

EXCERPTS FROM A SPECIAL REPORT OF THE COMMISSIONERS
OF FISHERIES, FILED WITH THE STATE LEGISLATURE IN 1866,
RELATIVE TO SALMON AND SHAD IN THE MERRIMACK AND
CONNECTICUT RIVERS.



Bureau of Wildlife Research and Management
MASSACHUSETTS DIVISION OF FISHERIES AND GAME

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INTRODUCTION

Periodically, questions are raised relative to the salmon and shad runs of former years in the Connecticut and Merrimack Rivers. Inquiries range the whole spectrum of past abundance and present scarcity. Several volumes would be required to do justice to the interest in the problems and history of such fisheries. This is not one of them.

Instead, the following are merely glimpses of the past with regard to such fisheries, as reflected in excerpts from a special report prepared by Theodore Lyman and Alf. A. Reed, the first fish commissioners in Massachusetts, and submitted to the General Court through the Governor and his Council in 1866.

The duties of the commissioners were spelled out in various propositions or objectives. The following narrative commences with the 15th section of their report and continues to the end without modification. It is hoped that it will help in promoting a better understanding of one of the basic resources with which the state was once blessed. In any case, it is hoped that the following pages will point up the fact that sea-run salmon have not populated the lower reaches of the Westfield, Deerfield, and Millers Rivers, except for a rare straggler, within the memory of living man.

James W. Mullan,
Aquatic Biologist

15. One of the things that chiefly delighted the early colonists of New England, was the great plenty of marine and fresh water fishes, and among these the salmon and shad find honorable mention, as may be seen by the following quotations: "It (Wamesit, or Tewksbury,) is excellently accommodated with a fishing place (Patucket Falls, now Lowell;) and there is taken variety of fish in their seasons, as salmon, shads, lamprey eels, sturgeon, bass, and divers others. *** And this place being an ancient and capital seat of the Indians, they come to fish; and this good man (Mr. Eliot) takes this opportunity to spread the net of the gospel, to fish for their souls." (1) "In this river (Merrimack) is sturgeon, salmon and bass." (2) ----"the inhabitants (of Namaschet, or Middleboro',) entertaining us with joy in the best manner they could; giving us a kind of bread called by them maizium, and the spawn of shads, which they then got in abundance, in so much as they gave us spoons to eat them." (3) "A little below this fall of waters (in Charles River) the inhabitants of Water-towne have built a wear to catch fish, wherein they take great store of shads and alewives. In two tides they have gotten one hundred thousand of these fishes." (4) "Abundance of salmon and lamprons" (5) (in the Saco.)

"In it swim salmon, sturgeon, carp and eels,
Above fly cranes, geese, ducks, herons and teels." (6)

"The attention of the first settlers (1760) was principally directed to fishing for salmon and shad, which were then taken in great abundance at Bellows Falls." (7) "Notwithstanding the velocity of the current, the salmon pass up this fall (Bellows) and are taken many miles above; but the shad proceed no farther. *** On the steep sides of the island rock several arm-chairs, fastened to ladders and secured by a counterpoise, in which fishermen sit to catch salmon and shad with dipping nets. *** It (salmon) still ascends the Saco, Merrimack and Connecticut; in the two last, to their farthest head." (8) Williams, in his History of Vermont, states that salmon then (about 1790) ran to the highest branches of the Connecticut and were taken in abundance. From Burnham's rock, on the crest of Turner's Falls, there have been taken over five thousand shad, in one day, with dipping nets. This was toward the end of the last century. (9) Salmon, too, were then abundant, in the neighborhood of Turner's Falls, according to the testimony of Messrs.

- (1) Gookin. 1674. Collections Mass. Histor. Soc., Vol. I. p. 186.
- (2) Wood. 1633. Young's Chronicles. Mass. p. 411.
- (3) Journal, &c. 1622. Collect. Mass. Histor. Soc., Vol. VIII. p. 232.
- (4) Wood, ubi supra, p. 403. Plagiarized by Josselyn.
- (5) Josselyn. Voyages, 1674. p. 204.
- (6) Connecticut River. Wolcott, Collect. Mass. Histor. Soc., Vol. IV. p. 270.
- (7) Thompson. History of Vermont. p. 150.
- (8) Belknap. Hist. New Hampshire. 1792. Vol. III. p. 61.
- (9) Hoyt. Antiquarian Researches, p. 127.

Smith and Thornton, aged, respectively, eighty and eighty-two years, Mr. Josiah Stevens, of Chicopee, aged eighty-four, stated that, about 1793, salmon were still very plenty in that part of the Connecticut, and large fish sometimes sold for fifty cents a piece. About the same period, salmon were still abundant in the middle and east branches of the Pemigewasset.

Mr. Barron, of Woodstock, New Hampshire, aged seventy-eight, recollects when they came up in vast numbers. It was then the habit for each family that lived near the stream to lay in some four barrels of salted salmon, which would be equal to about one hundred fish. The "eddies," or pools, where the salmon loved to lie, were all numbered, and the fishermen had certain customs and rights in them. It is in tradition that one capable old lady was wont to spear the fat fish with a pitchfork, to feed her working men withal! (10) In the lower waters of the Merrimack, the fisheries were then unfailing. On this point we have the testimony of Mr. Charles Ramsay, of Amesbury, aged ninety-one. He began to fish in 1789. Not only shad, but salmon, were at that time very plenty. It was customary to get, with a ninety-yard seine, from sixty to one hundred salmon a day. Such a day's fishing would now be worth from three to five hundred dollars. He once took eighteen salmon at a single haul, and has seen twenty-four taken.

The chief tributaries, too, were visited by these annual pilgrims. Shad passed in numbers up the Concord River. Whether salmon did so is a question. Mr. John Josselyn says they did; (11) Sir Ferdinando Gorges says they did not. (12) It could never have been a good salmon stream, because the water is warm, slow and thick. There is a small stream, still called Salmon River, which rises in Groton, and empties into the Merrimack a little beyond the Massachusetts line. So also in the Suncook, the Soucook, and the Contoocook, all emptying near Concord, New Hampshire, salmon were taken. But the great body of them kept on to their true waters, the clear, cold streams that rise among the White Mountain group. Even Baker's River was almost neglected in the presence of the east and middle branches of the Pemigewasset, which drain our New England Ober-land from Mount Willey to Franconia Notch. Indeed, it is among and beyond the White Mountains that lie the chief salmon spawning beds of all the rivers of the Eastern States south of the Kennebec. Hence flow the head tributaries of the Androscoggin, the Saco, and the Merrimack. Even the Connecticut derived thence the upper Ammonoosuck, Israel's River, and the lower Ammonoosuck, which were doubtless the three principal

(10) Report of Messrs. A. and G. Reed.

(11) Voyages. 1674. p. 170.

(12) Wonder-working Providence. 1635. p. 79

nurseries for the parent stream; though salmon also ran about ten miles up Miller's River, and still further up the Deerfield, and were occasionally taken in Green River. The shad are comparatively lowlanders. They stopped at Franklin, on the Merrimack, and at Bellows Falls, on the Connecticut, but they invaded the lower tributaries, too warm and sluggish for the salmon's taste. In fine, at the close of the last century, the two rivers, and their chief inflowing streams, were so stocked with salmon, bass, alewives, shad and lamprey eels, that the inhabitants along these water courses were bountifully supplied therewith, and drew thence a considerable part of their food. It now remains to investigate: ---

16. When this supply began to fail; and
17. The causes of this failure.

About 1792 there rose a mania for making dams and canals to render river navigation practicable round falls or rapids. Hence the Locks and Canal Company of the Merrimack, which still exists in a limited form at Lowell. Already, in 1796, the canals at Patucket, Mass., and at Amoskeag, N. H., were nearly done, and with them, of course, dams to back the water into them. In 1812 there was a complete dam, from seven to twelve feet high, at Bow, N. H., and at Merrill's Falls another dam, running obliquely nearly across the river. Below Amoskeag, the river, for nine miles, was converted by law into the "union Canal," and here and at all the "falls" was full of locks and other obstructions. (13).

When we consider what an amount of disturbance in the river all these works must have occasioned through a series of years, and how many actual obstacles they must have raised, we shall not be surprised to find a diminution of its inhabitants, as may be inferred from the following quotations: "Note on Plymouth, N. H., (1814). Salmon are sometimes caught in these rivers." (14) (Baker's and Pemigewasset.) No more laying in of four barrels saled, or spearing them with pitchforks! "Sketch of Tyngsborough, (1815). Until bridges, dams and other obstructions were multiplied, it (the Merrimack,) abounded with shad and salmon, but now the fishing has become less lucrative." (15) "Sketch of Haverhill, (1815). Salmon are not so plenty as formerly, but this fishery is still of considerable importance and has not diminished for fifteen or twenty years past." (16) The number of years, here loosely stated, since which there had been no diminution, is probably rather too large. The fish would not continue to diminish after the obstacles which caused that diminution became stable and ceased to increase. That the diminution was great may be drawn from the direct testimony of Mr. David Worthen, of Salisbury Point, aged seventy-

- (13) T. Dwight. Travels, Vol. I. p. 406.
- (14) Collect. Mass. Histor. Soc., 2d Ser., Vol. III. p. 110.
- (15) Collect. Mass. Histor. Soc., 2d Ser. Vol. IV. p. 192.
- (16) Collect. Mass. Histor. Soc. 2d Ser. Vol. IV. p. 121.

five, who stated that, in 1805, it was considered good luck to get twenty salmon in a day, though he had known as many as forty to be taken. In 1789, it has already been shown, that sixty to one hundred salmon a day was a common catch in this lower part of the river. For this diminution no good reason can be given but the dams, which by opposing the passage of the fish, by altering the levels of the river, and by increasing the amount of silt (17) in the water, drove them from parts of the main stream and of its tributaries. By 1830, salmon had become still scarcer in the lower Merrimack. At the best places, like Haverhill, ten or twelve a day was good fishing, while at the inferior places only one or two a day would be taken. The cause of this new falling off is to be found near Bristol, N. H., where Brown's Dam, about the year 1820, forever barred the fish from the Pemigewasset, their favorite spawning ground. The last salmon was taken on that river some forty-five years ago by Mr. John Wallace. Cut off from their favorite haunts, annoyed by river pollution and pursued by fishermen, the salmon continued to decrease until, in 1845, the best places yielded no more than from three to six a day. In 1847, the building of the Lawrence Dam gave the death-blow to this species. But it is curious to observe that its extinction was not immediate. At first the best places would get a salmon every other day; the poorer, one every ten days. The diminution, however, was rapid until 1859 or 1860, when they became extinct, excepting an occasional straggler. For five or six years they came each year to the foot of the dam in their vain endeavor to get over, and about a dozen were taken each year with a scoop-net. After that time very few appeared there. The dam was closed in the spring of 1847, after the salmon had begun to run. Now the spawn of those that succeeded in getting to their breeding-beds would be hatched late in the winter of 1847-48. In the early summer of 1850 the last smolts that could be hatched in the waters above the dam would pass down to the sea. None of these would probably be caught till the spring of 1851, and then only a few, as they would not be likely to average over five pounds in weight. It would not be till the spring of 1852 that the last of this brood, from the spawn laid in 1847, would begin to be freely taken. It appears then, that after salmon are cut off from their spawning-beds, they will still return for a dozen years to a river, without breeding, and consequently constantly decreasing in numbers. This view is supported by the age which this fish has already been proved to attain.

As to shad, their diminution in the Merrimack has been, for obvious reasons, much more gradual than that of the salmon, which are always far less in actual numbers, breed only in peculiar and distant localities, and are easily driven away by pollutions, obstacles or disturbances in the river. Nevertheless, the evidence goes to show that four or five times as many shad were taken thirty years ago as at present; and in the early part of the last century it would appear that they were so plenty as sometimes

(17) During freshets, the amount of silt in a gallon of water from the river at Lawrence is as great as 1/4 oz. to a gallon.

to be used for manure, like menhaden at the present day. (18)

The disappearance of salmon in the Connecticut River is of much earlier date than in the Merrimack; nor was it gradual, but comparatively sudden. In 1797, they were abundant; within a dozen years after they had nearly or quite disappeared. The cause of this rapid extinction was a dam, whose effect was precisely that of the one at Lawrence, though its relative position was entirely different. Just below the mouth of Miller's River may yet be seen the ruins of this fatal barrier, erected about 1798 by the Upper Locks and Canals Company. (19) It was sixteen feet high and stretched entirely across the river. The extinction that followed makes a precise parallel with that already cited in the Merrimack River. For some ten years, till about 1808, salmon were caught at the falls. The first year they were in great numbers, being headed off by the new obstruction, but, within a dozen years, their extinction was complete; and, for at least fifty-five years, the salmon has been unknown, except as a straggler, in the Connecticut. It may well be asked, how an impassible barrier, placed at Miller's Falls, one hundred miles from the river mouth, should have caused the immediate extinction of the salmon, whereas a similar barrier, near Bristol, on the Pemigewasset, at about the same distance from the mouth of the Merrimack, should simply have shut out the fish from so much of the river as lay above the dam, while below they continued to flourish; for they were numerous a dozen miles above Concord, N. H., some thirty years since? The answer to this question is a complete illustration of those special conditions which are absolutely essential for the propagation of salmon. The Connecticut has a long and gently declining course; it deposits the fertile alluvium of a sluggish stream. The Merrimack has about the same fall, but in a much shorter course; it deposits the coarse barren silt of a strong current. The waters of the one were too quiet and too little aerated to hatch the salmon spawn, except in the mountain branches; while in the other many of the middle tributaries and parts even of the main river were doubtless suitable for spawning-beds, when the fish were cut off from the upper sources. Quite otherwise with the shad. The gentle Connecticut is precisely suited to their nature, as is well shown by the way in which they hold out in that river, despite a multitude of gill-nets at its mouth and the dams that have stopped their free migrations. Nevertheless, they too have decreased in numbers seriously. Three-quarters of a century ago they were so abundant as to be thought of little value, and were taken in large quantities in weirs. As many as two thousand were sometimes caught by one haul of the seine at Hadley Falls. (20) There has been no such fishing in recent years, except in 1849, when the fish were headed off by the closing of the Holyoke Dam and two thousand three hundred were taken by one sweep of the seine. Ever since the building of that dam, there has been a perceptible diminution of

(18) Shattuck's Hist. of Concord, p. 202.

(19) Letter from Hon. George T. Davis.

(20) Holland's Hist. Western Mass. Vol. I. p. 303.

shad. Thus, in 1853, (not a remarkable year,) between forty thousand and fifty thousand were caught at Hadley Falls; during the past season (which was a remarkable one,) the catch has been only about thirty-five thousand, indicating a decrease of one-fourth in twelve years. On both rivers, the number of fishing places abandoned because no longer profitable is very great. There were probably three times as many places thirty years ago as there are now on any given part of these rivers. Fifty years since eight nets were used at Hadley Falls; now only one. It is proper to observe that the fishery is very dependent on high spring freshets, which enable the fish to pass over the gill-nets at the mouth of the river. Were it not for these engines, the Connecticut, below Holyoke, would still be a fine shad stream.

The destruction of young fish by mill-wheels, and the deleterious effects of pollutions, have already been treated of; but it will readily be seen that the chief cause of the decrease of migratory fish has been the building of impassable dams.

18. It is of prime importance to give some estimate, albeit a rough one, of the comparative value of the fisheries on the two rivers, at different periods. As to their present value, the statistics are sufficiently accurate. On the Merrimack, below Lawrence, there are nine seining places, of which the best one yielded 10,000 shad the past season (1865); the poorest one, perhaps, 3,500. The total catch of the nine places was not far from 50,000 worth, with what bass were taken at the same time, about \$9,000, or the interest on a capital of \$150,000. The capital stock of the mills at Lawrence was, in 1860, \$7,300,000. On the Connecticut there are ten fishing places, between Holyoke and the Massachusetts line, besides a small one on the Chicopee. Taking the average of the nine lower places at 7,000, and adding the Chicopee fishery, 1,000, and the great Hadley Falls fishery, 35,000, gives a total of 102,000, worth over \$20,000, the interest on a capital of \$340,000. The amount of capital employed at Holyoke is \$3,500,000. To obtain any idea of the former value of the fisheries, it is necessary to build up the figures by a system of proportions from the known present value, and the evidence obtained of what it used to be; for there are no exact statistics. It appears that, about 1835, the shad fisheries of the Merrimack averaged one-half better than at present, and there were three times as numerous, within the same space. In other words, the number of fish taken was four and a half times as great as now, which would give 225,000 fish below Lawrence; or, in the same ratio, 306,000 to Patucket Falls. The fishery at this place was in itself important, just as it was at South Hadley, at Turner's and at Bellows Falls. Wherever a series of steep rapids, improperly called "falls", occurred, the fish were temporarily brought to a stand, and were crowded together, just as troops crowd on the edge of a brook, across which they are obliged to wade. Moreover, in passing up the shallows, they were greatly exposed to the attacks of the fishermen standing on the bank, or on rocks in mid stream. Thus, the number of shad now taken at Hadley Falls is equal to the average number taken on seven and a half miles of the river below. This, applied as an element of calculation

to Patucket Falls, gives a yield of 65,000 for the year 1835. In calculating the salmon for the same year, from the river-mouth to Patucket Falls, it may be assumed that there then were thirty-six fishing places, that each place averaged six salmon a day, and that the season was six weeks, with three fishing days in each week. This calculation would give 3,900 fish. If the salmon fishery of Patucket Falls were equal to that of seven and a half miles of the river below, the number taken there in 1835 would be over 800. This estimate is fully supported by direct testimony concerning the former fishing at these falls. At one time, within forty-five years, there were forty places in this locality where seines or scoop-nets were used, and about twenty places where "pots" were set for salmon. A common day's fishing, at a favorable spot, was then twenty salmon and five hundred shad. As late as 1846, Mr. William McFarlin, of Lowell, took sixty-seven salmon during the season, (21) and in 1847, before the Lawrence dam was closed, he netted nine hundred shad in one day. The following table, based upon the kind of evidence and the proportions already alluded to, has been prepared to give a general idea of the actual value of the fisheries, now and formerly, and to show the ratio of their decrease. Of course it is only to be regarded as an approximation: ---

YEAR	Estimate for river to Patucket Falls.	Estimate for Patucket Falls.	Total Estimate.	Value at present prices.
1789 (Salmon)	\$31,200.00	\$6,800.00	\$38,000.00	\$190,000.00
(Shad)	700,000.00	130,000.00	830,000.0	138,300.00
1805 (Salmon)	7,800.00	1,700.00	9,500.00	47,500.00
(Shad)	450,000.00	90,000.0	540,000.00	90,000.00
1835 (Salmon)	3,900.00	850.00	4,750.00	23,700.00
(Shad)	306,000.00	59,000.00	365,000.00	60,800.00
1865 (Salmon)	1.00	-----	1.00	5.00
(Shad)	50,000.00 (22)	-----	50,000.00	8,500.00

(22) Only from river mouth to Lawrence

Lest some of these figures be considered large, it may be well to add, for comparison, the statistics of one or two other rivers. In 1820, 21,817 salmon were taken at the single village of Deje in Sweden. In 1850, 32,000 fresh salmon, taken near St. John, N. B., were thence exported. (23) In 1842, there were taken in the Tay, and in its tributary, the Earn,

(21) Dr. Storer is not, therefore, quite exact, when he writes, in 1839, that "now the few specimens taken are looked on as rarities." Boston had then grown to 80,000 people, and the Merrimack salmon no longer made much figure in so considerable a place; especially as they were probably largely consumed on the spot, or sent, by railroad, to New York and elsewhere. See *Fishes of Massachusetts*, p. 104.

(23) Sabine's Report. *Fisheries of the American Seas*.

107,318. (24) In 1830, the estimated annual yield of the Penobscot and the Kennebec was 150,000 salmon for each river. (25) The estimated catch of shad for the Delaware river, in 1837, was 1,500,000; and there is an instance recorded where 10,800 were taken at a single haul of a seine. (26) Before closing this part of the subject, it may not be out of place to say, that the lamprey eel (*Petromyzon americanus*) is a fish greatly esteemed by our country people, and one which was formerly taken in almost incredible numbers, when passing up the rivers to spawn. In the Merrimack, it was found as far north as Plymouth, N. H., and by the Connecticut, also, it passed into the same State. When the Lawrence dam was first built, several cart-loads have there been taken in a day, by one man. In 1840, Mr. Joseph Ely took 3,800 in one night, at Hadley Falls. It was then the custom, in the country, for each family to salt down several barrels of them, for winter use. Now, this valuable fish has become nearly extinct in both rivers. The striped bass (*Labrax lineatus*) also deserves mention, although it is not abundant, except near the mouths of the rivers, where are its chief spawning beds; and its diminution is not owing to dams, but rather to constant and indiscriminate fishing.

In conclusion, the Commissioners beg leave to reiterate a few of the results of their investigations: --

1. In order successfully to restock the two rivers with shad and salmon, it would be necessary that fish-ways should be built over the dams; that the pollution of the water should be prevented; that New Hampshire should breed salmon; that Connecticut should forbid the use of weirs and gill-nets; and that stringent laws, regulating fishing, should be passed by the States concerned.

2. These fish-ways would injure or inconvenience the manufacturers more or less seriously.

3. If the above conditions were complied with, an abundant supply of fish might reasonably be looked for within five years, though they would not be so plenty as when the country was in its primitive state.

All of which is respectfully submitted.

THEODORE LYMAN,
ALF. A. REED,
Commissioners.

December 1, 1865.

(24) Coste Voyage, p. 259.

(25) Letter from Mr. N. Cummings.

(26) Dr. Howell, loc. cit.

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