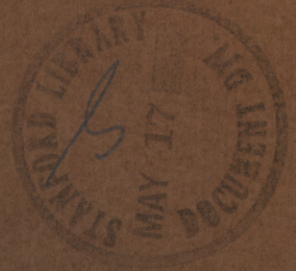


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STATE OF NEW JERSEY



Administrative Report

of the

Commissioner of Conservation

for the period

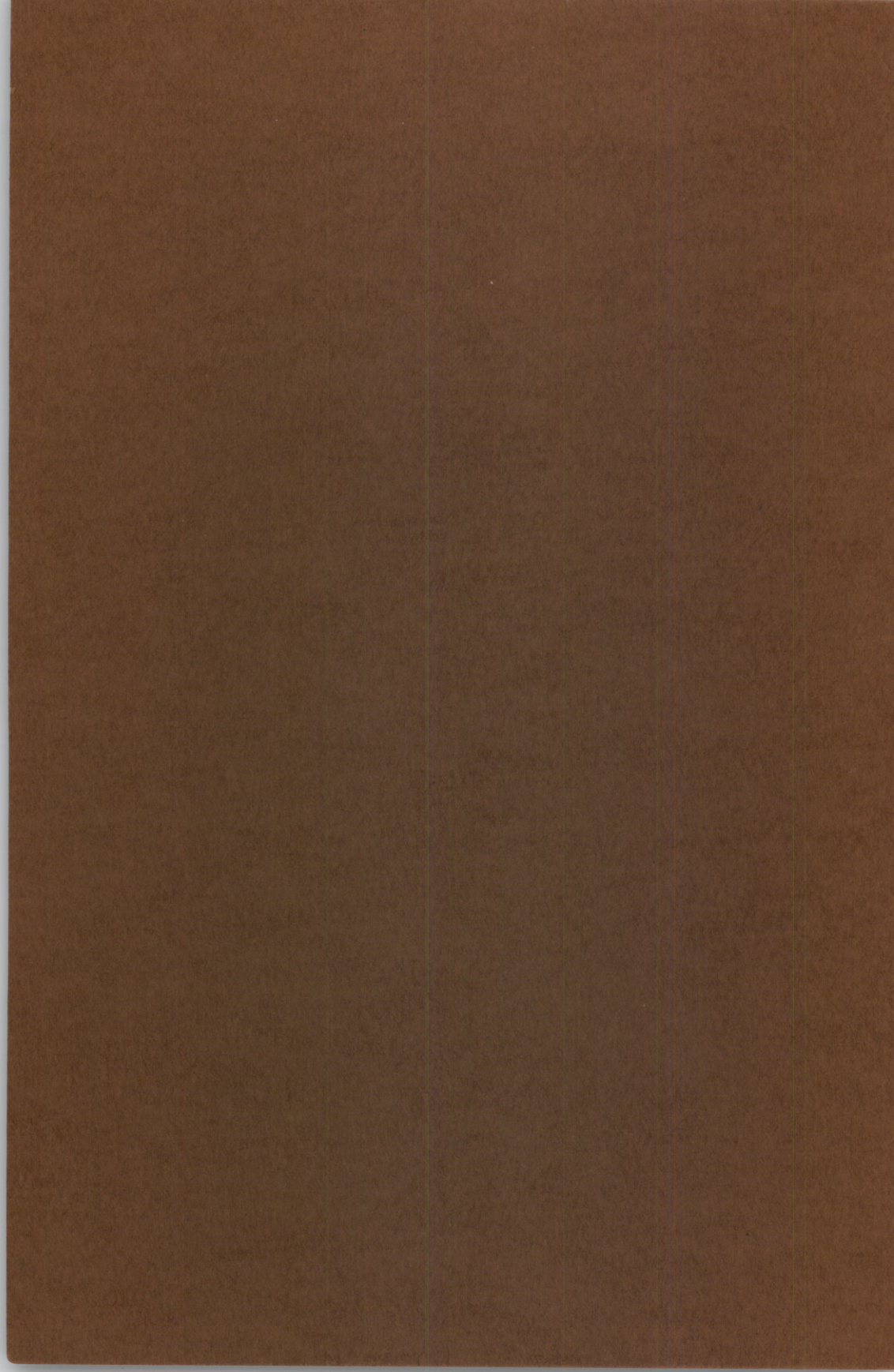
July 1, 1945, to June 30, 1946

MORGAN F. LARSON, *Commissioner*

New Jersey State Dept. of Conservation

January 15, 1947

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ADMINISTRATIVE REPORT
OF THE
COMMISSIONER OF CONSERVATION
FOR THE PERIOD
JULY 1, 1945 TO JUNE 30, 1946

January 15, 1947

Morgan F. Larson
Commissioner

To the Honorable Walter E. Edge, Governor
and Members of the Senate and General Assembly
of the State of New Jersey:

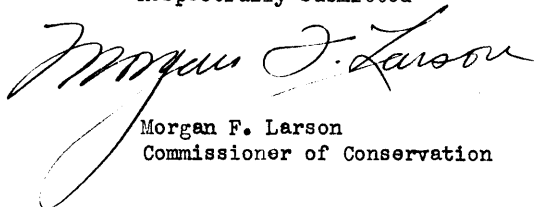
In accordance with law, I have the honor to transmit herewith the administrative report of the Commissioner of Conservation for the fiscal year July 1, 1945 to June 30, 1946.

I shall not attempt to present here the important results achieved during the first year of my administration, since an examination of this report will indicate what has been accomplished.

This first annual report of the reorganized Department of Conservation recites the combined activities of eleven State Departments and Agencies formerly operating independently which were, on July 1, 1945, consolidated into the five Divisions of the new State Department of Conservation.

For the first time in the history of New Jersey related activities with a common objective, the preservation of our vast heritage of basic resources, have been unified. This is preeminently a forward step in the conservation of our natural resources.

Respectfully submitted



Morgan F. Larson
Commissioner of Conservation

THE DEPARTMENT OF CONSERVATION

The new Department of Conservation created on July 1, 1945 represents the consolidation of related State agencies responsible for the protection and development of New Jersey's important natural resources. The unification of independent agencies which have a common goal cannot fail to serve the citizens of New Jersey advantageously.

Because the units of this new department have existed for years under various names there still remains confusion in the public mind as to the organization and scope of the present Department of Conservation. It seems desirable, therefore; to present briefly a few facts concerning the present department.

There are five divisions as follows:

Division of Fish and Game.

- " " Forestry, Geology, Parks and Historic Sites.
- " " Navigation
- " " Shell Fisheries
- " " Water Policy and Supply

The administrative head of the Department is the Commissioner of Conservation. Each division is supervised by an administrative director and a governing board known as an advisory council. The councils are essentially policy-making groups, meet monthly and serve without compensation. The advisory councils are independent of each other and are practically autonomous except that their actions are subject to the veto power of the Commissioner.

DIVISION OF FISH AND GAME

Council of the Division

Frank J. Valgenti, Jr., Chairman	Madison
Marvin A. Spaulding	Trenton
Harold W. Laauwe	Paterson
W. Steelman Mathis	Toms River
Harold E. Longsdorf	Mount Holly
Arthur F. Foran	Flemington
Harrison Cook	Atlantic City
Joseph Ayers	Andover
Hiram B. D. Blauvelt	Oradell

Anne E. Sullivan, Secretary

DIVISION OF FISH AND GAME

The primary objectives of this Division are the protection and propagation of fish, birds and game in order that the waters and fields of this State will be adequately stocked.

The accomplishment of these objectives is achieved in several ways. The annual licensing of 200,000 sportsmen as well as the licensing of commercial fishermen and game breeders is a measure of control. This Division is charged with the enforcement of all fish and game laws which themselves are designed to insure the adequate continuance of fish and game. An important contribution is the development of a suitable game management program, including research work, in order that factual evidence will be at hand for proper game management practices. The educational program conducted by this Division is also a potent factor in accomplishing the purposes of fish and game conservation.

As less private land becomes available to the sportsman, it becomes increasingly necessary to provide public lands, streams and water bodies on which game management practices can be instituted to provide sufficient fish and game for the sportsman.

This Division now administers 17 areas totalling 33,690 acres as public hunting, shooting grounds and field laboratories for the development of wild life techniques.

Summary of Activities 1945-46

The following is a brief summary of conservation of wildlife and propagation and liberation of fish and game during the year.

Fish and Game Liberation

Pheasants - 30,835, of which number 10,667 were propagated and distributed from state-owned game farms; 12,016 purchased from licensed dealers; 8,152 raised to adult stage by 4-H Clubs and others from day-old chicks hatched at state farms.

Quail - 12,778, of which number 12,497 were propagated and distributed from the State Quail Farm and 281 purchased and liberated.

Rabbits - 20,523, purchased from the West for liberation.

Fish - 954,248, of which number 721,674, as follows, were propagated and distributed from the state-owned hatcheries: trout over seven inches, 430,967; trout under seven inches, 32,200; large mouth bass, 67,567;

small mouth bass, 126,080; bluegill sunfish, 39,070; yellow perch, 265; tadpoles, 25,000; shiners, 525.

There were 232,574 fish netted from various reservoirs and other closed waters and redistributed as follows: yellow perch, 114,896; white perch, 6,150; sunfish, 55,502; bluegill sunfish, 2,122; calico bass, 11,110; large mouth bass, 5,354; small mouth bass, 44; striped bass, 40; shiners, 24,052; catfish, 9,287; pickerel, 542; pollywogs, 3,400; miscellaneous, 75.

* * * *

The market value of all fish and game liberated was	\$400,340.30
The receipts from resident and non-resident hunters and anglers' licenses were	\$498,477.40

Law Enforcement

During the fiscal year ending June 30, 1946, there were 1,036 prosecutions for violations of the fish and game laws. Five of these cases were dismissed by the court.

Hunting and Fishing Licenses Issued

<u>1944</u>	<u>1945</u>
170,798	195,866

1945 Deer Kill

The number of deer taken during the five-day open season of the year 1945 was 2,704.

Latest Report of Fish and Game Taken

The tabulation of fish and game taken during the calendar year 1944 shows a slight increase in practically all species. With only 36 per cent of the license holders reporting, as compared with

41 per cent the previous year, the following fish and game was taken during 1944:

	<u>1943</u>	<u>1944</u>
Deer	2,458	2,633
Pheasants	128,342	135,765
Quail	24,643	25,445
Rabbits	454,596	488,722
Gray squirrels	214,747	285,596
Grouse	4,199	4,289
Woodcock	2,566	2,520
Ducks	78,620	79,238
Geese	856	888
Trout	290,221	299,992
Bass	114,025	181,523
Pickereel	96,641	98,036
Skunk	4,816	2,925
Mink	572	245
Muskrat	187,285	176,112

Predatory Vermin Control

The following tabulation shows predatory animals taken by the sportsmen during 1944, as compared with the previous year:

	<u>1943</u>	<u>1944</u>
Cats	5,220	3,788
Weasels	1,799	1,261
Red squirrels	1,861	1,116
Foxes	1,402	1,754

In addition, there were 30,429 head of predatory birds and animals taken by wardens, wildlife managers, trappers, and holders of special vermin permits, exclusive of predators trapped or shot by farmers on their own lands.

Legislation

(All Laws of 1946)

1. Prohibits angling in trout streams from March 1 to April 14. Chapter 47.
2. Clarifies deer possession law. Chapter 48.
3. Repeals contradictory section regarding breeding of game. Chapter 49.

4. Provides Council may issue permits for use of rifle on woodchuck only. Chapter 50.
5. Amends State law so that woodcock season shall conform to Federal law. Chapter 83.
6. Fixes legal size of pickerel, pike and pike-perch at 12 inches, Chapter 74.
7. Includes Camden County among counties prohibiting hunting in tracking snow. Chapter 75.
8. Eliminates contradiction in raccoon season. Chapter 103.
9. Provides special permit for trapping beaver. Chapter 165.
10. Prohibits discharge of firearm within 300 feet of occupied dwelling. Chapter 171.
11. Permits possession and sale of artificial bait having up to nine hooks. Chapter 166.

Wildlife Management Activities

In order to supplement a diminishing food supply, a total of 248 food patches was planted on state-owned lands. In addition, 58 acres of corn, 4.5 acres of reed canary grass, 29 acres of soybeans, 1 acre of Lespedeza sericea and 500 plants of zig-zag clover were planted. Along this vein it was interesting to note that tick trefoil, Lespedeza bicolor and Lespedeza cyrtobotrya give evidences of high production this year. If these plants prove adaptable to southern New Jersey, a great progressive step in supplementing a severe food deficiency in that region will have been made.

In accordance with pre-war custom, this division co-operated with clubs fostering food patch planting programs as far as facilities would allow. The 6866 Gun Club at Weymouth sponsored a planting of three acres, the Metuchen Rod and Gun Club sponsored a project of eight food patches, the Lower Camden County Game Protective Association fostered a program of eight patches, and a large program was actively pursued by the Salem County Beagle Club.

Other projects included the placing of 350 cubic yards of fill on the dikes at the Colliers Mills Public Shooting and Fishing Grounds; plotting and mapping the Turkey Swamp Public Shooting and Fishing Grounds; preparation for a boundary survey of the Winslow Public Shooting and Fishing Grounds, and considerable maintenance of roads, fences and buildings at the Flat Brook Public Shooting and Fishing Grounds.

Winter feeding was an active program during periods of emergency on the state-owned lands and open lands throughout the State. In addition, 500 bushels of corn were delivered to Rookport Pheasant Farm, 540 bushels to the Forked River Pheasant Farm, and 375 bushels given to the Game Wardens. This amount of corn was produced by the Wildlife Managers on the State-owned Public Shooting and Fishing Grounds.

During the year, the propagation units at Holmansville, Forked River and Rockport were closely allied with the Wildlife Management unit. Posts for pens at the game farms were furnished from State-owned grounds, and lumber from dismantled CCC Camp buildings on State-owned lands was used for new construction and repair.

A pheasant management plan was formulated for pheasant restoration in Warren County. The plan was requested by Warren County Rod and Gun Clubs Nos. 1, 2, 3, and 4. Preliminary work on the plan has been completed.

Miscellaneous activities included the removal of 323 squirrels from Newark and vicinity and their subsequent liberation on open lands in rural areas, the construction of a one-hour field trial course on the Clinton Public Shooting and Fishing Grounds, the inspection of 115 deer damage complaints and the issuance of 99 deer damage permits, the construction of four electric fences to repel deer, repairs to the clubhouse and tower at the Clinton Grounds, and repair of the storage building on the Glassboro Public Shooting and Fishing Grounds. Predator control yielded 38 cats, 33 skunks, 7 owls, 30 hawks, 12 foxes, 64 crows, 4 weasels, 10 opossum and 2 wild dogs.

Considerable effort was directed toward the control of beaver which necessitated the removal of these animals alive from areas in which they were doing damage and liberating them in areas where they could do no damage. Fifty-seven beaver were removed.

Federal Aid to Wildlife Project 11-D-5, a waterfowl development project, was maintained on the Tuokahoe-Corbin City Public Shooting and Fishing Grounds. Previous work is yielding good results in waterfowl habitat by carrying a good duck population. The following construction projects were completed during the year.

- 3,107 ft. of dike
- 6,618 ft. of circulation ditch
 - 1 thirteen-foot spillway
- 2,229 ft. of sod wall
- 6,768 ft. of dike grading
 - 4 powder magazines
 - 2 salt water ponds
 - 1 ditch plug

Hunting Accidents

Eighteen hunting accidents were reported during the year, which is the same number as the previous year; however, there was a greater number of fatalities, seven persons having died as a result of injuries received. Three of the accidents were self-inflicted. Only one deer hunting accident was reported and this proved fatal.

Fish

Report of Hatchery Operations

	Raised July 1, 1945 to June 30, 1946	Disposed of	Estimated Number On Hand
Brook trout	580,430	245,430	335,000
Brown trout	559,575	84,575	475,000
Rainbow trout	648,162	133,162	515,000
Large mouth bass	217,567	67,567	150,000
Small mouth bass	276,080	126,080	150,000
Bluegill sunfish	39,070	39,070
Yellow perch	265	265
Shiners	525	525
Tadpoles	25,000	25,000
	2,346,674	721,674	1,625,000

The Council's decision to distribute trout of a larger size proved successful. In continuance of this policy, operations at the hatchery are being directed toward further increasing both the size and number of trout. The bluegills and sunfish released were also of a larger size than formerly, in keeping with the new policy.

Laying of 2,500' of pipe line, 1,000' of which will be for new lines to give better water supply control, and the balance to replace old lines is underway at the present time.

Thirty acres of land adjoining the main hatchery were purchased for construction of ten large ponds, and the Council has approved the purchase of 16 $\frac{1}{2}$ additional acres. When the development of this acreage is completed, it is expected that production of warm water fish will be doubled. In conjunction with the warm water fish program, a survey of the lakes of the State is to be made in order to formulate a sound lake stocking policy.

Netting Operations

The fish reclamation and redistribution work resulted in the netting of the following fish from reservoirs and other private sources,

which were planted in open waters:

Yellow Perch	114,896
White Perch	6,150
Sunfish	55,502
Bluegill Sunfish	2,122
Calico Bass	11,110
Large Mouth Bass	5,354
Small Mouth Bass	44
Striped Bass	40
Catfish	9,287
Shiners	24,052
Pollywogs	3,400
Miscellaneous	75
Pickereel	542
	<hr/>
	232,574

Fish Distributed by Federal Government

The following tabulation shows the fish distributed in New Jersey by the Fish and Wildlife Service, United States Department of the Interior during the 1945 calendar year:

Brook trout	3,212
Rainbow trout	920
Small Mouth Bass	284
Large Mouth Bass	4,844
Bluegill Sunfish	<u>23,550</u>
	32,810

Educational Activities

In continuing the policy to offer a broader conservation program to the public, the Division in the past fiscal year presented 318 programs in the State and six outside the State consisting of motion pictures, lectures, conferences, discussion group meetings, and exhibits. Over 130,000 adults and children heard the lectures and viewed the pictures and displays.

Radio scripts were prepared and broadcast over WAAT, Newark, and rebroadcast in Trenton, Bridgeton and Atlantic City on the program, "This is New Jersey," sponsored by the Department of Economic Development.

Conservation exhibit material was designed and constructed at the workshop on the Flat Brook Tract and displayed at the "Cavalcade of progress" in Asbury Park, the State Fair, and various meetings. Many

persons viewed these displays of panels, photographs, live and mounted fish and wildlife. The panels portrayed safety with firearms, the kill of wildlife on the highways, the pheasant rearing program, wildlife on the farm, and the essentials of food, cover, water and protection.

The day-old pheasant chick rearing project was conducted in 15 counties. The 141 participants, consisting of Future Farmers of America, 4-H members, farmers, individuals, and Sportsmen's Clubs, reared 8,152 birds to 12 weeks of age and over. Some of the participants held seed stock for spring releasing. Reports of natural propagation were noted in some areas this spring. Part of the program was the preparation of habitat for the released birds, and many rows and shocks of corn were to be left standing for food. A pheasant rearing bulletin titled "As You Sow - So Shall You Reap" was prepared in connection with this program.

The first 4-H Game Bird Rearing Club in the eastern states was organized in March in Sussex County. Some of its objectives are to help restore wild game in the county, rear to well-feathered, healthy birds more than 75 per cent of the chicks received and adopt a wildlife management project on the farms of individual members.

Because of the anticipated increase of hunters in the field during the upland season, emphasis at meetings and displays was placed on safety with firearms. Over 100,000 copies of the leaflet "Ten Commandments of Safety" were distributed. With the assistance of the New Jersey State Police, special high school assembly programs of plays and demonstrations were conducted.

Since the releasing of more colored motion picture film, this Division has taken many feet of film and will complete some of the scenarios prepared before the war. Additional still pictures have been added to the files for news and magazine articles, lectures and displays. A new colored sound film titled "Pheasant Fever" has been added to our library. This film, made in New Jersey, portrays a man and his hunting dogs. It is considered the finest of its kind in photography and action.

Prosecutions

There was a great increase in the number of prosecutions for violations of the fish and game laws during the fiscal year ending June 30, 1946. Only five cases were dismissed of a total of 1,036 complaints filed.

Sentence was suspended in 57 cases, two defendants were given time to pay the penalty imposed, seven were placed on probation, and 16 committed to jail. Two guns were confiscated and 53 licenses revoked. Appeals to the Common Pleas Court were filed by defendants in 21 instances.

Game

Game Farm Reports

Forked River Farm

A heavy mortality of birds was experienced at this farm due to an outbreak of equine encephalomyelitis. Measures have been undertaken to prevent a recurrence.

Construction of a new breeding pen 1,200'x300', with two attached sheds 50'x12', and a concrete-block egg room, has greatly improved crowded conditions at this farm.

The pheasant record for the calendar year of 1945 was as follows:

Breeding birds on hand January 1, 1945	1,187
Young birds on hand January 1, 1945	1,118
Eggs laid	33,194
Eggs distributed	162
Eggs set	26,850
Birds hatched	16,375
	<u>18,680</u>
Spring distribution	913
Fall distribution	3,185
Day-old chicks distributed	5,300
Birds died or escaped	7,078
Breeding birds on hand December 31, 1945	37
Birds held for Spring distribution	2,167
	<u>18,680</u>

Rockport Farm

The pheasant record for the calendar year of 1945 was as follows:

Breeding birds on hand January 1, 1945	1,152
Young birds on hand January 1, 1945	1,423
Eggs laid	33,660
Eggs distributed	3,582
Eggs set	27,650
Birds hatched	17,462
	<u>20,037</u>
Spring distribution	1,350
Fall distribution	4,237
Day-old chicks distributed	8,452
Birds died or escaped	1,537
Breeding birds on hand December 31, 1945	1,112
Birds held for Spring distribution	3,299
	<u>20,037</u>

Quail Farm

Experiments were conducted with new electric brooding units and slight alterations were made in the hatchers. The most gratifying experiment was one in large scale holding. A wire-floored pen 96'x9' was constructed and 400 birds at eight weeks of age were placed in the pen on September 1. On May 1 the birds were removed with a loss of only 4 per cent over the eight month period, and the quality of the birds was much improved over the old method of small unit holding. Four additional new type units are being constructed in view of the satisfactory results obtained.

The quail record for the calendar year 1945 was as follows:

Breeding birds on hand January 1, 1945	641
Young birds on hand January 1, 1945	1,843
Eggs laid	27,180
Eggs set	24,435
Birds hatched	<u>18,302</u>
	20,786
Spring distribution	1,460
Fall distribution	7,273
Birds died or escaped	5,440
Breeding birds on hand December 31, 1945	1,318
Birds held for Spring distribution	<u>5,295</u>
	20,786

Pound Fisheries Summary

The following is a summary of the pound fisheries' reports for the calendar year ending December, 1945:

Approximate value of all pounds	\$ 959,773.47
Proceeds derived from sale of fish	1,756,219.98
Number of pounds of fish caught and disposed of	32,496,909

Licenses issued:

Atlantic Ocean	120	
Sandy Hook and Raritan Bay	<u>32</u>	152
Number of pounds operated	131	
Number of men employed	344	

Menhaden and Food Fish Licenses

There were 45 vessels licensed to take menhaden with purse or shirred nets within the three-mile limit during the calendar year of 1945, and 128 vessels licensed to take food fish in the area between the two- and three-mile limit.

Striped Bass Licenses

During the past year, there were 560 licenses issued to 132 persons for the netting of striped bass. Licenses were granted for the use of 528 gill nets and 32 haul seines.

Special Netting Licenses

Under the law authorizing the use of nets of various types in tidal waters, the following licenses were issued during 1945-46:

Drifting gill net	50
Hauling seine	39
Flounder fyke	135
Miniature fyke	783
Fyke	109
Shad	441
Stake gill	262
Bait seine	15

General Fund
Supplement to 1944-45 Report

Income

Balance as per last printed report \$154,001.59

Expenditures

Chapter 150, Laws of 1944	\$ 30,190.74
To balance	<u>123,810.85</u>
	\$154,001.59

Report for 1945-46

General Fund

Income

Balance July 1, 1945		\$123,810.85	
Hunters' & Anglers' licenses, Title 23, Chap. 3.	\$388,410.00		
Special Fish licenses, Title 53, Chap. 18.	47,417.25		
Sales and sundries	1,835.72		
Fines, Title 23, Chap. 10	28,233.00		
Miscellaneous receipts, Title 23, Chap. 7	923.61	<u>\$466,809.58</u>	
			\$590,620.43

Expenditures

Chapter 52, Laws of 1945, expenditures		<u>\$448,719.88</u>	
Cash balance, July 1, 1946		\$141,900.55	
Requisitions outstanding against this balance		<u>59,117.45</u>	
Account balance, July 1, 1946			\$ 82,783.10

Public Shooting and Fishing Grounds Fund

Report for 1945-46

Income

Balance July 1, 1945		\$121,673.59	
Receipts from U.S. Federal Aid			
Account, 1944-45	\$ 7,076.25		
Receipts from U.S. for Federal Aid			
Account, 1945-46	4,340.10		
Receipts from hunters' and anglers' licenses	113,192.10		
Miscellaneous receipts	<u>4,973.20</u>	<u>\$129,581.65</u>	
			\$251,255.24

Expenditures

Expenditures		<u>\$ 77,045.48</u>	
Cash balance, July 1, 1946		\$174,209.76	
Requisitions outstanding against this balance		<u>3,546.72</u>	
Account balance, July 1, 1946			\$170,663.04

DIVISION OF FISH AND GAME

DELAWARE RIVER SHAD INDUSTRY

County	Boats		Nets		Men Engaged		Number Shad Caught		Pounds Shad Caught		Value Shad Caught		Value Boat
	1945-1946	1946	1945-1946	1946	1945-1946	1946	1945	1946	1945	1946	1945	1946	
Burlington	3	3	3	4	7	9	12	55	32	210	\$15.50	\$60.00	\$390
Cumberland	36	32	298	25	44	42	29,082	14,110	94,652	57,594	18,617.32	14,078.50	9,054
Gloucester	3	4	3	4	4	7	205	1,850	820	6,900	180.00	1,100.00	1,875
Hunterdon	5	4	5	3	19	11	424	200	1,600	500	587.75	175.00	1,210
Mercer	4	3	4	3	14	9	143	40	572	170	226.94	34.00	1,275
Salem	14	12	14	12	28	23	1,476	758	7,380	3,695	2,459.25	923.75	4,775
	65	58	327	51	116	101	31,322	17,013	105,056	69,069	\$22,036.76	\$16,371.25	\$18,579

HUDSON RIVER SHAD INDUSTRY

Boats	Nets Owned		Men Engaged		Pounds Caught		Number Shad Caught		Value Shad Caught		Boat	
	1945-1946	1946	1945	1946	1945	1946	1945	1946	1945	1946		1945
185	226	146	182	191	264	1,296,132	1,525,243	285,854	437,689	\$221,443.67	\$240,637.63	\$12

DIVISION OF FORESTRY, GEOLOGY,
PARKS AND HISTORIC SITES

Council of the Division

Col. Henry L. Moeller, Chairman	Millburn
William C. Cope	Glen Ridge
George S. Curtis	Hawthorne
Harry L. Derby	Montclair
Edwin E. Dudley	Paterson
W. Stewart Hollingshead	Riverton
J. Howard Morris	Pitman
Jacob Tanis	Augusta
Owen Winston	Mendham

Charles P. Wilber, Director

DIVISION OF FORESTRY, GEOLOGY, PARKS
AND HISTORIC SITES

The work of this Division covers a wide range of activities that are not closely related.

A major responsibility is the forest conservation program committed to its supervision. This includes protection against forest fires, reforestation, forest research, advisory service to woodland owners and the operation of a State-wide system of forests and parks.

In the field of geology this Division has important obligations including; cooperation with existing mineral industries, compilation of mineral statistics, stimulation of an active search for new sources of minerals, assistance in the solution of ground water and well drilling problems, revision and distribution of topographic maps and geological reports and the maintenance and extension of the system of survey monuments established by the New Jersey Geodetic Control Survey.

Protection of the State's interest in the remaining portions of the abandoned Morris Canal is the responsibility of this Division.

All of the foregoing duties were obligations of the predecessor agency of this division, the former Department of Conservation and Development. At the time of the consolidation the administration of the State supported historic sites, operated by the former Commission on Historic Sites, became an administrative function. Simultaneously several independent commissions, charged with the operation of some historic property were abolished and the maintenance of these properties became a part of the obligations of this Division.

Division Administration

All of the Division personnel on military service have returned to take up their regular duties.

Negotiations are now under way for the acquisition of Fort Mott, a Federal Military Reservation in Salem County, as a combined State Park and Historic area, the property having been declared surplus by the Federal Government. In this connection, two legislative acts were passed, one making it possible for the State to accept the property as a gift from the Federal Government if that arrangement could be made; the other authorizing the purchase of the property when funds are available.

Morris Canal and Banking Company

A very satisfactory lease has been made for the use of the South Street Pier at the Little Basin, Jersey City, under which urgently needed major improvements have been made to the pier and the adjoin-

ing basin, and the income to the State from the use of the pier has been increased very substantially.

Through special legislation, arrangements have been made for the retirement of three Morris Canal employees who were not eligible for regular State retirement pensions.

Income during the year amounted to \$21,491.65. This included

Rentals	\$20,244.90
Parking and fireplace permits	1,169.25
Sale of Charcoal	<u>77.25</u>
	\$21,491.65

Revenue received since April 22, 1946 from the Hercules Company under the terms of the lease \$8,482.80 (included under rentals).

Plans were developed and contract completed for the erection of a latrine at Lake Musconetcong.

A further survey of Cranberry Lake was also made.

Number of Leases

Greenwood Lake	5
Lake Hopatcong	36
Cranberry Lake	20
Little Basin - Dock space 8 (mooring)	3 private
Lake Musconetcong	23 ¹
Miscellaneous	4

Geology

Administration

Provision for additional help was made during the year, but the staff for geological and related work by any standards is still inadequate. The State Geologist has only three employees assisting him.

As the result of a cooperative research project with the Soil Science Laboratory of Princeton University, a technical paper by Dr. F. L. Cuthbert titled DIFFERENTIAL THERMAL ANALYSES OF NEW JERSEY CLAYS was published.

Manuscript of a report entitled THE MINERAL INDUSTRY OF NEW JERSEY, 1935-1944 is now being edited. The State Chamber of Commerce was aided in the preparation of a leaflet, NEW JERSEY'S BURIED TREASURE which was designed to acquaint the public with the State's mineral resources.

Conferences were held with the Bureau of Mineral Research at Rutgers University to help that agency plan and execute its work program. Manuscripts prepared by members of that Bureau reporting the results of sand investigations were critically read. A BIBLIOGRAPHY AND INDEX OF THE GEOLOGY OF NEW JERSEY by Agnes B. Grametbauer, was proof-read.

Lengthy reports on the utilized and potential mineral resources along or near the lines of The Pennsylvania Railroad in New Jersey were critically read. The logs of many deep wells in southern New Jersey were copied and given to representatives of a number of major oil companies who are now investigating the possibilities of commercial oil developments along the Eastern Seaboard.

The cooperative collection and compilation of mineral statistics was continued with the U.S. Bureau of Mines.

The identification and classification of fossils in well drillings and other materials was accomplished chiefly through cooperation with the Academy of Natural Sciences of Philadelphia.

Upon request, a number of guided tours to points of particular geologic interest in New Jersey were run for the benefit of groups of geologists from this and other states.

An address on "The Ground-water Supply of New Jersey" was given over radio station WAAT in Newark.

A great many individual requests for miscellaneous information were answered by mail or in person.

Geologic work.

In cooperative projects with the Bureau of Mineral Research, large samples of the nepheline syenite occurring west of Boomerfield, Sussex County, and many sand samples from central and southern New Jersey were collected for laboratory investigation. Aid was also extended in making detailed maps of areas of pegmatite and coarse granite. These materials, which are now being tested, may ultimately prove to be economic sources of feldspar - a material extensively used in both the pottery and glass industries.

The geologic mapping of a small area north of Towaco was correlated; also an area of 15 square miles surrounding Clinton in which there are small, low-grade deposits of manganese ore. Investigations were made of reported occurrences of molybdenite, natural petroleum, copper and other mineral deposits. Mineral and rock specimens were collected for detailed examination, and representative specimens were shipped to many individuals requesting them. A large set of rocks and minerals were donated to the newly created Department of Geology at Alma White College, near Somerville, New Jersey.

For advice relating to groundwater problems 327 requests were received, most of which required reference to a file of some 6500 well records, accumulated over a period of more than sixty years. Among those aided were the State Institutions at Bordentown and New Lisbon, the State Department of Health, the Soil Conservation Service, and a host of corporations and individuals. The increased use of ground waters by farmers for irrigation, and their rapidly expanding use for air-conditioning or industrial cooling, are trends which in some areas have already led to consumption equal or greater than the supply. Because of this situation, and as an aid to planning where future industrial growth in this State should occur, the Department of Economic Development was furnished a map showing areas of over-pumpage, and also areas where salt-water intrusion has already occurred.

Topographic work

An opportunity has been presented for checking the records and computations of the New Jersey Geodetic Control Survey which were turned over to the State Geologist. As a result, coordinates giving the exact position of 1939 additional monuments have been made available for public use since July 1, 1945, making a total of 5642 monuments in the State.

In addition to the foregoing horizontal control data, vertical control data is provided through level runs to the same series of monuments. All of this data is given on $8\frac{1}{2}$ x 11 inch tracings upon which descriptions of the monuments are typed and from which blueprints are made at cost for those wishing them. In the year ended June 30th many hundreds of such prints were furnished upon request.

The position of all monuments is shown upon key maps of the various counties and for the convenience of users, all level runs of the U.S. Coast and Geodetic Survey were also plotted on these same maps during the year.

Aid was given in settling a number of boundary problems between counties, townships and municipalities, and information supplied showing the exact position of the boundary between this State and New York.

A Tape Testing Base was completed for the convenience of engineers in standardizing the tapes they use and in accordance with the Revised Statutes (51:1-6).

Articles describing the topographic work and the precise control data available were written for various journals read by engineers and surveyors.

The revision and printing of topographic maps has had to proceed slowly for reasons beyond our control, but some progress has been made in that final proof of a new and greatly improved edition of TOPOGRAPHIC ATLAS SHEET 36 has been returned to the printer. The exhaustion of the

stock of Atlas Sheets 23, 29 and 33 has made it necessary to order re-runs of the latest editions of those maps. Atlas Sheet 21 is currently being revised in preparation for a new edition.

A comparative table of map and report sales is given herewith.

	<u>Fiscal year ended June 30th</u>		
	<u>1946</u>	<u>1945</u>	<u>1944</u>
Maps sold	5,418	4,954	4,287
Free copies to govern- mental agencies	<u>419</u>	<u>284</u>	<u>492</u>
Total number of maps distributed . .	5,837	5,238	4,779

Income from the sale of maps and printed reports
has been as follows:

	<u>Fiscal year ended June 30th</u>		
	<u>1946</u>	<u>1945</u>	<u>1944</u>
Maps	\$2,693.52	\$2,445.98	\$2,083.88
Printed reports	<u>244.45</u>	<u>462.66</u>	<u>245.28</u>
Total cash receipts	\$2,937.97	\$2,908.64	\$2,329.16

Forest Research and Cooperation

Two state foresters are assigned to this work. They are assisted by four foresters paid by the Federal Government under the Norris-Doxey Act. Two private timber agents who are paid by woodland owners also work under direction of the Department, and arrange the details of selling and scaling timber marked under this program.

Forest Research

The solution of a variety of technical problems is necessary for the successful practice of forestry in this State. The field of forest research is practically unlimited. In this division, however, the effort is confined to research problems of a practical rather than a fundamental character.

The projects undertaken this year are as follows:

Cost study of release cuttings to favor natural regeneration after logging.

Controlled burning for combined protection and silviculture in South Jersey.

Construction of tree volume tables and taper tables.

Reappraisal Survey of the Forest Conditions in New Jersey in cooperation with the U.S. Forest Service.

Stump analyses of growth.

Periodic measurement of 6 permanent sample plots for growth study.

Establishment of 21 permanent sample plots for growth study and demonstration.

Establishment of 5 plots for the study of underplanting.

Correlation of site index with yield of timber.

Correlation of log scale volume and lumber volume.

Forestry Cooperation

More than ninety per cent of New Jersey's forest land is in private ownership, and approximately 22 million board feet of lumber was cut in this State in 1945.

It is in the public interest that these lands be cut in such ways as will leave them in productive condition, but this is not being done under current commercial methods of cutting. In an effort to introduce proper cutting methods marking service is offered to all owners who agree to follow prepared cutting plans by Department foresters.

The following table shows the work accomplishments during the last year.

(1) Number of Forestry projects Unfinished or Pending:		175
		<u>Fiscal Year</u>
(2) Requests for Forestry Assistance		274
New Contacts Made		250
Forest Examinations: Number of Ownerships		172
" Acres		8761
Forest Cutting Plans	"	Ownerships
		Acres
		Board Feet
		Cords
		55
		1296
		5,116,500
		401

Fiscal Year

(3) Woodland Harvested on Approved Forestry Basis:

Number owners	52
Acres of woodland	1,170
Volume, board feet	1,904,100
Fuelwood, cords	743
Posts	1,000

Reforestation

In the reforestation program an effort is made to encourage reforestation of idle unproductive lands throughout the State. One million acres of land, about one fourth the area of the State, produces practically no revenue.

Nearly all of this land is privately owned and consists of abandoned farm land in North Jersey and cut-over and burned over areas in the South Jersey coastal plain. Many parts of the South Jersey pine area have been burned so repeatedly that all seed trees have been destroyed, and because natural reproduction is virtually impossible reforestation becomes necessary.

Three technical foresters are assigned to reforestation work. Their services are available to all farmers and landowners in the State. Field supervision is furnished on large planting operations during the Spring and Fall planting seasons.

Forest Nurseries

Two Forest Nurseries are operated, one located at Washington Crossing in Mercer County and the other situated at Green Bank in Burlington County. These nurseries have a combined annual capacity of 12,000,000 seedlings and transplants.

Each nursery is in charge of a nursery superintendent assisted by a foreman and one permanent helper. During the busy nursery season temporary helpers are employed as required.

Intensive management is required to successfully raise large quantities of seedlings in densely stocked seedbeds. The soil must be maintained in a high degree of fertility and a constant watch must be kept to detect diseases and insects which may cause excessive losses of stock unless promptly controlled.

Since the first State Nursery was established in 1926, 30,545,000 seedlings and transplants have been distributed in this State to forest planters.

The distribution of planting stock during the year is as follows:

<u>Agency</u>	<u>Trees Planted</u>
State Forests and State Parks	500
State Institutions, Cities and Counties	12,400
Water Companies	142,000
Industries and Corporations	1,000
Schools and Colleges	10,500
Organizations and Associations	12,000
Farmers	372,100
4-H Clubs	<u>15,500</u>
	564,000

The first lot of Norway Spruce seed obtained from Europe since the war, was sown in the nurseries during the year. This came from the Baltic states. Other species sown are tabulated below.

<u>Species</u>	<u>Pounds</u>	<u>Species</u>	<u>Pounds</u>
Red Oak	938	Shortleaf Pine	26
Pin Oak	79	Loblolly Pine	8
Tulip Poplar	200	Douglas Fir	23
Red Gum	1	Norway Spruce	25
White Pine	63	Pitch Pine	13
Red Pine	8	Hemlock	2
		Southern White Cedar	5

A new folder was prepared describing reforestation and the details of planting stock distribution.

A number of contacts have been made with the owners of forest properties relative to the establishment of "Tree Farms". This project, sponsored by the American Forest Products Industries, is still in the formative stages but some progress is expected in the months ahead. Two hundred signs have been obtained for use in posting "Tree Farms", through the cooperation of the State Highway Department which furnished the signs and painted them at a very low cost.

Copy was prepared for a folder to be issued by Forest Products Industries describing the "Tree Farm" program in this State.

Inspection of plantations in North Jersey indicate that the European pine sawfly is still causing serious damage in red pine plantations. Millions of parasitic insects have been liberated throughout the area in the hope that these parasites, by destroying the larvae of the sawfly, will control this pest. So far these parasites do not seem to have had any appreciable effect in plantations where the sawfly infestation is heavy. However, there is an indication that some degree of control is being obtained in lightly infested areas. Study of the sawfly

problem is being continued and until definite control is established red pine should be used very sparingly.

Sowing of white pine has been increased in the nurseries to balance the decreased production of red pine. White pine is a native North Jersey tree and probably should be favored for North Jersey planting.

Shade Trees

The Division continued its service to municipal and county shade tree commissions during the past year by rendering advice and assistance both in the field and by mail on the solution of shade tree problems. This is a part of the regular service which the Division has offered to organized shade tree bodies throughout the State for many years.

Assistance to individuals with shade tree problems was necessarily limited, because of insufficient personnel to take care of the many individual requests for shade tree advice and assistance. In some cases individual requests were given consideration in the field when such visits could be tied in with regular reforestation activity.

The Division also continued its interest in New Jersey Federation of Shade Tree Commissions which is a cooperative association of all shade tree bodies in the State, both municipal and county, created about 20 years ago for the purpose of encouraging and promoting general shade tree welfare. A member of the Department staff has served on the Board of Directors of this organization since it was first established and was again re-appointed to the Board of Directors this year for a term of three years.

Tree Expert Bureau

The Tree Expert Bureau established under Chapter 100 P.L. 1940, renewed certificates of 17 tree surgeons, previously registered as Certified Tree Experts. One application for certification was received, and a certificate was issued without examination, the Bureau being satisfied concerning the applicant's qualifications.

Financial Statement

Bank Balance July 1, 1945 \$325.26

Receipts

Renewal Fees	\$85.00	
Examination Fee (Examination Waived)	5.00	90.00
		<u>\$415.26</u>

Expenditures

Travel Expense	42.41	42.41
Balance June 30, 1946		<u>\$372.85</u>
Applications Received	1	
New Certificates Issued	1	
Certificates Renewed	17	

State Forests

The management policy of the State Forests is directed towards multiple land use which includes: (1) the production of timber and other forest products for commercial use, (2) the maintenance of a forest cover to protect watersheds and control soil erosion, (3) the development and operation of adequate recreational features and facilities for public use, (4) the development of food and cover to provide a habitat for wild life. The organization for the operation of the State Forests is 30 full time and five part time men.

Area

The total area of the eight State Forests is 56,176 acres. This does not include an estimated 48,314 acres of tax delinquent lands accepted previously by the State for State Forest purposes in accordance with law. (Rev. Stat. 54:3-119, et. seq.)

<u>State Forest</u>	<u>Initial Acquisition</u>	<u>County</u>	<u>Acres</u>
Bass River	1905	Burlington & Ocean	9,270
Belleplain	1928	Cape May & Cumberland	6,492
Green Bank	1930	Burlington & Atlantic	1,833
Jackson	1915	Ocean	43
Jenny Jump	1931	Warren	967
Lebanon	1908	Burlington & Ocean	22,185
Penn	1910	Burlington	2,958
Stokes	1907	Sussex	12,428

Income

The income from the sales of forest products, leases and rents, camp and picnic sites, cabin rentals, the sale of three former CCC Camps and other special uses was \$34378.90 as compared with \$14,314.96 received for the previous fiscal year.

Sources of Income

	<u>Amount</u>
Stumpage	\$ 1257.92
Cordwood	437.65
Cedar Products . . .	366.15
Sawmill	458.05
Mill By-products . .	76.50
Recreational use . .	10959.22
Leases & Rents	2505.00
Sand & Gravel . . .	24.45
Miscellaneous . . .	18293.96*
Total	\$34378.90

*Includes the sale of three C.C.C. Camps

Recreation

The number of visitors to the State Forests for recreational purposes was 93,785 as compared with 60,624 for the preceding year.

Summary of Attendance

<u>Fiscal Year</u>	<u>Visitors</u>	<u>Number Recreational Permits Issued</u>
1945-1946	93,785	2,715
1944-1945	60,624	1,902
1943-1944	35,784	969
1942-1943	50,336	1,282

Tax Lieu

In accordance with law \$5617.52 was paid to the Townships for the calendar year 1945, at the rate of 10 cents per acre for the State Forest lands located within the Township.

Forest Fires

Five forest fires burned on State Forest lands resulting in the damage to 2243.25 acres as follows: Bass River one fire burned 78 acres; Lebanon three fires burned 69.25 acres and on the Penn one fire burned 2096 acres.

Reforestation

Approximately 150,000 parasites (microplectron fuscipennis) were liberated by the New Jersey Department of Agriculture for the control or eradication of the sawflies on red pine on the Jenny Jump State Forest.

There were 493 seedlings and 5225 acorns of cork oak, supplied by The Crown Cork and Seal Company, planted on the State Forests during the spring of 1946.

Roads

The State Highway Department graded approximately 37.3 miles of roads during the year.

Forest Management

There were 718 cords of pine and oak removed by thinnings and improvement cuttings from 322 acres on the Lebanon State Forest. The pine was used mainly in the making of pulp and the oak was used for fuel. In these operations only the poor quality trees were removed.

There were no major cutting operations on any of the other State Forests except the removal of inferior species for fuel for recreation and administrative purposes.

High Point Park

This area comprising 10,935 acres, formerly administered by the Commissioners of High Point Park, was transferred to the Division of Forestry, Geology, Parks and Historic Sites, on July 1, 1945.

There are 19 employees full time and part time.

Recreation

The number of visitors at High Point Park was 128,427 and 1021 recreational use permits were issued.

Sources of Income

	<u>Amount</u>
Bathing Beach	\$805.18
Binoculars (1)	150.90
Cabins	315.00
Camp Sites	399.75
Lodge	2198.00
Monument (2)	57.60
Picnic Sites (3)	74.50
CCC Camp	9020.00
Garage (4)	201.35
Refreshment Stands (5)	1966.79
Miscellaneous	<u>552.64</u>
	\$ 15741.71

1. Thirty per cent Commission of total received
2. Actual May 1946
3. Charge started May 1946
4. Sales discontinued January 1946
5. Operated by State, July-October 1945

Roads and Trails

Two and a half miles of park roads were surfaced with shale and graded and entrance roads to two parking areas were surfaced with the same material.

The road from State Highway Route 23 to Clove Road was cold patched. Maintenance work on this particular road has been discontinued because of an appropriation of \$30,000 made by the Legislature for the

reconstruction of this portion of the road as an extension of State Highway Route 23. The State Highway Department applied a surface treatment of oil to 12.32 miles of Park roads.

Three trail bridges were constructed, 1 foot bridge was reconstructed and 1 road concrete culvert was installed.

Buildings and Structures

Extensive improvements were made to the lodge, comfort stations and camp for the blind as well as other buildings.

During the year 46 fireplaces were repaired and numbered. Also 178 table and bench combinations were repaired or painted and a number of benches and chairs.

On this extensive park area a great number of miscellaneous repairs were made which will not be detailed here.

State Parks

The State Parks are developed primarily to afford facilities for the out-of-door pleasure seeker. There are now 15 parks in the system and pertinent facts are indicated in the table below.

Location and Area - June 30, 1946

<u>State Park</u>	<u>Initial Acquisition</u>	<u>County</u>	<u>Acres In Land</u>	<u>Acres In Water</u>	<u>Acres</u>
Allaire	1940	Monmouth	1278		1278
Cheesequake	1938	Middlesex	947	15	962
*Cranberry Lake	1925	Sussex	70	129	199
Farny	1944	Morris	803		803
Hacklebarney	1924	Morris	193		193
*Hopatcong		(Sussex	13	2	
	1925	(Morris	78	14	107
Mount Laurel	1908	Burlington	20		20
*Musconetcong Lake		(Sussex	14	231	
	1925	(Morris	14	84	343
Parvin	1931	Salem	860	107	967
Ringwood Manor	1936	Passaic	460	10	470
Swartwood	1914	Sussex	185	519	704
Stephens		(Morris	89		
	1937	(Warren	148		237
Voorhees	1929	Hunterdon	429		429
Washington Crossing	1912	Mercer	373		373
		Total	5974	1111	7085

*These are Morris Canal properties which were acquired without cost under special legislation, with the exception of 5.13 acres at Hopatcong Inlet purchased in 1928.

There are 80 permanent and seasonal employees in the State Park organization.

Income

The income for the year was \$21,124.29, as received from leases, rents and recreational use.

Attendance

During the year, 574,649 visitors enjoyed the facilities offered in the State Parks. The use of all developed State Park areas has increased beyond the capacity of existing facilities.

Acquisition

An additional 150 acres were purchased at Allaire State Park. The tract gave the Department the old canal and water rights on the Mingamahone Brook.

The annual appropriation bill carries an item of \$100,000 for "the development of Princeton Battlefield," the appropriation becomes available on July 1. Consequently nothing except preliminary studies and investigation of the site can be undertaken until the next fiscal year.

Alienation

A small tract (200 ft. by 200 ft.) comprising the hill top at Mount Laurel State Park, was sold to The Western Union Telegraph Company.

General

The use of the Allaire State Park area by the Army for training purposes was discontinued.

At Washington Crossing a serious infestation of sawfly has caused considerable damage to the red pine plantations. Control was attempted by the use of DDT distributed by airplane dusting.

The maintenance crews of the State Highway completed new road construction and surface maintenance to existing drives and parking areas at a number of parks.

A section of the equipment building at Stephens State Park was renovated for necessary living quarters.

Planning and Engineering

In this category fall the preparation of plans and specifications for the construction, development, and maintenance of public use facilities in State Forests, Historic Sites, and State Parks. In addition preliminary studies and investigations are made and reports submitted upon request on proposed areas for acquisition. Two employees devote full time with some additional assistance.

General

Location maps of all State Park and State Forest areas were completed and brought to date.

Studies were made of treated areas at Swartswood Lake and a check plot established to study aquatic weed control thru the use of a chemical emulsion. These continued studies began the previous year. Frequent inspections are made of the areas noting growth conditions and the effectiveness of the treatment.

The preparation of a map and deed description from data secured from air photographs was attempted and carried out to determine the general practicability of this method in the preparation of acquisition data. The actual survey of this area will be made when necessary to provide a check on the accuracy with which the work may be done with present office equipment.

General Planning and Engineering Work - State Forests, Parks & Historic Sites.

At Bass River Forest, surveys of overlapping property lines were made. Also at this forest plans were made and supervision of construction carried out on the completion of six public cabins at Lake Absegami. Miscellaneous surveys were conducted at Green Bank and Lebanon Forests.

At Stokes Forest a great deal of planning and engineering work was done, particularly at Skellinger Lake, Lake Ashroe and Sunrise Mountain.

At Allaire, studies were made looking toward the ultimate restoration of certain features of the village. At Cheesequake Park supervision was made available during the construction of a new approach road. Plans were made for a recreational development at Hook's Creek Lake. Acquisition and survey projects were completed.

Surveys and various phases of planning and engineering were undertaken at Farny, High Point, Hopatcong, Mt. Laurel, Musconetcong, Parvin, Ringwood, Stephens, Swartswood, Voorhees and Washington Crossing Parks.

General assistance was furnished on a number of planning and engineering problems involving historic sites. Those include designing a suitable sign to mark these historic properties, planning for revamping Washington Rock State Park, the investigation of land title problems at Edison Park, surveying with grade stakes and the installation of a new bituminous asphalt circle at Monmouth Battle Monument and assistance with landscaping problems at the Princeton Battle Monument.

Forest Fire Service

The most important forestry problem in New Jersey is the protection of the woodlands of the State from forest fires. The New Jersey Forest Fire Service affords protection over the wooded areas in all but the most populous sections of the State, and in addition, protects the marshlands along the New Jersey Coast. The acreage of land to which the New Jersey forest fire laws are applicable is more than 50 per cent of the total land area of the State, or about 3,000,000 acres.

Forest Fire Statistics

Forest fire occurrence and spread are correlated with weather factors of relative humidity, wind velocity and rainfall. In order to evaluate progress in fire control it is necessary to compare periods of years. The following table illustrates the progress made during two eight year periods. The tabulation for 1945-46 is made as a matter of record.

	<u>No. Fires</u>	<u>Area (acres)</u>	<u>Average (acres)</u>	<u>Cost to Exting- uish</u>	<u>Average Cost</u>
8 yr. average ('30-'37)	1289	69719.3	54.1	34754.0	27.7
8 yr. average ('38-'45)	1695	27780.5	16.4	27894.4	16.4
1 year ('45-'46)	1263	34032.8	26.9	30731.1	24.3

Law Enforcements

	<u>Violations Detected</u>	<u>Violations Closed</u>	<u>Penalties Collected</u>
Technical Violations	195	162	\$ 113.12
Responsibilities	149	132	1998.58
Railroads	302	254	2025.79
Hazards	<u>44</u>	<u>36</u>	<u>.00</u>
Total	690	584	\$ 4137.49

Fire Fighting Equipment

Fire fighting tools were purchased to equip wardens and their fire fighters. There are now 2400 Indian knapsack tanks and sprayers, 3200 water-carrying buckets, 1800 brooms, 125 axes and approximately 1400 additional pieces of equipment such as brush hooks, backfire torches and other hand fighting equipment. Of this equipment 60 per cent is in hands of the local warden crews, the other 40 per cent is held for replacement and emergency reserve. Sufficient equipment and tools are available to simultaneously equip 9,000 men.

Mobile Equipment

Large fire fighting trucks have been developed. Constructed at the shop at the Trenton Airport, they are completely equipped as fire fighting apparatus. There are now 43 forest fire trucks in service.

During the past fiscal year the following equipment has been purchased from Army surplus:

1 weapon carrier; 4 jeeps; 1 reconnaissance car; 5 Clarke-Air tractors; 1 high pressure pump and tank; 2 O.D. trailer pumps; 2 front mount pumps; 2 portable pumps; 42,500 ft. of inch and one half unlined linen hose.

Other equipment bought during the year was: 50, 1 qt. Pyrene fire extinguishers to be mounted in trucks; 400 knapsack sprayers; 137 tool boxes, and three Ranger Pal plows were constructed.

The development of new equipment and the adaptation for Fire Service use of devices used in other fields has been continued this year. Plows drawn by tractors for fire line construction were used for the first time on burning fires in New Jersey during the Spring of 1946. This type of plow is capable of cutting a fire line approximately four feet wide, down to mineral soil, at the rate of two miles per hour. This has proved to be an invaluable time-saver because of the speed in which the fire line can be constructed on the side lines of fires. By building these lines while fires are burning it is estimated that over 3,000 acres were saved from destruction on six major fires during the Spring fire season.

From lumber salvaged from old CCC buildings, 137 cabinets were made. These have been placed at local wardens' homes. This method of storage not only preserves equipment but makes it readily available to the local warden.

Radio

The extension and general use of an ultra-high frequency radio system has also had its place in the improvement of fire extinction and control.

The Forest Fire Service radio system has been developed so that in the system there are 62 two-way communication sets; one in the airplane; one in each of the 21 lookout towers; one at State Headquarters; one in each of the three Forest Fire Division Headquarters; 36 mobile units located in fire truck apparatus or key wardens' cars.

By the use of the radio system fires are immediately cross-checked for location, and the alarm instantly flashed to State and Division Headquarters. Section and District Wardens are immediately notified and the "get away" time enormously reduced. Once on the fire lines, communication is constantly maintained and call for additional help or equipment instantly complied with.

Airplane

The Fire Service airplane has played a prominent part in the fire record of reduced damage. The plane is ordered to observe all fires burning in excess of 50 acres. Upon arrival at a fire the observer plots the fire area, charting streams, swamps, roads, etc. and other natural lines of resistance, and drops a map to the warden in charge. Thereafter, during the duration of fire the observer keeps in constant contact with the field force, giving information of changing conditions either thru maps or by radio, thus saving hours in ground reconnaissance, and often costly mistakes by the warden or wardens in charge of the fire.

Protection Program

This past Fall a program was instigated in the "Hot Spot areas" of Atlantic, Camden, Cumberland, Cape May, Ocean and Burlington Counties whereby the Forest Fire Service in conjunction with railroad companies, protective-burned a safety strip 100' wide on each side of the road bed, a total distance of 123 miles of railroad. This eliminated 75 per cent of this type of railroad fires.

During the winter schools of fire instruction were held. This was the first of its kind in New Jersey. A conference was held in Trenton and points of discussion were: Personnel; Organization; Law Enforcement and Extinction problems; proper execution of reports and bills; new types and uses of equipment, and safety of fire fighting personnel. Later meetings were held in all areas of the State. Instruction and training was given to all District Wardens.

Public Relations

The functions of the Public Relations activities are two-fold: first, to promote interest in the conservation of those natural resources with which the Division of Forestry, Geology, Parks and Historic Sites is concerned; second, to acquaint the public with the services

and facilities offered by this Division. All media which will help to effectuate these objectives are used. Most of the members of the technical staff assist in public relations work and two men assigned to this work devote the major portion of their time to it. Much of the public relations work cannot be recorded in a report nor can it be reduced to statistical terms. Those data, however, which can be recorded are listed in the following categories.

Radio

Script was prepared for seven 15-minute broadcasts on the program "This is New Jersey" sponsored by the State Department of Economic Development and broadcast from Station WAAT, Newark, which are re-broadcast by transcription on subsequent dates at Trenton, Atlantic City and Bridgeton. Department personnel presented the broadcasts. Six other radio broadcasts were presented by Department personnel over stations WTTM, Trenton, WBAB, Paterson, and WEAJ, New York. The Department was also represented on the Rutgers Forum broadcast on Conservation.

News Releases

During the year period eight releases were written and sent to all newspapers in the State (also New York and Philadelphia papers.) and spot news on current forest fires was released on twenty-three occasions.

Feature Stories

Three feature stories for rotogravure sections were prepared. These included text and photographs.

Photographs

Additions were made to the large and varied photographic file of the Division. A complete series of photographs of each of the Historic Sites and High Point Park, now under the direction of this Division, was commenced.

Magazine Articles

Illustrated articles appeared in "New Jersey Municipalities" and "American Forests." An article describing the organization and work of the entire Department of Conservation was prepared for the New Jersey Industrial Directory of 1946. Descriptions of the work of the Division were prepared for the New Jersey Legislative Manual and the Philadelphia Bulletin Almanac. Revisions were also made to AAA Tour Book information on State Forests, Parks and Historic Sites.

Printing

The Bureau is responsible for all printing for the Division. A number of publications were edited and are currently being printed.

Guided Tours

The Madison Garden Club was given an opportunity to view the problems and work of the Division through a tour conducted by Division personnel to the Pine Barrens. Other tours were conducted for the Girl Scouts of Cape May County, and the Boy Scouts of Cape May County through the Belleplain State Forest. Glen Rock High School students were shown Washington Crossing Park and the Trenton Battle Monument and the members of the Newark Museum of Natural History were conducted on a field trip at Ringwood Manor State Park.

Exhibits

A conservation exhibit was placed at the Annual Garden State Flower Show at East Orange.

The Captain James Lawrence portrait on stainless steel by Buell Mullen was exhibited at Asbury Park Cavalcade of Progress, L. Bamberger's and Company, in Newark, and at the DuPont Exhibit in Atlantic City.

Historic Sites

Administration

When this Division assumed charge of the historic sites it was found that considerable variation existed in rules and regulations governing the operation of these properties. The first problem was to develop some regularity in administrative procedure.

Approval was secured for the establishment of uniform hours during which these houses are open for public inspection. A second problem which was solved was a uniform salary for caretakers filling comparable positions. Further study is revealing additional changes that should be made during the coming year in the administration of these properties.

Acquisitions

Preliminary steps were undertaken to assume complete responsibility of the Wallace House and Old Dutch Parsonage at Somerville, and the Hancock House, Hancock's Bridge (Salem County).

Attendance and Income

The attendance at the historic sites was 20,625 visitors. Income from four sites for which an admission charge was made was \$1,089.97.

Historic Sites

These historic sites presently under the administrative control of this Division are as follows:

Boudinot House	Elizabeth
Carranza Memorial	Near Tabernacle (Burlington County)
Edison Park	Menlo Park
Grover Cleveland Birthplace . .	Caldwell
Hancock House	Hancock's Bridge (Salom County)
Indian King Tavern	Haddonfield
Lawrence House	Burlington
Monocacy Battle Monument . . .	Monocacy, Maryland
Monmouth Battle Monument . . .	Freehold
Oxford Furnace	Oxford
Princeton Battle Monument . . .	Princeton
Stauben House	North Hackensack
Somers Mansion	Somers Point
Trenton Battle Monument	Trenton
Veterans of All Wars Memorial .	Lakehurst
Washington Rock State Park . .	Dunellen
Wallace House	Somerville
Washington's Headquarters . . .	Rocky Hill
Walt Whitman House	Camden

Improvements

Lawns at all the historic sites were fertilized and treated with bone meal.

Indian King Tavern - considerable interior painting was completed and all the venetian blinds were renovated.

Grover Cleveland Birthplace - exterior painting completed.

Washington Headquarters at Rocky Hill - exterior painting completed.

Trenton Battle Monument - new elevator cables installed and arrangements were made for regular elevator service.

Monmouth Battle Monument - new bituminous macadam walks installed replacing gravel walks which were expensive to maintain.

Walt Whitman House - caretakers quarters were completely renovated.

Miscellaneous repairs to other sites too numerous to detail here were made.

DIVISION OF NAVIGATION

Council of the Division

J. Spencer Smith, Chairman	Tenafly
Edward Crabbe, Vice Chairman	Toms River
James J. Kelly	Elizabeth
Louis Schiavone	Jersey City
Francis V. Lowden	Roselle
Wayne D. McMurray	Asbury Park
Maurice Y. Cole	Atlantic City
Edward G. Kurtz	Ocean City
Rudolph S. Ayres	Haddonfield

Frank D. Holmes, Director and Secretary

DIVISION OF NAVIGATION

The principal sub-divisions of the Division of Navigation are as follows:

Administration of Riparian Lands.

The Division of Navigation administers the State's right, title and interests in tidal and navigable waters. It makes grants and leases; issues bridge and other crossing rights and licenses and collects royalties on sand and gravel dredged from State's lands under water; has jurisdiction in the reclaiming of, or building upon lands under tidewater and the abatement of purprestures; and compels the removal of boats illegally moored upon riparian lands.

Waterfront and Harbor Facilities.

This Division is charged with the duty of investigating the condition of waterfront or harbor facilities and any other matters incident to the movement of commerce upon all navigable water in the State or bounding thereon. Its approval must be obtained for all plans of construction or alteration of any structure or development of waterfront on tidal waters.

Inland Waterways.

The Division conducts the work of developing, maintaining and improving inland waterways; and appoints harbor masters to supervise their use and to enforce the observance of all rules and regulations. It marks annually the channel of the Inland Waterway between Manasquan Inlet and Cold Spring Inlet at Cape May, a distance of 123 miles, as well as approximately 160 miles of tributary channels; and maintains and operates public yacht and boat basins at Forked River, Ocean County and at Fortescue, Cumberland County, and has started but has not yet in operation a public yacht basin at Atlantic City, Atlantic County. It maintains a repair shop at the Forked River Basin where the major part of the repairs to its mechanical equipment is performed. Only repairs beyond the scope of this shop is done by outside sources.

Division of Engineering.

Under the law for Beach Protection and Improving Waterways the Division of Navigation is authorized and empowered:

1. To repair, reconstruct or construct bulkheads, breakwaters, groins or jetties, on any and every beachfront along the Atlantic Ocean, or any beachfront along the Delaware Bay and Delaware River, or at any inlet or any inland waters adjacent to any inlet along the coast of New Jersey, to repair damage caused by erosion and storm, or to prevent erosion of the beaches and to stabilize the inlet;

2. To use the facilities and services, and any funds which may be available or which may hereafter be appropriated by the Federal Government, or any division of the State Government, or of any county or municipality within the State for the purpose of beach protection;
3. To dredge and remove any and all obstructions in every waterway in the State to a depth and width to be determined by the Council;
4. To dredge, bulkhead and improve the Shrewsbury and Manasquan Rivers, and any of their tributaries within the limits of tidewater.

Regulation and Registration of Power Vessels

The Division conducts the work of registering all boats and the licensing of all operators on waters above tidewater; regulates and enforces power vessel laws and the rules and regulations of the Council.

State Boundary Monuments

The Division makes examination of the monuments marking the State boundary between New Jersey and New York, and in cooperation with the Superintendent of Public Works of the State of New York, it repairs, restores or replaces any monuments wherever the State boundary is intersected by the boundary of any municipalities or counties of this State, or by a highway.

Administration of State's Riparian Lands

Summary of cash receipts of riparian transactions completed during the year ending June 30, 1946 is given in Table I. Evaluation of total riparian business transacted during the year is outlined in Table II.

These receipts are dedicated to the School Fund. The receipts from the sale of riparian lands constitute the principal of the School Fund. As transmitted to the State Treasurer they are placed in the School Fund Investment Account. The income from the invested funds together with lease rentals, license fees and other income from riparian lands are put into the School Fund Income Account.

Referring to Table I, the net total of riparian cash receipts for completed transactions was \$115,907.51. Of this, \$113,671.35 net represents monies dedicated to the School Fund, \$2,225.64 fees, etc., collected for special fund for legal expenses drawn on by the Attorney General for court expenses involved in connection with Riparian cases, and also by the Council to pay fees for recording new leases, and \$10.50

for small miscellaneous receipts payable into the State Funds.

Table II, gives the net total riparian business transacted during the fiscal year of \$129,341.94. This is an evaluation of the worth of total business transacted as compared with cash receipts of \$113,671.35 in Table I. The difference in the two figures is due to the evaluation of new leases, deductions being made for the unrealized capitalization of leases converted during the year into grants. The various riparian transactions have been grouped to show their affiliation with the School Fund.

Table I

Summary - Riparian Cash Receipts

Fiscal Year Ending June 30, 1946

Monies Dedicated to School Fund

Receipts Investment Account	\$76,648.20	
Gross Receipts Income Account \$39,324.86		
Lease Rentals in Escrow	<u>2,301.69</u>	
		<u>37,023.17</u>
		\$113,671.37

Special Funds for Legal Expenses

Fees for Preparing New Instruments	2,160.00	
Certified and Photostat Copies of Instruments	47.00	
Court Costs Collected	<u>18.64</u>	
		2,225.64

General State Fund

Copies of Atlas Sheets and Maps	<u>10.50</u>
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Net Total Cash Receipts: 1945-46 Fiscal Year	\$115,907.51
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Table II
Evaluation of Riparian Transactions
Fiscal Year Ending June 30, 1946

Investment Account-School Fund

Grants, Easements, etc.

84 Grants	\$71,573.92	
2 Grants converted from leases	1,977.70	
1 Grant installment on lease being converted , ,	2,069.58	
6 Easements	500.00	
<u>Riparian Fees</u>		
3 Reformatory grants	\$250.00	
4 Confirmatory grants	275.00	
3 Agreements	2.00	527.00
103 Total		\$76,648.20

Principal Account-School Fund

Evaluation of New Leases

5 Long term leases-convertible (capital sum value)	\$32,166.90	
2 Non-convertible short term (aggregate Rental value)	250.00	
7 Total		\$32,416.90

Income Account-School Fund

Lease Rentals Collected

<u>9 New Leases</u>		
Current rentals \$1,705.91; rentals in escrow \$2,301.69	\$ 4,007.60	
94 Old leases within evaluation period	12,860.18	
103 Total on leases within evaluation period	16,867.78	
49 Leases antedating current capitalization period	15,072.32	
1 Arrearage on foreclosed lease	304.37	
153 Total Rentals Collected		\$32,244.47

Revocable Licenses

3 New, indeterminate term, one fee	61.00	
6 New, one year	101.00	
72 Renewals, one year	3,328.25	
7 Dredging royalties	2,740.36	
1 Permit to dredge	10.00	
89 Total Fees and Royalties		6,440.61

Use and Occupancy of State Lands

1 Charge for use and occupation	10.00	
12 Purprestures: received for deposit and/or on account \$2089.05, applied to principal of grants		
1 Total Applicable to Income		10.00
Sub-total Forwarded		\$38,695.08

	Sub-total brough forward	\$38,695.08
<u>Interest on Deferred Payments</u>		
1 Grant installment on lease being converted . . .	434.61	
3 Delinquent leases	21.51	
1 Arrearage on foreclosed lease	173.66	
5 Total Interest Collected		629.78
248 Total		<u>\$39,324.86</u>

Summary

Gross Total, All Transactions		\$148,389.96
<u>Deduct Items Evaluated twice</u>		
2 Leases converted into grants, unrealized capitalization	1,124.78	
1 Lease being converted by installments: prorated u.c.	1,055.48	
103 Rentals on leases within capitalization period	16,867.78	19,048.04
<u>NET TOTAL RIPARIAN BUSINESS TRANSACTED</u>		<u>\$129,341.94</u>

Inventory of Riparian Leases, June 30, 1946

Evaluation, 146 leases		\$356,008.65
Unrealized capitalization		124,534.35
Sum Total of Annual Rentals		28,926.01
2 Leases Cancelled - Unrealized Valuations (1940 yr.) . .		1,200.29

Leases with less than 14-2/7 years to run but having conversion privilege were rated at their conversion value, 27 leases in this group having a valuation of \$114,254.03 with an unrealized capitalization of \$97,760.50. Similar leases where conversion privilege has expired or are otherwise without conversion rights were evaluated at their aggregate rental value, 54 leases in this class thus having a valuation of \$31,443.71 and an unrealized capitalization of \$26,732.47.

Purprestures.

Investigations of illegal occupations of the State's riparian lands are being continued. The unauthorized occupations disclosed by these investigations consist mainly of small piers or bulkheads erected by the owners of residential properties. These owners, unfamiliar with the law and necessity for acquiring the riparian rights, are notified of the statutory requirements. Some thereupon file applications for the rights and acquire grants. The cases in which the owners fail to respond to the notices are referred to the Attorney General.

As a result, some fifty purpresture cases near Cape May are now being concluded. Applications for grants, together with deposits in substantial amounts have been made in most of these cases. Grants in some cases have been delayed pending completion of the required surveys. During the fiscal year ending June 30, 1946, 28 of the grants and 3 of the

leases were derived from purprestures, 22 of the grants being located on Spicors Creek, Cape Island Creek and Devils Reach near Cape May.

Increases in Riparian Valuations.

During the year the Council reviewed price maps and the report on riparian values. Two inspection trips were made and there were some increases in those localities.

On August 7, 1945 the Council viewed the frontage from the State Boat "Navigator" while on route on an inspection of the inland waterways from Bay Head-Manasquan Canal to Cape May. Increases in rates were fixed on easterly shore of Barnegat Bay from Bay Head to Seaside Park, and on the Forked River improved by dredging of a channel from deep water in Barnegat Bay upstream to the State's Forked River Boat Basin.

On June 25, 1946, an inspection was made at the site of the proposed filling in of the County Bridge approach on the Glimmer Glass, Brielle. The southerly or Manasquan frontage comprises an island necessitating bridging Debbies Creek to connect it with the Brielle road. This waterway lends itself to a commercial development in a sheltered harbor. The frontage, although presently directly inaccessible from the road, should be considered from the standpoint of its desirable location and possibilities. In view of the State dredged channel in Debbies Creek connecting the main channel in the Manasquan River with the Glimmer Glass, and the proximity of this section to Manasquan Inlet, offering much possibility of marine development for both commercial and private use, the Council voted to adopt a rate along both sides of Debbies Creek downstream from the Brielle bridges of \$5.00 per foot front.

United States of American Condemnation Proceedings.

In prosecuting the war the Federal Government condemned many areas of waterfront lands which included lands heretofore granted by the State such as the Bayonne Terminal, the Army Base on New York Bay at Jersey City, right of way for oil-pipe line and numerous parcels in private ownership. In three cases, riparian lands belonging to the State were involved. Upon filing notice of declaration of taking in the U.S. District Court, title to the lands taken became vested in the United States of America, leaving only the question of the amount to be paid to the owners.

Immediately upon receiving notices in the case of tracts owned by the State, the Council fixed a valuation for the State lands involved, and had the Attorney General file three claims in the total amount of \$56,954.46. The largest of these was for lands included in a \$40,000.00 grant to the City of Newark delivered shortly after the close of the fiscal year together with a disclaimer, leaving a balance of \$20,790.00 to be paid by the Court from monies deposited by the Federal Government.

Islands in Tidal Waters

The Council is now confronted with three applications for grants on reefs or sedge islands near Wildwood, Cape May County, submerged, although only slightly so. These areas are not attached to upland property and the question of upland ownership as required in making ordinary riparian conveyances does not enter, there being no upland owner to be considered.

The Attorney General ruled that while the Council under R.S. 12:3-19 had power to fix exterior lines around islands comprising fast land above the level of high tide and thereupon make riparian conveyances to the respective owners or owner, it did not have power to convey isolated areas of State's lands submerged at high tide. To meet this situation Chapter 299, Laws of 1946, approved May 6, 1946, was enacted authorizing the Council to "sell, let, lease or grant any island, shoal or reef situate in the tidal waters of this State in which the State owns or has an interest."

The above applications are being held in abeyance pending an accurate survey of the sites, to be made by the staff, and the formulation of a definite policy with respect to the sale of such parcels.

Progress in Recapture of Goetchius Grant

Grant was made to John M. Goetchius on the Hudson River, vicinity of Edgewater-Fort Lee boundary, on September 15, 1901, by the former Riparian Commissioners. The validity of this grant has been in question since the investigation of riparian grants in 1906 by Special Committee of the Legislature, for the reason that a consideration of \$50.00 was paid for this grant, covering a frontage of 2646 feet, instead of \$50.00 per front foot, as provided in Section 4, Chapter 383, Laws of 1869, requiring payment of a consideration of \$132,300.00.

Since the Borough of Edgewater on March 8, 1939, had foreclosed a tax lien on the "granted" lands, it was necessary to include the borough as a defendant in the proceedings. On December 4, 1944, the Court of Chancery declared the grant to John M. Goetchius null and void. As to the other defendant, the Borough of Edgewater, Counsel filed an answer, and an order of reference was made to Vice Chancellor Kays.

In the meantime certain public spirited citizens expressed a desire to have the Borough acquire this waterfront for park purposes and further proceedings were delayed to enable a committee to work out a solution on the property in question. After nearly a year of fruitless negotiation, the Council, at its October 8, 1945 meeting, instructed the Attorney General to continue the proceedings in opposition to the borough's claim of ownership.

The Federal Throat to State's Title to Riparian Lands

Until the discovery of oil under California's submerged tidal lands, there was no question as to the States' ownership of lands under tidal and navigable waters. By the Federal Constitution the States ceded to the United Government the right to regulate commerce among the States. No title to lands under water was conferred upon the Federal Government, the respective States retaining title, to be disposed of as they saw fit.

Ever since the creation of the Federal Government it has been a uniformly established rule of constitutional law that all lands beneath tidewater and navigable water are the absolute property of the respective States.

In 54 cases the Supreme Court has uniformly held ownership of such lands vests in the States and their successors in title.

For more than 100 years prior to 1937 this rule was uniformly recognized and respected by all departments of the Federal Government. However, in 1937 and 1938, resolutions known as the Nye resolution were introduced in the Senate in which the assertion was made that all tide and submerged lands within the 3-mile limit were "the property of the United States." Notwithstanding that these resolutions failed of passage, the claims set forth therein have operated to cast a cloud upon the State's titles to all lands beneath tidal and navigable waters.

While the efforts of Federal officials were originally directed at the California submerged oil lands, the advocates of the Nye resolutions, frankly admitted that if the law were construed in accordance with their claims, it would necessarily follow that the Federal Government "would have the right to go into all the ports and take the ports' property or all the property that has been constructed thereon and therein".

Later, the matter became acute when the Secretary of the Interior stated that he intended to grant certain applications for Federal oil and gas leases on tide and submerged lands. The issuance of such leases would be an actual assertion of title by the Federal Government, and if successful in destroying the principle of State sovereignty and the ownership in one State, it will automatically follow that the principle will no longer apply in any State.

Title to lands beneath inland navigable waters, including lakes and rivers, is held by the States under the same legal principle as tidelands. All inland States are, therefore, subjected to the same threat as the coastal States. The sovereign rights of every State in the Union were thus put in jeopardy, and early in 1945 Senate Joint Resolution 48 and some eighteen similar House Joint Resolutions were introduced to permanently quiet the titles of the States to their lands beneath tidal and navigable waters. A composite measure known as H.J.R. 225, constituting

a quitclaim by the Federal Government emerged from this "crop" of resolutions, and had the endorsement of a joint brief filed by the Attorneys General of 46 States.

The House passed H.J.R. 225 on September 20, 1945, and the Senate adopted it on July 22, 1946.

While the Congress was considering this bill, U.S. Attorney General Biddle brought suit in the District Court of California against an oil company, operating under a State lease claiming title to the leased lands. This suit was later withdrawn. At a later date and prior to the passage of the bill, U.S. Attorney General Clark brought suit against the State of California in the United States Supreme Court which suit is still pending. This is a test suit which if decided in favor of the Federal Government would permit seizure, without compensation, of all lands below high water in every State in the Union.

On August 1, 1946 the President vetoed H.J.R. 225. On August 2, 1946 the House sustained the veto by a vote of 139 to 95 in favor of the bill, which was less than the two-thirds necessary to override the veto.

In his veto message, the President took the position that Congress should not have acted upon the bill while the case of United States v. California is pending in the Supreme Court. He also stated that the pending case does not involve lands under bays, harbors, ports or other inland waters. Both of these points are commented upon by the Law and Legislation Committee of the American Association of Port Authorities, Inc. as follows:

"concededly there can be cases where it would be highly desirable for Congress to await a court decision before taking action in a matter. It seems difficult, however, to see how such a rule is applicable in the present instance. If, as we believe, title to submerged and reclaimed lands is in the States and their grantees, then there could be no possible reason for delaying Congressional action until the Supreme Court action reaffirms its prior decisions. If, on the other hand, the advocates of expropriation have indeed found an underlying flaw in the title to submerged and reclaimed lands - if the Supreme Court can in fact be persuaded to hold that lands which throughout our entire history have been bought, sold, used and occupied in good faith and honest belief of ownership are legally federal property - then there is all the more reason for remedial legislation along the lines of H.J.R. 225...."

"The statement that the pending suit in the United States Supreme Court 'does not involve' lands lying under bays, harbors, ports or other inland waters is a repetition of the statement made by Attorney General Clark in the memorandum which he filed in support of his complaint. Taken literally as a statement of the precise subject matter of the particular suit, this statement may be correct since Attorney General Clark limited the subject matter of his complaint to lands along the California Coast

other than lands underlying inland waters. We are unable to conceive, however, of any argument in support of the claim of federal ownership which would not apply to all lands under navigable waters, those within bays and harbors as well as those out near the three-mile limit. Neither in his complaint nor in his supporting memorandum has Attorney General Clark conceded that lands lying under bays and harbors are the property of the States and their grantees. On the contrary, they are so phrased that there is nothing in them which could be quoted against him if he should bring suit at some later date claiming lands in bays or harbors."

With the veto of H.J.R. 225, the question of the ownership of submerged and reclaimed lands will come up for decision in the pending suit of United States v. California. It is believed that the case will be argued soon and that a decision will be reached by January 1947. The Division of Navigation of the Department of Conservation is a party to the suit, and the Attorney General of New Jersey is continuing his cooperation with the legal representatives of the other States. Regardless of this, proponents of the vetoed measure are preparing to re-introduce the measure or a similar bill at the next session of Congress.

Administration of Easements, Licenses and
Commercial Dredging

* * * * *

Revocable Licenses

The Council from time to time, issues revocable licenses for a period of one year, where in such cases it is not possible to convey title as in a grant or lease; channelward of the United States Pierhead Line or where the fixing of a permanent exterior line of a grant might prove detrimental to navigation along the waterway.

Easements

Easements are usually granted at one fee to Public Utilities, Municipal and County Governments and private Corporations. The easement grants the right forever for crossings of submarine cables, water mains, oil and gas pipe lines.

While an easement gives the right forever for a crossing, it does not convey title to the State's land under water as in the case of a grant. The State reserves the right, if in the interest of navigation, to cause the relocation of cables, pipe lines, etc., or to cause them to be lowered to a greater depth below mean low water. This is at the expense of the grantee.

Easements are executed in the same manner as grants requiring the signatures of the Governor, Commissioner of Department of Conservation and the Council of the Division of Navigation.

Commercial Dredging

This work is covered by an Agreement or license running for a period of years and where a large volume of dredging is involved, the instrument is executed in the same manner as stated above.

The contracting party or licensee is required to report quarterly upon the number of cubic yards of material removed with payment for same. The Council of Navigation has fixed a charge of 2¢ per cubic yard for material removed. There is no charge for maintenance dredging, where the applicants have acquired the necessary riparian rights, or where the dredging is an improvement of the navigation channel. See page 39 for the fees collected.

* * * * *

As the revenue received from easements, licenses and commercial dredging are allocated to the Public School Fund, the same as revenue received from the riparian grants and leases, the details regarding the above are recorded in the Riparian Section of the Annual Report.

Power Vessels - Inspection and Licenses

Report for the season 1945

The Department revenues showed a decided increase over the previous year due to the return to civilian life of so many of our members of the armed forces and their desire for a little enjoyment and relaxation.

The following shows the number of licenses issued for operating power vessels and the number of boats and motors registered on the inland waters of the State above tide.

3026	Operators Licenses	@ \$1.50	\$4,539.00
2429	Private Boat Licenses	@ 1.50	3,643.50
9	Passenger Licenses	@ 15.00	135.00
5	Dealers Licenses	@ 5.00	25.00
6	Commercial Licenses	@ 5.00	30.00
20	Transfers	@ 1.00	20.00
4	Lost Plates	@ 1.00	4.00
	Fines		80.00
			80.00
	Total Forwarded		\$8,476.50

Total Brought Forward	\$8,476.50
29 boat licenses and 44 operators licenses issued to Inspectors, Police and Game Wardens for which no charge was made.	
Fees paid to Inspectors for issuing licenses at the rate of \$0.25 for each license issued.	<u>592.25</u>
	\$7,884.25

The case of Charles Snook and Andrew Darlin, Jr., of Lake Mohawk, in which finds of \$62.50 were imposed by Judge W. Groer Young, is still pending in the courts on the appeal of Andrew Darlin, Jr.

Examination of State Boundary Monuments

Re-examination is being made of the monuments marking the northern boundary of the State extending from the Hudson River to the Delaware River. One survey party commenced at Tri-State Rock, the western terminal near Port Jervis and worked eastwardly. The other party commenced at the eastern terminal at the Hudson River and worked westwardly.

In all, 77 monuments were found in place and 8 monuments destroyed. The site of some monuments were found covered over by pavements, sidewalks or railroad tracks. Others are located in wooded mountain sections where the dense foliage made it impossible to follow the line through. Some 34 monuments thus remain to be examined or located during the late fall or early winter when visibility is more favorable.

A mosaic map of compiled air photographs was prepared on a scale of 1000 feet to the inch, upon which the State boundary line has been accurately delineated. Locations of the monuments are shown, special symbols distinguishing the milestones.

Plans for the coming year call for the reestablishment of all monuments destroyed or missing.

Division of Engineering

Inland Waterway, Channel Marking

This was the first full year since 1941 the navigation lights on the Inland Waterway were permitted to be in operation. Under war time black-out regulations the Navy Department, through the Coast Guard, required the discontinuance of all flashing marine beacons. With the advent of peace in Europe, however, the Navy relaxed its stringent war time regulations and the boating public was again able to travel at night guided by the lights marking our waterways.

After the regulations were removed, shortage of materials and supplies prevented the Division from marking the waterways as adequately as in the pre-war years. Battery packs were unobtainable necessitating the purchase of dry cell batteries by the barrel and assembly of packs by our own employees.

Acetylene gas for operation of the gas beacons could not be obtained because of a shortage of cylinders. The Division, through the courtesy of Commander R.M. Ross, Aids to Navigation Officer, 3rd Naval District and with the approval of the Admiral in Command, was able to borrow 40 cylinders of gas from the U.S. Coast Guard. This was not sufficient for our needs, so 40 additional gas lights were sent to the manufacturer to be converted to electric beacons. Again shortage of materials became a controlling factor and the manufacturer could convert only 15 by the end of the boating season.

The end of the war saw a great increase in the number of boats passing through New Jersey to and from Florida. They urged that navigation lights be maintained from March 1st to December 1st. This will be the future policy of the Council, when ice conditions do not make it impossible.

The modifications of the standard channel markers to conform to the new Coast Guard standards for the intra-coastal waterway was well received by the boating public; comments and commendations indicated the Council and the Director had instituted a well conceived plan.

Two Department boats patrol the inland water daily, repairing the lights, changing batteries and removing debris from the channels.

Several cases of first aid to persons injured in boating accidents were reported by the patrol crews, and several fires on boats extinguished with the fire fighting equipment carried.

Present indications are a demand, within a short time, for a stimulated maintenance program to make up the curtailed program of war time. To bring the present channel from Manasquan to Cape May to a depth of 8 feet would entail removing 2,800,000 yards of material at an estimated cost of \$1,800,000.00.

Federal Government Taking Over Main Stem of the Inland Waterway.

The March 1945 Federal Rivers and Harbors Act included authorization of a Federal inland waterway between Manasquan Inlet and the Federal Cape May Canal into Delaware Bay. In substance such a continuous waterway would supplant the existing State Main Inland Waterway as through channel between those terminals.

As the Division has pointed out in the past, the construction of such a Federal through waterway will substitute for only a small fraction of the State Inland Waterway System. There will still exist the

the tributary channels, creeks, rivers and harbors which constitute the largest portion of the system. In addition, such portions of the State Main Inland Waterway not incorporated in the Federal Project will continue to require State maintenance.

The dependence of the seafood industries as well as those seeking recreation on the State Inland Waterway System emphasizes the need for continued maintenance and development of the system.

The majority of the members of the Council are in favor of the Federal Government taking over, operating and maintaining the main stem of the Inland Waterway from Manasquan to Cape May. The conditions, however, as provided for in the Rivers and Harbors Bill cannot be met by the State of New Jersey.

The former surveys by the Army Engineers for this project have become obsolete, and a new survey is now being made. To meet the conditions previously proposed by the Army Engineers would, at today's prices, cost the State of New Jersey twenty million dollars. In most of the southern states this type of project has been undertaken with very little cost to the state.

Bay Head-Manasquan Canal.

Maintenance and improvement of the Bay Head-Manasquan Canal has followed the comprehensive plan recommended by the Director and the Chief Engineer eight years ago.

Insufficient money was appropriated to properly lay out a canal, making it necessary to fit the project into the appropriation resulting in a canal of insufficient width to safeguard surrounding property. The erosion of the banks by the rain and wash of boats using the canal threatened to destroy private property on each side of the right-of-way.

The volume of water in the Manasquan River calls for a canal of greater width to reduce the velocity of the current.

A comprehensive plan of bulkheading was inaugurated, and each year a section of bulkhead has been installed at a cost of \$50,000.00 per section. The bulkhead project has stopped the destruction of private property, but has further confined the water, resulting in an increased velocity of the current.

Whereas previous to the bulkheading, it was necessary to spend \$35,000.00 a year for dredging in the canal proper, the canal now keeps itself clean, but a new problem has to be met, that of safeguarding the washing out of the bulkheads.

During the past year Division employees, with State-owned equipment, placed 2,863 tons of stone along the tow of the bulkhead to prevent erosion. Additional stone will have to be placed each year at new

locations, and at the locations already maintained to safeguard the bulkheads.

Maintenance dredging must be continued at both ends of the canal to remove the eroded material carried by the swift current.

To further safeguard the bulkhead, stringent regulations have been put into effect to prevent speeding of boats in the canal, causing a heavy wash from the propellers.

Due to lack of space in the crowded Forked River Basin, the Field Engineering Department was divorced from the Inland Waterway Marking Department. A small basin was purchased on the Bay Head-Manasquan Canal at Lovelandtown Bridge. This basin has access by land and water, and the Engineering Quarterboat "Meridian" is docked here. All the field engineering work is centralized at this point, and the major part of the State-owned equipment of cranes, boats, etc., work out of this basin.

Inland Waterway Dredging

During the year nine projects, totaling \$223,826.00 in contract amounts were in force. Of these, five were completed during the year.

In addition to projects contracted for, the Division's construction crew dredged several shoal spots in the Inland Waterway System, in an effort to keep the channels open until a major project was set up and placed under contract. Work to the value of approximately \$30,000.00 was taken care of in this manner.

Mechanical Maintenance and Repair

The Division maintains its own repair shop at the Forked River Yacht Basin, employing two full-time mechanics who are subject to call 24 hours a day to keep its equipment in first class order. There are also two carpenters to keep the buildings and boats in repair.

In addition to all of the small miscellaneous equipment, such as generators, outboard motors, oil burners, pumps, etc., owned by this Division, there are two patrol boats, a channel marking boat with a power hoist, a tow boat, a fire boat, three sea mules, three ducks (amphibious vehicles), two large crano carrying barges, two cranes, two bulldozers, eight automobiles, four heavy duty trucks, two pick-up trucks, three station wagons, one small scow, one engineers quarters boat, one engineers survey boat and one patrol boat on Lake Hopatcong.

Lack of a heavy duty marine railway, capable of handling our crane barges in the southern end of New Jersey, has prevented proper and adequate maintenance and repair of these boats. The cost of moving our heavy barges to New York Harbor to repair them is prohibitive. As a result present plans call for the construction of a heavy duty marine

railway at Forked River. When constructed this railway will expand our facilities for doing our own work and add to the duties of the Division of Maintenance and Mechanical Repair. The railway will be constructed by this Division.

In addition to the repair duties, the employees of the Division are called on, from time to time, to undertake new construction. There is now under construction a stiff leg derrick to be mounted on one of the "Sea Mules". When completed we will be able to install light piles for the Inland Waterway and mooring piles in the public yacht basins.

Greenwood Lake

Under the provisions of Laws 1945, Chapter 239, the sum of \$25,000.00 was appropriated to the Division for work in Greenwood Lake.

Each year, late in the summer, the lake purges itself. Three large masses of old cedar and other soft wood stumps rise to the surface and continue as floating islands for several weeks until changing weather conditions cause them to sink to the bed of the lake. During the past summer these islands were the direct cause of the death of a visitor to the lake.

These masses of interlaced stumps and marine growth are so thick that it is not practical to use a hydraulic or clam shell dredge to remove them. Present plans provide for breaking up the floating islands by dynamite, and then removing by clam shell dredge.

To let this work to a private contractor would entail a cost beyond the limit of the funds available. The Division is altering one of its sea mules to carry a stiff leg derrick, permitting it to be used as a clam shell dredge. The proposed work will be undertaken during the early summer of 1947.

Terminal and Public Yacht Basins

The Council, maintains two public yacht basins at Forked River, Ocean County and Fortescue Creek, Cumberland County, which are filled to capacity and require additional facilities.

The Forked River Basin, which is perhaps the most modern and up-to-date public marine base in the country, is also the base for the inland waterway channel marking crew. Present plans call for the construction of a marine railway for the exclusive use of State owned boats, as well as dredging which will provide additional anchorage facilities for the boating public. All of this proposed construction will be completed by the employees of the Council using State-owned equipment.

The Council has dredged for a public yacht basin on Clam Creek in Atlantic City. No docking facilities have been provided as yet, but plans have been drawn and work will start as soon as funds are provided by the Legislature.

Several bills have been introduced into the Legislature for new basins none of which have provided the necessary funds for construction or maintenance. The Council is in favor of such basins, which do not interfere with private enterprise, provided they can be made self-sustaining.

The basin at Fortescue, is in its preliminary stage of development, and until additional money is made available, will not serve its full useful purposes.

The coast protection or beach erosion program has been one of the most important functions of this Division during the past three years. The Governor and the Legislature have been very cooperative with the shore communities of the State in meeting this most serious problem. The allocation of money has been made on the basis of the seriousness of the problem confronting each municipality. The most urgent needs were met first and the balance of the projects undertaken in the order of their importance.

The method of setting up beach erosion money for future projects should be changed to give the State entire control of the money, the same as was previously done on similar projects. Divided authority in some cases has resulted in difficulty with the contractors the project proceeding on orders of one authority without first obtaining the approval from the other.

While it is the function of the Legislature to establish the basic policy of State aid for coast protection, it is recommended that a study be made of the possibility of rendering assistance to municipalities badly in need of coast protection but who are unable to raise the 50 per cent cost of the project. One municipality should not be given preference and the basis of participation must be kept the same, but a committee of the Legislature could look into the possibility of setting up a finance plan whereby the State could be repaid over a period of years for the amount of money advanced for a project. The seriousness of the beach erosion problem is such that some plan must be worked out for not only their protection but in many instances the protection of the neighboring community which must also suffer although able to finance its own project by reason of the comprehensive plan not being carried out in full.

From an economic viewpoint, the beaches in their entirety must be protected for without them the shore-front recreation industry, which grosses \$424,000,000 annually, and is the third largest in the State, will suffer.

The Coast Protection Act. (Ch. 52, PL 1945), effective July 1, 1945, supplemented the program of State aid to oceanfront municipalities initiated under the 1944 Act (Ch. 93, PL 1944). These Acts provided the

authority and funds for grants of aid to municipalities undertaking coast protection projects.

The Acts provide that municipal projects shall be reviewed by the Governor, the Commissioner of Conservation, and the Division of Navigation, and if approved, shall be eligible for allotment of State Aid funds to one-half of the construction cost.

Prior to July 1, 1945, twelve municipalities applied for aid in financing thirteen projects. The estimated total construction cost was \$3,787,000 and requested State aid totaled \$1,743,500. Three of these projects totaling \$560,000 were in operation.

As of July 30, 1946, there are nine projects in operation in eight municipalities. Estimated cost is \$3,166,868 and State Aid \$1,511,868. In addition, eleven municipalities are planning twelve projects involving total cost of \$1,345,800 and \$672,900 in State aid.

The total cost of work completed during the year under both the State-Municipal Program and the State maintenance projects is \$1,790,476.36.

These figures represent the greatest construction activity by the State in the field of coast protection since the inception of the State aid policy nearly thirty years ago.

Nearly 90 per cent of the money was spent on stone for jetties, and the magnitude of the project is indicated by the fact that 332,000 tons of stone were used. This is at the rate of 20 car loads each working day. Incidentally, the stone used has benefited both the producing quarries and the railroads. Only one per cent of the stone came from outside the State.

This wide acceptance and construction of all-stone jetties also is indicative of a trend in coast protection jetty design. Throughout State participation in planning and financing coast protection structures, a basic consideration has been to develop the best structure at the least cost. New Jersey, as the pioneer State in coast protection and preservation has had to explore and develop experience in methods, designs, and construction materials.

Earliest work employed simple jetties of creosoted timber and steel sheet piling with creosoted timber wales and master piles. Normal deterioration, heavy sea-wave attack, and in the case of steel, abrasion by sand made uncertain the length of useful structure life. The next step, envelopment of the timber and steel jetties with large quarry stone was tried but again only with fair results. Finally, the decision was made to attempt jetty construction using only quarry stone.

The design consisted of a center mound of small stone laid as a compact mass as a seal to prevent movement of sand through the jetty. This center core of small stone is enveloped by large pieces of stone weighing between two tons and seven tons each, and in special projects up to twelve tons.

This design was used four years ago for the first time. Its use during the current year by all seashore communities under the State aid program is an indication of the wide-spread acceptance by municipal officials and engineers.

The comprehensive program as initiated by the engineering department and approved by the Governor has been found to produce the results expected. It should be pointed out, however, that before this entire comprehensive plan shall have been completed, it will cost an average of \$1,000,000 a mile to meet the erosion problem.

DIVISION OF SHELL FISHERIES

Council of the Division

Mercer Wilson, Chairman	Linwood
William Dennis	Port Monmouth
William Gray	New Gretna
G. Luther Cox	Barnegat
E. Finley Mixner	Goshen
Lemuel B. Newcomb	Vineland
E. Walter Parsons, Jr.	Tuckerton
Horatio Sockwell	Port Norris
Roy Yates	Port Norris

Joseph N. Fowler, Director

DIVISION OF SHELL FISHERIES

It is not generally known that the State of New Jersey owns outright every foot of shellfish producing bottom. The natural grounds approximately 50,000 acres in extent are open to dredging to citizens of the State in proper season. The seed oysters removed from these beds are carried to the planting grounds where the salinity is higher and where growth to marketable size occurs in from two to three years. The value of the natural beds of Delaware Bay was determined at the time of the Delaware Diversion Case in 1929 to be approximately \$26,700,000. The planting grounds, located in various bays and sounds in Cumberland, Cape May, Atlantic, Burlington, Ocean and Monmouth counties, now comprise more than 35,000 acres under lease to citizens from which the State derives an annual revenue almost sufficient to defray all the expense of protection and administration. The grounds must be guarded to prevent unlawful acts and to assure proper cultivation.

The powers and duties of this Council have since 1903 been broadened by several supplements and amendments and it now has under its regulation and control the whole vast industry. While most other shellfish producing States have been depleting their seed producing grounds and losing in production, New Jersey has been building up the industry from year to year through wise control of its natural grounds.

Department of the Maurice River Cove

Number of oyster bed leases granted	178
Number of acres of leased land	27,564
Number of vessels licensed (large)	120
Number of tongs licenses issued	144
Number of bushels of oyster shells and seed oysters planted upon the State's Natural Oyster Beds in the Delaware Bay from State's funds	10,780
Number of bushels of shells contributed by the Delaware Bay Oyster Planters and planted on the State's natural oyster beds in the Delaware Bay at the expense of the oyster planters	273,005

Anticipated

By the terms of Chapter 39, P.L. 1945, which was sponsored jointly by the Council of Shell Fisheries and the Oyster Planters Association, it is estimated that 400,000 bushels of oyster shells will be returned to the State during the year 1947, and will be planted upon the State's Natural Oyster Beds in the Delaware Bay at the expense of the oyster planters. It is heartening to report that the oyster planters are fully cooperating with the State in preserving and developing this vast natural resource. Heretofore it was a "hit and miss" system

of cooperation from a few oyster planters, but the terms of this act, agreed to by the Delaware Bay Oyster Planters Association, assure the State of New Jersey of the continued development of the oyster industry.

Department of the Atlantic Coast

Division #1

Number of oyster and clam bed leases granted	306
Number of acres of leased land	3,387
Number of tongers licenses issued	202
Number of clambers licenses issued	2,470
Number of violators convicted	7
Number of bushels of shells planted on the State oyster beds in Mullica River from the State's funds	10,200
Number of bushels of seed oysters transplanted from the State oyster beds in the Mullica River (Chestnut Neck area) to the State's beds at the mouth of the Mullica River from State's funds	13,200
Number of oyster and clam bed leases granted	152
Number of acres of leased land	971
Number of linear feet of leased land averaging 100 feet in width	51,014
Number of tongers licenses issued	173
Number of clambers licenses issued	1,896
Number of violators convicted	11
Number of bushels of spawning oysters planted on the State's Natural Oyster Beds in the Tuckahoe River	609

The Mullica River area has been transformed from one of low productivity to one of the most prolific oyster beds on the Atlantic Coast. During the year of 1945-46 over 35,000 bushels of oyster plants were removed from the lower beds at the mouth of the Mullica River in comparison with an average of 2,000 bushels per year prior to 1937. The methods used in obtaining such wonderful results in the Mullica River area will be used in other oyster areas along the Atlantic seaboard.

In order that the Council of Shell Fisheries may continue with and expand its program for the improvement of the State's Natural Oyster and Clam Beds, the Council, with the approval of Commissioner Morgan F. Larson, has recommended an increase in the appropriation for that purpose. These projects should go forward not merely to increase the supply of oysters as a valuable food but to provide employment in the post war period for veterans and war workers who have returned to the shore communities eagerly anticipating the opportunity to invest their labor and money in the shellfish industry. The significant increase in the sale of licenses clearly shows that a great many of the returning veterans and

war workers are finding employment through this great natural resource of our State. With sufficient funds the State's Natural Oyster and Clam Beds can be built up so as to give employment to thousands more of our citizens who with an investment of \$500.00 to \$1,000.00 can earn a livelihood independently.

DIVISION OF WATER POLICY AND SUPPLY

Council of the Division

Thurlow C. Nelson, Chairman	New Brunswick
George S. Burgess	Madison
Forster W. Freeman	Paterson
Max Grossman	Atlantic City
Kenneth H. Murray	Far Hills
Joseph H. Palmer	Tuckerton
John Roach, Jr.	Dover
Roswell M. Roper	East Orange
Herbert K. Salmon	Stanhope

Howard T. Critchlow, Chief Engineer

DIVISION OF WATER POLICY AND SUPPLY

The Division of Water Policy and Supply of the Department of Conservation completed its first year of operation on June 30, 1946 under Chapter 22, P.L. 1945, as successor to the State Water Policy Commission, the Board of Conservation and Development relating to the Delaware and Raritan Canal and to the Passaic Valley Flood Control Commission. These activities embraced jurisdiction of public and potable water supplies, erection of dams, stream encroachments, flood control and rehabilitation of the Delaware and Raritan Canal for industrial water supply. This work was carried on under the control of the Water Policy and Supply Council and the supervision of the Chief Engineer. The staff at the close of the year included 45 full time employes, 22 in the water policy section and 23 in the Delaware and Raritan Canal section. Legal matters were handled by the Attorney General's Department.

The branch office at East Orange formerly operated by the Water Policy Commission was closed on March 15, 1946 and the remaining staff, records and equipment were transferred to Trenton.

On April 30, 1946 the Division lost the valued services of Councilman William R. Conard of Burlington by death. Mr. Conard was a man of sterling character and an engineer of high standing in the profession. He gave devoted service to the Division and the State.

Responsibilities

As successor to the State Water Policy Commission, the Division has general supervision over all sources of public and potable water supplies. It is charged with the formulation of policies for the conservation and prudent development of the State's water resources, as well as for the protection of the public against damage from flood waters. Certain regulatory powers are conferred upon it - the approval of the Division is specifically required for the diversion of water for public use, for the construction and repair of dams, and for the erection of structures along streams, such as bridges, culverts, walls, fills and other encroachments.

The transfer to it of the Delaware and Raritan Canal property, placed upon the Division the responsibility for rehabilitating and converting the canal into a source of industrial water supply and for park and recreational use. The management, maintenance, operation and control of the canal property rests with the Division.

Water Policy Activities

During the year, studies of the water resources of the State, the systematic gaging of stream flow, rainfall, ground water levels and conditions were continued. Fifteen applications for diversion of water for

public use were approved, after public hearings; the diversion of 7,239,000 gallons of water daily, all from wells, was authorized. The renewal of three contracts for the delivery of water between certain municipalities was approved. Approval of works for permanent operation of four water supply projects previously authorized was given. Several other projects could not be completed because pumping and power equipment could not be obtained by the water departments.

Thirteen permits for the construction of dams and 81 permits for the construction of stream encroachments were issued. One hundred and thirty-three inspections of dams and 36 inspections of encroachments were made by the engineering staff. Thorough investigation was made of the damages resulting from the floods of July 1945 in the North Jersey areas; also numerous conferences were held with Federal, county and municipal officials and the affected property owners on improvement plans for the control of flood waters.

Water Supply

Rainfall and runoff during the calendar year 1945 were above normal, while these conditions continued at about normal for the first six months of 1946. As a result, all the major water supply reservoirs were full or practically so on June 30, 1946. The water consumption for 1945 slightly exceeded the prior peak year of 1944. The records are summarized as follows:

<u>Consumption - Million Gallons Daily</u>	<u>Calendar Year</u>	
	<u>1944</u>	<u>1945</u>
North Jersey Metropolitan District	344.5	348.7
South Jersey Metropolitan District	62.3	67.1
Sea Shore Area	34.4	35.4
Rest of the State	<u>40.5</u>	<u>42.3</u>
Total for the State	481.7	493.5

A serious interruption in water service occurred in the central part of the district of the Hackensack Water Company in Bergen County due to a transmission line break on October 14, 1945. Conferences between engineers of the Division, the Public Utility Commission and the water company resulted in a program for the improvement of the water works facilities looking toward the prevention, so far as possible, of similar interruption in service.

Plans for new or additional water supplies from wells were submitted by 10 municipalities and 5 private water companies. Public hearings were held thereon and in all cases approval was granted, with conditions for conserving the underground sources of supply. In addition, two other applications were filed and seven hearings held, but the cases were not closed before the end of the fiscal year.

Cooperation with United States Geological Survey

The stream gaging and ground water investigations were continued under cooperative agreement with the United States Geological Survey, with the cost being shared equally. The fundamental information on water resources collected over many years of this cooperation and from other sources is the basis of all water supply and flood control designs. The ground water studies have pointed out the danger of salt water intrusion in the important well fields of the Atlantic City and Sayreville areas and indicated the remedial steps that should be taken. Among these steps is the need for State supervision over the diversion of water from private wells, similar to that now exercised by this Division over public and potable water supplies; also the danger to the State's valuable artesian water supplies by the construction of the proposed New Jersey Ship Canal was also disclosed.

Ship Canal

The Engineering Department has attended conferences and addressed meetings in different parts of the State, setting forth the dangers to the water resources of the State through the construction of the proposed New Jersey Ship Canal between Sayreville on the Raritan River and Bordentown on the Delaware River. This project would cut through the State at the waist line and seriously affect the valuable artesian well supplies in the southern part of New Jersey. The plans of the Army Engineers as originally proposed would preempt the water supplies of the entire Raritan River basin. There are many other objections to the proposed canal besides the objection on the ground of damage to water resources which is the most serious. The Division has conferred with the Army Engineers on this problem and some modifications of the original plans for water supply for the canal are understood to have been made. The final report on this project is awaited with considerable interest.

Flood Control

Flash floods during July, 1945 in northern New Jersey, particularly in the Paterson area, again focused public attention on the problem of flood control. As a result of the damage suffered, the Engineering Department has been overloaded in the endeavor to bring about the orderly improvement of the situation. Numerous dams, bridges, retaining walls, buildings, highways and railroads were affected. While a certain amount of this work was handled by issuing permits for the reconstruction and repair of these damaged structures, more comprehensive study of the improvement, particularly of small streams, is necessary to plan intelligently for the future. Preparation of so-called master plans for many streams is desperately needed. This is a State responsibility which can only be handled by enlarging the present engineering staff of the Division. Authorization for this staff has been obtained but the recruiting of a competent personnel for this work has been disappointingly slow. The larger problem of flood control on the main Passaic River is being reviewed by the United States Army Engineer's office, New York

District. This study will be continued during the coming year. The Division of Water Policy and Supply has held conferences with the Army Engineers, looking toward the carrying out of this program and will continue to cooperate with them in every way possible.

Delaware and Raritan Canal

Rehabilitation

The Delaware and Raritan Canal Rehabilitation Program was begun by the former Department of Conservation and Development under authority of Chapter 172, P.L. 1944, for the purpose of converting the canal property into a source of industrial water supply and for recreational and park use. This authority was transferred to the Division of Water Policy and Supply on July 1, 1945. Prior to that date, two contracts for construction had been let.

The first was the improvement of 2.85 miles of the Canal feeder in the City of Trenton and involved excavating the channel and constructing walls in portions where encroachments made such protection necessary. This work was completed shortly after the transfer in authority was made, at a total cost of about \$155,000. The second contract was for the reconstruction of the aqueduct carrying the Canal over the Millstone River at the upper end of Carnegie Lake near Princeton. This work involved the removal of a timber aqueduct constructed about 1870 and replacing it with a reinforced concrete flume founded on the existing masonry piers, with concrete capped steel sheet piling wing walls and four sluice gates. This project was completed in January 1946, at a total cost of about \$95,000.

Two additional contracts have been let during the fiscal year 1945-46:

Raven Rock Control Gates

This contract covered the dredging of the Delaware River intake channel down to Raven Rock lock, a distance of 0.81 miles, the sealing of the old masonry culverts next to the old lock through which water was formerly controlled, and the construction of control gates at the site of the old lock. This structure will control all the water taken into the Canal from the Delaware River which is the source of water supply. This work was completed in March 1946, at a total cost of about \$66,000.

Kingston Control Gates

This contract was let June 20, 1946 for the construction of control gates at the site of the old Kingston lock, about 2.4 miles below Carnegie Lake Aqueduct. These gates will control the longest water level in the Canal, extending through Trenton and up to Lambertville, a total distance of 28 miles. It was necessary to repair the old masonry walls

for the entire length of the lock. This was done by "gunniting" over a thousand square yards of the surface of the old walls. A concrete weir and gage house were also erected to measure the flow of water passing downstream. This work was completed in November, 1946, at a total cost of about \$55,000.

During the year surveys and plans were made for other work which will be necessary to complete the rehabilitation program. Plans were prepared for contract award on dredging the Canal feeder at five locations between Mileposts 5.25 and 16.15 and involve removal of bars formed by streams discharging into the feeder. This contract was awarded shortly after the close of the fiscal year.

There are other items of construction and maintenance that must be carried out eventually if the Canal is to be placed in reasonable shape for continuous use. For example, there are seven other control gates which will eventually have to be built - Prallsville, Lambertville, Griggstown, Weston, Bound Brook, Fieldville and New Brunswick.

Negotiations for the execution of a new Water Sale Contract with the Bakelite Corporation were in process at the end of the year. Inquiries regarding water supply were received from the firm of Runyon and Carey and the Anchor Thread Company. Two minor water use proposals for irrigation and a wildfowl refuge were in consideration at the end of the year. One minor lease and a long unused water privilege were cancelled during the year.

A program for the recreational use of the canal property is being developed in cooperation with the Division of Forestry, Geology, Parks and Historic Sites of the Department. Pending its completion, requests to purchase Canal property are being held in abeyance.

Maintenance

Operation was of necessity geared to the Rehabilitation Program, complicated by maintenance of a supply to present users. Blocking of feed from the Delaware River, in connection with reconstruction at Raven Rock, made it necessary to rent a tractor to provide power for a mill at Prallsville. Other users on the Feeder were supplied from dead storage, held by bulkheads. A bulkhead in Trenton provided storage of a supply for the Public Service gas plant, and users below Princeton were supplied by diversion of excess flow of the Millstone River and local stream inflow during construction of the Carnegie Lake Aqueduct. The gates of the completed aqueduct were closed and Delaware River feed restored on May 1st. Emergency flow control measures were made necessary because of flood damage to a culvert near Landing Lane at the end of December, and because of the collapse, during flood conditions over the week-end of June 1-2, of the Kingston Lock droppate. In addition to flow control and work in connection with the Rehabilitation Program, canal forces made extensive repairs to the feedway bridge at Lambertville, repaired gates, wing walls, culverts, etc., and completed improvements to the Canal offices at Academy Street.

Canal forces cooperated with the Mercer County Mosquito Control Commission in treating the canal from Princeton through Trenton. Special flow-control action was also taken at the request of the Trenton Health Department to meet complaints (not supported by the Health Department) that the drained condition of the canal was contributing to the "Polio" epidemic.

Finance

The water policy activities are financed entirely by revenue collected by the Division for the excess diversion of water. During the year collections from this source totaled \$112,923.95. Revenue from the Delaware and Raritan Canal; for rentals, permits and from the limited sale of water now possible, amounted to \$10,302.65.

Expenditures for water policy activities amounted to \$63,151.63; for maintenance and operation of the Delaware and Raritan Canal, \$30,431.71, and for the rehabilitation of the Canal, \$307,931.81. The latter is a capital improvement expenditure in the program for converting the Canal into a source of industrial water supply. Based on conservation estimates, the anticipated revenue from the sale of this water will make the project self-liquidating within 25 years.

Legislation

State control over private wells for large industrial and commercial use is urgently needed if the valuable artesian water supplies are to be protected from over draft and salt water intrusion in certain tidal areas. The control over public and potable supplies which has been effective since 1912 is not sufficient to conserve these natural water resources. Additional legislation to extend State control over all large uses of privately owned wells is strongly recommended.

In the field of flood control, present laws giving the Division control over stream encroachments in congested areas need clarification and extension of authority. State authority to define the location and to establish widths, grades and elevations of streams, either directly or in cooperation with municipalities and the preventing of encroachment upon the same is recommended. Without this authority, the Division is seriously handicapped in alleviating damage from floods.

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