys



The USPA communicates with PNF about the control of the Bitter Root on White Pine

White Pine Bitter Control

1931

Banded Birds

A total of 2,384 birds were banded on Great Head

1933

Letter on birds of Acadia

A letter from the Pictou and Society of Natural History describing flight seasons observed from 1867-1934

1934

Bird list

A complete list of birds observed by Chris Farley

1937

Beaver restocking

A letter about beavers living in PNF

1929

Birds of the Harbor

A list of birds seen on the 10th fortnight of June

1933

MBI Snakes

Nature notes on three species of snakes found on MBI

1933

Beaver reintroduction letter

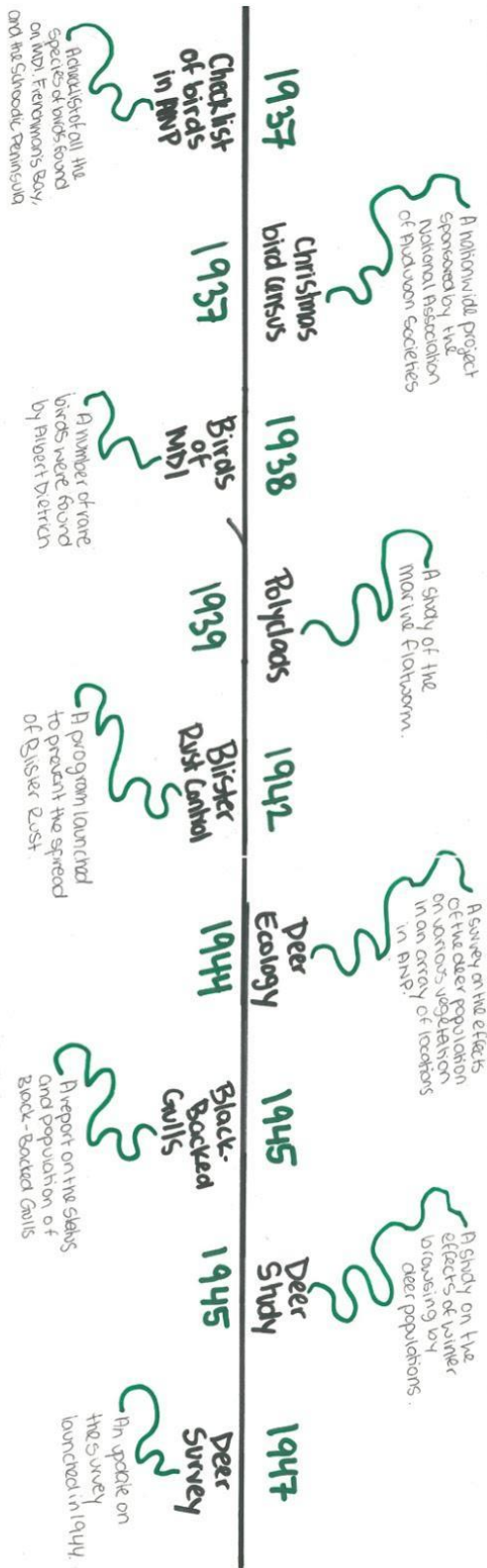
The Board of Game and Fish commissions through PNF for their contribution of beaver.

1935

Cape May Warbler

James Bond describes the behavior of making Cape May warblers.

1937



An array of surveys, studies, and observations were conducted on Mount Desert Island between 1916 and 1947. During this time period the Sieur de Monts National Monument became Acadia National Park, visitation to the area increased, and the Park Service's interest in studying the ecology of MDI grew. These scientific investigations examined and recorded various living entities of Mount Desert Island, including but not limited to; birds, deer, beavers, amphibians, fish, insects, and sea creatures. Most of these studies were conducted by private organizations, such as the National Association of Audubon Societies, Local citizens, and biologists and naturalists that worked in conjunction with the park service.

Birds:

1899 Eagle, Crow, Osprey, Scooters

An observer on Mount Desert Island witnesses an osprey dropping a fish it has caught and an eagle took it. Soon after this victimized bird has another fish, and the eagle is quick to pursue it. The eagle was not as successful this time due to a couple of crows chasing him away. The osprey now had his fish to himself. (Hallock, 1899)

1916 Summerbirds of Sieur de Monts

This is a report by Charles Eliot, Jr. on the observations in the new Sieur de Monts National Monument on Mount Desert Island. This report includes in depth observations of the American Bald Eagles and their life history. In Autumn there is a great increase on the ocean-dwelling birds. Fishermen refer to the young Black Guillemots as the sea-pigeons. Hawks are also referred to as "evil little sharp-shinned rascals." The voices of the Thrushes are the crowning glory of the National Monument's bird-life. This report includes observations for a total of 160 species of birds, not including the 35 species observed in the winter and during migration (Eliot, 1916).

1931 Birds of NE Harbor

A list of the birds seen in the last fortnight of June, 1931; from the whole of Brown and Sargent Mountains, and Greening's Island, with everything inbetween, from Somes Sound to Long Pond. There were 72 species spotted. (Eliot, 1931)

1933 Banded birds

A total of 2389 birds were banded on Great Head from August 12th, 1929 to June 26th, 1933. Bird species banded were: Chickadee, Myrtle Warbler, Junos, Red-breasted Nuthatch, Purple Finch, Downy Woodpecker, White-throated Sparrow, Catbird, Bronzed Grackle, White-crowned Sparrow, Robin, Barnswallow, Lincoln Sparrow, Cowbird, Crow, Acadian Sharp Tail Sparrow, Dovekie, Tree Sparrow, Chipping Sparrow, Song Sparrow, Tree Swallow, Redstart, Fox Sparrow, Magnolia Warbler, Savannah Sparrow, Maryland Yellow Throat, Goldfinch, Black & White Creeper, Indigo Bunting, Spotted Sandpiper, Cedar Waxwing, Towhee, Mocking Bird, Lark

Sparrow, Hermit Thrush, Yellow Warbler, Ovenbird, Vesper Sparrow, and the Eve Swallow (Anthony, 1933).

1933 Letter on Birds of Acadia

A letter from the Portland Society of Natural History to a park naturalist describing the flight seasons from 1867 to 1934. No less than three hundred birds were handled in one flight by taxidermists in Maine. A local taxidermist paid only .50 cents each against \$3.00 in early years. They exchange a story of a Snowy Owl that held a large brown rat in its right hand talons, and carried the prize about as it flew from place to place, when too closely approached. Acadia National Park stuffed animals are also being sent to the Portland Society of Natural History (Norton, 1933).

1935 Bird list

A complete list of all the birds observed by Chris Farley on Mount Desert Island in the year 1935. At least one bird of 37 unique species of bird were observed. This compares to 45 species that were collected by Henry Fillietas in 1895 (Norton, 1935).

1937 Cape May Warbler

James Bond reports on the presence of Cape May Warblers on the southern point of Mount Desert Island, he observes ten pairs. The birds appeared during the last week in May and in all instances the males were discovered singing at or near the top of tall spruces. At no time was a male seen to descend, when feeding, lower than twenty feet above the ground. The males had no particular 'singing tree' as many warblers have, but each bird confined itself to a very restricted locality, keeping within a radius of approximately a hundred yards. One afternoon he located a female Cape May Warbler collecting nesting materials, which in this case was the hair of a collie dog that had been buried by someone and later dug up by foxes. The male took no part in nest building. The species is known on occasion to lay as many as eight eggs (Bond, 1937).

1937 Checklist of Birds in Acadia

A list of all of the species of birds found on Mount Desert Island, Frenchman Bay and the Schoodic Peninsula since 1900 until 1937. The park service considered that any birds found in any of these regions, were likely to be found in the park, and were therefore included in the list of Birds in Acadia. The list was compiled by Maurice Sullivan a park naturalist at Great Smoky Mountain National Park, from the notes, records, and publications about birds of various private citizens from / Bar Harbor, Winter Harbor, and Southeast Harbor. 157 bird species are listed. 8 species are listed as hypothetical; species that once lived in or are rare visitors to the park. (Sullivan, 1937).

1937 Christmas Bird Census

The survey was conducted by A. E Browner, Charles Gay, Vernon Lunt and Maurice Sullivan. The survey found a "deplorable lack of hawks and owls." The Association was

concerned that the lack of those rodent predators were a major contributing factor to the growing number of squirrels and mice on the island (Brower, et al. 1937).

1938 Birds of MDI

Two young peregrine falcons were seen flying near Eagle Cliffs [Precipice]. Ten Tennessee Warblers were found on Schoodic Point but not on the Mount Desert Island, but were suspected to live on the island. Yellow Pine Warblers were found at the Sea-Wall. A Lincoln Sparrow was found at the Sea wall bog, a species that had not been mentioned in any record on the Island up until that point (Dietrich, 1938).

1945 Black Back Gulls

A report on the status and population of Black-Backed Gulls on the coast of Maine by Alfred Gross on the unprecedented increase of various Gull populations occurred in the beginning of the 20th century, mostly due to conservation efforts. The report estimated the population of Black-Backed Gulls in Maine to be 3,500. The population was spread out on 98 Maine islands. 61 of these islands had more than 5 nesting pairs of Gulls. There were 46 nesting pairs found on Schoodic Island southeast Schoodic Peninsula unit of Acadia National park. The report found that Black-backed Gulls were aggressive and destructive to other gull species. They would destroy eggs and kill the young of other species. The report recommended measures be taken to control the booming population of this species by the FWS (Gross, 1945).

Mammals:

1925 Beavers of MDI

The author recounts that one beaver was introduced to Otter Creek in 1920 but died. Then the following year four beavers were introduced to the Bubble Pond stream (this report is contradictory to a late report by B.L Hadley, that lists the 1921 and 1922 as the date of these events.) In just three years time the population of Beavers on the Island grew to 25-30, and spread out to colonies at Breakneck Ponds, Witch Hole Pond, New Mill Meadows Pond, Eagle Lake, and Little Hunters Beach Brook. The author reports significant damage to timber in swamp lands that were flooded by beaver dam in the first three locations. The author suggests the trapping of beavers living near destructive dams, to be either relocated to areas of the park where they would be harmless or killed for fur. He concluded that allowing the beavers to reproduce and expand unchecked by the park service would be destructive to the beavers and their food supply (Bailey, 1925).

1934 Beaver Reintroduction letter

The chief warden of the Board of Game and Fish Commissioners in Dover, Delaware is writing to thank the Assistant Superintendent of Acadia National Park for sending them beavers to release on their land, there were two previous releases. They hope to re-establish beavers through this foundation stock. They noted that this beaver acted just as though they belonged there (Foster, 1934).

1937 Beaver Restocking

Beavers, which had been present on historically present on Mount Desert Island as evidence by the old dams and historical records, were completely wiped out on the island by trappers in the beginning of the 19th century. The park staff at Acadia took an immediate interest in re introducing beavers to the various streams and creeks on the island. The first attempt to do so was in 1921. Doctor George H. Phillips, the representative of Bar Harbor in the Maine Legislature, brought a beaver to Otter Creek Valley in autumn. However the beaver was unable to build a dam and died in the winter. In 1922 Phillips brought three beavers to Bubble Pond Stream in the park where they successfully built a dam and house. By 1925, the beaver population on the island exploded. New dams were found as far as Trenton, 12 miles from the original dam site. From 1925-1928 park rangers began trapping and moving beavers back to the three original colonies, in an effort to keep the beavers from spreading all over the park. The park also allowed the State Conservation Department and accredited Game Associations to take the beavers and move them to colonies off Island, as far away as New Hampshire. This measure effectively confined the early beaver population on the island to three main colonies, one at Bubble Pond, and two on the western part of the island, by 1930 (Hadley, 1937).

1944 Deer Ecology

A Study conducted on September 11th - 22nd, 1944 by Phil Goodrum a Wildlife Biologist on Public Lands with the help of various park officials. The survey studied the effects on the large deer population on various vegetation found at a wide array of locations in the park.

A series of almost twenty studies and reports on the deer situation and population in Acadia had been conducted primarily by Park Service Employees, such as superintendent Hadley, since 1930. The first of these reports in 1930 found that there was an abundance of deer on the island and in the park. However a State Game Law allowed for a brief ten day period of hunting to take place on the island, during which 60 deer were killed. However this law was overturned for Mount Desert Island, and protection status was given back to the park for deer. Between 1937 and 1942 a series of studies found that deer were very large, and that they did considerable damage to farms and gardens on the Island outside of the park. However the park service remained staunchly opposed to hunting. However a number of groups on MDI called for opening hunting of deer outside of the park on the island. In 1941 the trapping of deer outside the park was suggested by the park service as a possible solution to the deer problem. The park service believed that the issue should be solved by local and state government and private citizens, not by the park service or other federal agencies. They recommended that any hunting or trapping that took place on the island, should be organized by the state government and carried out by locals at their own discretion. In 1944 the proposal to allow trapping in the non parklands of MDI came to a vote in the town of Bar Harbor and was firmly rejected by a wide margin, effectively ending the possibility of hunting or trapping on the island for the time being.

No formal or exact census of deer was taken during the study by the park service. However it was estimated that deer populations were 50% of what they were when the last deer census was taken in 1941. That census found the deer population on the island to be 1850 in April and 2300 in November. The study estimated, based off of deer tracks, that the deer were equally spread around the island, but tended to congregate near roads and trails, where increased sunlight led to lush vegetation on the forest floor. The deer also tended to congregate on the southern slopes of mountains. Additionally the author came to the conclusion that deer moved freely between the mainland and the island, as well as moving onto smaller islands offshore of MDI.

The survey focused on the activity of deer, and the impact they had on vegetation in certain areas of the park. The areas surveyed are, Cadillac Mountain, Schooner Head, Upper Hadlock Pond, New Mill Meadow Road, Oak Hill, Richardson's Gravel Pit, Sargent Mountain, Breakneck Road, Somesville and Pine Hill, Bass Harbor, and Acadia Mountain. A series of fenced areas were created on Sargent Mountain and Pine Hill around thick areas of white cedar to prevent deer from eating the plants. The study found that the summer population of Deer on the Island caused sufficient over browsing of certain plants. Significant damage was done to northern red oaks, red maples, and the ground hemlock. These plants sprout growths were significantly hurt by deer. However most of the plants commonly eaten by deer were available in large enough numbers as to not be hurt by the deer population.

It was the opinion of the author of the study and various other park personnel that the population of deer on the Island had dropped considerably since 1939. The primary reason for this was postulated to be an increase in illegal killings of deer. A park ranger Lyle Smith kept a record of known deer mortalities on the island from 1937 to 1944. He found that the number of deer directly or indirectly killed by people went from 51 in 1938 to 92 in 1939, and slowly decreased to 15 by 1944 as the population of deer on the island decreased. These deer were killed by dogs, cars, poachers, or gardeners, with cars being the leading cause of recorded death of the deer on the Island.

The Author recommended some kind of control measure to be considered by the park in order to curb the population of deer (Goodrum 1944).

1945 Deer study

The Study conducted on April 22 - 28nd, 1944 by Phil Goodrum a Wildlife Biologist on Public Lands with the help of various park officials on Mount Desert Island. The purpose of the study was to determine the effect of winter browsing by the deer population of the island on the plots established by the 1944 study.

The Study compared the vegetation within fenced areas compared to the surrounding areas, in order to discover the effect that deer had on various species of plants and trees. The author found that the following plants provided most of the food for deer during the winter;

red maple, red oak, white cedar, sweet fern, striped maple, sumac, blackberry, raspberry, aspen, blueberry, and huckleberry. The white cedar, sweet fern, blackberry, raspberry, sumac, red maple, and striped maple were the preferred winter food for the deer. The other plants were only grazed when the preferred vegetation was not available. The study found that red oak sprouts and red maple sprouts could be completely removed by deer during the winter and spring. Inside the park, there was not a sufficient enough amount of these plants to sustain the population in the foreseeable future. Additionally deer were moving outside of the park, to deforested areas of the park where better vegetation could be found. The study reached the conclusion that the current population of deer on the island could not grow anymore without potentially damaging the vegetation which the deer feed from. Any increase in the deer population could lead to the eradication of the red oak and sumac from the park.

The park service began setting traps for deer's on Sargent Mountain in 1945. The ten traps were used to capture and tag deer (Goodrum, 1945).

1947 Deer Survey

The study found that the population of deer on MDI had maintained the same between 1944 and 1946, but increased between 1946 and 1947. No census was taken during the study. The population estimates were based off of the damage caused by deer browsing. The study concluded that the current deer population of MDI would cause significant browsing damage to various species on MDI, notably Red Maple, Sweet Fern, White Cedar, striped Maple, and Red Oak. The author recommends an increase in the use of traps to capture deer so that they can be tagged and moved off Island. The author suggests that the park service keep track of all deer mortalities on Island, and record cause and location of death (Goodrum, 1947).

Herpetology:

1933 Notes on MDI Snakes

The Nature Notes on Mount Desert Island describe the capture of a fine adult specimen of the Ring-necked snake, which was the first of its kind seen on the island in two summer seasons. Many Red-bellied snakes were birthed in captivity. The Smooth-scaled green snake is the most common snake in Acadia National Park. There was a sighting of a starting house cat eating a green snake (Stupka, 1933).

Plants:

1926 Pitcher Plants

A study on the protozoa of the pitcher plant was conducted by using samples from Salisbury Cove, on Mount Desert Island. The general problem under attack is that of host-parasite relationships and the specific problem is that of the relations between intestinal protozoa and their environment. The most common living organisms encountered in the pitchers were insect larvae, mites and rotifers. There are two types of protozoa living in

pitchers: free-living species and species adapted for life in the pitcher liquid and restricted to this habitat. The pitchers are visited by many insects which are drowned in the liquid and these no doubt are frequently soiled with material containing cysts or even living trophozoites of free-living protozoa (Hegnet 1926).

1929 White Pine Blister Control

The Bureau of Plant Industry is coordinating with Acadia National Park on the procedures to for White Pine Blister Rust Control on Mount Desert Island. They have identified 10,000 acres with White Pine where the disease is generally distributed. They have proposed to supplement the Ribes survey to determine more accurately the abundance and distribution of host plants. They would like to hire a "COMPETENT MAN" to examine and determine areas that should be protected. They have also suggested that the extra funds from the surveys go to the control measures. In depth they describe the locations/blocks for the surveys. It is also suggested that the control work begin once all the leaves are out. They all produce leaves at the same time due to differences in site, exposure, etc. The development of Ribes growing in depressions or on the north side of a hill, is usually a week or more behind that in more favorable situations. The Maine Insect Field Laboratory was established in Bar Harbor to study forest insect conditions on Mount Desert Island as well as within Acadia National Park (Acadia National Park Archives 1929).

1942 Blister Rust Control

A program launched by the park service from July 15th to September 1942 to prevent the spread of Blister Rust, a species of rust fungus invasive to North America that kills white pines. The \$1080 was set aside by the program to pay 10 Civilian Conservation Corps workers to help in the reduction of the blister rust. In order to stop the spread of the blister rust, the workers would mark white pines that had blister rust on them, and remove surrounding ribe plants that helped to spread the blister rust to other white pine. A report by B.L Hadley in march 1942 found that the red garden currant does not spread the blister rust, while european black currants and wild gooseberries were known carriers of the disease (Hadley, 1942).

Gastropod mollusc:

1916 Dog Whelk

This is an article from the Proceedings of the Academy of Natural Sciences of Philadelphia concluding the results from a study of Dog Whelk on Mount Desert Island. There are great differences between the ratio of the color varieties present in different locations. In the surf environment at a given age, dog whelk, are smaller than those from the bay environment. There is a correlation between the many color varieties of Dog Whelk with the conditions under which the animal lives. Over 12,000 snails were collected from sixty-seven localities. It has been shown that the color of the rocks, whether dark or light, has an effect. The

individuals living on rocks near mud flats are darker than on the more exposed points on the island (Colton, 1916).

Fish:

1927 Fishes of MDI

There is a problem of the particular manner in which inland fish gain access to the brooks and ponds of Mount Desert Island which has no connection with the mainland since preglacial times. Fish were found where they adapted to live, no matter how much salt water separates them from the mainland. There are 11 indigenous species of fish, and a total of 13 species of fish. There are many proposed methods of dispersal: recently introduced or 'stocked' by man; species that migrate along the shore; and fish-eating birds. Considering the speed of these birds in flight, it is entirely possible to conceive of life-delivery at any of the bodies of freshwater on the island. There appears also to be a remarkable correlation between the fish-fauna of the area and its adaptability for avian transportation. Food taken for such a purpose must conform to rather definite specifications: it must be abundant, commonly distributed, quickly discovered, readily caught, and easily carried. Examination of the several routes and agencies of possible dispersal indicates favorable consideration of the hypothesis that fish-eating birds have played an important part in the introduction and distribution of these fish (Batchelder, 1927).

Polycladida:

1939 Polyclads

Study of polyclads biological systems by Libbie Hyman, a Biologist from the Museum of Natural History in New York city. He studied polyclads, a marine flat worm, found on Mount Desert Island in the summer of 1937 and various other locations on the north eastern US seaboard (Hyman, 1939).

General Biology and Geology Surveys:

1914 National Geographic of MDI

George B. Dorr and companions write for the National Geographic Magazine, exploring the acquisition of land, observations on passenger pigeons, Audubon Society protection advances, bird conservation, and the magnificence of Mount Desert Island's landscape (Dorr, et al, 1914).

1922 Survey of Turner Lake, Isle au Haut

Various USGS chemists took various samples of water from the lake and analyzed the chemical structure of the lake. The levels of various Ions, Minerals, and Organic matter in the lake were recorded. The chemists were able to link the existence of most of the Ions and Minerals to various species that lived in the lake. The survey found a surprising lack of various comeon lake dwelling life forms from the lake, such as cattails, duckweed, eelgrass,

pondweeds, turtles, frogs, and most fish. Small eels and herring gulls from the sea were the most notable residents of the lake. Eight species of crustacea were found in the lake (Clarke, et al. 1922).

1925 Survey of MDI region

A survey started in 1923, published in 1925, by members of the MDI Biological Laboratory and Associated Naturalists, in order to gain a knowledge of the marine flora and fauna of the region. 50 trips were undertaken by the biologists to collect samples and record about 250 forms of marine animals. The work occurred mostly near Otter Creek and Egg-Rock (Dahlgren, 1925).

The preliminary research done during this period set a groundwork for the much more cohesive ecological studies conducted by the Park service in the latter half of the 20th century . Acadia's valuable wildlife diversity was better understood by the park service and other interested organizations because of these studies (Dorr, et al. 1914). Many species of birds, fish, and mammals that had been wiped out in other areas of the Maine coast were observed on Mount Desert Island during these surveys. This led to the use of Acadia's wildlife to reintroduce certain species to other parks, wildlife preserves, and conservatories in the region (Clarence, 1934). Because of these surveys' the park service better understood the urgency for wildlife conservation and public education.

These initial scientific surveys and studies in and around Acadia National Park brought a deeper understanding of the Parks unique wildlife to the park managers and visitors. These wildlife censuses and impact studies strongly influenced the park service's wildlife management decisions, and brought national prominence to the park. The surveys and studies conducted collectively created a park wide census of the species abundance and diversity along the Maine Coast (Norton, 1935). Due to the abundance and management of species on Mount Desert Island, Acadia National Park was able to contribute specimens to other parks, wildlife refuges, and centers lacking sufficient specimens to repopulate over poached areas (Batchelder 1927). Bird specimens were also sold to taxidermists (Norton, 1933). There was an extensive collection of observations of bird mating and breeding patterns (Hallock 1899). Acadia National Park became a model for conservation, due to their efforts to conserve species that were being over poached elsewhere in Maine. There was a strong encouragement of conservation and education. They took active steps to mitigate invasive species and diseases threatening native flora and fauna (Acadia National Park Archives 1929). The studies done on Mount Desert Island explored the various methods of species introduction, such as human introduction, glacial formations patterns, and species transporting species occurrences (Dorr, et al, 1914).. The management techniques of species reintroduction due to competition by invasive species and over poaching were adopted by other facilities (Acadia National Park Archives 1929). Acadia National Park participated in nationwide censuses, this data complied with surveys and studies lead to the comparison of species diversity on Mount Desert Island and along the Eastern Coast (Brower, et al. 1937). The studies and surveys conducted on Mount Desert Island were crucial for the conservation and species management done by Acadia National Park; they contributed to region wide centers for flora and fauna protection and appreciation.

Works Cited

- Acadia National Park. 1947. History of beaver management : Acadia National Park. Published Report-2178642. <https://irma.nps.gov/App/Reference/Profile/2178642>
- Anthony F. 1933. Number of Birds Banded at Great Head, Mount Desert Island, August 12, 1929 to date, June 26, 1933. Acadia National Park. Published Report-2178641. <https://irma.nps.gov/App/Reference/Profile/2178641>
- Bailey V. 1925. Beavers on Mount Desert Island. Acadia National Park. Unpublished Report-2179946. <https://irma.nps.gov/App/Reference/Profile/2179946>
- Bishop SC and Clarke NT. 1923. A Scientific Survey of Turner's Lake: Isle au Haut, Maine; 1922. Bulletin Number 251. New York State Museum. Albany, NY. Published Report-2178652. <https://irma.nps.gov/App/Reference/Profile/2178652>
- Bond J. 1937. The cape may warbler in Maine. The Auk. 54(3):306-308. Journal Article-20585. <https://irma.nps.gov/App/Reference/Profile/20585>
- Brower A and Others. 1937. Christmas bird count on Mount Desert Island (1937). Published Report-2178685. <https://irma.nps.gov/App/Reference/Profile/2178685>
- Colton HS and National Park Service, Acadia National Park. 1916. On some varieties of Thais lapillus in the Mount Desert region, a study of individual ecology. Proceedings of the Academy of Natural Sciences of Philadelphia. 68:440-455. Journal Article-2177780. <https://irma.nps.gov/App/Reference/Profile/2177780>
- Dietrich A. 1938. Notes from Mt. Desert, Me. Bulletin, Massachusetts Audubon Society. 15-15. Newsletter Article-2196026. <https://irma.nps.gov/App/Reference/Profile/2196026>
- Dorr GB and Others. 1914. The unique island of Mount Desert. National Geographic Magazine. 26:75-89. Journal Article-2177834. <https://irma.nps.gov/App/Reference/Profile/2177834>
- Eliot SA. 1931. Birds of Northeast Harbor in the last fortnight of June, 1931. Unpublished Report-2180008. <https://irma.nps.gov/App/Reference/Profile/2180008>

Eliot C. 1916. The summer birds of the Sieur de Monts National Monument. Unpublished Report-2180007. <https://irma.nps.gov/App/Reference/Profile/2180007>

Dahlgren U. 1925. The Biological Survey of the Mount Desert Island (Maine) Region. Science. 56(1582)Journal Article-2177799. <https://irma.nps.gov/App/Reference/Profile/2177799>

Farley C. 1935. List of Mount Desert Island birds. White Plains, NY. Unpublished Report-2180010. <https://irma.nps.gov/App/Reference/Profile/2180010>

Foster C. 1934. To: D.L. Hadley, Asst. Superintendent of Acadia National Park. Re: No Title. Letter-2180368. <https://irma.nps.gov/App/Reference/Profile/2180368>

Goodrum P. 1944. White-tailed Deer in relation to the environment of Mount Desert Island, Maine, including Acadia National Park. Unpublished Report-2179958.

Goodrum P. 1945. White-tailed Deer in relation to the environment of Mount Desert Island, Maine, including Acadia National Park. Unpublished Report-2179958.
<https://irma.nps.gov/App/Reference/Profile/2196477>

Gross AO. 1945. The present status of the great black-backed gull on the coast of Maine. The Auk. 62:241-256. Journal Article-2177879. <https://irma.nps.gov/App/Reference/Profile/2177879>

Hadley B. 1937. To: Regional Director, National Park Service. Re: No Title. Letter-2180379.
<https://irma.nps.gov/App/Reference/Profile/2180379>

Hallock C. 1899. Eagle crow and osprey, also scoters. Forest and Stream. 53:207. Journal Article-2177883. <https://irma.nps.gov/App/Reference/Profile/2177883>

Johnson MS. 1936. Report on beaver flow : Acadia National Park extension (RDP-ME 3). Unpublished Report-2180042. <https://irma.nps.gov/App/Reference/Profile/2180042>

Manville RH. 1938. The Herpetology of Mount Desert Island, Maine. Bar Harbor, ME. Unpublished Report-2180068. <https://irma.nps.gov/App/Reference/Profile/2180068>

Manville RH. 1939. Notes on the herpetology of Mount Desert Island, Maine. Copeia. 3:174. Journal Article-2178027. <https://irma.nps.gov/App/Reference/Profile/2178027>

Mazur, Gail. "Acadia." *Salmagundi* No. 143 (2004): 185-86. Web. <http://www.easybib.com/cite/view>

National Park Service, Acadia National Park. 1929. White Pine Blister Rust Control Work on Mount Desert Island. Acadia National Park. Unpublished Report-218828.

<https://irma.nps.gov/App/Reference/Profile/2188280>

National Park Service, Acadia National Park. 1942. White Pine Blister Rust Program Report. Acadia National Park. Unpublished Report-218828.

<https://irma.nps.gov/App/Reference/Profile/2188284>

Pelley MJ. 1927. A preliminary list of birds of Mt. Desert and adjacent islands. Unpublished Report-2180225. <https://irma.nps.gov/App/Reference/Profile/2180225>

Reiche HC and Burton RH. 1924. A list of the animals and plants found in the Oak Meadow region east of Newport Mountain. *Maine Naturalist*. 4(4):116-132. Journal Article-72334.

<https://irma.nps.gov/App/Reference/Profile/72334>

Stupka A. 1933. Notes on Mt. Desert Island snakes. *Nature Notes from Acadia*. 2(3):6. Journal Article-2178199. <https://irma.nps.gov/App/Reference/Profile/2178199>

Stupka A. 1933. The Massachusetts Audubon Society's list of Mt. Desert Island birds. *Nature Notes from Acadia*. 2(3):2-3. Journal Article-2178196.

<https://irma.nps.gov/App/Reference/Profile/2178196>

1935. Great Head woman has banded 4,000 birds in past six years : Mrs. J. Franklin Anthony, Sr., carries on remarkable volunteer work for the U.S. Biological Survey. *Maine? Bar Harbor, Maine*. 03 Nov 1935. Newspaper Article-2185136. <https://irma.nps.gov/App/Reference/Profile/2185136>

Sullivan M. 1940. Winter birds of Acadia. *Regional Review*. 26-32. Journal Article-2178209.

<https://irma.nps.gov/App/Reference/Profile/2178209>

Sullivan M. 1937. Check-list of birds of Acadia National Park. Published Report-2178934.

<https://irma.nps.gov/App/Reference/Profile/2178934>

Twitchell E and Crockett R. 1925. Some results of the first season's work at the University of Maine's Summer Biological Station at Mt. Desert Island/Part IV : report of the mixed conifer region on Pickett Mountain, Mt. Desert Island. *Maine Naturalist*. 5(2):65-81. Journal Article-2178239.

<https://irma.nps.gov/App/Reference/Profile/2178239>

Stupka A. 1938. To: Sullivan M. Re: [Notes on birds of Mount Desert Island]. Letter-2183570.

<https://irma.nps.gov/App/Reference/Profile/218357>

Stupka A. 1935. Park naturalist's reports : 1932-1935. Unpublished Report-2180144. Park naturalist report. <https://irma.nps.gov/App/Reference/Profile/2180144>

Stupka A. 1933. The Massachusetts Audubon Society's list of Mt. Desert Island birds. Nature Notes from Acadia. 2(3):2-3. Journal Article-2178196.

<https://irma.nps.gov/App/Reference/Profile/2178196>

Tyson CS and Bond J. 1941. Birds of Mt. Desert Island, Acadia National Park, Maine. Waverly Press. Baltimore, Maryland. Book-2179713. <https://irma.nps.gov/App/Reference/Profile/2179713>

Twitchell E and Crockett R. 1925.: report of the mixed conifer region on Pickett Mountain, Mt. Desert Island. Maine Naturalist. 5(2):65-81. Journal Article-2178239.

<https://irma.nps.gov/App/Reference/Profile/2178239>

United States. National Park Service. 1937. Check list of the birds of Acadia National Park. Published Report-2178855. <https://irma.nps.gov/App/Reference/Profile/2178855>

USGS Patuxent Wildlife Research Center: Biological Survey Unit History." *USGS Patuxent Wildlife Research Center: Biological Survey Unit History*. N.p., n.d. Web.
<http://www.pwrc.usgs.gov/history/bsphist2.htm>