MERRIMACK RIVER MONITORING PROGRAM

A Report for the Study Period 1970

Prepared for

Public Service Company of New Hampshire

by

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Manchester, New Hampshire

March 1971

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TABLE XIII

1970 Larval Fish Observations

Hooksett Pond - Merrimack River, N. H.

Date	Station	Temperature °F	Fish Larvae
April 23, 1970	N-6	- - -	none
	S-17	- - -	none
	S-4	- - -	none
April 28, 1970	N-6	- - -	none
May 19, 1970	C-16-0	76.2°	none
	N-6-N-8	56.0°	none
May 27, 1970	S-24W	65.4°	abundant
	S-17W	56.7°	abundant
	S-17E	56.7°	abundant
	S-11W	57.0°	abundant
	S-11E	- - -	abundant
	S-4W	58.0°	abundant
	S-4E	59.9°	abundant
	OE	56.5°	abundant
	OW	- - -	none
	Canal	84.8°	abundant
	N-6W	57.0°	abundant
	N-6E	59.0°	abundant
	N-10W	59.0°	abundant
	N-10E	59.7°	abundant
	N-15W	58.2°	abundant
	N-15E	58.5°	abundant
June 2, 1970	Canal	86.0°	abundant
June 8, 1970	S-24W	70.0°	abundant
	S-24E	70.9°	abundant
	S-17W	70.2°	abundant
	S-17E	71.5°	abundant
	S-11W	68.5°	abundant
	S-11E	68.0°	abundant
	S-6W	69.0°	abundant
	S-6E	71.8°	abundant
	OW	81.9°	abundant
	OE	69.0°	abundant
June 8, 1970 (continued)	N-6W	69.0°	abundant
	N-6E	69.9°	abundant
	N-10W	65.7°	abundant
	N-10E	69.0°	abundant
	N-15W	68.8°	abundant
	N-15E	69.9°	abundant
	C-13	83.0°	abundant
June 16, 1970	OE	81.0°	abundant
	S-24E	80.0°	abundant
	S-24W	80.0°	abundant
	S-17W	79.2°	abundant
	S-17E	78.5°	abundant
	S-11W	81.9°	abundant
	S-11E	82.4°	abundant
	S-4E	83.0°	abundant
	N-6W	73.8°	abundant
	N-6E	74.0°	abundant
	N-10E	- - -	abundant
	N-10W	66.6°	abundant
	N-15W	73.4°	abundant
	N-15E	73.6°	abundant
June 19, 1970	N-10	71.0°	abundant
	N-6	71.0°	abundant
	C-16	92.0°	none
	S-4	80.0°	abundant
	S-17	78.0°	abundant
July 6, 1970	N-6 E and W	72.0°	abundant
	Canal	81.0°	none
	S-4 E and W	76.0°	abundant
	S-17 E and W	74.0°	abundant

July 8, 1970 through mid-October: Dredging operations in canal, spray module cooling system installation and temperatures of up to 107° F appeared to prevent fish from entering the canal.

F. FISH SURVEY

A fin fish survey was initiated during the 1970 monitoring study. The purpose of this phase of the project was to observe and document the presence of larval and juvenile fish occurring in the Hooksett Pond of the Merrimack River. Special consideration was given to possible effects of heated discharges from the Merrimack Generating Station on the occurrence of resident larval and juvenile fishes in the area adjacent to the power plant. In addition, observations were made of spawning behavior of sunfish in the discharge canal.

1. Procedures-

Various techniques were used in sampling fish populations. These included coarse plankton nets, seines and dip nets. Other data were obtained by visual observations and photographic records.

2. Results-

Larval Fish Studies

During the 1967 and 1968 survey of the Merrimack River, most fish studies centered around the presence and relative abundance of resident adult fish populations. No attempt was made to document the presence of immature and particularly the larval forms of these species.

The identification of fish larvae is most difficult and the larvae of many of the species present in the Merrimack River have never been described. Although attempts at identification of fish larvae were made during the 1970 study, these were generally unsuccessful. Therefore, for the purpose of this report, the larvae were not identified, but their presence at various stations during different periods of the spring and summer have been documented (Table XIII). Note that fish larvae were not found until late May (May 27, 1970) in which case they were observed as being abundant at all stations. Although the temperature of the canal was nearly 85° F, fish larvae were found in large numbers. Figure 34 shows fish larvae over nest of June 2, 1970 in the discharge canal. On June 19, 1970, fish larvae were abundant at all river stations sampled. However, they were not observed in the discharge canal. Temperatures in excess of 90° F in the canal may have been limiting to larval fish. By July 8, 1970 dredging operations in the canal and temperatures in excess of 100° F were most likely limiting to fish. None were observed in the canal.

Spawning and Other Observations

The most extreme thermal conditions naturally occurred in the discharge canal. For this reason observations were made on fish found in the canal, their spawning activity, and apparent response to temperature increases.

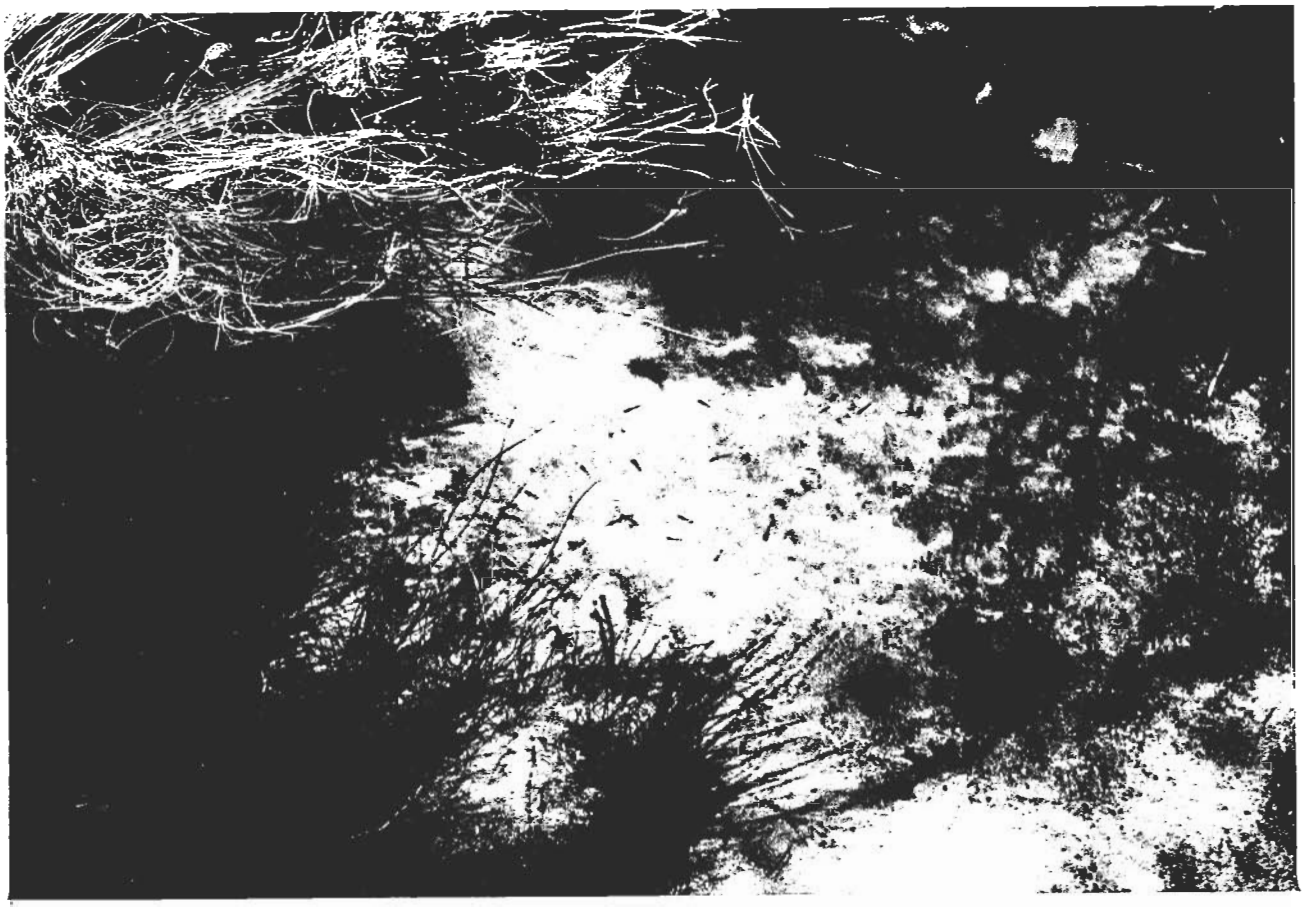

Figure 34. Photograph of Sunfish larvae in discharge canal taken on June 2, 1970. Temperature recorded at 86° F.

Large numbers of yellow perch, *Perca flacescens*, pumpkinseed, *Lepomis gibbosus*, red breasted sunfish, *Lepomis auritus*, golden shiner, *Notemigonus crysoleucas*, brown bullhead, *Ictalurus nebulosus*, yellow bullhead, *Ictalurus natalis*, largemouth bass, *micropterus salmoides*, and white perch, *morone americanus*, were observed in in the discharge canal. These fish were observed in varying numbers from early spring until mid-July. No large numbers of fish were observed in the canal from mid-July to late September. At that time, temperatures dropped to 85° F, large schools of largemouth bass and white perch were observed and caught in the canal. General observations indicated that at some temperature between 85° F and 90° F conditions within the canal no longer appeared to be favorable to resident fish species. However, no fish kills were observed and their absence followed by their return in September indicated their ability to move into a more favorable environment when conditions became intolerable.

On June 2, 1970 approximately 700 pumpkinseed nests were observed in the discharge canal (Figure 35). The canal obviously provided suitable conditions for these spawning fish. However, the water level in the canal and river dropped considerably within a few days. By June 8 most of the pumpkinseed nests had been destroyed as a result of exposure. Since these fish spawned in very shallow water, they were quite susceptible to sudden changes in water levels. It is unlikely that the destruction of their nests had any significant affect on adult pumpkinseed.

Figure 35. Three adult Sunfish nesting in discharge canal on June 2, 1970. Temperature recorded at 86° F.

There were no detrimental effects to fish populations of the Merrimack River which were observed during the 1970 study and which could be attributed to the Merrimack Generating Station.