

MOOSE BROOK STATE PARK, GORHAM

Developed by Civilian Conservation Corps from plans of the National
Park Service. Mounts Madison and Adams in the background.
(Photo by A. N. Heath)

State of New Hampshire

BIENNIAL REPORT

of the

**Forestry and Recreation
Commission**

For the Two Fiscal Years

Ending June 30, 1938



CONCORD

1939

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REPORT

*To His Excellency, the Governor
and the Honorable Council.*

The Forestry and Recreation Commission submits herewith its report of the various activities of the Department for the biennial period ending June 30, 1938. The timber blow-down of September 21, 1938 created problems of immediate and pressing concern to many people of New Hampshire as well as to the Forestry and Recreation Department. Anxiety to secure protection from fires was supplemented by the desires to have timber losses salvaged as far as possible and confidence restored to owners of forest and other properties damaged by the hurricane. Activities of the Department during the last biennial period were over shadowed by the needs for planning and organization to meet the emergency problems ahead. Every line of activity which this Department has pursued during years past has been to some extent thrown out of adjustment. Brush and down timber created a tremendous fire hazard. Public roadsides which the laws of this State have required to be kept clean of lumber slash for upwards of 30 years suddenly became littered through no fault of the owners. Wood roads and trails used for fire purposes, woods operations and for recreation were temporarily or permanently out of use. The destruction of merchantable timber all at once has upset the balance of normal production and marketing for many years to come. Forest industries do not know what the future holds for them. Forest activities in some sections must wait years until plantations and young growth which escaped serious injury will become marketable during which time they are exposed to extraordinary hazard. Tax adjustments will result in reductions of valuations in many towns. Owners of private recreational properties whose standing trees were of particular value

have become confused and disheartened. Most of the state forests and recreational areas shared the very severe damage to private property.

Our forest fire service has up to the present been economical and effective. The annual records of number of fires, areas burned and losses compare favorably with those of any other state. To meet the emergency conditions of the next few years, it is necessary to spend more money for (1) Strengthening of office and district chief organization, including educational work and preparation of detailed fire plans; (2) Repair of lookout towers, buildings and telephone lines and additional temporary or permanent lookout stations; (3) More fire fighting tools and equipment; (4) Patrol and stringent law enforcement; and (5) Fire suppression. The towns will have to bear a greater burden than ever before in sharing the suppression costs. If extremely bad fires occur in poor towns the cost may become greater than they should bear. Increased warden services will add to fire expenses of the towns as well as of the State. Many towns should share in the purchase of equipment which, however, is not required of them.

Aid can be expected from the Federal Forest Service in the clean-up of inflammable material and the use of technical personnel, CCC and other work crews to help extinguish fires, as well as purchasing the merchantable logs at designated delivery points. CCC Camps will be equipped and organized for work at all fires where needed. Meetings of Federal and State fire agencies are being held for purposes of fire planning and coordinating the technical and other man power available. Daily special fire weather forecasts will be broadcasted for public information through Federal channels.

It is important that the State district chiefs and town wardens continue to be responsible for the prevention and suppression of fires in their towns and that assistance from Federal agents shall supplement and not supplant

or disrupt existing functions of the State and towns. Our forest fire laws provide for control and supervision by the State Forester, State responsibility for prevention and detection work and sharing of fire fighting and warden expenses equally between towns and the State. The forest fire wardens, one for each town, and their deputies appointed by the State Forester are responsible for the suppression of fires and are paid only for services rendered. This supplies a force of some 1200 men representing the back bone of our organization which through the years has rendered a high degree of public service at a minimum of cost. Towns pay no other charges than are voluntarily provided for fire tools and equipment. Town warden services could become very costly if freely used. In normal years except in extinguishing fires and investigating causes, they serve only in issuing brush burning permits, posting notices and on occasion inspecting mills and slash. In time of emergency they may be used for patrol. In some sparsely settled towns it is impossible to obtain forces to fight fires comparable to those in populated communities. The State supplies the prevention and detection machinery with such financial and advisory assistance as it is entitled to receive from the U. S. Forest Service under the Clarke-McNary appropriations. Our Federal funds are used to supplement State funds for district chiefs and fire lookout station operation, maintenance and new construction and for fire equipment. It is the function of district chiefs employed by the State to advise and assist wardens especially at important fires, as well as inspect mills and slash, and direct the lookout watchmen at their stations and enforce the forest laws generally. The organization of County Fire Warden Associations has helped greatly to bring the wardens together and increase their efficiency without adding greatly to the cost.

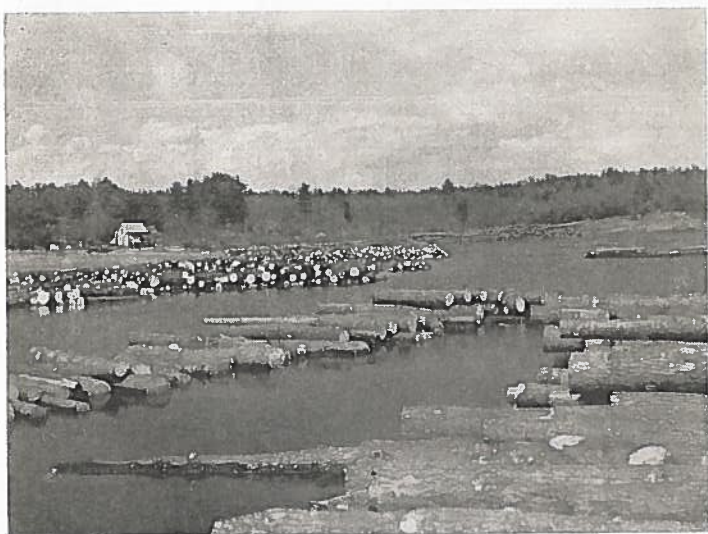
There is need for fire equipment in many towns subject to great fire danger. It has been the State policy to share

equally with the town the cost of knapsack pumps and small tools wherever towns were willing to cooperate and State funds were available. About 27 per cent or 64 towns have never been willing to purchase such equipment even at half of wholesale costs. About 22 per cent or 50 towns have some equipment and 51 per cent or 120 towns are fairly well equipped with power and other pump units of one type or another. Nearly all lack cutting and trenching tools needed to combat fires burning in dry, deep fuel of blowdown areas. The State has in the past helped to meet the need by placing 13 portable power pumps, hose, etc., in strategic towns under good supervision for use when needed by wardens within a reasonable distance. There are altogether among the towns 77 portable power pump units, 1,737 knapsack and other water pumps, 6,800 hand tools and 277 fire trucks available for forest fire use.

It is impossible at this time to determine what funds should be made available next year and for a considerable time ahead for emergency expenditures in connection with forest fire protection. With the Government spending large sums for hazard reduction and salvage in this State, and with many distressed towns unable to protect themselves if fires occur, it is certain that the State should not be niggardly in making emergency funds available for the work it is responsible with the towns to do. It seems proper and there will be wide spread demands that a special appropriation be passed for the general purpose of forest fire protection.

Before the next fire season begins, this Department will be expected to carry through its reconstruction and fire planning work. This includes the replacement of two lookout towers blown down by the gale and completion of repairs to other stations, cabins and telephone lines. From four to six additional towers with shelters, equipment and telephone lines are contemplated for use next spring. New power pumps each with 2,000 feet of hose

together with many more knapsack pumps and supplies of small fire tools for many of the towns must be in the equipment program. Extra district chief and special services of wardens and clerk dispatchers will be provided if possible. Except for a balance of about \$10,000 in the Federal Clarke-McNary Fund we would be helpless to undertake any emergency fire work this coming spring period.



Owners of hurricane felled timber have been assisted by this department in logging and salvage problems. (Department photo)

The State Timber Salvage Committee and various fact finding sub-committees set up by your direction have worked whole-heartedly together and with similar agencies in neighboring states to help the Federal authorities, chiefly the U. S. Forest Service, who have come to the aid of the New England States. The Forestry and Recreation Department with your approval has set up a timber salvage advisory agency to assist land owners who do not know how to proceed to salvage their logs and need advice as to the quality of their timber, cost of logging, con-

tractors, financing, etc. Airplane mapping of down timber areas has been made possible by your authorization of State funds to help defray expenses. It is the hope that at least 500 million feet of logs out of at least twice that amount of down timber in the State can be sold to the Government at a reasonable return to the owners as stumpage value. Farmers who own teams and can do their own logging have the benefit of labor income in addition.

The total area of state forests and recreational reservations is now 42,219 acres including a net addition of 454 acres during the biennial period, of which 137 acres are to protect the scenic roadsides in Dixville Notch, 217 acres added to the Pawtuckaway Reservation in Nottingham and 73 acres to the Fox Research Forest in Hillsboro. There are 140 towns in New Hampshire owning 36,884 acres of forest land, 98 of which report acquisition by defaulted taxes since 1932 of 21,106 acres. Of the town forests 8,631 acres are for protection of water supplies. The Department has assisted many of these towns in the management of their lands and has furnished over half a million trees for reforestation during the past two years.

The restoration of State forest lands, roads and buildings as a result of the hurricane is no simple or easy task. At least 50 areas including recreational centers are involved. The Department has budgeted a small working capital out of its forest and recreational fund for timber salvage operations, brush disposal and clean-up work on the more intensively used areas. It is hoped that the CCC will be able to assist later on. During the past two years a very considerable amount of improvement work on State lands has been done by the CCC from the Forest Service as well as the National Park Service camps. Outstanding is the continued work at Bear Brook with its two sets of organized camps and day outing area, the work at Moose Brook State Park and the parkway road project at the Connecticut Lakes Reservation.

Revenue obtained from recreational fees and charges the last two seasons at 15 supervised areas paid for about one-half the cost of all operating and off-season expenses, overhead and ordinary maintenance which totals about \$30,000 per year—the other half being from recreational appropriation. Of these 15 areas under supervision, 12 are bathing centers, and five include camp grounds. Over 750,000 people are estimated to have visited these areas the past two seasons. Alterations, improvements and maintenance with some oiling of park roads are matters of concern because sufficient funds are not available anywhere except by increased appropriations. Consideration should be given to placing the responsibility for maintenance of about 8 to 10 miles of State park roads with the Highway Department to be paid for out of its maintenance funds. Several short sections of our park roads are now taken care of this way by legislative provision. Similar provisions to maintain all park roads are in effect in Vermont.

There are indications that the demand for tree planting stock to replace forest growth destroyed by the hurricane will require an increase in the output of the State Nursery in the next few years. About 3,091,000 trees were produced during the biennial period and distributed free to 4-H and similar groups, to two counties and 15 towns, and State forest areas and sold at cost to private land planters.

White pine blister rust eradication by the Department has been steadily continued. In 1937, 54 towns voted \$14,200 and in 1938, 51 towns voted \$13,050, the crew men used having been selected by the towns from those in need of work but not on relief. In addition WPA funds allocated through the Federal Bureau of Entomology and Plant Quarantine made it possible to more than double the amount of eradication work each year and also furnished winter work in pine and control area mapping. Besides the town and WPA crews the CCC assisted in

control work particularly during 1937 both in eradication and in white pine mapping.

During the two years 735 men were employed on town crews and over 1,600 men on WPA crews on eradication work. Over 183,000 acres were either re-eradicated or cleared of ribes for the first time. The State's contribution to all this has been discouragingly small, being part of the office overhead and 25 per cent of the actual town appropriations for the employment of the crew foremen.

The Fox Demonstration Forest has been operated as a sustained yield management area since 1933 involving planting, thinning and sales of cordwood and saw logs with careful accounting and investigation of all possible markets. Advances in working capital are made possible through the Department's forest improvement fund. The results of five years have furnished much information on markets and market difficulties faced by owners of small private woodlands. Information on this subject has recently been made available to the public with the assistance of the Planning and Development Commission.

The European spruce sawfly infestations in the Monadnock region have been carefully studied and about 150 towns containing spruce timber were scouted during 1938. While serious infestations outside the Monadnock region were not found the situation for the future is none too encouraging. The present infested areas near Monadnock have increased enormously and the only hope for permanent control is by getting insect parasites and other natural enemies thoroughly established which work has been in progress two seasons. Dr. Baldwin in charge of our research work has edited and been instrumental in distributing brief authoritative leaflets on important tree insects and diseases. Ten subjects have been published each year during the past three years. Ten surveys or other investigations relating to various problems in forestry have been completed during the biennium. It is always necessary to find the means of publishing and dis-

tributing results of investigations if this character of work is to be effective.

It is significant that the number of portable sawmills registered within the State each year has fallen below 200 since 1930 until 1938 but the number has quite steadily increased during these years from 125 in 1932 to 207 in 1938. The lumber cut has also steadily increased from the low of 62 million in 1932 to 153 million in 1937 which are the last figures available. Although the number of operators has more than doubled since 1932 the majority of cutting has been done by less than 50 operators. Two-thirds of the timber cut is used within the State and two-thirds of the total cut is white pine. The lumber cut of the next two years, 1939 and 1940, due to the hurricane will make interesting statistics.

Proposed amendments to the laws relating to the forest fire organization and to the emergency conditions generally are now being considered. While some proposals being made are obviously desirable the fundamental forest fire code which has been developed and improved over a period of many years should not be materially disturbed.

W. R. BROWN,

H. K. ROGERS,

B. K. AYERS,

Forestry and Recreation Commission.

JOHN H. FOSTER, *State Forester.*

REVISION OF LAWS—1937

The Legislature of 1937 made the following changes in the laws which affect the operation of this Department.

Chapter 191 of the Public Laws—as amended by Chapter 151, Laws of 1937:

Sections 4 and 4-a were amended by striking out said sections and inserting new sections in place thereof as follows:

4. Duties; Assistants. The state forester shall, with the approval of the governor and council and under the supervision of the commission, execute all matters pertaining to forestry within the jurisdiction of the state, and, within the limits of the appropriation, may hire such field and office assistants, including a chief clerk at an annual salary not exceeding eighteen hundred dollars, as in the judgment of the commission are necessary for the proper execution of his duties, and, upon terms approved by the commission, may enter into co-operation with departments of the federal government for the promotion of forestry work within the state.

4-a. Duties of State Forester. The state forester shall, with the approval of the governor and council and under the supervision of the commission, execute all matters pertaining to the use of state forests and reservations including reservations for public recreational and park purposes.

Section 33-a was inserted after section 33 as follows:

33-a. Powers of Arrest. Any agent or caretaker appointed by the state forester for the protection of property on any state forest, reservation or recreational area or on any federal area under the administration of the forestry and recreation commission shall have, on said areas, the same powers as a constable.

Chapter 192 of the Public Laws—as amended by Chapter 151, Laws of 1937:

Section 5 and 6-a were amended by striking out said sections and inserting in place thereof the following new sections:

5. Gifts. With the approval of the governor and council, the commission is empowered to receive, in the name of the state, land by gift, escheat or otherwise for the purpose of a state forest or reservation, in such manner that no cost of purchase shall accrue against the state, and may arrange for the registration of necessary papers, map and survey the land, protect it from fire, plant, cut and otherwise improve the forests within the limits of the appropriation.

6-a. Privileges and Concessions. On terms approved by the commission and the governor and council, the state forester may make contracts for the leasing of privileges and concessions on state forests and reservations, for periods not exceeding five years.

Section 6-b was amended by inserting after the word "contracts" in the first line the words "extending for a period of more than one year or for an annual consideration of more than one hundred dollars," so that said section as amended shall read as follows:

6-b. Recording. All such contracts, extending for a period of more than one year or for an annual consideration of more than one hundred dollars, shall be recorded in the registry of deeds in the county, or counties, where the lands to which such contracts relate are situated.

The following sections 6-c and 6-d were inserted after section 6-b:

6-c. Fees, Development of Recreational Areas. With the approval of the commission and the governor and council, the state forester may (1) furnish accommoda-

tions and render services to the public on state forests and reservations, (2) charge reasonable fees for such services and accommodations, (3) develop suitable state forests and reservations for recreational purposes. All revenue received from fees authorized hereunder shall be paid into the forest improvement and recreational fund.

6-d. Limitation. The authority to furnish accommodations to the public on state forests and reservations, as provided by section 6-c, shall not be construed as authorizing the state forester to furnish sleeping accommodations to the transient public either in overnight cabins or in buildings owned by the state, provided that this limitation shall not affect the leasing of buildings or cabins owned by the state at the time of the passage of this act where the accommodations are furnished by the lessee.

Section 7 was amended by striking out said section and inserting in place thereof the following section:

7. Created. All revenue derived from fees for services and accommodations on, and rentals and the sale of any products from, state forests or reservations and federal lands placed under the jurisdiction of the forestry and recreation commission shall, except as otherwise provided, be paid into the state treasury. All of such revenue, except that received from the sale of nursery stock from the state forest nursery, shall be kept by the state treasurer in a separate account as a continuous fund to be known as the forest improvement and recreational fund from which payments may be made upon recommendation of the state forester, with the advice and consent of the governor and council, for the purchase and improvement of state forests and reservations and buildings thereon and for administration and improvement of such federal lands as may be placed under the jurisdiction of the commission. At the close of each fiscal year the unexpended balance of said money shall be carried forward and be made available for use in the subsequent year for said purposes.

Chapter 15 of the Public Laws—as amended by Chapter 151, Laws of 1937:

Section 11 was amended by striking out said section and inserting in place thereof a new section. The part of this section referring to this department is as follows:

11. Application of Receipts. Moneys received by the state treasurer, as provided in section 10, shall be available for general revenue of the state with the following exceptions: . . . revenues from fees, rentals and the sale of products from lands under the jurisdiction of the forestry and recreation commission which shall be credited as provided for in chapter 192 of the Public Laws; . . .

Chapter 99 Laws of 1937:

1. Forestry and Recreation Commission. If any lands of this state shall hereafter be acquired by the federal government and placed under the jurisdiction of the forestry and recreation commission, in accordance with an agreement entered into by the governor and council and the federal government pursuant to the so-called Fulmer Act (H. R. 6914), or any other similar act, the forestry and recreation commission shall administer, manage and develop said lands in accordance with the terms of such agreement and distribute the proceeds from said lands in accordance with the terms thereof. The provisions of law relative to the disposition of revenue received from state lands shall not apply to the revenue received from such lands.

Chapter 196 of the Public Laws—as amended by Chapter 188, Laws of 1937:

Referring to duties of conservation officers of the State Fish and Game Department, section 18 was amended by adding after paragraph X the following new paragraph:

XI. Fires. It shall be the duty of all such conservation

officers, while in and about the forests, to caution persons of the danger from fires in the forests, and to extinguish a fire left burning, if in their power. They shall give notice to all parties interested when possible, and to the forest fire warden in particular, of fires threatening to extend beyond control. Pending the arrival of such fire warden, they shall assume all his lawful powers.

Reference to Other Laws:

Reference is made to other laws of 1937 relating directly or indirectly to the work of this Department, as follows:

Chapter 130. An Act to provide for the construction and operation of an aerial tramway on Cannon Mountain in the Franconia Notch.

Chapter 26. An act relating to the Land Use Board.

PUBLIC FORESTS



HE acquisition of public forest lands in New Hampshire has not materially increased since the last biennial report. Additional important areas were acquired by the White Mountain National Forest which now includes 663,005 acres in New Hampshire. The Federal Forest Service has constructed about 20 public forest camps which are now available for motor campers in addition to several picnic spots and camping sites. Eight cabins and 35 shelters of the Adirondack type are available along the trails maintained by the National Forest. Several scenic automobile roads have been constructed through the Forest and accommodations made on nine forest camps for home trailer camping, the most important being at Dolly Copp. Tuckerman's Ravine is undoubtedly the greatest public winter skiing spot in the White Mountains as ideal conditions continue in the ravine through the months of April and May. The total public forest acreage is as follows: Federal 663,005 acres; State 42,219; and Town 36,884; total 742,108 acres.

State Forests and Reservations

During the years 1937 and 1938 the State acquired 544 acres of forest land. The most important addition was the purchase of 137 acres in Dixville Notch. One tract of 32 acres was returned to the former owner by the State in exchange for 27 acres of more accessible land. Recent surveys on the Kearsarge Mountain Reservation in Warner, Wilmot, and Salisbury reduced by 58 acres the former acreage as given in the last report. The acreage of State Forests and Reservations in the last biennial report was 41,765 acres. The net addition of 454 acres during the last two years brings the total to 42,219 acres. The following table indicates these changes:

STATE FORESTS AND RESERVATIONS

Acquired and Conveyed by the State during the Years
1937 and 1938

Name	Location	Acreage	Year	How Acquired	Cost
Dixville Notch	Dixville	137	1937		\$1,370.00
Kingston Dam	Kingston	11	1937	Gift	
Pawtuckaway	Nottingham	201	1937		1,000.00
Cathedral and White Horse Ledges	Bartlett	48	1937		250.00
Pulpit Rock	Bedford	27	1937	By Transfer Gift	
Shadow Hill	Sutton	24	1938		
Toll Gate	Warner	7	1938		100.00
Pawtuckaway	Nottingham	16	1938		350.00
Fox Reservation	Hillsboro	73	1938		440.00
TOTAL ACQUIRED		544		TOTAL COST	\$3,510.00
Pulpit Rock	Bedford	32		Conveyed by State	
Kearsarge Mountain	Warner, Wilmot and Salisbury	58		Correction in Acreage	
TOTAL CONVEYED WITH CORRECTED ACREAGE		90			
		NET ADDITION	454		

A Brief Description of Tracts Acquired During
the Years 1937 and 1938

Dixville Notch State Reservation. The State purchased 137 acres in Dixville Notch from the Trustees of the Brown Company in January, 1937. This forest tract is located on the southerly slope of the Notch and extends for over a mile on both sides of the main highway. Flume b. ook adjacent to the highway and the Cascades near the picnic grounds are included in the purchase. Trailer, camping and commercial concessions are not permitted. This purchase puts into public ownership the last important scenic notch.

Kingston Dam. The Merrimack Valley Power and Building Company of Boston, Mass., conveyed to the State as a gift six separate parcels of land in the town of Kingston. Four of these tracts are located at the outlet of

Kingston Pond and two between Little and Great Kingston Lakes. The purpose of these conveyances is to put into State control the dams that directly affect the height of water on the shores of the bathing beach at Kingston Park.

Pawtuckaway Additions. During March, 1937 two tracts of forest land comprising 201 acres in the town of Nottingham and known as the old Shaw farm were purchased by the State from the administrator of the estate of John H. Bartlett of Raymond, N. H. These lots including the site of the old farm are adjacent to the Pawtuckaway Reservation and extend from the road around Middle Mountain to the south shores of Round Pond and its outlet.

In August, 1938 another tract of 16 acres was purchased from Mrs. Stuart A. Munson of Cliftondale, Massachusetts. This lot lies just to the north of the old Shaw tract and borders on the westerly shores of Round Pond. Included in this tract are several attractive camp lots accessible and adjacent to the main road through the Reservation. The total acreage of the Pawtuckaway Reservation in the towns of Nottingham and Deerfield is now 1,288 acres.

Cathedral & White Horse Ledge. This reservation was one of the first to be acquired by the State as a gift in 1901. Several years ago a road was built to the top of Cathedral Ledge by funds for State unemployment relief. In order to arrange for the parking of cars, for toilet facilities and for wood for public use, a tract of 48 acres was purchased from Mrs. Katherine D. Eastman of North Conway in June, 1937. The State is indebted to the following persons who have released a right of way across their land for the auto road: Henry J. Hatch, Myron C. Davis and Mary R. Davis all of North Conway and Frank E. and Robert H. Kennett of Conway, N. H.

Pulpit Rock. An exchange of land was made between the State and Harold J. Campbell of Manchester, N. H., adjusting certain boundaries on the Pulpit Reservation in Bedford. One tract of 25 acres of forest land and another of 2 acres were deeded by Mr. Campbell to the State for 32 acres of pasture and forest land during June, 1937. The purpose of this exchange was to provide more pasture for Mr. Campbell's stock and to increase the acreage of forest land along the southerly side of the New Boston-Bedford road. No State funds were used in the transaction. The hurricane of September 21, 1938, blew down all the softwood growth about the Pulpit Rock so that the future policy of managing this Reservation is uncertain. It may be to the best interest of the State to reconvey to the donor all the land to which it now holds title; the consideration to be the total cost of acquiring these lands.

Shadow Hill. Reference is made in the last biennial report to the acquisition of 10 acres of land on Gile Pond in the town of Sutton. The Society for the Protection of New Hampshire Forests has presented to the State two other tracts, the first being of 5 acres located at the southern end of the pond and formerly owned by Ada L. Little of Sutton and the second, 19 acres adjoining and conveyed to the Society by James E. Carroll of Warner. The total area is now 34 acres and includes about half of the shore of Gile Pond.

Toll Gate. A tract of 10 acres was acquired in 1935 at the entrance to the auto road leading to Kearsarge Mountain in the town of Warner for the development of a parking area and picnic grounds. Arrangements for purchasing an adjacent tract of 7 acres was made with the owner, Blanche N. Abbott of Warner, and the title passed to the State during the summer of 1938.

Fox Reservation. The Caroline A. Fox Research and Demonstration Forest of 400 acres in Hillsboro, N. H., was seriously damaged by the storm of September 21,

1938. Additional land consisting of mixed growth was under option prior to this storm. Little damage was suffered from the storm and the owner, Herbert H. Tracey of Nashua, conveyed 73 acres to the State for \$440. The deed was signed in December, 1938.

A list of State Forests and Reservations by towns was included in the 1935-36 report, to which reference is hereby made.

TOWN FORESTS

In order to secure the latest information about town forests in New Hampshire a questionnaire was sent out to all towns on April 1, 1938. Valuable information has been received from 218 of the 221 towns receiving this questionnaire. One hundred and forty towns reported having town forests, not including parks, commons and cemeteries. Ninety-eight towns reported the acquisition of forest land by defaulted taxes since 1932 and all deeds had been recorded. Many of the towns reported their total acreage as divided into numerous separate tracts. Some towns acquired forest property of much value; others were holding cut-over or slash lots of little value. A few of the towns felt that the State should assume title, while other towns were not concerned about title. The 140 towns having forest land reported a total acreage of 36,884 acres or about 263 acres per town. The valuation of all this forest property was returned as \$523,552.00. This high valuation is probably due to the number of towns having valuable water supply forests. One town reported that it had acquired 3,580 acres for a water supply costing \$45,000.00.

It is expected that the towns which have owned forest lands over a long period of years will retain them; that towns recently acquiring title will endeavor to put them to good use by accepting free reforestation stock from the State if planting is necessary. The State would expect to be reimbursed for trees supplied without cost if the

Town later sells its planted lands. Towns using wood for fuel in schools should put the able unemployed men to work improving their forests. The September storm damaged many of the best town forests and several towns are now salvaging their down timber and disposing of the slash. The State will continue to assist the towns in the planting and management of their lands. Out of the total of 36,884 acres, 57.2%, or 21,106 acres were acquired through defaulted taxes. This problem deserves further, serious study to determine the best disposition of these lands. A list of towns having title to forest lands follows:

LIST OF TOWN FORESTS—BY COUNTIES

	Tax Title	How Acquired Gift	Purchase	Total Acres
Belknap	849	263		1112
Carroll	1805	142	130	2077
Cheshire	1276	835	757	2868
Coos	1426	150	4198	5934
Grafton	6400	182	2771	9353
Hillsborough	1201	888	865	3969
Merrimack	3340	1397	64	4801
Rockingham	2134	652	16	3062
Strafford	1238	65	140	1443
Sullivan	1437	350	478	2265
	21106	4924	9419	36884*

* This figure indicates total acres only.

LIST OF TOWN FORESTS IN EACH COUNTY

BELKNAP COUNTY	Tax Title	Gift	Purchase	Total Acres
Alton		8		8
Barnstead	55			55
Belmont	50			50*
Gilmanton	372	80		452
Meredith		175		175
New Hampton	162			162
Sanbornton	200			200
Tilton	10			10
	849	263		1112

CARROLL COUNTY	Tax Title	Gift	Purchase	Total Acres
Conway .....	.....	10	.....	10
Eaton	75	.....	.....	75
Effingham	195	.....	.....	195
Freedom	285	.....	.....	285
Madison .....	.....	.....	70	70
Ossipee	1250	12	.....	1262
Sandwich .....	.....	20	.....	20
Wakefield .....	.....	.....	60	60
Wolfeboro .....	.....	100	.....	100*
	1805	142	130	2077

CHESHIRE COUNTY	Tax Title	Gift	Purchase	Total Acres
Alstead	90	.....	.....	90
Dublin .....	.....	.....	40	40
Hinsdale .....	.....	174	.....	174*
Jaffrey .....	.....	367	150	517*
Marlboro .....	.....	53	.....	53
Nelson	550	.....	.....	550
Richmond	125	.....	467	592
Roxbury	7	.....	.....	7
Stoddard	180	.....	.....	180
Sullivan .....	.....	.....	100	100
Swanzy .....	.....	175	.....	175
Westmoreland	104	.....	.....	104
Winchester	220	66	.....	286
	1276	835	757	2868

COOS COUNTY	Tax Title	Gift	Purchase	Total Acres
Clarksville	200	.....	.....	200
Dalton	400	.....	.....	400
Dummer .....	.....	.....	128	128
Errol .....	.....	150	.....	150
Gorham .....	.....	.....	3580	3580*
Lancaster .....	.....	.....	.....	160†
Milan	100	.....	250	350
Northumberland .....	.....	.....	240	240*
Stewartstown	726	.....	.....	726
	1426	150	4198	5934

GRAFTON COUNTY	Tax Title	Gift	Purchase	Total Acres
Alexandria	365	.....	.....	365
Bethlehem	150	.....	.....	150
Campton .....	.....	25	.....	25
Grafton	880	.....	.....	880
Hanover	300	.....	1417*	1717
Haverhill	2033	.....	.....	2033

28 REPORT OF FORESTRY AND RECREATION COMMISSION

GRAFTON COUNTY—Continued	Tax Title	Gift	Purchase	Total Acres
Landaff	685	.....	.....	685
Lisbon	10	5	.....	15
Littleton .....	.....	112	1000	1112*
Orange	806	.....	.....	806
Orford	700	.....	.....	700
Plymouth .....	.....	.....	50	50*
Warren	95	.....	.....	95
Waterville .....	.....	.....	304	304
Wentworth	376	.....	.....	376
Woodstock .....	.....	40	.....	40*
	6400	182	2771	9353

HILLSBOROUGH COUNTY	Tax Title	Gift	Purchase	Total Acres
Antrim	303	.....	58*	361
Bedford	50	.....	.....	50
Bennington	230	.....	6	236
Brookline	4	.....	430*	434
Deering	116	.....	.....	116
Goffstown .....	.....	125	250	375*
Greenfield .....	.....	22	.....	22
Hillsboro .....	.....	115	55	170
Hollis	25	201	.....	226
Hudson	25	55	.....	80
Litchfield .....	.....	.....	.....	15†
Lyndeboro .....	.....	5	.....	5
Mason	51	27	.....	78
Merrimack	60	.....	10	70
Mont Vernon	10	.....	.....	10
New Boston	17	137	56	210
New Ipswich	50	.....	.....	50
Pelham .....	.....	.....	.....	1000†
Peterborough	13	.....	.....	13
Temple	90	.....	.....	90
Weare	75	200	.....	275
Wilton	42	1	.....	43
Windsor	40	.....	.....	40
	1201	888	865	3969

MERRIMACK COUNTY	Tax Title	Gift	Purchase	Total Acres
Allenstown .....	.....	.....	15	15
Andover	235	.....	.....	235
Boscawen	6	30	.....	36
Bow	35	20	.....	55
Bradford	35	.....	.....	35
Canterbury	217	.....	.....	217
Chichester	214	.....	.....	214
Dunbarton	272	305	.....	577
Epsom	54	27	.....	81
Henniker	50	.....	.....	50

MERRIMACK COUNTY—Continued	Tax Title	Gift	Purchase	Total Acres
Hill	307	.....	.....	307
Hooksett	23	.....	.....	23
Hopkinton .....	.....	50	5	55
Loudon .....	.....	119	.....	119
Newbury	37	.....	.....	37
Northfield	900	.....	.....	900
Pittsfield	65	30	24	119
Salisbury	250	.....	20	270
Sutton	258	.....	.....	258
Warner	369	800	.....	1169
Webster	13	16	.....	29
	3340	1397	64	4801

ROCKINGHAM COUNTY	Tax Title	Gift	Purchase	Total Acres
Atkinson	149	.....	.....	149
Auburn	37	.....	10	47
Brentwood	30	.....	4	34
Candia	188	.....	.....	188
Danville	200	75	.....	275
Deerfield	562	.....	.....	562
Derry .....	.....	30	.....	30
East Kingston	3	.....	.....	3
Exeter .....	.....	18	.....	18
Fremont	26	.....	.....	26
Greenland	9	.....	.....	9
Hampstead	140	.....	.....	140
Londonderry .....	.....	.....	2	2
Newfields .....	.....	.....	.....	10+
Newington .....	.....	112	.....	112
Northwood	30	400	.....	430
Nottingham	152	.....	.....	152
Raymond	250	12	.....	262
Salem	237	5	.....	242
Sandown	11	.....	.....	11
Seabrook	18	.....	.....	18
South Hampton	52	.....	.....	52
Stratham	40	.....	.....	40
Windham .....	.....	.....	.....	250+
	2134	652	16	3062

STRAFFORD COUNTY	Tax Title	Gift	Purchase	Acres
Barrington	175	.....	.....	175
Durham .....	.....	65	.....	65
Lee	100	.....	.....	100
Middleton	498	.....	.....	498
Milton	116	.....	140	256
Strafford	349	.....	.....	349
	1238	65	140	1443

30 REPORT OF FORESTRY AND RECREATION COMMISSION

SULLIVAN COUNTY	Tax Title	Gift	Purchase	Total Acres
Acworth	100	.....	.....	100
Charlestown	50	50	.....	100
Claremont .....	.....	175	313	488*
Cornish	160	.....	.....	160
Goshen	40	.....	.....	40
Grantham	75	125	.....	200
Lempster	572	.....	.....	572
Newport .....	.....	.....	30	30
Springfield	60	.....	35	95
Sunapee .....	.....	.....	100	100
Unity	380	.....	.....	380
	1437	350	478	2265

* Water Supply.

† No divisions of total available.

SUMMARY

Total towns having forest lands by gift, purchase and tax title	140
Total towns having forest lands by tax title only	98
Total trees planted	1,287,850
Total acres in water supply areas	8631
Total estimated value	\$523,552.

THE FRANCONIA NOTCH PROFILE

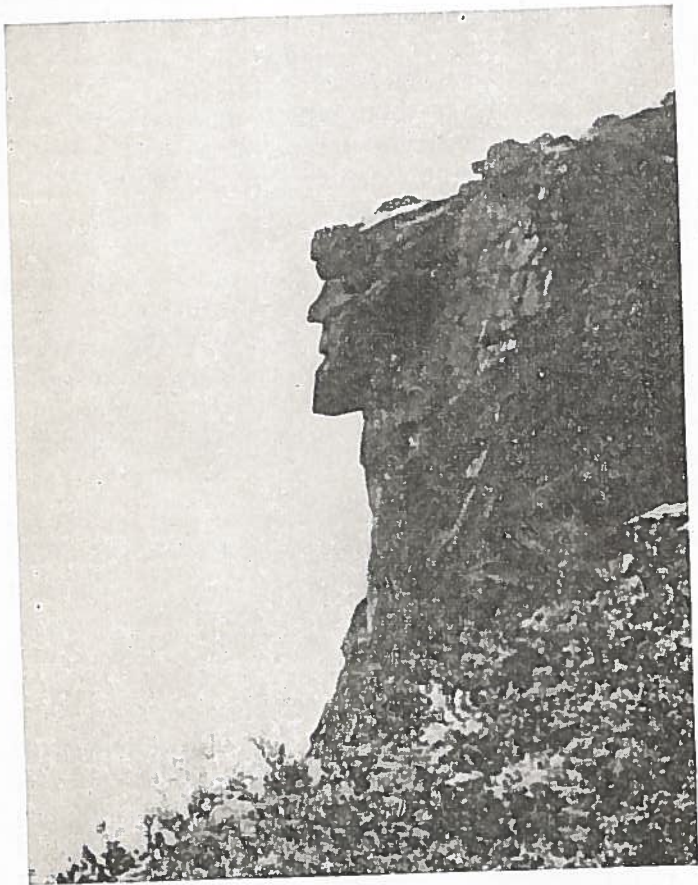


URING the winter of 1936 and 1937 articles appeared in several newspapers throughout the country indicating that there was danger of disintegration and loss of The Profile in Franconia Notch if steps were not taken to preserve it. This did not seem probable to those who were acquainted with The Profile and the conditions around it over a period of time. However, on July 3, 1937, Mr. E. H. Geddes, an engineer who was in charge of work on The Profile in 1916, Mr. C. T. Bodwell, Director of the Flume Reservation for the Society for the Protection of New Hampshire Forests and Mr. Lyle N. Watson, Assistant State Forester, climbed the mountain to check the conditions and note any change that had taken place since 1916. At that time Mr. Geddes took measurements of The Profile which made it possible for him to check what changes if any had taken place.

After inspecting its condition again and measuring crevices in the ledge, Mr. Geddes was able to say he could not determine any movement of the rocks or ledge that would endanger The Profile. It did seem desirable, however, that loose boulders in back of The Profile should be anchored to the ledge and, also that sections of cement be run in cracks in the ledge to make it possible to determine from time to time if there was any movement of this part of the ledge. This was done as recommended by Mr. Geddes and it is very gratifying to be able to say that in the following spring of 1938 careful checking showed that neither ice nor frost had had any effect on that part of the ledge.

A great deal of credit is due Mr. Geddes for his interest and unlimited effort in making this fact finding trip possible. Although Mr. Geddes was seventy-two years of

age and made the trip against his doctor's orders, he did not hesitate to attempt this hard and difficult climb in order that those responsible for the preservation of "The Old Man of the Mountain" might have the benefit of the best information available.



PROFILE, FRANCONIA NOTCH

RECREATION ADMINISTRATION



HIS division of the Department has carried out the administration, operation and maintenance of the State's public recreational areas along the same general lines as were established four years ago. During the past two years there have been additional areas placed under supervision and facilities added to others previously operated; people in increasing numbers have come to use these areas; a larger number of seasonal personnel has been employed; expenses of administration, operation and maintenance have increased. However, by inaugurating a schedule of general but moderate charges, one-half the total expenses of the fiscal two year period were met by income.

The following are the areas supervised and operated by this Department in addition to Franconia and Crawford Notch Reservations.

Bellamy State Park—*Dover*
Cathedral Ledge State Reservation—*Conway*
Clough State Reservation—*Weare*
Endicott Rock State Park—*Laconia*
Forest Lake State Reservation—*Dalton*
Hampton Beach State Reservation—*Hampton*
Kearsarge State Reservation—*Andover—Wilmot*
Kingston Lake State Park—*Kingston*
Monadnock State Reservation—*Jaffrey*
Moose Brook State Park—*Gorham*
Peterborough State Pool—*Peterborough*
Wadleigh State Park—*Sutton*
Wellington State Reservation—*Bristol*
Wentworth State Park—*Wolfeboro*
White Lake State Forest Park—*Tamworth*

NOTE: Three in italics newly supervised in the past two years.

Newly Supervised Areas

Kearsarge State Reservation

A public road from Wilmot Flat leads to the site of the Old Winslow House on the northwest shoulder of Mt. Kearsarge. This attractive site on a section of land extending to the summit is owned by the State. The road terminates in a parking area at an elevation which provides a splendid view. Nearby are fire places in the old hotel cellar hole and a shelter house. Firewood, picnic



Bellamy State Park, Dover. This splendid recreational area reclaimed from an old mill site. (Departmental photo by Ellis)

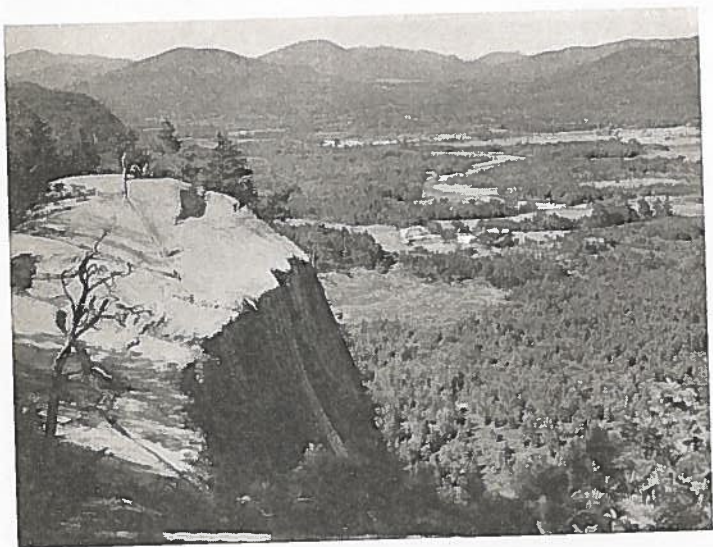
tables and running water are provided. Hiking trails start in a nearby grove and extend to the summit. A cabin for the Supervisor is separate from the public area. For many years people have used the area for picnicking and hiking. During the summer of 1936 the part time services of a man were needed for clean-up work. During 1937 and 1938 for the full summer season, a supervisor was provided who was able to care for the grounds and trails,

serve visitors in various ways and, during the past summer season, to collect auto parking fees. Visitors included many from nearby towns, organized groups from juvenile camps, and increasing numbers from distant places. During 1937 the operating cost of \$254 was borne by the State. During 1938, however, all but \$67 of the cost was contributed by those who used the area. It is planned to continue the supervision and to make improvements at the Reservation.

Hampton Beach State Reservation

At the south end of this reservation is an extensive area along the shore which was reclaimed from the marshes. A fine bathing beach over a quarter of a mile long has been formed. The area has considerable potential recreational value. The first steps toward development were made in 1937 when a modern bathhouse was built by the State. The balance of \$20,000 departmental bond issue funds and state building funds were combined by the Governor and Council to construct the building under a private contract. Preliminary plans by the National Park Service constituted the Federal assistance. Dedication took place on July 4, 1937. The bathhouse has spacious airy dressing courts for men and women in either wing. Each is provided with some 75 cubicles, shower baths, and toilet accommodations. The central portion of the building contains clothing and valuables checking systems for nearly 3000 patrons, an office, storage and service rooms, a refreshment counter, a first aid room, public waiting rooms and toilets, and a spacious roof used as an observation deck. Operations started directly after the dedication and the season extended to September 12. A schedule of fees was based on the parking of cars (as at other State areas), admission and checking of clothing at the bathhouse, and rentals for bathing suits, towels, beach chairs and umbrellas. At the Central Beach just off the highway another parking area is operated by the Department.

After the season closed, nominal inspection was needed periodically through the winter. Total cost of personnel, supplies, electric, water and telephone services from July 1 to December 1 was about \$3000 in excess of income. Before the beginning of the 1938 season, plans were carried out to effect economies through the rearrangement of services at the bathhouse and by shortening the hours of operation. Thus a smaller regular crew was sufficient.



The Cathedral Ledge State Reservation, North Conway, offers a beautiful view with a minimum of effort. (Departmental photo by Ellis)

The season was marked by rainy-week-ends, (including the 4th of July and Labor Day) and cool weather which adversely affected attendance here more than at other centers. However, at the close of the season, September 11, the total income was slightly greater than operating cost.

It is hoped that ways can be found to provide other features which will supplement the bathhouse, meet public demand, and which can be maintained and operated on a profitable basis.

Cathedral Ledge Road

This two mile road leads from the low river land just west of North Conway Village to a parking area, trails, and observation point some 700 feet higher in elevation than the start. On top of the ledge a safety fence and picnic tables have been provided through the CCC. People visit the area to enjoy the unusual view, to picnic, and to hike. Travel over the steep grades of the road and the use of the area necessitate frequent maintenance work and clean-up. During the 1938 summer season a man was employed to attend to this work and to collect a toll of 15 cents for automobiles using the road. Slightly more than half the cost of this maintenance and supervision was defrayed by this income. These arrangements were not wholly successful since the man stationed at the start of the road for collection purposes was not readily available when needed at the top. Furthermore some local public resentment was expressed in regard to the toll. Experimental plans may be undertaken to see if income can be obtained here through other methods so that maintenance and some supervision can be continued.

FACILITIES PROVIDED AT STATE RECREATION AREAS

<i>Summer Season</i>	<i>1937</i>	<i>1938</i>
Number Supervised Areas	14	15
Number Bathing Centers	12	12
Number Picnic Areas	11	13
Number Camping Grounds	5	5

Attendance and Events

During the 1937 season a general increase was noted in attendance at all areas. A decrease of some 15% during 1938 can be attributed to general adverse weather conditions. Apparently people within the State are coming from more distant points to visit our areas. However, the

largest percentage of patrons are visitors to our State. It is observed that patrons are extending the length of their visit at the areas and that they are using several facilities rather than one. Among the few special events the swimming meet held at Wentworth State Park seems to have become a regular affair. The Department helps to provide prizes and publicity and the supervisor cooperates with local people to assure a sporting and instructive event. At Peterborough Pool this season a pageant was produced through the cooperation of many organized camps and individuals of the town. It was written and directed by W. E. Longfellow, American Red Cross Representative. Several hundred persons attended the first evening performance. On account of rain it was repeated the next evening to a larger group. The gay and interesting costumes as well as the pageant itself were displayed to advantage under the flood lights of the pool. The expenses in connection with aquatic meets, pageants, etc., are small. Their success depends largely upon the interest and voluntary services of local groups. We hope to give continued assistance and encouragement so that interest in outdoor recreation, greater proficiency in these sports and the enjoyment provided by such events can be increased.

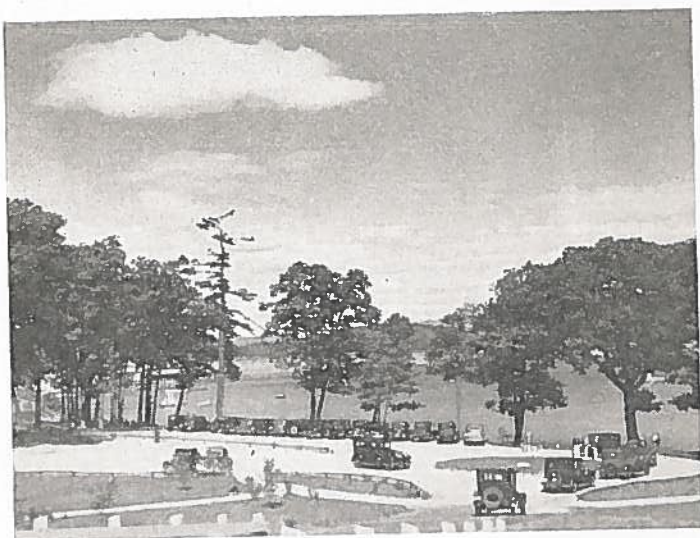
Charges and Income

The major change of policy over the past two years was that of making service charges; a practice which is general in many state, county and municipal areas throughout the country. Study was made of the rates charged by these agencies and it was finally concluded that a fair and easily collected fee would be that for automobile parking. Charges were also made for special services such as the checking of clothing at most bathhouses, admission and checking at two others and for camping (covering automobile parking, camp site, firewood). Thus those who used the facilities contributed toward their operation and upkeep. These costs had been previously paid wholly from legislative appropriations.

GENERAL CHARGES AT RECREATIONAL CENTERS

Auto Parking (unlimited time)	\$0.25
Books of eight tickets good at all centers until used	1.00
Camping—party of two per night	.25
Each additional over 12 years	.10

Experimental variations of the above schedule of charges are made and will be continued to determine those most equitable and least expensive to collect.



The Endicott Rock State Park, Weirs, is the only complete public recreational area on Lake Winnepesaukee. (Departmental photo)

At first some resentment was expressed by those who felt, that being public, these areas should also be free. Now that it is generally understood that the money collected is used in operating and maintaining areas, objections have largely disappeared. A survey made during the past summer season by the State Planning and Development Commission in cooperation with this Department, (complete report to be made public by the Planning and Development Commission in the spring) asked of patrons of these areas if they objected to thus contributing to the

THE FOLLOWING TABLES SHOW OPERATION, MAINTENANCE AND IMPROVEMENT COSTS,
INCOME AND ESTIMATED ATTENDANCE BY CALENDAR YEARS
January 1—December 31, 1937

AREA	No. of Personnel	Average Monthly Wage	Total Wages	*Other Expenses	Total Maintenance Cost	†Total Income	Net Cost	Estimated Attendance
Bellamy Park	3	\$63	\$567.32	\$253.62	\$820.94	\$29.43	\$791.51	26134
Clough Reservation	75	75	375.00	83.75	458.75	39.00	419.75	13810
Endicott Rock Park	2	87	494.17	313.18	807.35	604.33	203.02	27670
Forest Lake Reservation	1	75	337.50	30.16	367.66	52.05	315.61	12741
Hampton Beach Reservation	38	80	7,810.19	2,304.86	10,115.05	7,075.04	3,040.01	100000
Kearsarge Reservation	1	80	216.00	38.25	254.25	.....	254.25	19995
Kingston Park	5	68	1,308.67	598.20	1,906.87	1,126.17	780.70	65210
Monadnock Reservation	2	82	794.08	719.96	1,514.04	1,084.00	430.04	25201
Moose Brook Park	2	75	277.50	33.55	311.05	91.74	219.31	16376
Peterborough Pool	4	67	699.60	489.46	1,189.06	333.93	855.13	15955
Wadleigh Park	2	77	563.17	345.22	908.39	65.59	842.80	10165
Wellington Reservation	3	78	583.15	238.32	821.47	1,477.40	.....	49102
Wentworth Park	1	80	474.00	177.96	651.96	64.65	587.31	14268
White Lake Park	3	85	832.04	514.96	1,347.00	836.87	510.13	12289
					\$21,473.84	\$12,880.20		408916

January 1—December 31, 1938

AREA	No. of Personnel	Average Monthly Wage	Total Wages	* Other Expenses	Total Maintenance Cost	† Total Income	Net Cost	Estimated Attendance
Bellamy Park	5	\$66	\$928.30	\$277.05	\$1,205.35	\$39.18	\$1,166.17	26596
Cathedral Road	1	60	208.00	5.00	213.00	125.00	88.00	2687
Clough Reservation	2	75	430.00	82.53	512.53	50.65	461.88	7467
Endicott Rock Park	3	75	617.30	353.45	970.75	825.88	144.87	11670
Forest Lake Reservation	1	75	345.00	48.16	393.16	75.30	317.86	14680
Hampton Beach Reservation	15	85	4,581.08	3,420.83	8,001.91	7,493.99	507.92	95000
Kearsarge Reservation	1	75	355.50	66.91	422.41	355.00	67.41	10770
Kingston Park	5	74	1,643.69	350.68	1,994.37	1,805.15	189.22	34870
Monadnock Reservation	2	82	908.67	477.50	1,386.17	902.35	483.82	11411
Moose Brook Park	3	67	522.03	199.88	721.91	158.56	563.35	27328
Peterborough Pool	4	70	796.13	417.75	1,213.88	286.90	926.98	12500
Wadleigh Park	3	85	929.90	557.65	1,487.55	788.95	698.60	14901
Wellington Reservation	3	81	1,021.04	305.03	1,326.07	1,631.02	.....	38333
Wentworth Park	2	70	578.33	227.39	805.72	96.06	709.66	18852
White Lake Park	4	75	1,200.20	266.73	1,466.93	1,108.01	358.92	14987
					\$22,121.71	\$15,742.00		342052

* Includes Supplies, Equipment, Maintenance, Improvements, Electric, Telephone and Water Cost.

† Includes income from Concession, Parking, Checking, Camping, etc.

operation and maintenance; of 203 replies, 195 stated they had no objections. Income during the 1937 season amounted to \$13,880 and increased to \$15,742 in 1938. Income from parking accounted for the largest part of this. Camping income increased over 100 per cent during the second year. In 1937 sixty per cent and in 1938, seventy per cent of operating and maintenance expense was met from income.

Personnel

The total number of seasonal personnel has increased in the past two years due to (1) collection of fees, (2) newly supervised areas, (3) increasing maintenance work. The newer personnel is generally employed for a short season and for specific purposes, such as life guards and collectors. Most of the supervisors who have charge of our areas have had several years experience in the service. It is felt necessary to obtain police powers for our supervisors and in a few instances it has been necessary to exercise this authority. Their duties are to maintain the grounds and buildings in good condition, to assist in any way which will enable patrons to get the most enjoyment from the facilities and to see that the privileges are not abused. Actually there is very little abuse or disorderliness. A type of uniform has been used so that employees may be readily identified.

SEASONAL PERSONNEL FOR SUPERVISION AND MAINTENANCE

	1937	1938
Supervisors	15 (81)	14 (85)
Assistant Supervisor	3 (78)	5 (73)
Women Assistants	5 (70)	5 (56)
Life Guards	8 (79)	11 (73)
Collectors	16 (83)	12 (77)
General	22 (80)	7 (80)
Total	69	54

Note: Average Monthly Wages in Parenthesis.

Maintenance and Improvements

When these areas were newly developed or were being improved by the CCC very little maintenance work was needed. The situation is now changing. Upkeep to buildings, grounds, and equipment is already mounting. The regular supervisory crews attend to general maintenance work, but the need for extra help is growing. Certain areas are more easily maintained than others because of the layout of the area. Where the development was not completed by the CCC, it will be necessary, in the interest of economical operations, to finish this work. Assistance may be sought from the state highway department for the maintenance of some scenic auto roads.

A large portion of patronage occurs during week-ends and at these times certain areas are being used at capacity. This may lead to irreparable damages to the natural features which give an area its recreational value. Some means may be tried to spread this patronage more evenly over a period of time. Failing this it may be necessary to set limits. It is becoming apparent that the need for more recreational areas may soon be recognized. Where and how these can be developed and what their facilities should be, will be given serious consideration.

Hurricane Damage

Considerable damage to several recreational areas was caused by the hurricane of September, 1938. Most serious was at Wadleigh State Park in North Sutton. Many acres of fine old pine and hemlock groves were laid flat. Some damage to the buildings was apparent but not until the area is cleared will the extent of damage to the underground water and electric systems be known. Repairs are already being made to the buildings. Considerable work will be necessary to restore and rearrange the area for recreational use. At the entrance to Wellington State Reservation a grove of about an acre was completely uprooted and some two acres by Hornets Cove was blown down.

After salvage operations some cleaning, planting, and road repair work will be necessary. The blow-down around Peterborough State Pool will probably not affect the recreational use of the area. This is also true of Monadnock State Reservation as far as camping and picnicking are concerned. Damage to the mountain trails will not be apparent until after salvage work has been done. At Kingston Lake State Park about 125 large pines blew down. These have been cut into logs. Their salvage value will probably defray the cost of cutting and removing stumps. Where considerable restorative work is needed as at Wadleigh Park and to a lesser degree at Wellington Reservation, the Department will have to seek funds for this if CCC aid is not available.

General

Information concerning recreation and other phases of the Department was given through exhibits at a few state fairs and at the Eastern States Exposition. Talks and pictures were used to describe the recreational areas to community groups during the winter. A booklet, "New Hampshire Public Recreational Areas," published by the Planning and Development Commission contained complete information regarding our centers. The largest amount of information is spread by those who have used these areas and who recommend them to others.

It is recognized that our centers are valuable in various ways. They conserve natural scenic beauty. They provide opportunities for various forms of recreation to many thousands of people. The effect of this on public health and morals, though indirect, is considerable. By stimulating travel, various forms of commercial recreation business are benefitted. In certain instances our developments have stimulated others and have thus had a favorable effect upon land values. The high standards of safety, sanitation, and operation which we endeavor to maintain meet with such general approval that it should encourage high types of private developments.

FOREST FIRE CONTROL

Introduction



FOREST fires in New Hampshire were placed under State control nearly thirty years ago when, in 1909, after several unsuccessful attempts to bring about the enactment of necessary legislation, a statewide protective organization was created by the State Legislature.

Before that period large-scale logging operations, the reversion of abandoned farms to woodland, the lack of aggressive action to control fires and other factors all combined to create serious fire danger and inflict grave losses. The best records available indicate that values aggregating \$300,000 were destroyed in 1909, the very year when the present organization came into being.

The importance of adequate fire control thus came to receive suitable recognition and the first work undertaken by the Department was the appointment of forest fire wardens, according to the departmental reports of that period. The first appropriation to finance the various objectives of the department was nearly all expended for fire control.

Since that time, a process of constant refinement has been in progress and the organization today is in every respect what its sponsors hoped it would become and costs are well within economic bounds. New Hampshire's year-to-year record is well up to that of the leaders in the Nation.

Organization and Personnel

Municipal crews consisting of the forest fire warden, his deputies, men and equipment form the backbone of the fire control organization. These are grouped into eight fire districts headed by a State district chief who

functions to facilitate cooperation between municipalities and districts. The State also maintains a system of mountain lookout stations, and district portable power pump units, shares with municipalities the costs of fire suppression and cooperates with fire control agencies of the Federal Government and adjacent States. New Hampshire was the first State whose fire control program received the



Forest devastation caused by the 1938 hurricane increased tremendously fire hazard reduction problems. (Departmental photo)

approval and financial cooperation of the Federal Government through the Weeks Act, forerunner of today's Clarke-McNary Law.

The personnel of the service, in addition to those just mentioned, includes the patrolmen of the New Hampshire Timberland Owner's Association, the staff and employees of the U. S. Forest Service in the White Mountain National Forest, the State fish and game conservation officers, State highway patrolmen, railroad section foremen and many others whose positions make them

available for action when needed, a total of some 1,300 men whose services are always available.

Important administrative changes were not made during the current period, existing laws, cooperative relationships and other phases of fire control having been deemed reasonably adequate. The valuable assistance given by all agencies just mentioned, as well as by the State Extension Service, the Society for the Protection of New Hampshire Forests and the several County and district associations of forest fire wardens is hereby gratefully acknowledged.

The efforts of the warden associations are especially commended. These groups began to form nearly six years ago and their membership includes "all wardens and their deputies, all chiefs, their assistants and members of fire departments, and any person interested in the protection, improvement and development of "New Hampshire woodlands." Three newly organized associations in Merrimack, Grafton-Sullivan and Carroll Counties bring the total to eight and the opportunity to confer each month on mutual objectives to approximately 75% of the men engaged in fire control. Only a small portion of the State does not have organization facilities, due to difficulties presented by sparse population, relatively large territory and long travel distances. It is probable, however, that even in these sections the development of modified associations will be attempted.

Review of Fire Danger Conditions

Critical fire danger did not occur during the biennium until the spring of 1938 when late April and the first part of May witnessed serious precipitation deficiencies, high temperatures and low humidities. Woodlands were closed by gubernatorial proclamation on May 4, temporarily opened on the 7th and automatically closed again on the 8th, being finally opened on May 11.

Notable fires of the biennium occurred in Windham during October, 1936, Nashua, Londonderry, Rochester,

Derry, Hanover, Wakefield, Gilmanton and Alton during April and May, 1937, and Brookline, Hooksett, Sanbornton, Gilmanton and Northwood during April, 1938. The Brookline and Hooksett fires occurred on two successive days and burned an area equal to one-half of the total for the whole fiscal year.

Fires of the Fiscal Years 1937 and 1938

Fires during this biennium were somewhat more numerous than average but seasonal records were otherwise fairly satisfactory. Total area burned was low and while the occurrence of several seriously large fires has again shown the necessity of continual improvement, there is reason to assert that control forces are basically organized on a sound footing and that steady progress can be expected.

The following tables show fire occurrence statistics by months, annual totals and averages for 29 years, County summaries, railroad fires, distribution by causes and a statewide summary:

NUMBER OF FIRES BY MONTHS (Exclusive of Railroad Fires)

FISCAL YEAR Ending June 30, 1937		FISCAL YEAR Ending June 30, 1938	
July, 1936	50	July, 1937	40
August, 1936	44	August, 1937	25
September, 1936	14	September, 1937	13
October, 1936	12	October, 1937	30
November, 1936	13	November, 1937	16
December, 1936	1	December, 1937	1
January, 1937	0	January, 1938	0
February, 1937	17	February, 1938	5
March, 1937	35	March, 1938	59
April, 1937	99	April, 1938	200
May, 1937	138	May, 1938	74
June, 1937	10	June, 1938	25
Totals	433	Totals	488

FOREST FIRE RECORD FOR TWENTY-NINE YEARS (Exclusive of Railroad Fires)

Year	No. Fires	Area Burned	Average Area Burned Per Fire	Damage	Average Damage Per Fire
1910	272	9,038A	33.2A	\$40,000.00	\$147.06
1911	462	30,958	67.0	175,000.00	378.79
1912	344	8,474	24.6	62,000.00	180.23
1913	609	14,507	23.8	100,000.00	164.20
1914	315	8,119	25.8	53,000.00	168.25
1915	792	29,480	37.2	174,567.00	220.41
1916	128	6,630	51.8	40,075.00	313.09
1917	197	1,680	8.5	18,205.00	92.41
1918	357	8,693	24.3	94,468.00	264.61
1919	308	3,502	11.4	41,287.00	134.05
1920	138	1,996	14.4	17,681.00	128.12
1921	276	7,172	26.0	59,503.00	215.59
1922	295	9,484	32.1	94,917.00	321.75
1923	199	2,333	11.7	27,786.00	139.63
1924	330	5,351	16.2	83,347.00	252.57
1925	486	8,368	17.2	97,508.00	200.62
1926	295	8,181	27.7	115,614.00	391.91
1927	367	9,420	25.7	75,762.00	206.44
1928	271	4,714	17.4	27,090.00	99.96
1929	192	1,661	8.7	9,188.00	47.85
1930	765	18,750	24.5	93,191.00	121.82
1931	363	4,882	13.4	38,994.00	107.42
1932	485	5,080	10.5	39,760.00	81.98
1933	542	7,485	13.8	55,524.00	102.44
1934	370	2,920	7.9	10,043.00	27.14
1935	488	2,667	5.5	15,122.00	30.98
1936	387	2,011	5.2	12,548.00	32.42
27 years	10,033	223,556A		\$1,672,180.00	
1937	433	2,906	6.7	13,451.00	31.06
1938	488	4,400	9.0	20,524.00	42.06
29 years	10,954	230,862A		\$1,706,155.00	

SUMMARY OF AVERAGES

Average	27 Years	1937	1938	29 Years
Fires Per Year	371	433	488	378
Area Per Year	8,279	2,906	4,400	7,961
Damage Per Year	\$61,932.59	\$13,451.00	\$20,524.00	\$58,832.93
Area Per Fire	22.3	6.7	9.0	21.1
Damage Per Fire	\$166.67	\$31.06	\$42.06	\$155.75

FIRE RECORD FOR FISCAL YEARS 1937 AND 1938 (Exclusive of Railroad Fires)

County	Year	Number of Fires	Total Acres Burned	Average Area Per Fire in Acres	Total Damage	Average Damage Per Fire	Total Cost of Fighting	Average Cost Fighting Per Fire
Belknap	1937	29	228	7.9	\$676.00	\$23.31	\$207.14	\$7.14
	1938	32	395	12.3	539.00	16.84	571.26	17.85
Carroll	1937	36	161	4.4	634.00	17.61	811.03	22.53
	1938	38	67	1.8	452.00	11.89	570.46	15.01
Cheshire	1937	36	86	2.4	298.00	8.28	303.91	8.44
	1938	54	118	2.2	982.00	18.19	477.22	8.84
Coos	1937	20	73	3.7	1,067.00	53.35	595.31	29.77
	1938	22	129	5.9	761.00	34.59	406.57	18.48
Grafton	1937	39	259	6.6	1,217.00	31.21	434.28	11.14
	1938	49	205	4.2	1,654.00	33.76	899.28	18.35
Hillsborough	1937	109	448	4.1	797.00	7.31	787.61	7.23
	1938	102	1,130	11.1	3,245.00	31.81	2,160.68	21.18
Merrimack	1937	43	301	7.0	2,036.00	47.35	778.52	18.11
	1938	62	1,792	28.9	4,931.00	79.53	2,316.82	37.37
Rockingham	1937	93	1,008	10.8	2,965.00	31.88	1,486.10	15.98
	1938	82	389	4.7	4,475.00	54.57	1,300.40	15.86
Strafford	1937	15	304	20.3	1,327.00	88.47	433.70	28.91
	1938	13	75	5.8	2,577.00	198.23	152.15	11.70
Sullivan	1937	13	38	2.9	2,434.00	187.23	335.55	25.81
	1938	34	100	2.9	908.00	26.70	943.68	27.76
State Totals	1937	433	2,906	6.7	\$13,451.00	\$31.06	\$6,173.15	\$14.26
State Totals	1938	488	4,400	9.0	\$20,524.00	\$42.06	\$9,798.52	\$20.08

RAILROAD FIRE RECORD FOR FISCAL YEARS 1937 AND 1938

Year	No. Fires	Total Area Burned	Average Area Per Fire	Total Damage	Average Damage Per Fire
1937	45	176	3.9	\$54.00	\$1.22
1938	80	314	3.9	\$879.17	\$10.99

TOTAL NUMBER OF FOREST FIRES, AREA AND DAMAGE
BY CAUSES
For Fiscal Years 1937 and 1938

CAUSES	Per Cent Total Number of Fires	Per Cent Total Area Burned	Per Cent Total Damage Causes
Railroad	12.	6.3	2.7
Smokers	43.5	40.9	47.4
Burning Brush	23.8	19.5	21.1
Miscellaneous	10.2	26.3	18.1
Lumbering	1.9	1.2	5.2
Incendiary	1.7	2.5	2.1
Lightning	1.1	.6	.2
Camp Fires	3.5	1.1	2.4
Unknown	2.3	1.6	.8
Total	100.0	100.0	100.0

COMBINED FOREST FIRE RECORD FOR FISCAL YEARS
1937 AND 1938

All agencies reporting.

NUMBER OF FIRES

Year	Town	Railroad	White Mountain National Forest	Total
1937	433	45	4	482
1938	488	80	6	574
<hr/>				
Total	921	125	10	1,056
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AREA BURNED				
1937	2,906	176	1	3,083
1938	4,400	314	12	4,726
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Total	7,306	490	13	7,809
<hr/>				
DAMAGE				
1937	\$13,451.00	\$54.00	0.00	\$13,505.00
1938	20,524.00	879.00	0.00	21,416.00
<hr/>				
Total	\$33,975.00	\$933.00	0.00	\$34,921.00

Forest Fire Record Analysis

The first statistical analysis of fires in New Hampshire was made in 1928 by Samuel T. Dana, formerly Director of the Northeastern Forest Experiment Station, when the records of the period 1921-1925 were studied. With the completion of a further investigation by Walter E. Brown, through project assistance of the Works Progress Administration, detailed information now becomes available for the period of 1931-1935 and the two years 1936 and 1937. In addition to the usual studies of number and area of fires, thorough consideration has been given to causes, geographic distribution, effect of weather, time

required for control from initial discovery to final suppression, as well as other factors affecting fire behavior.

This analysis was made to facilitate the work of U. S. Forest Service officers in inspecting cooperative efforts under the provisions of the Clarke-McNary Law and should otherwise be of great value to district chiefs, wardens in the towns and others engaged in the control of forest fires. The study is to be published in pamphlet form, copies of which will be made available to all those concerned.

Lookout Stations

Lookout stations have always played an important part in the work of controlling fires and New Hampshire woodlands are under observation throughout the danger period from 27 State stations, 11 Federal stations in the White Mountain National Forest and several in adjacent States in accordance with reciprocal agreements.

During the biennium, one new station went into operation in Carroll County on Great Hill which is within the Hemenway State Forest Reservation in Tamworth. This was the only major addition to the State system but the development by U. S. Forest Service authorities of an office method through which to measure areas directly visible as against "blind" spots led the Department to undertake such an investigation. This was conducted by Mr. Robert G. Dustin who not only made "seen-area" maps of State stations but had previously made similar studies of Government stations in the White Mountain National Forest and many other elevations which might prove to be useful.

We now know how much territory is directly visible from established stations as well as the location of areas which are not thus under observation. In time to come, new stations may be established where the total area to be observed warrants such development and other means

of protection can be devised if lookout stations cannot be economically justified.

The following table summarizes the number of smokes observed and reported to proper authorities, as well as the number of visitors who registered at each station. Attention is especially called to the latter because these contacts with the public provide an extremely useful medium for the dissemination of fire prevention information.

FIRE LOOKOUT STATION STATISTICS

Name of Station	Number of Smokes Discovered		Number of Fires Reported		Number of Visitors Registered	
	1937	1938	1937	1938	1937	1938
Agassiz	5	13	3	13	9,900†	9,600†
Belknap	49	74	16	31	4,745	3,847
Black Mt.	48	77	24	36	881	504
Blue Job	41	53	20	22	861	1,324
Cabot	53	49	2	11	168	166
Cardigan	227	271	68	128	2,611	3,043
Crotched	80	72	8	3	2,026	2,029
Croydon	80	114	49	51	143	251
Deer	0	13	0	2	640	126
Federal Hill ..	131	158	88	110	729	882
Great Hill	*	27	*	14	*	659
Green	39	71	27	19	1,705	1,447
Hyland Hill ..	225	210	77	66	330	249
Jeremy Hill ..	256	266	91	111	2,412	4,646
Kearsarge	126	183	17	33	7,199	7,793
Magalloway ..	36	47	0	4	33	14
Milan Hill	49	43	4	4	3,436	2,886
Monadnock	142	434	53	147	18,779	13,744
Oak Hill	20	60	13	40	814	774
Pawtuckaway ..	143	171	41	53	4,468	3,588
Pitcher	16	39	12	30	1,753	1,533
Red Hill	46	60	8	4	2,264	2,318
Rock Rimmon ..	483	552	85	126	741	838
Signal	21	6	7	1	80	48
Stinson	96	115	18	12	997	1,116
Stratham Hill ..	142	320	67	109	3,323	5,382
Uncanoonuc	109	173	55	78	3,259	3,195
Totals	2,663	3,671	853	1,258	74,297	72,002

* Service inaugurated 1938.

† Estimated.

The Civilian Conservation Corps

The accomplishments of the Civilian Conservation Corps are described in detail elsewhere in this report but its place in the organization for the control of forest fires should be briefly described here. As a matter of policy, the CCC has not been used as a primary fire fighting force. This course has been followed so that existing town organizations might be kept up to desirable standards and also to prevent too great an encroachment on the CCC work program itself. However, the presence of the Corps has been kept constantly before the district chiefs and its services have been requested on a number of occasions when fires could, or actually did, become so serious as to require extreme suppression efforts. Notable among cases of this kind were the Brookline and Hooksett fires which occurred almost simultaneously and to which crews were sent by the Bear Brook Camp of the National Park Service, among others on the scene. The CCC from the North Woodstock Camp and Thornton Camp of the White Mountain National Forest also rendered yeoman service when suspected incendiarism threatened to cause a serious series of fires in the famed Franconia Notch State Park and Memorial Reservation.

Portable Saw Mill Operations

Fires attributable to the operation of portable saw mills were fairly numerous in the days of steam but the increasingly frequent use of internal combustion engines for power is serving greatly to reduce fire risk and few fires now result directly from operations.

The law requires the annual registration of each mill, permits to operate on each new setting, slash disposal for 100 feet around all mills and the maintenance of effective spark arresting devices on steam mills. The following table gives statistics of mill operations since 1925:

TABULATION SHOWING REGISTRATION OF PORTABLE SAW MILLS

Year	Total No. Mills Registered	Power Used		Total Number of Permits	Number of Permits	
		Steam	Gas & Others		Steam	Gas & Others
1925*	163	116	47	244	163	81
1926	240	171	69	432	267	165
1927	254	177	77	459	265	194
1928	249	164	85	443	255	188
1929	248	145	103	440	207	233
1930	202	111	91	310	118	192
1931	149	77	72	273	82	191
1932	125	51	74	175	47	128
1933	141	69	72	298	106	192
1934	174	75	99	343	95	248
1935	143	60	83	276	68	208
1936	167	66	101	323	80	243
1937	196	69	127	387	83	304
1938	207	74	133	361	88	273
14 year average	190	102	88	340	137	203

* Law in effect from July 1, 1925.

The Hurricane

This biennial record of fires during the period ended on June 30, 1938, is written after the occurrence on September 21, 1938, of a windstorm so disastrous as to be without precedent in contemporary history and a brief statement of its effect on the fire situation is therefore in order.

Following a 10-day period during which 9.49 inches of rainfall was officially recorded in Concord and a major flood occurred, a tropical wind came inland at Long Island, N. Y., raking New England from the southeast at official velocities which exceeded 56 miles per hour. For approximately five hours from 5 p.m. to 10 p.m., a sustained wind battered the forests. Soil conditions being what they were after such heavy and prolonged rainfall, trees accustomed to winds from the opposite quarter were highly susceptible to the uprooting, bending or breaking

force which followed and the net effect on New Hampshire woodland was that an estimated $1\frac{1}{2}$ billions of timber had been blown down or otherwise damaged on hundreds of thousands of acres, creating problems of salvage, fire protection and restoration demanding the utmost from all agencies in a position to act.



The 1938 hurricane blew down an estimated $1\frac{1}{2}$ billion feet of merchantable timber. (Departmental photo)

An emergency gubernatorial committee of foresters, lumbermen, legislators and landowners was formed and Federal assistance was solicited, with the result that the President of the United States authorized the U. S. Forest Service to administer funds of the Reconstruction Finance and Surplus Commodities Corporation in salvaging windthrown timber, and Congress appropriated \$5,500,000 for special emergency fire hazard reduction. Since that time, both programs have been inaugurated through the efforts of the New England Forest Emergency Project and bid fair to go a long way in alleviating what are probably the gravest forest conditions with which we have ever been confronted.

The State program in this connection contemplates the appropriation of \$100,000 for special emergency fire measures and the probable enactment of new legislation. Fire districts will be re-aligned, additional fire lookouts will be established, extra equipment and apparatus will be procured for direct State use and for distribution to municipalities, local patrol during high danger periods and other means will be used to cope with probable fire danger worse than any we have ever known.

The fire hazard reduction program of the U. S. Forest Service will include the re-establishment of fire communications and lookout towers, opening of roads and fire lanes, clearing of high hazard material from around dwellings, villages and along roads, railroads, streams and other areas of concentrated use, as well as such other clean-up work as will assure the greatest possible measure of public safety. Special fire weather forecasting service will be instituted and crews engaged in hazard reduction, as well as all members of the Civilian Conservation Corps, will be trained and equipped for fire fighting to bolster the wardens and their crews in times of necessity. In this connection, a thorough-going plan will be developed to co-ordinate the efforts of all men and resources at the disposal of fire control agencies throughout New Hampshire and in adjacent States.

The presence of the U. S. Forest Service, an agency with which the Forestry and Recreation Commission has already had years of friendly and helpful relations under the Clarke-McNary Law and in other ways is heartening and everyone having a part in the work of fire control looks to the future with determination and confidence.

STATE FOREST NURSERY



HE distribution of trees from the State Forest Nursery during the past biennial period has shown an increase over previous similar periods for several years. However, with the larger acreages of state land reforested and with less lumber being cut, smaller amounts of seed have been sown both years in the Nursery with the intention of reducing the output. This again seems to need adjusting as the hurricane of September, 1938, has forced the harvesting of many thousands of acres of timber and an increased demand for forest planting stock will naturally follow.

White and red pine and white spruce are the species that are in the greatest demand for forest planting and these species made up 92 per cent of the Nursery output. There has been a noticeable increase in the number of inquiries for balsam fir. This is due to plantings being made for growing Christmas trees.

The policies of giving trees to boys' and girls' educational groups and to municipalities for planting on public land, have been continued.

The 4-H Clubs of all counties planted a total of 276,685 trees divided by counties as follows: Belknap, 7,400; Carroll, 7,000; Cheshire, 32,750; Coos, 29,900; Grafton, 20,675; Hillsborough, 88,000; Merrimack, 42,585; Rockingham, 41,275; Strafford, 4,000; Sullivan, 3,100. Smith-Hughes or Agricultural High Schools planted a total of 84,150 trees and were divided by counties as follows: Carroll, 1,100; Cheshire, 18,450; Coos, 4,500; Grafton, 5,000; Hillsborough, 13,600; Merrimack, 18,150; Rockingham, 10,850; Strafford, 12,500.

Trees were given to all counties, cities and towns that were interested in reforesting public and municipal lands. Two counties and fifteen municipalities took advantage

of this opportunity and planted 514,550 trees divided as follows: Sullivan County, 30,000; Belknap County, 2,000; Manchester, 187,000; Hillsboro, 96,000; Claremont, 68,500; Hanover, 30,000; Walpole, 30,000; Franklin, 29,000; Hampstead, 16,000; Dunbarton, 12,000; Hollis, 7,000; Dover, 2,000; Concord 1,500; Northwood, 1,200; Warner, 1,200; Salem, 750; Nottingham, 400.

The Nursery has continued to cooperate with the State Highway Department by giving over a section of the Nursery to the carrying and growing of ornamental stock for roadside beautification work. This assistance consists of receiving stock from commercial nurseries and holding it until needed at various points about the State and also in growing small trees and shrubs to large sizes that are purchased in wholesale amounts. This takes about two acres of the Nursery area.

All species of trees grown by the Forestry and Recreation Department in the Forest Nursery are given free of charge to other State departments.

Service to other branches of the Forestry and Recreation Department have been given by receiving and storing both recreational supplies and fire equipment in wholesale quantities and distributing the supplies to all recreational areas and fire equipment to towns and cities as needed.

The following table shows the value of stock distributed by years and the agency receiving same.

VALUE OF NURSERY STOCK PRODUCED

Year Ending June 30, 1937

Trees sold to private planters	\$3,381.56
Trees given to 4-H and other juvenile clubs	824.85
Trees given to towns	975.90
Trees used on State lands	2,105.15
	<hr/>
	\$7,287.46

VALUE OF NURSERY STOCK PRODUCED

Year Ending June 30, 1938

Trees sold to private planters	\$3,320.06
Trees given to 4-H and other juvenile clubs	951.51
Trees given to towns	1,695.85
Trees used on State lands	1,130.07
	<hr/>
	\$7,097.49

NURSERY OUTPUT: FALL 1936 — SPRING 1937

AGE OF STOCK	White Pine	Red Pine	Scotch Pine	White Spruce	Norway Spruce	Red Spruce	Balsam Fir	Total
5 yr. transplants	5,000	.....	.....	.....	.....	.....	.....	5,000
4 yr. transplants	38,648	118,795	13,425	127,949	6,550	10	12,000	317,377
3 yr. root pruned seedlings	395,685	181,100	29,350	93,438	40,300	.....	10,600	750,473
2 yr. seedlings	155,000	228,000	25,000	.....	.....	.....	.....	408,000
	594,333	527,895	67,775	221,387	46,850	10	22,600	1,480,850

NURSERY OUTPUT: FALL 1937 — SPRING 1938

AGE OF STOCK	White Pine	Red Pine	Scotch Pine	White Spruce	Norway Spruce	Balsam Fir	White Ash	Pinus Peuce	Total
5 yr. transplants	2	13,250	.....	100	.....	.....	.....	.....	13,352
4 yr. transplants	37,450	118,177	3,329	62,045	3,875	6,500	.....	2,000	233,376
3 yr. root pruned seedlings	344,921	207,575	11,775	160,526	40,900	13,650	.....	.....	779,347
2 yr. seedlings	215,000	50,000	10,000	300,000	.....	.....	9,300	.....	584,300
	597,373	389,002	25,104	522,671	44,775	20,150	9,300	2,000	1,610,375

FOREST PLANTING



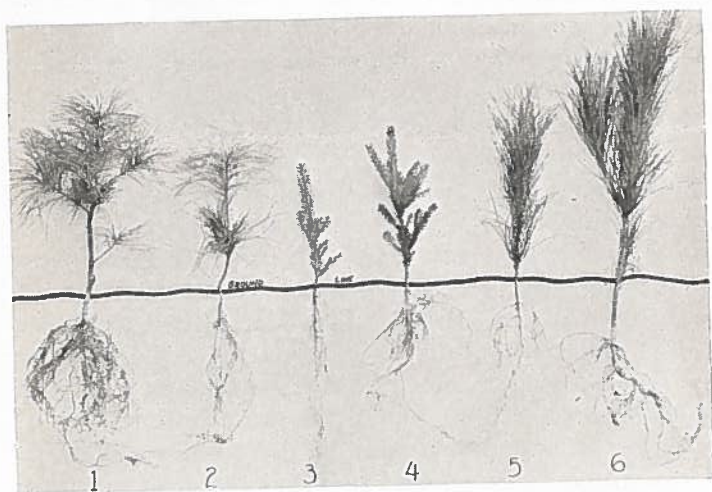
THE need for forest planting and advising prospective planters how to plant is so great at this time that it seems important to outline briefly the more desirable methods. The Forestry and Recreation Department has tried many species of trees and planting methods which are not as satisfactory for general use as those mentioned in the following recommendations. There are also limitations in the use of forest planting stock purchased from the State which should be understood.

The New Hampshire Forestry and Recreation Department is authorized to grow reforestation stock for planting on public land and for sale to private parties at cost F.O.B. shipping point for planting within the State. In return for this consideration the planter agrees to furnish a brief report from time to time as requested and not to use the trees for ornamental use or resell them with their roots attached. Only a few of the more desirable species of timber trees are grown in order that a reasonably steady demand may be anticipated and the costs kept as low as possible. White and red pine and white spruce make up a large percentage of the total amount grown, while a few Scotch pine, Norway spruce, balsam fir and white ash are grown for special use and sites for which the others are not well adapted.

Kind of Trees to Plant

The tree most generally planted in the southern and central section of the State is the white pine. It should not be planted on high elevations, in swamps where water stands several months of the year, or on light sand and heavily burned areas without shade, and never within 1000 feet of any wild or cultivated currant and gooseberry bushes because of the danger from White Pine Blister Rust. It would be more desirable to plant a 1000 foot

strip of red pine around all swamps and mountain sides where it is inadvisable to remove currant and gooseberry bushes. The White Pine Weevil which kills the leader is one of its worst enemies as it retards growth and causes crooked logs. It is sometimes advisable to plant it with red pine in small groups of 10 to 20 trees each. It will grow well under partial shade or among sprout growth.



Forest planting stock: (1) white pine transplants, 4 yrs. 9"; (2) white pine root-pruned seedlings, 3 yrs. 6"; (3) Spruce root-pruned seedlings, 3 yrs. 6"; (4) Spruce transplant, 4 yrs. 7"; (5) Red pine root-pruned seedling, 3 yrs. 6"; (6) Red pine transplants, 4 yrs. 10".
(Departmental photo by Ellis)

Red or Norway pine is a good substitute for white pine generally and grows well on light sandy or gravelly soils without shade. It is also practically immune to the insects and diseases that affect the white pine and is preferred by many for this reason. It will not grow well on wet soil or under shade, but is an excellent tree to plant with other species in mixed stands.

Scotch pine is a fast growing pine of inferior type. It will grow on sand blows, gravelly soils, and heavily burned areas without vegetation and its use should be limited to such areas. It is subject to snow and wind damage and should not be planted under shade.

White Spruce and Fir Balsam are desirable for planting at high elevations. They will stand a reasonable amount of shade and are the best trees to grow for the Christmas tree market. White Ash is the most valuable hardwood that can be grown but is not easy to transplant and make live.

Sizes of Trees to Plant

Reforestation stock is of two kinds, seedlings and transplants. Seedlings are trees that have remained in the seed bed where originally planted. This is usually for only two or three years, although it may be more. Transplants are trees which have been taken from the seed bed and transplanted in the nursery with more space for developing. Three year transplant means that the tree has been transplanted one year, and four year transplant, that it has been transplanted two years. The four year transplant is the best for reforestation purposes. It is the largest tree that can be planted economically and has the best developed root system for competing with other plants and trees among which it is to be planted. New Hampshire does not distribute three year transplants but has developed a three year root pruned seedling that is nearly as good for planting as four year transplants and can be grown for less money than three year transplants, but might fail where the four year old tree would come through. There are some sites where two year seedlings might come through fairly well. However, they should not be used except by experienced planters and where conditions are thoroughly understood. Three year root pruned seedlings are satisfactory for planting on most sites but do not have as good a root system as four year transplants.

Cost of Trees

It costs about \$8.00 to raise a thousand four year transplants, about \$6.00 to raise a thousand three year transplants, and about \$5.50 to raise a thousand three year root

pruned seedlings. Commercial nurseries charge a little more as they must make a profit. As it takes three or four years to produce the best trees, the demand cannot always be anticipated in advance and orders should be placed as far in advance as possible.

Number of Trees Per Acre

For general planting a 6 x 6 ft. or 8 x 8 ft. spacing will be found to be most satisfactory. While the majority of persons plant 6 x 6 ft., a wider spacing of 8 x 8 ft. is satisfactory for planting among other growth where the trees will have competition. Old plantations set 8 x 8 ft. and recently cut have shown high yields, and the initial investment is less as only 680 trees are used with 8 x 8 ft. spacing while 6 x 6 ft. spacing takes 1200 trees per acre. The trees are still close enough to prune themselves before the knots are large enough to cheapen the quality of lumber on the wider spacing. The plantations also go through to maturity better when unthinned, and when the time arrives that they should be thinned, produce a more valuable product. The 6 x 6 ft. spacing should be used for spruce and white ash, and for all species on extremely light dry soils and where shade is especially desirable.

Areas recently cut over should be planted at once to give the planted trees as much of a start as possible over other less desirable growth. This will reduce the amount of release cutting and the cost of carrying the trees to a point where they are dominant. Postponing the planting of recently cut pine areas has been recommended for some sections on account of Pales Weevil. This should not interfere with planting in New Hampshire as these weevils have not been as common here as farther south.

The best time of the year for planting trees is just as soon as the frost is out of the ground in the spring. However, trees may be set any time with a reasonable degree of success with the exception of a period from June to

September. Dry periods and other unusual conditions should be taken into consideration.

Methods of Planting

There are two methods of planting reforestation stock: mattock planting and spade planting. The mattock was the first implement used in planting forest trees, and is still used by a large per cent of planters. The work is usually done by two men although one can work alone at a slight disadvantage. One man digs the holes with the mattock, keeping the dirt removed from the hole close beside it and in one pile for the convenience of the man following with the trees. The hole should be made deep enough to allow the roots to occupy as natural a position as possible. The second man follows with a pail of trees in which a little water is kept to keep the roots from drying out. One tree is removed from the pail at a time by the second man, who sets the tree in the hole and the pile of earth is then filled in around the roots by hand and stamped solid with the heel. The spade method while not as well known is usually preferred when understood. It is less back breaking for the planter, fully as speedy, and the tree is left in a better position to withstand drouth. The operation is as follows: first, drive the spade into the ground and bend it backward and forward to open up a hole; withdraw the spade; next, place a tree in the side of the opening and push the roots down well and straighten out the roots with the fingers; last, stamp the ground firmly around the tree with the heel. Special planting spades may be purchased from the Forestry and Recreation Department at cost. Planting sites with a heavy cover of grass or vines should be planted with a mattock. The proper procedure under such conditions is to turn back a turf 12 to 15 inches square and set the tree in the center of the opening. This gives the tree a chance to start before the grass can grow close enough to stop its growth and kill it. One man can set

500 trees per day on an average planting site and the total cost will usually average about \$15.00 per acre.

Care of Plantation

After the trees are planted they do not require any attention for four or five years. After this time they should be watched for weevil injury, and where the trees were set on sprout land and among bushes the area should be gone over and all limbs and hardwood sprouts which are whipping the tops of the trees should be cut back. All such hardwoods should be cut two or three feet from the ground. This allows the sap to flow into the stump, and sprouts which naturally start from the stump will not make as rapid and vigorous growth as when the stump is cut low. The average cost of such weeding is about \$1.50 per acre.

State Land Planting

Reforestation work on State areas during the past biennial period has been considerably reduced over previous years due to the extensive CCC and relief planting programs that were in force previous to that time. Only the more desirable species for producing forest products were planted and the following table shows the detail of plantings made on State areas during the planting seasons of 1937 and 1938:

PLANTING ON STATE LAND BY TRACTS, NUMBER AND SPECIES

Tract	Acres Covered	White Pine	Red Pine	Scotch Pine	White Spruce	Norway Spruce	Black Spruce	Balsam Fir	Eur. Larch	Jap. Larch	Pinus Peuce	White Ash	Total
Annett	45	23,450	11,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	35,150
Bear Brook	100	41,000	61,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	102,000
Bellamy Park .....	.....	.....	125	.....	.....	.....	.....	.....	.....	.....	.....	.....	125
Black Mountain	45	.....	8,000	.....	25,000	13,250	.....	.....	.....	.....	2,000	.....	48,250
Cardigan Mt.	75	.....	.....	.....	15,125	22,500	.....	.....	.....	.....	.....	.....	37,625
Carroll	2	1,000	.....	.....	.....	650	.....	.....	.....	.....	.....	.....	1,650
Casalis	3	3,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,000
Crawford Notch .....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	6
Fox	104	9,950	19,650	2,375	15,500	7,255	250	500	300	400	.....	.....	56,180
Hampton Beach .....	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	10
Harriman-Chandler ..	9	500	.....	.....	8,300	.....	.....	.....	.....	.....	.....	.....	8,800
Hemenway	45	20,000	.....	.....	10,000	.....	.....	.....	.....	.....	.....	.....	30,000
Hubbard Hill	80	60,000	1,500	.....	.....	.....	.....	.....	.....	.....	.....	1,000	62,500
Jeremy Hill	4	.....	2,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,000
Kearsarge, North	15	.....	.....	.....	7,125	.....	.....	.....	.....	.....	.....	.....	7,125
Kearsarge, South	55	.....	.....	.....	15,650	11,150	.....	.....	.....	.....	.....	.....	26,800
Kingston Lake Park ..	.....	.....	36	.....	6	.....	.....	.....	.....	.....	.....	.....	42
Merrimack River	80	.....	55,875	27,100	.....	.....	.....	.....	.....	.....	.....	.....	82,975
Peterborough Pool .....	.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	24
Ponemah	35	.....	1,350	20,000	.....	.....	.....	.....	.....	.....	.....	.....	21,350
Wadleigh Park .....	.....	24	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	60
Wentworth Beach .....	.....	24	.....	.....	12	.....	.....	.....	.....	.....	.....	.....	60
White Lake	15	.....	15,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,000
Total	712	158,948	176,320	49,475	96,734	54,805	250	500	300	400	2,000	1,000	540,732

EMERGENCY CONSERVATION WORK IN NEW HAMPSHIRE



URING the biennial period a considerable change took place in the number and location of forest camps of the Civilian Conservation Corps. The Hemenway Camp in Tamworth, first occupied on June 5, 1933, was discontinued September 30, 1937. In Rindge, the Monadnock Camp, established June 5, 1933, ultimately closed down on June 7, 1937. At Danbury, Camp Cardigan opened on June 16, 1933, was abandoned October 11, 1937 and the Company transferred to North Woodstock taking over buildings formerly occupied by a National Forest unit. The Cardigan Camp was reopened October 24, 1938, in order to assist in fire hazard reduction as a result of the hurricane of the previous month.

Camp Claremont, set up in Unity, September 3, 1935, largely for moth control work, was discontinued March 31, 1937.

Camp Monadnock was reopened October 19, 1938, also due to fire hazard occasioned by the September hurricane. At the present time—(December 31, 1938)—there are five State Forest camps located in the towns of Danbury, North Woodstock, Rindge, Pittsburg and Warner. Side Camps are at Haverhill, Laconia and West Stewartstown. The entire man power of all camps is utilized in fire hazard reduction, except the Pittsburg Camp which has only a small detail assigned to this project.

A brief description of work projects conducted by the several CCC camps follows:

Camp Hemenway, S-53

Located three miles from the village of Tamworth on the Hemenway State Reservation, this camp has car-

ried on projects not only over this property of nearly 2,000 acres but upon eleven other state tracts.

Hemenway Reservation

Improvements within and outside of the Huckins House were carried on to completion and additional refinements were made to the adjacent parking area. One-half mile of truck trail, from the school house corner to a point near the Great Hill Tower, was finished and wire strung on the telephone line leading to the fire lookout tower. Forest improvement work was conducted over 38 acres, slash burned upon 34 and 32,500 trees set out as fill-ins throughout the reservation plantations.

White Lake Reservation

Located along the southern shores of White Lake, Tamworth this state property offers ideal bathing and other recreational facilities. It has been developed entirely by the Hemenway Camp and improvements have been made from time to time. A cottage, 12' x 24', for the use of a lifeguard, was partially constructed with CCC labor and completed with other funds. To further aid in the disposal of refuse, a stone and cement incinerator was built. Improvements were made to the roads throughout this tract of 258 acres and the parking area further enlarged, necessitated by the increased use of the reservation. Improvement thinnings were made on eight acres, and 14,750 trees planted.

Crawford Notch State Park

Further improvements were made to the Mount Willard road through additional drainage and gravelling of the surface. Turn-outs were built at various points along the relocated sections.

At the Willey House Site general repairs were made to

State-owned buildings, clean-up of snags and blowdown debris was conducted along about 1.5 miles of the highway.

Other State Reservations

Stumps and rocks were removed from the previously built fire lane on the Huckins State Forest in Freedom. At Cathedral Ledge, in North Conway, cable guard rails were installed adjacent to the edge of the 700 foot cliffs. Maintenance work was also conducted over the reservation automobile road. Along the roadside, at the Bowditch-Runnells Forest, stumps from a previous blowdown were removed. In Tamworth, 1,550 acres of private pine lands were covered in blister rust control.

Camp Cardigan, S-54

Located in the village of Danbury, one-half mile off the State highway, this camp is so situated as to serve several important forest reservations.

Kearsarge Mountain Reservation

Road construction included the building of a truck trail from the town road to the shores of Morey Pond and also maintenance work of the mountain road leading to the Winslow Parking Area. The picnic area was further improved through landscaping and needed additions were made to the supervisor's headquarters. Forest stand improvement was carried on over 76 acres and planting on 11.5 acres.

Wellington Beach

Increased use of this popular bathing beach and recreational tract necessitated an enlargement of the original parking area. This was accomplished by filling in an adjacent swamp. In order to check erosion at one point

along the beach front, a rough laid wall 300 feet in length was built. A cabin, 12' x 24' was also constructed to house the lifeguard.

Franconia Notch Reservation

Through the establishment of a side camp (about 25 men)—from enrollees of the Cardigan Company, several projects were carried on. Among them were included the



Wellington State Reservation, Bristol, most popular of 11 fresh water State bathing beaches. (Departmental photo by Ellis)

completion of a Ranger's Cabin and an information booth near The Profile. At the outlet of Profile Lake the dam was repaired with new planking. North of Echo Lake an earth barrier was made and landscaped in order to hide a large sand pit. The parking area at the top of Three Mile Hill, intensively used by skiers, was improved and resurfaced.

Other State Reservations

On the Cardigan Mountain Reservation 1.6 miles of roadside were cleared of debris and ski trails improved.

At the Hotel Site parking area a rustic shelter was constructed and needed guard rails erected along the Burnt Hill truck trail.

Reforestation of certain sections on the Merrimack River, Cardigan, Mascoma, Sugar Hill, Wellington and Welton Falls State Forests totalled 46 acres. At camp, during inclement weather, 94 folding picnic tables were built for use at State recreational areas.

Private Lands

In Grafton, white pine blister rust control was conducted on 1,350 acres, while in Enfield, 2,070 acres were scouted and 19 thinned and cleaned in moth control.

Fire Hazard Reduction

Shortly after the hurricane this camp was reoccupied and cleaned up wind-falls and slash in the towns of Alexandria, Andover, Bristol, Grafton, Laconia, New London, Orange and Wilmot.

Camp Monadnock, S-55

Situated on the Annett State Forest, in Rindge, 3½ miles from East Jaffrey, this camp has performed much service in the way of public land improvement.

Miscellaneous Projects

The main truck trail through the Annett State Forest was widened to 11 feet for a distance of 2.5 miles. On the Monadnock Tract, 640 feet of water pipe was laid. At the Peterborough Pool improvements through landscaping, painting and the completion of a sewerage disposal bed were effected. A new well was constructed on the Casalis Reservation in Peterborough. Forest plantings were made on the Annett and Casalis State Forests and on town-owned lands in Jaffrey. Corner posts were set and

boundaries painted on the Annett, Miller Park, Farrar and Chesterfield Gorge Forests. Forest improvement work was carried on upon five reservations. In Jaffrey, 6,955 acres were covered in gypsy moth control.

The camp was reopened in October, 1938 and assisted in reducing the fire hazard by opening up roads and clearing debris in four adjacent towns.

Camp Warner, S-56

This camp is located north of Tory Hill, three miles from Warner Village and was established primarily for the purpose of rebuilding the old Toll Road up the slopes of Mount Kearsarge.

Kearsarge Reservation

Reconstruction of the Toll Road has gone steadily forward with the entire right-of-way cut and 2.8 miles completed. About 1.5 miles from the Toll Gate a parking area to the left has been constructed with a substantial wall-guard. This offers an excellent view to the west and southwest. Two others, to the right and left respectively, are partially completed, the second offering a fine vista to the northeast. To reduce fire hazard, debris was cleaned up along 3.1 miles of the mountain road and a water hole constructed adjacent to it. On the northern side of Kearsarge Mountain, work on the Morey Pond drainage ditch is now 75 per cent completed.

At the entrance to the mountain road a combination toll and caretaker's house, garage and rest room was constructed. A portion of the road at this point was relocated in order to provide a more satisfactory entrance. A parking area has been provided and the grounds about the Toll Gate generally improved.

Other State Reservations

Forest stand improvement was conducted on the Carroll, Davisville, Fox and Harriman-Chandler State Forests over a total of $73\frac{1}{2}$ acres. Fire hazard reduction took place on the Fox and Harriman-Chandler properties. Forest plantings were made at the Fox, Harriman-Chandler, Carroll and Merrimack River areas, aggregating $71\frac{1}{4}$ acres.

Miscellaneous

On the Warner Town Forest 128 acres were given stand improvement. Eleven water holes were constructed in the following towns: Warner, 2; Bradford, 1; and Sutton, 8.

White pine blister rust control was carried on over 2,333 acres and during the fall and winter months pine and control areas aggregating 6,478 acres were mapped in Henniker, Hopkinton and Warner.

Immediately following the September, 1938, hurricane, the Warner Camp rendered assistance to neighboring towns in re-establishing communications and opening up roads. The towns thus assisted are Bradford, Danbury, Henniker, Hopkinton, Salisbury, Sutton, Warner, Weare, Webster and Wilmot. At the Wadleigh Park and Kearsarge Mountain Reservations blowdowns were cleaned up.

Camp Claremont, P-57

Established solely for insect control, the gypsy moth project was continued in Charlestown, Langdon and Unity, an aggregate of 2,630 acres having been scouted. Moth colonies totalling 15 acres in Charlestown, 8 in Langdon and 6 in Unity were cleaned up. Forest stand improvement was also conducted on the Hubbard Hill State Forest.

This camp was discontinued on March 31, 1937.

Connecticut Lakes Camp, P-58

Established to open up a truck trail from Second Lake to the Canadian Border, near Chartierville, Quebec, construction involving right-of-way, cutting and stump removal was finished on 4.5 miles. Of this mileage, sub-grade, grading and surfacing has been completed on four miles. This involved laying 45 sixteen foot culverts, 6,000 cubic yards of fill and 8,695 of gravel. Construction of a bridge at Moose Falls is underway.

On the north and east shores of Third Connecticut Lake stumps and driftwood have been cleaned up. Miscellaneous projects included the collection of 103 bushels of fir balsam cones for the State Forest Nursery, the maintenance of the telephone line to Deer Mountain fire lookout station, and rewiring of a similar line to the Mt. Magalloway Station.

On private lands this camp has continued to cooperate in the Coos-Essex Timber Survey, estimating softwood growth on 47,972 acres in Clarksville, Colebrook, Columbia and Stewartstown. Following the September, 1938, hurricane, assistance was given in the reestablishment of telephone lines, opening up roads and trails.

Camp North Woodstock, S-59

The activities of this camp have been confined largely in projects centering around the new Aerial Tramway in Franconia Notch. A large parking area, capable of accommodating over 400 cars is nearly completed. Its slopes have been seeded and over 1,000 shrubs and trees set out. A walk, 700 feet in length and 8 feet wide was constructed. Over 1,200 feet of guard rail was built around the parking area.

At the summit station, more than 2,100 feet of gravelled walk was constructed leading to the summit of Cannon Mountain and looping back to the station. Assistance

was given in the construction of an observation platform on the summit.

The Cannon Mountain Ski Trail was nearly completed and in addition a practice slope was developed adjacent to the summit station.

Near The Profile an information booth of log and stone construction was built and the environs landscaped. Two foot-bridges were rebuilt and two additional ones constructed. Foot trails, as well as the Lafayette campground, were improved and maintained. Over 400 acres were improved by thinning and 19 bushels of cones collected.

Black Mountain Forest

A side camp located in Haverhill made many improvements to the Camp Chipewas buildings. Thirty-one brick chimneys, 48 foundation ventilators and 171 brick and cement foundation piers were constructed. A concrete diversion dam and 200 feet of ditch were built in order to increase the water supply for fire protection. At the camp area a 60 foot cement dam provides for recreation and fire control. Thirty-five picnic tables were assembled and painted.

Forest stand improvement was conducted on 197 acres and 67 reforested. For the State Forest Nursery, 54 bushels of cones were collected. Forest improvement was also carried on upon the Fay Reservation.

Following the hurricane, wind-blown timber was removed from trails, along the Franconia Notch road and about buildings. Assistance was also given the towns of Campton, Haverhill and Woodstock in fire hazard reduction work. Similar work was conducted in Kinsman Notch.

Park Camps

During the period covered by this report several changes took place in the personnel and location of these camps as first set up.

Bear Brook, SP-2, established as a junior camp in 1935, was turned into a veteran's company in October, 1938, when the junior enrollees were transferred to the Cardigan Forest Camp in Danbury.

Bellamy, SP-3, established in 1935, at Dover, was transferred to the old Pawtuckaway Camp, in Deerfield, on November 1, 1935, and was permanently closed down in February, 1937.

Bear Brook and Moose Brook constitute the remaining National Park Camps operated under the supervision of the Forestry and Recreation Department.

Moose Brook State Park, SP-1

Near the entrance of this property, an administration and recreational building was completed. It provides spacious public rooms, fireplace, sanitary facilities and quarters for the park supervisor. Water, electric and septic sewage systems have been installed. General landscaping has provided a lawn and attractive arrangement of native shrubs and trees.

The "Moseberry Camp Ground" covers approximately 30 acres and now provides a complete and well rounded out camping unit. Along a loop road are thirty camp sites, each with fireplaces, picnic tables and auto parking facilities. At twenty of these sites, tent floors have been provided. Centrally located is a building complete with lavatories, shower baths and laundry trays. Throughout the campground is an adequate water system with faucets convenient to the several camp sites. Shrubs and trees common to the region were used where landscaping was necessary.

In order to protect the warming, swimming pools and the dam during high water, a diversion ditch 14' x 1,000' has been constructed to carry flood waters of Moose Brook around these points.

During the rearrangement of the park entrance, a portal-gate, a new section of road and a small parking area were built. It leads to a new parking area with a capacity of about 120 cars. This necessitated a new bridge and landscaping treatment. Foot paths provide convenient approaches to the bath house.

Milan Hill State Park

Comprising but 127 acres, this reservation has proved very popular since its elevation of 1,737 feet permits a splendid view of the White Mountains and the Androscoggin Valley. During the biennial period the entrance road was located and parking and campground areas added. A water system was installed consisting of a well, an automatic electric pump, nearly one-half mile of pipe, and a tank in the fire lookout tower. From the tank, water flows by gravity to the area where there are convenient outlets. Near the fire tower is a picnic shelter, with toilets and a fireplace. An administration building and garage near the parking area provides headquarters for the supervisor. Both buildings have a water and sewage system.

Bear Brook Camp, SP-2

Bear Brook State Park

Along Bear Brook a dam, 170 feet in length and 10 feet in height, was constructed. This will impound about 25 acres. A fishway, allowing up and down-stream movement of trout, was also built. A portion of the flowage was excavated — 5,000 cubic yards being removed — in

order to create a swimming pool of sufficient depth and area. A bathing beach of sand, some 400 feet long, was also constructed.

On the so-called "First Day" outing area, a picnic shelter, 41 fireplaces and 50 table and bench combinations were built of logs. Two recreational fields, one for children, the other for adults, have been provided.

In order to facilitate travel throughout the park, three miles of truck trail and one-half mile of park road, 20 feet wide, have been built. Foot trails, with log corduroy and stone and log steps, together with 14 foot bridges of varied design have been constructed throughout the park. Trail seats of plank and logs were placed at various points along these paths. Three parking areas, with a total capacity of 130 automobiles, are completed. More than 1,200 feet of guard rails were placed about these areas.

A stone wall, comprising 90 cubic yards, was built around an old historic cemetery and nearby a split-rail fence 528 feet in length enclosed the old Allenstown Meeting House, now owned by the Daughters of the American Revolution.

Adjacent to a fire lane a water hole, containing 2,500 gallons, was constructed. Eighty-four acres were reforested about equally between white and Norway pine.

Scouting for gypsy moth was conducted on 3,000 acres and 446,270 egg clusters destroyed. In white pine blister rust control, 1,275 acres were worked.

Camp Pawtuckaway, SP-3

Bellamy Park

Many improvements and additions have been made to this recreational area. The beach was increased by 400 feet through the construction of a retaining wall and the addition of 500 loads of sand. The parking area was fur-

ther enlarged and general landscaping completed around it and about the bath house and entrance road. A wall at the reservation gate was constructed and the entrance road resurfaced. Portal gates were also built at both the main entrance and the old mill site which leads to the parking area. From the city main to the bath house, 1,900 feet of two inch pipe was laid and in addition, 1,100 feet of sewer pipe.

The Bear Brook State Park Camp also contributed to the improvements upon this property by completing the interior of the bath house and installing electric fixtures. A central gate in the dam was also constructed.

Endicott Rock

In order to prevent a back-wash from passing motor boats, to enlarge the area and also add to the general appearance, a sea-wall was built along the shore down to the highway bridge. The old foot bridge, leading to Endicott Rock, was removed and an earth and rock pathway constructed. These improvements enlarged this State Park by about one-half an acre. A large proportion of the area was loamed and seeded to grass, and considerable landscaping done. Two catch basins and the necessary drainage system were installed to prevent erosion.

Belknap Mountain Reservation

Activities on this property were confined wholly to improvements of the mountain road. It was widened for about 1.25 miles and larger culverts, more frequently placed, were added. The road, a gravelled surface, was put in condition for oiling and about one mile was finally oiled with the assistance of CCC labor. As a safety measure the reduction of a "switch-back" lessened hazardous curves.

Pawtuckaway Reservation

Parking areas were built near the entrance and along the center of the Boulder Road and sloping and sodding of the banks was concluded. A ski trail was laid out on North, Middle and South Mountains and a well was constructed near the house occupied by the fire lookout watchman.

Blister rust control was performed on private lands in Chichester and Deerfield.

WHITE PINE BLISTER RUST CONTROL

In Cooperation with Towns

Town Cooperative Control—1937

Action by New Hampshire towns, at their annual meeting, indicated a marked increase over 1936 in the number participating in this project and also in appropriations made available. Whereas, the previous year, 33 towns voted \$7,800, the total for 1937 was 54 and the aggregate of appropriations \$14,200.

Town monies for blister rust control were, as was the general policy, increased up to 25 per cent by the State which furnished the crew foreman, it being impossible to extend any greater aid to such towns owing to the limited sum provided by the State Legislature. Necessary field equipment and tools, also constituted an additional contribution by the State. Cooperating with the State Forester's Office, district leaders employed by the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, supervised without cost to the towns the project of ribes removal.

For some years it has been the State's policy to secure crew personnel by contacting town officials. This procedure was continued in 1937, the crew members being obtained from town officers and constituting men needing work but yet not on relief rolls. Rates of pay conformed to those set up by the town for unskilled labor and varied from 32 to 40 cents per hour. The number of hours per week also differed in many towns, but ranged from 40 to 48 hours. A total of 400 men were given employment, for varying periods, on these cooperative town projects and worked an aggregate of 41,034 $\frac{1}{4}$ hours.

Federal Relief Funds—1937

Since the spring of 1935, generous allocations of WPA funds have been granted to this state, coming through the Bureau of Entomology and Plant Quarantine. As a result, during the combined seasons of 1935 and 1936, a total of 1396 men were given employment. These men, owing to federal regulations, were obtained through application to the several WPA assignment offices.

During the spring and summer of 1937, a further allotment of WPA funds was received and while not as great as during the two previous years, it did permit the employment of 285 men in 36 towns for a total of 69,430 man-hours. Seven towns and one county cooperated in this project by contributing substantial sums for the transportation of these crews to and from work, since the allocation of federal funds for transportation was insufficient for all crews.

Accomplishments in ribes removal through Town and State and WPA programs are summarized in the following table.

SUMMARY—TOWN, STATE AND FEDERAL

Project	No. Towns	Initial		No. Towns	Re-eradication	
		Acreage Covered	Ribes Destroyed		Acreage Covered	Ribes Destroyed
Town	19	9,300	270,299	41	28,837	344,380
WPA	20	23,079	1,067,942	24	32,774	507,603
Totals		32,379	1,338,241		61,611	851,983

Pine and Control Area Mapping—1937

An allocation of WPA funds made possible the continuance of mapping white pine lands and the adjacent areas which needed to be put under control. These maps, made on a scale of 880 feet to the inch, are produced by use of a box compass to obtain bearings of the various boundaries and through pacing, or chaining of distances.

Interior features, such as drainage, woods-roads and trails, stone-walls and fences are also mapped. The inclusion of such natural as well as artificial features, not only serves to sub-divide the area into small units for control purposes, but also makes for greater accuracy in producing a white pine map.

This mapping program was carried on during the colder months of the year, when ribes were not in leaf. Two periods, January through April, and October through December, were devoted to control area surveys. A condensed summary of mapping accomplishments for these two periods follows:

PINE AND CONTROL AREA MAPPING 1937

No. Towns Worked	Man Hours	Total Acreage Mapped	Eliminated
60	52,219	282,657	65,254*

* Note: Acreage "eliminated" constitutes areas not containing sufficient white pine to warrant blister rust control.

During certain portions of the calendar year mapping of prospective control areas was conducted by three Park camps and one Forest camp. Careful training has demonstrated that CCC enrollees can produce as accurate and finished a map as have been turned out by the older and more experienced WPA personnel. The following table summarizes accomplishments of these camps.

PINE AND CONTROL AREA MAPPING Civilian Conservation Corps 1937

CAMPS	No. Towns Worked	Man Hours	Acreage Mapped
Bear Brook	3	2,454	6,190
Moose Brook	2	72	448
Pawtuckaway	3	2,064	3,380
Warner	3	4,912	6,478
	<hr/> 11	<hr/> 9,502	<hr/> 16,496

Town Cooperative Control—1938

Following their annual March meeting returns from towns acting upon white pine blister rust control, indicated that 51 voted a total of \$13,050. This was a reduction of but three in the number appropriating and \$1,150 less in the total amount made available as compared with 1937. In the conduct of town cooperative control no departure was made in the general methods employed. Excellent assistance was given by town authorities in the selection of unskilled labor, and wages paid laborers were those set up by the towns. During the season of 1938, 335 men were employed in the local town blister rust projects. Many town officials have expressed their approval and satisfaction over blister rust control work and the manner in which it was conducted.

In certain towns where cooperative work was conducted, it was possible, due to the local relief burden, to make an allotment of WPA funds, thus giving employment to additional men and also extending the control area.

Federal Relief Funds—1938

Allocations of WPA funds were made several times during the calendar year of 1938, generally for periods of about three months each.

As formerly, wage rates and hours per month were set up by the State Works Progress Administration and were on a state-wide basis. Rates of pay for skilled labor—crew foremen—were set at 53 cents per hour, and those of unskilled—crew members—at 40 cents; the standard work-month being 120 hours. With but three assignment offices to serve the entire state, some difficulty was experienced from time to time in obtaining promptly sufficient labor to keep the crews up to their proper quota.

During the 1938 season, a total of 212 men were employed on this WPA blister rust project.

In addition, a WPA project in forestry, which included blister rust control, was conducted in Hillsboro upon the State Demonstration Forest and town forest lands. At Manchester, the Water Board of that city conducted blister rust control, through WPA assistance, upon lands of its own aggregating 3,614 acres.

The following table indicates the results of blister rust control for 1938.

SUMMARY—TOWN, STATE AND FEDERAL

Project	No. Towns	Initial		No. Towns	Re-eradication	
		Acreage Covered	Ribes Destroyed		Acreage Covered	Ribes Destroyed
Town	11	5,631	206,775	38	25,083	322,583
WPA	21	25,033	793,111	25	24,375	492,181
Totals		30,664	999,886		49,458	814,764

Pine and Control Area Mapping—1938

During the first part of 1938—January to April inclusive—and again from October through December, WPA funds permitted the continuance of white pine mapping. In the Fall months, shortly after the September hurricane, the mapping personnel was diverted from mapping white pine areas to that of general mapping of wind-blown timber.

For the calendar year of 1938 mapping of white pine areas was conducted as follows:

PINE AND CONTROL AREA MAPPING

1938

No. Towns	Man Hours	Total Acreage	
		Mapped	Eliminated
51	49,409 ½	178,434	56,042

Since the first allocation of WPA funds for pine and control area mapping were received, up to the end of 1938, a total of 817,023 acres had been mapped and 169,782 acres eliminated from control work.

Civilian Conservation Corps Program 1937-1938

During 1937, blister rust control was conducted upon private and public forest lands by six State camps of the Civilian Conservation Corps. In 1938, control measures were carried on by one camp attached to the White Mountain National Forest and upon federal lands.

The results of these two years follow:

CIVILIAN CONSERVATION CORPS BLISTER RUST CONTROL

Year	No. Towns	Initial		No. Towns	Re-eradication	
		Acreage	Ribes		Acreage	Ribes
1937	5	2,916	258,644	9	5,227	84,867
1938	1	724	8,213	1	348	2,581
		<hr/> 3,640	<hr/> 266,857		<hr/> 5,575	<hr/> 87,448

REGISTERED ARBORISTS



CERTIFICATES of registered arborists were issued by the Arborist Board to 61 individuals or firms qualified to advertise, solicit or contract for the protection or improvement of fruit, shade and ornamental trees effective during the calendar year 1938 and in accordance with the requirements of Chapter 194 of the Public Laws. Their names and addresses are as follows:

- Aldrich Tree Service, Inc., Pond Street, Westwood, Mass.
Karl F. Amalia, Friend Court, Wenham, Mass.
Wendall A. Bacon, West Lebanon, N. H.
Frank H. Bailey & Sons, Inc., P.O. Box 308, Nashua, N. H.
Baker River Contracting Company, Plymouth, N. H.
(Alfred H. White, Jr.)
Ralph A. Baltzer, 179 No. Maple Street, Florence, Mass.
Eugene L. Barber, Tempeld Hill Farm, Temple, N. H.
F. A. Bartlett Tree Expert Company, 795 Memorial Drive,
Cambridge, Mass.
Ernest J. Chase, West Surry Road, Keene, N. H.
John O. Clancy, 17 Cedar Street, Newmarket, N. H.
Gordon Cloud, Norwich, Vermont.
E. S. Colprit, R.F.D. 1, Dover, N. H.
David W. Cupples, 1309 Auburn Street, Manchester, N. H.
Davey Tree Expert Company, Kent, Ohio.
Howard E. Davis, 9 Adams Street, Haverhill, Mass.
Ellery Nurseries, 344 Court Street, Keene, N. H.
(Laurence C. Ellery)
G. E. Ellinwood, 68 Rumford Avenue, Mansfield, Mass.
William G. Elliott, 3 Willow Road, East Kingston, N. H.
Richard L. Elwell, Winsunvale Orchards, Pittsfield, N. H.
Franklin Tree Expert Company, 156 Conway Street,
Greenfield, Mass. (C. T. Caldwell)

- H. L. Frost & Higgins Company, 20 Mill Street,
Arlington, Mass.
- George L. Harkins, 19 Lyndon Street, Concord, N. H.
- Henderson & Herndon Company, Inc., 9 Story Avenue,
Beverly, Mass. (R. E. Henderson)
- Hill Brothers Nursery, R.F.D. 1, Hudson, N. H.
- Arthur J. Hill, 9 Westford Street, Lowell, Mass.
- Frank C. Hill, Hill Tree Expert Company, Turnpike
Road, Chelmsford, Mass.
- R. L. Holton Tree Service Company, c/o Y.M.C.A.,
Keene, N. H.
- C. G. Hutchinson, 35 High Street, Lancaster, N. H.
- Jacoby Brothers, 141 Laurel Street, Manchester, N. H.
- Albert R. Jenks, Jenks Tree Service, Central Street, West
Acton, Mass.
- C. B. Jordan, Etna, N. H.
- Thomas Kezar, 255 Main Street, Sanford, Maine.
- Omer L. LaRoche, 67 Gillette Street, Laconia, N. H.
- Maine Tree Expert Company, 27 Chapel Street, Augusta,
Maine. (Howard M. White)
- Lindsay L. McKee, 70 Thompson Park, Franklin, N. H.
- Munson-Whitaker Company, 9 Fellsway East, Malden,
Mass.
- New England Forestry Service, Inc., 75 Federal Street,
Boston, Mass.
- New England Tree Expert Company, Pawtucket, R. I.
- Vanna Niemi, 70 R. Broadway, Concord, N. H.
- Northeastern Landscape and Garden Service Company,
Peterborough, N. H.
- Pollock and Halvorson, Box 183, Pittsfield, Mass.
- M. L. Raymond, Wolfeboro, N. H.
- Clifton E. Richardson, Peterborough, N. H.
- James W. Ricker, 18½ Ely Street, Littleton, N. H.
- Lester W. Robbins, Box 154, Freeport, Maine.
- William M. Sanborn, 33 Cedar Street, Newmarket, N. H.
- Spencer G. Smith, 303 Thornton Street, Portsmouth, N.H.

The State Tree Expert Company, 84 Leonard Street,
North Attleboro, Mass.

Carl H. Stickney, 98 Duncklee Street, Concord, N. H.

William J. Thibault, Box 5, West Peterborough, N. H.

John Tierney, 16 Liberty Street, Manchester, N. H.

R. M. Titus, General Delivery, Laconia, N. H.

W. F. Tuttle, Wolfeboro, N. H.

Stillman E. Walter, Wolfeboro, N. H.

Myles Standish Watson, Newington, N. H.

Russell H. Welsh, 23 Linden Street, Exeter, N. H.

Western Maine Forest Nursery, Fryeburg, Maine.

(T. E. McSherry)

White & Franke, Inc., 30 Cameron Street, Brookline,
Mass.

Williams Tree Company, 51 No. Main Street, Concord,
N. H. (H. B. Jenner)

Woodhead & Stickel, 85 Myrtle Street, Waltham, Mass.

Glynn K. Young, 4 Avon Street, Concord, N. H.

FOREST RESEARCH



THE investigative work of the Department, centered at the Fox Research Forest at Hillsboro, has been carried on with the assistance of several workers. Mr. Francis Gagnon continued under WPA Project 0174 until November 1936 and Messrs. Farrand, Michelson and Armington computed results of sample plot remeasurements and prepared maps and charts under WPA Projects 476 and 486 at the Concord office. Mr. Walter E. Brown was employed at Hillsboro from October 1937 until March 1938 on WPA Project 1323 and completed a population survey of European spruce sawfly on state lands, and a compilation of data on forest resources of New Hampshire. Subsequently he has been engaged on an analysis of forest fire statistics at the Concord office. Mr. Livingston Lansing, research fellow in 1936, spent part of the summer of 1937 at Hillsboro completing his study of forest fire weather. In June 1937 Mr. George M. Hopkins, a graduate forester, was engaged as regular assistant in forest research, and during the first 6 months carried on a field survey of markets for forest products throughout the State. In the course of this survey he visited all primary users of raw forest products in the State, and those in neighboring states using New Hampshire logs and wood. During October 1937 Mr. Hopkins was employed by the Society for Protection of New Hampshire Forests. He resigned to join the U. S. Forest Service in November 1938. The last two years have been marked by an increase of administrative work of all kinds, correspondence and answers to inquiries. The Fox Forest has had an increasing number of visitors. Classes of students from Syracuse and Yale Forestry Schools, groups from summer camps and from the Deering Community Center of Boston University may be mentioned.

Studies Completed

Reports on the following investigations have been completed:

A survey of forest research under way in New Hampshire by various agencies.

Weather conditions at the time of major forest fires.

Forest resources of New Hampshire.

Forests and flood control.

The European spruce sawfly in New Hampshire.

Planting experiments: Effect of season and method of planting.

Experiments in direct seeding.

Cold storage of nursery stock.

Nursery fertilizer experiments.

Markets for New Hampshire forest products.

Publications

A local flora of Fox Forest and vicinity entitled "Flowering Plants and Ferns of Fox Research Forest" by A. A. Beetle was published as Bull. No. 9 in 1937. The expense was met partly by the author personally, partly by a grant from the American Association for Advancement of Science through the New Hampshire Academy of Science, and partly by the Fox Fund. Over 30 brief articles and notes have also appeared in various technical journals and magazines within the period covered by this report. During 1938 a new series of one page mimeographs known as Fox Forest Notes was started, and about two per month have been issued, and sent to a limited mailing list. They contain short progress reports on experiments. It becomes increasingly apparent that no investigation, no matter how small, should be undertaken unless definite arrangements are complete, and funds allocated for making the results available. In most cases this means printing for public distribution.

Investigative Projects

Permanent sample plots for the study of weeding, thinning and girdling have been remeasured and preliminary computation of results is almost complete. Unfortunately the hurricane of September 1938 destroyed almost all these plots, thereby cutting short further observations on the results of these experiments. Experiments on seed-spotting, weeding and origin of seed are being continued.



Experimental forest nursery at the State Fox Research Forest in Hillsboro. (Photo by Baldwin)

Seed samples from over 100 different origins were received in 1938 from the International Union of Forest Research Organizations. These were subdivided and distributed from the Fox Forest to seven other stations for testing. The trees raised at the Fox Forest Nursery are to be planted on the Vincent Tract and the results followed with the intention of determining the best origin for New Hampshire planting. Cooperative studies of phenology, gypsy moth hatching, snow depth and interception by trees are also being continued, and brief progress reports

mimeographed as notes. The detailed forest working plan for the Fox Forest had been almost completed, with the assistance of Mr. Hopkins when the hurricane destroyed such a large part of the forest that nothing short of complete recalculation and re-writing will be necessary. A soil and humus survey and map of the forest was also begun in cooperation with agents from the U. S. Bureau of Chemistry and Soils, who generously spent several days on the forest, but time did not allow its completion. Much time has also been devoted to economic surveys of sub-marginal land in the vicinity of the forest in cooperation with the Bureau of Agricultural Economics of the U. S. Dept. of Agriculture and with the Office of State and Private Cooperation of the U. S. Forest Service.

Cooperative Game Management Project on Pillsbury Reservation

Early in the spring of 1936 Mr. J. Paul Miller, resident biologist employed by the U. S. Bureau of Biological Survey at the Pillsbury Reservation, was transferred and no further work was carried on until a biologist, Mr. John Pearce, was reassigned to New England in March 1937. Mr. Pearce's headquarters are New Haven, Conn., and he has all New England and New York as his territory. None the less he has spent about 40 days a year at Pillsbury during the past two years, and continued the observations begun by Mr. Miller. Some 596 numbered plants known to be important game foods have been kept under observation, and the abundance of fruiting noted. The use of various cover by grouse, deer and other species and of ponds by waterfowl has been recorded at various times of the year. The abundance of all forms of wild life has been especially noted. Porcupine damage and means for its control have also been studied. Reports submitted by Mr. Pearce confirm earlier conclusions that forestry operations have not proven detrimental to wild life; grouse, snowshoe rabbit and waterfowl have been

very scarce, and observations therefore relatively few. Deer and elk show increases. Beaver seem to have deserted the reservation after several years sojourn, but otter are still seen infrequently.

CCC and WPA Projects

CCC crews from the Kearsarge camp continued improvement work until June 30, 1937. During the year previous, work was continued on forest roads, and on stand improvement work. Large areas were thinned and weeded during the open winter of 1936-37. In the spring of 1937 30,585 trees were planted by CCC crews, and nursery seeding and transplanting performed.

A WPA forestry project was started in March, 1938, and accomplished much valuable work, including an extension of the forest road to the top of Munroe Hill, the construction of a large cement water hole for the protection of the headquarters buildings, and a new road in to the main wood yard. During the early spring, slash was burned on a large area following logging, and planting and nursery work carried on. Since Oct. 21, 1938 this project has been in abeyance while a similar storm rehabilitation project (No. 2025) has been engaged in repair of storm damage.

Game Refuge

The agreement with the Fish and Game Department entered into in September 1922, expired after 10 years, or in 1932, and it was necessary to obtain signed statements from all abutters. This task was finally completed on September 1, 1938 and the agreements deposited with the Director of the Fish and Game Department, insuring the continuance of the refuge for another 10 years.

Hurricane Damage

The storm of September 21, 1938 destroyed about 90% of the permanent sample plots maintained by the State, and the Fox Forest suffered very severely. Almost all the

mature and young merchantable timber was destroyed. The damage has been placed at 1,156,500 bd. ft. of softwood and 410,500 bd.ft. of hardwood saw timber 8" breast high and over, besides about 1550 cords of wood. This represents 70% of the total estimated stand, and almost all the high quality timber. It amounts to over 31 years annual cut at the previous rate of cutting under sustained



More than 1,000,000 board feet of high quality timber was felled by the hurricane on the Fox Research Forest. (Photo by Baldwin)

yield. Included in the loss was the natural area of primeval hemlock and hardwoods, and the large pine grove where various meetings have been held. The forest roads were also badly damaged. The road constructed by CCC on the north lot was completely washed away for one-fourth mile. Damage to the buildings was relatively slight; windows were blown in, shingles ripped off and one of the out-buildings moved from its foundations; only three shade trees were lost but all sustained broken branches.

Fox Forest Administration

The Fox Forest has been operated as a demonstration of sustained yield forest management since 1933 in so far as market conditions permitted. This has involved marking thinnings and areas for regeneration, sales of stumpage, and award of contracts for cutting, yarding and delivery of the products. Sales activities have made necessary some advertising, credit investigation, billing and accounting. During the two years ending June 30, 1938, products have included sawlogs, fireplace wood, cordwood, poplar pulpwood, and poplar and pine excelsior wood. The annual cuts have been as follows:

	1936-37	1937-38
Sawlogs (bd. ft.)		
Softwood	28,143	43,693
Hardwood	31,656	20,315
Total	59,799	64,008
Poplar Pulpwood (cords)	0	42.0
Poplar and Pine excelsior wood (cords)	0	6.45
Cordwood (cords)		
Cut by contract	115.60	178.15
Cut by WPA	0	63.35
Cut by CCC	254.92	0
Stumpage sales	4.00	37.56
Total cordwood	374.52	279.06
Grand Total in Cu. Ft.	34,943	31,535

Advances of working capital for these operations have been made from the revolving fund known as the Forest Improvement and Recreational Fund to which receipts are returned. The results of five years of operation have furnished much information on the marketing difficulties faced by owners who attempt to practice forestry in this region, and this demonstration is of outstanding value to them.

Reforestation

Planting of all bare areas except fields near the buildings needed for administration and as wood yards was completed in the spring of 1938. A considerable part of all planting has been in the nature of experimental plots.

NUMBER OF TREES PLANTED

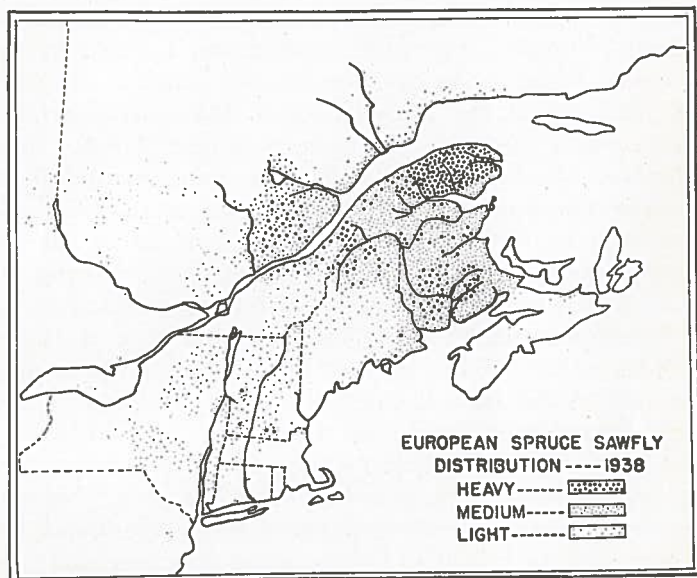
	1937	1938
White pine	5,950	4,000
Red pine	12,650	7,000
Scotch pine	1,385	990
White spruce	4,550	10,850
Black spruce		250
Norway spruce	6,050	1,205
Balsam fir		500
European larch		300
Japanese larch		400
Black locust		50
Total	30,585	25,645
Acres planted	73.9	30.1
Total planted to date	168,950 trees	148.3 acres
Av. No. of trees per acre	1,139	

Forest Insects and Diseases

The European Spruce Sawfly

The most important forest insect in point of present and potential damage is the European spruce sawfly (*Diprion polytomum*). Now proven an European species, it has largely destroyed spruce in the Gaspé region of Canada since its discovery there in 1930, as noted in our last report. It was first reported in New Hampshire in 1929 however. By 1935 the insect could be found well distributed throughout New Hampshire, but no damage was apparent. Late in the summer of 1937 an extremely severe infestation was discovered on the north slope of Mt. Monadnock in the Town of Dublin. The area involved was over 500 acres. Shortly after a small but intense in-

festation was found in Peterborough Gap, just over the line in Temple. During 1938 these areas have become greatly enlarged. Parasites were liberated in 1937 and 1938 and some individual trees have been protected by spraying. Numerous trees heavily defoliated in 1937 began to die in the late summer of 1938. Moderately heavy infestation with some defoliation was found in sev-



Heavy, infestation means total defoliation of old needles and half of new; medium, some degree of defoliation noticeable; light, larvae present but no noticeable defoliation. (Map by Bureau of Entomology and Plant Quarantine)

eral surrounding towns. Following conferences with Federal and State entomologists in October 1937 and April 1938 a state-wide survey was inaugurated in June 1938. Mr. Robert Norton, a graduate student of entomology, was employed by the New Hampshire Agricultural Experiment Station and supplied with transportation. He, together with Mr. Hugh Gregg of Nashua, who served as a scout for this department, was able to cover

all important spruce regions. Both men were in the field until mid-September. Mr. Hunter and Mr. Williams of the U. S. Bureau of Entomology and Plant Quarantine also spent several weeks in scouting in New Hampshire, the latter covering the entire town of Pittsburg and many surrounding towns, largely on foot. Arrangements were made for scouting the White Mt. National Forest by its own personnel, which visited the Monadnock area to receive instruction. A total of about 120 towns were thus scouted and mapped by the scouts. Where evidence of sawfly was sufficient to justify it, plantings of the cocoon parasite *Microplectron fuscipennis* were made with parasitized cocoons sent out from the New Haven office of the Bureau. Experimental plantings of larval parasites of the genus *Exenterus* were also made in heavy infestations. A complete list of parasite introductions is given in the following table. During the fall of 1938 several million cocoons were collected in the Monadnock area by crews sent in by the State of Maine. These will be used in parasite raising during the coming winter. A cocoon-collecting field day, sponsored by several organizations, was held which was attended by over 50 persons. The European spruce sawfly situation, as disclosed by the survey, is none too encouraging. No new severe infestations causing death of trees were found, but there is every reason to believe some may eventually develop with favorable weather; the present areas of heavy defoliation have increased enormously. Getting insect parasites and other natural enemies of this insect established as soon as possible is the only hope for permanent control now known.

PARASITE LIBERATIONS FOR CONTROL OF EUROPEAN SPRUCE
SAWFLY BY U. S. BUREAU OF ENTOMOLOGY
AND PLANT QUARANTINE

Parasite Species	Date	Town	Number Liberated
Microplectron fuscipennis	Aug. 19	Acworth	20,000
	Sept. 12	Alexandria	10,000
	Aug. 6	Berlin	30,000
	Sept. 12	Colebrook	20,000
	Sept. 12	Columbia	10,000
	Sept. 12	Conway	10,000
	Sept. 12	Danbury	30,000
	July 14	Dublin	50,000
	Aug. 29	Dublin	250,000
	Sept. 12	Dublin	20,000
	July 14	Francestown	30,000
	Aug. 31	Goshen	50,000
	Aug. 9	Hancock	30,000
	July 14	Harrisville	40,000
	Aug. 26	Haverhill	10,000
	July 15	Jaffrey	20,000
	Aug. 12	Lempster	10,000
	Aug. 6	Milan	20,000
	Sept. 12	Orange	10,000
	Aug. 26	Orford	20,000
	Aug. 26	Piermont	10,000
	Aug. 20-24	Pittsburg	100,000
	July 6	Stoddard	20,000
	Sept. 12	Tamworth	10,000
	July 7	Temple	40,000
	Aug. 17	Unity	10,000
	Aug. 9	Washington	30,000
	Aug. 26	Wentworth	20,000
Total			930,000
Exenterus abruptorius	July 7	Dublin	5,272
	July 8	Peterborough	2,927
	July 8	Temple	2,979
Total			11,178
Exenterus oleaceus	Sept. 12	Dublin	16
Exenterus adpersus	Sept. 12	Dublin	35
Exenterus tricolor	Sept. 12	Dublin	37
Lamachus marginatus	Sept. 12	Dublin	35
Microcryptus subguttatus	Sept. 12	Dublin	220

Other Forest Pests

Another sawfly, a so-far unidentified species of *Neodiprion*, has been reported causing defoliation of red pine in the town of Winchester. This insect has damaged plantations in eastern Massachusetts and its spread to New Hampshire is disturbing. It is not known how serious it may become in the colder climate. Forest tent caterpillars and eastern tent caterpillars, very abundant in 1937 and less so in 1938, were responsible for severe defoliation of many species of hardwood in early spring. Willow leaf beetle, elm leaf beetle, satin moth and gypsy moths were all reported causing injury.

The scab disease of willow (*Fusicladium saliciperda*) has attracted attention because of its rapid spread, especially in warm damp weather, and the death of willows resulting from it, especially in the northern part of the state. Other less serious foliage and twig diseases of hardwoods have been very extensive in 1938.

Tree Pest Leaflets

This series of brief but authoritative recommendations for the control of various forest and shade tree insects and diseases continues to be edited as one of the activities of the Fox Forest. Ten subjects have been published each year during the past 3 years and over 175,000 copies have been distributed.

The Disease and Insect Situation Created by the Hurricane

The huge quantity of wind-felled timber has provided especial problems in forest protection, in disease and insect control as well as in the case of fire. The white pine blister rust program must be prosecuted with renewed vigor if an increase in the disease is to be thwarted. The laying bare of large areas by the hurricane and resulting logging is liable to stimulate the germination of much dormant *Ribes* seed and regeneration of broken shoots,

which otherwise would have been repressed by shade and low temperature of the forest floor. Furthermore, scouting and eradication will be severely hampered by slash and unsalvaged blowdown. Fortunately most wood-destroying fungi will cause little harm to living trees, but the deterioration of unsalvaged timber from blue stain and incipient decay should be kept in mind. Logs and wood which have been cut can be protected by being kept thoroughly wet, or where the value justifies it, sprays and coatings may be applied. These are only partially effective.

Forest insects which bore in bark and wood are liable to increase markedly as a result of the blowdown. The pales weevil (*Hylobius pales*) which breeds in pine stumps will be active for two or three years or possibly longer. It damages coniferous seedlings 2-7 years old in the vicinity of pine stumps, logs or slash. This insect has proved more destructive in the southern part of the state and the extent to which it may develop in the north is unknown. There is every reason to believe that natural seedlings germinating this year will be unharmed. Pine bark beetles *Dendroctonus valens* are also liable to multiply so that they may even attack adjoining standing timber, especially trees somewhat weakened by the wind. Burning of slash and removal of fallen timber is the best safeguard. Protection of softwood logs which cannot be placed in water or sawn before June can be partially accomplished by dusting them with dry lime sulfur, preferably when the logs are slightly damp. Repeated treatment may be necessary if rain washes the dust off. It should be started by May 15 in most parts of the state. Large scale dusting has cost about three cents per M bd. ft. and proven 80 per cent effective in preventing borer damage. Windthrown hardwood is liable to infestation with bronze birch borer, 2-lined chestnut borer, and similar insects. The best protection for all timber is complete removal of bark in peeling season.

THE LUMBER CUT 1936-1937



THE following table indicates the lumber cut for the years 1936-37, and for the purposes of comparison that of 1932-34. The annual cut given for 1932 was the smallest as far as records are available in this State, but it will be noted that since that year the production of lumber has steadily increased. Although the number of operators have more than doubled since 1932, the majority of the cutting is being done by less than fifty operators cutting over one million feet annually.

TIMBER CUT

Year	Cutting between 100 M & 250 M	Cutting between 250 M & 500 M	Cutting between 500 M & 1000 M	Cutting over 1000 M	Cut of Hardwoods	Cut of Hemlock & Other Softwoods	Cut of Spruce	Cut of Pine	Total Cut
1932	14	14	17	15	8,600M	8,185M	6,553M	39,917M	62,255M
1934	21	25	21	32	14,169M	11,698M	14,168M	67,897M	107,932M
1936	24	19	19	38	17,701M	12,637M	13,094M	71,027M	114,459M
1937	24	27	23	48	28,620M	15,135M	13,684M	96,078M	153,517M

In order to better illustrate the relation of timber species in the annual lumber cut of this State, the following tables are submitted:

SPECIES PERCENT IN LUMBER CUT

1936 TIMBER CUT PERCENT		1937 TIMBER CUT PERCENT	
Pine	62.06	Pine	62.58
Hemlock & Other Softwoods	11.04	Hemlock & Other Softwoods	9.86
Spruce*	11.44	Spruce*	8.92
Hardwoods	15.46	Hardwoods	18.64
	100.00		100.00

* Does not include spruce cut for pulp.

This data clearly indicates the part white pine plays in the yearly lumber production, since in volume it is almost two-thirds of the total cut, with hardwoods ranking second. Spruce for dimension runs third, with hemlock and other softwoods, i.e. Norway pine, being fourth.

The lumber cut of the United States as reported by the Bureau of Census gives the total for 1932 as 10,151 billion feet; for 1934—15,594 billion feet and 24,355 billion feet for 1936. This will indicate approximately the same proportions of increase in cutting as has occurred in New Hampshire for the same period.

This same report shows that 66.6 per cent of the timber cut was used within the State and that the other New England States furnished 14.6 per cent, Southern and Central States, 6.1 per cent, Pacific Coast and Northwest, 6.8 per cent, while 5.9 per cent is imported.

The lumber cut for the next two years will of necessity show a very radical change as the amount of blowdown timber in September, 1938 as estimated will nearly equal the total cut as tabulated for the past ten years. A comparatively small amount of this was cut in 1938, therefore the 1939 cut will be very large.

STATE APPROPRIATION ITEMS

A detailed financial statement of revenue, appropriations and special funds available for this department is contained in the annual reports of the State Comptroller and State Treasurer. The following statement is for department appropriation items:

JULY 1, 1936—JUNE 30, 1937

	Appropriation	Expenditure	Reserved for Bills Payable
Administration	\$15,770.00	\$15,285.95	\$464.05
Nursery	6,993.00	6,990.86	.....
Reforestation	1,475.00	1,474.34	.....
District Chiefs	7,005.00	6,699.28	.....
Lookout Stations	9,960.00	9,959.93	.....
Prevention of Fires	2,100.00	2,099.98	.....
Forest Fire Bills to Towns	7,500.00	2,569.26	1,500.00
White Pine Blister Rust	4,650.00	4,611.22	.....
Forest Fire Equipment	1,000.00	*1,299.71	.....
Recreational Development	11,500.00	**12,183.82	.....
Federal Emergency Program	5,000.00	4,316.11	.....
Total	\$72,953.00	\$67,490.46	\$1,964.05

* Including \$300.00 transferred from District Chiefs.

** Including \$683.89 transferred from Federal Emergency Program.

JULY 1, 1937—JUNE 30, 1938

	Appropriation	Expenditure	Reserved for Bills Payable
Administration	\$16,550.00	\$16,528.76	.....
Nursery	6,635.00	6,635.00	.....
Reforestation	1,450.00	1,450.00	.....
District Chiefs	6,345.00	6,344.89	.....
Lookout Stations	10,000.00	10,000.00	.....
Prevention of Fires	2,450.00	2,449.96	.....
Forest Fire Bills to Towns	7,500.00	4,343.33	\$3,156.67
White Pine Blister Rust	5,353.00	5,352.53	.....
Recreational Development)	15,500.00		
Recreational Development)			
Income)	13,449.41	28,901.18	48.23
Federal Emergency Program	4,100.00	3,670.44	429.56
Total	\$89,332.41	\$85,676.09	\$3,634.46