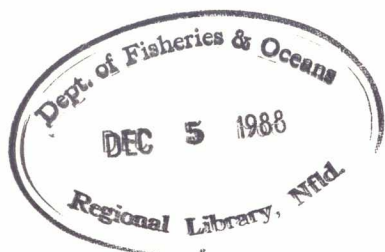




Fisheries
and Oceans

Pêches
et Océans



SMALL CRAFT HARBOURS BRANCH



NEWFOUNDLAND
REGION
ANNUAL REPORT

1987-88



Canada

ANNUAL REPORT

1987/88

**SMALL CRAFT HARBOURS BRANCH
DEPARTMENT OF FISHERIES & OCEANS
NEWFOUNDLAND REGION**

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1.0 OVERVIEW

Small Craft Harbours Branch was established in 1973 with a mandate aimed at improving both the physical condition and the quality of management of harbours operated by the federal government and used by commercial fishing vessels and recreational crafts. In the Newfoundland Region, the Branch has been providing facilities such as breakwaters, wharves, slipways, gear storage, shore protection, floats and the dredging of channels and basins.

All projects undertaken by the Branch have been prioritized on a Long Term List and a 5-Year Multi Plan to ensure that all public monies expended are going to communities in which economic and social benefits will give maximum returns. A computerized formal planning framework has been developed and utilized to assist in the planning process. Appendix 1 provides photographs of some projects completed during 1987/88.

This report covers all major activities of Small Craft Harbours Branch for the fiscal year 1987/88. It reports on major capital, operation and maintenance projects carried out in the regular program as well as special programs, ie. dredging projects carried out by Public Works, contributions to CEIC Job Creation Program, and the Harbour Revitalization Program; a summary of Harbour Operations including property acquisition and cost recovery policy; a summary of budget expenditures; and a step-by-step description of a project carried out in Bauline under the Harbour Revitalization Program.

2.0 SMALL CRAFT HARBOURS BRANCH - NATIONAL PLANNING FRAMEWORK

The Harbour Maintenance Management System (HMMS) is a formal procedure adopted by Small Craft Harbours Directorate, Ottawa, and administered by Small Craft Harbours Branch for the planning, controlling and maintenance of harbours under their jurisdiction in the Newfoundland Region. The system consists of four (4) components:

1. Harbour Classification
2. Guidelines of Accommodations
3. Harbour Condition
4. Harbour Audit

2.1 Harbour Classification

The harbour classification component of the system defines the different theoretical classes of harbours (i.e. A, B, C and D) with "A" harbours being the most active, while "D" harbours have little or no activity. Harbour utilization is the criteria used to classify harbours and is defined as the number of vessel-metres a harbour is normally called on to accommodate on a daily basis over the fishing season, including both home and transient fleets. This system ensures that the level of services at all harbours is consistently related across Canada.

In the Newfoundland Region, the number of harbours per class are as follows:

TABLE 1.
Harbour Classifications

| <u>Class</u> | <u>Vessel-Metres</u> | <u>No. of Harbours</u> |
|--------------|----------------------|------------------------|
| A | 800 or more | 31 |
| B | 300 to 900 | 60 |
| C | 400 or less | 195 |
| D | No activity | 119 |
| | | <hr/> 405 |

A more extensive breakdown of classifications for all scheduled and potential harbours is found in Appendix 2.

In certain cases, landed value is considered on a harbour-by-harbour basis to determine whether a harbour has sufficient fishing activity per vessel to be designated an active commercial fishing harbour (Class A, B or C) within a tolerance of 100 vessel metres for each harbour class. Landed value, however, is not one of the formal harbour classification criteria used by the Branch.

2.2 Guidelines of Accommodations

Guidelines of Accommodations is a standard to be followed when a facility or service is provided at one of the scheduled harbours. The standard is only a guide and is flexible in order to allow for special cases. A summary of services and standards by harbour classification is illustrated in Table 2 on the following page.

TABLE 2.
Minimum Services Offered

| <u>Item</u> | <u>Harbour Class</u> | | | |
|--|----------------------|----------|----------|----------|
| | <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> |
| 1. General Guidelines | x | x | x | x |
| 2. Approach Channels | x | x | x | |
| 3. Harbour Entrance | x | x | x | |
| 4. Depth of Water | x | x | x | |
| 5. Allowable Agitation within Harbours | x | x | x | |
| 6. Berth Area and Mooring Basins | x | x | x | |
| 7. Wharf | | | | |
| 7.1 Loads | x | x | x | |
| 7.2 Width | x | x | x | |
| 7.3 Elevation | x | x | x | |
| 7.4 Deck | x | x | x | |
| 7.5 Gangways | x | x | x | |
| 8. Fenders | x | x | x | |
| 9. Mooring Devices | x | x | x | |
| 10. Ladders | x | x | x | |
| 11. Launching Facilities | | | | |
| 11.1 Launching Ramps and Skidways | x | x | | |
| 11.2 Launching Ramps | x | x | | |
| 11.3 Skidways | x | x | | |
| 11.4 Grounding Out Platforms | x | x | | |
| 11.5 Straddle Carriers | x | x | | |
| 11.6 Marine Railways | x | x | | |
| 12. Services | | | | |
| 12.1 Lighting and Electrical Systems | x | x | x | |
| 12.2 Water Supply | x | x | | |
| 12.3 Fueling Facility | x | | | |
| 12.4 Parking | x | x | x | |
| 12.5 Sanitary Provision | x | x | | |
| 12.6 Fire Fighting | x | x | | |
| 12.7 Fish Handling Equipment | x | x | | |
| 12.8 Gear Handling Equipment | x | x | x | |
| 12.9 Ice | x | x | | |
| 12.10 Bait Sheds | x | | | |
| 12.11 Gear Storage Facilities | x | | | |
| 12.12 Safety Equipment | x | | | |
| 12.13 Signs | x | x | | |
| 12.14 Service Area | x | x | | |

Level of Services

The four level system will be retained for commercial fishing harbours with the level of services ranked as follows:

TABLE 3.
Level of Services

| <u>Class</u> | <u>Services</u> |
|---------------------|---|
| A | Full range of services and full-time on-site management. |
| B | Partial services and at least part-time on-site management. |
| C | Minimal services and some on-site management where practical. |
| D | Maintenance for safety reasons only. |

Recreational Harbours

The level of services for recreational harbours differs from commercial fishing harbours, since there is a greater difference in the type of harbours from region to region. Facilities range from small tourist wharves with a limited amount of berthage to large harbours having up to 11,000 metres of berthage. In the Newfoundland Region, the demand is very low and, therefore, recreational facilities have not been a priority in harbour planning.

2.3 Harbour/Facility Condition

The condition component of the system includes an in-depth inventory and inspection of all harbours under the Branch's jurisdiction and an evaluation of facilities and levels of service offered at each location. This conditional study enables Branch planners to review the condition of harbours to see if they meet the requirements set out in the harbour classification component.

Each facility in the harbour is rated between "1" and "5". Condition "1" signifies an unsafe condition, and hence is accorded the most urgency; condition "2" means a poor condition, and condition "3" indicates a fair condition. Conditions "4" and "5" indicate good and very good conditions.

The criteria for the facility condition rating is given below.

TABLE 4.
Condition Rating Scale
Related to Project Type

| PROJECT TYPE | | | | | | | |
|-------------------------------------|-----------|-------------------|-----------------------------|--------------|-----------|------------------------------------|---|
| Facility/ Component Condition | Essential | | Preventative Maintenance | | Upgrading | Est. Service Life (Years) | Years Before Which Project Action* Should Begin |
| | Repairs | New Facilities | Short Term | Long Term | | | |
| 1. Unsafe | x | x | | | x | 0 | 1 |
| 2. Poor | | | x | x | x | 3 | 2 |
| 3. Fair | | | x | x | x | 5 | 3 |
| 4. Good | | | | x | x | 10 | 5 |
| 5. Very Good | | | | | x | 20 | - |

* Project Action: (a) Preventive Maintenance Inspections, or
(b) Preliminary Engineering, or
(c) Construction

2.4 Harbour Audit

The harbour audit component of the system will include provision for assessment of a certain percentage of Small Craft Harbours facilities in each Region to evaluate the effectiveness of the Branch's long range

planning program on the level of services provided. This data will permit the Branch to substantiate its requests for adjustments in expenditures per harbour. The audit will also allow the Branch to compare services offered in different Regions to ensure that any major differences can be gradually eliminated, and thus provide users across the country with similar facilities.

Project Types

Projects are assigned a project type as EW (Essential Work), PM (Preventive Maintenance Work), or UG (Upgrading Work). Essential work may be further described as being either Essential Repairs or Essential New Facilities. Preventive Maintenance Work is subdivided as being short or long term. Upgrading Work is used to describe projects intended to provide new facilities or components needed for long term development. A more complete description of the criteria of each class of work is available in Appendix 3.

Budget Categories

Projects are assigned a budget category as "A" (Program Administration), "B" (Technical Support), "C" (Harbour Operations), "D" (Projects to Avoid Unsafe Conditions), "E" (Projects to Avoid Major Disruption), "F" (Projects to Avoid Incurring Major Repair Costs) and "G" (All Other Projects). A more complete description of the each budget category is included in Appendix 4.

3.0 LONG RANGE PLANNING: NEWFOUNDLAND REGION

Small Craft Harbours Branch places considerable emphasis on long range plans for the development of commercial harbour facilities in the Newfoundland Region. This process has become especially important in light of the current restraints on budgets and the resulting inability to meet demands for new facilities and improvements to existing services. The long term program includes 272 projects in 150 harbours.

3.1 Computer Aided Management of Harbour Records (CAD)

An engineering workterm student, under the direction of the Regional Engineer, Small Craft Harbours Branch, prepared a report on the feasibility of adopting a computer system for the management of all harbour records. The results of the report indicate that a CAD system would greatly improve the quality and accuracy of drawings, reduce the drafting cycle, and enhance decision making regarding harbour maintenance and planning. A copy of the report is included in Appendix 4.

The Branch is now in the process of implementing a CAD System for its detailed harbour planning and it is projected that the system will be on stream by January 1989.

3.2 Priorization

The Branch uses a 5-Year Multi Plan which consists of a long term list of projects to be completed over a number of years. Two factors govern

the priority assigned any given project: (1) the facility condition rating describes the condition of the present facility, what needs to be repaired, upgraded or constructed and the cost associated with these requirements; and (2) the class of the harbour in which the facility is located. Harbours are classified as being "A", "B", "C", or "D" harbours, with Class "A" harbours being the most active. Facilities are classified as having a condition rating of "1", "2", "3", "4", or "5" with condition 1 being the most urgent. In setting priorities for projects, planners will assign the highest priority to Condition 1 projects in Class A harbours, with other condition rating/harbour class combinations being ranked accordingly. The 5-Year Multi Plan is updated on an annual basis to ensure that the most urgent work will be completed first and the Branch's objectives are being met.

3.3 Detailed Harbour Plans

As part of the Branch's multi-year planning process, detailed harbour plans are now being developed for harbours throughout the Region. This past year, approximately 100 harbour development plans are underway and will be completed by 1989. Detailed harbour plans give planners a logical program of development for each harbour, and to bring harbours up to the Guidelines of Accommodation as the necessary information and financial resources become available.

4.0 A PROJECT COMPLETED UNDER HARBOUR REVITALIZATION PROGRAM

The construction of a berm breakwater at Bauline is one project that has been undertaken and is scheduled to be completed in the fall of 1988 as part of Small Craft Harbours, Harbour Revitalization Program. The following will illustrate the step-by-step process of project development from initial conception, project approval, funding, model design and tendering for construction.

4.1 Bauline

The harbour of Bauline provides boat launching and fish landing facilities for up to 30 speed boats and trap skiffs which fish out of Bauline. The majority of these boats fish off Cape St. Francis and the fishing season extends from June to September. Fish landings at Bauline in 1981-82 were approximately 240 tonnes and 470 tonnes, respectively.

The request for a breakwater was initiated by fishermen in 1981-83 through written requests to the Department of Fisheries & Oceans and parliamentary representatives as well as verbal requests during community meetings between local residents and departmental officials. Acting upon these requests, for a breakwater at Bauline (and similar requests from other locations within the Province), Small Craft Harbours in 1984, engaged W.F. Baird and Associates to do a study and preliminary breakwater design for 22 harbours in Newfoundland and Labrador. Bauline was one of the locations to be studied.

The report by W.F. Baird & Associates provided the following information on Bauline. "The existing facilities at Bauline consist of a slipway and a short concrete breakwater. The breakwater was constructed in 1949 and has been extensively repaired in 1965 and 1970. The structure is currently in poor condition and cannot be used as a marginal wharf. There are no other fish landing facilities at Bauline except for an overhead cableway which was installed by the provincial Department of Fisheries.

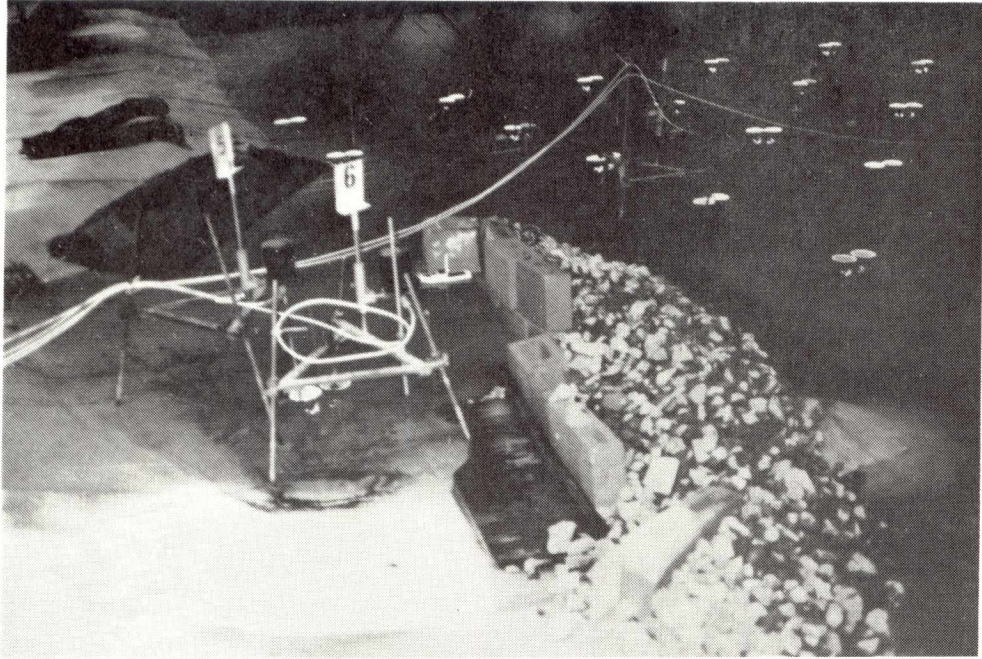
The existing breakwater at Bauline does not provide sufficient protection from waves from the NE through NW and provides no protection from the SW. This exposure makes it difficult, if not impossible, for fishermen to unload their catch, except for 1 or 2 days a week during the fishing season. New breakwater structures are required to allow continuous use of the harbour to land fish and to allow the expansion of the harbour to provide sufficient room for the construction of a protected landing wharf. Protection from waves from both the NE and through NW and from the SW is required."

The 22 locations for breakwaters were then evaluated by Small Craft Harbours and prioritized in their 5-Year Multi-Plan. Under this planning process, Bauline was designated a priority and a formal process initiated to build a breakwater at Bauline. The first step in this process was to begin property acquisition through the Department of Public Works. It is the policy of the federal government to take

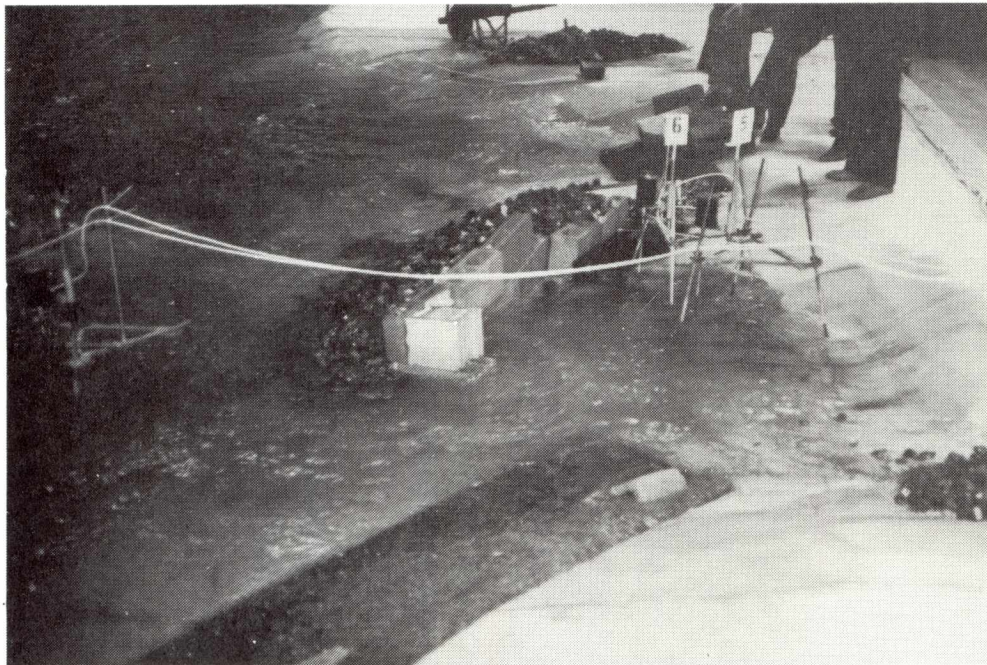
ownership of the land before building any facility. This ownership policy also includes any land underwater. Land acquisition takes approximately 3-5 years due to numerous factors, i.e. registry system in Newfoundland, government requirement of a 40 year clearance, etc. By 1987, ownership of the land at Bauline was attained by Public Works.

The second step is the model study. Under the direction of Public Works and using National Research Council facilities at Ottawa, a small scale, but exact replica of Bauline Harbour was built. Page 13 includes photographs of the breakwater design taken at the National Research Centre. Over a period of six months, researchers conducted a number of experiments in flume tanks, as well as several proposed models to determine the optimal design for Bauline. The model study is used to pre-test several proposed designs, and the most appropriate concept then becomes the base of the formal design. It also helps guard against the possibility of a proposed structure having unforeseen side effects ... a harbour silting up, for example, after a breakwater is installed and changes water flow patterns.

Employees of the Branch also assisted in the model design by supplying films taken during storm conditions and meeting with fishermen's committees to supply knowledge of the local area. This allowed local fishermen to have input into the design process. The fishermen also went to Ottawa to review the model and to pick out the ideal layout.



HYDRAULIC MODEL STUDY OF BAULINE
NATIONAL RESEARCH CENTRE IN OTTAWA

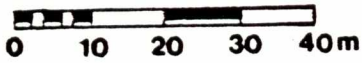
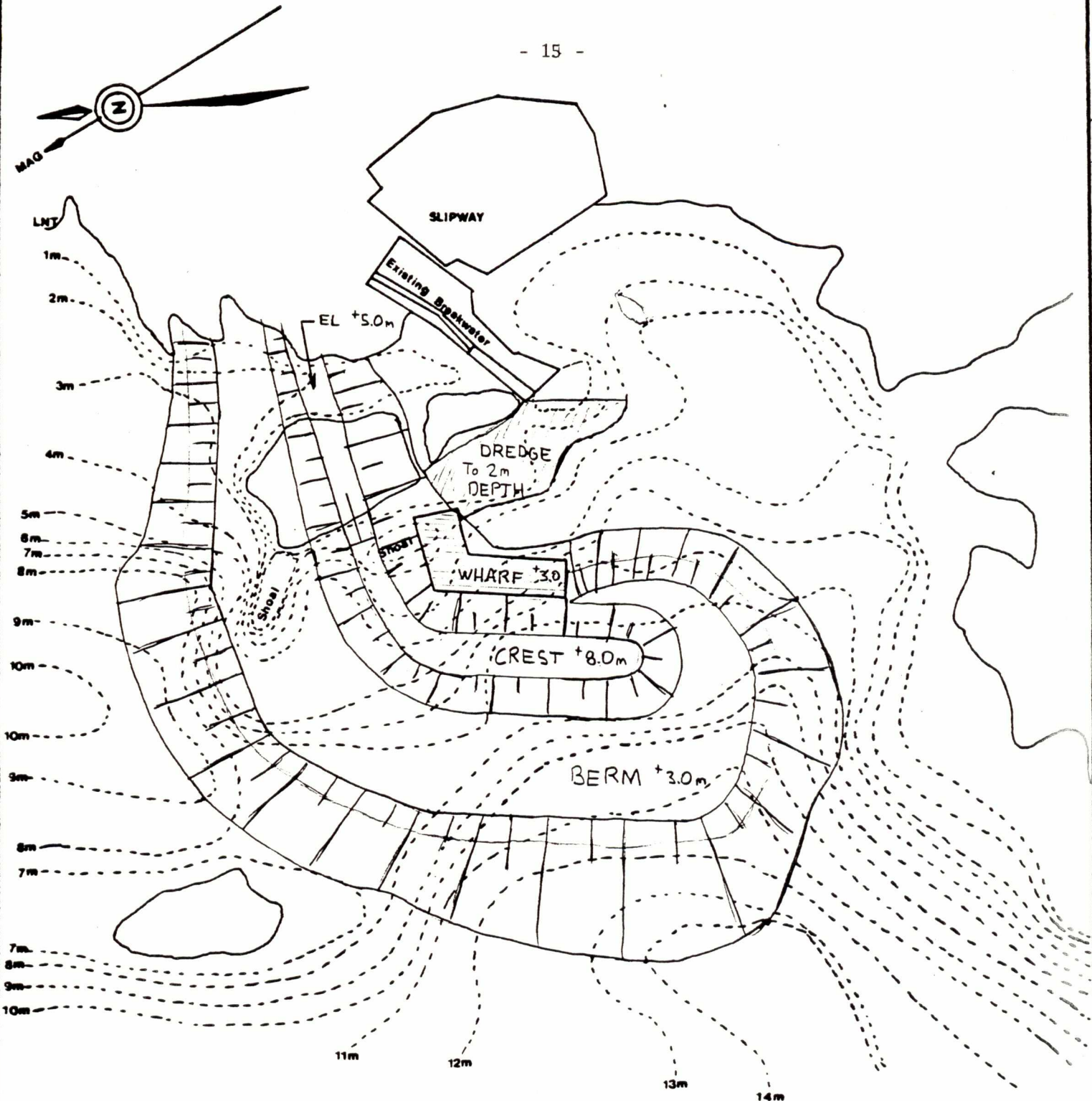


HYDRAULIC MODEL STUDY OF BAULINE
NATIONAL RESEARCH CENTRE IN OTTAWA

The design process was more lengthy than usual because of complications arising when it was found an island outside the harbour concentrated wave energy on the breakwater during storm conditions, leading to catastrophic failure of the structure. The failures, while demonstrating the value of the model, caused considerable delays in finalizing the design. The design process took about six months to complete and the final choice was a berm breakwater, the second to be built in Newfoundland.

Only when these steps had been taken did the final design of the breakwater get underway. Small Craft Harbours Branch staff, in conjunction with staff from the Dept. of Public Works and outside consultants, prepared construction plans and specifications for the proposed breakwater. The Branch then started seeking an allocation of the required funding for the Bauline project. Funding in the amount of \$2.2 million dollars was allocated over a 3-year period beginning in fiscal year 1987/88.

Small Craft Harbours Branch, in conjunction with the Department of Public Works, tendered the project and supervised the work under contract. The contract of the berm breakwater was awarded to Modern Paving and construction started on August 8th, 1988. The breakwater is approximately 70% completed and it is planned to be finished by June 5th, 1989. Page 15 illustrates the final breakwater layout design, while Page 16 provides photographs of the breakwater construction process.



BREAKWATER DESIGN
BAULINE



BAULINE
BREAKWATER CONSTRUCTION



BAULINE
BREAKWATER CONSTRUCTION

5.0 HARBOUR MAINTENANCE AND DEVELOPMENT

Funds provided under various programs are used to maintain and upgrade facilities and services as required to meet the Guidelines of Accommodations. The programs are prepared by Small Craft Harbours Branch and implemented through Public Works Canada, under an interdepartmental agreement. Public Works prepares contracts and specifications, lands acquisitions and supervises the actual construction under contract.

Funding available in the 1987-88 program was \$10.7 million dollars. A summary of expenditures by program for 1987-88 is:

| | |
|--------------------------------|------------------|
| Regular Program | \$ 8,439,200 |
| Harbour Revitalization Program | <u>2,281,500</u> |
| | \$10,720,700 |
| | ===== |

5.1 Regular Program Projects

Fifteen projects were carried over from the previous year and thirty-nine new projects started. All projects proceeded without any unusual problems and were completed in 1987/88 with the exception of: breakwater repairs at Grand Bank; wharf repairs at Old Perlican, Quirpon, Trepassey, and Trinity East; skidway/slipway repairs at St. Shott's; wharf reconstruction at Admirals Beach, St. Lunaire; breakwater extension at Bonavista; skidway/slipway construction at Capelin Cove; a coastal engineering study at Branch; wharf construction at Fogo; and

basin dredging at Marysvale. Appendix 6 gives a breakdown of all regular program projects by location.

One hundred and twenty six minor operations and maintenance projects were carried out by the Branch's staff with a total expenditure of \$489,900. Appendix 7 gives a detailed description of all minor O&M projects for 1987/88.

5.2 Harbour Revitalization Program

The Harbour Revitalization Program was approved in 1987 for implementation over three fiscal years, with a total projected expenditure of \$24,495,000 in the Newfoundland Region. The Canada-wide program is a major new measure aimed at improving both the physical condition and the quality of management of small craft harbours which are operated by the federal government and used by commercial fishing vessels and recreational crafts throughout the country. The primary goals are maximum safety for fishermen and recreational boaters and maximum protection for vessels.

During the 1987/88 fiscal year, thirty-seven projects were initiated under the Harbour Revitalization Program with a total expenditure of \$2,281,500.

5.3 Assistance to Job Creation Projects

Under the 1987/88 Job Creation Programs, Small Craft Harbours Branch

assisted with nineteen projects. Financial assistance varied up to \$35,000 per project. All projects were completed by March 31, 1988 for a total expenditure of \$225,800. Appendix 8 gives a more detailed description of each Job Creation project.

5.4 Dredging - Using Public Works Canada Plant 401

Under this arrangement, two dredging projects were undertaken and completed, one at Arnold's Cove and the other at Lawn. The following table gives a breakdown of materials and cost:

**TABLE 5.
Dredging Projects Utilizing DPW Plants**

| <u>Location</u> | <u>Type of Material</u> | <u>Volume</u> | <u>Total Cost</u> |
|-------------------------------------|------------------------------|-------------------------|--------------------------------|
| <u>Convoy #401</u> Arnold's Cove | Class "B" Sand and Gravel | 24,537 CPM | 547,205.11 |
| Lawn | Class "B" Sand and Gravel | 18,390 CPM 3,436 CPM | 474,702.00 72,498.00 |
| | | | <u>547,200.00</u> |
| | | Total: | <u>\$1,094,405.11</u> ===== |

5.5 Advance Planning

Aerial photography and community mapping were not conducted during this fiscal year. Hydrographic surveys were conducted at 17 locations and wharf surveys at 17 locations. Pre-designs were completed for 15 locations. Also, a special study on wave climate was conducted at Bonavista. Appendix 9 provides a list of locations and various types of advance planning used in 1987/88.

5.6 Harbour Condition Surveys:

Ninety-one Class A and B scheduled harbours have been surveyed, assessed and information added to the computer inventory module. A further 244 Class C scheduled harbour surveys have been started. All Class "D" scheduled harbours will be reviewed in 1989 to either: (1) retain jurisdiction, ie upgrade to Class "C", or (2) proceed with disposal, ie remain Class "D".

6.0 HARBOUR OPERATIONS

The Harbour Operations Section is responsible for the management of the harbour facilities and provision of property services responsive to the Branch's present and future requirements.

6.1 Leases, Licenses, Revenue

The Branch is presently administering 374 leases and licences whereby permission has been given to private companies or individuals to use exclusively certain property administered by the Department.

The revenue derived from leases, licences as well as from berthage fees is small, but steadily increasing. The amount collected this year is a 34% increase over the amount collected last year. Table 6 gives a breakdown of revenues collected in 1987/88.

TABLE 6.
Revenues 1987/88

| | <u>Amount</u> |
|----------|------------------|
| Wharfage | \$23,452 |
| Berthage | 46,261 |
| Licences | 33,832 |
| Leases | 80,661 |
| Other | 6,303 |
| Total | <u>\$190,509</u> |

6.2 Property Acquisition

Property acquisition is an on-going program and this year acquisitions are underway at 67 locations on the Island and in Labrador. Appendix 10

details all locations and cost expended per acquisition as of March 31, 1988.

6.3 Property Disposal

During the past year, no disposal actions were undertaken.

6.4 Fire Protection

Complete and modified fire fighting packages have been placed at the disposal of eleven fire departments within the Newfoundland Region. This equipment is to be used to assist fire departments, if a fire should take place at wharves or other facilities administered by the Department. The locations where fire fighting packages are available are: Bonavista, Old Perlican, Arnold's Cove, Grand Bank, La Scie, Twillingate, Harbour Grace, Trepassey, Admiral's Beach, Fogo and St. Brides.

7.0 BUDGET SUMMARY

Funding available in the 1987/88 program was \$10.7 million dollars. A summary of expenditures is as follows:

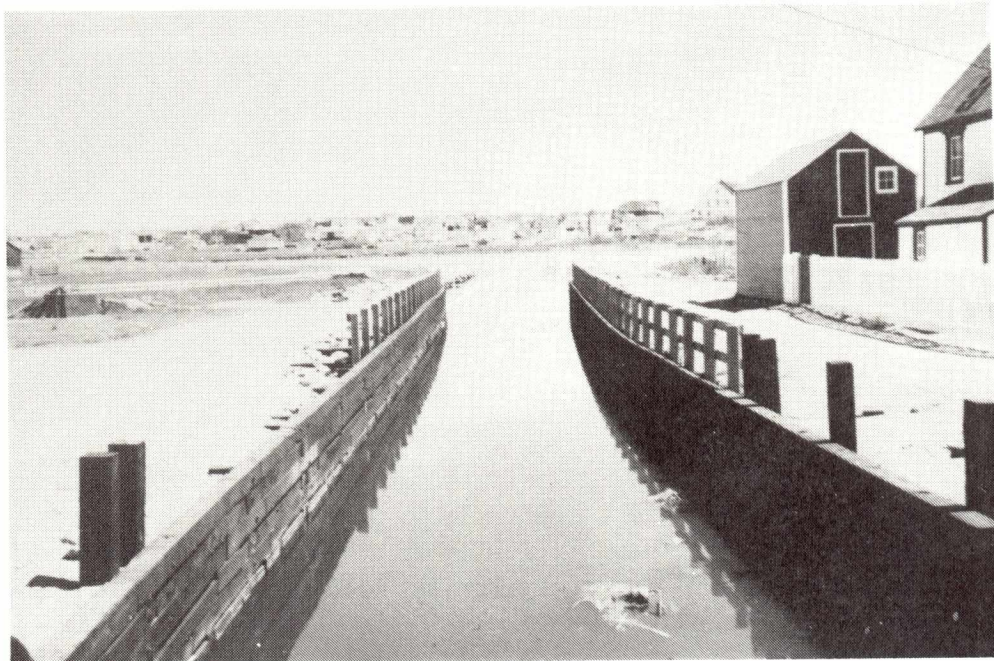
TABLE 7.
Budget Utilization 1987/88

| | <u>Committed to</u> <u>March 31/88</u> (\$000) | <u>Expend. to</u> <u>March 31/88</u> (\$000) |
|---------------------------------------|--|--|
| Salaries - Staff | 452.9 | 452.9 |
| <u>Harbour Maintenance</u> | | |
| Goods and Services | 120.5 | 120.5 |
| Advance Planning | 333.0 | 333.0 |
| Assistance to joint SCH/C.W. projects | 481.9 | 481.9 |
| Inshore Fish Handling | 150.0 | 150.0 |
| Program Projects | 5320.6 | 5320.6 |
| Dredging Utilization DPW Plants | | |
| - Arnold's Cove | 563.4 | 563.4 |
| - Lawn | 547.2 | 547.2 |
| Sub-total: | <u>7969.5</u> | <u>7969.5</u> |
| <u>Harbour Operations</u> | | |
| Goods and Services | 25.0 | 25.0 |
| Property Acquisition | 226.6 | 226.6 |
| Harbour Operations | 130.0 | 130.0 |
| Sub-total: | <u>381.6</u> | <u>381.6</u> |
| REGULAR PROGRAM TOTAL: | 8351.1 | 8351.1 |
| <u>Harbour Revitalization Program</u> | | |
| - A-Base | 2007.1 | 2007.1 |
| - Initiative | 274.4 | 274.4 |
| Sub-total: | <u>2281.5</u> | <u>2281.5</u> |
| <u>Salaries - Students</u> | 88.1 | 88.1 |
| TOTAL: | <u>\$10,720.7</u> ===== | <u>\$10,720.7</u> ===== |

A P P E N D I X 1



BONAVISTA
BEFORE CANAL WALLS
(CANADA WORKS)



BONAVISTA
AFTER CANAL WALLS
(CANADA WORKS)



CENTREVILLE
WHARF REPAIRS



CENTREVILLE
WHARF REPAIRS



BLACK TICKLE
NEW WHARF



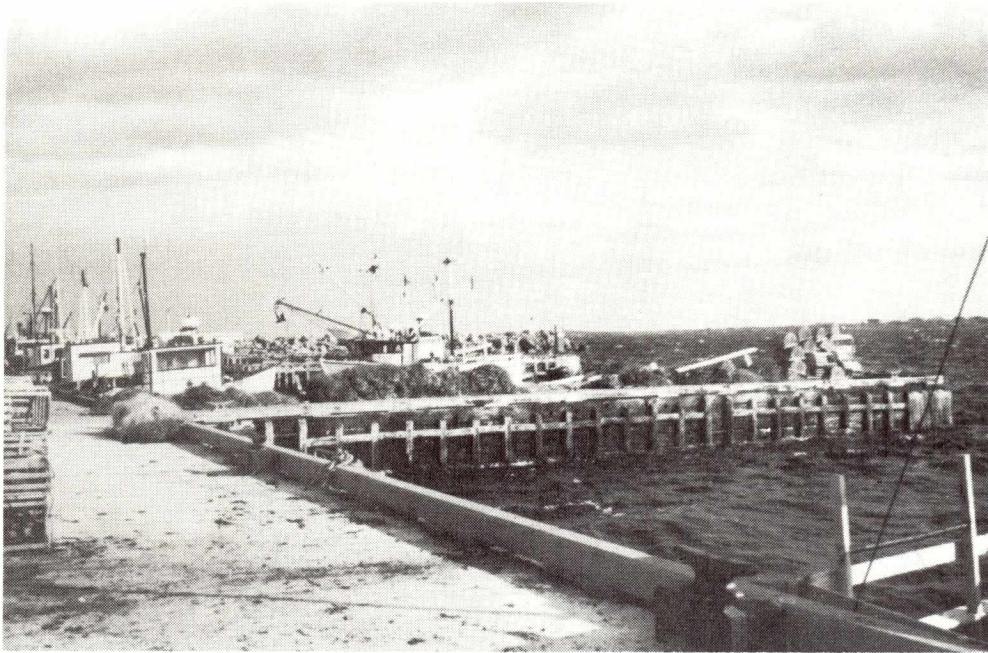
BLACK TICKLE
NEW WHARF



ARNOLD'S COVE
WHARF CONSTRUCTION



ARNOLD'S COVE
WHARF CONSTRUCTION



MUSGRAVE HARBOUR
WHARF REPAIRS



MUSGRAVE HARBOUR
WHARF REPAIRS



MAKKOVIK
NEW WHARF



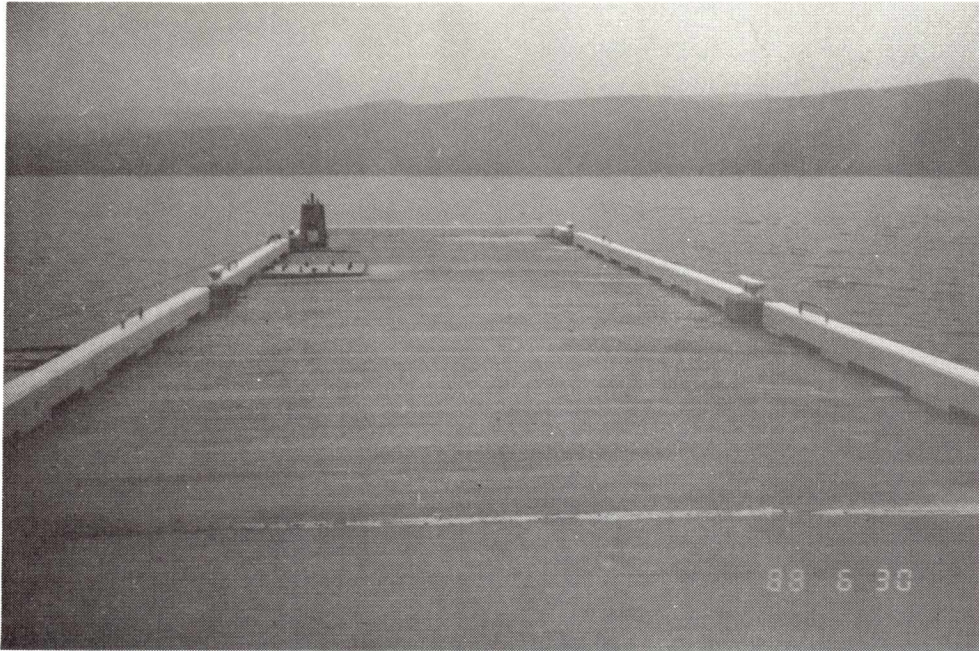
MAKKOVIK
NEW WHARF



LOWER ISLAND COVE
SLIPWAY REPAIR



LOWER ISLAND COVE
SLIPWAY REPAIR



PRINCETON
WHARF RECONSTRUCTION



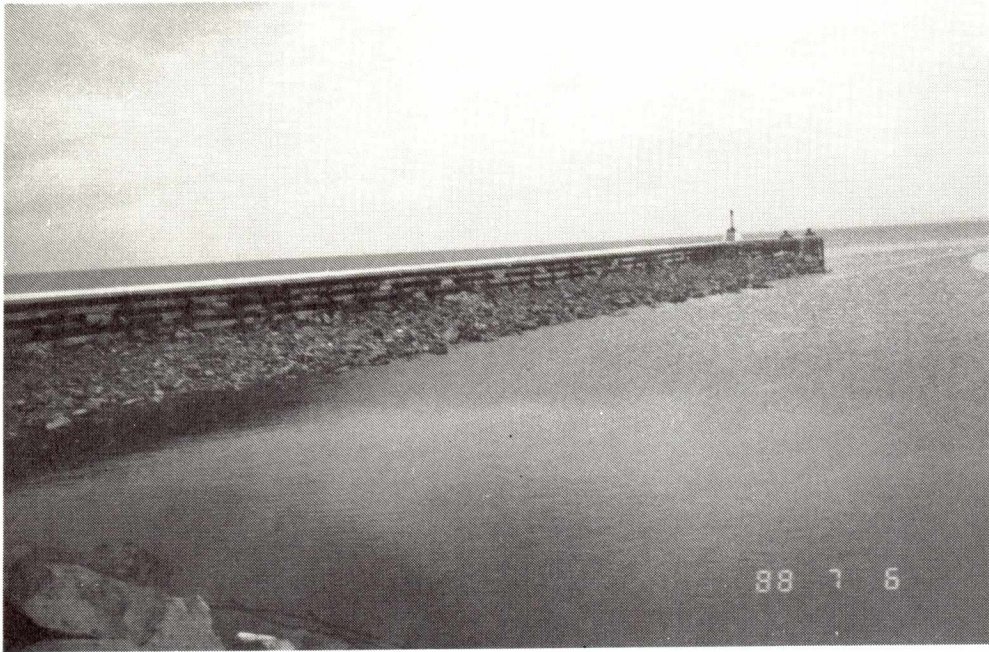
PRINCETON
WHARF RECONSTRUCTION



LUMSDEN SOUTH
NEW BREAKWATER
(LOOKING IN)



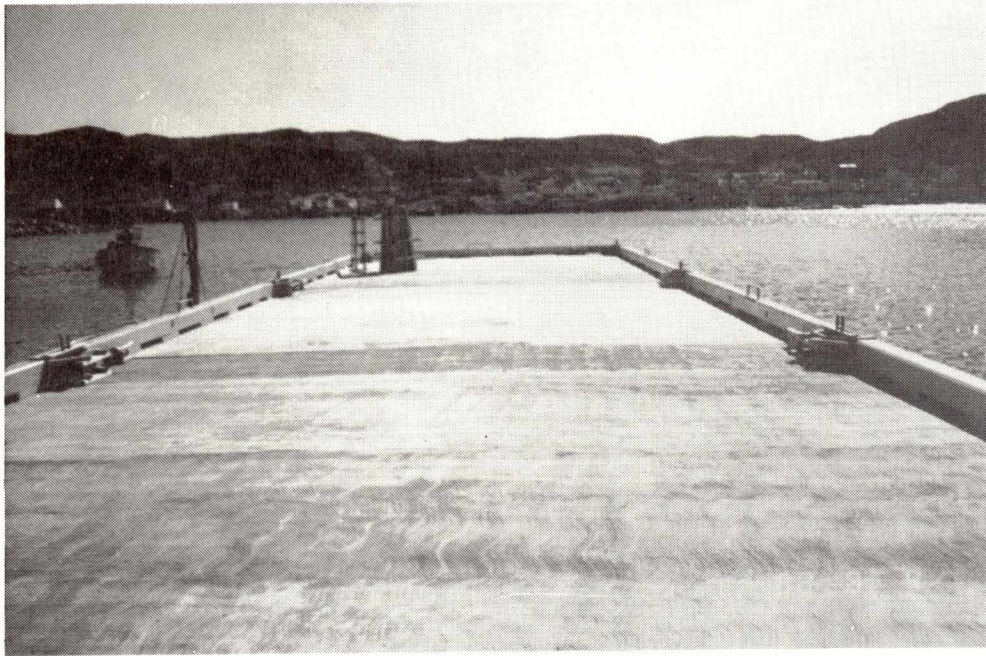
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(LOOKING OUT)



GRAND BANK
BREAKWATER REPAIRS



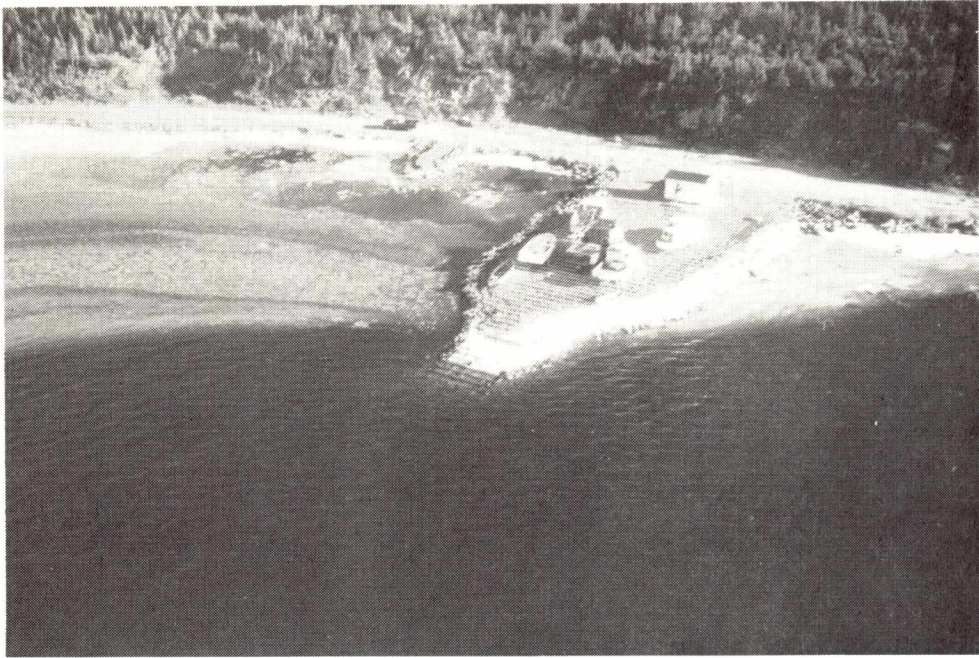
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BREAKWATER REPAIRS



FOGO
NEW WHARF



FOGO
NEW WHARF



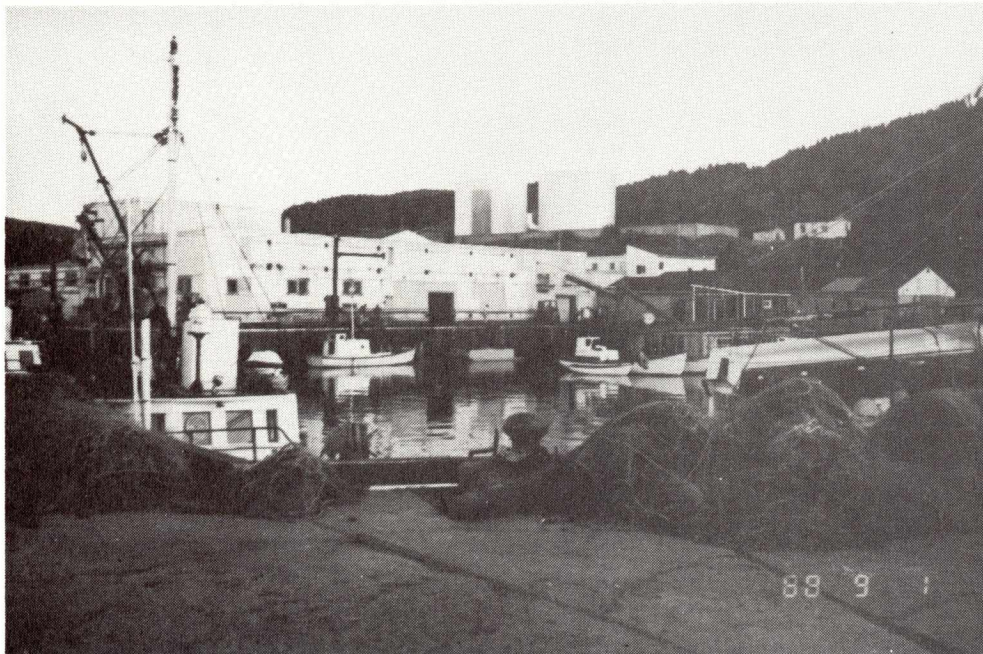
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NEW SLIPWAY



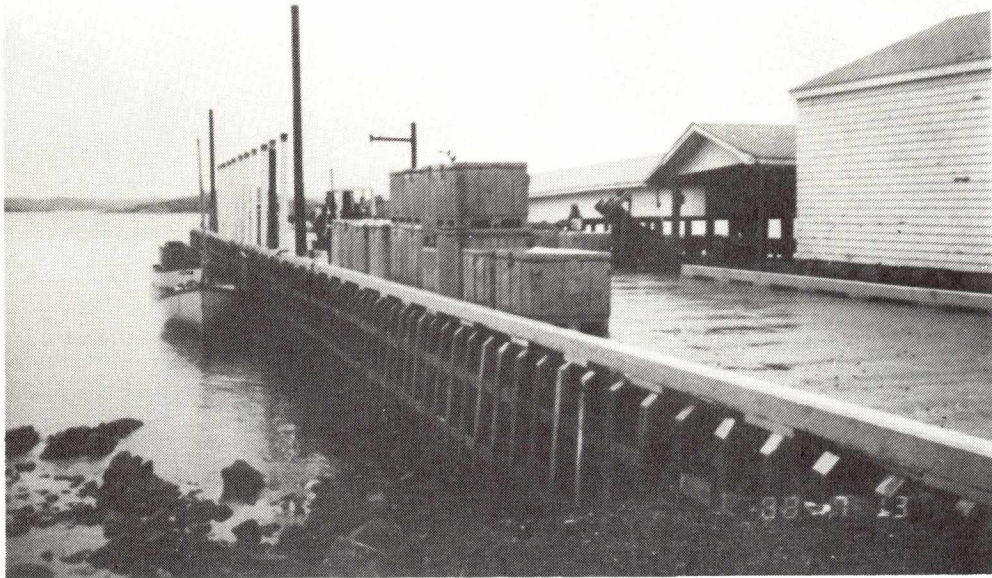
SMOKEY
NEW WHARF



LA SCIE
BREAKWATER CONSTRUCTION



LA SCIE
EXISTING FACILITY



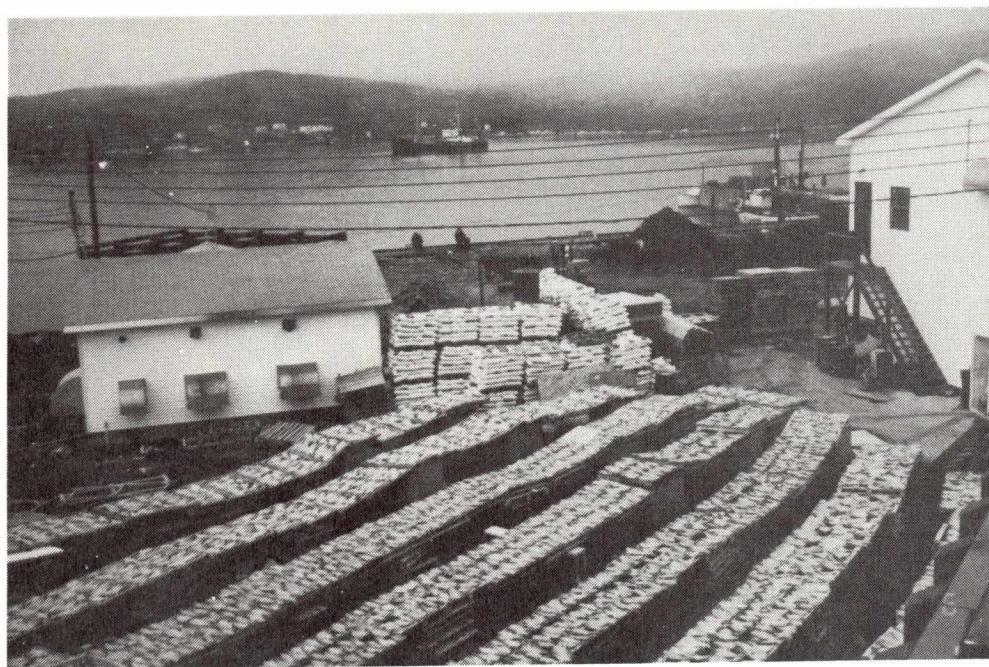
ST. LUNAIRE
WHARF RECONSTRUCTION



ST. LUNAIRE
WHARF RECONSTRUCTION



PUNCHBOWL
MARGINAL WHARF CONSTRUCTION



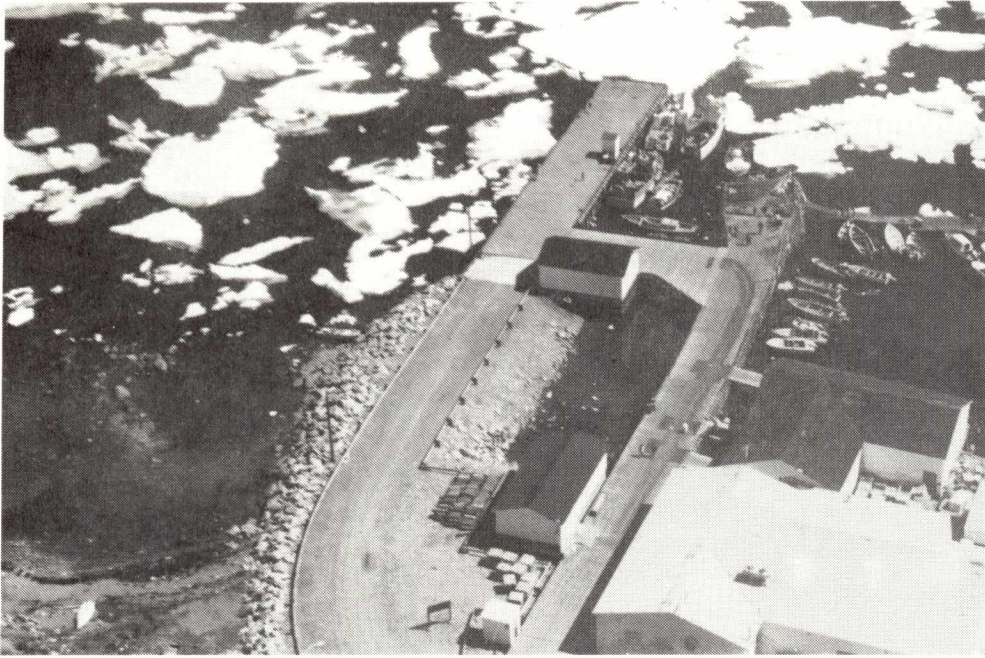
PUNCHBOWL
MARGINAL WHARF CONSTRUCTION



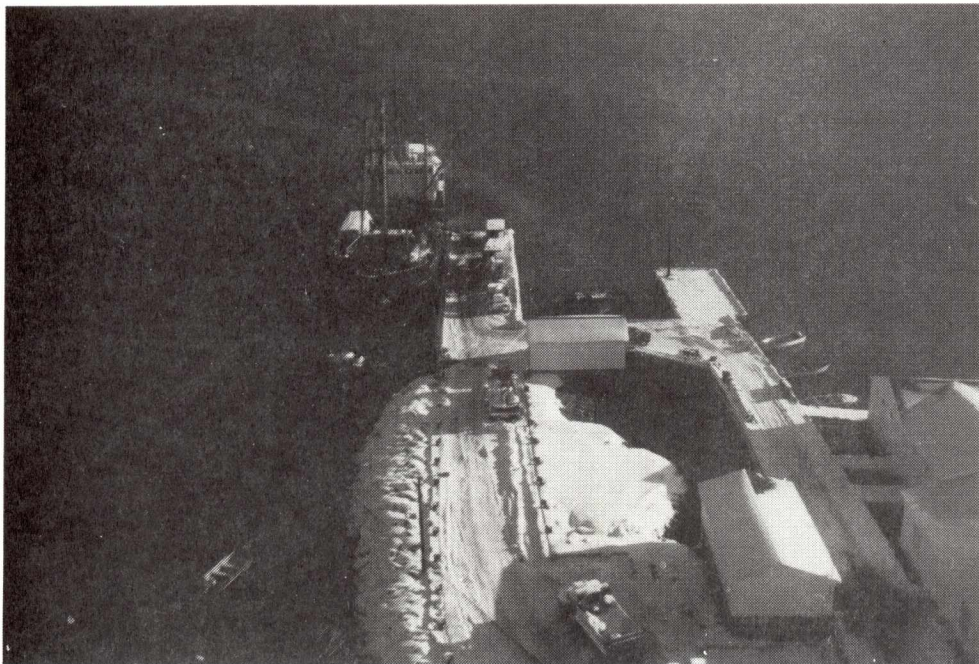
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BREAKWATER REPAIRS



ST. BRIDES
BREAKWATER REPAIRS



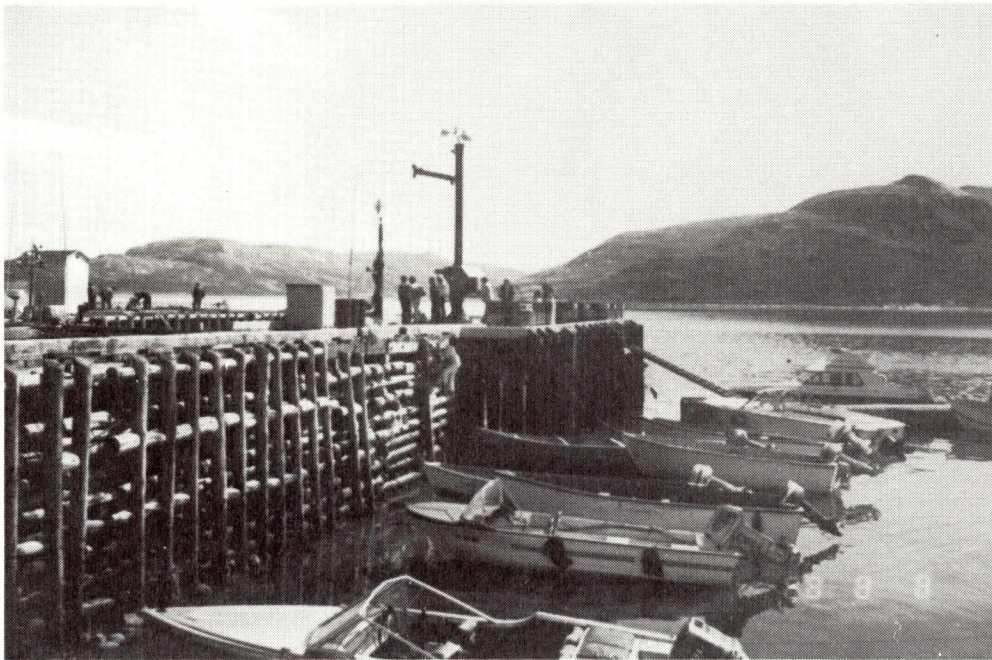
NAIN
BEFORE WHARF RECONSTRUCTION



NAIN
AFTER WHARF RECONSTRUCTION



NAIN
BEFORE WHARF RECONSTRUCTION



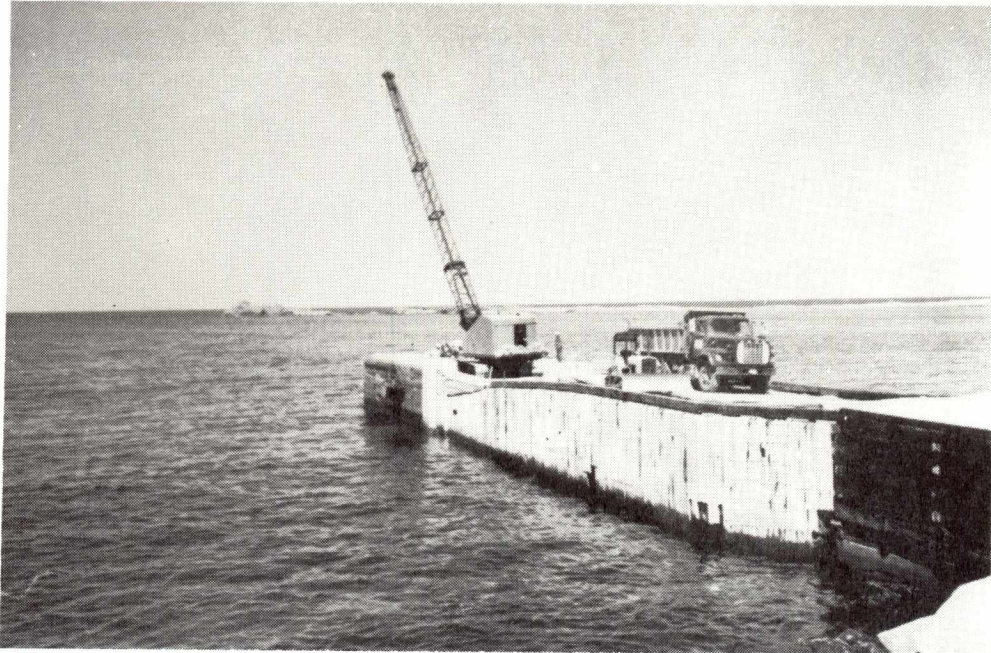
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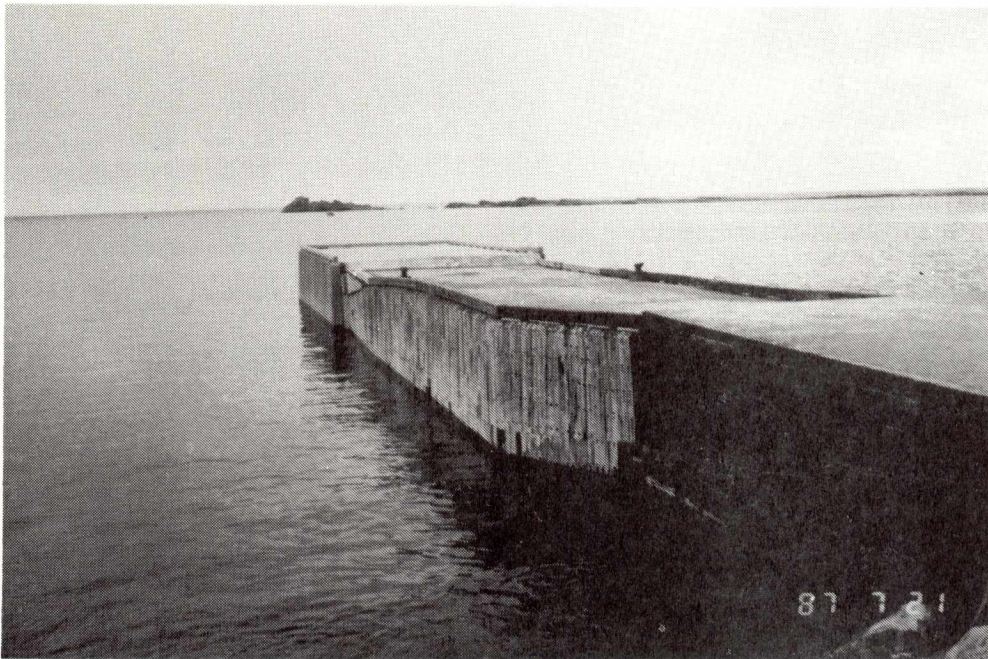
RIVERHEAD, S.M.B.
WHARF REPAIRS



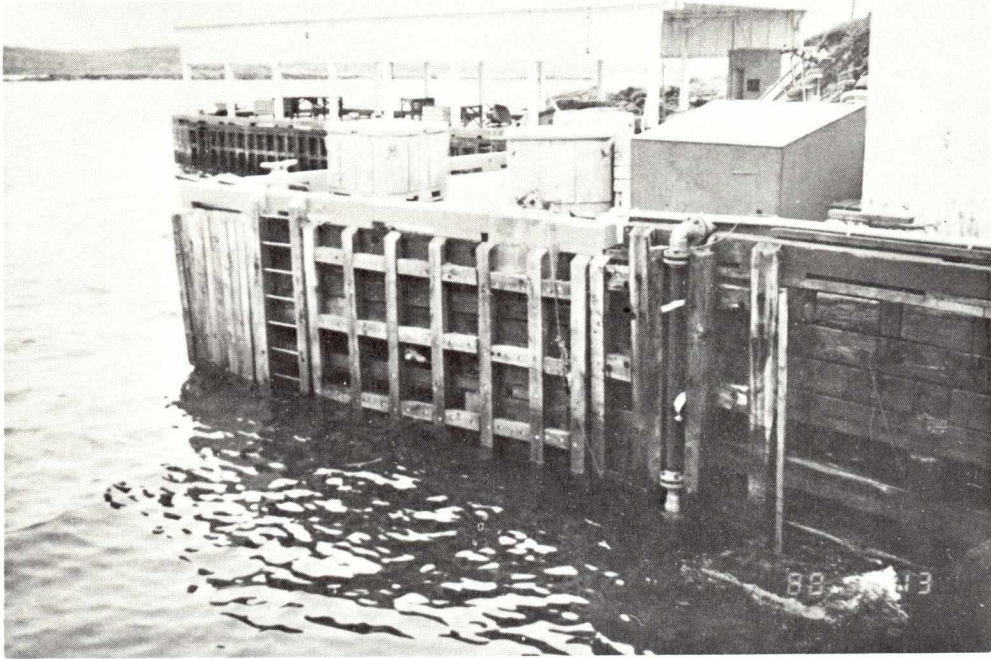
RIVERHEAD, S.M.B.
WHARF REPAIRS



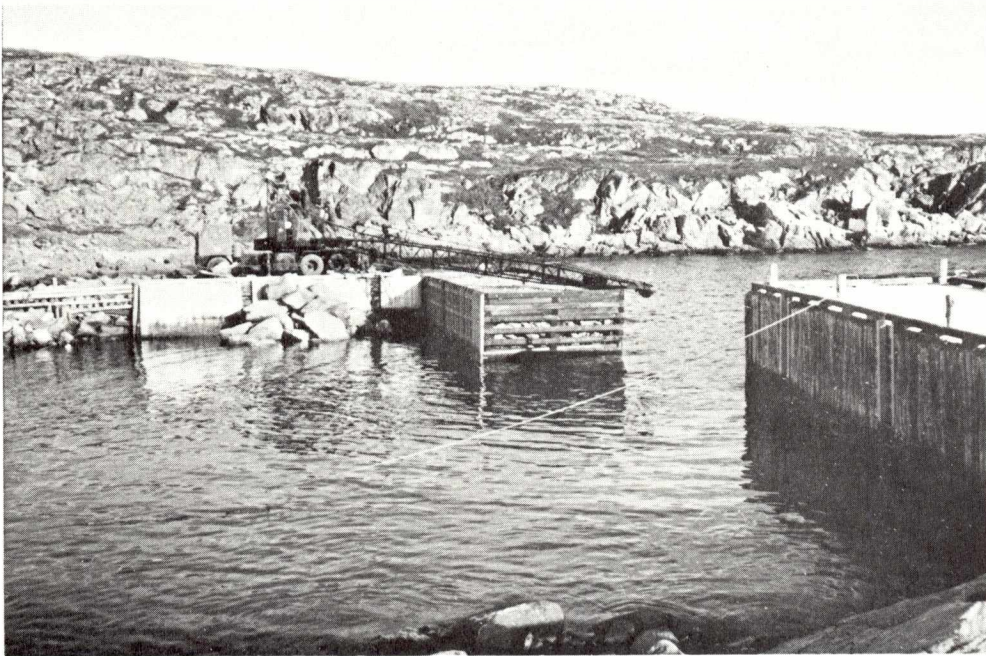
BONAVISTA
BREAKWATER EXTENSION
UNDER CONSTRUCTION



BONAVISTA
BREAKWATER EXTENSION
COMPLETED



QUIRPON
WHARF REPAIRS



ST. CAROLS
BREAKWATER REPAIRS

A P P E N D I X 2

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|-----------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 2 | Adams Cove | NFLD | SCX | F | D | 1 | B-T-C | |
| 3 | Admirals Beach | NFLD | SCH | F | B | 801 | S J W | 452 |
| 4 | Admirals Cove (Cape Broyle) | NFLD | SCH | F | D | 802 | S J W | 14 |
| 5 | Allan's Island | NFLD | SCX | F | D | 151 | B-SG | |
| 7 | Anderson's Cove | NFLD | SCX | F | D | 152 | B-SG | |
| 8 | Angels Cove | NFLD | SCX | F | D | 868 | S J W | |
| 9 | Aquaforte | NFLD | SCH | F | C | 803 | S J W | 187 |
| 10 | Argentia - Boat Pool | NFLD | SCH | F | C | 865 | S J W | |
| 11 | Arnold's Cove | NFLD | SCH | F | A | 804 | S J W | 1168 |
| 12 | Aspen Cove | NFLD | SCH | F | C | 301 | G-T | 163 |
| 13 | Avondale | NFLD | SCH | F | D | 726 | S J E | 53 |
| 735 | Bacon Cove | NFLD | SCH | F | D | 765 | S J E | 19 |
| 14 | Baine Harbour | NFLD | SCH | F | C | 153 | B-SG | 221 |
| 17 | Bar Haven | NFLD | SCX | F | D | 156 | B-SG | 24 |
| 18 | Bareneed | NFLD | SCH | F | C | 3 | B-T-C | 128 |
| 20 | Barr'd Island | NFLD | SCH | F | C | 302 | G-T | 63 |
| 23 | Battle Harbour | NFLD | SCH | F | C | 452 | GFWBL | 117 |
| 24 | Bauline | NFLD | SCH | F | C | 727 | S J E | 196 |
| 25 | Bauline East | NFLD | SCH | F | C | 805 | S J W | 17 |
| 26 | Bay Bulls | NFLD | SCH | F | B | 806 | S J W | 512 |
| 28 | Bay de Verde | NFLD | SCH | F | B | 4 | B-T-C | 764 |
| 29 | Bay du Nord | NFLD | SCX | F | D | 154 | B-SG | |
| 30 | Bay L'Argent | NFLD | SCH | F | C | 253 | B-SG | 259 |
| 31 | Bay Roberts (Crane's Brook) | NFLD | SCH | F | B | 141 | B-T-C | 735 |
| 34 | Beaumont | NFLD | SCH | F | B | 303 | G-T | 480 |
| 35 | Bell Island (The Beach) | NFLD | SCH | F | C | 729 | S J E | 182 |
| 574 | Belleoram-Fishermen's Wharf | NFLD | SCH | F | C | 259 | B-SG | 301 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

...2

| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|-----------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 38 | Bellevue | NFLD | SCH | F | C | 5 | B-T-C | 201 |
| 41 | Birchy Bay | NFLD | SCH | F | C | 304 | G-T | 128 |
| 42 | Birchy Cove | NFLD | SCX | F | D | 6 | B-T-C | |
| 44 | Biscay Bay | NFLD | SCH | F | D | 807 | S J W | |
| 48 | Black Island | NFLD | SCH | F | D | 305 | G-T | |
| 609 | Black Tickle | NFLD | SCH | F | B | 455 | GFWBL | 780 |
| 49 | Blackhead | NFLD | SCH | F | C | 8 | B-T-C | 45 |
| 50 | Blow Me Down | NFLD | SCH | F | D | 9 | B-T-C | 4 |
| 53 | Boat Harbour | NFLD | SCH | F | C | 157 | B-SG | 122 |
| 54 | Bonavista | NFLD | SCH | F | A | 10 | B-T-C | 1047 |
| 55 | Boxey | NFLD | SCH | F | C | 158 | B-SG | 101 |
| 56 | Boyd's Cove | NFLD | SCH | F | D | 438 | G-T | 81 |
| 57 | Bragg's Island | NFLD | SCH | F | C | 429 | G-T | 243 |
| 58 | Branch | NFLD | SCH | F | C | 809 | S J W | 210 |
| 59 | Bridgeport | NFLD | SCH | F | B | 306 | G-T | 477 |
| 61 | Brighton | NFLD | SCH | F | C | 307 | G-T | 259 |
| 62 | Brigus | NFLD | SCH | F | C | 11 | B-T-C | 253 |
| 63 | Brigus South | NFLD | SCH | F | C | 810 | S J W | 102 |
| 64 | Bristol's Hope | NFLD | SCH | F | D | 12 | B-T-C | 46 |
| 65 | Britannia | NFLD | SCH | F | C | 13 | B-T-C | 115 |
| 66 | British Harbour | NFLD | SCH | F | D | 14 | B-T-C | |
| 67 | Broad Cove | NFLD | SCX | F | D | 15 | B-T-C | |
| 70 | Brownsdale | NFLD | SCH | F | C | 16 | B-T-C | 40 |
| 71 | Bryant's Cove | NFLD | SCH | F | C | 17 | B-T-C | 115 |
| 73 | Burgeo | NFLD | SCH | F | A | 159 | B-SG | 1097 |
| 74 | Burgoynes Cove | NFLD | SCH | F | C | 18 | B-T-C | 56 |
| 75 | Burin | NFLD | SCH | F | B | 274 | B-SG | 473 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|--------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 76 | Burlington | NFLD | SCX | F | D | 457 | GFWBL | |
| 77 | Burnside | NFLD | SCH | F | C | 309 | G-T | 172 |
| 78 | Burnt Cove | NFLD | SCH | F | D | 811 | S J W | 33 |
| 81 | Burnt Island Tickle | NFLD | SCX | F | D | 444 | G-T | |
| 82 | Burnt Point | NFLD | SCH | F | C | 20 | B-T-C | 50 |
| 85 | Calvert | NFLD | SCH | F | C | 812 | S J W | 232 |
| 87 | Campbellton | NFLD | SCH | F | C | 311 | G-T | 232 |
| 88 | Cannings Cove | NFLD | SCH | F | B | 23 | B-T-C | 385 |
| 89 | Cape Broyle | NFLD | SCH | F | B | 813 | S J W | 385 |
| 90 | Cape Freels North | NFLD | SCH | F | C | 313 | G-T | 185 |
| 91 | Cape Island | NFLD | SCX | F | D | 314 | G-T | |
| 96 | Caplin Cove (Conception Bay) | NFLD | SCH | F | D | 25 | B-T-C | 66 |
| 695 | Caplin Cove (Trinity Bay) | NFLD | SCH | F | C | 918 | B-T-C | 23 |
| 98 | Carbonear | NFLD | SCH | F | B | 149 | B-T-C | 775 |
| 99 | Card's Harbour | NFLD | SCH | F | C | 315 | G-T | 223 |
| 739 | Cartwright (Fishermen's Wharf) | NFLD | SCH | F | B | 560 | GFWBL | 312 |
| 101 | Catalina | NFLD | SCH | F | C | 147 | B-T-C | 303 |
| 102 | Cavendish | NFLD | SCH | F | C | 26 | B-T-C | 105 |
| 103 | Centreville | NFLD | SCH | F | C | 446 | G-T | 161 |
| 736 | Champney's | NFLD | SCH | F | D | 911 | B-T-C | 40 |
| 106 | Champney's West | NFLD | SCH | F | C | 29 | B-T-C | 93 |
| 107 | Chance Cove | NFLD | SCH | F | C | 31 | B-T-C | 229 |
| 108 | Change Islands | NFLD | SCH | F | B | 316 | G-T | 776 |
| 111 | Chapels Cove | NFLD | SCX | F | D | 730 | S J E | |
| 112 | Charleston | NFLD | SCH | F | C | 32 | B-T-C | 156 |
| 114 | Clarke's Beach | NFLD | SCH | F | D | 33 | B-T-C | 36 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATTON | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|--------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 113 | Clarke's Head | NFLD | SCH | F | D | 320 | G-T | |
| 116 | Clifton | NFLD | SCH | F | D | 34 | B-T-C | |
| 117 | Coachman's Cove | NFLD | SCH | F | C | 462 | GFWBL | 170 |
| 119 | Coley's Point | NFLD | SCH | F | C | 35 | B-T-C | 130 |
| 121 | Colliers | NFLD | SCH | F | C | 731 | S J E | 96 |
| 122 | Comfort Cove | NFLD | SCH | F | B | 322 | G-T | 492 |
| 123 | Conception Harbour | NFLD | SCH | F | C | 732 | S J E | 142 |
| 124 | Conche | NFLD | SCH | F | A | 460 | GFWBL | 916 |
| 125 | Conne River | NFLD | SCH | F | D | 166 | B-SG | 6 |
| 127 | Coomb's Cove | NFLD | SCH | F | C | 167 | B-SG | 156 |
| 129 | Cottle's Island | NFLD | SCH | F | B | 323 | G-T | 657 |
| 130 | Cottrell's Cove | NFLD | SCH | F | B | 439 | G-T | 664 |
| 132 | Cowards Island | NFLD | SCX | F | D | 447 | G-T | |
| 135 | Crow Head | NFLD | SCH | F | C | 324 | G-T | 49 |
| 136 | Cupids | NFLD | SCH | F | C | 38 | B-T-C | 175 |
| 137 | Cuslett | NFLD | SCH | F | D | 815 | S J W | |
| 141 | Dark Hole | NFLD | SCH | F | D | 325 | G-T | |
| 142 | Davidsville (Mann Point) | NFLD | SCH | F | D | 326 | G-T | 43 |
| 143 | Davis Cove | NFLD | SCH | F | C | 168 | B-SG | 74 |
| 144 | Deadman's Bay | NFLD | SCH | F | C | 327 | G-T | 134 |
| 145 | Deep Bay | NFLD | SCH | F | C | 328 | G-T | 271 |
| 146 | Deer Harbour | NFLD | SCH | F | D | 39 | B-T-C | |
| 147 | Deer Island | NFLD | SCX | F | D | 329 | G-T | |
| 149 | Dildo | NFLD | SCH | F | B | 137 | B-T-C | 576 |
| 150 | Dildo South | NFLD | SCH | F | C | 40 | B-T-C | 200 |
| 152 | Dover-Butchers Cove/Wellington | NFLD | SCH | F | C | 332 | G-T | 165 |
| 153 | Duck Island | NFLD | SCX | F | D | 333 | G-T | |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|--------------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 154 | Dunfield | NFLD | SCH | F | D | 41 | B-T-C | |
| 155 | Duntara | NFLD | SCH | F | C | 42 | B-T-C | 118 |
| 160 | Elliott's Cove | NFLD | SCH | F | D | 43 | B-T-C | |
| 161 | Elliston | NFLD | SCH | F | C | 44 | B-T-C | 86 |
| 162 | Embree | NFLD | SCH | F | C | 335 | G-T | 287 |
| 579 | Englee | NFLD | SCH | F | A | 465 | GFWBL | 1050 |
| 163 | English Harbour | NFLD | SCH | F | D | 45 | B-T-C | 24 |
| 164 | English Harbour West (Evans Co) | NFLD | SCH | F | C | 257 | B-SG | 185 |
| 166 | Exploits Island | NFLD | SCH | F | C | 336 | G-T | 119 |
| 168 | Fair Haven | NFLD | SCH | F | B | 817 | S J W | 278 |
| 167 | Fair Island | NFLD | SCH | F | C | 337 | G-T | 250 |
| 169 | Fermeuse | NFLD | SCH | F | A | 818 | S J W | 717 |
| 170 | Ferryland | NFLD | SCH | F | C | 819 | S J W | 264 |
| 172 | Flat Island | NFLD | SCX | F | D | 435 | G-T | |
| 173 | Flat Islands (Port Elizabeth) | NFLD | SCH | F | D | 173 | B-SG | |
| 174 | Flat Rock Tickle | NFLD | SCH | F | C | 445 | G-T | 115 |
| 175 | Flatrock | NFLD | SCH | F | C | 766 | S J E | 136 |
| 176 | Fleur De Lys | NFLD | SCH | F | B | 467 | GFWBL | 555 |
| 178 | Fogo-Brkwtr Wharf/Canal Side | NFLD | SCH | F | A | 409 | G-T | 914 |
| 179 | Forest Field | NFLD | SCH | F | D | 820 | S J E | |
| 182 | Fortune-Fishermen's Wharf/Fish Plant | NFLD | SCH | F | A | 169 | B-SG | 965 |
| 183 | Fortune Harbour | NFLD | SCH | F | C | 440 | G-T | 182 |
| 184 | Fosters Point | NFLD | SCH | F | D | 46 | B-T-C | |
| 185 | Fox Cove | NFLD | SCX | F | D | 288 | B-SG | |
| 186 | Fox Harbour | NFLD | SCH | F | C | 821 | S J W | 125 |
| 636 | Fox Harbour (St. Lewis) | NFLD | SCH | F | A | 527 | GFWBL | 917 |
| 189 | Foxtrap | NFLD | SCH | F | A | 734 | S J E | 950 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

...6

| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|----------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 190 | Francois - Slipway | NFLD | SCH | F | C | 171 | B-SG | 268 |
| 191 | Frederickton | NFLD | SCH | F | C | 338 | G-T | 202 |
| 192 | Frenchman's Cove | NFLD | SCH | F | C | 172 | B-SG | 138 |
| 194 | Freshwater | NFLD | SCH | F | C | 48 | B-T-C | 39 |
| 196 | Gambo | NFLD | SCH | F | D | 339 | G-T | |
| 197 | Garden Cove | NFLD | SCH | F | C | 175 | B-SG | 166 |
| 198 | Garnish | NFLD | SCH | F | C | 176 | B-SG | 277 |
| 199 | Gaskiers | NFLD | SCH | F | C | 823 | S J W | 54 |
| 201 | Gaultois - Slipway | NFLD | SCH | F | A | 254 | B-SG | 1332 |
| 202 | Gay Side (Birchy Bay North) | NFLD | SCH | F | D | 340 | G-T | |
| 738 | Georges Cove | NFLD | SCH | F | C | 562 | GFWBL | 357 |
| 203 | Gillesport | NFLD | SCH | F | C | 341 | G-T | 200 |
| 205 | Gillard's Cove | NFLD | SCH | F | D | 342 | G-T | 10 |
| 206 | Glovers Harbour | NFLD | SCH | F | C | 343 | G-T | 195 |
| 207 | Glovertown - Saunders Cove Wharf | NFLD | SCH | F | C | 344 | G-T | 209 |
| 208 | Goose Cove | NFLD | SCH | F | B | 536 | GFWBL | 337 |
| 209 | Gooseberry Cove | NFLD | SCH | F | B | 49 | B-T-C | 368 |
| 210 | Grand Bank | NFLD | SCH | F | A | 177 | B-SG | 1300 |
| 214 | Grand Le Pierre | NFLD | SCH | F | C | 181 | B-SG | 94 |
| 215 | Grates Cove | NFLD | SCH | F | C | 50 | B-T-C | 234 |
| 223 | Green's Harbour | NFLD | SCH | F | C | 51 | B-T-C | 106 |
| 224 | Greens Island | NFLD | SCH | F | D | 345 | G-T | |
| 225 | Greenspond | NFLD | SCH | F | B | 346 | G-T | 565 |
| 226 | Griquet | NFLD | SCH | F | B | 472 | GFWBL | 464 |
| 227 | Gull Island | NFLD | SCH | F | D | 52 | B-T-C | |
| 228 | Hampden | NFLD | SCH | F | C | 471 | GFWBL | 78 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|----------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 229 | Hant's Harbour | NFLD | SCH | F | B | 53 | B-T-C | 397 |
| 230 | Happy Adventure | NFLD | SCH | F | B | 349 | G-T | 465 |
| 231 | Harbour Breton | NFLD | SCH | F | A | 185 | B-SG | 2276 |
| 232 | Harbour Grace | NFLD | SCH | F | A | 54 | B-T-C | 1270 |
| 234 | Harbour Main | NFLD | SCH | F | C | 736 | S J E | 216 |
| 235 | Harbour Mille | NFLD | SCH | F | C | 186 | B-SG | 240 |
| 236 | Harbour Round | NFLD | SCH | F | C | 474 | GFWBL | 149 |
| 237 | Harry's Harbour | NFLD | SCH | F | C | 476 | GFWBL | 242 |
| 238 | Hatchet Cove | NFLD | SCH | F | D | 55 | B-T-C | 5 |
| 240 | Heart's Content | NFLD | SCH | F | B | 56 | B-T-C | 274 |
| 241 | Heart's Delight | NFLD | SCH | F | C | 133 | B-T-C | 76 |
| 242 | Heart's Desire | NFLD | SCH | F | C | 57 | B-T-C | 80 |
| 243 | Hermitage | NFLD | SCH | F | B | 189 | B-SG | 618 |
| 244 | Herring Neck | NFLD | SCH | F | A | 351 | G-T | 1027 |
| 245 | Hibb's Hole | NFLD | SCH | F | D | 58 | B-T-C | 16 |
| 246 | Hickman's Harbour | NFLD | SCH | F | B | 59 | B-T-C | 385 |
| 248 | Hillgrade | NFLD | SCH | F | C | 352 | G-T | 207 |
| 249 | Hodge's Cove | NFLD | SCH | F | C | 60 | B-T-C | 78 |
| 250 | Holyrood | NFLD | SCH | FR | B | 740 | S J E | 442 |
| 251 | Hopeall | NFLD | SCH | F | C | 61 | B-T-C | 63 |
| 252 | Horse Islands | NFLD | SCH | F | D | 478 | GFWBL | |
| 253 | Hunt's Island | NFLD | SCX | F | D | 188 | B-SG | |
| 254 | Indian Burying Place | NFLD | SCH | F | D | 479 | GFWBL | 20 |
| 258 | Island Harbour | NFLD | SCH | F | C | 354 | G-T | 209 |
| 259 | Isle Valen | NFLD | SCH | F | C | 191 | B-SG | 136 |
| 261 | Islington | NFLD | SCH | F | C | 62 | B-T-C | 14 |
| 263 | Jackson's Arm | NFLD | SCH | F | B | 481 | GFWBL | 560 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|--------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 264 | Jackson's Cove | NFLD | SCH | F | C | 482 | GFWBL | 224 |
| 576 | Jamestown | NFLD | SCH | F | C | 148 | B-T-C | 261 |
| 537 | Jenkins Cove | NFLD | SCH | F | C | 402 | G-T | 200 |
| 266 | Jerseyside | NFLD | SCH | F | B | 824 | S J W | 390 |
| 267 | Job's Cove | NFLD | SCH | F | C | 64 | B-T-C | 189 |
| 268 | Joe Batt's Arm | NFLD | SCH | F | A | 355 | G-T | 992 |
| 269 | Keels | NFLD | SCH | F | C | 65 | B-T-C | 118 |
| 271 | King's Cove | NFLD | SCH | F | C | 66 | B-T-C | 93 |
| 272 | King's Point | NFLD | SCH | F | C | 483 | GFWBL | 137 |
| 277 | LaScie | NFLD | SCH | F | A | 547 | GFWBL | 1181 |
| 278 | Ladle Cove | NFLD | SCH | F | C | 356 | G-T | 222 |
| 279 | Lady Cove | NFLD | SCH | F | C | 67 | B-T-C | 18 |
| 280 | Lally Cove | NFLD | SCX | F | D | 197 | B-SG | |
| 281 | Lamaline | NFLD | SCH | F | C | 198 | B-SG | 204 |
| 284 | Lawn | NFLD | SCH | F | B | 200 | B-SG | 322 |
| 285 | Lawrenceton (Laurenceton) | NFLD | SCX | F | D | 357 | G-T | |
| 286 | Lead Cove | NFLD | SCH | F | D | 68 | B-T-C | |
| 287 | Leading Tickles (West) | NFLD | SCH | F | A | 358 | G-T | 1020 |
| 288 | Lewisporte - Fishermen's Wharf | NFLD | SCH | F | D | 441 | G-T | 215 |
| 291 | Little Burnt Bay | NFLD | SCH | F | C | 360 | G-T | 246 |
| 292 | Little Catalina | NFLD | SCH | F | C | 69 | B-T-C | 83 |
| 293 | Little Fogo Islands | NFLD | SCX | F | D | 361 | G-T | |
| 294 | Little Harbour East | NFLD | SCH | F | B | 825 | S J W | 456 |
| 295 | Little Harbour West | NFLD | SCX | F | D | 282 | B-SG | |
| 296 | Little Heart's Ease | NFLD | SCH | F | B | 70 | B-T-C | 412 |
| 298 | Little Paradise | NFLD | SCH | F | C | 202 | B-SG | 144 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|----------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 300 | Little St. Lawrence | NFLD | SCH | F | C | 201 | B-SG | 63 |
| 301 | Logy Bay | NFLD | SCH | F | D | 762 | S J E | |
| 302 | Long Beach | NFLD | SCH | F | C | 72 | B-T-C | 29 |
| 303 | Long Cove | NFLD | SCH | F | C | 138 | B-T-C | 121 |
| 305 | Long Pond/Manuels - Inner Pond/C | NFLD | SCH | R | A | 743 | S J E | 1877 |
| 306 | Lord's Cove | NFLD | SCH | F | C | 203 | B-SG | 266 |
| 308 | Low Point | NFLD | SCH | F | C | 73 | B-T-C | 12 |
| 310 | Lower Island Cove | NFLD | SCH | F | C | 74 | B-T-C | 124 |
| 311 | Lower Lance Cove | NFLD | SCH | F | C | 75 | B-T-C | 212 |
| 312 | Lumsden North | NFLD | SCH | F | C | 362 | G-T | 277 |
| 313 | Lumsden South | NFLD | SCH | F | B | 363 | G-T | 620 |
| 314 | Lushes Bight | NFLD | SCH | F | C | 442 | G-T | 86 |
| 564 | Makkovik | NFLD | SCH | F | A | 490 | GFWBL | 1106 |
| 317 | Mall Bay | NFLD | SCH | F | C | 830 | S J W | 16 |
| 290 | Marystown (Little Bay) | NFLD | SCH | F | C | 249 | B-SG | 163 |
| 322 | Marysvalle | NFLD | SCX | F | D | 756 | S J E | 35 |
| 323 | McCallum - Slipway | NFLD | SCH | F | B | 208 | B-SG | 356 |
| 325 | Melrose | NFLD | SCH | F | D | 77 | B-T-C | 73 |
| 570 | Merasheen | NFLD | SCH | F | C | 258 | B-SG | 88 |
| 326 | Middle Arm (Notre Dame Bay) | NFLD | SCH | F | C | 550 | GFWBL | 185 |
| 327 | Middle Brook | NFLD | SCH | F | D | 364 | G-T | |
| 328 | Miles Cove | NFLD | SCH | F | C | 365 | G-T | 114 |
| 329 | Miller's Passage | NFLD | SCX | F | D | 209 | B-SG | |
| 330 | Milton | NFLD | SCH | F | D | 78 | B-T-C | 29 |
| 331 | Ming's Bight | NFLD | SCH | F | C | 492 | GFWBL | 285 |
| 737 | Monkstown | NFLD | SCH | F | C | 278 | B-SG | 125 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|--------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 333 | Moreton's Harbour | NFLD | SCH | F | C | 366 | G-T | 259 |
| 334 | Mortier | NFLD | SCH | F | D | 210 | B-SG | 53 |
| 335 | Mose Ambrose | NFLD | SCH | F | D | 251 | B-SG | 21 |
| 336 | Mosquito | NFLD | SCX | F | D | 832 | S J W | |
| 337 | Mount Arlington Heights | NFLD | SCH | F | C | 833 | S J W | 110 |
| 338 | Mount Carmel | NFLD | SCX | F | D | 834 | S J W | |
| 339 | Musgrave Harbour | NFLD | SCH | F | A | 367 | G-T | 965 |
| 340 | Musgravetown | NFLD | SCH | F | D | 80 | B-T-C | 62 |
| 585 | Nain - Fishermen's Wharf | NFLD | SCP | F | B | 525 | GFWBL | 521 |
| 343 | New Bonaventure | NFLD | SCH | F | C | 81 | B-T-C | 177 |
| 344 | New Chelsea | NFLD | SCH | F | C | 82 | B-T-C | 83 |
| 345 | New Harbour | NFLD | SCH | F | C | 83 | B-T-C | 123 |
| 346 | New Melbourne | NFLD | SCH | F | D | 85 | B-T-C | 23 |
| 347 | New Perlican | NFLD | SCH | F | C | 86 | B-T-C | 115 |
| 348 | Newmans Cove | NFLD | SCH | F | C | 84 | B-T-C | 84 |
| 349 | Newstead | NFLD | SCH | F | C | 368 | G-T | 171 |
| 350 | Newtown | NFLD | SCH | F | B | 369 | G-T | 472 |
| 351 | Nippers Harbour | NFLD | SCH | F | B | 524 | GFWBL | 521 |
| 353 | Norman's Cove | NFLD | SCH | F | D | 87 | B-T-C | |
| 356 | North Harbour | NFLD | SCH | F | C | 275 | B-SG | 304 |
| 357 | North Harbour | NFLD | SCH | F | C | 835 | S J W | 79 |
| 358 | Northern Bay | NFLD | SCH | F | D | 88 | B-T-C | 27 |
| 359 | O'Donnells | NFLD | SCH | F | C | 836 | S J W | 141 |
| 360 | Ochre Pit Cove | NFLD | SCH | F | C | 89 | B-T-C | 202 |
| 361 | Oderin | NFLD | SCH | F | D | 212 | B-SG | |
| 362 | Offer Wadham Islands | NFLD | SCX | F | D | 371 | G-T | |
| 363 | Old Bonaventure | NFLD | SCH | F | C | 90 | B-T-C | 170 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|--------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 364 | Old Perlican | NFLD | SCH | F | A | 91 | B-T-C | 1333 |
| 365 | Old Shop | NFLD | SCH | F | C | 92 | B-T-C | 71 |
| 366 | Open Hall | NFLD | SCH | F | C | 93 | B-T-C | 111 |
| 367 | Our Harbour | NFLD | SCX | F | D | 289 | B-SG | |
| 369 | Pacquet | NFLD | SCH | F | B | 495 | GFWBL | 503 |
| 370 | Parkers Cove | NFLD | SCH | F | C | 213 | B-SG | 96 |
| 373 | Paul Island | NFLD | SCX | F | D | 373 | G-T | |
| 374 | Peter's River | NFLD | SCH | F | C | 837 | S J W | 128 |
| 376 | Petley | NFLD | SCH | F | C | 94 | B-T-C | 206 |
| 377 | Petty Harbour | NFLD | SCH | F | B | 838 | S J W | 640 |
| 378 | Phillips Head | NFLD | SCH | F | D | 374 | G-T | 24 |
| 380 | Pilley's Island | NFLD | SCX | F | D | 448 | G-T | |
| 383 | Placentia | NFLD | SCH | F | B | 839 | SJW | 467 |
| 384 | Plate Cove East | NFLD | SCH | F | C | 95 | B-T-C | 162 |
| 385 | Plate Cove West | NFLD | SCH | F | C | 96 | B-T-C | 277 |
| 386 | Pleasantview (Paradise) | NFLD | SCH | F | D | 375 | G-T | 40 |
| 387 | Point au Gaul | NFLD | SCH | F | C | 218 | B-SG | 162 |
| 389 | Point Crewe | NFLD | SCH | F | D | 220 | B-SG | |
| 391 | Point La Haye | NFLD | SCH | F | D | 840 | S J W | |
| 392 | Point Lance | NFLD | SCH | F | C | 841 | S J W | 34 |
| 393 | Point Leamington | NFLD | SCH | F | C | 376 | G-T | 216 |
| 396 | Pool's Cove-Slipway/Slipway Gu | NFLD | SCH | F | C | 273 | B-SG | 239 |
| 397 | Pool's Island | NFLD | SCX | F | D | 377 | G-T | |
| 398 | Popes Harbour | NFLD | SCH | F | D | 97 | B-T-C | |
| 399 | Port Albert | NFLD | SCH | F | C | 378 | G-T | 133 |
| 400 | Port au Bras | NFLD | SCH | F | C | 221 | B-SG | 107 |
| 402 | Port Blandford | NFLD | SCH | F | D | 100 | B-T-C | 29 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|-----------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 403 | Port de Grave | NFLD | SCH | F | A | 98 | B-T-C | 1084 |
| 405 | Port Kirwan | NFLD | SCH | F | C | 842 | S J W | 166 |
| 407 | Porterville | NFLD | SCH | F | D | 433 | G-T | 16 |
| 408 | Portland | NFLD | SCH | F | D | 99 | B-T-C | |
| 410 | Portugal Cove South | NFLD | SCH | F | C | 844 | S J W | 224 |
| 409 | Portugal Cove - Bridge/Slipway/W | NFLD | SCH | F | B | 761 | S J E | 341 |
| 411 | Pouch Cove | NFLD | SCH | F | C | 747 | S J E | 235 |
| 412 | Pound Cove | NFLD | SCH | F | D | 380 | G-T | 52 |
| 414 | Princeton | NFLD | SCH | F | C | 103 | B-T-C | 229 |
| 565 | Punchbowl | NFLD | SCH | F | B | 565 | GFWBL | 405 |
| 415 | Pushthrough | NFLD | SCX | F | D | 222 | B-SG | |
| 416 | Quidi Vidi | NFLD | SCH | F | C | 748 | S J E | 122 |
| 417 | Quirpon | NFLD | SCH | F | B | 500 | GFWBL | 552 |
| 418 | Ragged Harbour | NFLD | SCH | F | D | 381 | G-T | |
| 421 | Ramea | NFLD | SCH | F | B | 223 | B-SG | 414 |
| 422 | Rattling Brook | NFLD | SCH | F | D | 502 | GFWBL | 18 |
| 424 | Red Cliff | NFLD | SCH | F | D | 104 | B-T-C | 73 |
| 425 | Red Cove | NFLD | SCH | F | D | 225 | B-SG | |
| 426 | Red Harbour | NFLD | SCH | F | C | 224 | B-SG | 262 |
| 427 | Red Head Cove | NFLD | SCH | F | C | 105 | B-T-C | 144 |
| 429 | Redlands | NFLD | SCX | F | D | 916 | B-T-C | |
| 431 | Reginaville | NFLD | SCX | F | D | 869 | S J W | |
| 432 | Rencontre East-Slipway/Breastwork | NFLD | SCH | F | C | 226 | B-SG | 252 |
| 433 | Renews | NFLD | SCH | F | B | 845 | S J W | 347 |
| 435 | Riverhead | NFLD | SCH | F | C | 846 | S J W | 136 |
| 436 | Robert's Arm | NFLD | SCH | F | C | 506 | G-T | 176 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|----------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 440 | Round Harbour | NFLD | SCX | F | D | 279 | B-SG | |
| 441 | Round Harbour | NFLD | SCH | F | C | 504 | GFWBL | 222 |
| 442 | Rushoon | NFLD | SCH | F | C | 229 | B-SG | 131 |
| 446 | Salvage | NFLD | SCH | F | B | 382 | G-T | 603 |
| 447 | Samson's Island | NFLD | SCX | F | D | 383 | G-T | |
| 448 | Sandy Cove | NFLD | SCH | F | D | 384 | G-T | |
| 451 | Sandyville (Dawson's Cove) | NFLD | SCH | F | C | 230 | B-SG | 82 |
| 453 | Seal Cove | NFLD | SCH | F | C | 236 | B-SG | 271 |
| 455 | Seal Cove | NFLD | SCH | F | D | 751 | S J E | 68 |
| 454 | Seal Cove (White Bay) | NFLD | SCH | F | C | 510 | GFWBL | 202 |
| 457 | Seldom Come By | NFLD | SCH | F | B | 385 | G-T | 525 |
| 459 | Ship Cove | NFLD | SCH | F | C | 111 | B-T-C | 200 |
| 462 | Ship Harbour | NFLD | SCH | F | C | 852 | S J W | 131 |
| 466 | Shoe Cove Bight | NFLD | SCX | F | D | 512 | GFWBL | |
| 467 | Shoe Cove Brook | NFLD | SCH | F | B | 511 | GFWBL | 342 |
| 468 | Sibley's Cove | NFLD | SCH | F | C | 112 | B-T-C | 171 |
| 469 | Smith's Harbour | NFLD | SCH | F | C | 513 | GFWBL | 253 |
| 566 | Snokey | NFLD | SCH | F | B | 563 | GFWBL | 354 |
| 470 | Snooks Arm | NFLD | SCH | F | C | 515 | GFWBL | 100 |
| 471 | Sop's Arm (Budden's Tickle) | NFLD | SCH | F | C | 517 | GFWBL | 179 |
| 472 | Sops Island | NFLD | SCX | F | D | 567 | GFWBL | |
| 473 | South East Bight | NFLD | SCH | F | C | 238 | B-SG | 260 |
| 474 | South River | NFLD | SCH | F | D | 114 | B-T-C | |
| 475 | Southern Harbour | NFLD | SCH | F | B | 855 | S J W | 847 |
| 476 | Southport | NFLD | SCH | F | B | 113 | B-T-C | 435 |
| 477 | Spaniard's Bay | NFLD | SCH | F | C | 115 | B-T-C | 136 |
| 478 | Spencer's Dock (Pilley's Island) | NFLD | SCH | F | D | 389 | G-T | |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|-----------------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 479 | Spillars Cove | NFLD | SCH | F | D | 116 | B-T-C | 20 |
| 481 | Spoon Cove | NFLD | SCH | F | D | 117 | B-T-C | 23 |
| 740 | Square Islands | NFLD | SCH | F | B | 564 | GFWBL | 790 |
| 483 | St. Anthony Bight | NFLD | SCH | F | C | 507 | GFWBL | 79 |
| 482 | St. Anthony - Fishermen's Wharf | NFLD | SCH | F | A | 549 | GFWBL | 902 |
| 484 | St. Bernard's | NFLD | SCH | F | C | 234 | B-SG | 322 |
| 486 | St. Brendan's (Shoal & Dock Cove) | NFLD | SCH | F | B | 390 | G-T | 394 |
| 487 | St. Bride's | NFLD | SCH | F | B | 847 | S J W | 552 |
| 488 | St. Carol's | NFLD | SCH | F | C | 518 | GFWBL | 86 |
| 489 | St. Chads | NFLD | SCH | F | D | 391 | G-T | 54 |
| 492 | St. Jacques | NFLD | SCH | F | C | 262 | B-SG | 160 |
| 494 | St. John's - Ft. Amherst Slipway | NFLD | SCH | F | A | 866 | S J W | 2655 |
| 495 | St. Jones Within | NFLD | SCH | F | C | 106 | B-T-C | 103 |
| 496 | St. Josepn's | NFLD | NJL | F | D | 233 | B-SG | |
| 497 | St. Joseph's | NFLD | SCH | F | C | 848 | S J W | 154 |
| 499 | St. Lawrence - Fishermen's Wharf | NFLD | SCH | F | A | 163 | B-SG | 528 |
| 500 | St. Lunaire | NFLD | SCH | F | B | 508 | GFWBL | 347 |
| 501 | St. Mary's | NFLD | SCH | F | C | 861 | S J W | 107 |
| 689 | St. Patricks | NFLD | SCH | F | D | 509 | GFWBL | |
| 503 | St. Phillips | NFLD | SCH | F | C | 750 | S J E | 71 |
| 504 | St. Shotts | NFLD | SCH | F | C | 849 | S J W | 204 |
| 506 | St. Vincent's | NFLD | SCH | F | D | 851 | S J W | 51 |
| 507 | Stag Harbour | NFLD | SCH | F | C | 392 | G-T | 232 |
| 508 | Stanhope | NFLD | SCH | F | D | 393 | G-T | |
| 510 | Summerford | NFLD | SCH | F | A | 394 | G-T | 1048 |
| 512 | Summerville | NFLD | SCH | F | B | 108 | B-T-C | 605 |
| 513 | Sunnyside | NFLD | SCH | F | C | 109 | B-T-C | 322 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|----------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 514 | Sweet Bay | NFLD | SCH | F | C | 110 | B-T-C | 94 |
| 515 | Swift Current | NFLD | SCH | F | D | 241 | B-SG | 70 |
| 516 | Tacks Beach | NFLD | SCX | F | D | 242 | B-SG | 27 |
| 517 | Thornlea | NFLD | SCH | F | C | 908 | B-T-C | 77 |
| 691 | Tickle Cove | NFLD | SCH | F | C | 140 | B-T-C | 147 |
| 519 | Tilting | NFLD | SCH | F | B | 395 | G-T | 407 |
| 520 | Tizzard's Harbour | NFLD | SCH | F | C | 396 | G-T | 207 |
| 521 | Torbay | NFLD | SCH | F | C | 753 | S J E | 241 |
| 522 | Tors Cove | NFLD | SCH | F | C | 856 | S J W | 112 |
| 523 | Trepassey | NFLD | SCH | F | A | 857 | S J W | 1890 |
| 524 | Trinity | NFLD | SCH | F | C | 119 | B-T-C | 286 |
| 525 | Trinity (Bonavista Bay) | NFLD | SCH | F | D | 398 | G-T | |
| 526 | Trinity East | NFLD | SCH | F | C | 120 | B-T-C | 170 |
| 527 | Triton West | NFLD | SCH | F | A | 399 | G-T | 1264 |
| 530 | Trouty | NFLD | SCH | F | C | 121 | B-T-C | 147 |
| 531 | Twillingate (Shoal Tickle) | NFLD | SCH | F | A | 400 | G-T | 2327 |
| 532 | Upper Amherst Cove | NFLD | SCH | F | D | 122 | B-T-C | 20 |
| 534 | Upper Gullies | NFLD | SCX | F | D | 755 | S J E | |
| 536 | Upper Island Cove | NFLD | SCH | F | C | 123 | B-T-C | 270 |
| 538 | Valleyfield | NFLD | SCH | F | A | 410 | G-T | 800 |
| 539 | Virgin Arm | NFLD | SCH | F | C | 404 | G-T | 253 |
| 540 | Wadham Islands | NFLD | SCX | F | D | 434 | G-T | |
| 573 | Wesleyville | NFLD | SCP | F | C | 421 | G-T | |
| 543 | Western Bay | NFLD | SCH | F | C | 125 | B-T-C | 88 |
| 544 | Westport | NFLD | SCH | F | C | 526 | GFWBL | 149 |
| 545 | Whale's Gulch | NFLD | SCH | F | B | 407 | G-T | 418 |
| 546 | Whiteway | NFLD | SCH | F | C | 128 | B-T-C | 202 |

APPENDIX 2
HARBOURS (ALL LOCATIONS)

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| HARBOUR CODE | LOCATION | REG | RESP | USE | CLASS | COST CODE | CNSTY CODE | VESSEL LENGTHS (metres) |
|-----------------|------------------------|------|------|-----|-------|--------------|---------------|-------------------------------|
| 547 | Wild Bight (Beachside) | NFLD | SCH | F | C | 520 | GFWBL | 279 |
| 548 | Wild Cove | NFLD | SCH | F | B | 532 | GFWBL | 494 |
| 549 | Williams Harbour | NFLD | SCH | F | C | 521 | GFWBL | 245 |
| 550 | Williamsport | NFLD | SCH | F | D | 522 | GFWBL | |
| 552 | Winterton | NFLD | SCH | F | C | 129 | B-T-C | 201 |
| 553 | Witless Bay | NFLD | SCH | F | C | 858 | S J W | 244 |
| 557 | Woody Island | NFLD | SCH | F | D | 246 | B-SG | |
| 559 | Wreck Cove | NFLD | SCH | F | C | 247 | B-SG | 223 |

A P P E N D I X 3

APPENDIX 3
EXAMPLES OF PROJECT TYPES

| PROJECT TYPES | Channels, Basins | Breakwaters | Wharves |
|-------------------|--|--|---|
| EW: Repairs | redredging as an immediate requirement to allow vessels to enter, leave or moor | repair a breach to stop excessive wave agitation which prevents mooring and navigation | repair structure or component which has failed and creates a safety hazard |
| New Facilities | minimum new dredging as an immediate requirement to allow vessels to enter, leave or moor | minimum new breakwater to stop excessive wave agitation which prevents mooring and navigation | minimum new wharfage to overcome a serious deficiency which creates a safety hazard |
| PM: Short Term | local dredging to ensure that infilling does not excessively hinder operations (site inspection, user reports, and local soundings) | replacement of armour units to prevent a breach (slump, or loss of individual units occurring) (visual inspection and user reports) | repair or replace deteriorated components to maintain soundness for full continuous operations (visual inspection) |
| Long Term | planned periodic dredging to ensure best operating conditions and cost-effectiveness (monitoring and siltation forecasts) | replacement of structure to ensure long term integrity and effectiveness (comprehensive solution from full study; wave hindcase, model study, underwater inspection) | replace, reconstruct structure to ensure long term integrity and effectiveness ("re-design" of structure from wave hindcast, forces, ice, etc., and from foundation inspection and non-destructive testing concrete, steel) |
| UG: Upgrading | dredge new areas to add berth mooring capacity or to straighten channels, etc. for improved/expanded operations or to meet guidelines of accommodation | breakwater construction to protect an enlarged harbour; to control wave agitation to meet guidelines of accommodation; to ensure least siltation | build new structure to accommodate changing fleet size or a particular new requirement or to meet guidelines of accommodation |

A P P E N D I X 4

APPENDIX 4

BUDGET CATEGORIES
SMALL CRAFT HARBOURS BRANCH

| <u>BUDGET CATEGORY</u> | <u>DESCRIPTION</u> |
|------------------------------|--|
| A) Program Administration | <ul style="list-style-type: none">- Salaries - all SCH salaries including salaried harbour managers- Travel - all travel by salaried SCH employees- Transportation - taxi, courier service, air freight, postage, etc.- Professional/special services - computer services, socio-economic studies, policy analysis, contracts related to program management, training- Rentals - car, land, buildings, floor space, equipment- Repairs to office equipment - typewriters, computers, etc.- Materials and supplies - consumable items such as stationary, miscellaneous goods and office machines and equipment valued at less than \$500- Equipment purchases - includes computers, word processors, cars, office furnishings, etc.- Other - exgratia payments, deletion of debts, write-off of losses, etc. |
| B) Technical Support | <ul style="list-style-type: none">- Scientific and technical services related to harbour maintenance/operation including project feasibility, model studies, harbour planning, etc.- Advance planning carried out by non-SCH personnel for work such as spring/annual inspections- Land surveys and market appraisals- Land acquisitions - includes all costs for the land acquisition process except the actual price of the property. Normally this is your fees and disbursements costs in an SSA (Real Estate). |

Note: All engineering, travel and disbursement costs by non-SCH personnel identifiable to specific projects must be included in budget categories, D, E, F, G and H.

BUDGET CATEGORIES
SMALL CRAFT HARBOURS BRANCH

| <u>BUDGET CATEGORY</u> | <u>DESCRIPTION</u> |
|---|--|
| C) Harbour Operations | <ul style="list-style-type: none"> - All expenditures directly related to the operation of the harbour. This category does not include any minor maintenance, care taking or repair items. Do <u>NOT</u> include the disposal/acquisition of property in land surveys. - Includes travel/training costs only for non salaried SCH personnel - On-site management includes costs for students, temporary help and net handling - Any item too small to be separately identified should be included under the object Goods and Services. |
| D) Projects to Avoid Insafe Conditions | <ul style="list-style-type: none"> - Includes projects not identified in budget categories A, B and C - All engineering, travel and disbursement costs by non-SCH personnel identifiable to specific projects (harbours) - Land acquisition - includes only the actual purchase price for the property. |
| E) Projects to Avoid Major Disruption | |
| F) Projects to Avoid Incurring Major Repair Costs | |
| G) All Other Projects | |

A P P E N D I X 5

*COMPUTER AIDED MANAGEMENT
OF HARBOUR RECORDS*

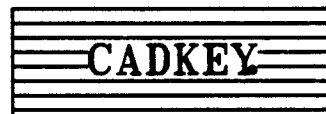


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Appendix B (Original Drawings)

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Structure Locations

Canaille Breakwater - 1,2*
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 Longliner and Bait Depot Wharf - 1,2
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 Harbour Pond - 3
 Deepwater Wharf and Mockbeggar Breakwater - 1
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 Canal Side Walls - 1
 Mockbeggar Wharf and Squarry Head Breakwater - 1,2
 Bailey's Cove - 1
 Bailey's Cove - 2

Appendix C (Drawings with CADKEY)

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Layout2 (coastlines drawn freehand)
 Layout1 (no coastlines)
 Longliner Wharf and Canaille Breakwater
 Longliner Haulout Wharf - 1,2
 Canaille Breakwater - 1
 Canaille Breakwater - 2
 Swyer's Wharf - 1
 Swyer's Wharf - 2
 Fishplant Wharf - 1
 Fishplant Wharf - 2
 Fishplant Wharf - 3
 Longliner Wharf and Bait Depot Wharf - 1
 Longliner Wharf and Bait Depot Wharf - 2
 Longliner Wharf and Bait Depot Wharf - 3
 Harbour Pond - 2
 Harbour Pond - 1
 Harbour Pond - 3
 Deepwater Wharf and Mockbeggar Breakwater - 1
 Deepwater Wharf and Mockbeggar Breakwater - 2
 Mockbeggar Wharf - 1
 Mockbeggar Wharf - 2
 Bailey's Cove - 1
 Bailey's Cove - 2

Appendix D

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List of Part and Pattern Files on Disk
 List of Part Files with Borders on Disk

-
- * 1 indicates dimensions
 - * 2 indicates soundings
 - * 3 indicates berthage

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SUMMARY

The Harbours and Infrastructure Branch of the Department of Fisheries and Oceans, St. John's, Newfoundland could benefit from the adoption of a CAD system to manage their vast amounts of data presently contained in paper records. An integrated CAD system, incorporating graphical visualization and large scale data communication, has the potential to enhance the management of harbour records.

NewTel Computing Systems have recommended a system of two engineering workstations that will handle alphanumeric and graphic data bases. The drafting software package under consideration for purchase is CADKEY, Version 3, by Micro Control Systems, Inc. However, when this report was written Version 3 was not available, and therefore the information contained in this report relates exclusively to CADKEY Version 2.11.

CADKEY Version 2.11 can perform all the functions required by the Harbours and Infrastructure Branch with the exception of the digitizing feature. These functions include the ability to create accurate drafted documentation of harbour facilities detailing dimensions, soundings, berthage, and other relevant information. According to CADKEY Technical Services, Version 3 includes the digitizing feature necessary for the representation of coastlines and roads. A few other minor problems exist with Version 2.11, but some or all of these may have been corrected by the latest modifications to CADKEY in Version 3.

1.0 INTRODUCTION

Computer aided engineering (CAE) encompasses a wide variety of computer aided systems. Certainly one of the largest CAE applications is computer aided design and manufacture (CAD/CAM), used to a great extent by mechanical engineers. Other CAE systems include computer aided design and drafting (CADD), computer simulated automation, numerical control (NC) manufacture, and robotics.

1.1 CAD SYSTEMS

During the past few years, many engineering companies and government departments or agencies have considered implementing a CAD/CAM system. However, there has been some skepticism, as many see CAD as simply a high powered toy and question the necessity of the investment. In some cases, results do not always meet expectations. This is generally not a problem with the CAD system itself, but rather a more complex problem of inadequate or unclear specification of use, improper selection of equipment, incorrect installation, and/or insufficient management. It is wise to remember that computer aided design is only a tool and can only be as good as the information available to it. "Garbage in - garbage out" is an appropriate phrase in this age of computer technology.

1.2 BENEFITS OF CAD SYSTEMS

The immediate impacts of a CAD system to any engineering

application are improved accuracy and productivity. Some of these benefits include improved drawing quality, reduced drafting cycle, easier calculations for geometric properties, wider use of analysis and simulation techniques, and the possibility to study more design alternatives.¹ Drafting with a CAD system also saves immeasurable amounts of paper and effort. Similarly, the ability to store data in the same file on different layers allows effortless changes to be made and different information to be displayed on a graphics screen or on a hardcopy at any one time. The full benefits of any CAD system can only be attained, however, if both management and users learn beforehand what CAD really is and determine if they are using CAD as effectively as possible.

1.3 PROBLEMS WITH CAD SYSTEMS

While looking at some of the benefits, it is also worthwhile to consider some of the problems with CAD. At present, CAD systems are expensive and not everyone can afford or justify the initial capital cost. However, assuming the decision to purchase a system has been made, it may still be found unsuitable for the desired application, and could result in decreased productivity. Some staff may resist the changes imposed on them by a CAD system, and may be reluctant to disclose information, thus impeding the flow of data. Management must provide the commitment to implement an

¹ John Stark, What Every Engineer Should Know About Practical CAD/CAM Applications (New York: Marcel Dekker, Inc., 1986), p.16.

integrated system that will enable the company or department to access necessary data and ensure no restriction on the flow of information.

1.4 DIGITAL COMPUTERS

Essential to any CAD system is, of course, the digital computer, and to fully understand the CAD concept it is important to have some general understanding of computers and their uses. There is a wide range of hardware and software available to users and the possible combinations are numerous. The selection depends upon the required result, and no one combination is best in any situation. Choosing the right system to install requires considerable knowledge of computers, their capabilities, and the type of systems currently available. Several factors that must be considered are the size and extent of the system, the number of users, the reliability of the hardware and ease of servicing the system, and finally, perhaps most importantly, the budget available for the system.

1.4.1 NECESSARY HARDWARE

The essential hardware components of a CAD system include data storage, a central processing unit, a means of data input and output, a high resolution screen, and communication devices. Data storage can either be in the form of main memory or mass memory, such as a floppy disk or hard disk, and for easiest manipulation, stored in a database. Several common data input devices include

the alphanumeric keyboard, function keyboard, graphics tablet, mouse, or light pen. More recently, touch sensitive screens and voice recognition have been developed as means of data input. High resolution screens (or EGA - Enhanced Graphics Adapter) are a requirement for displaying the graphical data. Several terminals connected to one central processing unit (CPU) require appropriate hardware connections and networking capabilities to facilitate information transfer and communication. A truly integrated CAD system incorporates three special computer functions, namely interaction, graphical visualization, and large scale data communication.

1.4.2 SOFTWARE LEVELS

The software component is made up of several levels. The first level is the computer systems software consisting of the disk operating system (DOS), compilers, and other such programs essential to the basic operation of the computer. The second level includes the graphics software, which controls the graphics terminal and the method by which information is selected from the screen and images redrawn. A third level consists of general CAD software including the user interface, data management, and data exchange software. This level is vital, as databases are an essential ingredient to any CAD system. Several other levels of software may exist depending on the type of system, but the final level consists of user-developed software. This level creates the personalized touch and allows data to be manipulated and

organized in a manner specific to the user.

2.0 HARBOURS AND INFRASTRUCTURE BRANCH (H&I)

Harbours and Infrastructure, is a newly formed Branch of Fisheries and Oceans Canada comprised of the former Small Craft Harbours and Fisheries Development Branches. The two major divisions of Harbours and Infrastructure are the Industry Programs Division, and the Engineering and Construction Division. This re-organization was a result of direct budget restraints and resulted in the termination of several temporary and fulltime positions. Thus, there is a need for greater efficiency and productivity in the branch to maintain and, where possible, improve upon the established standards.

2.1 PRESENT MANAGEMENT OF HARBOUR RECORDS

The role of the Harbours and Infrastructure Branch is to manage some 405 fishing and recreational harbours in Newfoundland and Labrador. This management includes the maintenance and repair of existing structures such as wharves, breakwaters, slipways, and retaining walls, and the planning for future development of these harbours. At present, regular inspections are carried out year round, with each harbour inspected approximately once every three years. While in the field, Facility Inspection Reports are completed for each structure that falls under the jurisdiction of the Harbours and Infrastructure Branch. These reports document the detailed inspection of the physical condition of the

structure. On returning to the office, the paper files of the inspected harbours are updated with new drawings indicating all the existing facilities in the harbour. Soundings relative to low normal tide are also indicated on the drawings to determine the berthage available to various size boats. Another form, the Functional Requirements to Meet Guidelines of Accommodation, details the available operational and non-operational berthage, lighting, parking, approach roads, storage area and buildings in the vicinity of the harbour. The files are illustrated with photographs taken on site and, along with the two forms, indicate the state of the existing facilities. Finally, Harbour Inventory Computer Forms are completed and the data is entered through a dataline computer to head office in Ottawa. This is a rather tedious task as the interactive program is accessed through a modem and is extremely slow. Periodic system crashes make the entire system temporarily unavailable to users.

2.2 PROJECT PLANNING

At present, there are four district managers at Fisheries and Oceans; two in St. John's and two in Grand Falls, each responsible for the management of the harbours in their district. With limited funds available, it is impossible to meet all demands for new facilities and upgrading of existing facilities, and it is thus essential for the Harbours and Infrastructure Branch to have a list of projects on a priority basis. This long range list is based on a five year projection and on a

predetermined budget. Three main considerations, in order of importance, are:

- (1) Avoiding unsafe conditions,
- (2) Avoiding major disruption to the fishery, and
- (3) Avoiding major repair costs.

Budget restraints have been so severe, however, that virtually all projects on the list are from category one.

Apart from these three considerations, two factors further determine the priority of any project: the facility condition rating code and the harbour classification. The condition rating code is a number from 1 to 5 determined at the time of the field inspection. A value of 1 indicates an unsafe structure, whereas a value of 5 indicates a structure in excellent condition. The harbour classification (A, B, C, or D) depends on the level of activity within the harbour, Class A being the most active. The highest priority is assigned to a Class A harbour of Condition 1 with other combinations ranked accordingly.

When determining the priority of a project, numerous statistics must be analyzed. One such statistic is the available berthage at a harbour, determined from the number of registered and transient vessels and the available wharfage. This is then used to determine whether a berthage excess or shortfall exists. Other major considerations are fish landing statistics (number of fish caught in the vicinity for the current year), wind and wave action, and storm frequency.

At present, most of these statistics are handled by different divisions as either paper records or computer print outs. The Engineering and Construction Division of the Harbours and Infrastructure Branch decided to investigate the possibility of implementing an integrated CAD system to improve the information flow within the department. Since the branch lacked the computer expertise to select the hardware and software combination necessary to meet their needs, NewTel Computing Systems were approached to outline a suitable setup.

2.3 ADVANTAGES OF A CAD SYSTEM FOR H&I

NewTel Computing Systems have outlined the greatest benefits to the Harbours and Infrastructure Branch in terms of the management, updating, and manipulation of files and data. The immediate benefit of a computerized data storage system will be recognized in the drafting of facilities within the harbours, with the full impact of a drafting package experienced at the completion of the three year inspection cycle. Once the alpha-numeric database is completed, any information may be selected and analyzed either directly or using a spreadsheet. Long term benefits will be experienced by the Fisheries Development Division with a graphics database of standard structures. Existing harbour layout may be easily analyzed and modified as necessary.

The system under consideration falls into the "turnkey" engineering workstation category. A turnkey system is a complete system with all hardware and software supplied by one vendor and, in principal, can be operated after installation at the "turn of a key."² The term "engineering workstation" implies that only one graphics terminal runs off each CPU. Specifically, Hewlett Packard (or similar) engineering work stations are being considered.

3.0 USING CADKEY

The CAD software package under consideration is CADKEY Version 3, by Micro Control Systems Inc., Vernon, Connecticut, although CADKEY Version 2.11, will be discussed here, as Version 3 was unavailable at the time of this report. As previously noted, the majority of CAD software is oriented primarily towards mechanical engineering, and CADKEY is no exception, however, it may be used quite successfully by civil and architectural engineers. Two features make CADKEY highly attractive for the purposes of the Harbours and Infrastructure Branch. The first is that CADKEY is a relatively new, well written software program, that should have significant improvements with each version update. Other similar software packages may not have been as well written initially, and have been patched so many times that real improvements may require a complete rewriting of the software. The second is the

² Ibid., p. 39.