ANNUAL REPORT

OF THE

NEW JERSEY BOARD OF FISH

AND

GAME COMMISSIONERS

FOR THE

Fiscal Year Commencing July 1, 1931

And Ending June 30, 1932

STATE OF NEW JERSEY

BOARD OF

FISH AND GAME COMMISSIONERS

TRENTON

To His Excellency, A. Harry Moore, Governor, and Members of the Senate and General Assembly of the State of New Jersey:

As required by law, we submit herewith the Annual Report of the work of the Board of Fish and Game Commissioners for the fiscal year covering the period from July 1, 1931, to June 30, 1932.

Very respectfully,

H. J. BURLINGTON, *President,*
CHARLES F. HUNTER,
HARRY M. ARMSTRONG,
ALEXANDER H. PHILLIPS,
GEORGE C. WARREN, JR.,
LEWIS SPINKS,
JAMES R. HENSLER,
BENJAMIN W. COOPER,
GEORGE S. MCCARTY,
Commissioners.

List of Fish and Game Commissioners Holding Office at the Date of This Report June 30, 1932

H. J. BURLINGTON, *President* ..... Montvale
CHARLES F. HUNTER, *Vice-President* ..... Palisade
HARRY M. ARMSTRONG, *Treasurer* ..... Jersey City
ALEXANDER H. PHILLIPS ..... Princeton
GEORGE C. WARREN, JR. ..... Summit
LEWIS SPINKS ..... Nixon
JAMES R. HENSLER ..... Toms River
BENJAMIN W. COOPER ..... Moorestown
GEORGE S. MCCARTY ..... Newfield

WALTER H. FELL, *Secretary*
ANNE E. SULLIVAN, *Assistant Secretary*
Office of the Board, State House, Trenton, N. J.
MALCOLM DUNN, *Assistant Superintendent of Game Farms,* Forked River
CHARLES O. HAYFORD, *Superintendent of Fish Hatchery,* Hackettstown.

List of Fish and Game Wardens Holding Commissions at the Date of This Report

STRATTON, JAMES M., *Protector* ..... Long Branch
CUDNEY, HARRY E., *Assistant Protector* ..... Hackettstown
DAVISON, ARTHUR, *Assistant Protector* ..... Belmar
KELLEY, THOMAS, *Assistant Protector* ..... Jersey City
MATHIS, HOWARD Z., *Assistant Protector* ..... Collingswood

BAKER, EDWIN ..... Haleyville
BAKLEY, ALFRED F. ..... Newton
BERNIUS, HENRY F. ..... Oxford
BROOKE, GEORGE B. ..... Blackwood
CARSLAKE, WILLIAM C. ..... Columbus
CARSON, ROY R. ..... Medford
COX, JOHN F. (Retired July 1, 1932) ..... Washington
CROWLEY, HAROLD M. ..... Tuckerton
DACKERMANN, FRED H. ..... Elizabeth
EGGERT, JOSEPH S. ..... West Millington
EVERNHAM, JAMES H. ..... Toms River
GRAHAM, JOHN W. ..... Swedesboro
GROVES, GEORGE E. ..... Hammonton
HALL, FRED J. (Retired Sept. 1, 1932) ..... Montclair
HALL, GERVAS I. ..... Salem
HILL, CHARLES C. ..... Somerville
HUGG, JOHN R. ..... Livingston
LARSON, LEWIS ..... Clinton
LAWRENCE, HARRY R. ..... Succasunna
LYELL M. HOWARD ..... Freehold
MILLER, JOHN C. (Died July 15, 1932) ..... Absecon
MIZELL, CHATHAM ..... Elmer
NOLAN, THOMAS F. ..... Trenton
PAUL, GEORGE R. ..... Perth Amboy
PHIFER, GEORGE W. (Retired Sept. 1, 1932) ..... Millville
ROACH, ALBERT A. ..... Butler
RUTH, ALBERT J. ..... Woodcliff Lake
SAXTON, DANA J. ..... Absecon
SMALL, WILLIAM H. ..... Teaneck
STEEL, WILLIAM ..... Cape May Court House
TRELOAR, JAMES H., JR., ... Franklin
WILLIAMS, ROY H. ..... Pompton Lakes

GENERAL

PROGRESS STATEMENT

The following statement shows the activities of the Board of Fish and Game Commissioners for the past fiscal year and also shows a comparison of progress made in the past five years against the previous five years.

1931-32

During the fiscal year of 1931-32 there were distributed the following: 23,695 pheasants, 12,454 of which were propagated and distributed from our own farms, 4,354 raised by the public from eggs sent from our farms, and 6,887 purchased from dealers in the State; 21,435 rabbits and 2,958 quail; 506,667 trout over 6 inches, 65,150 trout under 6 inches; 127,900 bass; 116,001,000 perch fry; 805,000 shad fry, and 255,045 sunfish. The market value of the above was $275,526.05.

The receipts from hunters' and anglers' licenses for this year were $268,838.20, showing that the Commission returned more in fish and game in market value than the total amount of receipts from hunting and fishing licenses.

The following tabulations show the distribution of fish and game in this State for the past ten years and also show the increase in the production in the past five years as against the previous five years.

GAME DISTRIBUTION

	Pheasants	*Rabbits*	*Quail*	*Hungarian Partridge*
1922-23	6,612	1,619	...	...
1923-24	14,175	8,874	...	151
1924-25	16,826	9,265	185	160
1925-26	18,428	10,483	36	1,029
1926-27	16,302	14,218	102	326
	72,343	44,459	323	1,666
1927-28	25,964	15,112	758	431
1928-29	18,337	14,921	...	...
1929-30	22,709	14,900	120	...
1930-31	30,668	20,661	722	...
1931-32	23,695	21,435	2,958	...
	121,373	87,029	4,558	431

The above shows that we have increased our distribution of pheasants 67½% distribution of rabbits 95½%, and put out practically fifteen times more quail. The Board has not attempted to liberate Hungarian partridges in the State for the past four years as experience with these birds showed that they do not thrive in New Jersey although a few coveys can be found in the State.

FISH DISTRIBUTION

The following table shows the fish propagated and liberated from our Fish Hatchery at Hackettstown, and the Shad Hatchery located at Hancock's Bridge, New Jersey.

	Trout over 6"	*Trout under 6"*	*Bass Fingerling*	*Yellow perch fry*	*Shad*	*Sunfish*
1922-23	20,467	1,280,900	132,350	58,000,000	.....	206
1923-24	121,531	768,000	66,535	54,500,250	.....	13,700
1924-25	213,960	1,043,400	214,250	58,000,000	.....	127,550
1925-26	251,680	872,810	145,500	65,600,000	.....	217,900
1926-27	297,200	533,900	98,750	75,000,000	40,000	389,700
	904,838	4,499,010	657,385	311,100,250	40,000	749,056
1927-28	302,622	345,900	190,300	96,325,000	1,120,000	607,300
1928-29	423,505	310,600	285,300	104,800,000	2,688,000	376,475
1929-30	446,882	203,300	131,000	113,800,000	3,094,000	391,950
1930-31	467,390	90,400	102,025	112,000,000	763,000	141,700
1931-32	506,667	65,150	127,900	115,400,000	.....	255,000
	2,147,066	1,015,350	836,525	542,325,000	7,665,000	1,772,425

This shows an increase of 137½% in the propagation and distribution of trout over 6" over a five-year period, and a great increase in the number of all other fish.

The total receipts of this Board on account of hunters' and anglers' licenses for the last five years amounted to $1,457,466.10. The above total shows that during this same period the Commission distributed game to a market value of $491,013.25 and fish to a market value of $896,918.93, making a total value of $1,387,932.18.

WARDENS' SERVICE

There was an increase of 30% in the number of prosecutions, as the following will show, with no increase whatever in the number of wardens. It would appear that the appointment of two additional assistant protectors on July 1, 1929, to give closer supervision to the wardens was a necessary step, as there has been a marked increase in the number of prosecutions made by the wardens since that time.

1922-27.....4672 1928-32.....6085

CENSUS OF FISH AND GAME TAKEN

Since 1924 licensees when applying for licenses are asked to report the number of fish and game taken by them during the previous calendar year, and since that time we have reports showing the following game and fish killed.

Pheasants	412,376	Geese	24,651
Rabbits	2,319,366	Ducks	328,261
Grey Squirrels	118,710	Trout	1,269,187
Grouse	31,654	Bass	515,144
Quail	318,621	Pickerel	918,958
Woodcock	51,631		

The estimated value in dollars and cents of the game and fish reported taken is $4,627,757.50. The figures do not include fish and game taken by the farmer or property owner on his ground, who does not require a license, and only cover about 35% of the total number of licenses issued in the State. However, there is a law now on the statute books making it mandatory for everyone to report his kill before a license can be obtained and future reports will give a more accurate figure of the actual number of fish, birds and animals taken in the State.

In addition to the above the total number of deer taken during this period was 10,022. Estimating deer at 75 lbs. each, and 50c per pound, shows a food value to the sportsmen of $375,000.00.

VERMIN CONTROL

Since 1924, licensees have also reported that the following vermin was killed by them:

	Cats	*Weasels*	*Red Squirrels*	*Foxes*
1924	13,233	4,954	....	675
1925	11,052	2,972	....	693
1926	11,564	4,249	....	848
1927	11,560	4,679	....	731
1928	9,255	6,918	....	785
1929	10,185	7,076	....	1,037
1930	9,906	5,188	2,239	866

ORGANIZATION

At the organization meeting of the Board in December, President H. J. Burlington, of Montvale; Vice-President Charles F. Hunter, of Palisade, and Treasurer H. M. Armstrong, of Jersey City, were unanimously re-elected to their positions.

PUBLIC SHOOTING AND FISHING GROUNDS

After January 1, 1932, revenues became avaliable for the "Public Shooting and Fishing Grounds Fund," as authorized by act approved April 6, 1931, which increased the Residents' Hunting and Fishing license from $1.50 to $3.00, the act providing that one-third of every resident license fee remitted to the State Treasurer shall be placed to the credit of a fund to be known as the "Public Shooting and Fishing Grounds Fund," for the purchase and development of lands and waters for use as public shooting and fishing grounds and game refuges. Under this act, 90¢ of every $2.70 received by the Board for a resident license went to the Fund. When the 1932 Legislature reduced the hunting and fishing license fees for 1933, a change was made in the proportion of the amount to be applied to the Fund, which is set forth below under "Change in Cost of Licenses."

The necessity for such grounds grew out of the posting of great areas of land which in past years had been open to the sportsmen.

Steps were taken at once to view suitable properties. We purchased, June 10, 1932, a most desirable tract in Sussex County, between Wallpack Center and Flatbrookville, which includes a mile of the famous trout waters, the Flat Brook, and territory suitable for rabbit, partridge and woodcock, etc., hunting. The tract consists of 134.60 acres.

The Board has options of a large tract in South Jersey in the vicinity of Haleyville, on which there are rabbits, squirrel, ruffed grouse, quail, ringneck pheasants, black duck, mallard duck, wood duck, blue wing teal, sora, Virginia rail, king rail, woodcock, skunk, mink, muskrat, otter, deer and raccoon, and white and yellow perch and catfish in the tidal meadows on the tract.

This Flatbrook tract is on the fringe of the great Stokes State Forest, whose 12,113 acres, through agreement with the Board of Conservation and Development, are opened to hunting and fishing. The Stokes Forest extends from Wallpack Center and joins High Point Park.

A program of stocking with fish and game and for vermin control will be adopted at once for the Flatbrook tract, which will be extended into the Stokes preserve. The Commission expects to be able to add by lease at least three more miles of the Flatbrook for use by anglers, and will stock another five miles of the stream within the Stokes Forest which will be open to the public.

Swartswood Lake, entirely owned by the State and open to fishermen, is a nearby attraction for sportsmen. The lake is kept plentifully stocked.

LESS LICENSES SOLD

It became apparent early in the calendar year of 1932 that the economic situation would cause a considerable reduction in the sale of licenses. While the cost of the license is only a small part of the outlay for hunting and fishing, yet many felt that they could not afford the expenses in excess of the license cost, and therefore did not secure licenses. A further decrease in our receipts from licenses was due to the Federal regulations which prohibited water wild fowl shooting in January, and confined such shooting to a one month's period, from November 16 to December 15.

Reflecting the economic situation, the Board had requests from persons asking that they be allowed to fish with nets despite the provisions of the law regulating fishing as to seasons. The Board had no authority to grant these requests, and if it had it would be inadvisable, as the laws are made to provide for close seasons for spawning, and to grant the permits would result in a serious depletion of the fish supply for the future.

A number of requests were also made by persons who desired our permission to hunt and fish without securing the required license, which could not, under the law, be granted.

CHANGE IN COST OF LICENSES

In view of a careful study of our hunting and fishing license system, the Board concluded that there should be a change and to that end the Legislature, at our request, provided by the act of June 14, 1932, for a separate license to fish, at $2.00; a separate license to hunt, at $2.00, and a combination hunting and fishing license, at $3.00 for the calendar year of 1933. These costs will undoubtedly appeal to persons who fish, but do not hunt, and who hunt, but do not fish, and taking into consideration the vast amount of fish and game in the State, for the privilege of taking both, we believe the man who both hunts and fishes will be glad to pay $3.00 for the combination hunting and fishing license.

Another feature of the act changing fees for 1933 is that females may fish without taking out a license.

With the new costs of licenses for 1933, a change was necessary in the proportion of the fees to go into the Pubic Shooting and Fishing Grounds Fund. Ninety cents of every combination resident hunting and fishing license fee, forty-five cents of every resident hunting license fee and forty-five cents of every resident fishing license fee, remitted to the State Treasurer, will be placed to the credit of the Fund.

The hunter and angler is too broadminded not to realize that without a fair fee through which the State can be stocked, the fish and game of the State would in a very short time be wiped out, and he must realize that with the acquisition of public hunting and fishing grounds, thousands of acres of land and water will be opened to him for present use and for all time, and that he is building up places where his children may hunt and fish, without which, with the present tendency of posting, there will be only restricted and isolated areas for use of the rod and gun.

EDUCATIONAL

Educational lectures and exhibits of moving pictures of Game Farms and Hatcheries were made at high schools, sportsmen's clubs, and other places throughout the State. The newspapers have cooperated splendidly in placing before the public fish and game news affecting our department, which is keenly followed by over 200,000 sportsmen.

PATROL OF WATERS

Due to a decrease in our receipts from hunting and fishing licenses, the State cruiser was ordered laid up on May 15, as were also some of the smaller boats. However, we patrolled effectively the whole coast from Atlantic Highlands to Cape May and also the Delaware river and bay with six boats.

RECEIPTS AND EXPENDITURES

An analysis of the receipts and expenditures during the fiscal year follows:

Receipts

Hunters' and Anglers' Licenses, County Clerks' Checks to State Treasurer, Chapter 152, Laws of 1914			$264,388.20
Board's Check to State Treasurer:			
Chapter 125, Laws of 1922 (Woodcock Licenses)			4,224.00
Chapter 320, Laws of 1915 (Juvenile Licenses)			226.00
			$268,838.20
Other Licenses:			
Menhaden	$1,550.00		
Food Fish	1,850.00		
Pounds	6,330.00		
Breeders	3,070.00		
Carp	75.00		
Fur	100.00		
		$12,975.00	
Fines and Penalties:			
Chapter 247, Laws of 1911	$31,535.10		
Chapter 96, Laws of 1922 (trespass)	612.75		
		32,147.85	
Farms and Hatchery Sales	$1,170.10		
Sundries	1,596.77		
Deputy Badges	568.00		
		3,334.87	
Check returned		3.97	
			48,461.69
			$317,299.89

Expenditures

Personal Administration, Commissioners	$1,333.08
Wardens' Salaries	76,332.50
Wardens' Expenses	9,456.47
Stocking and netting expenses	8,197.51
Office Expenses	12,875.32

Publicity	820.00
Printing, Stationery, etc. (office furniture—typewriters)	4,770.39
Hunting and Fishing licenses and buttons	5,609.79
Legal Expenses (court costs and assistance in cases)	1,727.75
Maintenance of Cruiser	9,239.88
Gasoline and Oil for Autos, Boats, Farm and Hatchery	10,933.32
Tires and tubes for Autos and Trucks	2,270.47
Maintenance Autos and Boats	8,134.20
Purchase of Autos and Boat engines	9,880.76
Postage, Telephone, Telegraph and Insurance	4,053.57
Maintenance, Forked River Farm, Salaries, etc.	20,671.34
Equipment and improvements, Forked River Farm	4,091.28
Maintenance, Rockport Farm, Salaries, etc.	19,336.89
Equipment and improvements, Rockport Farm	2,246.84
Maintenance, Fish Hatchery, Salaries, etc.	76,905.79
Equipment and improvements, Fish Hatchery	10,528.39
Maintenance, Shad Hatchery	849.81
Purchase of Game and Fish from outside sources	36,740.76
Miscellaneous expenses	6,822.06
	$343,828.17
Bills Outstanding	$4,167.68

PROSECUTIONS

During the fiscal year ending June 30th, there were 1,395 prosecutions for violations; 1,378 of the offenders were convicted and 17 acquitted. In 113 cases by reason of youth, old age, extreme poverty, or other extenuating circumstances, sentence was suspended upon the payment of costs. Thirty-five cases were appealed to the Common Pleas Court and sixty-four of the defendants were committed to the county jail for periods of 10 to 90 days in default of payment of the penalty imposed. There were 144 hunting and fishing licenses revoked, after the offenders were convicted of violating the act, and 16 guns were confiscated from aliens.

The number of prosecutions was 24 less than last year, when 1,419 arrests were made, which was the greatest number in the history of the Fish and Game Commission.

The proportion of arrests made by each warden during the fiscal year and the total number of arrests in each district is as follows:

District in charge of Assistant Protector Kelley	521%
District in charge of Assistant Protector Davison	337%
District in charge of Assistant Protector Mathis	321%
District in charge of Assistant Protector Cudney	203%
Prosecutions by deputies and troopers	10
	1395

Williams	148⅛
Graham	97½
F. J. Hall	73
Carslake	66⅛
Evernham	65
Hugg	63⅛
Hill	60⅛
Miller	57
Groves	56½
Carson	52⅜
Dackermann	44⅛
Roach	42½
Nolan	42
Lawrence	41½
Paul	40½
Lyell	39½
Larson	36
Saxton	34
Brooke	32
Small	31½
Eggert	31⅛
Treloar	30
Mizell	30
Ruth	29
Bakley	26½
Crowley	23½
G. I. Hall	18
Cox	15⅝
Davison	15
Steel	12
Deputies and Troopers	10
Baker	9
Bernius	8⅛
Phifer	7½
Cudney	3⅛
Mathis	2
Kelley	1
	1395

The following shows the various offenses for which persons were arrested during the fiscal year:

Fishing, no license	291
Hunting, no license	128
Procuring wrong license	110
Possession of protected birds	67
Firearms in woods	58

Illegal possession of game	55
Possession of hen pheasant	52
Sunday gunning	46
Possession of illegal missile	45
Illegal deer hunting	42
Hunting with automatic gun	40
Illegal net fishing	34
Illegal possession of deer	32
Giving false information to procure license	29
Hunting by auto light	27
Excess of bag limit	26
Hunting duck illegally	25
Hunting close season	24
Hunting after sunset	22
Possession of short fish	22
Alien firearms	21
Attempting to take fur-bearing animals without license	20
Killing game illegally	19
Illegal fishing	15
Possession of fish out of season	14
Artificial bait	13
Loaning or altering buttons and licenses	12
Hunting in snow	9
Training dogs at night	9
Dog running at large	9
Killing protected birds	8
Possession of short lobsters	8
Killing hen pheasant	7
Shooting from auto	7
Refusing to show license	6
Illegal trapping	5
Setting snare or trap	4
Pennsylvanians fishing on Sunday	4
Illegal possession of fish	4
Carrying gun close season	3
Spearing fish	2
Polluting waters	2
Spotlighting	2
Mutilating doe deer	2
Stealing traps	1
Mutilating bird	1
Possession of automatic gun	1
Possession of mutilated bird	1
Firearms while intoxicated	1
Baiting water	1
Nonresident buying furs, no license	1
Using gun larger 10 gauge	1
Fishing through ice	1

Operating fish pound, no license	1
Operating beam trawl	1
Illegal possession of fox	1
Shooting in squirrel's nest	1
Possession of skunk out of season, trapped	1
Giving false address	1
	1395

GAME AND FISH PUT OUT BY SPORTSMEN'S ASSOCIATIONS

We sent a questionnaire to 56 leading sportsmen's clubs asking what game and fish they had distributed since 1925 obtained from sources other than State Fish and Game Commission. Replies were received from 22. Only 12 clubs put out game, the total amount being 11,202 rabbits, 1,180 pheasants, 199 ducks, 292 quail, 4 raccoon.

Six reported that game was placed on grounds open to everyone. One reported that game was placed on a sanctuary where no hunting or trapping would be allowed for five years. Eleven clubs reported that they carried on an educational campaign against vermin. Twelve clubs reported that they provided food and cover.

Four clubs distributed fish in waters open to everyone. The total amount of fish distributed was 500 perch, 100,000 baitfish, 3,000 small mouth bass, 2,000 white and yellow perch.

DEATH OF DUNCAN DUNN

Duncan Dunn, who was superintendent of the Rockport and Forked River Game Farms, died January 18, 1932. He had been the head game keeper for the Board since April 1, 1912. A resolution adopted by the Board set forth that in his death the Board had lost an able, conscientious and industrious superintendent, whose successful work in the propagation of pheasants contributed to the fame in which New Jersey is held, on account of being heavily stocked with pheasants, and it was further noted that Mr. Dunn's ability as a game keeper was well known throughout the nation.

GAME

The indications are that in the fall of 1932 there will be excellent hunting for upland game, due to a generous stocking of the State with pheasants, quail, and rabbits, accomplished without a penny of cost to the general taxpayer, the expense of which having been met by the receipts of the Board from license fees, etc. It is safe to predict that there will be more game for the hunter then than at any time during the past generation. And it is believed also that in the season to be fixed by the Federal authorities, there will be an abundance of wild waterfowl shooting.

GAME DISTRIBUTION

During the fiscal year 1931-1932 the Commission distributed the following: 23,695 pheasants, 21,435 rabbits, and 2,958 quail; 12,454 of the pheasants were propagated and distributed from our own game farms, 4,354 were raised by the public from eggs sent from our farms, and 6,887 were purchased from dealers in the State.

The Board paid $1.00 each for 524 pheasants raised by the public from eggs furnished by us. We supplied 36 eggs to an applicant, the birds hatched to be liberated at the age of ten weeks on lands open to public hunting, under the supervision of a warden. A bag of feed and instructions for raising the birds were furnished to each applicant.

In the distribution of 38,014 pheasant eggs to applicants during the spring of 1932, returns from which are not completed at the date of this report, the age of liberation was fixed at eight weeks.

Early in the spring, 1,256 male pheasants were liberated in localities where female pheasants were known to have wintered.

BANDED QUAIL

Of the quail purchased, 2,751 were banded and liberated as follows:

County	*Birds*	*Bands*
Cape May	238	239- 476
Cumberland	238	477- 714
Salem	238	715- 952
Gloucester	238	953-1190
Camden	346	1191-1428 and 2165-2273
Burlington	346	1429-1569; 1570-1666; and 1949-2056
Atlantic	346	2057-2164 and 1-238
Ocean	238	1667-1904
Monmouth	238	2512-2749
* Mercer	192	2274-2465
Warren	22	1905-1948
Union	22	

* Forty-nine quail not banded were released in Mercer County

GAME CONDITIONS IN 1931

Protector James M. Stratton sent a questionnaire to the wardens respecting game conditions in 1931.

There are closed seasons on quail in Warren, Passaic, Bergen, Sussex, Morris, Essex, Hudson, Union, Somerset, and Hunterdon Counties until 1933, and on ruffed grouse in Essex, Union, Somerset, Hunterdon, Mercer, Middlesex, and Monmouth Counties until 1935.

The season was closed throughout the State for Hungarian partridge and wild turkey.

Principal points of the reports from the wardens follow:

No Hungarian partridges or wild turkeys were reported in any of th counties except: Burlington, 45 Hungarian partridges; Hunterdon, 15 Hungarian partridges; Passaic, 10 Hungarian partridges and 200 wild turkeys; Somerset, 30 Hungarian partridges; Warren, about 300 Hungarian partridges.

Atlantic County. Wardens Miller and Groves. Rabbits—Good supply, increase in killed, thinned out. Squirrels—Good supply, increase in killed, large number left. Pheasants and Quail—Good supply, increase in killed, small number left. Grouse—Fair supply, increase in killed, small number left. Ducks, Geese and Brant—Good supply, decrease in killed, large number left. Rails and Woodcock—Poor supply, decrease in killed, small number left. Raccoon—Poor supply, decrease in killed, small number left.

Bergen County. Wardens Small and Ruth. Rabbits, Pheasants and Grouse—Good supply, increase in killed, small number left. Squirrels—Good supply, increase in killed, large number left. Quail—Few visitors. Ducks—Fair supply, decrease in killed. Geese and Brant—None. Rails—Fair supply, decrease in killed, none left. Woodcock—Good supply, increase in killed. Raccoon—Fair supply, decrease in killed, thinned out. Closed season on quail.

Burlington County. Wardens Carson and Carslake. Rabbits—Fair supply, decrease in killed, small number left. Squirrels—Good supply, increase in killed, large number left. Pheasants—Fair supply, increase in killed, thinned out. Quail—Fair supply, increase in killed, large number left. Grouse—Fair supply, increase in killed, small number left. Ducks—Good supply, increase in killed, large number left. Geese—Fair supply, increase in killed, small number left. Brant—Poor supply, decrease in killed, thinned out. Rails—Fair supply, increase in killed, more than ever left. Woodcock—Good supply, increase in killed, more than ever left. Raccoon—Good supply, increase in killed, more than ever left.

Camden County. Warden Brooke. Rabbits—Fair supply, decrease in killed, small number left. Squirrels—Poor supply, decrease in killed, thinned out. Pheasants—Poor supply, increase in killed, small number left. Quail—Fair supply, increase in killed, small number left. Grouse—Poor supply, decrease in killed, thinned out. Ducks—Poor supply, decrease in killed, small number left. Geese—Poor supply, decrease in killed. Brant—Poor supply. Rails—Fair supply, increase in killed, small number left. Woodcock—Good supply, increase in killed, large number left. Raccoon—Fair supply, increase in killed, small number left.

Cape May County. Warden Steel. Rabbits—Good supply, increase in killed, more than ever left. Squirrels—Fair supply, decrease in killed, thinned out. Pheasants—Fair supply, decrease in killed, small number left. Quail—Good supply, increase in killed, large number left. Grouse—None. Ducks—Poor supply, decrease in killed, small number left. Geese—Poor supply, decrease in killed, more left than ever before. Brant—None. Rails—Poor supply, decrease in killed, thinned out. Woodcock—Good supply, increase in killed, large number left. Raccoon—Poor supply, decrease in killed, thinned out.

Cumberland County. Wardens Phifer and Baker. Rabbits—Good supply, increase in killed, small number left. Squirrels and Quail—Good supply, increase in killed, more than ever left. Pheasants—Fair supply, decrease in killed, thinned out. Grouse—Fair supply, increase in killed, small number left. Ducks—Good supply, increase in killed, more than ever left. Geese—Fair supply, increase in killed, large number left. Brant and Rails—Good supply, increase in killed, large number left. Woodcock—Fair supply, increase in killed, large number left. Raccoon—Fair supply, decrease in killed, thinned out.

Essex County. Warden Fred J. Hall. Rabbits—Good supply, increase in killed, small number left. Squirrels and Pheasants—Good supply, increase in killed, thinned out. Quail and Grouse—None. Ducks—Good supply, large number left. Geese and Brant—None. Rails—Poor supply, thinned out. Woodcock—Good supply, increase in killed, small number left. Raccoon—Poor supply, decrease in killed, small number left. Closed season on quail and grouse.

Gloucester County. Warden Graham. Rabbits and Pheasants—Fair supply, increase in killed, thinned out. Squirrels—Fair supply, decrease in killed, small number left. Quail—Good supply, increase in killed, thinned out. Grouse—None. Ducks—Good supply, decrease in killed, large number left. Geese—Poor supply, decrease in killed, thinned out. Rails and Woodcock—Good supply, increase in killed, large number left. Raccoon—Fair supply, decrease in killed, small number left.

Hudson County. Assistant Protector Kelley. Rabbits and Pheasants—Poor supply, decrease in killed, thinned out. Squirrels—None. Quail and Grouse—None. Ducks—Poor supply, decrease in killed, small number left. Geese—Poor supply, decrease in killed. Brant—None. Rails—Fair supply, decrease in killed, small number left. Woodcock—Good supply, increase in killed, large number left. Raccoon—None. Closed season on quail.

Hunterdon County. Warden Larson. Rabbits and Pheasants—Good supply, increase in killed, small number left. Quail—Good supply. Grouse—Fair supply. Squirrels—Good supply, increase in killed, large number left. Ducks, Geese, Brant and Rails—None. Woodcock—Poor supply, decrease in killed. Raccoon—Fair supply, decrease in killed, small number left. Closed season on quail and grouse.

Mercer County. Warden Nolan. Rabbits—Good supply, increase in killed, small number left. Squirrels—Fair supply, decrease in killed, thinned out. Pheasants and Quail—Good supply, increase in killed, thinned out. Grouse—None. Ducks—Good supply, increase in killed, more than ever left. Geese and Brant—Poor supply, decrease in killed. Rails—Fair supply, increase in killed. Woodcock—Good supply, increase in killed, thinned out. Raccoon—Good supply, increase in killed, more than ever left. Closed season on grouse.

Middlesex County. Wardens Hugg and Paul. Rabbits—Good supply, increase in killed, small number left. Squirrels—Fair supply, decrease in killed, thinned out. Pheasants—Good supply, increase in killed, thinned out. Quail—Good supply, decrease in killed, large number left. Grouse—Slowly increasing. Ducks—Good supply, increase in killed, large number left. Geese and Brant—None. Rails—Poor supply, decrease in killed, thinned out. Woodcock—Good supply, increase in killed. Raccoon—Poor supply, decrease in killed, thinned out. Closed season on grouse.

Monmouth County. Warden Lyell. Rabbits and Pheasants—Good supply, increase in killed, large amount left. Squirrels and Quail—Good supply, decrease in killed, large number left. Grouse—Poor supply. Ducks and Geese—Poor supply, decrease in killed, small number left. Brant—None. Rails—Poor supply, decrease in killed, thinned out. Woodcock—Fair supply, increase in killed, large number left. Raccoon—Fair supply, decrease in killed, small number left. Closed season on grouse.

Morris County. Wardens Bernius, Roach and Lawrence. Rabbits, Squirrels and Pheasants—Good supply, increase in killed, thinned out. Quail—A few coveys. Grouse and Ducks—Fair supply, increase in killed, large number left. Geese and Brant—None. Rails—Very few, very few killed, very few left. Woodcock—Good supply, increase in killed, thinned out. Raccoon—Good supply, increase in killed, small number left. Closed season on quail.

Ocean County. Wardens Evernham, Crowley and Saxton. Rabbits, Squirrels and Quail—Good supply, increase in killed, large number left. Pheasants and Grouse—Fair supply, increase in killed, thinned out. Ducks, Geese and Brant—Good supply, increase in killed, more than ever left. Rails and Woodcock—Poor supply, decrease in killed, small number left. Raccoon—Fair supply, increase in killed, thinned out.

Passaic County. Warden Williams. Rabbits, Squirrels and Pheasants—Good supply, increase in killed, thinned out. Quail—Poor supply. Grouse

—Good supply, increase in killed, more than ever left. Ducks, Geese, Brant and Rails—Poor supply, decrease in killed, small number left. Woodcock—Good supply, increase in killed, more than ever left. Raccoon—Fair supply, about the same number killed, large number left. Closed season on quail.

Salem County. Wardens Mizell and G. I. Hall. Rabbits—Fair supply, decrease in killed, small number left. Squirrels—Good supply, increase in killed, large number left. Pheasants—Fair supply, increase in killed, thinned out. Quail—Good supply, decrease in killed, large number left. Grouse—Poor supply, decrease in killed, small number left. Ducks—Good supply, decrease in killed, more than ever left. Geese—Poor supply, decrease in killed, more than ever left. Brant—Poor supply, decrease in killed, small number left. Rails—Good supply, increase in killed, large number left. Woodcock—Good supply, decrease in killed, more than ever left. Raccoon—Good supply, increase in killed, small number left.

Somerset County. Wardens Hill and Eggert. Rabbits—Good supply, decrease in killed, thinned out. Squirrels—Good supply, increase in killed, more than ever left. Pheasants—Fair supply, decrease in killed, small number left. Quail and Grouse—Poor supply. Ducks—Poor supply, decrease in killed, thinned out. Geese, Brant and Rails—None. Woodcock—Fair supply, increase in killed, large number left. Raccoon—Fair supply, decrease in killed, thinned out. Closed season on quail and grouse.

Sussex County. Wardens Treloar and Bakley. Rabbits—Good supply, small increase in killed, thinned out. Squirrels—Good supply, increase in killed, large number left. Pheasants—Good supply, small increase in killed, small number left. Quail—Good supply. Grouse—Good supply, increase in killed, large number left. Ducks, Geese, Brant and Rails—None. Woodcock—Good supply, small increase in killed. Raccoon—Good supply, small increase in killed, thinned out. Closed season on quail.

Union County. Warden Dackermann. Rabbits—Good supply, increase in killed, thinned out. Squirrels—Fair supply, decrease in killed, thinned out. Pheasants—Good supply, decrease in killed, thinned out. Quail—Fair supply. Grouse—Poor supply. Ducks—Good supply, decrease in killed, large number left. Geese—Poor supply, decrease in killed, thinned out. Brant and Rails—None. Woodcock—Fair supply, increase in killed, large number left. Raccoon—Fair supply, increase in killed, small number left. Closed season on quail and grouse.

Warren County. Assistant Protector Cudney and Warden Cox. Rabbits—Good supply, decrease in killed, large number left. Squirrels—Good supply, increase in killed, large number left. Pheasants—Fair supply, decrease in killed, large number left. Quail—Good supply. Grouse—Good supply, increase in killed, large number left. Ducks—Poor supply, increase in killed, small number left. Geese, Brant and Rails—None. Woodcock—Good supply, increase in killed. Raccoon—Good supply, increase in killed, large number left. Closed season on quail.

FORKED RIVER AND ROCKPORT GAME FARMS

The 20th annual report of the operation of Game Farms for the year ending June 30, 1932, is made by Malcolm Dunn, Assistant Superintendent, who took charge of both farms on the death on January 18, 1932, of his father, Duncan Dunn, Game Farm Superintendent.

Forked River Farm. We plowed all the newly cleared land (16 acres) and seeded it with rye for a green cover crop, which when grown was plowed under. Carted 700 rearing coops, 700 bottom boards, 700 feed boards, and 250 frames from rearing fields to barn for disinfection, etc., and repaired shipping crates; carted 2 carloads of coal (50 tons) and 2 carloads of lime (40 tons) from the depot, and spread the lime on the fields and pens, and also spread 200 tons of manure on the rearing fields. Cut, carted, and sawed 50 loads of wood, which had been charred by a forest fire, for use in the rearing fields in summer. Plowed 14 acres of land and seeded it in oats and grass seed as a preparation for rearing. Plowed and seeded all the winter holding pens after the pheasants had been moved. Carted 300 loads of gravel and spread it on the main farm road, packed eggs for distribution by wardens and spent considerable time on trips buying setting hens.

Built two new holding pens for quail, each 40′ wide and 150′ long and 7′ high and covered over the top with wire. Built for quail, 50 breeding coops, 70 rearing coops, and 30 frames. Also built 100 new bottom boards and 30 frames for pheasant use. Built a pen 50′x75′ for deer. Forty-eight pairs of quail were paired up in coops, and a fence was built around the quail breeding pens so that the quail would not be disturbed during the laying season. We did considerable painting of buildings.

We started the season on the Forked River Farm with 48 pairs of quail, but have only 40 pair left to date, July 1st, and from these quail I have set 700 eggs and have 350 young ones hatched which are doing very good. Obtained 2,800 quail from W. J. Mackensen, Yardley, Pa., and of this number 49 were dead, 49 were kept at the Forked River Farm for breeders, and the balance were banded and then liberated by the wardens.

There were 60 owls, 70 hawks, 150 crows, 35 opossums, 10 skunks, 60 cats, and about 2,500 rats killed.

Rockport Farm. Took care of rearing fields equipment. We carted 50 tons of coal and 25 tons of lime from Hackettstown to the farm and spread the lime on the pens and fields. Cleared the hedge-rows on the Kruger Farm to destroy hiding places for vermin. Cut 40 posts in the mountain and used them to replace some that were rotted off in the holding pens. Cut 12 loads of cedar brush and carted it to the breeding pens for shelter. Took all the fences down around the rearing fields on the main farm, and rebuilt fences around the fields on the Fisher Farm which was used this season for raising pheasants. Carted 100 loads of stone and 75 loads of gravel to repair the road leading to the fields on the Fisher Farm. Disinfected hatching boxes, etc. Plowed and seeded 40 acres of land on the Fisher Farm and 30 acres on the main farm with oats and

grass seed. Cut and carted 27 loads of hay to the barn and cut and stacked 8 loads of wheat, carted 50 loads of manure from the barns and spread it on the fields. Plowed and seeded all the holding pens. Packed eggs for the wardens for distribution, and spent considerable time on trips buying setting hens. Built 2 new feed shacks each 10′x14′, 50 new rearing coops.

There were 14 foxes, 40 owls, 60 hawks, 45 cats, 175 crows, 12 weasels, 7 skunk, and about 2,000 rats killed.

Exhibits of game were made from both farms for fairs at Bridgeton, Branchville, Flemington, and Trenton, and for the Asbury Park Poultry Show.

During the year the following number of pheasant eggs were set, hatched and distributed from both farms:

Eggs set at Forked River Farm..	15,500	Young birds hatched....	10,800
Eggs set at Rockport Farm.....	15,600	Young birds hatched....	11,000
	31,100		21,800

Pheasants eggs distributed throughout the State:

From Forked River Farm	16,784
From Rockport Farm	21,266
	38,014

At Rockport the pheasants were affected with the same disease as last year, and the mortality has been very high. I took some of these birds to the Rockefeller Institute and the New Jersey Agricultural Experiment Station, and at neither place were they able to give me a remedy. The only thing I have been able to do so far was to use precautionary methods to prevent it spreading to other fields.

The pheasant record is as follows:

Forked River Farm:

Breeding birds on hand 6/30/31	1,128
Mature birds raised	7,368
Birds purchased and cared for	57
Estimate of young birds on hand 6/30/32	9,000
Birds raised and held over to replace breeders which died	200
	17,753

Rockport Farm:

Breeding birds on hand 6/30/31	975
Mature birds raised	5,086
Birds purchased and cared for	600
Estimate of young birds on hand 6/30/32	8,500
Birds raised and held over to replace breeders which died	275
	15,436

Forked River Farm:

Birds liberated	7,368
Purchased birds liberated	57
Breeding birds on hand 6/30/32	1,160
Estimate of young birds on hand 6/30/32	9,000
Birds died and escaped	168
	17,753

Rockport Farm:

Birds liberated	5,086
Purchased birds liberated	572
Breeding birds on hand 6/30/32	1,171
Estimate of young birds on hand 6/30/32	8,500
Birds died and escaped including purchased birds	107
	15,436

TO ENCOURAGE GAME BREEDING

An outstanding law approved June 14, 1932, was an act to encourage the propagation of game birds and game animals and the sale of propagated game birds and animals.

This subject has been given attention of late by many States and our Board gave careful study to it for two years. There has been an increasing demand from farmers and sportsmen for authority to raise game. The Breeders' License Act of March 27, 1913, did not meet the present situation in that its terms were not clear and its privileges were limited. Many conferences were held with representative sportsmen. The Board always had in mind that any act should safeguard the game of the State so that it would not become the prey of a special class, yet at the same time the Board was enthusiastically in favor of increasing the breeding of game. Several bills were introduced in the Legislature on the subject by various interests, but the only bill which received our approval was Assembly 265, which became a law.

BENEFITS TO FARMERS

The New Jersey farmer receives marked benefits under the present laws. More farmers hunt, it is safe to say than any other class of citizens, and he and his family may hunt and fish without a license on his farm, whereas the stocking of game and fish is kept up from the fees of sportsmen who must take out licenses to hunt and fish. The farmer may sell hunting and fishing privileges, but, of course, we do not stock lands unless they are open to the public holding regular licenses. The farmer is protected by a strong law respecting trespassing on his lands for the purpose of hunting and fishing. He may arrest trespassers without warrant where the land is posted forbidding trespassing, hunting and fishing. The law provides a fine of $500 for wilful destruction of property. With permits he may kill deer doing damage to his

cultivated lands and trap or kill rabbits and squirrels which do him damage. The Board protects him without cost the year around in enforcement of the laws to save insectivorous birds, from whose activity in destroying insects, he receives a direct and valuable dividend.

U. S. WATERFOWL SEASON

The action of the Federal authorities in fixing a thirty days' open season on waterfowl, from November 16 to December 15, 1931, was not received favorably by the hunters. The Federal authorities held that a drought of two years had made emergency condition for the protection of the waterfowl of the continent, and that in large areas of the United States and Canada, through lack of water on breeding grounds essential to rearing the young birds, there was widespread destruction among the former hoards of the wild fowls which migrated to our several States.

President Burlington was appointed by the Board a committee of one to take up with the Government the matter of further regulations. He urged that arrangements should be made to spread the thirty days' season with rest days over a three months' period which would save the ducks, help to ease the unemployment conditions and provide for a better enforcement of the regulations. The Government, however, adhered to the thirty days' season.

Before the waterfowl season for 1932 was fixed by the Government for two months from November 1 to December 31, Paul G. Redington, Chief, Bureau of Biological Survey, Washington, made inquiries respecting the ideas of our Board on the subject. After consideration by the Board, the President was authorized to send Mr. Redington a letter, which follows:

Question 1. If any of the following open seasons—one month, six weeks, two months—should be permitted by Federal regulation, please indicate by month and day the time (between October 1 and January 15) of the open season that would be most suitable for your State.

Answer. If one month was permitted by Federal regulations we would prefer November 16 to December 15.

If six weeks were permitted we would prefer November 1 to December 15.

If two months were permitted we would prefer November 1 to December 31.

Question 2. Would you suggest the adoption of an open season with a reduced number of shooting hours daily? If so, at what hour in your opinion should shooting open and at what hour should it close?

Answer. We believe that shooting should not begin before seven A. M. or be continued after four P. M.

Question 3. What is your opinion of the rest day principle as applied to open seasons on migratory waterfowl?

Answer. We are of the opinion that the rest day principle as per our answer to question No. 4, should prevail, that is, three rest days per week, more particularly if the season is shortened to one or two months.

Question 4. If, for example, a 30-day season is allowed, would you prefer it extended over a three-months' period by the insertion of weekly rest days, or would you recommend a solid season of thirty consecutive days?

Answer. Our preference in New Jersey would be that no matter what time was allotted by the Federal Government that it be spread over a period between October 16th and January 31st, with rest days during this period that would confine the actual shooting days to the period allotted by the Government. If the period allotted was two months with Sunday, Wednesday and Thursday rest days, this would give us 60 days or two months' shooting, which would be ideal for New Jersey.

Question 5. If you favor an open season with weekly rest days, please indicate on what days in each week shooting should be prohibited in your opinion.

Answer. Sunday, Wednesday and Thursday.

Question 6. Would you suggest a further reduction of bag limits?

Answer. No, further reduction would tend to make many shooters disregard the bag limit entirely and would be practically unenforceable.

Question 7. Would you suggest the adoption of an amendment to prohibit shooting wild fowl over baited grounds and waters?

Answer. The law in New Jersey now prohibits baiting closer than 400 feet. If prohibition of shooting waterfowl over baited grounds and waters applied to the whole United States, New Jersey would be willing to go along with it.

Question 8. Would you suggest the adoption of an amendment to prohibit or restrict the use of live decoys?

Answer. No, the system of decoying in New Jersey does not tend to slaughter, as we understand it does in other parts of the United States.

STATE WATERFOWL SURVEY

In February, 1932, the Board sent a questionnaire to persons familiar with the waterfowl localities in the State in view of ascertaining the reaction to the season from November 15 to December 16, in 1931, promulgated by the U. S. Bureau of Biological Survey. The replies indicated that there had been no noticeable shortage of waterfowl.

All the observers were wardens, with the exception of Commissioner James R. Hensler, Toms River, Ocean County, and the following guides: John Inman, Sr., W. H. Ridgway, Curtain Fenimore, and Lester Cooperthwaite, Ocean County.

The State was divided into three groups as follows, for twenty-four observers:

The Atlantic Coast, thirteen observers.

Delaware River and Bay, six observers.

North Jersey: Troy Meadows on the border of Essex and Morris Counties; Hackensack River, five observers.

The short season tended to conserve the fowl. Owing to the mild weather the birds arrived later than usual.

Sixteen of the twenty-four reported the Government season not the best of the year, and the same number reported more geese, brant and ducks than in former years.

As might be expected the Government regulations deprived the guides on the Atlantic Coast of considerable of their former employment.

Some confusion arose early in the year of 1932 as to the effect of the Government regulations fixed for 1931. It was claimed by some that the one month season only closed the shooting of waterfowl during 1931 and that the former season became re-established in 1932. The Federal authorities advised us that the one-month season for 1931 giving protection to waterfowl remained in effect until new seasons were approved and proclaimed.

Albert Stadlmeir, U. S. Game Warden, appeared before the Board in the matter of the enforcement of the Federal law for duck, etc., hunting, and he was informed that the Board would be glad to cooperate with the Government. The Board's Protector was directed to instruct our wardens to report to him any violations, which in turn were to be reported to the Federal authorities. Only one violation was reported.

SHORTAGE OF NATURAL WATERFOWL FOOD

In June the Board received complaints that there was a shortage of eel grass in the brackish water bays in New Jersey, making a shortage of food for ducks, geese and brant. We issued an order to our wardens to plant grain wherever they found ducks, geese or brant unable to obtain enough food to start them on their migrations north. We found on a survey of the bays that there were very few ducks, geese, or brant left. Evidently they had migrated north, and it was unnecessary to plant grain.

In conjunction with Mr. A. C. Martin, of the U. S. Biological Survey, an investigation of the diminution of eel grass in the bays along the New Jersey coast was made, with the following findings: The crop of eel grass appears to have been severely decimated. In parts of Barnegat Bay, particularly at Manahawkin Flats and flats near the Barnegat lighthouse, there is an extensive but sparse representation of eel grass. In a few limited areas the plant was common, and while the residents claim that the depletion has been in progress for two or three years, still there was enough of the plant in the bays last fall to produce very considerable amounts of drift piled up in windrows after northeast storms. Many tons of this debris have been removed annually for fertilizer. The conclusion of this investigation by the Bureau of Biological Survey and the Fish and Game Commission shows circumstantial evidence pointing to increased salinity due to decreased rainfall in 1929-31 as cause of eel grass shortage. Storm damages and high temperatures may have been contributory factors. None of these factors are subject to human control. It seems probable that with the return of more normal climatic conditions, eel grass will regain its former abundance. Weather reports now show a rainfall which is just about normal.

We found that the same condition held in Back Bay, Virginia, and in Currituck Sound, North Carolina, during the fall of 1931.

TO CONTROL FIRES

Early in the spring the wardens were instructed to take up with farmers and others the desirability of controlling burnings of meadows, etc., in order to save game, and to cooperate with the State fire wardens respecting illegal burnings. To prevent the destruction of duck eggs from forest fires and to save nesting birds and rabbits, they were advised to see that burnings are conducted as early in the year as possible, when there is less danger of fire spreading. A large loss from fires occurs between March 15 and June 15.

Colonel Leonidas Coyle, State Fire Warden, cooperated with us by notifying his fire wardens to urge early burning, and notifying them that when permits to burn are issued after March 15 and before June 15, the permittees should be warned to give due consideration to game. A law enforceable by the State Fire Warden provides that persons burning clearings must have a permit if within 200 feet of woodlands or in places where fire is likely to be carried to woodlands.

The forest fires in the State from January 1 to June 30, 1932, burned over an area of 48,903 acres, and some good game cover was burned. There were fires in all counties except Essex and Hudson. The larger fires were in the following counties: Atlantic, 4,321 acres; Burlington, 3,524 acres; Camden, 8,338 acres; Cumberland, 7,165 acres; Gloucester, 4,149 acres; Monmouth, 6,507 acres; Morris, 2,593 acres; Ocean, 6,176 acres; Warren, 1,083 acres.

FLIGHT OF HAWKS

Observations were made late in September and in October of the southern flights of hawks from a southerly point in Cape May County, the observers being Warden George E. Groves, of our force, Dr. Thomas E. Winecoff, in charge of Research of the Pennsylvania Game Commission, and Professor George Saunders, of Cornell University, representing the National Audubon Society. All hawks are protected by law excepting goshawks, Cooper's hawks, sharp shinned hawks and duck hawks. It had been alleged that in this flight many protected birds on their southern flight, which also gather at the point, are killed by persons shooting hawks. About 500 hawks were shot after Dr. Winecoff's arrival, and he reported that those killed were almost wholly sharp-shinned hawks, with a few Cooper's hawks and a very few duck hawks, all three of these species being destructive to song and insectivorous birds. Dr. Winecoff noted more pigeon hawks than he has seen all together over the country as a whole in the last 35 years. Before he arrived six of these hawks, while protected by law, yet prey on insectivorous birds, had been killed, and instead of prosecution, the gunners were instructed to identify the birds, and none of the observers could learn of a single protected bird, whether hawk or other species, was killed afterward. Unrestrained slaughter was stopped.

It is well known that the hawks which gather at this point kill thousands of protected birds and the killing of the unprotected hawks is a distinct conservation measure.

VERMIN

The Board is taking steps to provide for a superintendent of vermin control. His first operations will be on the lands acquired by the Board for public shooting and fishing grounds and also on the 58,607 acres of State forests, under the control of the Conservation and Development Commission. As funds warrant, there could be established a force of vermin control men who could cooperate with sportsmen.

During the year the Board issued a bulletin calling attention that observations show that where large tracts of land have been posted against gunning, vermin increase on such lands more rapidly than do the game upon which they prey, and High Point Park and Havemeyer Estate were cited as examples of this mistaken idea on conservation. On lands open to hunting and trapping the gunners manage to kill off or check the foes of birds and small game.

During the fiscal year 1,091 foxes were reported killed other than by wardens.

Hunters, in making their returns of vermin taken in 1930, the last audited census returns, show that 909 cats, 5,181 weasels, and 2,239 red squirrels were killed by them.

Reports of wardens for the fiscal year showed that the following vermin were killed by them: Cats, 568; hawks, 91; dogs, 32; weasels, 24; crows, 82; owls, 5; snakes, 8; foxes, 44; opossums, 10; red squirrels, 11; skunks, 16; woodchucks, 2.

At our game farms 5,245 vermin were destroyed, which included 4,500 rats.

DEER

During the deer season, consisting of four days, from December 17th to the 21st, both dates inclusive, Sunday excepted, there were 1,702 bucks legally killed and reported; 149 does or illegal bucks with horns less than three inches long were found dead in the woods or confiscated from hunters who were prosecuted. This is an increase of 218 bucks over last year, when 1,484 bucks were killed and also an increase of 33 does illegally killed, 116 does having been killed last year. The carcasses of the illegal deer fit for food purposes were given to hospitals, charitable institutions, or distributed to poor people.

There were 54 prosecutions for violations of the deer act, and penalties from $50.00 to $100.00 were imposed upon each violator. The offenses were as follows:

17 persons were prosecuted for using illegal missiles.
10 for hunting deer by the aid of lights attached to automobiles.
5 for hunting deer at night.
19 for possession of does or buck fawns with horns less than three inches in length.
2 for mutilating the carcass of doe deer to conceal sex.
1 for hunting deer with rifle.

There were five accidents during the deer season, two self-inflicted and three were caused by other persons. One person was killed in Sussex County by the accidental discharge of a hunting companion's gun. One person was slightly

injured in Atlantic County by a stray shot fired by some unknown person. One person was slightly injured in Burlington County by being shot in the foot by the accidental discharge of his own gun. One person was slightly injured in Cumberland County by a shot fired by some unknown person. One person was quite seriously injured in Ocean County by being shot in the hand by the accidental discharge of his own gun. No persons were killed or injured in being mistaken for deer.

The small number of accidents was no doubt due to the law in this State which prohibits the use of rifles or missiles larger than buckshot for hunting deer, which law also provides that no deer shall be killed except those having horns at least three inches long, which provision has a tendency to make the hunter pause and determine at what he is shooting.

During the deer season which recently closed in Pennsylvania, where bucks and also does were permitted to be killed, and rifles used, it is reported that between 40 and 50 hunters were killed, and more than 100 injured, and it was further reported that 10 of the deaths were the result of persons being shot in mistake for deer.

There were 30 permits issued under the deer act to owners or lessees of land under cultivation or the authorized agents of such owner or lessee to kill deer that might be found upon said land, excepting that no doe deer shall be killed during the open season for deer. Five deer were reported killed under these permits as follows: Monmouth County, 1; Ocean County, 2; Burlington County, 1; Atlantic County, 1.

The following are the counties in which deer were killed:

County	*Bucks*	*Does or Fawns*
Atlantic	189	6
Bergen	56	16
Burlington	500	55
Camden	14	..
Cape May	3	..
Cumberland	45	2
Essex	16	..
Gloucester	5	..
Hudson	..	..
Hunterdon	8	3
Mercer	21	3
Middlesex	3	..
Monmouth	40	4
Morris	139	11
Ocean	322	25
Passaic	71	3
Salem	..	..
Somerset	42	14
Sussex	163	5
Union	1	..
Warren	64	2
	1,702	149

At other times during the year there were 154 deer killed by automobiles, railroad trains and other agencies, making a grand total of 2,005 deer reported killed during the year. The deer found dead which were not fit for food were buried, and the others given to charitable institutions.

During December, other than the open season for deer, 26 dead deer were accounted for as follows, being killed by autos, hunters, or found dead:—Burlington County, 2 by auto; Morris County, 2 by auto, 5 by hunters; Hunterdon County, 3 found dead; Monmouth County, 1 by auto; Mercer County, 2 by auto, 1 by hunter; Ocean County, 2 by auto; Atlantic County, 2 by auto; Passaic County, 2 by auto, 4 by hunters.

HUNTING ACCIDENTS

There were two fatal accidents during all the hunting of the year, one being among the five accidents during the deer season, and one being among the 17 accidents during the open season for small game.

RACCOON HUNTING

Raccoon hunting is growing in popularity. On the plea that the fur of the raccoon is more valuable the later in the year it is taken, the Legislature fixed a season for trapping raccoon from November 1 to December 31, except during the deer season. The former season opened October 1 and continued to December 15. The new law fixes a bag limit of 15 raccoons, the first time a bag limit was ever established in this State on these animals.

It is estimated that there are at least 2,000 hunters in the State who hunt raccoon, and that in Middlesex County alone there are 200. There is a demand from raccoon hunters in Middlesex County for a law to fix the season from October 20 to January 15, both dates inclusive, except during the open season for deer.

We find seasons in nearby States as follows:

Connecticut—October 21-December 31.
Maryland—November 1-January 31.
New York—November 10-February 10.
North Carolina—November 15-February 15.
Pennsylvania—November 1-December 31 in twenty counties and October 15-December 15 in all other counties; bag limit, three a day, ten in a season.

A law has been proposed providing as follows: A special license to hunt raccoon, making it unlawful for a person not so licensed to hunt raccoon with either dogs or guns, but any person without firearms or dogs may accompany a specially licensed raccoon hunter; that a person holding a special license may train his dogs at night between sunset and sunrise between October 1 and October 19, both dates inclusive; that it shall be lawful to take raccoons during the season with dogs and firearms including a rifle of .22 calibre and a shotgun not larger than .410; that it shall be unlawful to take raccoon at any time or in any manner between sunrise and sunset; that it shall be unlawful for any person to have in possession, sell or offer for sale any raccoon unless such person has been given that privilege through the special license; that no taxidermist

or dealer in furs shall accept any raccoon from any person who cannot produce evidence that he is a specially licensed raccoon hunter; that it shall be unlawful to take raccoon from den trees at any time; and that it shall be unlawful to trap raccoon at any time.

It appears that raccoon are born in April and May, varying with the altitude and that the young remain with the parents for a year or more. The Riverside Natural History contains a statement that there is only one species of raccoon in New Jersey, but that there is an interesting difference in their habits; some nest in hollow trees and some in burrows made in the sides of ditches or streams.

RABBIT RAISING

The Board made inquiry into the advisability of purchasing rabbits in the open market for stocking, in view of some suggestions that rabbits could easily be raised for this purpose within this State. A report on rabbit raising was requested of Assistant Game Farm Superintendent Dunn. He said that they had experimented at the Forked River Game Farm in the raising of rabbits, but without success. An attempt was made to raise rabbits in an area of eight acres surrounded with a fence seven feet high and having the wire on the bottom put into the ground about eighteen inches. The area consisted of oak woods, pine woods and cleared land. Eighty rabbits were put in the enclosure, brush furnished for hiding places, and rape and clover were planted for food. In addition, feeding stations were established, where they were fed oats and bran mixed and also corn on the cob, most of the feeding being done in the winter. The first summer the rabbits did well, but it was necessary to trap a number of bucks and release them on the farm. It was noticed that there was a lot of fighting among the animals and in some cases the bucks killed one another. The following year the rabbits did not do so well, as many were found dead, the dead ones being very thin and their deaths were due to ticks and grubs. Live rabbits were put in to replace the dead ones, but they failed to multiply. It was thought that the failure was due to the fact that the land was low and sandy, depriving the rabbits of finding holes in the ground to enter and thereby keeping themselves free from ticks and grubs. Another method of raising rabbits in hutches, the same as tame rabbits, was tried, but only in a few cases was there any reproduction and in a few instances the does killed the young after they were born.

The Board decided that it would continue the policy of purchasing rabbits in the open market, but at the same time was in favor of securing any rabbits which could be raised in the State.

FISH

At the end of this report will be found a detailed statement of the Board's stocking of the fresh waters. The fishing season produced gratifying results as to the size and abundance of the catch. The operations of the hatchery are noted in the following pages, together with detailed reports on trout conditions for 1932.

There was a total distribution of 118,223,603 fish by the State as follows:

From the State Fish Hatchery at Hackettstown	87,564,372
From the State Shad Hatchery at Hancock's Bridge, shad, yellow and white perch fry	30,205,000
From netting various waters	454,231
Total	118,223,603

The United States Bureau of Fisheries distributed in the State during the year ended June 30, 1932, fish as follows: Lock Leven trout, 1,500; brook trout, 8,000; crappie, 750; large mouth black bass, 6,784; small mouth black bass, 1,000; bream, 7,800; yellow perch, 275; total, 26,109.

RECLAMATION OF FISH

We netted 454,231 fish from the following waters, which were planted in lakes and streams opened to those holding fishing licenses.

Split Rock Reservoir: Black bass, 3,580; yellow perch, 117,025; pickerel, 10,805; crappie, 588; sunfish, 17,725; shiners, 10,000; catfish, 14,945. Total, 174,668.

Manasquan River: White perch, 600; yellow perch, 150. Total, 750.

Swenson Pond, near Hackettstown: Sunfish, 1,200.

Intake Reservoir, owned by City of Newark: Black bass, 50; perch, 450; pickerel, 50; sunfish, 450. Total, 1,000.

Delaware and Raritan Canal, when the canal was drained for the winter: Black bass, 3,940; crappie, 3,340; white and yellow perch, 4,060; catfish, 800; baitfish, 24,000. Total, 36,140.

Salem County streams: Calico bass, 5,642; sunfish, 8,736; white perch, 38; shiners, 1,568; pickerel, 5; yellow perch, 362; black bass, 223; catfish, 12,527. Total, 29,101.

Gloucester County streams: 200,000 minnows.

Maurice River, below dam at Millville: Yellow perch, 1,500; white perch, 70; pickerel, 5. Total, 1,575.

Cohansey River, below dam at Bridgeton: Yellow perch, 82; white perch, 208; pickerel, 18; calico bass, 22; sunfish, 41. Total, 371.

Boonton Reservoir: Black bass, 609; pickerel, 207; sunfish, 8,610. Total, 9,426.

POLLUTIONS

The President attended a meeting of the New Jersey section of the Tri-State Anti-Pollution Commission, held at New Brunswick on October 7, and made an address on oil pollution as affecting aquatic life. It is interesting to note that the President participated in the drawing of the present Federal law respecting pollutions passed in 1924.

We investigated several cases where pollution was alleged, but there was only evidence for prosecution in two of them. John Kromsfield was penalized $200 for polluting Dellaka Brook, and a like fine was imposed on John Luczurn for polluting Burnett's Brook.

It is gratifying to learn that many miles of excellent fishing, particularly for Oswego or large mouth bass and crappie or calico bass, have been restored to the Delaware River. A quarter of a century ago bass provided much food and sport in the Delaware valley, but the fish appeared to have been almost exterminated by the use of the river for the dumping of sewage. Years of work by State health authorities and the activities of sportsmen's organizations brought about laws to control the dumping of sewage into the stream. Phillipsburg was the first important locality to install a filtration system and some years later the city of Trenton installed a sewage disposal plant. Many years ago the State Board of Health was able to stop the pollution of Maurice River, since which time it has been a notable stream for the catching of shad.

The State Board of Health has stringent laws respecting pollutions and has done excellent service in the past several years in requiring the installation of sewage disposal plants for many municipalities and industrial concerns. Recently that Board made a survey of the Raritan River watershed, and served notice on 14 municipalities to cease polluting the river, and also served such notices on 14 individuals discharging into privately owned sewers emptying into that river. That Board ordered installed during the year improvements to sewage treatment plants at Tenafly, Greystone Park State Hospital, Washington and Butler. Two new plants for treatment of industrial waste were installed, one at the Bakelite Corporation, Bound Brook, and one for the O'Dowd Dairy at Pine Brook. In addition that Board has approved plans for five sewage treatment plants and one for a plant for trade wastes.

HATCHERY OPERATIONS

Charles O. Hayford, Superintendent of the Fish Hatchery at Hackettstown and in charge of the Shad Hatchery at Hancock's Bridge, in his twentieth annual report for the fiscal year ending June 30, 1932, says:

The output of the Hackettstown Hatchery for the past fiscal year is shown by the following table:

	Inches	*Raised July 1, 1931, to June 30, 1932*	*Disposed of*	*Estimated Number On Hand*
Brook Trout	3– 4	300,000		300,000
" "	6– 7	28,700	28,700	
" "	6– 8	2,900	2,900	
" "	7– 9	26,475	26,475	
" "	8–10	34,305	31,305	3,000
" "	10–12	4,925	4,925	
" "	10–14	1,890	1,890	
" "	12–14	1,250	1,250	
" "	14–17	475	475	
Brown Trout	2– 3	456,000	56,000	400,000
" "	4– 6	3,150	3,150	
" "	6– 8	27,000	7,000	20,000
" "	7– 9	5,700	5,700	
" "	8–10	117,157	117,157	
" "	10–12	52,916	52,916	
" "	12–14	17,290	17,290	
" "	14–18	579	579	
" "	16–20	560	560	
Rainbow Trout	1– 2	350,000		350,000
" "	4– 6	36,000	6,000	30,000
" "	6– 8	32,000	9,000	23,000
" "	8–10	101,240	101,240	
" "	10–12	53,255	53,255	
" "	10–14	28,975	28,975	
" "	12–14	15,000	15,000	
" "	12–16	75	75	
Yellow Perch	fry	86,600,000	86,600,000	
" "	4– 6	1,000	1,000	
Large Mouth Bass	1	200,000		200,000
" " "	2– 3	44,650	44,650	
" " "	3– 4	35,400	35,400	
Small Mouth Bass	1	75,000		75,000
" " "	2– 3	20,725	20,725	
" " "	3– 4	25,375	25,375	
" " "	4– 6	1,750	1,750	

	Inches	Raised July 1, 1931, to June 30, 1932	Disposed of	Estimated Number On Hand
Common Sunfish	4–6	1,010	1,010	
Bluegill Sunfish	fry	200,000		200,000
" "	1–2	160,000	160,000	
" "	2–3	94,600	94,600	
" "	4–6	400	400	
" "	6	45	45	
Crappie	2–3	600	600	
Catfish	fry	50,000		50,000
"	4–8	7,000	7,000	
		89,215,372	87,564,372	1,651,000
Output from Hancock's Bridge Hatchery, Salem County—				
Yellow Perch	fry	28,800,000	28,800,000	
White Perch	fry	600,000	600,000	
Shad	fry	805,000	805,000	
		30,205,000	30,205,000	
Total from both Hatcheries		119,420,372	117,769,372	1,651,000
In addition to the above:				
Various fish netted in State Reservoirs			454,231	
Total Distribution			118,223,603	

The following tables show distribution of trout, bass, perch, fry, bluegill sunfish, and catfish, during the past five years:

Trout over 6 inches

1927-28	302,622
1929-29	423,505
1929-30	446,882
1930-31	467,390
1931-32	506,667
	2,147,066

Trout under 6 inches

1927-28	345,900
1928-29	310,600
1929-30	203,300
1930-31	90,400
1931-32	65,150
	1,015,350

Bass Fingerlings

1927-28	190,300
1928-29	285,300
1929-30	131,000
1930-31	102,025
1931-32	127,900
	836,525

Yellow Perch Fry

1927-28	96,325,000
1928-29	104,800,000
1929-30	113,800,000
1930-31	112,000,000
1931-32	115,400,000
	542,325,000

Bluegill Sunfish Fingerlings

1927-28	607,300
1928-29	376,475
1929-30	391,950
1930-31	141,700
1931-32	255,000
	1,772,425

Catfish Fingerlings

1927-28	58,700
1928-29	55,900
1929-30	24,500
1930-31	74,600
1931-32	7,000
	220,700

Shad Work—This season the improvement of the shad catch in the Maurice River offset the continued loss of the catching of shad in Delaware River and Bay. In the Delaware River and Bay, the total shad catch reported by the New Jersey fishermen this year was only 7,142, as against 12,796 last year; the Maurice River produced 38,500 shad, as compared with 22,500 the previous year. Two reasons for this increase of the shad in the Maurice River are: First, this stream, with the help of the State Board of Health, has been kept free from pollution. As a result, not only do the shad make their annual runs in increasing numbers, but non-migratory native fish flourish and furnish an important food supply. Second, the Maurice River shad fishermen are cooperating with the Fish and Game Commission in saving the eggs from ripe or spawning shad.

New Work—During the past fiscal year the Commission spent $6,000 dividing the old supply reservoir into four ponds; completing two new ponds at the rearing station, each 300 feet long, 15 to 20 feet wide and 3 feet deep; grading and seeding one thousand feet of pond banks and putting in 1,000 feet of stone and gravel base for a new road at the rearing station.

Conferences were held at the hatchery at various times during the year with Dr. George C. Embody, of Cornell University, and Dr. H. S. Davis, of the U. S. Bureau of Fisheries.

Bass Work—Dr. Paul R. Needham, of the U. S. Bureau of Fisheries, has continued his fish cultural investigations this summer at our hatchery, which are mostly concerned with the culture of large and small mouth bass.

We have been very successful in rearing bass 3 to 5 inches in length by a system of intense feeding. The food used is the common water-flea, Daphnia. These are cultured by the million either in the bass ponds themselves or in special culture ponds fertilized with various manures. A combination of foods, water-fleas, followed by sheep hearts and ground fish (salt water herring), given when the fish are old enough to take meat, has also given good results. We are using trout excrement, which formerly went to waste, for Daphnia production.

We also experimented with the "balanced-pond" system used by the U. S. Bureau of Fisheries. With the latter system no artificial feeding is done, the fish eating merely what is naturally present and available in the ponds. This method has proven quite successful under certain conditions as reported by Dr. H. S. Davis, of the Bureau of Fisheries, from experi-

mental ponds operated at the Fairport, Iowa, station. Last summer's work has shown that bass can be raised to good size on water-fleas alone as food. Ponds in which trout are kept in the winter time and which contain large amounts of trout excrement will produce exceedingly rich cultures of water-fleas without further fertilization. This same type of bottom harbors thousands of midge larvae, sowbugs, etc., which furnish a large part of the food consumed.

Last year in the two test ponds of this type, containing 2.02 acres of water and having bottoms deeply covered with trout excrement, there were produced 31,550 large mouth bass from 3 to 4 inches long at a cost of around $200. The average loss from the fry stage in each pond was only 15 per cent. These figures show then that over 15,000 good-sized bass per acre can be raised using this system, whereas in the general run of ponds we find the numbers produced to be about 5,000 to 6,000 per acre.

Trout—The output of trout above the legal size for the past fiscal year was the largest in the history of the hatchery.

Referring to the matter of our use of selected breeders for trout production commenced in 1919 and increased each year, the results may be enumerated as follows:

1—The Commission has been able to increase the stocking of legal-sized trout from 277,500 in 1926-27 to 506,667 in 1931-32. This increased the stocking from 188 trout per mile in 1926-27 to 344 trout per mile in 1931-32.

2—In 1929-30 it cost .264 for food to produce a pound of trout. In 1931-32 it cost .152, showing a saving of .112 per pound, or 42½%. In 1931-32 we produced 240,085 pounds of trout, of which were planted in the streams, an increase of 58% as compared with 1929-30.

3—The amount of food required to produce a pound of trout was reduced from 5.5 in 1929-30 to 3.8 pounds in 1931-32, or 31%.

4—The net result is that with our selective breeding, breeders need only be kept over one winter instead of two, thus eliminating for an entire year labor and food costs and permitting us to have a greater pond capacity, besides providing for planting in the streams trout from 8 to 12 inches, 12 to 18 months old as compared with former plantings of trout at 6 to 8 inches at the same age.

Increase in Production of Trout—Below follows a tabulation showing increase in the production of legal-sized trout since 1929-30, and the result is largely due to the establishment of the new rearing pond station acquired in 1927 and located one mile from the original hatchery.

Date	*No. legal size trout distributed*	*Increase in distribution over* 1929-30	*No. lbs. legal size trout distributed*	*Increase in number lbs. distributed over* 1929-30
1929-30	446,882		151,642	
1930-31	467,390	4.5%	210,625	38.%
1931-32	506,667	13.3%	240,085	58.%

Distribution legal-size trout—1926-27, 277,500 in 1,474 miles of stream—188 per mile.

Distribution legal-size trout—1931-32, 506,667 in 1,474 miles of stream—344 per mile, increase 82%.

Increased output of legal-size trout since establishment of new hatchery in 1927 is 82%.

Reduced Cost of Trout per Pound—Below will be found a tabulation showing the cost of producing a pound of trout during the past three years. The reduced cost was brought about due to an increased egg yield from our hardy and selected strain of breeders and a consequent reduced mortality of these breeders. It is now only necessary to keep about one-quarter of the breeders and one-half of the number of fingerlings as compared with former years. In addition daily microscopic observations are made of the fish as to their physical condition and there has been a more careful feeding with a view of eliminating all waste of feed. Greater room was also provided for the rearing of the fish, which permits faster growth and healthier fish.

Year	*No. lbs. food to make lb. trout*	*Average cost of food per lb.*	*Cost of food to make lb. trout*	*Saving in cost over* 1929-30	*Saving in amount of food required over* 1929-30	*Average saving in purchase price per lb. over* 1929-30
1929-30	5.5	.048	.264			
1930-31	4.0	.047	.189	28.5%	27.3%	2.1%
1931-32	3.8	.040	.152	42.5%	31.0%	16.3%

Bass and Bluegills Increase—The following tabulation shows an increase in distribution of bass and bluegills over 1930-31 and an increased yield per acre over 1931, etc. A policy was adopted in 1930-31 to raise for distribution all bass at least 3 to 5 inches long. Bass of this size can take care of themselves equal to a trout 6 to 9 inches long.

Date	*No. fingerlings large mouth and small mouth bass, 3 to 5 in. distributed*	*Increase in distribution over* 1930-31	*Average yield per acre*	*Increase yield per acre over* 1930-31	*No. acres water*
1930-31	102,025		8,810		11.58
1931-32	127,900	25.3%	9,992	13.3%	12.80
		Bluegills			
1930-31	141,700		27,893		5.08
1931-32	255,000	79.9%	50,196		5.08

DRAINAGE FOR HATCHERY

The Board has under consideration the purchase of 24 acres of land of Lars Swenson adjoining the Hatchery at Hackettstown for the purpose of abating drainage from the Hatchery which pollutes his property, and which property can be utilized for Hatchery drainage.

TROUT CONDITIONS IN 1932

Assistant Protector Cudney, Warren County, in charge of the distribution of fish: On account of the very mild winter and the streams being so heavily stocked with fish from the hatchery, I believe this year has been the best I have ever known in New Jersey for trout fishing. We started our distribution on February 12th instead of the usual date, March 1st. The size of the fish were much larger than in former years and by the opening of the season, April 15th, we had practically every stream in the State well stocked. The streams were in very fine shape on the opening day and continued so until well along in June. While the number of licenses sold seemed to show a decrease the streams were loaded with fishermen on the first day, and were heavily fished during the entire season. There were a great many large fish taken and it is my opinion it was the best season we have ever had.

Assistant Protector Davison, Monmouth County: During this trout season climatic conditions have been good; the brooks remained normal and many fishermen took their limit. There were fewer men on the streams than last year, probably due to the existing economic conditions, and most fishermen stop fishing the streams after May 20th. Some exceptionally fine brown trout were taken from the Manasquan and Manalapan brooks, and as is usually the case, these fish were taken by men who continue fishing until the latter part of the season. Fishermen generally are well pleased with the number and size of the fish planted this year. A large number of fish will be left at the close of the season.

Warden Small, Bergen County: The usual numbers were in evidence at favorite places on the opening date in Bergen County, and, except for slight decrease in licensees due to unemployment, the sport of angling is more popular than ever and only needs the stimulus of good times to bring into evidence a multitude of devotees. The daily bag limit was common on the Saddle River, Pascack Creek and at Van Emburgh Lake and Willow Lake; the latter place on account of its generous area and good depth, is the only place where a fair supply is left at the close of the season, as all sections are intensively fished throughout the open period. Expressions of satisfaction were fairly general.

Warden F. J. Hall, Essex County: The opening of the trout season in Essex County was very successful, and in my opinion the general interest of the fishermen far exceeded that of former years. I can safely say there were more fishermen on the streams and lakes than last year. Many bag limits were taken.

Warden Graham, Gloucester County: There was a general interest taken in trout fishing and most all were pleased with the number of trout caught, and with our stocking of the waters. There were about the same number of trout fishermen this year as last and a large number took the bag limit. The fishing continued until late in the season, and there was a fair supply left.

Warden Larson, Hunterdon County: Trout fishing has been good. There have not been as many fishermen as in previous years, but they have been as enthusiastic. As usual, on the opening day I found the streams lined with fishermen and several of them gave reports of having caught the limit before ten o'clock in the morning. Fishing continued to be good until the first of July. There was a good supply of fish left at the end of the season.

Warden Hugg, Middlesex County: This year, for the first time, has seen a decrease in the number of trout fishermen in Middlesex County, probably on account of the increase of the license fee. The browns which were released last fall in the Manalapan and Matchaponix brooks produced real fighters which were appreciated. At Bonhamton pond the number of fishermen was larger than in other years, particularly after each restocking. There was a great deal of interest this year as to when and where the fish were being planted by those that fish for the number they take home. A very large percentage caught their limit, some in a morning's fishing. The waters are pretty well fished out.

Warden Lawrence, Morris County: The season opened fine with the streams in the best of condition as to water and being well stocked. The sportsmen as a rule were well satisfied. There were as many fishermen on the streams this season as in previous seasons. The good fisherman had no trouble in taking the limit often. I often met men who would say they could see plenty of trout in the streams which would not take any bait, showing that there was plenty of feed for them. Fishing continued fine all through the season, and there were several good catches reported very late.

Warden Williams, Passaic County: Trout fishing in Passaic County this year was everything that the sportsmen expected. Many favorable comments were heard from the real trout fishermen. On the other hand, I also heard quite some grumbling from the sportsmen of the hatchery truck following type about their only being able to catch perhaps ten or twelve in a day, after having followed the truck many miles. I have heard many fishermen comment very favorably about the large amount and nice size of the trout which we put out this year. Many daily bags were secured on the Wanaque River at Pompton Lakes, and it was a common daily occurrence to see twenty-five persons fishing there in April and May. Fishing for trout was slacked up by the end of June quite a bit. There was a lot of nice-size trout left in the Wanaque, and I believe that the nice size and large amount of trout left in the Wanaque will give Passaic County mighty fine fishing in 1933.

Warden Treloar, Sussex County: This has been the best trout fishing season that Sussex County has ever enjoyed. Not only have the fish of all species been more numerous, but the average size has been consistently larger. This year, throughout the county it was quite common for anglers to report limit catches, many of the fish being of exceptional size. From Stony Lake, in the Stokes State Forest, for instance, a 3¼-pound native was taken, while in various other parts of the county catches of rainbow and brown trout of approximate size were quite common.

A notable feature has been the great increase of fishermen on the Big Flat Brook, a condition attributable to the new method of stocking this stream. This method consists of carrying the fish down the brook in an especially constructed boat and liberating them in the different pools, instead of, as heretofore, placing them in the brook directly from the truck, thus enabling following fishermen to know just where the fish had been placed.

SHORE FISHERIES OF NEW JERSEY

Robert A. Nesbit, Assistant Aquatic Biologist of the U. S. Bureau of Fisheries, reports as to the Bureau's study of the shore fisheries of New York and New Jersey, during the year, as follows:

> "Comparison of catch records over a period of years (since 1927) has shown that the yield of all important species in New Jersey is subject to marked fluctuation. In the case of butterfish and scup these fluctuations have been shown to be caused by failure of reproduction in certain years resulting in low yield. When reproduction is more than ordinarily successful, the yields rise to high levels. This was the case with butterfish in 1927 and scup in 1927 and 1928. As a result, the yield of butterfish rose to nearly record levels in 1929 and the yield of scup has exceeded all records in 1929, 1930 and 1931.
>
> "Investigation of the weakfish indicates that reproduction is seldom successful in New Jersey and that the majority of the adults taken there are produced on southern spawning grounds and spend the first two summers of their lives on southern nursery grounds. This hypothesis is now being carefully tested by tagging experiments and studies of differences in rate of growth in southern and in New Jersey localities."

SUPERVISION OF SALT WATER FISHERIES

The Board had a conference with J. H. Mathews, Secretary of the Middle Atlantic Fisheries Association, who suggested that it would be desirable to have the Board create a bureau for the supervision of the salt water fisheries. Mr. Mathews was informed that the Board had a standing committee on salt water fishing and that the Board would be gald to have Mr. Mathews' associates take up with the committee any matters respecting the commercial fishermen.

SALT WATER LICENSE

It is well known that the salt water anglers are not bearing any cost of protecting and improving their sport. At the same time, there is a demand on our board to take steps to improve the angling in our salt waters. It has been suggested that a salt water fishing license costing fifty cents or one dollar should be imposed, but no salt water fishing license would be required of those who purchase either a resident or non-resident fishing license.

Our fleet of boats, maintained at considerable expense, patrols the coast and bays in order to prevent illegal netting of fish and from this the salt water angler receives a direct benefit.

Our salt water fishing attracts multitudes from Pennsylvania and New York State who fish without having to pay one cent, and it is claimed that persons from out of the State take in food value salt water fish ten times more than the native sportsmen, whose license fees contribute toward the money for the control of salt water fishing.

With revenues from such a license, a salt water marine laboratory could also be established, hatcheries maintained for striped bass and fluke propagation, and there could be a better patrol of the coastal waters.

It will be readily admitted that the observation and care of fisheries, and the ascertainment of proper methods for doing so are duties of the State. The production of fish in our salt waters cannot be observed or studied as can products on the farm. It is clear that without a statistical knowledge of the fisheries, the biological study of the habits of the fishes, measures to avert depletion, and fixing regulations, cannot be intelligently discussed.

Among the numerous activities of a laboratory would be inquiry as to whether a depletion occurs from natural causes or from over fishing, the gathering of actual complete statistics of the transactions between the commercial fisherman and the dealer over a long period of time, the interpretation of these statistics by trained men, the tagging of fish for the study of migration, the relation of the abundance of fish to improved methods of catching them, the taking of the number of mature or spawning fish for maintenance of the species commercially; the ages, size and rate of growth of fish; the relative percentage of mature or immature fish in the products of fisheries; how the same would vary at different periods; the matter of fluctuations in supply other than those of over fishing, irregular annual yields, minor fluctuations within the season; a record of the relative number of adult and young in connection with the total abundance, and the ascertainment of the abundance rather than the amount taken.

MOTOR BOATS ON LAKES

We frequently have requests for information as to whether outboard motors on boats are destructive to fishing on small lakes. While it is a fact that propellers have been known to cut through the sand and a bass nest in shallow water, evidently destroying the nest, the probabilities are that the propeller of an outboard motor does not come in direct contact with but a very small percentage of nests. However, it cannot be denied that fishing has fallen off since the advent of outboard motors on smaller lakes, and whether the cause is the noise, the oil or the vibrations, cannot be stated at this time. There is no law prohibiting the use of motor boats, but the Conservation and Development Commission, which has control of Swartswood Lake, prohibits motor boats on the lake, property owners having claimed that motor boats made such a disturbance on the water as to interfere with angling. Some anglers complained of motor boats because they came near where they were fishing, thus disturbing the fish.

POUND FISHERIES SUMMARY

Following is a summary of the pound fisheries' reports for the calendar year ending December 1, 1931:

Approximate value of all pounds	$888,293.00
Proceeds derived from sale of fish	832,757.89
Number of pounds of fish caught and disposed of	25,579,987

Licenses issued:

Atlantic Ocean	127
Sandy Hook and Raritan Bay	18
	145
Number of pounds operated	139
Number of men employed	479

SHAD

The report of the shad fishing industry in the Delaware River and Bay and tributaries by residents of the State of New Jersey or persons operating nets from the New Jersey shore, shows an increase in the catch of shad of 10,346 over 1931, but practically all of this increase was in Maurice River, Cumberland County, as the catch in the Delaware River proper showed a decrease in each county as follows:

In 1931 there were 4,764 shad caught in Salem County, and this year the catch was 2,396.

In Burlington County there were 635 caught last year and 575 this year.

In Mercer County there were 1,586 caught in 1931 and 801 this year.

In Hunterdon County in 1931 there were 1,211 shad caught and 1,170 this year.

In the Delaware River and Bay proper, in Cumberland County last year, there were 4,600 shad caught and 22,500 in the Maurice River, and this year there were 2,200 shad caught in the Delaware River and Bay and 38,500 in Maurice River.

The nets used in the Delaware River and Bay in Cumberland County are gill nets approximately 600 fathoms long and stake nets set near the shore, 25 fathoms long.

In Maurice River the nets used are hauling seines 50 fathoms long and drifting gill nets 30 fathoms long, and row boats are used in their operation.

There was no shad fishing in Gloucester or Camden Counties, as was the case last year.

It is to be noted that the catch of shad in Maurice River, Cumberland County, was 38,500 as compared with the catch of 7,142 in the entire Delaware River and Bay in Cumberland, Salem, Burlington, Mercer and Hunterdon Counties.

The catch of shad in Maurice River for several years has shown a decided increase, and this is undoubtedly due to the fact that under orders of the State Board of Health pollutions of that river were abated, and also particularly to

the fact that the river receives a quantity of shad fry which are hatched at the State Shad Hatchery at Hancock's Bridge.

We made efforts to obtain shad eggs from the fishermen for hatching, but were only successful in securing eggs from the fishermen of Maurice River, which is practically the only place in South Jersey where hauling seines are now used, and the fishermen there gladly cooperated with us in the gathering of eggs.

Undoubtedly the notable record of the catch of shad in Maurice River is due to the fact that we plant fry in the waters from which the eggs were obtained. The Maurice River record substantiates the claim that shad return in three years to the waters in which they have their early existence.

REPORT OF SHAD CAUGHT IN DELAWARE RIVER AND BAY AND MAURICE RIVER

1932

County	Boats		Nets		Men Engaged		Number Shad Caught		Value Shad Caught		Value of Boats and Nets	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
Cumberland	47	116	116	161	100	166	27,100	40,700	$21,475	$31,075	$12,750	$17,430
Salem	28	32	28	32	56	64	4,764	2,396	5,192	1,892	19,600	12,800
Burlington	18	22	18	22	40	50	635	575	1,270	575	2,795	3,300
Mercer	10	9	11	7	40	28	1,586	801	2,740	1,100	2,265	1,550
Hunterdon	5	3	5	3	16	12	1,211	1,170	1,768	1,201	550	500
	108	182	178	225	252	320	35,296	45,642	$32,445	$35,843	$37,960	$35,580
Increase		74		47		68		10,346		$3,398		
Decrease											$2,380	

CRABS

We made a survey of the crab situation in the State, and while there has been some increase in the crabs since we had a law passed in 1926 prohibiting the possession of any female crab with eggs or spawn attached and also the law passed in 1928 prohibiting the taking of crabs in any of the tidal waters of the State, except in Delaware Bay, by means of a line with more than ten baits attached thereto, it is believed necessary to have further protection, particularly as to a legal size. It was shown that there was yearly increase in the number of persons taking crabs with various devices, that there was scarcity of young crabs, and that there has been a ruthless destruction of small crabs for bait and poultry feed, which affect the supply for sport and commercial purposes. We feel that the fullest possible protection should be given to crabs of the State, as their taking is enjoyed by thousands of men, women and children, and that the commercial taking of crabs could be brought to great proportions.

Heretofore there has been no closed season on crabs except for the North and South Shrewsbury Rivers and their tributaries, where since 1875 there has been a closed season from November 1 to May 1.

Suggestions to meet the situation include a State-wide closed season from November to May 1, prohibiting the taking or possession of any female crab with eggs visible thereon, or any female crab from which the egg pouch or bunion has been removed, prohibiting the taking or possession of any hard shell crab measuring less than five inches across the shell from tip to tip of spike, or any peeler, shedder, or soft crab measuring less than 3½ inches across the shell, and making it unlawful for any person to take crabs in any manner, except with one line with not more than ten baits attached, or a scoop net with a single handle, the diameter of the net being not more than two feet.

LOBSTERS

It is the intention of the Board to prepare for the Legislature a bill for better regulation of the lobster industry. Our act prohibits the taking of lobsters measuring less than 4⅛ inches from the end of the bone of the nose to the center of the rear end of the body shell, and prohibits the taking of spawning lobsters. The New Jersey law does not require lobster fishermen to take out a license or to mark their pots and boats.

The lobster industry in this State is conducted in the Atlantic Ocean, chiefly from Barnegat Bay northward, and in Sandy Hook and Raritan Bay.

Most of the lobsters brought into this State are caught in the Atlantic Ocean beyond the three-mile limit, where we have no jurisdiction. During the year we made eight arrests for violation of our lobster law.

The White-Nelson bill now pending in Congress, intended to prohibit the importation of lobsters less than 3½ inches, eye-socket measure, and to prohibit the importation of lobster meat into the United States, was approved by the Board. H. D. Crie, Commissioner of Fisheries of Maine,

wrote that unless importation of "chicken lobsters" from Canada, which glut the markets, is prohibited, that 50% of the lobster fishermen of Maine will have to go out of business, and that this will be true in other lobster producing States.

A survey of several States shows that their legal size for lobsters is the same as in New Jersey, with the exception of Maine. The Maine system of measurement of lobsters provides for a total length of ten inches, while our method provides for a length of about nine inches.

Season. Our law does not fix any season. No season is fixed by Connecticut or Massachusetts. Maine allows the taking the whole year, with the exception of restrictions in special laws. Rhode Island has a season from April 15 to December 15. The only restriction in New York as to taking is that it is unlawful to take lobsters from six o'clock Saturday night until twelve o'clock Sunday night. Delaware, where there is not much fishing done, has an open season from May 1 to August 31, and a closed period from Saturday, 2:00 P. M. to 12:00 midnight of the Sunday next ensuing.

Legal Size. Connecticut, Rhode Island and New York fix a size of 4⅛ inches, the same as our State. In Massachusetts the legal size is 9 inches alive or 8¾ inches cooked, full length measurement, exclusive of claws and feelers. In Delaware the size is 9 inches. In Maine the measurement is 3½ inches, eye-socket measure. A lobster according to New Jersey law measuring 4⅛ inches from the end of the bone of the nose to the center of the rear end of the body shell, would make the total length of the lobster about 9 inches. A lobster measuring 3½ inches from the eye-socket to the rear end of the body shell, according to the Maine measurement, would make the total length of the lobster about 10 inches.

Bag Limit. The above mentioned States, together with New Jersey, do not have a bag limit.

Marking Equipment. Connecticut, Maine, Rhode Island and Massachusetts require pots or retaining cars to be marked. New York requires boats which are licensed to display license numbers. In Delaware lobsters can only be taken in lobster pots.

License. Licenses are required by Connecticut, Maine, Rhode Island and Massachusetts. New York only requires a license from non-residents. No license is required in Delaware.

Cost of License. Connecticut, $5.00 and $1.00 for each assistant. Maine, $1.00 for fishermen and domestic smack and $5.00 for foreign smack. Rhode Island, $5.00; must be a citizen of the State. New York only requires licenses from non-resident boats, from $15 to $35 depending on size. Massachusetts, $5.00.

Difficulty in Enforcement. In New Jersey illegal lobster fishermen carefully watch our boat patrol. When a warden approaches, they get rid of an illegal catch by throwing them overboard. Connecticut finds the same

difficulty. Rhode Island reports that the short lobster situation is a great difficulty. Maine reports some difficulty. New York reports difficulty in proving that eggs have been brushed off female lobsters. Massachusetts reports that their penalty is not severe enough for the first offense.

Patrol of Waters. In New Jersey we attempt to check up the fishermen at their landing places and inspect hotels and fish markets. It has been found that violators dispose of their illegal-sized catch to persons from other States outside the three-mile limit, where we have no jurisdiction. We have sent wardens from other parts of the State in private cars to markets. Our wardens have patrolled with a boat connected with the coast guard service; we have employed detectives. Connecticut, Maine, New York and Massachusetts patrol the waters. Maine employs women wardens and have wardens peddling fish and receive information from families living in cottages in summer. Rhode Island has two lobster deputies the entire year and two extra ones during the lobster season.

Penalties. The penalty in New Jersey for possession of an illegal lobster is $20.00. Penalties in other States are: Connecticut, $50.00. Maine, possession of illegal-sized lobster, $5.00; possession of female lobster in spawn or with eggs attached, $10.00; shipping lobsters not properly marked, $25.00 for first offense. Rhode Island exacts a penalty of $20.00 for taking from the State waters without a license, and $5.00 each for illegal-size lobsters; possession of egg lobsters, $5.00 each. New York exacts penalties from $10.00 to $100.00 upon conviction for first offense, and in addition, in a civil action, a penalty of $60.00 and an additional penalty of $5.00 for each lobster. Massachusetts imposes a fine of from $10.00 to $100.00 for possession of any female lobster bearing eggs; for possession of illegal-size lobster, $2.00 to $5.00, license to be voided for second conviction. In Delaware the penalty for violation is $20.00.

STOCKING OF WATERS

The Board took up with Governor Moore as to the situation under the Manly act, which referred to the stocking of waters. The Governor authorized us to continue our policy of stocking as heretofore, pending action by the Legislature, and thus was preserved for the people of the State a cheap recreation and a cheap food supply, and business for sporting goods stores, and preventing the carrying at a tremendous cost growing fish at the hatchery, with a saving of thousands of fish which would have died if retained at the hatchery.

For many years it has been the rule of the Commission not to stock waters to which the public holding licenses do not have access, and any warden or employee of the Board who stocks such waters understands that he is liable to instant dismissal. It is true, however, as has been pointed out in our previous reports, that there are some streams which we stock which contain a few posted areas for the protection of residents thereon. The few places posted do not interfere in providing good sport for many thousands of anglers.

The good faith of the Board in stocking waters open to anglers was indicated by the fact that the Board had posters put up in various parts of the

State calling attention that 500 lakes and streams plentifully stocked with game and food fish were open to licensed anglers. The posters contained a summary of the seasons and the cost of licenses.

FISH AND GAME LEGISLATION IN 1932

Senate 367, Chapter 214, approved June 14th. Provides that after January 1, 1933, licenses shall be issued as follows: Resident fishing license, $2.15. Resident hunting license, $2.15. Resident hunting and fishing license, $3.15. Females will be exempt from taking out a license in order to fish.

Senate 286, Chapter 206, approved June 14th. Reduces from 400 feet to 200 feet the distance required between set nets in Mullica River.

Assembly 265, Chapter 238, approved June 14th. Provides for the following licenses: To engage in the business of raising and selling game birds and animals in a wholly enclosed preserve, license fee $2.00 per annum. To propagate pheasants in the semi-wild state on lands owned by licensee, license fee $2.00 per annum. To have in captivity game birds or animals, license fee $2.00 per annum. This act takes effect immediately, but all breeders' licenses issued under the act of March 27, 1913, shall be valid until December 31, 1932.

Senate 165, Chapter 147, approved May 2nd. Fixes the season for the killing of raccoon from November 1 to December 31, except during the open season for hunting deer. It also fixes a seasonal bag limit on raccoon of fifteen.

Senate 36, Chapter 38, approved March 28th. Extends the closed season on wild turkey until March 28, 1935.

Senate 35, Chapter 37, approved March 28th. Extends the closed season on ruffed grouse until March 28, 1935, in Essex, Union, Somerset, Hunterdon, Mercer, Middlesex and Monmouth Counties.

Senate 37, Chapter 39, approved March 28th. Extends the closed season on Hungarian partridge until March 28, 1935.

Assembly 32, Chapter 103, approved April 26th. Relates to the stocking of lands and waters.

Senate 161, Chapter 29, approved March 31st. Repeals the act which prohibited non-residents or their agents from engaging in the business of buying and selling furs, hides and pelts in this State without first procuring a license.

SUPPLEMENT TO 1930-1931 REPORT

Income

Balance as per last printed report	$98,751.47

Expenditures

Chapter 140, Laws of 1930, paid after June 30, 1931	20,190.52
To Balance	78,560.95
	$98,751.47

REPORT FOR 1931-1932

Income

Balance July 1, 1931		$78,560.95	
Hunters' and Anglers' Licenses:			
Chapter 152, Laws of 1914 (Regular) Chapter 320, Laws 1915 (Juvenile) Chapter 125, Laws 1922 (Woodcock)	$268,838.20		
Chapter 153, Laws of 1918:			
Menhaden Licenses	$1,550.00		
Food Fish Licenses	1,850.00		
Pound Licenses	6,330.00		
Breeders' Licenses	3,070.00		
Deputy Fees	568.00		
Carp Permits	75.00		
Sales Farms and Hatchery	1,170.10		
Sundries	1,596.77		
Trespass cases	612.75		
Fur permits	100.00		
	$16,922.62		
Fines, Chapter 147, Laws 1911	31,535.10		
Checked returned	3.97	317,299.89	$395,860.84

Expenditures

Chapter 382, Laws 1931		$343,828.17
Cash Balance July 1, 1932	52,032.67	
Requisitions outstanding against this balance	4,167.68	
Account Balance		$47,864.99

PUBLIC SHOOTING AND FISHING GROUNDS FUND

Receipts for Public Shooting and Fishing Grounds, from January 1 to June 30, 1932	$28,775.32
Expenditures from January 1 to June 30, 1932	8,128.38
Balance June 30, 1932	$20,646.94

STOCKING OF NEW JERSEY WATERS

By the New Jersey Board of Fish and Game Commissioners for the Fiscal Year Ending June 30, 1932

Total Number of Fish Planted from All Sources—118,223,603

KEY TO ABBREVIATIONS

Bt.	Brook Trout	Per.	Perch
Brnt.	Brown Trout	Pic.	Pickerel
Rt.	Rainbow Trout	P.	Pike
Cb.	Calico Bass	S.	Sunfish
Lmb.	Large Mouth Bass	B.	Baitfish
Smb.	Small Mouth Bass	Cr.	Crappie
Ob.	Oswego Bass	Sh.	Shiners
Bs.	Bluegill Sunfish	Wper.	White Perch
C.	Catfish	Yper.	Yellow Perch
M.	Minnows	Shad	Shad

Size

fg.	fingerlings
f.	fry
a.	adults

ATLANTIC COUNTY

(Great Egg Harbor System)

Bargaintown Lake—Bargaintown—750 Lmbfg, 3,000 Bsfg, 1,200,000 Yperf, 200 Lmba, 400 Cra.
Egg Harbor Lake—Penny Pot—2,000 Bsfg.
Indian Cabin Pond—Egg Harbor—750 Lmbfg, 2,000 Bsfg.
Lenape Lake—Mays Landing—1,000 Lmbfg, 5,000 Bsfg, 1,200,000 Yperf.

(Mullica River System)

Hammonton Lake—Hammonton—1,450 Rta, 1,200,000 Yperf, 1,000 Lmbfg, 5,000 Bsfg, 1,400 Brnta.

BERGEN COUNTY

(Hackensack River System)

Closter Brook—Closter—200 Rta, 300 Brnta.
Coopers Lake—Bergenfield—200 Rta, 800 Brnta, 150 Pera, 100 Pica, 250 Sa.
Gardners Lake—Little Ferry—150 Pera, 100 Pica, 250 Sa.
Hackensack River—Oradell, 1,875 Brnta.
Holdrums Pond—Rivervale—75 Pera, 50 Pica, 25 Sa.
Morrow Lake—Englewood—650 Rta, 100 Bta, 1,805 Brnta, 1,200,000 Yperf.
Musquasink Creek—Westwood—350 Rta.
Pascack Creek—Woodcliff Lake—5,060 Brnta, 4,388 Rta, 1,075 Bta.
Tellers Brook—Riverdale—250 Bta.
Tenekill Creek—Closter—350 Rta, 100 Brnta.
Willow Lake—Little Ferry—1,975 Brnta, 1,300 Rta, 125 Bta, 200 Pera, 20 Pica, 10 Lmba, 250 Ca, 20 Cra.

(Pascack Creek System)

Bear Creek—Woodcliff Lake—700 Bta.
Electric Lake—Montvale—713 Pera, 230 Pica, 600,000 Yperf, 462 Sa, 50 Lmba, 400 Ca.

(Passaic River System)

Goffle Brook—Ridgewood—175 Brnta.
Saddle River—Saddle River—1,575 Bta, 6,037 Rta, 4,630 Brnta.
Valentine Brook—Hawthorne—350 Rta.
Van Emburghs Pond—West Ridgewood—850 Rta. 425 Brnta.

(Ramapo River System)

Ramapo River—Above Oakland—500 Rta.
Winter Lake—Mahwah—10 Cra, 400 Pera, 20 Pica, 20 Sa, 1,500 Smbfg, 20 Lmba, 30 Ca.

(Saddle River System)

Allendale Lake—Hohokus—750 Smbfg.
Ridgewood Park Lake—Ridgewood—600,000 Yperf.
Waldwick Lake—Hohokus—750 Smbfg.

BURLINGTON COUNTY

(Delaware River System)

Sylvan Lake—Burlington—900 Lmbfg, 500 Cfg, 400,000 Yperf, 1,125 Brnta, 2,000 Rta, 150 Lmba, 50 Cra, 200 Ypera.

(Mullica Hill River System)

Atsion Lake—Atsion—500 Lmbfg, 750 Cfg, 400,000 Yperf.

(Rancocas Creek System)

Browns Mills Lake—Browns Mills—1,000 Lmbfg, 1,000 Cfg, 200 Lmba, 225 Cra, 250 Ypera.
Cookstown Lake—Cookstown—250 Cfg.
Durand's Lake—Mt. Holly—150 Lmbfg, 200,000 Yperf.
Hunter's Lodge Lake—Brown's Mills—400,000 Yperf.
Little Pine Lake—Brown's Mills—400,000 Yperf.
Medford Creek—Medford—500 Lmbfg, 500 Cfg, 200,000 Yperf.
Mirror Lake—Brown's Mills—400,000 Yperf.
Mt. Holly Creek—Mt. Holly—500 Lmbfg.
Mt. Run Creek—Near Medford—150 Lmbfg.
Mt. Run Pond—Near Medford—250 Cfg.
New Lisbon Lake—New Lisbon—200 Lmbfg, 500 Cfg.
New Lisbon Creek—New Lisbon—200 Lmbfg.
Norcross Lake—Pemberton—400,000 Yperf.
Pemberton Creek—Pemberton—350 Lmbfg, 500 Cfg.
Rancocas Lake—Rancocas—350 Lmbfg, 500 Cfg.
Smithville Lake—Smithville—200 Lmbfg, 400,000 Yperf.
Vincentown Lake—Vincentown—200 Lmbfg, 400,000 Yperf.
Warwicks Lake—Hartford—500 Ctfg.

(Wading River System)

Lake Cotoxen—Kirby's Mills—200 Lmbfg, 250 Cfg.

CAMDEN COUNTY

(Cooper River System)

Forest Hill Park Lake—Camden—1,000 Cfg.
Lindenwold Lake—Lindenwold—150 Lmbfg.
Robert Park Lake—Collingswood—2,000 Bsfg, 50 Bta, 200 Rta.
Woods Pond—Boro of Gibbsboro—350 Lmbfg, 1,000 Cfg, 400,000 Yperf.

(Delaware River System)

Blackwood Lake—Blackwood—450 Lmbfg.
Crystal Lake—Westmont—1,000 Bsfg.
Evans Lake—Haddonfield—300 Lmbfg, 1,000 Cfg, 1,000 Bsfg, 400,000 Yperf.
Grenloch Lake—Grenloch—900 Lmbfg, 1,000 Bsfg, 75 Lmba, 50 Cra, 200 Ypera, 400,000 Yperf.
Haddon Lake—Mt. Ephraim—1,000 Lmbfg, 1,000 Bsfg, 400,000 Yperf.
Hopkins Lake—Haddonfield—1,000 Bsfg.
Lucas Lake—Gibbsboro—850 Lmbfg, 1,000 Cfg, 400,000 Yperf.
Mountwell Stream—Haddonfield—1,350 Brnta, 450 Bta, 1,000 Rta.

(Mullica River System)

Atco Lake—Atco—350 Lmbfg, 1,000 Cfg, 400,000 Yperf.
Ellisburg Creek—Ellisburg—200 Bta, 100 Rta, 600 Brnta.

(Timber Creek System)

Bottomley's Lake—Clementon—400 Lmbfg, 200,000 Yperf.
Brown's Run—Turnersville—1,000 Rta, 300 Brnta.
Clementon Lake—Clementon—900 Lmbfg, 1,000 Cfg, 400,000 Yperf.
Gardner Lake—Laurel Springs—200 Lmbfg.
Lakeland Lake—Lakeland—600,000 Yperf.
Little Lebanon Run—Turnersville—600 Rta.
Big Lebanon Run—Turnersville—1,650 Brnta, 1,200 Bta, 1,200 Rta.
Pillings Lake—Clementon—100 Lmbfg.

CAPE MAY COUNTY

Alms House Pond—Cape May Court House—500 Lmbfg, 400,000 Yperf.
Cape May Pond—Cape May—300 Lmbfg.
Dennisville Pond—Dennisville—500 Lmbfg, 600,000 Yperf.
Eldora Lake—Eldora—400,000 Yperf.
Lilly Lake—Cape May—600,000 Yperf.
Ludlam's Lake—Dennisville—400,000 Yperf.
Rio Grande Pond—Rio Grande—700 Lmbfg, 800,000 Yperf.
Sleepy Hollow Lake—Cape May Court House—400,000 Yperf.

CUMBERLAND COUNTY

(Cohansey Creek System)

Cedar Lake—Cedarville—2,000 Bsfg, 400,000 Yperf.
Clarks Pond—Bridgeton—200 Lmbfg, 2,000 Bsfg, 600,000 Yperf.
Elmer Lake—Bridgeton—200 Lmbfg, 2,000 Bsfg, 400,000 Yperf.
Jeddy's Lake—Bridgeton—200 Lmbfg.
Tumbling Dam Lake—Bridgeton—200 Lmbfg, 82 Ypera, 208 Wpera, 2,000 Bsfg, 400,000 Yperf, 18 Pica, 22 Cba, 41 Sa.

(Maurice River System)

Beach Lake—Millville—600 Lmbfg, 1,000 Bsfg.
Cumberland Pond—Near Millville—250 Lmbfg, 1,000 Bsfg, 400,000 Yperf.
Fries Lake—Near Millville—200,000 Yperf.
Laurel Lake—Near Millville—800 Lmbfg, 3,000 Bsfg.
Leaming Lake—Near Millville—250 Lmbfg, 1,000 Bsfg, 400,000 Yperf.
Little Mill Lake—Millville—500 Lmbfg, 1,000 Bsfg.
Union Lake—Millville—1,000 Lmbfg, 3,000 Bsfg, 800,000 Yperf, 1,500 Ypera, 70 Wpera, 5 Pica.
Vineland Home Pond—Vineland—300 Lmbfg.

ESSEX COUNTY

(Passaic River System)

Branch Brook Park Lake—Newark—225 Bta, 750 Lmbfg, 400 Rta, 600,000 Yperf, 200 Lmba, 2,300 Pera.
Clarks Pond—Bloomfield—500 Rta, 25 Brnta.
Notch Brook—Essex Park—125 Bta, 400 Rta, 100 Brnta.
Oakes Pond—Bloomfield—125 Bta, 700 Rta, 3,400 Pera, 125 Brnta.
Passaic River—Swinefield & Columbia Bridges—550 Ca, 950 Pera, 450 Pica, 950 Sa.
Verona Park Lake—Verona—125 Bta, 200 Rta, 100 Brnta.
Weequahic Park Lake—Newark—1,500 Lmbfg, 5,000 Bsfg, 600,000 Yperf, 50 Lmba, 100 Ca, 50 Cra, 2,000 Pera, 300 Pica, 500 Sa.

(Rahway River System)

So. Mt. Reservation—Bloomfield—50 Bta, 3,850 Rta, 2,905 Brnta.

GLOUCESTER COUNTY

(Delaware River System)

Woodbury Lake—Woodbury Heights—200 Lmbfg.

(Mantua Creek System)

Alcyon Lake—Pitman—900 Lmbfg, 1,500 Bsfg, 700 Rta, 100 Lmba, 125 Cra, 150 Ypera, 600,000 Yperf.
Mantua Creek—Pitman—600 Rta.
Tyrell's Run—Above Tyrell Pond—100 Rta.
Wenonah Lake—Wenonah—500 Lmbfg, 500 Bsfg, 200,000 Yperf.

(Maurice River System)

Iona Lake—Iona—800 Lmbfg, 1,500 Bsfg.
Kandle Creek—Franklinville—100 Rta.
Malaga Lake—Clayton—1,000 Lmbfg, 4,000 Bsfg, 600,000 Yperf.
Wilson Lake—Clayton—900 Lmbfg, 2,000 Bsfg.

(Raccoon Creek System)

Gilman Lake—Ewan—700 Rta, 600 Lmbfg, 800 Brnta.
Mullica Hill Lake—Mullica Hill—900 Lmbfg, 1,000 Bsfg, 100 Lmba, 125 Cra, 150 Yperf.

(Timber Creek System)

Almonesson Lake—Almonesson—75 Lmba, 50 Cra, 300 Ypera, 1,700 Lmbfg, 3,000 Bsfg, 400,000 Yperf.
Bell's Lake—Woodbury—200 Lmbfg, 1,000 Bsfg.
Big Lebanon Run—Turnersville—1,000 Rta, 100,000 M.
Little Lebanon Run—Turnersville—800 Rta, 200 Brnta, 100,000 M.
Pages Lake—Turnersville—200 Lmbfg, 500 Bsfg.
Turnersville Lake—Turnersville—600,000 Yperf.

HUDSON COUNTY

Hudson County Park Lake—Jersey City—2,575 Rta, 425 Brnta.

HUNTERDON COUNTY

(Delaware River System)

Alexauken Brook—Lambertville—150 Brnta.
Everittstown Brook—Everittstown—750 Bta.
Lacatang Creek—Stockton—400 Rta.
Little York Brook—Little York—400 Rta.
Musconetcong River—Penwell to Asbury—1,725 Bta, 2,775 Brnta, 2,350 Rta.
Wichecheoke Run—Sergeantsville—750 Bta.

(Musconetcong River System)

Beatys Brook—Penwell—600 Rta, 425 Brnta, 63 Bta.

(Raritan River System)

Beaver Brook—Clinton—100 Bta, 200 Brnta.
Cakepaulin Creek—Pittstown—300 Rta, 62 Brnta.
Clinton Lake—Clinton—600 Smbfg, 150 Pera, 100 Pica, 250 Sa.
Cushetunk Lake—White House—600 Smbfg, 300 Lmba, 3,400 Pera, 100 Cra, 100 Ypera, 800 Ca, 1,600,000 Yperf.
Norton Brook—Norton—125 Bta, 150 Rta, 100 Brnta.
Nishisakawick Creek—Frenchtown—400 Rta.
Pittstown Brook—Pittstown—63 Brnta.
Prescott Brook—Lebanon—325 Brnta.
So. Br. Raritan River—Middle Valley to High Bridge—1,000 Pera, 800 Sa, 400 Bsfg, 2,550 Bta, 5,675 Rta, 10,335 Brnta, 500 Brntfg.
Solitude Lake—High Bridge—1,600,000 Yperf.
Spruce Run—Glen Gardner—950 Rta, 850 Bta, 1,375 Brnta.
Tetertown Brook—Califon—700 Rta, 125 Brnta, 62 Bta.

(Rockaway River System)

Cold or Skillman Brook—New Germantown—300 Bta.
Hoovers Pond—Clinton—1,425 Rta, 50 Brnta.
Rockaway River—White House—400 Rta.
No. Br. Rockaway River—New Germantown to White House—2,005 Rta, 1,855 Bta, 1,836 Brnta.
So. Br. Rockaway River—Lebanon to White House, 425 Bta, 1,792 Brnta, 450 Rta.

(Spruce Run System)

Mulhockaway River—Van Syckles—150 Rta.

MERCER COUNTY

(Crosswick Creek System)

Gropp's Lake—Maple Shade—650 Lmbfg.
Yardville Pond—Yardville—600 Lmbfg.

(Delaware River System)

Hills Lake—Ewingville—750 Lmbfg, 600,000 Yperf.
Whitehead's Lake—Trenton—600,000 Yperf.

(Millstone River System)

Carnegie Lake—Princeton—1,200 Lmbfg, 200 Wpera, 600,000 Ypera, 200 Lmba, 225 Cra, 285 Ypera, 40 Oba, 25 Cba.
Etra Lake—Etra—1,050 Lmbfg.
Peddie Lake—Hightstown—1,050 Lmbfg, 300 Lmba, 200 Cra, 100 Ypera.
Stoney Brook—Pennington—1,750 Rta, 200 Bta, 575 Brnta.

(Miry Run System)

Hutchinson's Pond—Robbinsville—850 Lmbfg.
Reeds Mill Pond—Mercerville—650 Lmbfg, 600,000 Yperf.

MIDDLESEX COUNTY

(Lawrence River System)

Jacquard Pond—Near Milltown—100 Brnta.
Milltown Lake—Milltown—400 Lmbfg.
Oakey Brook—Franklin Park—200 Brnta.

(Manalapan River System)

Helmetta Lake—Helmetta—400,000 Yperf, 10 Lmba, 40 Ca, 10 Cra, 200 Pera, 10 Pica, 30 Sa.
Hunns Pond—Spotswood—50 Rta.
Jamesburg Lake—Jamesburg—1,250 Lmbfg, 200 Lmba, 250 Cra, 600 Ypera, 200 Ca, 50 Pica.
Manalapan River—Jamesburg—1,375 Brnta, 2,050 Rta, 100 Bta.
Matchponix Brook—Old Bridge—1,825 Brnta, 2,450 Rta, 175 Bta.
Spotswood Lake—Spotswood—600 Lmbfg, 400,000 Yperf, 350 Ypera, 110 Pica, 280 Sa, 10 Lmba, 40 Ca, 10 Cra.
Wigwam Brook—Jamesburg—200 Brnta.

(Millstone River System)

Brainard Lake—Cranbury—175 Lmba, 50 Ypera.
Cranbury Lake—Cranbury—650 Lmbfg.
Plainsboro Lake—Plainsboro—650 Lmbfg, 175 Lmba, 50 Ypera.

(Raritan River System)

Bonhampton Lake—Bonhampton—200 Lmbfg, 2,000 Bsfg, 530 Brnta, 1,650 Rta, 200 Bta.
Causeway Pond—Sayerville—200 Lmbfg.
Dismal Brook—Boundbrook—200 Rta, 100 Bta.
Farrington Lake—Near New Brunswick—1,600 Lmbfg, 3,000 Bsfg, 600,000 Yperf, 200 Ca, 275 Lmba, 275 Cra, 700 Ypera, 50 Pica.
Lawrence Brook—New Brunswick—400 Brnta, 100 Rta.

Nixon's Pond—Nixon—600 Cra, 3,000 Bsfg, 1,300 Ypera, 75 Cra, 375 Sa, 150 Ca.
Middlesex Water Works Lake—New Brunswick—1,500 Bsfg.
Sayresville Pond—Sayresville—130 Lmba, 3,800 Ypera, 75 Ca, 10 Cra, 30 Pica, 55 Sa.
South Amboy Lake—So. Amboy—300 Lmbfg.
Weston's Mill Lake—New Brunswick—1,300 Lmbfg, 600,000 Yperf, 75 Lmba, 15 Cra, 100 Ypera.

(Rahway River System)

Ash Brook—Near Plainfield—200 Rta.
Sage Brook—Metuchen—75 Bta, 100 Brnta.

MONMOUTH COUNTY

(Atlantic Ocean System)

Eatontown Brook—Eatontown—83 Bta, 68 Brnta.
Franklin Park Lake—Boro West Long Branch—1,500 Rtfg, 150 Wpera.
Manasquan River—Ardena—1,450 Brnta.
Trib. Manasquan River—5,000 Brntfg, 500 Brnta.
Old Mill Pond—Villa Park—850 Lmbfg, 3,500 Bsfg, 200 Rta, 100 Lmba, 100 Cra, 150 Ypera.
Osborne's Pond—Bailey's Corner—1,000 Lmbfg, 3,000 Bsfg, 200 Rta.
Spring Lake—Spring Lake—500 Rta.
Woodman's Brook—Near Squankum—75 Brnta.

(Delaware River System)

Allentown Lake—Allentown—300 Lmbfg, 350 Rta.
Doctor's Creek—Red Valley to Allentown—250 Brnta.

(Doctor's Creek System)

Imlaystown Lake—Imlaystown—300 Lmbfg, 325 Rta, 25 Brnta.
Ivanhoe Brook—Prospertown—250 Brnta.

(Manalapan River System)

Debois Brook—Milhurst—2,000 Brntfg.
Englishtown Pond—Englishtown—200 Lmbfg, 75 Lmba, 100 Cra, 25 Ypera.
Orr's Brook—So. of Englishtown—2,000 Brntfg, 450 Brnta, 500 Rtfg.
Topenemus Brook—Englishtown—3,000 Brntfg, 625 Bta, 200 Brnta.
Topenemus Lake—Freehold—1,150 Rta, 75 Lmba, 100 Cra, 25 Ypera, 850 Lmbfg, 3,500 Bsfg, 800,000 Yperf.

(Metedeconk River System)

Clear Brook—Greenville—75 Brnta.
No. Br. Metedeconk River—Lakewood—112 Bta, 150 Brnta.

(Raritan River System)

Black Mills or Milhurst Lake—Milhurst—550 Lmbfg, 600,000 Yperf, 250 Rta, 200 Brnta, 100 Lmba, 50 Cra, 50 Ypera.
Leffert's Lake—Matawan—800 Lmbfg, 45 Bsa, 1,500 Cfg, 600,000 Yperf, 200 Lmba, 400 Cra.
Manalapan River—Milhurst—1,765 Brnta.
Pine Brook—Tinton Falls—208 Bta, 541 Brnta.
Wemrock Brook—Englishtown—4,000 Brntfg, 375 Bta, 200 Brnta.

(Shark River System)

Big Brook—Marlboro—200 Bta.
Buck Mills Pond—Colts Neck—600 Lmbfg, 375 Rta, 400,000 Yperf, 25 Ypera, 100 Wpera, 75 Lmba, 50 Cra.
Hurley's Pond—Glendola—800 Brnta, 500 Lmbfg, 200 Rta, 100 Cra, 3,500 Cfg, 100 Lmba, 300 Ypera, 150 Wpera.
Hockhocksen River—Tinton Falls—209 Bta, 616 Brnta.
Lewis Brook—Tinton Falls—2,000 Brntfg, 100 Bta, 1,000 Rtfg.
Shark River—Belmar—1,263 Bta, 1,350 Brnta.
Snyders Brook—Colts Neck—2,000 Brntfg, 233 Bta.
Tintern Manor Lake—Lincroft—600 Lmbfg, 800,000 Yperf, 150 Lmba, 25 Cra, 200 Ypera.
Willow Brook—Holmdel—134 Bta.

(Swimming River System)

Mine Brook—Tinton Falls—133 Bta.
Randolph's Brook—East Freehold—100 Bta, 500 Rta.

MORRIS COUNTY

(Delaware River System)

Electric Brook—Schooley's Mt.—400 Rta.
Gulick Brook—Schooley's Mt.—100 Bta. 75 Brnta.
Musconetcong River—Near Hackettstown—3,650 Bta, 4,225 Rta, 7,449 Brnta.
Musconetcong Lake—Netcong—5,000 Bsfg, 3,000,000 Yperf, 125 Lmba, 600 Ca, 10,725 Pera, 461 Pica, 1,200 Sa, 100 Cra, 55 Smba.
Schooley's Mt. Brook—Schooley's Mt.—475 Rta, 475 Bta, 175 Brnta.
Weldon Brook—Hurdtown—225 Bta, 175 Rta, 500 Brnta.

(Passaic River System)

Beaver Brook—Rockaway—425 Bta, 888 Rta.
Burnt Meadow Brook—Hibernia—100 Bta, 87 Rta, 100 Brnta.
Durham Pond—Marcella—150 Pera, 100 Pica, 250 Sa.
Hibernia Brook—Hibernia—200 Rta.
Kakeout Brook—Butler—625 Bta, 275 Rta, 645 Brnta.
Madison Water Works Lake—Madison—150 Rta.
Mine Ridge Brook—Taylortown—225 Bta.
Morris Plains Brook—Morris Plains—875 Rta.
Rockaway River—Rockaway—7,625 Rta, 2,600 Bta, 10,795 Brnta.
Rock Ridge Lake—Denville—800,000 Yperf, 200 Ypera, 50 Pica, 200 Sa.
Stoney Brook—Taylortown—300 Rta, 239 Brnta, 1,075 Bta.
Washington Valley Brook—Morristown to Mendham—50 Bta, 2,875 Rta, 829 Brnta, 2,400 Brntfg.

(Raritan River System)

Black River—Milltown to Pottersville—4,525 Rta, 3,075 Bta, 9,024 Brnta, 500 Brntfg.
Ledgewood Brook—Ledgewood—150 Rta.
So. Br. Raritan River—Budd Lake to Middle Valley—2,500 Rtfg, 5,725 Bta, 11,275 Rta, 15,726 Brnta.
Succasunna Pond—Succasunna—700 Ca, 200 Ypera, 100 Pica.

(No. Br. Raritan River System)

Burnett Brook—Ralston—2,400 Brntfg, 1,625 Bta, 1,200 Rta, 1,875 Brnta.
Indian Brook—Ralston—250 Bta, 550 Brnta, 400 Rta, 2,400 Brntfg.
Peapack Brook—Chester to Gladstone—400 Rta, 400 Brnta.

(So. Br. Raritan River System)

Budd Lake Brook—Budd Lake—550 Bta, 750 Rta, 150 Brnta.
Budd Lake—Budd Lake—800 Lmbfg, 3,350 Smbfg, 1,450 Sa, 80 Smba, 9,000 Bsfg, 93 Cra, 207 Lmba, 3,600,000 Yperf, 1,750 Ca, 3,665 Pera, 1,087 Pica.
Drakes Brook—Flanders—300 Rta.
Flanders Brook—Flanders—1,325 Rta, 228 Brnta.
Pleasant Grove Brook—Pleasant Grove—150 Rta.

(Rockaway River System)

Bear Pond—Lake Hopatcong—2,500 Bsfg.
Black Brook—Madison—400 Brnta, 400 Bta, 150 Rta, 2,400 Brntfg.
Cedar Lake—Denville—650 Pera, 200 Pica, 100 Sa, 250 Ca.
Cooks Lake—Denville—800,000 Yperf, 350 Pera, 200 Pica, 350 Sa, 100 Ca.
Cozy Lake—Oakridge—100 Ca, 300 Pera, 100 Pica, 100 Sa.
Crooked Brook—Montville—200 Rta.
Espanong Lake—Near Lake Hopatcong—350 Bta, 475 Rta, 200 Brnta.
Estling Lake—Denville—150 Pera, 100 Pica, 250 Sa.
Granny's Brook—Mine Hill—200 Brnta.
Green Pond—New Foundland—20 Lmba, 580 Ca, 60 Cra, 1,950 Pera, 720 Pica, 1,520 Sa, 3,500 Smbfg, 5,000 Bsfg, 2,400,000 Yperf.
Lake Hopatcong—Lake Hopatcong—46 Smba, 3,000 Lmbfg, 2,500 Smbfg, 15,000 Bsfg, 150 Lmba, 8,400,000 Yperf, 653 Pica, 2,175 Sa, 650 Ca, 7,325 Pera.
Kenvil Brook—Kenvil—400 Rta.
Lenora Lake—Mt. Tabor—14 Smba, 1 Pica, 300 Sa, 300 Ypera.
Longwood Lake—Longwood—600 Lmbfg, 3,000 Bsfg, 100 Ca, 1,600,000 Yperf, 200 Pica, 350 Pera, 350 Sa.
Mill Brook—Dover—350 Rta.
Moosepack Lake—Oak Ridge—100 Ca, 200 Pera, 100 Pica, 200 Sa.
Mt. Hope Pond—Mt. Hope—350 Rta, 100 Ca, 200 Pera, 100 Pica.
Parsippany River—Parsippany—175 Rta.
Stickles Brook—Rockaway—400 Rta, 200 Bta, 825 Brnta.

(Whippany River System)

Pochantas Lake—Morristown—300 Brnta.
Whippany River—Morristown—200 Brnta.

OCEAN COUNTY

Barnegat Lake—Barnegat—300 Lmbfg, 1,000 Bsfg.
Estlows Lake—Brookville—100 Lmbfg.
Forked River Lake—Forked River—600,000 Yperf.
Jackson Mills Lake—Jackson Mills—400 Lmbfg, 1,200,000 Yperf, 150 Lmba, 100 Cra, 50 Ypera.
Manahawkin Lake—Manahawkin—300 Lmbfg, 400,000 Yperf.
New Egypt Lake—New Egypt—400 Lmbfg, 150 Lmba, 100 Cra, 50 Ypera.
Oyster Creek—Burnt Mill—350 Rta.
Tuckerton Lake—Tuckerton—100 Lmbfg.
Wells Mills Pond—Wells Mills—200,000 Yperf.

PASSAIC COUNTY

(Greenwood Lake System)

Belcher's Creek—West Milford—550 Rta, 575 Brnta.
Cooley Brook—Greenwood Lake—525 Rta, 150 Brnta.

(Passaic River System)

Barbers Lake—Paterson—750 Ca, 468 Ypera, 254 Pica, 467 Sa, 5 Smba.
Memorial Lake—Clifton—260 Sa, 260 Ypera.
Oldham Lake—North Haledon—1,050 Rta, 400 Brnta, 20 Lmba, 30 Ca, 10 Cra, 275 Sa, 65 Smba, 550 Pera, 135 Pica.
Wanaque River—Greenwood Lake—7,225 Rta, 9,740 Brnta, 350 Bta.

(Pompton River System)

Pequannock River—Charlottsburg—425 Brnta, 350 Rta.

(Ramapo River System)

Pompton Lakes—Pompton Lakes—10,000 Bsfg, 1,250 Ca, 1,800 Lmbfg, 3,000 Smbfg, 900 Pica, 3,000,000 Yperf, 150 Lmba, 50 Cra 1,500 Sa, 8,000 Pera.

(Wanaque River System)

Greenwood Lake—Greenwood Lake—1,800 Lmbfg, 1,500 Smbfg, 5,000 Bsfg, 800 Lmba, 19,200 Pera, 2,000,000 Yperf.
High Mt. Brook—Pompton—825 Rta, 406 Brnta.
Twin Lakes—Above Pompton—1,200,000 Yperf, 10 Lmba, 250 Ca, 20 Cra, 800 Pera, 220 Pica, 700 Sa.

SALEM COUNTY

(Alloway Creek System)

Alloway Lake—Alloway—750 Lmbfg, 2,000 Bsfg, 200,000 Wperf.
Ballinger's Mill Lake—Aldine—300 Lmbfg, 58 Cba, 190 Sa, 43 Ca, 73 Sh, 1 Pa.
Camp Roosevelt Lake—Aldine—550 Lmbfg, 1,500 Bsfg, 495 Cba, 200,000 Wperf, 29 Ypera, 98 Sh, 1,487 Sa, 556 Ca, 34 Lmba, 1 Pa.
Cobbs Lake—Alloway—350 Lmbfg, 500 Bsfg, 200,000 Wperf, 202 Cba, 15 Sa, 12 Ypera, 83 Lmba.
Dilks Lake—Alloway—43 Cba, 6 Ypera, 16 Lmba.
Hazelhurst Stream—Alloway—250 Bta.
Sycamore Lake—Alloway—600 Lmbfg, 1,500 Bsfg, 468 Cba, 80 Sa, 300 Ca, 69 Lmba.
Tranquility Lake—Alloway—150 Lmbfg.

(Maurice River System)

Centreton Lake—Centreton—1,050 Lmbfg, 174 Sh, 2,000 Bsfg, 1 Pa, 1,586 Ca, 2 Wpera, 771 Sa, 806 Cba.
Elmer Lake—Elmer—950 Lmbfg, 2,000 Bsfg, 100 Ypera, 1,096 Sh, 1,711 Ca, 1,466 Sa, 742 Cba.
Maurice River—Millville—805,000 Shadf.
Rainbow Lake—Near Norma—600 Lmbfg, 1,000 Bsfg, 500 Cba, 2,500 Sa, 1 Ypera, 40 Ca.
Union Grove Lake—Near Centreton—1,200 Lmbfg, 80 Ca, 2,000 Bsfg, 103 Cba, 341 Sa, 1 Ypera.
Willow Grove Lake—Willow Grove—900 Lmbfg, 1,000 Bsfg, 670 Cba, 800 Sa, 5,600 Ca.

(Salem River System)

Avis Lake—Woodstown—306 Cba, 561 Sa, 611 Ca, 127 Sh.
Davis Lake—Salem—550 Lmbfg, 769 Cba, 435 Sa, 2,000 Ca, 7 Lmba, 36 Wpera, 1 Pa, 57 Ypera.
Memorial Lake—Woodstown—750 Lmbfg, 2,000 Bsfg, 14 Lmba, 480 Cba, 90 Sa, 1 Pa, 156 Ypera.
Richmond Lake—Woodstown—500 Lmbfg.
Richmontown Lake—Richmontown—500 Lmbfg.

SOMERSET COUNTY

(Millstone River System)

Back Brook—Bridgepoint—200 Brnta.
No. Pike Brook—Harlington—200 Brnta, 300 Rta.
Rock Brook—Rock Mill—100 Rta.

(Passaic River System)

Indian Graves Brook—Bernardsville—612 Bta, 1,237 Rta, 1,100 Brnta.
Nickle Spring Brook—Bernardsville—2,000 Brntfg.
Somerset Inn Brook—Bernardsville—413 Bta, 863 Rta, 1,250 Brnta.

(Raritan River System)

Black River—Pottersville—1,790 Rta, 985 Brnta, 2,000 Brntfg.
Middle Brook—Bound Brook—650 Rta.
Millstone River—Griggstown—300 Lmba, 100 Cra, 100 Ypera.
Mine Brook—Far Hills—100 Bta, 50 Brnta, 150 Rta, 2,000 Brntfg.
Peapack Brook—Gladstone—200 Bta, 680 Brnta, 350 Rta.
Peters Brook—Somerville—500 Bsa.
No. Br. Raritan River—Far Hills—850 Bta, 2,300 Rta, 3,469 Brnta, 125 Lmba, 400 Ypera.

SUSSEX COUNTY

(Delaware River System)

Upper Big Flat Brook—Tuttles Corner—5,737 Bta, 4,287 Rta, 4,820 Brnta.
Lower Big Flat Brook—Wallpack Center—5,738 Bta, 4,288 Rta, 4,821 Brnta.
Little Flat Brook—Layton—2,200 Rta, 700 Bta, 950 Brnta.
Lubbers Run—Cranberry Lake—300 Bta, 350 Rta, 200 Brnta.
Mill Brook—Montague Township—400 Brnta.
Musconetcong River—Stanhope—575 Brnta, 500 Rta, 200 Bta.
Paulinskill River—Lafayette to Stillwater—1,850 Bta, 6,375 Rta, 5,444 Brnta, 400 Brntfg.
Pequest River—Brighton to Springdale—7,000 Rta, 1,900 Bta.
Pequest Springs—6,000 Brntfg.
Shimers Brook—Millville—550 Rta.

(Big Flat Brook System)

Stoney Pond—In the Reservation—150 Bta, 2,300 Rta, 1,000 Brnta, 1,000 Brntfg.
Stoney Brook—Tuttles Corner—200 Rta.
Snook Brook—Near Culvers Lake—125 Bta, 100 Rta.
Tuttles Corner Brook—Tuttles Corner—200 Rta, 400 Brnta.

(Hudson River System)

Wallkill River—Sparta to Franklin—2,250 Rta, 625 Bta, 1,687 Brnta.
Hdw. Wallkill River—1,125 Rta, 275 Brnta.

(Musconetcong River System)

Cranberry Lake—Cranberry—1,100 Lmbfg, 3,025 Smbfg, 10,000 Bsfg, 5,600 Ypera, 650 Pica, 800 Sa, 250 Lmba, 2,800,000 Yperf, 1,500 Ca.
Dragon Brook—Outlet Cranberry Lake—500 Bta, 350 Rta, 760 Brnta.

(Paulinskill River System)

Alms House Brook—Myrtle Grove—200 Bta, 200 Rta, 500 Brnta.
Beaver Lake—Two Bridges—4,600 Bsfg, 600 Lmbfg, 50 Lmba, 450 Pera, 50 Pica, 450 Sa.
Culvers Lake—Culvers—2,875 Smbfg, 12,500 Bsfg, 3,200,000 Yperf, 10,000 Ypera.
Fairview Lake—Near Hardwick—950 Smbfg, 7,500 Bsfg.
Margerum Brook—Stockholm—225 Brnta, 113 Bta, 113 Rta.
Lake Owassa—Near Culvers—600 Lmbfg, 1,250 Smbfg, 777 Ypera, 4,200,000 Yperf, 12,500 Bsfg, 40 Smba, 31 Pica, 778 Sa.
Paulinskill Lake—Swartswood—100 Ca, 500 Pera, 300 Pica, 600 Sa.
Quicks Pond—No. of Swartswood—500 Smbfg, 2,500 Bsfg.
Ross Brook—Stockholm—112 Bta, 112 Rta.
Big Swartswood Lake—Swartswood—2,500 Lmbfg, 2,300 Smbfg, 15,000 Bsfg, 67 Smba, 637 Pica, 300 Ca, 3,400,000 Yperf, 2,825 Ypera, 1,825 Sa.
Little Swartswood Lake—Swartswood—1,400,000 Yperf.
Trout Brook—Middleville—350 Rta.

(Pequest River System)

Andover Jc. Brook—Andover Jc.—200 Rta.
Aubels Lake—Andover—150 Ypera, 150 Pica, 150 Sa, 150 Ca.
Gardners Lake—Andover—400 Ypera, 100 Pica.
Iliff Lake—Near Andover—1,000,000 Yperf.
Kymers Brook—Andover—450 Bta, 350 Rta.
Lenape Lake—Andover—800,000 Yperf, 200 Ypera, 100 Pica, 200 Sa, 100 Ca.
Muck Meadow Brook—Andover—200 Bta, 200 Rta.
Tar Hill Brook—Tar Hill—275 Rta, 75 Brnta.
New Wawayanda Lake—Andover Jc.—1,200,000 Yperf, 350 Ypera, 150 Pica, 300 Sa, 100 Ca.

(Pochuck Creek System)

Warwick River—Break DeKays—450 Bta, 400 Brnta.

(Rockaway River System)

Bear Pond—Lake Hopatcong—700 Lmbfg, 3,325 Smbfg, 1,200,000 Yperf.
Lake Hopatcong—Lake Hopatcong—2,500 Lmbfg, 6,600,000 Yperf, 1,000 Ypera, 800 Pica, 1,300 Ca, 400 Sa.

(Wallkill River System)

Beaver Run Brook—Beaver Run—300 Rta, 1,750 Brnta, 925 Bta.
Black or Pochuck Creek—McAfee—250 Bta, 1,125 Brnta, 400 Brntfg, 1,650 Rta.
Black Brook—Franklin—475 Brnta, 1,125 Rta, 100 Bta.
Clove Brook—Sussex—1,375 Brnta, 550 Rta.
Grinnell Lake—Monroe—2,300 Smbfg, 2,500 Bsfg, 100 Ca, 350 Pera, 200 Pica, 450 Sa.
Papakating River—Sussex—800 Rta, 1,037 Brnta, 100 Bta.
Sparta Glen Brook—Sparta—100 Rta, 213 Brnta, 100 Bta.
Sparta Jc. Brook—Sparta Jc.—350 Rta.

UNION COUNTY

(Rahway River System)

Ash Brook—Ashbrook—350 Rta, 250 Bta, 350 Brnta.
Bryant Lake—Near Summit—2,000 Bsfg.
Echo Lake—Mountainside—600 Lmbfg, 400,000 Yperf.
Normahaggin Park Lake—Cranford—600 Lmbfg, 1,000 Bsfg.
Rahway River—Rahway—1,500 Bsfg, 600 Lmbfg, 400 Bta, 2,975 Rta, 3,245 Brnta.
Rahway River Park Lake—Rahway—600 Lmbfg, 1,500 Bsfg.
Reformatory Lake—Rahway—100 Bta, 100 Rta, 100 Brnta.
Surprise Lake—Summit—750 Lmbfg, 400,000 Yperf.

(Raritan River System)

Cedar Brook Park Lake—Plainfield—150 Bta, 900 Rta, 1,060 Brnta, 400,000 Yperf.
Green Brook—Scotch Plains—25 Bta.
Seeleys Pond—Scotch Plains—600 Lmbfg, 1,425 Rta, 150 Bta, 1,755 Brnta, 400,000 Yperf.

WARREN COUNTY

(Delaware River System)

Buckhorn Creek—Roxburg—450 Rta.
Delaware River—Belvidere—7,975 Smbfg.
Dunfield Creek—Dunfield—350 Bta, 525 Rta, 800 Brnta.
Lomison's Glen Brook—Summerfield—575 Rta, 100 Bta, 200 Brnta.
Lopatcong Creek—Above Phillipsburg—425 Rta.
Musconetcong River—Waterloo to Penwell—9,475 Bta, 12,250 Rta, 12,505 Brnta.
Paulinskill River—Stillwater to Paulina—350 Brntfg, 6,125 Bta, 4,975 Rta, 12,875 Brnta.
Pequest River—Townsbury to Belvidere—6,440 Bta, 5,350 Rta.
Pohatcong Creek—Mt. Bethel—1,750 Brnta, 600 Bta, 5,350 Rta.
Pophandusing Brook—Belvidere—150 Rta.
Silver Lake—Hope—1,400,000 Yperf, 6,000 Bsfg, 100 Lmba, 3,400 Pera.
Stoney Brook—Columbia—100 Bta, 100 Brnta.
Triple Brook—Hope, 150 Rta, 150 Bta, 100 Brnta.
Van Campens Brook—Millbrook—725 Bta, 700 Rta, 625 Brnta.

(Musconetcong River System)

Andersontown Brook—Andersontown—3,200 Brntfg.
Guard Lock—Hackettstown—600 Smbfg, 2,400,000 Yperf, 50 Lmba, 200 Ca, 50 Cra, 1,448 Pera, 313 Pica, 947 Sa, 104 Smba.
Hance Brook—Beatystown—3,200 Brntfg.
Springtown Run—Port Colden—3,200 Brntfg.

(Paulinskill River System)

Blairs Creek—Blairstown—890 Brnta, 1,675 Rta, 575 Bta.
Blairs Springs—Blairstown—1,600 Brntfg.
Brands Brook—Columbia—500 Rta, 75 Bta, 75 Brnta.
Cedar Lake—Blairstown—250 Smbfg, 600,000 Yperf.
Columbia Lake—Columbia—1,200,000 Yperf.
DePew Brook—Hainesburg—1,600 Brntfg.
Halsey Lake—Columbia—600,000 Yperf.
Jacksonburg Brook—Jacksonburg—325 Brnta, 650 Rta.

Susquehanna Lake—Blairstown—250 Smbfg, 3,500 Bsfg, 1,200,000 Yperf.
White Lake—Marksboro—550 Smbfg, 3,000 Bsfg, 1,400,000 Yperf.
Yards Creek—Hainesburg—200 Bta, 75 Rta, 75 Brnta, 1,600 Brntfg.

(Pequest River System)

Bacon Run—Petersburg—400 Bta.
Bear Brook—Long Bridge—1,750 Rta, 775 Bta, 200 Brnta.
Beaver Brook—Hope—2,825 Bta, 4,850 Rta, 112 Brnta.
Buckaloo Swamp Brook—Mt. Herman—500 Rta, 200 Bta.
County House Pond—Townsbury—400 Bta, 400 Rta.
Locust Lake—Mt. Herman—1,400,000 Yperf.
Mt. Lake—Near Buttzville—1,200,000 Yperf, 1,150 Smbfg, 6,500 Bsfg, 20 Cra, 500 Ypera, 220 Pica, 150 Sa, 1,050 Ca, 60 Lmba.
Trout Brook—Near Shilo—100 Bta, 75 Brnta.

(Pohatcong Creek System)

Lows Hollow Brook—Stewartsville—550 Rta.
Mill Brook—Broadway—800 Bta, 100 Brnta.
Roaring Rock Brook—Brass Castle—400 Bta, 200 Brnta.
Shabbyconk Creek—Washington—150 Brnta.