

change in temperature, or if the eggs were not properly handled, those that die immediately turn white.

When the eggs are received at the different hatcheries they are all measured and in this manner we know exactly the number of eggs received. All poor eggs removed are measured and by subtracting the loss of eggs from the amount received at the hatchery, it is very easy to determine the approximate number of fry that the hatchery produces and ships out for planting in the waters of the state. Dividing the total production of the hatchery by the number of cans used to make the distribution gives the number of fry per can, and by multiplying the cans by the number of fry in each can, we arrive at the number of fish planted by each person applying for the same.

During the past three months the employees of the commission traveled over 46,000 miles in the distribution of fish and the planting of them in public waters. The fry was transported in specially constructed cans similar in shape to a ten gallon milk can. It required over 16,000 of these ten gallon cans to transport the fry and at certain times it is necessary to curtail the shipments, as the empty cans are not returned as rapidly as is necessary. Oftentimes persons receiving the fry do not return the cans to the depot promptly, and this hampers us greatly in our work of distribution.

ROUGH FISHING OPERATIONS.

During the season of 1915 the Commission entered into 36 contracts under sections 62.38 and 62.50 for the taking of buffalo, carp, dogfish, garfish, ellpout, suckers and sheepshead from inland waters. Six of the contracts were under sec. 62.38 covering the waters of Winnebago county and thirty covering other inland waters. Most of the rough fishing operations were carried on in Lakes Poygan, Winneconne, Butte des Morts and Winnebago in Winnebago county, and in the waters of the Crawfish and Rock rivers, Lakes Monona, Waubesa, Kegonsa and Beaver Dam. Under section 62.38 the fishermen paid the state at the rate of one-half cent per pound on all fish sold and under section 62.50 the state collected one cent per pound. All fishermen paid a per diem of \$2.50 plus necessary expenses including lodging and board for the services of a state supervising warden.

Most of the fish were sold in eastern markets, carp bringing from 3 cts. to 6 cts. per pound, buffalo from 5 cts. to 10 cts. Several carloads of live carp were transported to New York in a car especially constructed for this purpose. These fish were shipped from Hubbleton and Beaver Dam.

To make rough fishing successful under these contracts, requires the investment of considerable capital. It also requires one who understands the business of fishing and operation of nets. Many fishermen lost money because of their inexperience. This work is practically confined to waters in the southern portion of the state; northern waters are not heavily infested with the rough fish. Very few game fish were taken in the nets. Our game fish do not remain in the vicinity of a large school of carp or buffalo. When a particularly large haul of carp was made, 40,000 to 60,000 pounds, not over 75 to 100 pounds of the better varieties of fish would be found in the haul.

The following table will show that the 36 contracts yielded a total catch of 1,381,168 pounds of fish marketed and on the same the revenue of the state amounted to \$11,128.07. Approximately 300,000 pounds of dog-fish, ellpout and garfish were caught, which were buried on the shores.

Where the carp has established himself it is practically impossible to exterminate the fish, but consistent fishing will restrict their numbers to such an extent that the better varieties of fish may hold their own. Wherever the carp establishes himself it is not long before he becomes the dominating factor. The natural increase of the fish is exceedingly rapid and owing to its destructive habits the other varieties rapidly diminish. They simply crowd out the game fish and usurp the grounds. Some objections are made as to carp or rough fishing operations on the ground that seining the lakes does more harm than good. The season for rough fishing is from September 20 to March 20, at a time when the game fish are not



CATCHING WALL-EYED PIKE FOR COLLECTION OF SPAWN

spawning, are in deep water and for this reason there is practically no damage to the game fish. The fact stands that the carp will destroy more spawning grounds and water vegetation than all the seining that could be carried on. Lake Kegonsa in Dane county before carp fishing was carried on was practically a big carp pond. After three years of carp fishing operations, the summer of 1916 was the best game fishing season that the lake afforded for years. The water vegetation is now heavy and there are a number of splendid wild celery beds in the lake. There is absolutely no question as to the excellent results of cleaning the lake of tons of rough fish.

ROUGH FISHING OPERATIONS.

	Lbs.
Winnebago county waters (Sec. 62.50).....	333,840
Rock river (Sec. 62.38).....	158,162
Crawfish river (Sec. 62.38).....	77,145

Lake Monona (Sec. 62.38).....	165,465
Lake Waubesa (Sec. 62.38).....	96,985
Lake Kegonsa (Sec. 62.38).....	210,872
Lake Beaver Dam (Sec. 62.38).....	239,307
Other waters (Sec. 62.38).....	99,392
Total pounds marketed.....	1,381,168
Revenue collected by the state.....	\$11,128.07
Number of contracts entered into.....	36

SURVEY OF TROUT STREAMS.

For several years I have recommended a thorough survey or examination of trout streams in the state, so as to secure positive information as to whether or not the proper and necessary conditions exist to make the planting of trout successful. Many waters that at one time were excellent trout streams no longer have the proper natural conditions for the development and growth of this species of fish. The timber and brush have been cut from the banks, and the stream now meanders through farm and pasture lands, where, during the summer months, hogs and cattle wallow in the waters. Rains, owing to the timber and brush being cut, cause a heavy wash and flood. There is no question but that many thousands of trout from the state hatcheries are planted in streams in which the fish cannot exist. What may have been a good trout stream a decade ago is to-day nothing but a dirty, roily creek.

This year we started the work of a survey covering Wisconsin trout streams. A complete investigation is made as to the present conditions, i. e., temperature of water, depth, width and length of the stream, food conditions, results of former plantings, or any information that may have a bearing on the subject.

Many persons are of the opinion that water is all a fish needs. We may as well say that air is all a human being needs. A stream may be as pure and cool as spring water and as clear as crystal, if the necessary water vegetation which produces crustacea and caddis is absent, the planting of trout is useless. Crustacea is a form of animal life belonging to the fresh water shrimp family. This food must be abundant in the waters or the young trout cannot survive as it is the only food on which a baby trout lives during the first few months of existence.

The work was started in the southern part of the state and thus far ten counties have been covered. The survey is in charge of Mr. B. O. Webster, foreman of the Delafield State Hatchery, who with one assistant traversed the country in an automobile. By placing additional men on the work we expect to complete the undertaking during 1917.

After the work has been completed and statistics tabulated, the department will be able to arrange the future distribution of trout fry so that the fish will be planted only in streams where we know they will find proper conditions for growth and reproduction. Hundreds of thousands of fry have been planted in streams in which a trout cannot survive. Many trout streams are now polluted with refuse from creameries, cheese and canning factories. This survey also covers the situation where persons