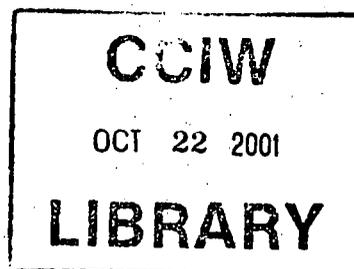


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CHARTING SMALL BOAT WATERWAYS AS A  
STIMULUS TO TOURISM

by

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ABSTRACT

The Canadian Hydrographic Service, with headquarters at Ottawa and regional offices at Dartmouth, N.S., Victoria, B.C. and Burlington, Ontario, has the important task of gathering and publishing the topographic and hydrographic data and marine navigational information on Canada's navigable waters and adjoining international waters essential to the safe, orderly and efficient conduct of commercial, recreational and defence shipping.

This paper reviews, briefly, the nature of this task and the resources devoted to the achievement of the overall objectives then describes, in rather more detail, the task of charting the nation's small craft waterways for recreational boaters.

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## CHARTING SMALL BOAT WATERWAYS AS A STIMULUS TO TOURISM

### INTRODUCTION

During the last few days, those of you who have participated in the field trips have had an opportunity to become familiar with the geography of one of our most popular tourist areas and I am certain you were not the only tourists, if I may call you tourists, using our highways and by-ways to escape from the daily rush of such urban areas as metropolitan Toronto. In your travels you have had a brief look at Georgian Bay, Lake Ontario and the Trent-Severn Waterway. These are important marine highways and they are the type of highway which I will discuss today but before I go further I will tell you, very briefly, something about the organization I represent and I believe you will then have a better appreciation of the size of the task we are presently carrying out and some of the problems we face in meeting increasing demands for charts of waterways used primarily by tourists.

I am sure we agree that Geography and Hydrography are very closely related and certainly both are concerned with transportation. However, for the purpose of this discussion, I will apply a rather narrow definition to hydrography and trust that this will be acceptable.

Hydrography (1) is the charting of navigable waters, a craft that is as old as map-making itself. In fact, it would be no exaggeration to say that historically it is the most important branch of map-making. Travellers proceeding over land could usually ask their way from town to town, country to

country. If there were no roads to follow there were at least river valleys and other natural land marks. And, unless they chose to travel through a moonless night, the ancient wayfarers could at least see natural dangers and obstacles ahead of them.

The mariner, then as now, is alone with the monotonous sea and the heavens as soon as he loses sight of land. It is true that to the experienced eye the appearance of the water may indicate the presence of dangerous shoals or currents, but this is a very uncertain guide, and of no use at night. It is therefore extremely important for the sea-farer to have instruments which, so to speak, would make dangers to navigation "visible". This was achieved by the production of charts and books of sailing directions. When used together with such navigational aids as the compass and other instruments, these charts and books not only tell the mariner where the dangers to navigation are, but also what course to steer to avoid them in the most effective manner, taking account of prevailing winds, currents, sea ice, etc.

Until late in the last century the British Navy did all hydrographic surveying in Canadian Waters. The Canadian Government began to carry out its own hydrographic surveys in 1883 and in 1911 its Hydrographic Service had completely taken over from Britain.

Today the Canadian Hydrographic Service is a Branch of the Marine Sciences Directorate of the federal Department of The Environment, with headquarters and chart production facility at Ottawa and regional offices at Dartmouth, N.S., Victoria, B.C. and at Burlington, Ontario. It uses a fleet of eight specially designed survey ships and about one hundred smaller vessels and launches as well as from one to three Canadian Coast Guard icebreakers annually. Helicopters are also normal equipment on today's surveys.

Our operations range from the northern tip of the Canadian Arctic to the boundary between Canada and the United States and in addition to the saltwater of our 117,000 miles of coastline and 1,452,000 square miles of continental shelf we survey and chart the navigable inland lakes and rivers. The current edition of the Canadian Hydrographic Service Chart Catalogue lists more than 1,000 charts and fourteen volumes of Sailing Directions for Canadian Waters. In addition to the standard navigation charts special Natural Resource Charts and Fishing Charts are produced for the continental shelf. Tide Tables, Water Level Bulletins and tidal current atlases are also produced.

I believe it is fair to say that, inspite of the fact that much remains to be done, we have made considerable progress since our modest beginning in 1883. It is interesting to note that in 1883 the House of Commons (2) approved a hydrographic budget of \$5,000.00. However, by the end of June 1884 this had been increased to \$6,000.00 with a large portion of it being spent on the purchase of new survey instruments. An additional \$15,000.00 was approved for the purchase of the first hydrographic vessel as well as \$4,000.00 for the remodelling and refitting the vessel for survey work. By Order-in-Council dated May 17, 1884, the ship's name was changed to "BAYFIELD" and the complement (which was also Canada's total hydrographic complement) was made up of "thirteen working hands" and four survey and ship's officers--a total of 17 persons.

Today the Canadian Hydrographic Service has a total complement of 345 persons, 125 of whom are hydrographic surveyors actively engaged in field surveys. These field officers are supported by another 400 people made up of ship's officers and crews, electronics technicians, students and helicopter crews.

The hydrographic budget is now \$6,000,000.00. This does not include that portion of the Ship Branch budget required to support hydrographic surveys. Compilation and drafting of the Nautical Charts resulting from the surveys occupies 120 cartographers. Automated ship and launch data logging systems and computer-aided cartographic systems are playing an ever increasing role in meeting the growing public demand for nautical charts and related publications.

### HYDROGRAPHIC SURVEYING

Hydrographic surveys which determine the depths of water and the character of the sea bottom, lake bottom or river bed were formerly obtained with the handlead, the deep-sea lead, or the pressure tube, and dangers were searched for with bar-sweep or wire drag. During the past three or four decades considerable improvements have been made in hydrographic surveying methods with the development of echo-sounding equipment and improved methods of control. Accurate profiles are now obtained of the ocean floor, lake bottom and river bed that provide the cartographer with a wealth of information for detailed charting of submarine relief which is often characterized by intricate and distinctive patterns.

The hydrographic survey starts with the high-water line and control points as they appear on the topographic survey. In general, hydrographic surveys are extended inshore across the low-water line in areas where this is practicable and can be done without danger to personnel or equipment. The low-water line, one of the most important depth contours of a survey, is fully developed wherever conditions permit.

The hydrographer endeavours to obtain depths which will develop the area and delineate submarine relief in a thorough and economic manner by the methodical system of evenly spaced sounding lines. Side-looking sonar systems which are presently in the development stage are gradually being brought into service as search tools to seek out dangers which may exist between the sounding lines described earlier. We should soon be able to ensure 100% coverage of the bottom.

Coastal detail and soundings are recorded on a field sheet by the hydrographer as the work progresses. In addition to coastal features and soundings the field sheet contains depth contours, control points, bottom characteristics, names of geographic features, vertical and horizontal control data, leading and clearing lines, aids to navigation, dangers and any other survey data which can conveniently be shown on such a cartographic representation of the area surveyed.

#### NAUTICAL CHART PRODUCTION

At present and for the foreseeable future, the greatest requirement will be for more detailed and larger-scale charts. Charts now exist for all of Canada's coast, but many are at small scales. Often the soundings date back decades, are too widely spaced, poorly positioned, and are therefore inadequate. Many of the older charts were compiled on the principle that thirty feet was the minimum safe depth along ocean coasts and 18 feet was the safe depth on the Great Lakes. Modern supertankers, however, draw over 80 feet, and large "lakers" draw 25½ feet, so that many shipping lanes have to be re-sounded. As new mines, industrial plants and refineries are being established, new water transportation routes and new harbours must be charted. This usually necessitates new marine surveys and new grist for the chart production mill so that the photographic cameras, manual and automatic scribes, plate makers and presses are continually turning out new charts or new editions of existing charts.

Nautical Charts are compiled principally from basic field surveys made by the Canadian Hydrographic Service and a few other agencies engaged in special hydrographic surveys of channels and certain harbours, and they include all information essential for safe navigation. To meet the different navigational requirements, nautical charts are published in different series classified as General, Coastal, Harbour, Seaway and Small Craft.

A new chart is only the start of a maintenance cycle. While about 50 new charts are published each year, nearly 250 other charts require reprinting because of extensive changes in their navigational content or because of stock depletion. A steady stream of information arrives each week from other federal and provincial agencies and commercial sources which affects what is shown on the charts. Field units in each of the three regions make annual systematic revisory surveys of charted areas, verifying and correcting the information on the charts. Because of the size of the regions and the number of charts published, this is a never-ending process. Industrial developments, silting of harbour approaches and channels and other man-made and natural processes never cease.

#### CHARTING SMALL CRAFT WATERWAYS

Nearly a decade ago, an in-service study (3) of charting requirements for our inland waters indicated that the greatest requirement for charting covers about 2,000 miles from Montreal, through the great lakes, to Lake Winnipegosis, and Lac La Rouge. Then on for a further 2,000 miles from Waterways, in Alberta, through the Athabasca and Great Slave Lakes and on to the mouth of the Mackenzie at Latitude 69°N., Longitude 135°W.

In this vast extent the charts cater for the whole gamut of water transport; from the ocean-going ships which traverse the St. Lawrence Seaway, the Lakes traffic, the barges of the Mackenzie, and the small craft on the Nelson River in Manitoba.

The charts reflect the varying factors on these vast stretches of water, the types of users and the hydrographic conditions. There is the requirement for modern updated charts published each year in time for the opening of the shipping season with all the latest information on them, to charts that are little more than general guides, compiled from aerial photographs, which because of the seasonal changes contain little or no hydrographic detail. But each in its way must be kept up-to-date, however limited the user traffic may be, and is by no means an easy matter with the resources available.

Add to this the upsurge of the pleasure craft industry whose patrons demand a special type of navigational publication, in waters previously little used, and it can be seen that in inland waters the task appears formidable. In fact, the requirement for small craft charts is not restricted to inland waters but is becoming more pressing in the coastal areas (4).

In attempting to define the real need for Small Craft Charts, we could not ignore the reasons for this new requirement or the type of user. It appears that the vital change, during the past 50 years, has been the growth of yacht clubs, the subsequent development of harbours and marinas, and the formation of international sailing organizations, power boat squadrons or associations and cruising clubs. In these modern organizations, we find a new breed of sailors and almost every conceivable type of pleasure boat (5).

Until the end of World War II, recreational boating was largely confined to sailing activities. A number of factors changed this and their continuance as operative influences guarantee that the boat population explosion will continue into the future if only the facilities to serve such growth are made available. Some of these factors are:-

- (a) The growth of population;
- (b) The increasing difficulty of obtaining suitable cottage areas conveniently adjacent to urban centres;
- (c) The growth in leisure time;
- (d) The general increase in disposable income and the technical improvements in marine motors and boats that extended their ownership through all economic levels of the population.

Whatever the motive for acquisition, it is a fact that more and more Canadians have joined the boating fraternity. Today nearly 1,000,000 pleasure boats are registered in Canada and, at the present growth rate, we will have estimated 6,000,000 pleasure boats by the year 2000. It is estimated that by the year 2000 the United States will have about 16,000,000 registered pleasure boats. Nearly half a million United States boats have been visiting Canada during recent summers and this number will probably increase.

As the boating population increases so does the demand for Small Craft Charts. This demand is being met in three ways:-

- (1) By the Canadian Hydrographic Service survey and charting program.
- (2) By surveys carried out by Provincial Fisheries Authorities. The hydrographic data is supplied to the Canadian Hydrographic Service, we then compile and publish the charts.

- (3) By bathymetric maps of more than two hundred Ontario lakes. The surveys are carried out and the contoured maps published by the Ontario Government.

The most extensive program is that of the Canadian Hydrographic Service and includes the charting of lakes, rivers, river and canal systems, coastal areas and harbours of refuge.

During recent years we have charted an 850 mile stretch of the Ottawa River, from Temiscaming to Montreal; the 125 mile Rideau Waterway; the 240 mile Trent-Severn Waterway; the 150 mile Georgian Bay route from Port Severn to Killarney; the small craft route from Sorel to Montreal was specially charted for visitors to Expo; we are in the process of charting the small craft route through the Thousand Island area of the St. Lawrence River; we have charted the 300 square mile Rainy Lake and by mid-September of this year, we will have charted the 1,000 square mile Lake of the Woods. A survey of Playgreen Lake, in northern Manitoba, is in progress and the Lake Winnipeg survey will be resumed next year; a number of lakes in British Columbia have been charted as well as the St. John River in New Brunswick and several lakes in New Brunswick and Nova Scotia. The charts of the Mackenzie River will serve pleasure craft as well as the commercial traffic.

All of these surveys have been carried out, and charts published as quickly as possible after completion of the surveys, in less than a decade. In order to accomplish this it was necessary to develop new survey techniques, develop a highly mobile survey force and design a new type of chart which would be most suitable for the small craft mariner.

To date, some 70 charts in this series have been published and we have just recently commenced the compilation of two volumes of small craft Sailing Directions, one for the southern British Columbia Coast and one for the Trent-Severn Waterway. While charts are the indispensable foundation of navigation, it is Sailing Directions, or "pilots", that make them really come to life. These Sailing Directions are books describing, in considerable detail, the best course to take when approaching harbours or negotiating passages. Beside describing the coast, they contain a wealth of information on shoals, anchorages, sea ice, magnetic anomalies, climate, winds, currents and facilities available in the various ports--in short, information that is of interest to the mariner. Future Small Craft Sailing Directions are planned for Georgian Bay; the St. Lawrence River; Ottawa and Rideau Waterways and will eventually cover all small craft routes.

#### IMPACT ON TOURISM

I have no precise information on the real impact which the Charting of Small Craft Waterways has had on tourism. However, if Nautical Chart Sales are an indication then reasonable conclusions can be reached.

It is interesting to note that of the half-million charts sold so far this year through our 300 regular distribution offices and some 200 marinas and small businesses, approximately fifty percent, or a quarter of a million, have been sold to small craft operators. Three quarters of the requests for charts have come from the United States.

Many reports have indicated that the Georgian Bay area, between Parry Sound and Killarney, has become a booming tourist area since we published the Small Craft Charts for that area. This seems to be an appropriate time to look at the increase in chart sales in a few areas where old, inadequate charts have been replaced by modern Small Craft Charts based on new hydrographic surveys.

AREA	1963 (OLD)	1972 (NEW)
Trent-Severn Waterway	1,250	14,000
Georgian Bay - Port Severn to Killarney	3,000	7,000
Rideau Waterway - Kingston to Smith Falls	950	2,100

CONCLUSION

The introduction of Small Craft Charts based on new hydrographic surveys has provided opportunities for a greater variety of pleasure craft to navigate safely in some of the most interesting parts of Canada. I believe that the few examples of increased chart sales for areas covered by the new charts provide clear evidence that our charting program has been, and continues to be a stimulus to tourism.

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