

REPORT...

N.J. Commission on the conservation
of natural resources
1908

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REPORT ON THE COMMISSION ON THE CONSERVATION OF NATURAL RESOURCES
OF NEW JERSEY

12/8/1908

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To the

Hon. John Franklin Fort,
Governor of New Jersey.

Sir:

The undersigned members of the Commission on the Conservation of Natural Resources of New Jersey, appointed by you July 13, 1908, beg leave to submit for your consideration the following statement.

THE PAST - ITS ACCOMPLISHMENT

Few states are so far advanced in the investigation and intelligent understanding of their natural resources as New Jersey. This is due largely, although by no means entirely, to the far-sighted policy of the Legislature in affording continuous support for more than forty years to the investigation of the State Geological Survey, whose studies during that period have taken a range far beyond that ordinarily included in a geological survey. Other bureaus and departments of the State have added in a varying degree to this knowledge, so that the preliminary investigations which must make up a large part of the work of similar Commissions in other States are unnecessary here. More specifically, the land, minerals, forests and water of the State, the four great classes of natural resources have been carefully investigated.

The Land. Under the direction of the Geological Survey, detailed and accurate topographical maps of the entire state have been made. These maps show the topography of the surface, the forested and cleared areas, the swamp and meadow lands, drainage areas and watersheds, as well as elements of culture and political divisions. At first the Geological Survey and later the State Experiment Station have investigated the character of our soil and the proper fertilizers necessary. Short courses in agriculture have been recently provided by legislative enactment. Experimental work has not been neglected. The reclamation of considerable areas of tide meadow has resulted from the drainage work undertaken by the State in the extermination of the mosquito. The importance of good roads in proper development and economical use of the products of the mine, farm and forest cannot be over-estimated. New Jersey now has 1381 miles of hard stone or improved gravel roads built by State aid, and 1487 miles of similar road built by counties and townships. This is 20 percent of the whole mileage, and is exclusive of the paved or macadamized streets of our cities. The excellence of New Jersey roads is extolled wherever good roads are known.

The Minerals. The investigations of the Geological Survey have made known the essential facts regarding the rock formations of the State and the mines and minerals contained therein. In its production

of zinc, cement, clay and clay products, sand, gravel and road metal, the State takes high rank. Its iron mines were important sources of supply in colonial days, and have never ceased producing high-grade ore, although in later years the relative importance of this industry has diminished. Nevertheless, there are considerable supplies of low-grade reserves which in fifty years when the rich ores of the northwest are exhausted will unquestionably be of great value and important sources of iron. Knowledge regarding the nonoccurrence of certain minerals is of hardly less value than the knowledge regarding the occurrence of certain other minerals. The early demonstration of the absence in workable quantities of the precious metals and coal, and the probable nonoccurrence of oil and gas has saved large sums to the people of the State which would have otherwise been spent in fruitless prospecting.

The Forests. A preliminary but thorough investigation of our forest conditions has been made by the Geological Survey, and the extent and in some degree the character of the forest indicated on the topographic maps. More recently under the Forest Commission, forest lands have been purchased for forest reserves, a strong effort is being made for the better and fuller use of all forest property, public and private, and an effective forest fire service has been organized, which, although not yet perfect, does afford a large measure of much needed protection to public and private forest lands, and which has enhanced the value of such property by not less than \$1,000,000.

The Waters The topographical surveys have furnished accurate knowledge of the area, character and slope of every watershed of the State. Special investigations by the Geological Survey have been made regarding the flow of our streams, their availability as sources of potable water, and of power. The great floods and methods for their prevention have been studied, and carefully worked out plans for huge storage reservoirs adequate for water supply and flood control have been prepared and published both by the Geological Survey and the Flood Commission. A special commission has also considered the question of the potable waters and their conservation, particularly in reference to the legal questions involved in their ownership. Their future conservation, control and distribution is now vested in the State Water-Supply Commission which has brought prominently before the people the importance of the conservation and control of the flood water of the Passaic River in particular. The public and private sources of pollution of our potable surface waters have been located, the degree of that pollution determined, and effective measures are now being taken by the State Board of Health to correct this serious evil. The ground waters have not been overlooked. Exhaustive studies of the rock strata have furnished many facts regarding the distribution, quality and amount of the underground water supplies. Here again knowledge of unfavorable conditions is as important as of favorable conditions.

The importance of improving the inlets along our coast, and deepening our inland waterways has been considered, plans have been proposed, surveys have been made, and dredging operations have been commended.

THE FUTURE - ITS NEEDS.

In the above statement your Commission has attempted to summarize briefly the advance which our State has made in the investigation of our natural resources and the steps taken toward their conservation. It is a record of which the citizens of New Jersey may well be proud. In the face of this achievement, it is evident that the preliminary investigations necessary to similar Commissions in other States are unnecessary here. This does not mean, however, that this Commission has no work to perform. On the contrary, it has two important functions which will sufficiently justify its existence as a permanent body.

First. In the progress of investigations and the multiplication of departments, there has been increasing evidence that in many cases the fields of their activity overlap so that conflict or duplication of effort are inevitable, unless there be some positive effort by a central body to arrange harmonious action.

An illustration is at hand. In the work of mosquito extermination, considerable sums of State money were spent this past summer in ditching the meadows in the vicinity of Bay Head. In connection with the inland waterway work, contracts were let for certain dredging near Bay Head, the dredged material to be spread upon the adjoining meadows, but no provision was made to avoid obstructing the drainage already completed. There was thus the possibility, by no means remote, that under one department of the State, public funds would be spent in such a manner as to undo the work for which other public money had just been paid. In the case cited our Commission has arranged for cooperation between these departments so that hereafter such conflicts will be impossible.

A large and valuable work can be performed by our Commission in unifying the work of various departments and promoting cooperation between those whose functions are similar. Conferences have been held not only between members of the Commission who represent each a different department, but with the Director of the Bureau of Shell Fisheries and with the State Board of Health. As a result of these conferences arrangements have been made for cooperation between the Geological Survey and the State Agricultural Experiment Station, between the State Water-Supply Commission and the Sewage Division of the State Board of Health, and the ground has been prepared for harmonious action between other bureaus.

Furthermore, the members of the Commission have agreed in the future to confer with each other as a preliminary to the adoption of any plans of investigation or lines of work in their respective departments. This action cannot fail to result in greater economy in the expenditure of State funds, as well as greater return for money spent.

Second. - In considering the conservation and at the same time the development of the natural resources of the State, the Commission were impressed with the importance of three lines in which a wise expenditure at the present time cannot fail to give great returns in the future. These are (1) the soil, (2) the forests, (3) the oyster

THE SOILS.

It is true in New Jersey, as in other States, that the soil is not yielding full and adequate returns. It is true that in many portions of the State its productivity has decreased and not increased under cultivation. It is true that in some portions of the State, unwise deforestation of steep slopes and careless methods of cultivation have resulted in complete loss of soil by the washing away of the fine material and the erosion of gullies. It is also true that in the southern portions of the State repeated burning of the forest has destroyed, not only the vegetation, but also the very soil itself, so that there are now extensive tracts of shifting sand which because of their very instability are a manace to the adjoining regions. Even in lands that are tilled and are cared for to some extent, the losses of plant-food are far too great for legitimate husbandry. A little effort, a little more intelligence could save most of this, and would reduce the necessity for the purchase of carloads of fertilizer. Indeed, the outlook would be discouraging were it not for notable examples of progressive farming and of consistent soil improvement. In sections of Gloucester and Monmouth Counties, where the teachings of the Experiment Station have taken root, we find a gratifying record of steady improvement, of a fast accumulating store of soil humus and of soil fertility. In the vicinity of Freehold, farmers are raising 250 to 300 bushels of potatoes per acre on land that fifteen years ago could not produce a third of this quantity. And yet on many of these acres not a pound of animal manure has been applied in two decades. Wheat and crimson clover ~~has~~ green manures and commercial fertilizers in large quantities have made possible this truly wonderful improvement. But the maximum returns have not yet ^{been} reached for the fertility of these lands is still markedly increasing.

What has been done in these instances can be done again, and on a much larger scale. The value of the soils of New Jersey can be enhanced and their fertility assured for many generations to come only by work of this sort. We must look to the farmers themselves for the accomplishment of this work, yet much will depend upon the intelligent guidance of the State through its proper institutions and officers.

Viewed from the standpoint of a practical problem, the following suggestions may be made for the conservation of the soil resources of New Jersey :-

1. A soil survey should be made of the entire State. By cooperation between the Experiment Station and the Geological Survey, the several areas should be mapped and mechanical analyses should be made of typical samples. This would furnish the necessary data concerning the methods of tillage, the green-manuring crops and the rotations best adapted to each particular soil.
2. The physical survey should be accompanied by a chemical survey. Typical samples should be analyzed for their content of available and total plant food. This would furnish information as to permanent systems of agriculture, suitable for each soil, and as to the kind and amounts of fertilizers required.
3. The chemical survey should be followed by an agricultural survey. Detailed information should be gathered concerning prevailing

methods of tillage, fertilization and crop rotation. Information should be collected, also relating to seeds, varieties, yields, methods and time of planting, animals, machinery, markets, transportation, etc. Consistent efforts should then be made to stop the leaks which will be thus revealed.

This task, while of considerable magnitude, need not involve large expenditures in proportion to the benefits which must accrue from the surveys. in question, The sum of fifty thousand dollars, spent through a period of ten years would prove ample for this work; in it the Agricultural Experiment Station, the Geological Survey and the Forest Commission should cooperate, and the survey can be accomplished by a very slight increase in the annual appropriations of these departments.

The benefits to be derived from these surveys by the farmers of New Jersey would be immediate and would in turn be followed inevitably by the conservation of plant food in our soils, by more intensive methods of culture and generally by improved economic and social conditions.

In addition to the experimental work now carried on and the investigations here proposed, more adequate provision should be made to demonstrate to the farmers of each county the financial benefits of improved methods of agriculture. This can be accomplished by better support of Farmer's Institutes, by wider dissemination of the results of the successful work of the Experiment Station and particularly by cooperation with progressive farmers in each community, to the end that the improved methods may be applied in practice and their superiority demonstrated.

F O R E S T R Y

In forestry New Jersey has a field for much active work. The public good to be attained by forest conservation had been so fully demonstrated by the three years work of the Forest Commission that the time has apparently come to increase its powers, and to add somewhat to its force. One forester and one State firewarden can scarcely be expected to accomplish all that the interests of the State require.

Most of what has been done, and much of that yet to be done, is educational, for a large proportion of the people still need to know what forestry will do for them. But there is an increasing amount of work, both in the forest fire service and in forest management, which demands considerably more time in the field than can now be found.

The several directions in which the Forest Commission can most profitably extend its activities are indicated as follows:

1. Increase the efficiency of the forest fire service.

The present organization is doing well but no satisfactory attainment in forestry is possible until our woodlands shall be reasonably free from the risk of destruction by fire. An effective fire service requires the heartiest cooperation of the executive officers of each township or other municipality, and by the railroads. An act of legislature providing for the construction and maintenance of wide fire lines along every steam road which traverses woodland is imperative, for it has been shown that more fires are now caused by the railroads than by any other one agency.

2. Instruction in forest management This applies largely to farmers, since they control a large part of our woodland. Practical demonstrations of woodlot management should be made in all parts of the State. This work can best be done by having a man go from farm to farm, getting in close touch with the people and showing each owner how to solve his own problem. This work might be carried on in connection with some agricultural investigation.

3. Cooperation with shade tree commissions. Several communities, chiefly in the northern part of the State, have established shade tree commissions under the law of 1893. Many more would undoubtedly take advantage of that law were it not for the fact that they cannot afford to employ an expert tree planter in addition to the necessary laborers. An important field for usefulness will be found by providing for effective cooperation between the Forest Commission and these local commissions. If the latter furnish material, labor and the necessary organization to carry on the work, the former ought to provide a technical man whose services could be claimed by any such commission, for a limited time each year, by paying no more than his salary and expenses for the actual time employed.

4. Increase the area of the State Forest reserves The acquisition of land for this purpose progresses rather slowly on account of the small appropriations that are available. It is suggested that cooperation with the State Water-Supply Commission on rather broad lines would result in the selection of very considerable areas of land capable of being utilized in the future for the conservation of potable waters. Many of these areas can now be purchased at relatively low prices, and, even though they are not needed immediately for water conservation, and the propagation of forests on them can easily be made to yield such a return that the State may properly regard the cost as an investment, not an expenditure.

THE OYSTER INDUSTRY.

Few persons have an adequate idea of the extent of the oyster industry of this State or of the possibilities of its extension. A rough estimate of the lands absolutely owned by the State under tidal waters and available for oyster culture is about 366,000 acres. Of this great total it is estimated that there are 207,448 acres in Delaware Bay and Maurice River Cove, 35,274 acres in Raritan Bay, and 123,278 acres in the other bays, rivers, creeks and channels of our coast. By the excavation of a canal connecting Manasquan Inlet with Bay Head, as discussed in the Annual Report of the State Geologist for 1903, 9,000 acres additional oyster ground could be obtained, making a total of 375,000 acres. It is extremely doubtful whether more than 10 percent of this total

available area is now used as natural seed ground, and another 10 per cent as planting ground. According to this estimate, therefore, not more than 75,000 acres are now in actual use as oyster grounds while the remaining 300,000 acres are lying idle, altho capable of rich development under proper care. Our Commission has been informed that the present oyster industry represents an annual return to those employed in gathering the oysters of over \$6,000,000. distributed to a large number of persons.

From such knowledge of this industry as we have been able to obtain, it appears that under wise legislation and the expenditure of moderate sums the area of the natural seed grounds can be much extended. With this increase in the natural seed grounds, it will be possible to lease at remunerative rates additional planting grounds, so that gradually a much larger percentage of the available area will be utilized. There can hardly be any question but that in the possession of these lands the State holds a valuable asset which should under proper regulation yield greater returns to the State Treasury, as well as much larger profits to the oysterman.

In this connection, it may not be amiss to allude to certain conditions which greatly threaten this industry. The increased pollution by sewage of the waters of our harbors and bays, and the increasing prejudice among consumers against oysters grown or fattened in sewage polluted waters, bodes ill to its continued prosperity. When it is remembered that the bulk of New Jersey oysters find a market in adjoining states, and that the Board of Health of those states have sweeping powers, even to the extent of closing those markets to oysters from polluted waters, the importance of radical measures to prevent pollution is apparent. We understand that our own State Board of Health is fully alive to this question and had already taken steps to meet and remedy these conditions. This Commission desires to go on record as strongly emphasizing the importance of this phase of the question and as endorsing the action of the State Board of Health in this matter.

The present advanced position of New Jersey in the lines mentioned is due in large degree to the continued support of broad-minded legislators of the scientific work of the State departments. This far-sighted policy must be maintained, and extended, if our natural resources are to be wisely conserved.

Respectfully submitted,

'Signed) Edward B. Voorhees- Dir. Agri. Exp. Station

Henry B. Kummel, State Geologist

Alfred Gaskill, State Forester

Morris R. Sherrerd, Engr. State Water-Supply
Comm.

Henry J. Sherman, Engr. Inland Waterways.

Trenton,
December 8, 1908