

REPORT

OF THE

Colorado Fish Commissioner

OF THE

STATE OF COLORADO,

FOR THE

YEARS 1889-90.



DENVER:
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To His Excellency,

JOB A. COOPER,

Governor of Colorado:

I have the honor to submit herewith my report for the years 1889-1890. When I took charge, April 1st, 1889, I found the only hatchery in use, viz.: the one nine miles below Denver, on the Platte river, in very bad condition. After more than eight years of service the cheap wooden structure had decayed so badly as to be unfit for another season's work. There was, however, a fine lot of trout fry ready for distribution, somewhere about 300,000. These were sent out over the several lines of railway for planting in the public waters, and were as equitably distributed as the limited means at my disposal would permit. A few thousand fry were sold to private parties. The number so disposed of is given in detail in an appendix to this report. I did not encourage the sale of fish to stock private lakes; had I done so there would not have been any left for the public waters. I have pursued the same policy this year and only sold very small lots to four or five persons. People who desire fish to stock private ponds can readily obtain all they need from those who make a business of growing eggs and fry. The live fish dealers of Denver are able to supply almost any kind of fish suitable for stocking ponds or lakes. The State has so large a territory to stock with fish for the public use, that there is never enough to go around. As soon as the work of distribution for 1889 would permit, an attempt was made to establish the branch hatcheries that the law called for,—the amount of money at my disposal for each of the three branches, was limited to four hundred dollars

for the construction. I soon discovered that this small sum was inadequate for the purpose, so determined upon making use of the old branch hatchery at the outlet of the Twin Lakes as the best plan to get good results from the outlay. This place was soon put in order, and, owing to the great difficulty of catching the spawning fish from the wild waters, the result was not satisfactory, and it became necessary to await the opening of the next season. Meanwhile, there was much to be done at the Denver hatchery, for it had to be entirely rebuilt in order to hatch the eggs for the season of 1890. This work has been done, many new ponds made, the water supply greatly increased, a dwelling for the superintendent constructed, a stable for the horse and wagon, and a complete change made in order to facilitate the handling and shipping of the fish, so that to-day the establishment is in excellent working order with a much better water supply, greater hatching capacity, and a larger and better stock of breeding fish than at any time since the place has been in use. I found it necessary to change superintendents before the season of 1890 should begin, so I placed W. S. Kincaid in charge October 1st, 1889, he having had eight or nine years experience prior to this time. I have no reason to regret the change, and the State has secured the service of a valuable man. The season of 1890 has been very successful, although the branch hatchery at Gunnison did not succeed in securing a sufficient number of breeding native trout to enable them to score a success for this year; however, with the further improvements made there the past season, there is a fine showing for 1891. At the Twin Lakes hatchery there were over 50,000 native trout hatched out and distributed in 1890, and improvements now being made will insure a very large supply of eggs for the next season. At the Denver hatchery there were over 478,000 eggs and fry distributed for the year 1890; these were sent to almost every section of the State, from Durango to the North Park, and almost as far east as

the Kansas line, over on the Blue, the Grand, the Roaring Fork, the Gunnison and the San Luis Valley. The record of the State Superintendent shows that he alone traveled over 9,454 miles while engaged in the work, and part of the time there were two other persons employed in this labor, whose miles of travel were not recorded, and I wish to add right here, were it not for the aid given by the railroads, this work could not go on. This wide distribution of trout into the public waters includes both stream and lake, and good reports come in from all quarters; the only cry is more fish. The season of 1891 bids fair to eclipse all others, every thing is in excellent order, and there are now in the Denver hatchery over 400,000 eggs, and the season not half begun.

MAGNITUDE OF THE WORK.

It has been estimated that there are six thousand miles of trout streams in Colorado, and I feel safe in placing the number of lakes that lie high up in our mountain ranges, mesas and parks, at not less than five hundred. These clear, cold bodies of water are, for the most part, entirely barren of fish-life of any kind, yet experience has shown them to be excellent for the growth of trout, and the reason is plain. They are filled with a superabundance of aquatic insect life that has been growing there for ages. Many of them contain what is known as the water dog, a kind of half fish and half lizzard, yet this little water animal is quite harmless, and affords most excellent food for the larger trout. These conditions of fish-food are such in our natural mountain lakes that when trout are placed in them they thrive to an extent almost incredible. Mention should here be made of the valuable work done by Col. F. F. Osbiston, of Idaho Springs, he being among the first to demonstrate, to a practical certainty, the great natural advantages of stocking a barren lake with brook trout, or charr, only 2½ inches long, and, in less than two years, taken from its waters these same fish over two pounds

in weight. I have myself visited his lake and seen the trout taken with hook and line from it that would weigh a good pound—and these only yearlings. The lake never had any fish of any kind in it until about four years ago, and, when stocked not over three years, a trout was taken from its waters that weighed three pounds and four ounces. This property, known as Echo Lake, does not exceed forty acres in extent, yet it has, I feel safe in saying, produced many thousands of trout that weighed over a pound each since it has been stocked, and is now simply alive with them. As this is only one among many hundred lakes that are scattered over our mountains, the field for fish culture is far in excess of what is generally known. It would be fair to assume that such a body of water contains enough natural food for 10,000 trout to thrive upon for two years. This would yield five tons of the choicest fish for an outlay of, say, one hundred dollars for the young fish as seed when but $2\frac{1}{2}$ inches long. The experience at Echo Lake has shown a better growth than one pound in two years from the planting. So, also, in several other lakes of the same class. There are over five hundred lakes in these mountains as large, or larger, than Echo, and all need stocking. If the State should succeed in placing 10,000 trout fry in each of only one hundred of these, the increase of choice fish-food for the people of the State would exceed one million pounds in two years, at no other cost to the State than the planting of the seed, as these now idle waters already contain the food. If half of these should be lost, the gain to the State would still be the product of half a million pounds of the finest fish. The State can produce these seed fish for less than \$5.00 per M., when grown in large numbers, so that by an expenditure of less than \$5,000.00 it is possible to furnish the seed for a food product of over 500,000 pounds. The rapid growth of the trout in our mountain lakes is due largely to the presence, in such waters, of countless swarms of

gaummarns, or fresh water shrimp. Other aquatic insects exist in great abundance, but the shrimp are the more numerous.

BARREN RIVERS AND STREAMS.

There is within our 104,000 square miles of territory more than 1,000 miles of suitable waters that now contain no trout of any kind. The North Park has by far the largest area of such waters. Big Laramie has only the few trout placed there by private enterprise and the generous aid of Wyoming's Commissioner. The rest are such streams as flow above high, impassable falls. The streams of this character that have been stocked with trout from the State Hatchery have grown them to great size, showing beyond question that they are well suited to the purpose. These excellent waters should be stocked with the Eastern brook trout, since they do not wander far from where they are planted. I only advocate these fish as being better, for the reason that our native trout have a natural habit of running down stream upon the approach of winter and are apt to get below these impassable falls.

That there is room for both the work of the United States Hatchery at Leadville, and all that the State can do besides is only too apparent. The United States Hatchery is not solely for Colorado waters as many persons seem to imagine. They intend to grow trout for other states and territories. Their work so far has only been preliminary and confined mostly to the hatching of the eggs of the Eastern brook trout. They will, however, be in shape to handle large numbers of the eggs of our native mountain trout next spring. The building to be used by the United States Commission, near Leadville, is very large and should be ample to shelter a great many trays of eggs. Our Colorado trout streams are so extensive that the entire output of any one hatchery could be deposited in a single stream and its waters not be overstocked. It is on account of the

magnitude of the work that I have advised the construction of branch Hatcheries in different sections of the State, and in every way sought to encourage private enterprise in order to awaken the people to the importance of what is to be done. I am aware that there are those who feel that the region of the State in which they live has been slighted, but I can only say to them that it is hard for me to make the few fishes feed *my five thousand*. The age of miracles has past and I am free to confess that I am unable to satisfy my friends with 700,000 trout fry for so large a territory. I could easily get rid of seven millions and really need more than that number each year.

Both the hatching and feeding capacity at the Denver Hatchery should be enlarged. There is need even now for more extensive improvements in order to properly care for the eggs and fry. An increased flow of water can be had by extending the present system of drains up along the base of the bluff that now yields the water for both ponds and hatchery, and this should be done without delay. The number of fish to be carried the present season is much larger than in any previous year.

“OPERATIONS CONFINED TO TROUT PROPAGATION.”

The reason why the State Fish Commission devotes so much attention to the propagation and distribution of trout is owing to the fact that most of our waters are naturally adapted to those fish and are by reason of their being cold in summer, not suitable for the development of the eggs of such fish as Bass, Pike, Perch, etc. While such fish will live and grow in very cold water, they need and must have moderately warm water in which to deposit their eggs. It is no use to place such fish in either our mountain streams or the cold icy waters of our lakes. These are the natural homes of the trout, and all varieties that have been introduced have done remarkably well. Neither will Carp, Crop-

pies, Cat Fish nor Sun Fish do well in our mountains except where the water becomes warm in summer. Where the water is suited to the growth of trout other fish of a predacious character should not be introduced. There has been a great deal said against the brook variety of our common Sucker. This fish is the natural food of our large trout, and, being a very prolific breeder, its young forms a large part of the food of our native mountain trout. The statement made so often of their being a destroyer of our trout by reason of their devouring the eggs at spawning time is, I find, a mere matter of conjecture and heresay. Investigation has shown that these Suckers are engaged in depositing their spawn in the shallow waters at about the same time as the native trout, and are not feeding but are actually filling the same beds of gravel with their own eggs and do not and could not eat the eggs of the trout without devouring their own. The real reason why they have increased so much in our mountain streams is that their natural enemies, the trout, have been caught out by men and the gentle Sucker allowed to remain. No, don't kill the Sucker but increase the trout and he will take care of the Sucker. Years ago, before man disturbed the balance in nature, the trout were in our streams in great numbers, and the Sucker was there too, but the trout were in the ascendancy.

New varieties of trout introduced into Colorado waters have shown no tendency to change their habit of spawning. Eighteen years of experience with the eastern brook trout, *S. Fontinalis* has failed to show any changes even at high altitudes. They do spawn in the wild waters and their increase live and flourish. The proofs of this are ample. Hundreds of thousands of eggs are annually taken at Dr. Law's hatchery near Leadville, in November, at an elevation of over 10,000 feet. I myself have recently taken and impregnated the eggs from these fish in the wild waters of Echo

Lake, on November 25, 1890, at an elevation of 10,200 feet above sea level, and was an eye witness to their acts of depositing their own spawn in the gravel around the shallows of the lake. I make this extended note to confute the statements made by others whose assumption, rather than knowledge, guided the expression of their views.

The growth of our native black spotted trout when placed in new waters is rapid, although they do not attain that exaggerated form so common to Fontanalis when supplied with all the food they can eat. The European brook trout, *Salmo. Fario*, has shown excellent growth in Chalk Creek, in Chaffee county, and in the ponds of General John Pierce, in West Denver. Their spawning habit continues the same.

The Rainbow, or California trout, *S. Irridea*, also an introduced variety, has made wonderful growth in our waters, and has given much satisfaction to the anglers; they, also, show no change in their period of spawning. Farther east these fish spawn several months earlier than in California, but here the conditions are more like those of their native waters and their habit remains the same.

Our branch Hatcheries have been constructed with a view to propagate our native mountain trout, of which we have several varieties, all peculiar to the Rocky Mountain region and in every way worthy of the attention of fish culturists, as they are not so shy of being fed as the eastern brook trout. They being summer spawners, it is possible to carry on the operation of the hatchery at a season of the year when ice and snow do not interfere. The eggs of these fish will hatch in water of sixty degrees Fahrenheit in eighteen days.

Fish culture, when undertaken in an intelligent manner, is profitable, but most people fail because they expect so much from a small area and so little outlay. Many seem to think that fish subsist largely upon water

when the truth is they need a large supply of food. Given plenty of room, the water will grow plant life in great abundance. This growth of aquatic vegetation furnishes food for myriads of water insects upon which the fish feed. There are very few fish that live upon vegetation; even the Carp devours the filth that ignorant people throw into their ponds solely for the insect life that collects upon it. The Carp would not be such a maligned fish if it were placed in clean ponds where it had room and plenty of natural food.

There are no desirable species of food fish that thrive upon either scenery, water, vegetation or filth. To feed a vegetable food to a fish is the worst sort of ignorance. When made to pass through their stomachs as food, it contributes so little to the formation of fish flesh that the product would cost many times more than the food. Hence there is no economy in it. Let the weeds or plants grow in your pond, as they are useful to feed the animal life upon which your fish feed. When large numbers of fish are kept in ponds of small area they must be fed by other means than that afforded by the natural growth in the ponds.

There is a growing demand upon the part of the people for information in regard to fish culture that should be supplied. In a country remote from the seaboard and large bodies of water where fish are to be had cheap, I see no reason why it is not profitable for farmers who employ water for irrigation to grow large numbers of fish, both for their own use and to sell. As an attraction to visitors for sport the trout fishing of our mountain streams and lakes yields an immense return to the people of our State. The railroads are directly benefited by this as evidenced by the thousands of people who take their annual outings to our fishing resorts. There is very little violation of our fish laws at present, still the angler loves too well to boast of the great number of trout he has killed in a single day. I

hope that this tendency will give place to a desire not to kill for the mere sake of killing, but to kill only for actual needs of the fish as food while in camp or at the resort.

SCREENS FOR DITCHES.

Reports still continue to come in about the destruction of fish in our irrigation canals, and as no one has made an actual trial of a suitable screen on those canals where the destruction is greatest, I am unable to present facts in regard to their efficiency; a trial alone will convince. From the fact that it is only a question of another season before all of the water flowing in our streams where this destruction is greatest will be used by the canals, I can see no use in placing screens at their headgates, as the trout would certainly perish by reason of their being held there in great numbers with no deep water to afford shelter or food. I believe that by making large dams on the streams above where the ditches are taken out, that the trout would not go below them, but remain in the deep waters all winter, where they would find both food and shelter, for that is all that impels them down stream at that season of the year. Thousands of them do find shelter in all our deep pools and natural lakes where they have access to and are not lost in the ditches. Irrigation is so much a necessity of our country that in time every drop of water will be used, and the placing of costly screens at the headgates would then be of no practical benefit. We have enough trout waters above all our ditches to afford good angling for all time to come if properly cared for. On the Rio Grande alone there are more than a hundred miles of trout waters above Del Norte and the great canals.

ESTIMATE OF FUNDS NEEDED FOR 1891 AND 1892.

AT DENVER HATCHERY, 1891.

Superintendent, salary	\$ 1,000 00
Assistants, salary	600 00
Expenses, fish food, fuel, etc.,	1,000 00
Expenses of distribution to public waters	1,000 00
Expenses of Fish Commissioner	500 00
Salary of Fish Commissioner	500 00
	\$ 4,600 00
Improvements needed in order to keep pace with the growth of the business, additional water supply and hatching apparatus	3,000 00
Total	\$ 7,600 00

DENVER HATCHERY, 1892.

Superintendent, salary	\$ 1,000 00
Assistant, salary	600 00
Expenses fish food, fuel, extra labor, etc.,	1,500 00
Expenses of distribution	2,000 00
Expenses of Fish Commissioner	500 00
Salary of Fish Commissioner	500 00
	\$ 6,100 00
Total	\$ 13,700 00

TWIN LAKES HATCHERY, 1891.

Improvements needed, hatching apparatus, feed- ing boxes, food, etc.	\$ 2,500 00
Superintendent, salary	900 00
Assistant, during hatching season	600 00
Cost of distribution of fish	1,000 00
Total	\$ 5,000 00

TWIN LAKES HATCHERY, 1892.

Superintendent, salary	\$ 900 00
Assistant, during hatching season	600 00
Cost of distribution of fish	1,500 00
Fish food	100 00
	\$ 3,100 00
Total	\$ 8,100 00

ESTIMATE OF FUNDS NEEDED—CONCLUDED.

GUNNISON HATCHERY, 1891.

Supurintendent, salary	\$ 900 00
Assistant, during hatching season	600 00
Cost of distribution	1,000 00
Fish food	250 00
Total	\$ 2,750 00

GUNNISON HATCHERY, 1892.

Superintendent, salary	\$ 900 00
Assistant, during hatching season	600 00
Cost of distribution	1,200 00
Fish food, etc	500 00
	\$ 3,200 00
Total	\$ 5,950 00

In the foregoing the improvements asked for will enable the Commissioners to place in the public waters of the State more than three millions of trout. This will not only contribute a vast amount of fish food for the people at a nominal cost, but will tend to attract to our mountain resorts great numbers of visitors who come here for the sport of angling and spend with our people thousands of dollars to defray their actual expenses. The expenditure of the small sum asked for at the end of two years will bring back returns far greater than a like sum expended for any other purpose. The experience of the Commissioner goes to show that the small sum of \$500 allowed him for actual expenses while engaged in the service of the State is wholly inadequate to enable him to visit and encourage fish propagation over so vast a territory as that embraced within the State, covering one hundred and four thousand square miles. Given a reasonable sum for the purpose, the Commissioner could visit the many sections of our State and instruct and encourage the people in fish propagation and protection. The position is one that should not be a sinecure, but a real field of usefulness, as it

tends towards the increase of a vast food supply. Our State has the water and the fish food and by proper means can grow the fish.

GORDON LAND,
Fish Commissioner.

