

FOURTH REPORT

OF THE

COMMISSIONER OF FISHERIES

OF THE

STATE OF MAINE,

FOR THE YEAR

1870.



AUGUSTA:

SPRAGUE, OWEN & NASH, PRINTERS TO THE STATE.

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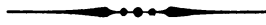
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REPORT.

To the Governor and the Executive Council:

I have the honor to submit a report of my doings as Commissioner of Fisheries for the year ending December 31, 1870.

The time that I have devoted to my duties as Commissioner has been chiefly occupied with the planning of fishways and the inspection of those already built. The artificial propagation of salmon, as a means of restoring the species to rivers where it is now extinct, and of adding to its natural increase, has received much attention. And, finally, the condition of the fisheries as an industry, the modes employed, and the manner and degree of the enforcement of the laws regulating them, have been subjects of examination.

In general the statement may be made that the progress toward a restoration of the river fisheries during the past year has been satisfactory. The period of preliminary examination has ended and the period of experiment is drawing toward a close. The past season has seen the fishways built by direction of the Commissioner for the first time subjected to the test of actual use. Until now I have been forced to content myself with promises of what might be done, supporting them by arguments drawn from the workings of fishways planned by other men, and from the piscicultural operations of other countries. Deprived, by the death of Mr. Foster, of the services of a practical man, the State was compelled to trust the decision as to the necessity of fishways, as to their location, form and capacity, in the hands of an officer who was without any practical experience in the matter,—who could only claim the possession of common sense and a fund of information drawn from observation and from the teachings of books and of his former colleague,—who could not open his mouth in reply when charged with being a “theorist.” Although the conviction that the fishways would be successful almost amounted to a moral certainty, there could but be a feeling of anxiety, lest among the many conditions to be considered in the location and form of them, there might have been some unthought-of difficulty that would destroy their usefulness. It is therefore with a feeling of relief that I am

able to report the entire success of all the fishways built in accordance with the Commissioners' plans, that have been tested. Among these may be mentioned the fishway at Union Mills on the Saint Croix, several on the Penmaquan river in Pembroke, and at Warren. In all these the fish ascended in numbers that delighted the public and astonished the incredulous. Others have been built but not yet tested. In several cases alterations were made in old fishways and improvements in natural passage-ways around dams, all with good results.

As in previous reports I must still give special prominence to the construction of fishways, without which the species that ascend our rivers to lay their eggs will in many cases be utterly unable to reach their proper breeding grounds; but the artificial incubation of certain species, among which are salmon and shad, is assuming new importance and promises to take its place by the side of the fishway as a practicable means of resuscitating our river fisheries.

I am able to refer with much satisfaction to the result of the shad-hatching on the Connecticut river, undertaken by the States of Massachusetts and Connecticut in the summer of 1867. From what was known of the growth of shad it was calculated that the fish hatched in 1867 would reappear as full-grown shad in 1870. There was much skepticism as to the matter, but the result has surpassed the hopes of the sanguine. The shad came into the river during the last summer in far greater numbers than had been known before for many years. This demonstration of the practicability of applying the artificial process to shad was so convincing that the Connecticut commissioners have decided to continue that mode of incubation yearly. They inform me that the operations in this department during the past summer were very successful, about fifty-six millions of shad having been hatched and turned into the river.

Another successful effort in the artificial breeding of fish, worthy of notice, is the salmon hatching at Newcastle, Ontario. This was first undertaken by Mr. Samuel Wilmot as a private experiment, and is now managed by the same gentleman under the auspices of the Canadian government. Early last spring I visited this establishment, for the double purpose of informing myself as to the modes in use and of purchasing eggs of salmon. The success of Mr. Wilmot in multiplying the brood of salmon that frequents the creek on which the works are situated is so remarkable that I de-

terminated to ascertain if possible whether there is within our own borders a place where the requisite facilities exist for the maintenance of a similar establishment. For this purpose I made two excursions up the Penobscot, one on the main river, and the other on its east branch, the Mattagamon. I think there are several points where a sufficient number of breeding salmon could be obtained at the right season to furnish a large number of eggs, part of which could be used in restocking exhausted rivers, and part in increasing the brood of the Penobscot itself. This matter will be discussed further on, under the head of "Artificial Propagation."

The enforcement of the laws wherever wardens have been appointed has been satisfactory. But there were, during the last fishing season, only three wardens under pay in the whole State, viz., Thaddeus H. Spear of Gardiner, Francis Blackman of Bradley, and Caleb Gilman of Meddybemps. These men were faithful, but they cannot of course enforce all the public laws regulating the fisheries. They were expected to give special attention to the enforcement of the laws regulating the fisheries for salmon, shad and alewives. In this they have succeeded. Several wardens have also been appointed to serve without pay in districts where fishing is followed as an amusement, and hardly rises to the rank of an industry. I think wardens of this class could be appointed in several other districts to advantage, for instance, one on the Sebago waters, and one on the west branch of the St. Croix. The State should only pay those wardens who are to guard the industrial fisheries, such as those for salmon, shad, alewives and smelts, and these should receive a sufficient sum to remunerate them for the time necessary to a faithful performance of their duties.

To revert to the matter of fishways. The arguments in their favor have been so often presented in previous reports that I will not here repeat them. A statement of their uses, their cost, the amount of water they require, of the beneficial results from their construction, and some interesting comparisons between our own rivers and some of those in Ireland and Scotland, will be found on the first pages of the report for 1869. In appendix "A" of this report will be found a paper by an English engineer on the fishways in use in the British Isles. We are happy to see that the only form of fishway that has stood the test of use there is nearly identical with that in use in this State. Plate I. shows two of the most successful fishways in Ireland; one, a short one in the river

of Galway, through which have passed *forty thousand salmon in a single year*; the other, a larger fishway, around a precipitous natural fall of *nineteen feet*. This last is on a river which had originally no salmon, but was stocked with them by means of this fishway. Plate II. represents a number of fishways and parts of fishways that have been built in this State during the last two seasons, together with two imaginary plans, contrasting a good plan with a bad one.

My experience thus far has convinced me that the most important point about a fishway is its *location*. Its lower end, where the fish enter, must be so placed that they will readily find it. When ascending a stream, all fish with whose habits I am acquainted stem the main body of water until they meet a serious obstruction. If this obstruction be a dam too high to get over, they seek some way around it. If the fishway have its entrance very near the dam, and readily accessible from the main channel, they will soon find it and pass up. If the entrance is far down the stream it will be long before they will drop back far enough to find it.

For this reason, when the dam is high, and the fishway consequently long, it is desirable to make a "return fishway," or, as it might well be called, an "elbow fishway." The fishway at Ballisodare (Pl. I., fig. 1,) is of that form. So is the fishway at Warren (Pl. II., fig. 5). The location of the latter is most admirable. Compare it with the position of the old fishway, shown in the same figure.

So various are the shapes of rivers and dams and their surroundings, that the fishways cannot be built on a uniform pattern. Each dam requires a special plan, only to be determined by a careful examination of the premises. Sometimes repeated examinations are necessary.

Considerable interest has been excited in our own State as well as in Massachusetts, by a case which has been some time before the courts of Massachusetts, involving the obligation of the Holyoke Water Power Company to build a fishway over their dam on the Connecticut river. The case was important from the extreme nature of its conditions. The Supreme Court has recently rendered a decision, of which the following are in brief the main points.*

By its charter the company was allowed to build a dam on con-

* Communication of Theodore Lyman, Esq., of Massachusetts Com'rs Inland Fisheries.

dition of paying all fishery owners *above* the dam. This they did. The court, however, thereupon decided nearly as follows :

1. Dam owners are required by common law to maintain fishways.
2. Chartered rights are to be construed against the grantees ; i. e. where a grant is not *stated* in the charter it is supposed to be withheld.
3. There is no exemption from a fishway granted by this charter, and no *implication* of such a grant can be considered. Therefore the Holyoke Water Power Company is liable to build a fishway.

The company was very confident, but the bench was unanimous against them. The fishway is now nearly finished, it having been built by the commissioners, the question who should pay for it being left to the decision of the court.

No principle of law is better established than that owners of dams are liable to build fishways, unless they are expressly relieved. No neglect on the part of the public to enforce their rights can be pleaded in favor of the proprietor ; for this liability, or limitation, being for the public good, no individual can prescribe against it.

Besides several matters of local interest, which will be presented in their proper place, I desire to suggest to you, and through you to the Legislature, two important alterations in the general law relating to the fisheries, that it seems desirable to make at the coming session.

The first is the increase of the number of the Commissioners to *three*. The duties of the Commissioner are of a complex character. He is constantly called upon to decide questions involving the liabilities and rights of private parties, and it is not in accordance with the previous practice of the State to trust so much to the opinion of one man in cases involving considerable interests. Further, there are times in each year when the presence of the Commissioner is demanded at so many points that some of them must be neglected. In other States the boards of Commissioners of Fisheries consist in each case of two or more persons. The increase does not necessarily imply an increase of the appropriation, and with respect to that I refrain from making any recommendation.

The second recommendation is that the weekly close-time, as a general regulation, be abolished. I have before expressed the opinion that this was a very unsatisfactory mode of protecting the

fisheries from depletion. It is a regulation which rogues will easily find means to evade, to the great discontent of honest men who would like to obey the law, but wish it to be effective as well upon their unscrupulous neighbors. The clause restricting the depth of weirs is more effective than would be a weekly closetime of twice its present length. The experience of the past season and the testimony of wardens and others, convinces me that it is not wise to retain this time-honored regulation any longer on the statute book, except in certain special cases. On the Penobscot river it is now the only restriction upon the weirs; it should be retained there until some other regulation can be framed to take its place. There are some smaller rivers, as the Saint George, where it may not be practicable to apply any other regulation; these may have special acts.

FISHWAYS AND OTHER MATTERS IN DETAIL.

Saint Croix River.

I was able, in my last report, to announce the construction of fishways over the dams at Calais and Baring. I am now able to report the success of the experiment.

The fishway in the dam at "Middle Landing," or Union Mills, the first obstruction met by fish in ascending the river, was completed in 1869, and has thus been tested during one season, and through several freshets of unusual violence. When, in the month of June, the alewives came, they readily found the entrance to the fishway, and passed up through it in great numbers. Crowds of people gathered to witness their ascent. On one occasion when Mr. Curran, the Canadian fishery officer at St. Stephen, was watching the operation of the fishway, he informs me that each of the seven pools which the fishway contains was so full of alewives that a stick could not be drawn through the water because of them. There is no reason to doubt that salmon also passed through the fishway, although I am not informed that any were actually seen in it. At any rate they passed this and the other dams. Before this fishway was in operation there were some fears lest mill-rubbish, unlawfully thrown into the river, and other floating material might choke the fishway up so often as to interfere seriously with the ascent of the fish, and cause the owners much trouble in clearing it out. But on trial it is found that the head of the fishway is so happily located that nearly all floating material is carried past, to one side or the other, by the current. Only two or three times

during the summer was it necessary to shut off the water and clear away the rubbish. Another point to be noticed about this fishway is its location. It will be seen by reference to Plate II, Figs 1 and 2, that the upper end would be exposed to the full force of the falling water, were not the wing dam, through which the fishway opens, built higher than the main dam. In its present condition the wing dam is several feet higher than the rest of the structure, and it might easily be raised so as to prevent water falling over it into the fishway even in the highest freshets. The proprietors, however, did not think it worth their while to take these ready means of ensuring the safety of the fishway, believing that it was strong enough to withstand the force of the water in any event. Their opinion seems justified by the experience of one season's freshets; for the fishway was not injured by them in the slightest degree. Fishways are not necessarily cobweb affairs. They can be made to stand wherever a dam will stand, without unreasonable expense. This fishway at Union Mills was seventy feet long, eight feet wide, inside measure, built up from the bottom in deep water to a height of ten feet above the surface, was of solid timber bolted together, except the foundation, which was of timber and stone; and it was built by contract for \$600.

The passage at Milltown was kept in operation as a fishway. At one time, late in the fish season, it became clogged for a few days with rubbish, and salmon were seen to collect in a pool below it. The obstructions were removed and the salmon passed up.

At Baring the fishway was not finished until September last. But the fish reached this point at a favorable stage of water and were able to pass the dam without the fishway. The latter has now been put in good order and will undoubtedly work well when the time comes for its trial.

Above Baring there are no obstructions in the river until we reach Vanceboro', on the East or boundary branch, and Princeton on the West branch.

At Vanceboro', a short distance below the outlet of Chepedneck lake, is the dam connected with the tannery of F. Shaw & Brothers. A fishway was planned here by Mr. Curran, and has been constructed, so that with ordinary success on the river below, the alewives will pass this dam and reach Chepedneck lake next season. In June or July last a man fishing for suckers with a small dip-net just below this dam, dipped up an alewife. It is thus cer-

tain that these fish reached this point the very first year of the existence of a fishway at Union dam; and would have entered Chepedneck lake had there been at the time a fishway at Vanceboro'. Whether salmon would pass this point or not, there is a great extent of breeding ground below as well as above.

Chepedneck lake is an exceedingly irregular sheet of water, about twenty miles in length. It contains a vast area of spawning ground for alewives, and a few years of open fishways would bring them back again somewhat after the fashion of olden times. There are also many smaller tributary lakes, and not a few gravelly streams wherein salmon probably once bred and would again.

Above Chepedneck is a still larger body of water called "Grand lake," discharging its waters into the former by a rapid stream less than a mile in length. At the outlet of Grand lake is the isolated village of Forest City, built up around a tannery and a sawmill. A dam crosses the river here, and a fishway has been planned for it and promptly built by the proprietors, Messrs. Shaw of Maine and H. N. Hill of New Brunswick. Its construction completes the opening of this branch of the St. Croix. The only dam remaining unprovided with a fishway on the whole river is that at Princeton on the west branch, entirely within our borders. But a fishway has been planned for that, and the owners have recently assured me of their determination to build it the coming winter. It will be a cheap affair; but its construction is quite important, as the admission of alewives to this chain of lakes is at least of as great importance as their admission to Chepedneck lake.

I have been informed by Mr. Curran that numbers of salmon have been seen playing up the river this fall, and there is good reason to believe that this season's work is a good beginning toward a revival of the fisheries of this river. Now let us have the laws enforced and the fishways kept in operation, and we shall in a few years see the results.

Penmaquan River.

Fishways were laid out over the four dams on this river in the fall of 1869, as stated in the last report. They were not, however, built until the spring of 1870. The fishway over the lower dam, owned by G. W. Leavitt, is merely an inexpensive gap cut through the ledge. In its present shape it does not fully meet my views, but as alewives are said to have found little difficulty in passing this point this year, it may prove sufficient.