

XVI.—REPORT UPON THE PROTECTION WHICH SHOULD BE GIVEN BY LAW TO THE FISHERIES OF THE ATLANTIC COAST.

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In pursuance of Senate resolution of July 26, 1882, directing "a sub-committee of the Committee on Foreign Relations, consisting of Mr. Lapham (chairman), Mr. Edmunds, Mr. Miller of California, Mr. Windom, and Mr. Morgan, in conjunction with the Commission of Fish and Fisheries, to examine into the subject of the protection to be given by law to the fish and fisheries on the Atlantic coast, as proposed in Senate bill No. 1823, first session Forty-seventh Congress," you were pleased to designate me to act as the representative of the Commission in the investigations conducted by the committee during the summer of 1883, and to direct that I should hold myself in readiness to accompany the committee and assist in the conduct of the investigation authorized.

Accordingly, in response to the request of the chairman, Mr. Lapham, I reported to him at Washington July 10, 1883, and accompanied the committee in its investigation of the coast and ocean fisheries of the Atlantic sea-board from the capes of the Delaware to Portland, Me.

Sessions of the committee were held at Cape May, Long Branch, Berkley Arms, Coney Island, New York, Boston, and Portland, Me. A voluminous mass of testimony was accumulated, which, being drawn from witnesses representing each of the interests engaged in the fisheries, necessarily presents many contradictory opinions, opposite interpretations of the same facts, and broad generalizations, based upon individual and local observations. This testimony has been printed *in extenso*, in connection with the report of the committee, as a Senate document.

At Portland the committee adjourned to meet at Old Point, Va., subject to the call of the chairman.

On October 12 the committee convened at Old Point, Va., in response to the call of the chairman, and held several sessions there and at Cherrystone, which is the center of the numerous pound-net fisheries on the eastern shore of Chesapeake Bay. An interesting session was also held at the extensive menhaden factory of Darling & Smithers, on Back River, Virginia. This point being the rendezvous of the large fleet of menhaden fishing-vessels in the employment of the factory, we

were enabled to secure very interesting details in regard to the purse-net fishing for menhaden in the Chesapeake.

The important point established by the inquiry in the Chesapeake was that the schools of menhaden entering the capes *do spawn* either in the bay itself or in the tidal estuaries tributary to it. The evidence to this effect, though circumstantial, is so full and precise as to leave little or no room for doubt, and confirms the conclusions at which I had already arrived from the study of data previously accumulated. Such being the case, the menhaden fisheries of the Chesapeake region are under like conditions and affected by the same agencies as the shore and river fisheries are, the fish being taken on their spawning grounds or intercepted and captured before reaching them.

As the necessity of legislation for the regulation of the fisheries, either by Federal or State authority, was not apparent unless it could be clearly shown that the abundance of the food-fish supply could be injuriously affected by man's agency—either directly in the prosecution of the commercial fisheries, or indirectly by impeding or hindering access of certain species to their spawning grounds—I was requested by Senator Lapham, chairman, to appear before the committee as a witness and submit for their consideration the conclusions reached by me in reference to this question.

The statements and conclusions submitted for the consideration of the committee were substantially as follows:

There are two fundamental questions involved in the inquiry prosecuted by the committee: The first relates to the possibility of the exhaustion of our salt-water as well as river fisheries by the interference of man, either directly in the prosecution of the commercial fisheries, or indirectly by the exclusion of the species from their spawning grounds. If this question is answered in the affirmative, what measures of legislation are necessary or expedient in the interest of the fisheries?

THE RIVER FISHERIES.

That man by his interference, directly or indirectly, may seriously impair or even destroy our river fisheries does not admit of question or controversy.

The most important river fishes, those which are the motive and the object of important commercial fisheries, are what are termed anadromous, and the most valuable members of this class in the Atlantic coast waters are the salmon, the white shad, the rock or striped bass, and the alewife or river herring. These all spawn in fresh water, and access to fresh water is the fundamental condition for reproduction. The young spend a portion of their lives in the streams, and then go to the ocean and remain one, two, three, or more years; there they get their development, and return to the rivers only for the purpose of reproduction. If, as in the case of the salmon, the spawning grounds

are at the head-waters of the rivers and we erect obstructions, such as dams, and thus prevent them from reaching their spawning grounds, the effect of such obstructions will be to exterminate the species in the waters thus obstructed. They will continue to come into the stream for several years; all that come in will be caught in time, and failing to reach their spawning grounds so as to maintain the species by reproduction, the river will be absolutely exhausted. We have a very marked illustration of this effect in the Connecticut River. The natural spawning grounds of the salmon are above Hadley's Falls, on the main river, and in the upper portion of the Farmington River. Before the Hadley's Falls dam and the dams on the Farmington were erected the run of salmon into the Connecticut was as important as the run of shad in that river. Salmon, indeed, were as cheap an article of food as shad in the valley of the Connecticut. The erection of the Hadley's Falls dam and of the dams on the Farmington had the effect in the first place of vastly increasing the catch of salmon at Hadley's Falls for two or three years. Then it dropped off very rapidly, and now no salmon at all enter that river.

Where, by reason of obstructions, the salmon fail to reach suitable spawning grounds, the development of the eggs goes on until they pass the period of maturity and spoil in the ovaries, the female meanwhile exhausting her energies in vain efforts to surmount the obstruction and reach suitable spawning grounds.

I have cited the case of the salmon fisheries of the Connecticut for the reason that the natural spawning grounds of this species, being entirely above the obstructions, the effect of the dams was to work absolute extermination. But what is accomplished by a dam, is or may be in a measure accomplished by exhaustive fishing. If this is pushed to such an extent in any river as to take—and it may be—all the mature salmon that enter this river, it needs but a few years to work absolute extermination. If it is not carried to this extreme, but is pushed far enough to prevent a sufficient number of the fish from reaching their spawning grounds to maintain the loss by capture or natural casualties, then the fishery will be impoverished year by year, and the depletion will go on in increasing ratio; so that, practically, although the salmon may not be exterminated, the fisheries in that river will be destroyed by being rendered unremunerative.

In the case of the shad and alewife the same result will follow over-fishing. As an illustration take the Chesapeake basin, into all the tributaries of which there is each season a run of shad and herring. The fish enter these streams in February and early in March for the purpose of spawning. Successive schools of them are passing up to their spawning grounds from April on as late as July. The young fish that are spawned remain in the rivers, feeding and growing until the cool weather of the fall comes on. They then begin to drop down-stream, and by the last of November they have passed out into the bay, and

we lose sight of them until they come back full-grown and ready to spawn. As young fish in the river they are the food of the rock or striped bass, the white perch, the bass, and other species of predaceous fishes that are found in the streams. When they reach the salt waters of the bay the number of their enemies multiplies. From their birth until their return to our rivers they are preyed upon incessantly by other fish, so that the larger portion of the young fish hatched do not survive their few months' sojourn in fresh waters, and of the remnant which leaves our rivers each season after the heat of summer is over, it is probable that not one in one hundred reaches maturity and returns to the same stream to deposit its eggs and contribute to the perpetuation of its species.

Man's destructive agency in the matter, if we consider only the number captured by him, seems very trivial and insignificant in comparison with the destruction by natural causes over which he can exercise no control. Yet if by natural causes 99 per cent are destroyed before reaching their spawning grounds, man may, by continuing season after season to capture this remnant of 1 per cent, render unproductive and finally destroy the shad fisheries of a river. Even this remnant, if permitted to spawn naturally, would be sufficient to maintain production and compensate waste or casualties through natural agencies. What has been said of the shad is equally true of the alewife or river herring. Its habits are the same, its geographical range about the same, as that of the shad. In the case of either species it is very certain that present modes and apparatus of fishing, used without legal restriction, will in the end destroy or render unproductive the shad and herring fisheries in our rivers.

PROTECTIVE LEGISLATION FOR RIVER FISHERIES.

What legislation is necessary to protect our shad and herring fisheries from spoliation and utter devastation, is a question that has given rise to more discussion, awakened more angry controversy, and occasioned greater diversity of legislation than any other question connected with the fisheries.

As the fish enter our rivers only for the purpose of spawning, the shad and herring fisheries are necessarily prosecuted during the spawning season, and often immediately upon the favorite spawning grounds of the species. How, then, are we to maintain favorable conditions of reproduction without imposing too onerous restrictions upon those engaged in these commercial fisheries?

Different methods have been proposed by different State commissioners to accomplish the desired end; but as the river fisheries are under State rather than Federal jurisdiction, it is not material that they should be stated in detail in this connection.

The waters of the Potomac River lying in the District of Columbia are under the immediate jurisdiction of Congress, and the law prohibit-

ing the setting of any nets in District waters after June 1 each season will doubtless exert a beneficial influence upon the production of the river, inasmuch as the spawning grounds of shad and herring in the Potomac are largely in District waters.

It would, I think, be greatly to the advantage of our commercial fisheries, and in the interest of those who are employed in them, if the regulation and control of our inshore, river, and inland fisheries was entirely under the jurisdiction of Congress. This is especially desirable in the case of extensive sheets of water like the Chesapeake and Delaware Bays and the Great Lakes which lie within or form the boundaries of two or more States, or of rivers like the Roanoke, the Potomac, the Susquehanna, the Delaware, and the Connecticut, which traverse several States, and which, in their different reaches, are under several and usually antagonized jurisdictions. Unfortunately, under existing interpretations of the relations of State and Federal jurisdiction, it is probably not competent for Congress to enact laws regulating the details of the inshore and river fisheries. But the establishment by Congress of a Commission of Fish and Fisheries for the purpose of conducting an inquiry into the causes of the alarming decline in our sea fisheries has originated an investigation which, under the inspiration and direction of Prof. S. F. Baird, the Commissioner, has been fruitful in results of the utmost value, both to science and to the well-being of the fisheries, and may, as an indirect consequence, lead to the enactment and enforcement of necessary legislation on the part of the States.

The causes of the rapid decline in our coast and river fisheries have been so clearly demonstrated and set forth with such forceful iteration in the annual reports of the Commissioner that men have learned to know at least the conditions which unfavorably influence the fisheries; and our State legislative assemblies are at last awakened to the necessity of legislation for the purpose of regulating the fisheries, improving their condition, and protecting them from actual spoliation.

The work of artificial propagation and planting of fish in new or depleted waters has been prosecuted on the most extensive scale by the United States Fish Commission and by many of the State commissions; and while this work has not, in the face of existing unfavorable conditions, accomplished as much as it might do, it has at least had the effect of checking the rapid decline of the fisheries in progress when this means of restoration was inaugurated, and in many cases has brought about a positive and substantial improvement.

The attention of the committee is earnestly directed to the fact that we are now expending considerable sums of money annually in the propagation and distribution of fish in our waters, and at the same time in those very streams in which we are seeking to create or restore productive fisheries, the Government has erected, and year after year is continuing to erect obstructions that negative every result to be expected from the work of artificial propagation and planting. In other words,

shad and salmon—these being the principal species—are being placed in the head-waters of streams in all sections of the country in vast numbers; and the Government, through its engineer department, is engaged at the same time in erecting obstructions that render all this work of no avail, so far as those sections of country are concerned that lie above the obstructions; and these are often vast sections. Now, I am convinced that if we permit the fish to reach their spawning grounds by removing, or by providing the means to enable them to pass, the obstructions which year by year are contracting the breeding areas of the shad and the salmon, and thus restore to them the range that they had before we put obstructions in the rivers, we will accomplish as much year by year by natural means as we are now accomplishing by artificial, and it would therefore appear to be a proper suggestion for the committee to make in this connection that *whenever the plans for the improvement of the navigation of any of our rivers contemplate the erection of obstructions which will intercept the passage of fish, the engineer in charge of such improvement shall be instructed in his plans and estimates to provide for suitable fishways, to be erected in accordance with plans prescribed by the United States Commission of Fish and Fisheries.*

If the general Government will set the example by providing suitable fishways over the obstructions now erected, or to be erected, in our navigable rivers, the good results will be soon apparent. The several States will follow the example set, and the areas of production thus recovered will determine a permanent increase in the productive capacity of the river.

There is not a State in which there are not already in existence numerous dams which effectually bar the ascent of the shad and the salmon to their spawning grounds. They are erected by the Government in connection with plans for improving the navigation of our inland waters. Until effectual means are provided for the passage of fish over them, they are a standing menace to the perpetuity of our valuable river fisheries.

THE SEA FISHERIES.

In dealing with the salt-water or sea fisheries it is important to keep clearly in our minds the fact that all the great fisheries of the world are prosecuted during the breeding or spawning season of the fish—the herring fisheries everywhere, the cod fisheries, and in part the mackerel fisheries. We should also keep in view the fact that the results of extensive observations by numerous observers point to the conclusion, that the spawning grounds of the salt-water species are just as definitely localized in the ocean as are the spawning grounds of the shad and herring in our rivers.

The influence of the great ocean currents and of meteorological conditions reacting upon the temperature of the water is such as to define and circumscribe geographically areas of water in which suitable con-

ditions of temperature for the development of the eggs of different ocean species prevail during the spawning season of the species.

To these areas, thus circumscribed or defined, the oceanic species, in the season of their spawning, resort as certainly and invariably as do the shad and the salmon each in their season to our rivers; such being the fact, it is possible in the case of the sea fishes that destructive or exhaustive methods of fishing pursued on their spawning grounds, may result in the destruction or exhaustion of the schools thus localized. It is true that the amount taken by man's agency may be infinitesimal compared with the aggregate destroyed by natural causes, but man's supply is taken from the remnant which has escaped destruction by natural causes, and all or nearly all must be permitted to spawn in order to maintain production. I think, therefore, that both in regard to the ocean species and the river species, the question whether we can affect the supply by man's agency is to be answered beyond a doubt in the affirmative.

As regards the menhaden, which is the principal object of this inquiry, the investigations of the Chesapeake region, although the evidence was circumstantial, showed beyond a doubt that the menhaden on entering the Chesapeake Bay in the spring of the year entered there full of spawn; that by the middle of May this spawn had been deposited and the fish were then lean and impoverished. As to the menhaden in the Chesapeake region, though usually regarded as an ocean species, spawning broad off from the shores, the probability is, and the conviction of the fishermen is, that it spawns in that region in the tidal creeks and salt-water estuaries of the rivers, and of course it would be under the same conditions and, as far as exhaustion is concerned, affected by the same agencies as the river species.

REGULATION AND PROTECTION OF THE SEA FISHERIES BY LAW.

The propriety of any law prohibiting the prosecution of the menhaden, mackerel, cod, or herring fisheries, during the spawning season of the fish is extremely doubtful.

Legislation should be directed not so much to prohibition of fishing during the spawning season—about which we are not yet very certain—but rather to such general regulations as will contribute to maintain production and put the product into market under the most favorable conditions to the fishermen.

The result of our investigations on the coast defines very clearly not only the character of the legislation that is necessary, but indicates that such legislation will be acceptable to the fishermen themselves. The mackerel fishermen, or rather the men who handle the mackerel and control the fishermen, were found to have a very general concurrence of opinion in favor of a law prohibiting fishing for mackerel before the 20th of June each season. In the Chesapeake region it was found that the principal men engaged in the menhaden fisheries, those who had

the largest moneyed interests in it, were favorable to the enactment of a similar law regulating the menhaden fisheries. It therefore seems practicable, as well as proper, to enact such legislation as will both increase the production of these two fisheries (the mackerel and menhaden) and place the product in the market under the best conditions, both for the consumer and the fishermen. To go further than to prohibit purse-net or pound-net fishing prior to a definite date each season would be neither practicable nor expedient.

The prohibition of the use of steamers in the mackerel or menhaden fisheries does not seem to be advisable. It is in the general interest to permit the prosecution of the fisheries by methods and apparatus that will secure the most profitable returns. Moreover, if legislation is enacted, fixing a date for the beginning of the mackerel fisheries, the shortening of the season proposed will greatly diminish the advantage of steamers over sailing-vessels; for the heavy expense incurred in the maintenance of the steamers for so short a season of active operations would impose a heavy tax on them.

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