

# RP 590(A)

A STUDY OF THE PEAT-BOGS OF MINGAN ISLANDS, DUPLESSIS COUNTY

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GOUVERNEMENT DU QUÉBEC  
DEPARTMENT OF NATURAL RESOURCES

Honorable PAUL - E. ALLARD, Minister

MINES BRANCH

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MINERAL DEPOSITS SERVICE

A STUDY OF THE PEAT-BOGS OF  
MINGAN ISLANDS

DUPLESSIS COUNTY

by

Antoine Simard

QUEBEC  
1970



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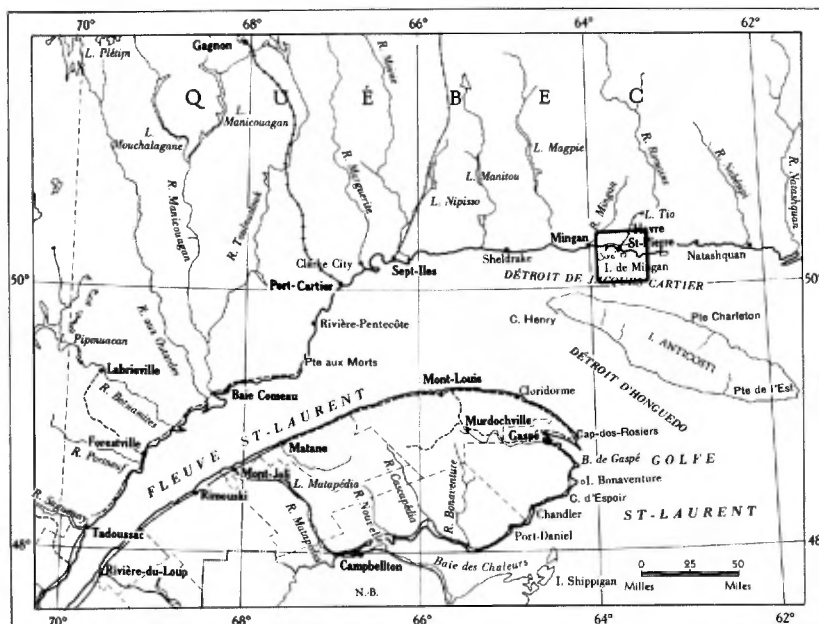
MINERAL DEPOSITS SERVICE

# A STUDY OF THE PEAT-BOGS OF MINGAN ISLANDS

DUPLESSIS COUNTY

by

Antoine Simard



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A STUDY OF THE PEAT-BOGS OF MINGAN ISLANDS\*

Duplessis County

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Antoine Simard

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INTRODUCTION

The peat-bogs of the Mingan Islands were examined during the period from Sept. 4 to Sept. 16, 1968. The Report of the Commissioner of Crown Lands of the Province of Quebec for the twelve months ending June 30, 1884, (p. 96) describes these organic deposits as follows:

"A fact, little known, but which may be of some interest to the Department of Crown Lands, is that nearly all of the islands of the Mingan group contain numerous deposits of a substance of a highly fertilizing nature, the composition of which probably approaches very nearly to that of a guano. These deposits appear to consist of vegetable matter which has become partially decomposed, mixed with a large proportion of ammoniacal excrements of birds; the whole combined with a small quantity of calcareous marl. These accumulations are sometimes of considerable extent and thickness."

The Mingan Islands lie about 450 miles northeast of Quebec City. They are 350 miles from Blanc-Sablon at the

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\*Translated from the French.

eastern extremity of the Province. The open Atlantic Ocean, beyond the Strait of Belle Isle, lies about 430 miles to the northeast.

After travelling by car from Quebec to Sept-Iles and by plane from Sept-Iles to Havre-Saint-Pierre, the field party arrived on September 5 in this land where distances are measured in hours of flying time or days of sailing time.

It is a land of great solitude, characterized by gray or pink rocks and pale green peat-bogs, with no mountains to interrupt the monotony of the terrain. There is very little soil cover, except for narrow stretches of sand at the mouths of rivers and within the bays.

The hamlets are spaced irregularly along the mainland, and the houses are clean, comfortable and well furnished. There are 600 inhabitants at Longue-Pointe-de-Mingan, 200 at the Mingan Indian Reserve and 2,500 at Havre-Saint-Pierre. The latter village is the terminal point for a 30-mile railroad which carries titanium ore from the north, near Allard lake, to port facilities, where it is unloaded at a rate of 20 cars per hour. After the opening of this mining venture, Havre-Saint-Pierre quickly lost the appearance of a fishing village which had characterized it fifteen years before. With the influx of new capital, and, following the same pattern as Forestville, Hauterive, Baie-Comeau, Port-Cartier and Sept-Iles, the modern bungalow replaced the fishing cabin, and no trace of the latter can be found today.

The livestock and fishermen have left the area. All of the small-scale farmers and fishermen are now mine-workers. Also gone are the many species of migratory marine birds which used to make the area a hunters' paradise.

Cod have also been scarce in the area for several years. This is apparently due to the large trawler fleets which from time to time sweep the depths of the sea with their immense nets.

Nevertheless, during the course of the writer's visit, the field party tried its luck to vary its menu somewhat. Tempted by a solitary fisherman who seemed to be busy pulling out prizes from the deep, by the lines of cod-fish bait or by the fish which occasionally broke the calm of the sea, we dropped our line and soon came up with a respectable catch. After 15 minutes, enough cod had been caught to satisfy a healthy appetite.

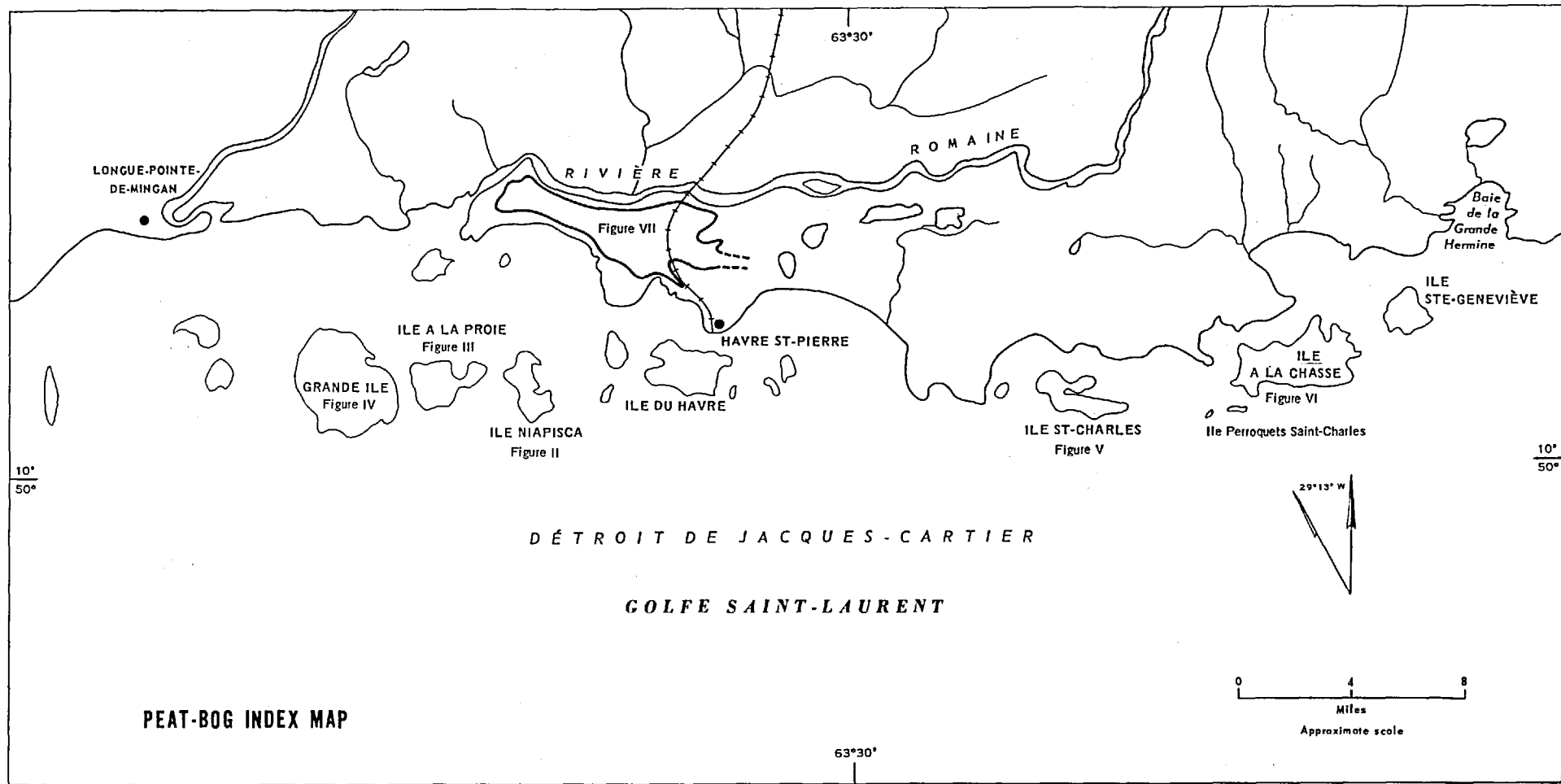


FIGURE 1

### Location

The archipelago of the Mingan Islands, which Rev. Brother Marie-Victorin called "La Minganie,"<sup>1</sup> lies opposite Havre-Saint-Pierre and is bounded by longitudes 63°00' and 64°10' and by latitudes 50°11' and 50°18'. It is made up of some twenty islands spaced over a distance of 40 miles from Longue-Pointe-de-Mingan ~~east~~<sup>west</sup> to De la Grande-Hermine bay (Fig. 1).

The two largest islands, A la Chasse and Grande Ile, are, respectively, 4 and 4.5 miles long. The others, in descending order of size, are Du Havre, Saint-Charles, A la Proie, Sainte-Geneviève, Niapisca and a dozen other smaller islands.

### Climate

The average annual precipitation amounts to 36 inches of rain and 120 inches of snow.<sup>2</sup> The growth period for vegetation is 140 days, with an average of 120 frost-free days.

### Geology

The bedrock of the Mingan Islands is made up of flat-lying limestone, from 10 to 25 feet thick, which overlies beds of sandy limestone. The latter is more easily eroded than the pure limestone and is broken up by wave action into evenly sized pebbles. Most of the old beaches observed on the Islands are made up of sharp-edged pebbles of this rock.

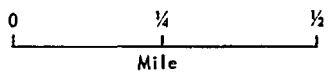
These two formations are underlain by a third, near-horizontal limestone formation.

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- 1 Rev. Brother Marie-Victorin: "Le Carnet du Sauvage," Action Soc. Cat., pp. 23-34, Quebec, 1926.
  - 2 Gilles Lemieux: "Troisième rapport annuel sur l'état de l'herbier," Dept. de Génie Forestier, Université Laval, 1962.

# MINGAN ISLANDS

## NIAPISCA ISLAND

DUPLESSIS COUNTY



Approximate scale

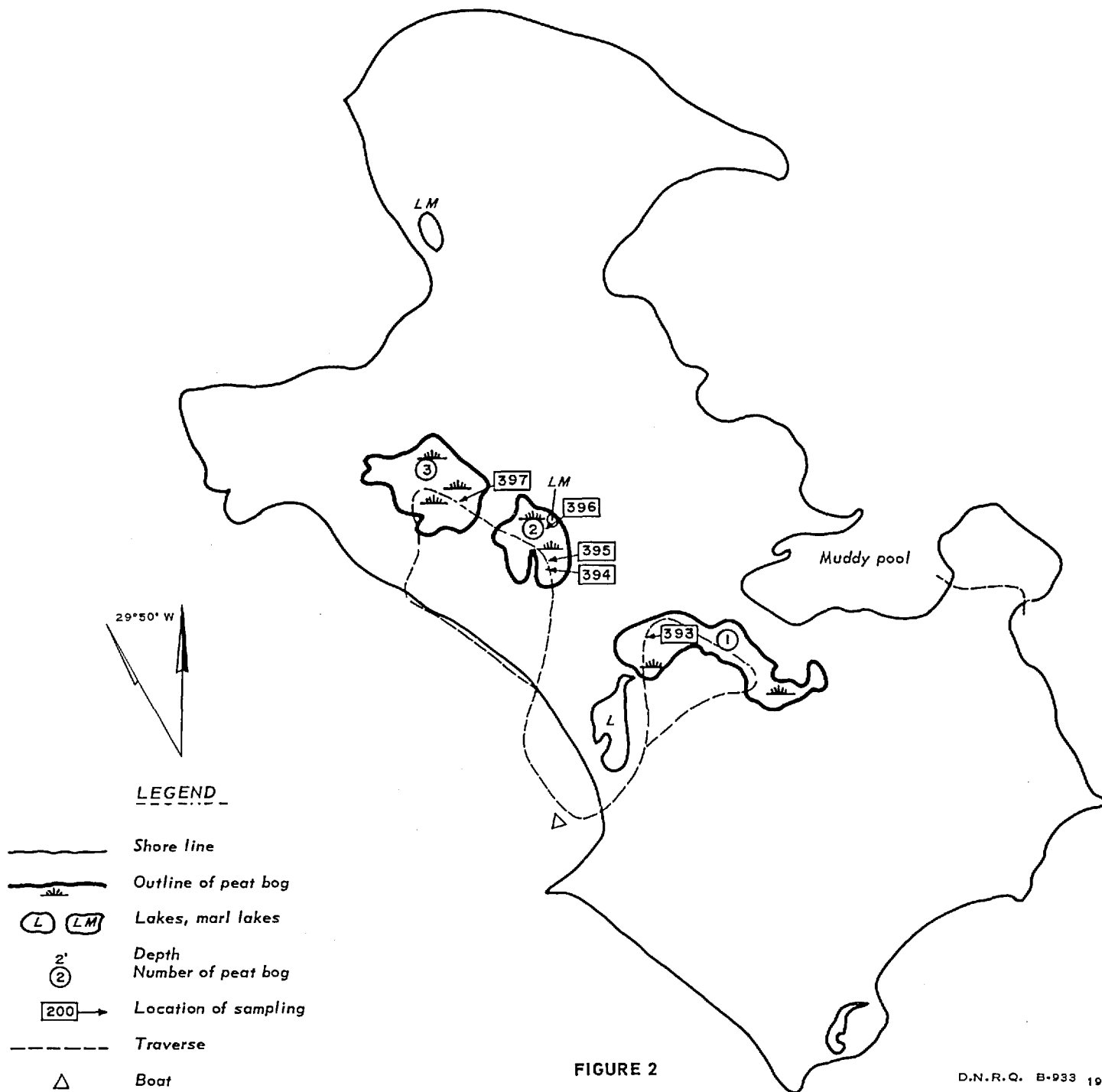


FIGURE 2

## Vegetation

The Mingan Islands are covered mainly by a forest of white spruce, black spruce, fir and a few rather sickly birch trees, as well as sorb-trees, willows (Candide) and even some red osier (dogwood) trees.

Some of the small islands are completely treeless. However, the presence of a few decomposed stumps indicates that they were formerly wooded.

## NIAPISCA ISLAND

The field party began its study with the peat-bogs of Niapisca island, working around them from the south. After looking at the rounded sea-stacks which Rev. Brother Victorin described in "l'Almanach de l'Action Sociale Catholique" <sup>1</sup>, the crew anchored in the harbor on the west side of the island (all of the major islands have harbors that are well protected from the winds). Three interesting peat-bogs, all in the west-central part of the island — Niapisca 1, 2 and 3 — are shown on Figure 2.

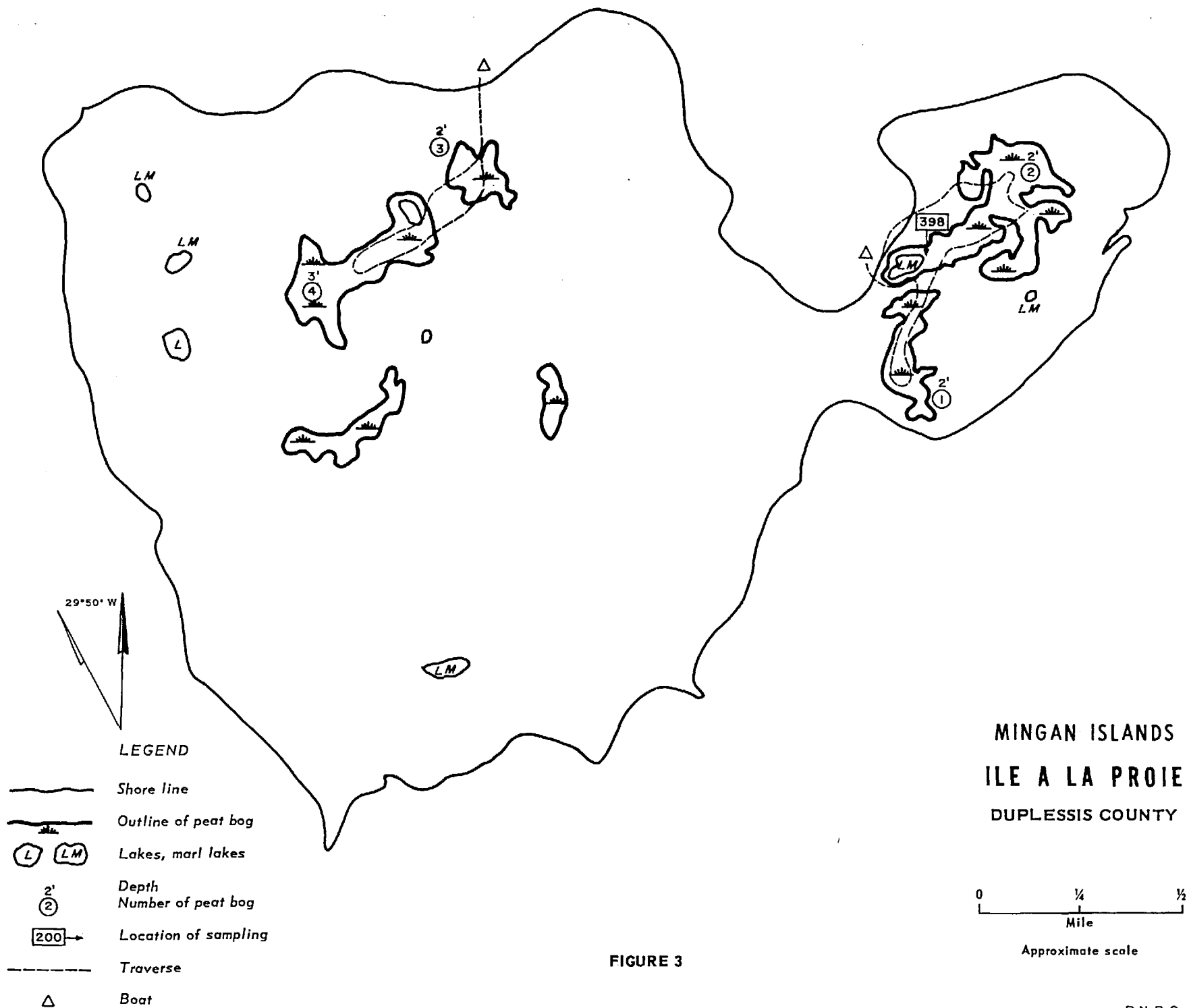
Niapisca 1 peat-bog is essentially treeless. Tamarack and dwarf birch occur only as shrubs from 1 foot to 1½ feet high; the rare black spruce are 3 to 5 feet tall. The organic deposit is 3 feet thick and the peat is very well decomposed (H-2, according to the Von Post modified scale) <sup>3</sup>. It is made up mainly of sphagnum, containing the remains of moor-grass, sedge-grass, etc. Although interspersed with small pools of open water, the peat is firm and it is quite difficult to take a trench sample because of the fibrous clumps of rushes and cotton grass roots.

Sample #393 was taken from Niapisca 1 peat-bog. Its analysis is shown in Table I.

The continuous carpet of sphagnum which covers the deposit is strewn with moor-grass, sedge-grass, Sarracenia (pitcher plants), Empetrum (crowberry) seeds, Canadian Sanguisorba, cranberry and cloudberry plants, Smilacina, Scirpa,

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<sup>3</sup> Wicklund, P.E., 1963, "Classification of Organic Soils," report on the 5th. meeting of the Nat. Soil Survey Comm. of Canada.



Potentilla, Scheuchzeria, horse-tails (*Hippuris vulgaris*), Baltic rushes, herbs of the rose family and also Low Selaginella. Juniper, laurel, "Labrador tea" and blueberry bushes (*Vaccinium myrtilloides*) appear irregularly in this assemblage. The surface has been overrun with lichens and polytriques (a family of mosses). A plant resembling an algae grows in some of the pools; it is green where wet, but becomes gray and brittle, and takes on the appearance of a limestone, where dry. Sample #394, from the bottom of a pool where this moss grows, was taken from the Niapisca 2 peat-bog (see Fig. 2). At first sight, this material resembles bird excrement, but analysis has shown that it is a neutral-reacting herbaceous substance, rich in ash.

The subsoil of these deposits is made up of a muddy pebble-bearing sand.

The Niapisca 2 and 3 peat-bogs resemble the above as far as their composition, covering vegetation, and subsoil are concerned. The peat is less decomposed, but remains within category 2 of the modified Von Post scale. These peat-bogs are interspersed with pools, one of which is bottomed by a deposit of marl 18 inches thick (see Fig. 2, Niapisca 2 peat-bog).

The average depth of the peat in deposit No. 2 is 5 feet. Peat-bog No. 3 averages 3 to 4 feet in depth. Samples #395 and #396 were taken from the Niapisca 2 peat-bog and #397 was from Niapisca 3. The results of the analyses are shown in Table I.

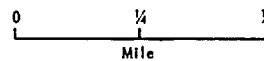
These three peat-bogs are bordered by an embankment that is up to 6 feet high.

#### A LA PROIE (QUARRY) ISLAND

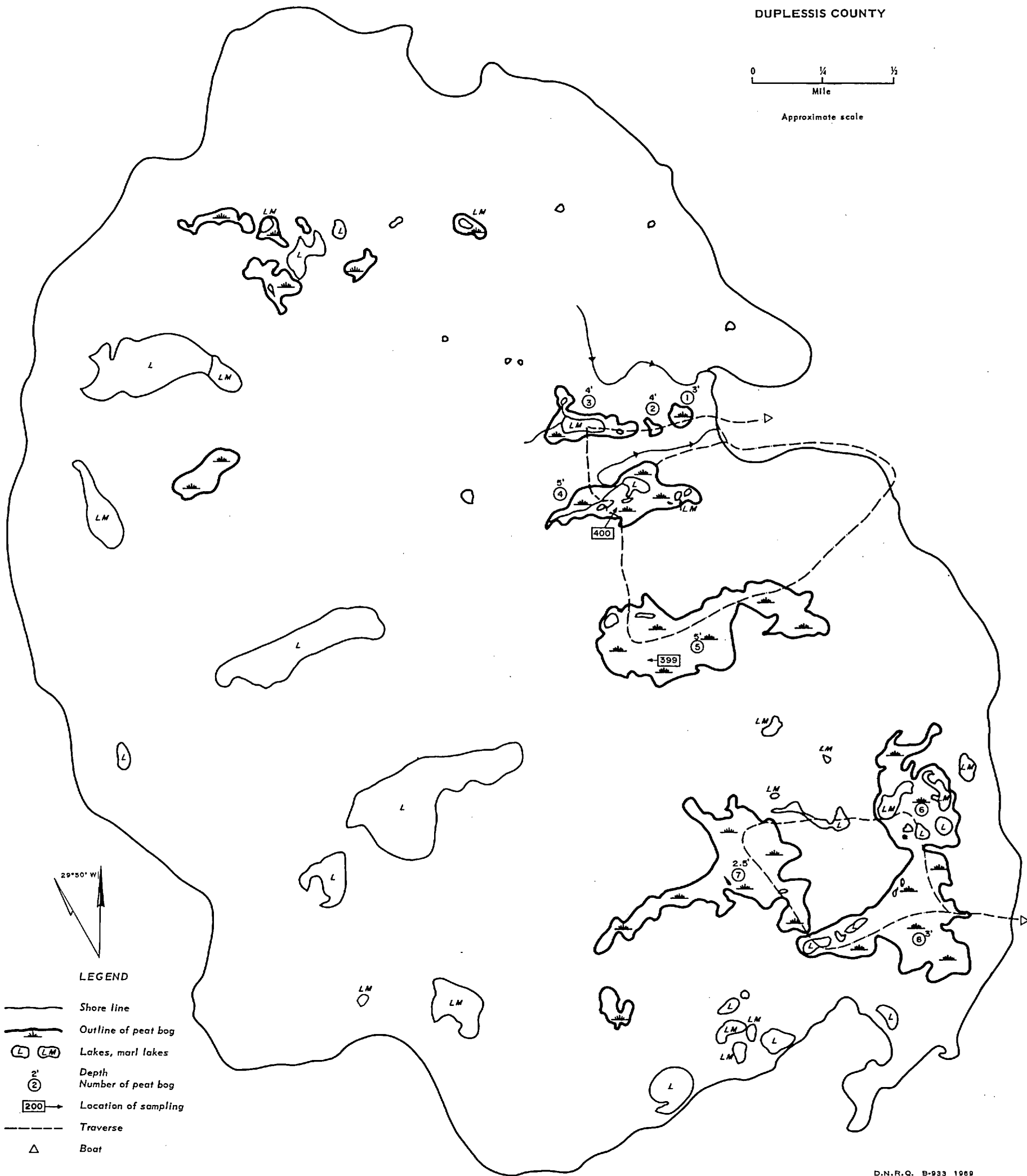
After leaving Niapisca island, the field party anchored in a bay along the north shore of A la Proie island.

This island contains five relatively important peat-bogs, of which four were examined. Peat-bogs Nos. 1 and 2 are on the eastern tip of the island. They lie to an average depth of 12 inches on a sandy, pebble-strewn mud. Twelve ponds were noted within these two deposits, all bottomed by marl; sample #398 was taken from one of them (see Fig. 3). The analysis of this sample is shown in Table I. Overgrowths of moor-grass on a carpet of sphagnum dominate in these peat-bogs. The other plant species are the same as those listed for the Niapisca 1 peat-bog.

MINGAN ISLANDS  
 GRANDE ILE  
 DUPLESSIS COUNTY



Approximate scale



LEGEND

- Shore line
- Outline of peat bog
- Lakes, marl lakes
- Depth  
Number of peat bog
- Location of sampling
- Traverse
- Boat

FIGURE 4



Peat-bogs Nos. 3 and 4 resemble those of Niapisca island. They average 12 inches and 3 feet in depth, respectively. Sedge-grasses are the dominant growth here.

#### GRANDE ILE (LARGE) ISLAND

The field party then proceeded to the west toward Grande Ile island, where it anchored in the natural harbor cut into the east shore (see Fig. 4). This is the largest of the Mingan Islands. A dense undergrowth (Canada yew-tree) masks the irregularities of the terrain, making falls from tree stumps, and limestone boulders quite commonplace.

Lakes are numerous on Grande Ile island, some being up to  $\frac{1}{2}$  mile long. Several contain beds of marl from 18 inches to 2 feet thick (~~Plate II~~). Peat-bogs are numerous, and eight of them were studied (Numbers 1 to 8).

Peat-bog No. 1 has an average depth of 3 feet. It encloses two ponds, the larger of which is bottomed by marl. The subsoil is a rocky sand.

Peat-bog No. 2 is 4 feet deep and lies on a thin bed of marl.

Peat-bog No. 3 is essentially a marl-bottomed lake bordered by peat. The bed of marl is 18 inches thick. A second, deep lake, off the eastern extremity of the first, is separated from it by a band of peat about 50 feet wide. Standing about 6 or 7 feet above the first, this lake does not contain any marl. The band of peat averages 3 feet in depth.

These three peat-bogs are virtually treeless and the plants growing on the sphagnum carpet are the same as those of the Niapisca peat-bogs. They lie at approximately the same elevation as the surrounding soil.

Peat-bog No. 4, on the other hand, has an embankment, 4 to 8 feet high, on its north, south and west sides. This peat-bog is obstructed with willows, tamarack, black spruce and even red osier (dogwood), which makes it almost impassable. Numerous marl-bottomed lakes (designated "white lakes," as opposed to the "black lakes," by the inhabitants of the mainland) further complicate travel on this bog. The depth of the deposit ranges from 3 to 5 feet. The subsoil bordering

the lakes is made up of marl, with a muddy, pebble-strewn sand elsewhere. The deposit is about 2,200 feet long. Sample #400 was taken here, and its analysis is shown in Table I. The peat is covered with a carpet of sphagnum, overrun with lichens and polytriques. This peat-bog is the most obstructed of all those examined on the Islands.

Peat-bog No. 5 is large, firm and treeless, and does not enclose any marl-bottomed lakes. It averages 4 feet in depth and is about 3,000 feet long. The surface of this peat-bog supports the growth of tamarack, 1 foot to 2 feet high, and round-leaved dwarf birches which have been overrun with sphagnum moss. Sample #399 was taken from this deposit (see Table I).

Peat-bog No. 6, with an average depth of 3 feet, contains about ten ponds, the five largest of which are bottomed with from 18 to 24 inches of marl.

Peat-bog No. 7 has an average depth of  $2\frac{1}{2}$  feet and is treeless. Small tamaracks, moor-grass and sedge-grass cover a carpet of sphagnum which has been almost totally overrun by lichens.

The average depth of Peat-bog No. 8 ranges from 3 feet in the north part to  $1\frac{1}{2}$  feet in the south. The surface is obstructed by willows. It encloses several lakes, none of which are bottomed by marl.

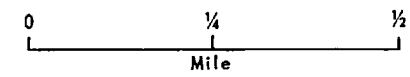
The degree of decomposition of this peat varies only very little from one deposit to another.

#### SAINT-CHARLES ISLAND

Saint-Charles island is about 15 miles east of Havre-Saint-Pierre. The field party anchored in the very deep harbor which divides the eastern tip of the island in two. The peat-bogs are concentrated mainly south of the bay, and the present studies began with the one which lies immediately adjacent to the southwest base of the bay and extends almost to the west side of the island.

Samples #401 and #402 (a and b) were taken from this peat-bog. Their analysis is shown in Table I.

MINGAN ISLANDS  
ST. CHARLES ISLAND  
DUPLESSIS COUNTY



Approximate scale



LEGEND

- Shore line
- Outline of peat bog
- (L) (LM) Lakes, marl lakes
- 2'  
(2) Depth  
Number of peat bog
- [200] → Location of sampling
- - - Traverse
- △ Boat

FIGURE 5



These peat-bogs are 12 to 36 inches deep and are dotted with ponds. The smaller of the ponds are bottomed by marl, as are the larger lakes outside the limits of the peat-bogs (see Fig. 5).

The peat-bogs are treeless and are covered by sphagnum intermixed with moor-grass, sedge-grass and the other kinds of plants listed at the beginning of this report. Lichens uniformly cover the surface. The two deposits studied lie at the same elevation as the surrounding soil.

#### A LA CHASSE (HUNTING) ISLAND

The field party anchored in the Schearrer lagoon on the east side of A la Chasse island, opposite Sainte-Geneviève island (see Fig. 6).

These two islands have long been designated as a national marine bird sanctuary. A permanent guardian used to be stationed here, to watch over the important population of aquatic birds, but now he and most of the birds have left the islands. Only the shrill cries of the sea-gulls now break the stillness.

Clam-digging was once a prominent activity along the north shore of A la Chasse island. The clams were abundant and still are. Now, however, only a few weather-ravaged buildings bear witness to this embryo industry of the past.

It was on this island that Henri de Puyjalon lived for many years, and here he died. His house was on the southeast shore, bordering the bay which now bears his name. It was here that he wrote "Récits du Labrador." All that remains now is a monument erected by his sons.

The geology of this island differs from that of the others described above in the scarcity of limestone beds and of marl-bottomed lakes. Forested areas and peat-bogs share the island's surface almost equally.

The writer first examined five peat-bogs on the northeast point of the island. These deposits are 1 foot to 3 feet deep and are more decomposed (Von Post 2 to 3) than the others. Sample #403 was taken from Peat-bog No. 2, and its analysis is shown in Table I. The surfaces of the bogs are made up of sphagnum and the other plants described above. Peat-bogs

2 and 3 are completely devoid of trees or shrubs, where Peat-bogs Nos. 1, 4 and 5 are covered by tamarack and stunted spruce. Lichens are present throughout.

From here, the party went to the west end of the island, where the Peat-bogs Nos. 6, 7, 8 and 9 were visited. These shallow deposits, 1 foot to 2.5 feet deep, are similar to the first ones visited, and vary in degree of decomposition from 2 to 3 on the Von Post scale.

During these visits, only a few places where birds lived or nested in any great numbers were noted. It seems that the birds have left these wooded islands, which are now the domain of fox and wildcat. Nevertheless, microscopic examination has shown that the peat of these islands contains a certain amount of bird excrement.

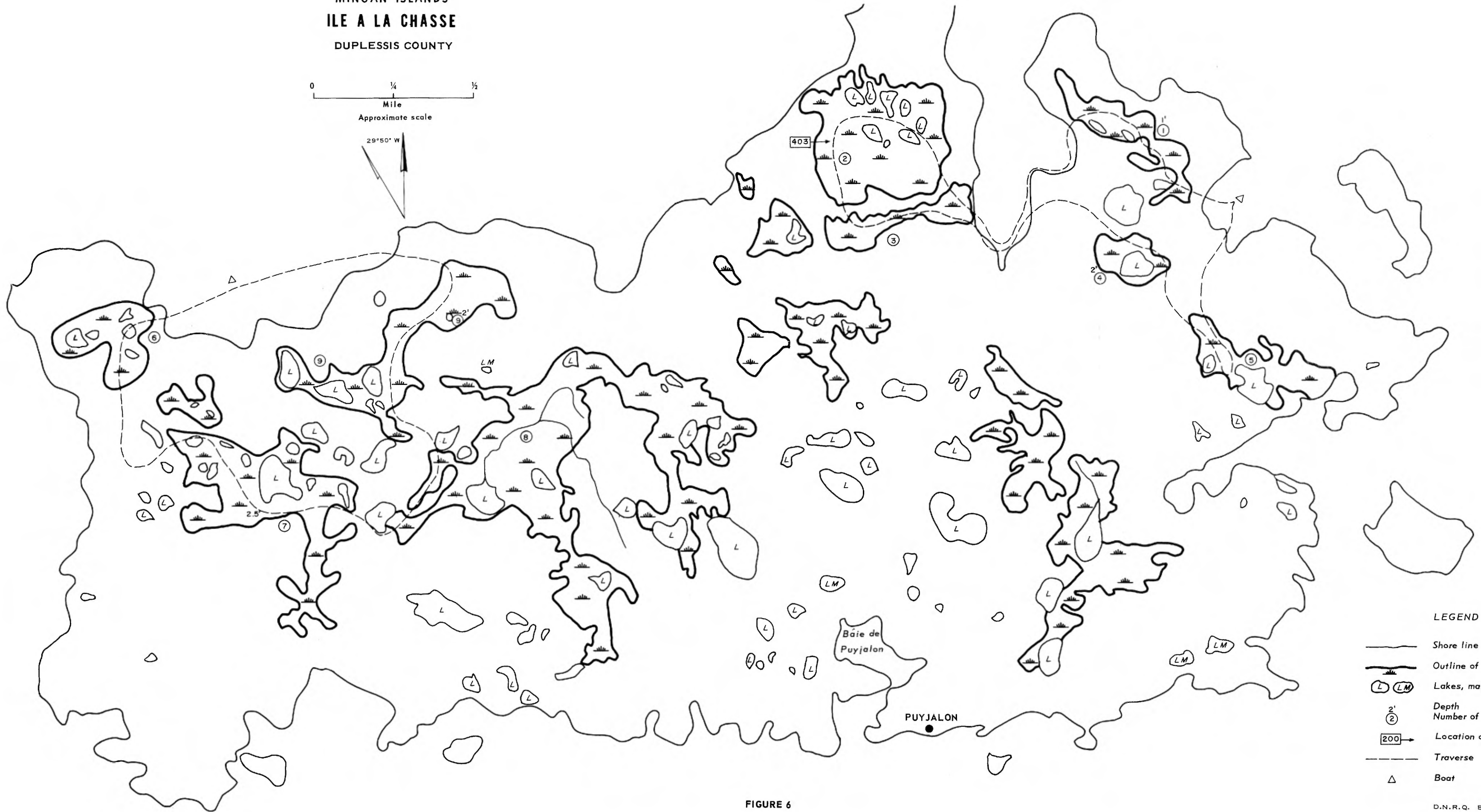
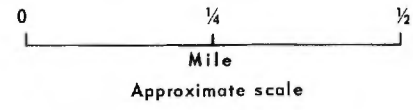
#### PERROQUETS SAINT-CHARLES (GUN) ISLAND

Perroquets Saint-Charles (Gun) island, located southwest of A la Chasse (Hunting) island, was the only treeless island visited. It is about  $\frac{1}{2}$  mile long and  $\frac{1}{4}$  mile wide. In contrast to the wooded islands, the surface is strewn with nests hidden in the tall grasses. The shores of this island are literally covered with spent rifle cartridges.

The vegetation of this island, made up mainly of cow-parsnip (Poglus), Angelica, raspberry and gooseberry bushes, Sanguisorba, woods aster (Aster nemoralis), golden-rod and other species, is unusual. The plants reach 6 or more feet in height and show an exceptionally strong growth. The only explanation for this is that bird excrement has caused the decomposition of the peat and the formation of a very fertile type of humus. The bed of humus, which overlies the limestone, ranges from 4 to 12 inches in thickness. Sample #404 was taken from here. Its analysis is shown in Table I.

On his return to Havre Saint-Pierre, the writer stopped at Du Hâvre island, not for a study of peat-bogs, but to visit a small field of turnips which had been cultivated for years. This is the only trace of agriculture in the entire area. The growth of these vegetables, aided by chemical fertilizer, is quite good despite the fact that the arable soil is only 12 inches deep. These turnips have a remarkable flavor.

MINGAN ISLANDS  
 ILE A LA CHASSE  
 DUPLESSIS COUNTY



- LEGEND
- Shore line
  - Outline of peat bog
  - (L) (LM) Lakes, marl lakes
  - ② Depth  
Number of peat bog
  - [200] Location of sampling
  - - - Traverse
  - △ Boat

FIGURE 6



### HAVRE-SAINT-PIERRE PEAT-BOG

In order to compare the peat of the Islands with that of the mainland, the writer took three samples from the large peat-bog behind Havre-Saint-Pierre. Extending from the mouth of Romaine river on the west, the peat-bog appears to be limitless to the east (see Fig. 7). It covers almost all the ground between Romaine and Saint-Laurent rivers.

This peat lies to an average depth of 6 feet on a sandy clay subsoil. Entirely treeless, it is dotted with hundreds of lakes. The deposit is made up of slightly decomposed sphagnum moss (Von Post 1 to 2) overlain by a mossy carpet. Highway 15 follows the south side of this peat-bog from Havre-Saint-Pierre and then cuts across the western part for about 2 miles. The rail-line which links Havre-Saint-Pierre with the titanium deposits to the north crosses the peat-bog in a north-south direction. With the permission of company authorities, the field party was able to reach the peat deposit by train.

The first sample (#405) was taken 800 feet north of Highway 15, about 2 miles west of Havre-Saint-Pierre. The second (#406) was taken 500 feet north of Highway 15, about 4½ miles west of Havre-Saint-Pierre. The third (#407) was taken 500 feet north of Highway 15, about 6 miles west of Havre-Saint-Pierre (see Fig. 7). The analysis of these samples is shown in Table I.

### CONCLUSIONS

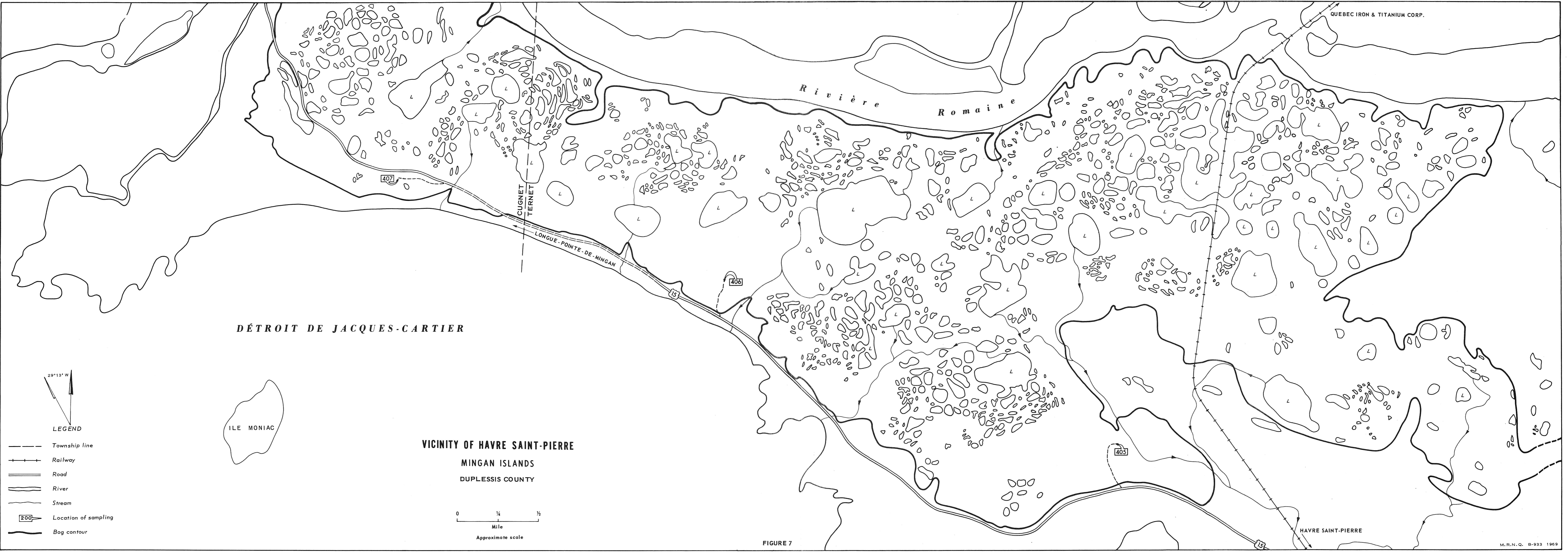
The results of the analyses show a considerable variation in the physical properties and fertilizing components of these peat deposits. Because of this, it is impossible to give a general opinion as to their economic importance.

The figures compiled in Table I show the results of analyses of: first, the peat-bogs of the Mingan Islands; second, a vast peat-bog on the mainland near Havre-Saint-Pierre; third, some peat-bogs of the Saint-Lawrence Lowland area (Ouelle river, Rivière-du-Loup, Saint-Ulric and Pointe-au-Père); and fourth, two types of guano. The conclusions drawn from these results are as follows:

1. The peat-bogs of the Mingan Islands, with a few exceptions, are less acidic than those of the mainland.
2. The peat-bogs of the Islands, except for the few very acidic ones, contain a higher percentage of ash than those of the mainland.
3. The peat-bogs of the Islands are richer in nitrogen than those of the mainland. Those containing 1.5% nitrogen are considered as average; those containing more than 3% are considered as very rich.
4. All of the peat-bogs are low in phosphorus, potassium and magnesium. The last-mentioned element, however, is well represented in samples #403 and #404, which came from the organic deposits of Perroquets Saint-Charles and A la Chasse islands.
5. The peat-bogs of the Islands are richer in calcium than those of the mainland. A soil containing less than 0.6% CaO is considered as being deficient in lime; one containing more than 1.2% is considered as being lime-rich.
6. The marl deposits of the Mingan Islands are very poor in magnesium.
7. In contrast to the peat-bogs of the mainland, the sodium content of the peat of the Islands is quite variable.
8. Only the humus soil of Perroquets Saint-Charles (Gun) island, and probably of the other treeless islands as well, is rich in fertilizer components and in calcium. These deposits, however, are too thin.

The above results contradict the statement in the report of the Commission on Crown Lands to the effect that the Mingan Islands "contain numerous deposits of a substance (peat) of a highly fertilizing nature."

Except for the nitrogen content, which is attractively high in these peat-bogs, the figures compiled in Table II show that the phosphorous and potassium contents are not even so high as in ordinary farm manure.



DÉTROIT DE JACQUES-CARTIER

Rivière Romaine

CUGNET  
TERNET  
LONGUE-POINTE-DE-MINGAN

ILE MONIAC

VICINITY OF HAVRE SAINT-PIERRE  
MINGAN ISLANDS  
DUPLESSIS COUNTY

HAVRE SAINT-PIERRE

- 29°13' W
- LEGEND**
- Township line
  - +—+— Railway
  - == Road
  - River
  - Stream
  - 200 Location of sampling
  - Bog contour

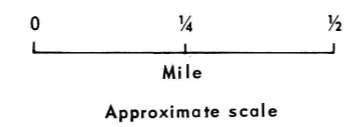


FIGURE 7



Table I. - RESULTS OF ANALYSES

(based on the weight of peat dried at 105°C.; November, 1968)

Sample Number	Sample Location	Depth	Type of Peat	pH	PER CENT				% of TOTAL ELEMENTS			
					water peat	ash	N	P <sub>2</sub> O <sub>5</sub>	NaO	K <sub>2</sub> O	MgO	CaO
<u>Mingan Islands Peat-bogs</u>												
393	Niapisca 1	1-3'	Grass & Sph.	5.9	9.4	7.27	2.60	.01932	.00612	.00840	.04998	2.54840
394	Niapisca 2	2'	Grasses	7.1	10.5	9.02	3.20	.07452	.02210	.01272	.02794	2.01222
395	Niapisca 2	1-4'	Grass & Sph.	6.3	7.9	6.33	2.82	.01472	.00595	.00624	.02958	2.10686
396	Niapisca 2	1-2'	Grasses	7.0	6.8	21.20	3.30	.03312	.02006	.18384	.07310	4.51542
397	Niapisca 3	1-3'	Sphagnum	4.4	14.2	2.79	1.79	.00966	.02635	.01680	.05287	.51128
398	A la Proie 2	1-2'	Marl	7.7	----	----	0.41	.00184	.04386	.03816	.06749	27.77782
399	Grande Isl. 5	1-3'	Sph. & Grass	3.4	14.3	1.80	1.42	.00736	.01904	.02160	.09095	.40852
400	Grande Isl. 4	3-4'	Marl & M.O.	7.3	----	----	0.38	.00138	.07276	.10272	.03893	23.52182
401A	St-Charles 1	0-1'	Grass & Hypn.	6.2	9.6	9.28	3.83	.00782	.01581	.02328	.06460	2.18736
401B	St-Charles 1	1-2'	Hypn. & Grass	6.5	9.9	8.07	2.74	.01840	.00986	.01392	.06256	2.28200
402A	St-Charles 1	0-18"	Grass & Sph.	6.2	10.9	12.34	3.44	.03634	.02295	.03288	.08330	3.38968
402B	St-Charles 1	18-36"	Grass & Hypn.	6.2	9.6	8.51	2.76	.01288	.00748	.00912	.07497	3.26466
403	A la Chasse 2	1-2'	Grasses	6.2	7.8	5.73	3.01	.00874	.00646	.01536	.31263	1.55148
404	Ile Perroquets	4-12"	Humus	6.5	2.6	39.84	2.32	.07406	.04964	.27672	.18275	7.42728
<u>Havre-Saint-Pierre Peat-bog</u>												
405	du Havre	2-5'	Sphagnum	4.0	23.7	1.16	0.82	.01242	.03128	.02544	.10166	.12236
406	du Havre	2-4'	Sphagnum	3.5	13.0	1.80	0.62	.00460	.02720	.01752	.13583	.21196
407	du Havre	1-4'	Sph. & Carex	3.4	13.7	1.17	0.68	.00460	.02278	.01608	.03978	.09002
<u>Five Peat-bogs of the lower Saint-Laurent</u>												
Average Value		1-5.5'	Sphagnum	3.2-4	12-26	0.5-3.5	0.5-2	0.05	-----	0.02	0.21	0.48
<u>Guano (average)*</u>												
Old deposits		well decomposed		----	----	----	5-8	25-30	----	2-3	----	----
Recent deposits		less decomposed		----	----	----	10-15	8-12	----	2-3	----	----

\*Information furnished by Dr. G.J. Ouellette, Professor, Faculty of Agriculture, Université Laval.

Table II

COMPARISON OF THREE ORGANIC FERTILIZERS

ORGANIC FERTILIZER	N%	P <sub>2</sub> O <sub>5</sub> %	K <sub>2</sub> O%	CaO%
Mangan Islands Peat <sup>1</sup>	2.9	0.05	0.18	0.15
Farm manure <sup>2</sup>	0.59	0.19	0.22	----
Sheep manure	1.03	0.35	0.99	----

1. Average nitrogen content above 2.3%; phosphorous, above 0.03%; and potassium, above 0.10%.
2. Mixture of cow and horse manure. Course in agriculture, Oka Agricultural College, Tome I, 3rd Edition, p. 328, 1948.