

THE TRAP (MACKEREL) AND IMPOUNDMENT (BLUEFIN) FISHERY IN
ST. MARGARET'S BAY, NOVA SCOTIA: ITS DEVELOPMENT

by

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SUMMARY

A brief description is given of the history of the fishery, and the current and potential contribution of the impoundments for bluefish research.

RESUME

Le présent document présente un bref exposé sur l'histoire de la pêcherie, ainsi que sur la contribution actuelle et potentielle des filets fermés à la recherche sur le thon rouge.

RESUMEN

El documento presenta una breve historia de la pesquería, y describe la contribución actual y potencial de las reservas a la investigación sobre el atún (BF).

INTRODUCTION

The purpose of this paper is to describe briefly the development of the St. Margaret's Bay trap and impoundment fishery, and the associated Bluefin research program. This paper merely summarizes the major topics currently being researched.

Thanks are due to numerous personnel and organizations involved; they will be more fully acknowledged in the detailed report(s) under preparation.

THE FISHERY

St. Margaret's Bay is a small embayment (6 x 10 miles) located 25 miles west of Halifax, Nova Scotia. For most of this century, the Bay has supported an important trap fishery for mackerel. The mackerel invariably enter the Bay in mid-June, closely followed by the Bluefin, which represent an incidental catch in this fishery.

Based on historical fishing rights, a maximum of 28 mackerel traps are permitted within the Bay; they are owned by 18 local fishermen. Within the past 13 years, the incidental catch of Giant Bluefin has varied from a low of 104 (1972) to a high of 861 (1974) (Table 1). Only in recent years have the Bluefin been of major monetary value, primarily because of the Japanese demand for "Sashimi". The Bluefin cannot be sold on the Canadian market because of the excessive mercury content; the maximum permissible level under Canadian Federal Regulations is 0.5 p.p.m. The Japanese, however, pay a premium price for fresh (not frozen) Bluefin exhibiting a high fat content. This is a

characteristic of late season fish which have accumulated large fat reserves during their northern feeding period. In 1976, the price paid to Canadian Bluefin fishermen (rod and reel) varied from 20¢/lb. (July - August) to \$1.40/lb. (October). The wholesale price of these Bluefin at the Tokyo fish market varied between \$2.-\$5./lb., depending on quality and the availability of fresh bluefin.

Because the majority of Bluefin trapped in St. Margaret's Bay are early season fish, and in an effort to capitalize on late season prices, two impoundment nets were constructed in the Bay in 1975. Each impoundment measured approximately 100 m x 50 m x 20 m (depth). Fifty Bluefin were transferred from neighbouring traps to the pounds by means of a towing cage. The impounded Bluefin were fed trash fish (herring and mackerel culls, squid, gaspereau and whiteing) purchased locally. Feeding was carried out once or twice a day at an approximate rate of 5% body weight per day. The fish were impounded for a period of two to three months and then sold on the Japanese market. The experiment was considered successful, unlike an earlier attempt in 1937. In 1976, nine impounding nets were constructed (Figure 1), and approximately 300 Bluefin were fattened.

To avoid depressing the market price, the impounded giants were killed in small batches. The "cleaned" fish were submerged in iced water for approximately 24 hours before being placed in flaked ice. Prior to transportation,

they were hosed-off, wrapped in protective paper and plastic sheets, and then placed in individual wooden "coffins". A quantity of dry ice or ice packs were also enclosed within the "coffin" to ensure that a low temperature (approximately 2-3°C) was maintained. The shipments of Bluefin were first transported by refrigerated truck to Kennedy Airport and then by air freight to Tokyo. Bluefin can thus be shipped from the St. Margaret's Bay impoundments to the Tokyo market within 4-5 days.

RESEARCH

St. Margaret's Bay offers a unique opportunity to carry out Bluefin research. The giants invariably visit the Bay, and the impoundment nets offer conditions akin to those of an aquarium. In addition, the locale has been the subject of extensive marine studies.

(a) St. Margaret's Bay: Oceanography

The Bay extends between Lat. 44°27' N and 44°42' N, and between Long. 63°50' W and 64°04' W. The western part of the Bay is deep in comparison with the eastern area and reaches a maximum depth of 80 metres near the Bay mouth. (Sharaf El Din et al. 1970)

The main circulation is an anticlockwise horizontal flow which forms an extension of the circulation of the Scotian Shelf outside the Bay. The Bay water has a two-layered structure from June to October (the Bluefin season); the inflowing water consists of a mixed layer, separated by a thermocline from a cooler, more saline layer. The resi-

dence time of the mixed layer is approximately 10 days, and the saline layer approximately 30 days (Heath, 1973; Sharaf El Din et al. 1970).

(b) St. Margaret's Bay: Bluefin Research (1975-76)

(i) Basic Data Collection

Accurate weights were obtained for all of the catch. In addition, morphometric data, sex and otoliths were recorded or collected from at least 400 Bluefin.

(ii) Spaghetti Tagging

Giant Bluefin can be conveniently tagged and released from the Bay traps. A total of 148 Bluefin were double tagged in 1975 and 11 in 1976. The increasing commercial value of the Bluefin curtailed the 1976 tagging program.

(iii) Ultrasonic Tagging Experiment

Ultrasonic tags are being used to monitor the body and gut temperature and the swimming depth of Bluefin in relation to ambient water temperature (particularly the thermocline), diurnal variations, feeding and swimming behaviour. In addition to the strictly biological value of such studies, the experiments also have practical advantages, i.e. the extent to which the fish utilize the thermally stratified water column within a pound may affect stocking rates.

(iv) Growth Studies

At present, growth rates of Bluefin within impoundments can only be estimated because the initial weights are approximations. For this reason, an experiment was undertaken in 1976 to determine the feasibility of anaesthetising and weighing a Giant Bluefin. On the basis of this single trial, and with additional refinements, the weighing of giants would appear to be practicable.

(v) Blood Analysis to Determine Sex

The determination of Bluefin sex during tag and release operations might permit the identification of sexually differentiated migration routes, which are indicated by the apparent reversal in the sex ratio of Giant Bluefin in their northern and southern habitats. Bluefin have only been positively sexed by gonadectomy, a fatal procedure. However, preliminary electrophoretic and hematocrit analyses of blood samples collected from St. Margaret's Bay Bluefin have not revealed sexual dimorphism.

(vi) Contaminant Analysis

Mercury analysis of Bluefin tissue is carried out on a regular basis by the Federal Government. In addition, a limited number of muscle and organ samples are being analysed this year for chlorinated hydrocarbons as part of a baseline study involving many fish species.

(c) St. Margaret's Bay: Proposed Research (1977)

With the possibility of an increased budget, an integrated research program is being planned for 1977, to involve both federal, provincial and university personnel. It is proposed to expand most of the 1975/76 projects, and to initiate others, such as studies in Bluefin nutrition and underwater observations of Bluefin behaviour over extended periods of time.

REFERENCES

HEATH, R. A., 1973.

Variability of Water Properties and Circulation of St. Margaret's Bay, Nova Scotia

Fisheries Research Board of Canada, Tech. Report No. 404

SHARAF EL DIN, S. H., E. M. HASSAN, and R. W. TRITES, 1970.

The Physical Oceanography of St. Margaret's Bay.

Fisheries Research Board of Canada, Tech. Report No. 219

TABLE 1

The incidental catch of Giant Bluefin in the St. Margaret's Bay traps for the period 1964-76.

<u>YEAR</u>	<u>NUMBER</u>	<u>YEAR</u>	<u>NUMBER</u>
1964	496	1970	458
1965	286	1971	208
1966	306	1972	104
1967	614	1973	508
1968	356	1974	861
1969	680	1975	452
		1976	480 (Approx.)

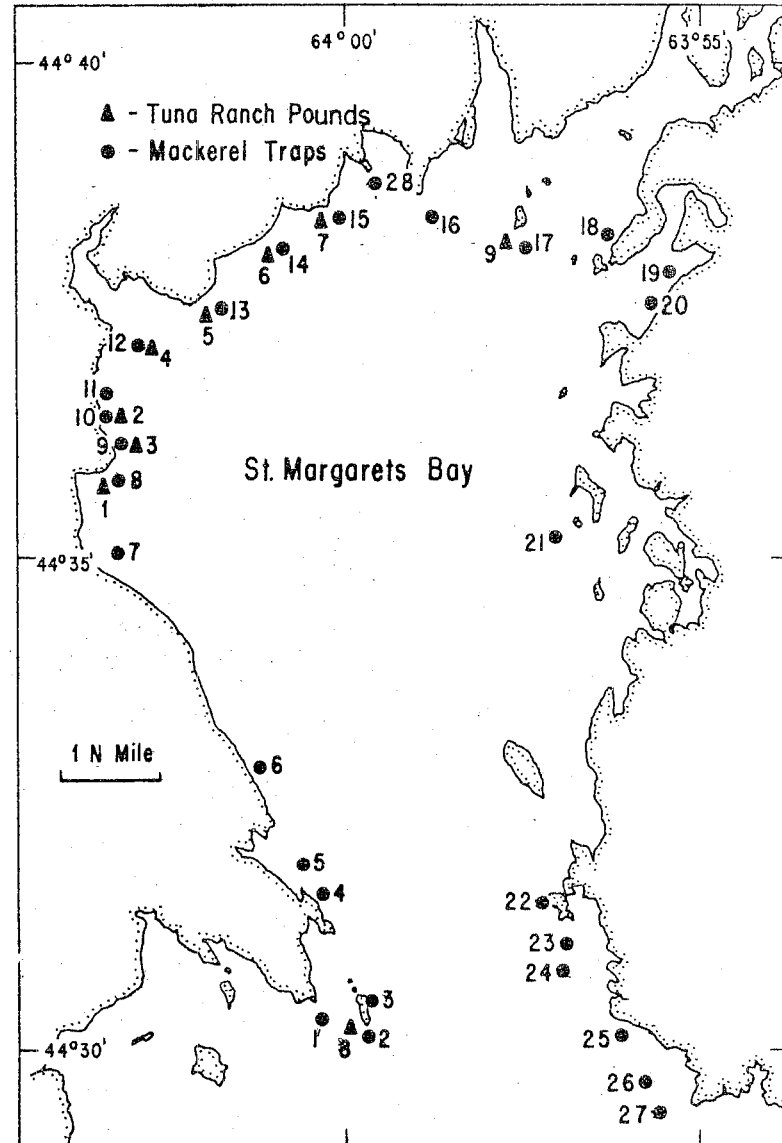


FIGURE 1 - The location of the 28 mackerel traps and nine Bluefin impoundments in St. Margaret's Bay, Nova Scotia.