

A CONTRACT SURVEY
OF
NORTHWESTERN GEORGIAN BAY

1972

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INTRODUCTION

In January 1972, Central Region made the decision to proceed with a Hydrographic Survey which would be contracted to private industry. This decision followed the recommendation by the Science Council of Canada that where possible, government and university laboratories contract work to private industries as part of a long range plan to develop competence in marine resource exploration and data acquisition. In addition, the Canadian Hydrographic Service has for some time recognized the requirement for competent industries to relieve some of the work load of a rapidly increasing demand for detailed charting of Canada's waters for increased pleasure craft traffic, deep draft shipping and hydrocarbons exploration.

The survey contract this season was the first to be awarded by the CHS, which has given us the first real opportunity to evaluate the interest which the private sector has in committing themselves to Marine Survey Activities as well as the opportunity to evaluate the capabilities of one of these marine-oriented organizations.

The following paragraphs describe in some detail the history of the first Contract Hydrographic Survey as well as recommendations for the future.

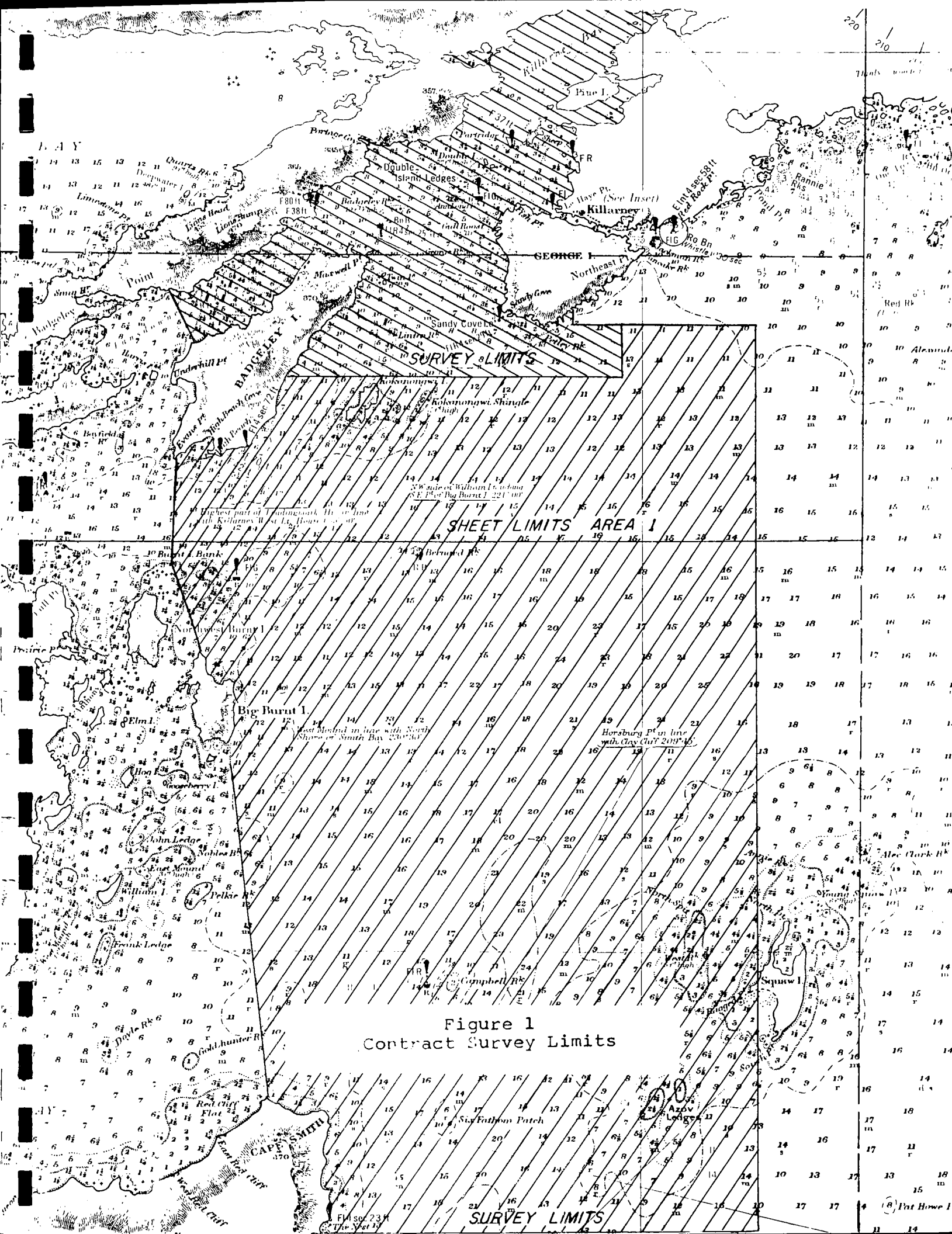


Figure 1
Contract Survey Limits

1. THE SURVEY AREA

Following the decision to proceed with a Contract Survey, a close examination of potential survey areas was undertaken. The area chosen for this survey was a 60 square mile area in Northwestern Georgian Bay, directly west and south of Killarney, Ontario. It is coincidental that the area chosen for this first contract is in the same area as the first survey undertaken by the Canadian Hydrographic Service in 1883. A copy of the existing chart, 2286, outlining the survey limits is shown as Figure 1.

This area was chosen for a number of reasons, of which the following are the most significant.

- 1) The survey area is representative of many of Canada's marine waters, i.e., the area included relatively open, unrestricted areas as well as shallow, confined and shoal-infested waterways which are typical of many small boat routes.
- 2) A complete and detailed up-to-date survey was required for this area to meet the requirements of commercial shipping and for the completion of the small boat charts west of Killarney.
- 3) Many of the unpredictable factors associated with new areas of hydrographic activity were known for this area, i.e.,
 - a) excellent horizontal control was available within the survey area, and
 - b) modern and detailed surveys had been completed in the adjacent areas so there was a good appreciation of the topography within the survey area.

- 4) The area is relatively accessible to the urban areas of southern Ontario.
- 5) Excellent shoreline plots as well as aerial photography was available for the area.

Compared with normal Canadian Hydrographic Survey operations, this area of Georgian Bay was relatively small and in our view a very straightforward survey. At this point in time there was no reason to choose a large or particularly difficult area but simply one which would require the demonstration of a basic hydrographic competence.

2. SURVEY SPECIFICATIONS

On completion of the selection of a suitable geographic area for the operation of a Contract Survey, detailed survey specifications were prepared. It is our opinion that these were a very good set of specifications and covered in detail all areas and aspects required of this survey.

During the preparation of the specifications an attempt was made to keep all areas as straightforward and basic as possible and yet maintaining an element of protection which is necessary in any contract and especially in areas such as hydrographic surveys where there can be extremely serious and long term consequences.

An attempt was also made to parallel normal and basic hydrographic practices - no new technical requirements or procedures were included.

It is perhaps pertinent to point out that these specifications and the resulting survey, do not constitute a complete hydrographic survey as is normal within CHS operations, i.e., the following were either provided or not required on this survey:

- 1) Recent aerial photography was provided.
- 2) Field sheet bases complete with control stations, shoreline and geographic graticules were provided.
- 3) No current observations were requested.
- 4) No place name data was requested.
- 5) No request was made for the survey of wharves or other large-scale surveys of inshore areas or installations.
- 6) No request was made for contour scaling, which would have been considered by CHS hydrographers.
- 7) No request was made for sweeping any area of the survey.
- 8) No request was made for descriptions of foreshore detail.

The specifications were prepared with the aim of being as clear and concise as possible, with no redundant requirements and there should have been little difficulty in their interpretation by those with hydrographic experience.

In most areas within the specifications we did not attempt to outline to the contractor how to carry out the survey, we simply included what was required with the method remaining the contractor's decision.

3. THE SURVEY

The contract for the survey was awarded to CDC on June 16, 1972. Field work commenced in the survey area on July 14th with the establishment of control being the first objective.

Sounding main lines along Mini-Fix patterns began on August 9th and continued until near the end of the season.

Sounding on the inner sheet (Field Sheet 3765) began in late September and continued to the end of the season. On only a very few days and only near the end of the season were sounding operations carried out simultaneously on both field sheets.

4. MONITORING THE SURVEY

As this survey was considered to be a pilot study on Contract Survey capability in Canada it was viewed as an extension of hydrographic development and therefore fell within the responsibilities of the Development Group. These responsibilities included the preparation of detailed survey specifications, review of submitted tenders, and, in the field, to ensure that accuracy standards and attention to details as outlined in the specifications were being adhered to. As this was the first contract survey, responsibilities also included the development of effective monitoring systems for future surveys of this nature, should they be considered.

The Development Group had personnel in the survey area for all except the first and the last few weeks of the survey's duration. A number of unrelated projects were undertaken in this area in addition to monitoring the progress of the contract survey.

Prior to the beginning of the field work, a preliminary monitoring program was developed, however, no detailed time table was set up as the monitoring was generally dependant on the progress being made by the contractor.

During the survey, the monitoring team was concerned mainly with quality rather than quantity of work, as it was assumed that the contractor would have a careful eye on the quantity as well as quality. The monitoring therefore followed the progress of the survey.

The main areas of activity in the field were:

- 1) Re-computation of all horizontal control,
- 2) Re-survey of one main control point,
- 3) Re-survey of water level staff,
- 4) Calibration of positioning system,
- 5) Collection of check sounding lines as well as side scan sonar lines throughout the survey area,
- 6) Visual inspection of field sheets,
- 7) Visual inspection of sounding rolls,

as well as numerous personal discussions with survey personnel. With our present knowledge (and hindsight) we are aware that too much emphasis was placed on the Contractor's verbal reports.

The monitoring program, as well as the actual survey, was much affected by the Mini-Fix calibration problems which were aired during the course of the survey. Because re-inking of a Field Sheet was required, the contractor was seriously delayed in maintaining sheets in an up-to-date status. An assessment of production achieved or outstanding additional work could not be made on data which was not fully processed.

5. SUMMARY OF OUTSTANDING WORK

Following a detailed review and assessment of data submitted, the following field and office work is required in order to meet the survey specifications. These points should be reviewed along with the overlays prepared for both Field Sheets.

Field Sheet 3765

1) Approximately 40-50 shoal indications require examination. Many of these are near main shipping and regular small boat routes and are of a critical nature.

2) In many areas the hydrography is difficult or impossible to interpret due to either one, or a combination of the following:

a) depth contours are poorly represented and in many cases erroneous, omitted or overlapping other data;

b) quality of inking soundings is not of a high standard which in many areas presents a confused condition.

It is recommended that this sheet be completely re-inked to gain a more presentable form.

3) Many rocks evident on the aerial photographs are not shown on the field sheet.

4) Elevations of rocks and small islands are not all shown.

5) A small number of interlines are required.

6) The elevation and characteristics of all lights and range structures should be shown.

7) The elevation of the microwave tower should be shown.

8) The range line and bearing of the leading lines must be shown.

9) The range structures near the old mine should be plotted in their correct position.

10) The shallow, inshore areas immediately west of George Island should be shown as foul.

11) The foul area indicated near station "Dub" requires further delineation.

12) The colour of the buoys (red or black) should be shown directly below the buoys as R or B.

13) Secondary control stations should not be shown with double red circles.

14) The names of main control stations should be shown with capital letters.

15) Sunken logs and cribs as indicated on the Master Boat Board should be shown on the Field Sheet.

16) The shoreline should not be broken at control stations.

17) The isolated drying areas as well as drying areas near shore should be shown with appropriate symbols.

A summary of the work required to complete Field Sheet 3765, with an estimate of time based on the use of one sounding vessel, is as follows:

FIELD

- 1) Shoal examinations - 5 days
- 2) Interlines and further delineation of foul area - 1 day
- 3) Shoreline check and elevations of rocks and islands - 1 day.

OFFICE

- 1) Complete re-inking of Field Sheet making corrections and/or incorporating changes as outlined above - 3 days.
- 2) Additional office work resulting from the above field work - 2 days.

TOTAL

FIELD - 7 days
OFFICE - 5 days

Additional work required on F.S. 3765 but not included in
Survey Specifications

1) A red broken line should be shown between border of F. S. and adjacent sheets along with adjacent F. S. numbers.

2) Additional reference notes

- a) Shoreline source
- b) Method of positioning soundings
- c) Adjacent Field Sheets
- d) Bar scale in feet and meters
- e) Field book file numbers

Field Sheet 3766

1) Approximately 150 shoal indications require examination.

2) A small number of interlines are required.

3) Sounding coverage is not complete on the northeast corner of the sheet.

4) In a number of areas contours are omitted or require correction.

5) The elevations and characteristics of all lights and range structures should be shown.

6) The range line and bearing of the leading lines must be shown.

7) The colour of the buoys (red or black) should be shown directly below the buoys as R or B.

8) Check lines through North Channel must be run.

9) Names of secondary control stations should have the first letter capitalized with the remainder being lower case.

10) The isolated drying areas as well as drying areas near shore, should be shown with appropriate symbols.

11) Soundings and contours do not agree between the overlap of Field Sheets 3765 and 3766. Those incorrect should be replotted.

12) Station "BOLD" should be drawn with red ink.

13) The wharf should be shown near Badgeley Island Rear Range.

14) Elevations of rocks and small islands should have been collected.

15) In a number of areas the soundings near shore overlap the shoreline. This should be corrected.

A summary of the work required to complete F. S. 3766, with an estimate of the time based on the use of one sounding vessel, is as follows:

FIELD

- 1) Shoal examinations - 15 days
- 2) Interlines and check lines - 1 day
- 3) Elevations of rocks and Islands - 1 day

OFFICE

- 1) Addition or corrections of data as indicated above - 1 day
- 2) Additional office work resulting from the above field work - 5 days.

TOTAL FIELD - 17 days
 OFFICE - 6 days

Additional work required on F.S. 3766 but not included in Survey Specifications

- 1) Graticules or parts of graticules which pass through soundings should be removed.
- 2) A red broken line should be shown between adjacent Field Sheets.
- 3) Names included in the Field Sheet Title should be shown on the Sheet.
- 4) Additional Reference Notes are required
 - a) Source of shoreline
 - b) Photograph numbers
 - c) Horizontal positioning method
 - d) Adjacent Field Sheets
- 3) Bar Scale

6. GENERAL COMMENTS

With the exception of the points raised in the previous section of this report, the general approach and the data shown on the two field sheets are very satisfactory. The presentation of data on Field Sheet 3766 is very good with no possible misinterpretation of soundings and the contours are well represented.

The data shown on Field Sheet 3765 is in all cases valid data, however, the quality of drafting has confused the presentation. A re-inking of some of the data by C.H.S. has presented a much clearer interpretation of the bottom topography and has clearly shown that all necessary data can be included.

As indicated previously, all horizontal control was recomputed in the field by the monitor team. At that time all standards were met with both triangulation and traverses. The control has subsequently been recomputed by the contractor and the final submission of data has brought about a number of changes, i.e.

- 1) check triangles are not available for a number of important stations, and
- 2) the position of MASTER has shifted by approximately 5 meters.

As the accuracy requirements for this survey, $\pm 20M$, are seriously taxing the capabilities of the Mini-Fix system under ideal conditions, further possible sources of error could not be tolerated. This uncertainty of Master position along with the calibration results places those

soundings collected with Mini-Fix in a questionable position.

Two other points on Field Sheet 3766 require clarification:

1) On two occasions shoals have been indicated as examined but there is no support of this on boat boards or sounding notes.

2) There is no indication within the sounding notes that leadline depths or bottom samples were taken on least depth of shoals.

7. SUMMARY

The area of this Contract Survey was not particularly large and all Hydrography could have been collected within the time frame available. In our opinion the major factor or change required for this would have been a better utilization of both personnel and material resources.

At the present stage of the development of private industry, this can only come about in the immediate future in one of two ways -

- 1) the recruitment of experienced hydrographers
or
- 2) considerably more consulting with experienced MSD hydrographers both during the survey planning stages and during the Field Operations. This potential service was not taken advantage of to any great extent during this first contract.

There is also little doubt that the contractor seriously underestimated the work involved in the completion of a Hydrographic Survey, especially in those areas requiring attention to detail - such as shoal examinations.

It is our opinion that the Survey Specifications were clear and concise, containing all necessary details for the conduct of this survey - in a number of areas it appears that these specifications were either misinterpreted or not closely followed.

It is most unfortunate that this contract was awarded at such a late date in the survey season. One must agree that an earlier start date would have been a distinct advantage to the contractor.

8. CONCLUSIONS & RECOMMENDATIONS

On reaching this stage of this report, one may have conceived the idea that the writer is being overly critical of the contractor of this survey. This is most certainly not the intent - the intent is simply to point out areas where there is deficiency and to provide solutions, where possible, for correction. One cannot over-emphasize the importance of an accurate, detailed and reliable hydrographic survey. At best Hydrographic Charts are an interpretation of bottom detail - this interpretation must be based on sound and as complete as possible basic knowledge of the area.

This contract hydrographic survey has been a major step forward by both the Canadian Hydrographic Service



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and private industry. It has been the first step of many steps which are required by both parties in order to reach the ultimate long range goals.

Certainly at this point in time, Private Industry must be given full credit for taking this major step forward in the development of competence in the specialized field of Hydrography. This has been done without any commitments beyond this first contract, either short or long range, by the C.H.S.

At this point in time, the CHS must respond by providing assurance to private industry that long term contracts will be available and that specialized requests now directed to the CHS will in the future be directed towards competent private Hydrographic firms. On the other hand, Private Industry must at this time continue to show their serious interest in developing a competence in this area. In the case of the 1972 survey of Georgian Bay, this serious interest can only be shown through an enthusiastic approach to the completion of the two Field Sheets.

It is recommended that at least one more hydrographic survey be contracted to private industry in 1973. This contract should be monitored by the CHS in much the same way as the 1972 contract, however, it should be pointed out to the contractor that there is great benefit to be derived from consultation with the CHS.

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