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OYSTERS IN THE BRAS D'OR LAKES, CAPE BRETON

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Oysters in the Bras d'Or Lakes. Cape Breton.

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At the instance originally of the provincial authorities a brief visit was made to the Bras d'Or Lakes in Cape Breton island to obtain information of the conditions there bearing on the proper development of the oyster resources. The writer was accompanied on July 22nd. to 24th, 1934, by Dr. M. Cumming of the Nova Scotia Department of Agriculture and by the local Inspectors of Fisheries, Messrs. P.W. Smith and J. O'Toole.

In the limited time available it was possible to obtain only a general conception of the situation and such of its details as were most obvious. Discussion with local interested parties was used to supplement direct observations. Only the principal oyster-producing areas in the vicinity of St. Patrick channel and Denys basin were visited.

The problems of the local industry are concerned with the marketing as well as the production of the oysters, and the improvement of the quality of those marketed must be kept in mind as an important aim.

Distribution of the oysters.

A large proportion of the oysters of the Bras d'Or lakes are taken from the highly enclosed waters of St. Patrick channel and Denys basin. These areas lie in Victoria and Inverness counties and only very small quantities are taken in the other two, Cape Breton and Richmond, bordering on the "lakes". The quantities marketed in each of the four during a number of recent years are given in Table 1.

Table 1. Oysters marketed from the Bras d'Or Lakes (bbl.)

	Richmond.	Cape Breton.	Victoria.	Inverness.
1920	-	-	125	600
1921	5	-	230	960
1922	-	-	137	610
1923	44	30	405	1657
1924	47	30	301	991
1925	4	27	378	986
1926	12	13	475	780
1927	20	5	497	702
1928	17	20	511	697
1929	-	8	450	521

For more detailed distribution as indicated by discussion with the local fishery officers reference may be made to the accompanying chart.

In St. Patrick channel the most productive locality is "Oyster Pond" at Little Narrows (as many as 500 bbl. in ayear). A few are taken as far west as Aberdeen and Whycocomagh Portage, while considerable quantities are taken in the inlets about Nyanza and the mouth of the Washabuck river and in neighbouring sheltered situations.

In Denys basin section about 100 bbl. annually are taken in the North Basin, 500 bbl. annually in the rest of the basin and 200-300 bbl. in the inlets outside the basin about Alba, Ottawa Brook and MacKinnon harbour.

Outside these two principal areas only very small quantities are taken in isolated sheltered spots - a few about West bay, about 20 bbl. at the head of East bay and a few at Barachois and George river on St. Andrew channel.

It should be noted that, although the whole "lakes" are connected with the open sea by two small channels so narrow that the tidal range inside is much reduced, it is only in the more sheltered parts of even these land-locked waters that the oysters are found.

Hydrography.

It is, of course, impossible to obtain a thorough and reliable picture of the hydrographic conditions in such a short visit as they are subject to a great deal of variation in such sheltered waters. It is possible, however, to point out some of the general features which are very important.

For reference, the hydrographic observations made during the visit are summarized in Table II.

Table 2. Hydrographic observations in the Bras d'Or lakes, 1934.

	Surface Temp.C.	Salinity (‰) Surface	Bottom
1. Bridge over R.Denys near Orangedale, 2.30 p.m. July 23rd. (Depth 12')	23.8	4.3	17.5
2. Denys basin off Lewis island, 11:30 a.m., July 23rd. (Depth 10')	22.0	17.9	18.7
3. S.side Denys basin near mouth. 10:00 a.m., July 23rd. (Depth 12')	21.5	18.7	19.1
4. Ottawa Brook near shore, 6:30 p.m., July 23rd. (Depth 2')	20.1	20.3	---
5. Oyster pond, Little Narrows, near shore, 11:00 a.m., July 24th (Depth 2')	20.6	18.8	----

The first four places in the table give a series in the River Denys basin section from about the upper limit of the oysters (#1) to one of the areas outside the mouth of the basin (#4), most of the oysters being taken at or above #3.

Salinities. From the above observations which were not made following unusually wet weather it is evident that the salinities prevailing on the oyster grounds are low. They may be compared with a lower limit for survival in the neighbourhood of 15 per mille and with salinities of 25 to 30 per mille prevailing throughout the inlets of the north shore of Prince Edward Island with which the writer is most familiar.

Higher salinities are, of course, to be met with towards the open from the oyster areas of the Bras d'Or lakes. But it is quite evident that the oysters disappear before the salinity becomes too high to be favourable and apparently just about when it reaches the

optimum range. It is obvious that in these waters the salinity does not limit the seaward distribution of the oysters.

On the other hand it does apparently limit the distribution of the oysters up the estuaries and the freshness of the water is doubtless responsible for the absence of oysters from the uppermost parts of St. Patrick channel and from River Denys much above the bridge.

Temperature. Temperature observations are of very limited significance unless made continuously over a considerable period and the data available on the temperatures in the Bras d'Or Lakes oyster areas is very meagre indeed. It appears, however, from the oyster production that temperatures sufficiently high for spawning are of fairly regular occurrence in the more sheltered waters. On the other hand it seems highly probable that temperature is the factor which limits the natural occurrence of the oysters to the bays, the water in the more exposed places not getting warm enough in summer to favour the spawning of oysters. In limiting the oysters to the sheltered waters it limits them at the same time to low salinities.

We see, then, the oysters occurring in a zone between water which is too fresh (up the estuaries) and water which is too cold (towards the open) - a zone which is developed only in the more sheltered situations.

Quality.

The writer cannot speak with much assurance regarding the quality of the oysters of the Bras d'Or lakes on the basis of his small experience of them. But it is worth while to mention certain aspects from the point of view of making the quality as good as possible.

Shape. In this regard the Bras d'Or Lakes compare favourably with most other oyster-producing areas. There is, of course, the usual variety of shapes present and the usual poorly shaped oysters from muddy bottoms especially towards the heads of the inlets. But there is a great deal of firm gravel or sandy bottom which is suitable for the production of a round shape. The growth on the lower areas is fairly slow favouring "cupping" (number examined at #3 in table 2 were apparently four years old with an average length of just over 3"). On these areas, too, there is little or no clustering. The shape on the firm bottoms towards the open is good and the production of good-shaped oysters is not the most serious problem although the usual methods should be followed to maintain and improve the shape. These include separation of clusters when the oysters are still small (about 2") or less when possible without damage), transfer of oysters from soft to hard bottoms and from the upper areas down the inlets.

Flavour. It appears inevitable that with such low salinities the oysters will taste relatively "fresh". This will vary from season to season under the influence of the rainfall but the average quality in this respect will be relatively low - i.e. the flavour will be less salty than the present taste prefers especially in Canada where a saltier flavour is preferred than in the United States. The saltiness of the oysters is influenced

quickly by the salinity of the water and the quality in this respect could be greatly improved by transfer to relatively saltier waters before marketing. The development of such a procedure is strongly recommended. Firm bottoms should be selected either near the present lowermost oyster-producing grounds or even further still and the oysters planted there for a month or so before marketing. The details would require further consideration in the light of special local conditions but the transplanting offers a solution of the problem of freshness of flavour.

Black mantle edge.. The Bras d'Or Lakes oysters have commonly a very dark brown ("black") edge to the mantle and a dark stain on the shell in that neighbourhood. To a great many the appearance of the oyster is improved but it is complained that the marketing is made more difficult.

The cause of the dark colour is not yet definitely known. Microscopic examination of fresh material indicates that the dark parts have numerous small particles on the surface - not imbedded in the surface. A series of sections are under preparation for better examination, but the ease with which the dark colour is rubbed off confirms the appearance of fresh material under the microscope.

Although most of the oysters examined during the visit had a very dark edge to ther mantle, there was considerable variation from almost jet black to a brown very nearly normal. There is some evidence that the blackness is less pronounced in the saltier areas. Transplantation might possibly reduce it.

No practical solution is offered other than this, whether the phenomenon is due to peculiarities of the environment or the tendency is inherited. In the latter case, which is regarded as unlikely, improvement could be only through the introduction of new oyster stock from outside areas. But the risk of the introduction of new enemies or diseases, especially in the case of such an isolated area, would far outweigh the chance of benefits and the task of replacing the native stock with a new one would be almost a practical impossibility. If the phenomenon is due to some peculiarities of the environment the introduction of new stock would offer no solution. Transfer to saltier waters might reduce the intensity of the dark colour through the dilution of whatever factors are responsible in the water. Such an improvement would go hand in hand with the increase in the saltiness.

Production.

There appears to be at present very little effort made to increase the production. This lack of activity on the part of the lessees is probably due largely to the relatively poor demand and to lack of knowledge regarding the possibilities of oyster culture. The leasing of oyster ground already provides machinery for the transfer of oysters which is recommended above in order to improve the quality. It also provides the opportunity for work to increase the production

Spat collection. There is no reason to believe that spat production could not be increased by some modification of the usual methods of exposing clean materials at the time the spat are settling. The details of the proper procedure under the local conditions would have to be developed by investigation of the distribution of the "setting" and by experience. It is evident, however, that natural settling of spat occurs in many places with fair regularity and it seems highly probable that spat collection would be successful in these places.

Enemies. Neither starfish or drills appear to be present in any serious numbers, being kept in check probably by low salinities.

Exploitation of natural production. In addition to the actual collection of spat, the proper exploitation of the existing natural "set" would, it is believed, increase the production. In this region, as in others, there are situations in which the natural production of spat is good and the survival poor. This is especially true of shallow areas where wave action keeps the bottom clean favouring the settling of the larvae, but where the oysters are exposed to damage or removal by ice in winter. Such conditions seem to obtain at the shallow entrances to numerous ponds and it is recommended that the picking of small oysters in these situations for planting on leased grounds be permitted under proper supervision. In the past fishing of unculled oysters from the public fishing grounds for planting has been permitted and has been discontinued. The renewal of this practice is not recommended as it results in little or no increase in production. But, in special situations such as are described above, many small oysters are produced, a large proportion of which never reach marketable size and in these instances the picking and planting in deeper water saves them and increases the production.

General Discussion and Recommendations.

In the Bras d'Or Lakes the low temperature of the water in the open limits the reproduction of oysters to sheltered waters where the salinities are relatively low. In these situations there is now a considerable production of oysters which are of good average shape but are somewhat fresher than the trade prefers. Oyster grounds have been leased by the provincial government but owing probably to the poor demand and to lack of knowledge regarding oyster culture relatively little effort has been made to increase the production. The proper exploitation of the oyster resources of the area involves the improvement of the quality and the demand, and the increase of the production to satisfy a growing market.

The improvement of the quality is a logical early aim.

A. It is recommended that, to improve their quality, the transfer of oysters to saltier water for a short period before marketing be tried. A small scale experiment would indicate the degree of improvement to be expected by transfer to the lowermost oyster-producing areas or farther. If successful the transfer could be undertaken by individuals or anybody interested in the marketing, areas being leased for these

interested in the marketing, areas being leased for the purpose. The full benefits would be had only after the improved oysters were thoroughly placed on the market. It is believed that in addition to making the flavour of the oysters saltier the transfer might possibly reduce the intensity of the dark mantle edge which is regarded as a hindrance to the marketing.

As a first step in increasing the production the proper exploitation of the natural reproduction is recommended.

B. It is recommended that the picking of oysters for planting be permitted on shallow areas at the mouths of ponds. In a number of these areas it appears that the production of spat is good and the survival relatively poor. It is believed that the supervision of the picking could be handled by the local Inspectors of Fisheries. The areas would be selected and permits issued to lessees to pick oysters for planting.

As the demand increases and even with the present demand the collection of spat should be developed. It is believed that the rearing of the spat would be relatively easy as regards the losses from starfish which are so important in many other areas. The lessees should be provided with information regarding oyster cultural methods and should be encouraged to try the usual methods of spat collection.

C. It is recommended that literature regarding oyster culture be distributed to the lessees, and that they be encouraged to attempt the collection of spat in areas known to have a good natural "set".

In the event of the demand increasing further investigation of the conditions in the Bras d'Or lakes oyster areas from the point of view of developing the best local procedures for producing and rearing spat may be required. It would appear, however, that the most pressing immediate needs are for improvement of the quality as recommended in A. and that the exploitation of the natural production and the application of the usual spat collection methods by the lessees may suffice to meet the demand for the present.

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