PROJECT REPORT NO. 20

THE TOURISM AND OUTDOOR RECREATION CLIMATE OF NEWFOUNDLAND AND LABRADOR

BY J.A. PEACH

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THE TOURISM AND OUTDOOR RECREATION CLIMATE OF NEWFOUNDLAND AND LABRADOR

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:Prepared for the
DEPARTMENT OF REGIONAL ECONOMIC EXPANSION
CANADA

and

DEPARTMENT OF TOURISM
PROVINCE OF NEWFOUNDLAND AND LABRADOR

by the

ATMOSPHERIC ENVIRONMENT SERVICE
DEPARTMENT OF THE ENVIRONMENT
CANADA

Publications in Applied Meteorology
REC-2-75

METEOROLOGICAL APPLICATIONS BRANCH

Toronto 1975

SUMMARY

The *Tourism and Outdoor Recreation Climate of Newfoundland and Labrador* was prepared in order to facilitate the use of meteorological information in recreation and tourism facility planning.

The introduction outlines the scope of the project and lay-out of the volume. Part A highlights the objectives of the study and the method of approach. In Part B the tourism and recreation seasons are defined, and the seasonal analysis is described in detail. In Part C the seasonal quality of the climate for tourism and outdoor recreation is presented. Part D contains material of a more general interest to recreation and tourism.

ACKNOWLEDGEMENTS

Gratefully the writer wishes to acknowledge the helpful advice of Mr. W. M. Baker, recreation consultant to the Department of Regional Economic Expansion, and the guidance and help kindly offered by many in the Atmospheric Environment Service including, among others, G. A. McKay, R. B. Crowe, B. F. Findlay and A. D. Gates. The writer is also indebted to Mr. R. H. O'Brien, Regional Superintendent, General Weather Services, Atlantic Region, AES, and Mr. R. Nelis, Officer-in-Charge of the Gander Weather Office, for release from normal duties.

The co-operation of the Ice Forecasting Central and the Canadian Forestry Service is much appreciated.

University student, J. W. Loder, was of great assistance during the summer of 1974.

FOREWORD

The *Tourism and Outdoor Recreation Climate of Newfoundland and Labrador* was designed to determine the climatic potential for a variety of recreational activities in Labrador and the Island of Newfoundland. It should prove useful to planners, developers and conservationists at the federal, provincial and municipal levels, as well as to private enterprise. Contained herein are three approaches which contribute to the understanding of climatic potential for recreation:

1. a delineation of tourism and recreation seasons based on the major climatic patterns of outdoor recreation.
2. an analysis of groups of similar outdoor recreational activities and the climatic conditions which must be met before these activities would be enjoyed by the public.
3. a discussion of the major climatic factors which significantly influence outdoor recreation and tourism.

The report was prepared by the Atmospheric Environment Service of the Department of the Environment, Canada, at the request of the Department of Regional Economic Expansion, Canada, and the Department of Tourism, Province of Newfoundland and Labrador.

The author, Mr. J. A. Peach, is a meteorologist employed at the Gander Weather Office by the Atmospheric Environment Service.

The over-riding objective of this report (and others in the same series) is to provide a more substantial factual data base on which to plan long-range tourist and recreation development.

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INTRODUCTION

Weather is one of the most significant factors influencing tourism and outdoor recreation participation and satisfaction. Temperature, precipitation, duration of daylight, wind speed and other elements, individually or in combination, strongly influence and frequently determine the choice of outdoor recreational activities, the participation time, and the degree of satisfaction obtained. The inclusion of weather information in the planning processes for tourism and recreation development is, therefore, of considerable importance.

The area under discussion in this report includes the whole of the Province of Newfoundland and its adjacent coasts, that is, both Labrador and the Island of Newfoundland. The term, *Newfoundland*, as used in this report refers to the complete Province, while its two separate parts are referred to as *Labrador* and *Island of Newfoundland* (or the *Island*). Although the population density of Labrador is much less than of the Island, it is nevertheless, very important from a planning standpoint, and both parts of the Province have been given equal treatment in this study as far as possible. At first glance it may seem unusual to analyse *landscape touring* for a large area of Labrador, where highways are almost non-existent. The natural potential for such touring, however, is present, and in any case, touring by boat is of some importance along the Labrador Coast, and it will be seen in the text that an attempt was made to assess this activity in relation to automobile landscape-touring.

Part "A" of the report highlights the objectives of the study and the method of approach. In Part "B" the tourism and recreation seasons are defined and the seasonal analysis is described in detail. In Part "C", following outlines of the outdoor recreation activities and their weather requirements, the seasonal quality of the climate for tourism and outdoor recreation is given in detail. The final section, Part "D" contains material of a more general interest to recreation and tourism, and which complements some of the information found in earlier sections.

Figures and tables have been numbered consecutively through the text, but have been inserted after the appropriate section (Introduction, Part A, Part B, etc.).

The data used in the analyses were almost exclusively in English units. In this report, however, the results are shown in Metric units with English units usually added in parentheses. The data in most cases were prepared in English units and the decimal fractions in the Metric conversions rounded off to avoid spurious accuracy. These Metric approximations result in no significant loss of accuracy. It should be noted, however, that in the case of the criteria used in the computer calculation of suitable days as outlined in Table 6, the English units are exact.

Readers should note that while the text, figures and tables provide a regionally reliable analysis, local exceptions may be significant, particularly in areas with varied topography or in areas of differing

exposure. In particular, conditions along all major coasts of both the Island of Newfoundland and Labrador are frequently vastly different than at localities only a short distance inland. These differences must be reflected in the long-term climatic normals. Knowledge of the exposures and situations of the individual climatological stations used in the analyses were taken under consideration. It was not always possible, however, to delineate the probable variation in the analyses of climatic elements and quality with complete satisfaction near the coasts on the map scale used. In some cases, only spot values were used on the maps, no isopleths being drawn. Finer detail can be reliably estimated only when the meteorological observation network is expanded to include many locations. Tourism and outdoor recreation authorities can assist in this matter by defining the degree to which weather factors influence their programs and by cooperative activities with the Atmospheric Environment Service for the regular measurement of such factors as water and air temperatures, wind velocities, and snow depth in their own areas of interest.

Because topography has such a strong influence on the climate, Figure 1 is included, which shows the main physiographical features of the Province and surrounding area.

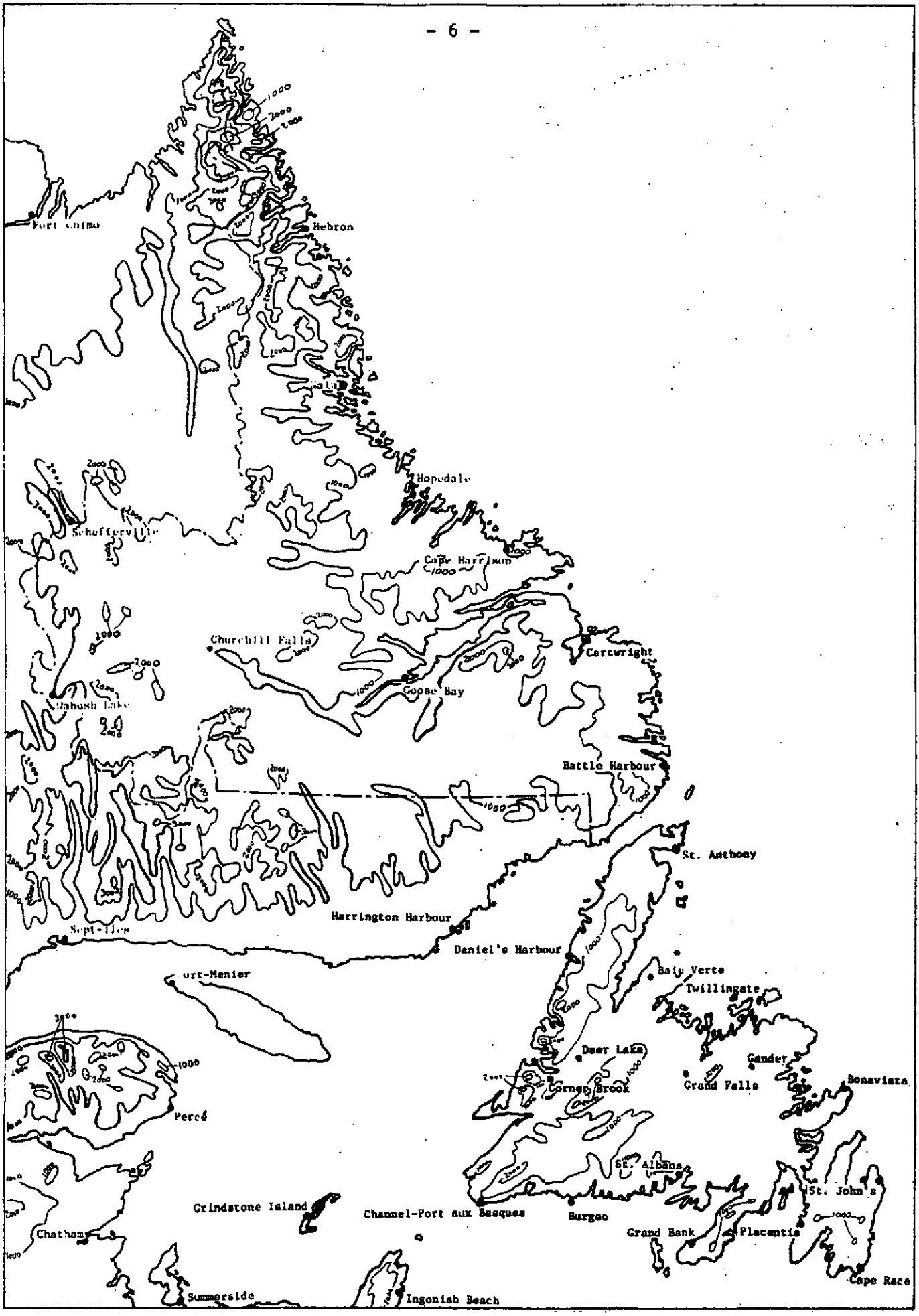


FIG. 1 TOPOGRAPHY OF NEWFOUNDLAND AND LABRADOR

PART A

OBJECTIVES AND METHOD OF APPROACH

I. GENERAL IMPORTANCE OF CLIMATE FOR TOURISM AND OUTDOOR RECREATION

Successful planning and development of tourism and outdoor recreation facilities in any area depends significantly on the degree of satisfaction that can be derived from outdoor pursuits. The weather influences almost all outdoor activity. Sunshine, precipitation, temperature and wind all have an effect.

Climate information must be available in an organized and standard form to make it convenient for use in decision-making. Comparisons of weather conditions at different sites that may be near each other or distributed province-wide then can be made readily. Comparisons for locations for which no climate observations are available may be achieved through values estimated from analyzed charts and diagrams.

II. TOURIST AND OUTDOOR RECREATION ACTIVITIES

The basic tourist and outdoor recreation activities that characterize the Canadian scene and their weather requirements have been outlined by Crowe, McKay and Baker (1973). While the number of outdoor pursuits is large, they found seven activity groupings of major concern:

1. *Landscape touring by automobile*
2. *Lounging and non-active outdoor pursuits*
3. *Vigorous outdoor activities, such as hiking, hunting, sports*
4. *Beaching, including sunbathing and other beach activities except swimming*
5. *Swimming and other water-based sports*
6. *Skiing*
7. *Snowmobiling*

Activities or activity groupings can readily be classified according to season.

Year-round Activities

In many areas of Canada landscape touring may be classified as a year-round activity. Because of the comfort of travelling by automobile, touring is the activity least affected by weather and may be enjoyed throughout most of the year in many parts of the country. Also, use of the summer cottage is being extended beyond the summer season.

Summer Activities

Some summer activities, such as picnicking and lounging are satisfying in cool weather as well as in warm. Beaching, on the other hand, requires temperatures of at least 18°C (65°F) and sunshine. These activities are inhibited by rain or strong wind.

The more vigorous summer activities, such as hiking, hunting and sports, are enjoyed best when temperatures are neither high nor extremely low. Moderate winds can be tolerated, but significant precipitation cannot.

Water-based activities, such as swimming and water skiing, require water temperatures in the upper teens as well as air temperatures of at least 18°C (65°F), preferably with sunshine.

Winter Activities

The main activities of winter are skiing and snowmobiling. Others, such as ice skating, snowshoeing, ice fishing, ice boating, and winter

hunting, are linked to the presence of ice and snow cover, and, indeed, may involve skiing or snowmobiling. The climatic requirements of most of these activities are similar, although snowmobilers can usually tolerate lower temperatures than skiers. Some falling and blowing snow and wind can be tolerated by skiers and snowmobilers, but at times access routes become blocked and local terrain conditions limiting.

Activities Discussed in this Study

In this study, very little comment is made concerning swimming, since water temperatures over broad areas of the Province are generally too low to make this activity pleasurable. In addition, lounging and non-active pursuits are not of the same significance as they are in many regions of Canada. Because of the preponderance of low summer temperatures, most outdoor activities in this season in Newfoundland and Labrador are essentially vigorous, such as hiking, hunting, or sports. However, it is important to note that locally, passive activities may be engaged in at times to a considerable degree with reasonable satisfaction.

In addition to the activities or activity groupings described above, it was decided to add *yachting* or coastal touring by boat. Touring by sailboat and powerboat around the coasts of Newfoundland and Labrador has been growing in popularity. Obviously, these activities will be most enjoyable when coastal waters are free from ice, fog is relatively infrequent, temperatures moderate, and before the onset of the numerous and vigorous late autumn and early winter storms.

III. NATURE AND AVAILABILITY OF WEATHER DATA

Most of the available weather records for Newfoundland and Labrador collected by the Atmospheric Environment Service were used in this study. In Labrador, data available from fifteen stations were supplemented by those from twenty-three Quebec stations located on or near the Quebec-Labrador border or the nearby shore of the Gulf of St. Lawrence. On the Island of Newfoundland data were available from sixty-three stations. These together with those data for thirteen stations in the Maritimes were used.

The length and period of records at these stations varied greatly. Wherever possible, climatic means were updated to December 31, 1973. Much use has been made of the observations recorded during the thirty years, 1941-1970, but shorter-period records were used where necessary. In order to improve the quality of the means or averages from shorter periods (less than fifteen years), adjustments were made by comparison with data from longer term stations (Aston and Kendall, 1972).

The network of stations used in the analysis of climatological elements is depicted in Figure 2, while their elevations and observation programs are given in Table 1. Regions identified in Labrador and the Island of Newfoundland for the purpose of description are given in Figure 3. Generally, the stations appearing in tables are grouped according to those regions. Stations used in the computation of *percentages of suitable days* (see Section IV, below) are also included in Figure 3.

IV. SUMMARY OF APPROACH AND METHOD

Initially, the weather requirements for each activity or activity grouping were established. For example, the acceptable values of temperature and wind speed and depth of snow required for skiing were determined.

A computer analysis of hourly weather records was performed for twenty-three stations in the Island of Newfoundland, Labrador and neighbouring Quebec. A suitable day was defined as one during which there were five hourly reports between 10:00 a.m. and 6:00 p.m., inclusive (local standard time), which satisfied specified conditions. From this, mean percentages of days with suitable weather conditions for landscape touring, skiing, snowmobiling, vigorous activity and beaching were determined by ten-day periods for each station.

An attempt was made to estimate the percentages of suitable days for yachting by relating the weather requirements for this activity with those of landscape touring, which are somewhat similar. In addition, records of wind, visibility, fog, the frequency of storms, the presence of ice, etc., were studied. Tabulations were then assembled to present what, it is hoped, will be a useful guide for sailboat and powerboat operators.

Because of the irregular spacing of climatological stations, it was necessary to construct climatological information for some areas. Admittedly, synthetic data of this type are less then ideal. However,

by following the established procedures of physical climatology and drawing on analytical experience, the results are believed to be reasonable.

TABLE 1

LIST OF STATIONS USED IN THE ANALYSIS

	Elements reported	Elevation	
		meters	feet
Argentia A	TPW	14	45
Avondale CDA	S	133	435
Badger	TP	101	330
Baie Verte	TP	110	362
Battle Harbour Loran	TPWS	9	31
Bay d'Espoir Gen Stn	TP	23	75
Belle Isle	TPS	130	426
Bonavista	TPW	25	82
Botwood	TP	9	31
Buchans	TP	281	920
Buchans A	TPW	220	720
Burgeo	TPWS	12	40
Burin	TP	M	M
*Burnt Pond	TP		
Cape Broyle	P	6	20
Cape Harrison	TPWS	10	33
Cape Norman	P	19	61
Cape Race	TPW	30	99
Cartwright	TPW	10	34
Churchill Falls A	TPWS	435	1426
Clunys	P	122	400
Colinet	TP	20	65
Colinet Peat Bog CDA	TPS	104	342
Comfort Cove	TPW	99	326
Corner Brook	TP	5	15
Daniel's Harbour	TPS	20	64
Deer Lake	TP	M	M
Deer Lake A	TPW	11	35

Table 1 (Cont'd)

Station	Elements reported	Elevation	
		meters	feet
*Ebbegunbaeg Lake	TP	M	M
Exploits Dam	TP	154	504
Fogo	TP	147	482
Gander Int'l A	TPWS	147	482
Glenwood	TP	30	100
Goose Bay A	TPWS	44	144
Grand Bank	TPW	2	5
Grand Falls	TP	60	197
*Hampden	TP	21	68
Hearts Content	TP	4	12
Hebron	TP	8	25
Holyrood Golden Eagle	TP	7	23
Hopedale	TPW	11	35
Lethbridge CDA EPF	TP	21	70
Lockston	P	6	20
Long Harbour	TP	8	26
Menihek Rapids	TP	489	1605
Millertown	TP	211	692
Nain	TP	6	20
New Chelsea	TP	11	35
North West River	TP	M	M
Nutak	T	2	5
Petty Harbour	TP	5	17
Pierres Brook	TP	5	17
Placentia	S	13	43
Point Amour	P	47	155
Point Riche	TP	11	35
Port aux Basques	TPW	7	24
Port Union	P	5	15
Rattling Brk Norris Arm	TP	9	29
*Rocky Harbour	TP	20	67

Table 1 (Cont'd)

Station	Elements reported	Elevation	
		meters	feet
*Roddickton	TP	12	40
Saglek	TP	21	70
*St. Alban's	TPW	13	44
St. Andrews	TPW	11	35
St. Anthony	TPW	17	57
St. Anthony A	W	6	21
St. Georges	TP	3	10
St. John's	TP	38/61	125/200
St. John's A	TPWS	141	463
St. John's West CDA	TPS	114	375
St. Lawrence	TPW	33	109
Salmonier	TP	122	400
Sandgirt Lake	TP	453	1485
Seal Cove	TP	14	47
Springdale	TP	11	35
Stephenville A	TPWS	13	44
Terra Nova National Park HQ	TP	99	325
Tors Cove	P	5	17
Twillingate	TPW	5	16
Twin Falls	TP	483	1585
Wabush Lake A	TPW	551	1807
Westbrook St. Lawrence	TP	30	100
*Woody Point	TP	9	30

* Very short-term record

T - temperature
P - precipitation
W - wind
S - sunshine

M - missing
A - airport site
CDA - Canada, Department of Agriculture
EPF - experimental farm

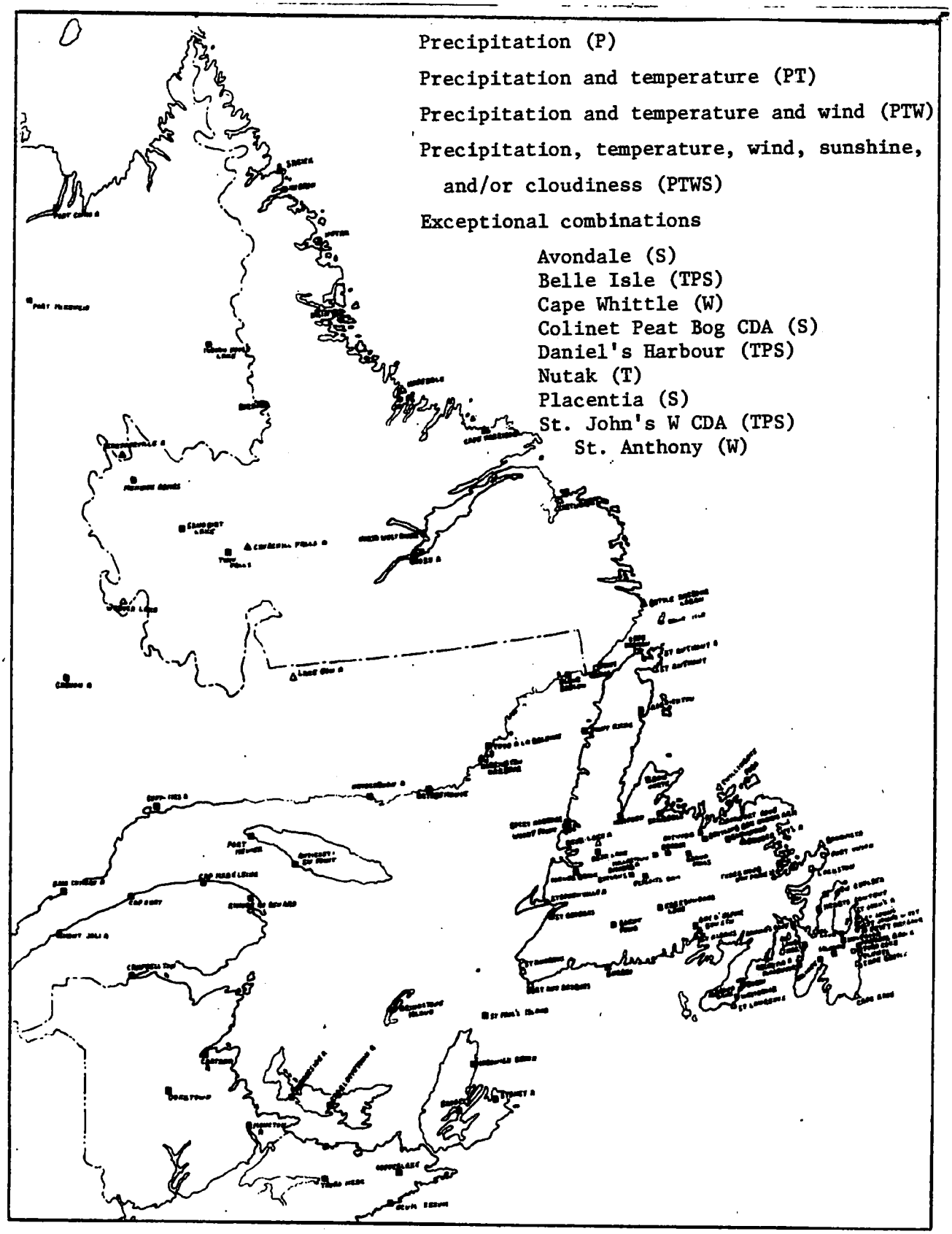


FIG. 2 CLIMATOLOGICAL STATIONS USED IN THE ANALYSIS

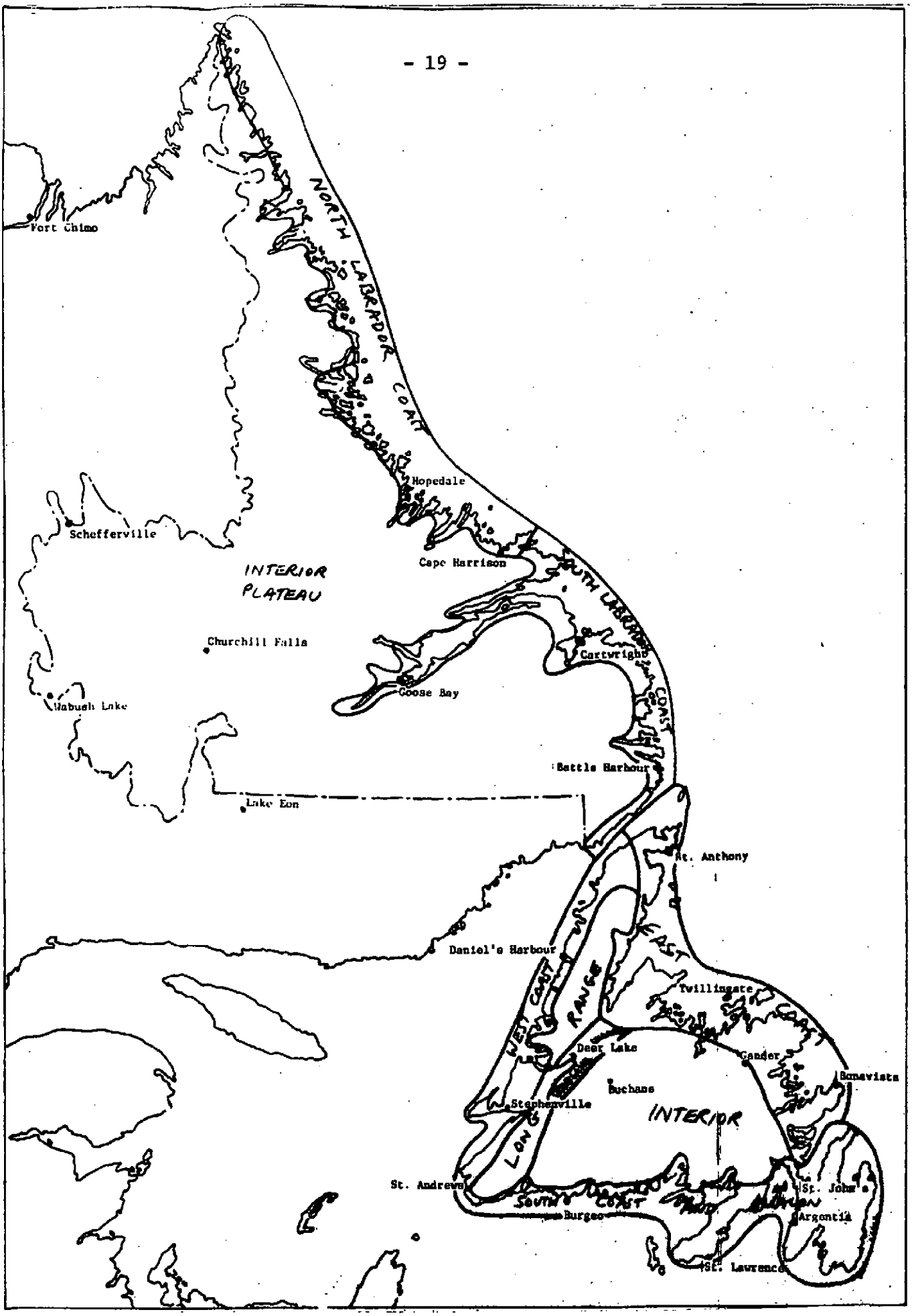


FIG. 3 RECREATION AND TOURISM REGIONS AND STATIONS USED IN SUITABILITY-DAY ANALYSIS

PART B

TOURISM AND RECREATION SEASONS

I. BASIC SEASONAL DIVISIONS

Crowe, McKay and Baker (1973) found a basic two-season division to be the most convenient for the purposes of a tourism and recreation climate study. For *winter* activities previously noted, a snow and ice cover are requisites. For *summer* activities, a relatively dry-terrain is necessary. Spring and autumn are combined with the warmest months of the year (July and August) to form the *complete summer season*. The terms used for the internal divisions of the complete summer season are *spring shoulder*, *high summer* and *autumn shoulder*. An arbitrary two-week period is allowed for the *spring thaw*, the period when outdoor activities are minimal. At this time, the runoff from the melting snow is occurring, and frost is coming out of the ground. These divisions of the year are depicted in Figure 4.

II. CRITERIA FOR DETERMING SEASONAL LENGTH

For outdoor activities to be satisfying in any season, weather conditions must measure up to an acceptable standard. The criteria, selected to describe such standards, are convenient also for determining the length of the seasons, and are described below:

Winter
- begins on median date of first snow cover 2.5 cm (1 inch) or more
- terminates on median date of last snow cover of 2.5 cm (1 inch) or more

Spring thaw
- a two-week period following the termination of winter

Spring shoulder - begins with termination of the spring thaw and ends with the start of high summer

High summer - begins on date that the mean daily maximum temperature rises above 18°C (65°F)

- terminates on date that the mean daily maximum temperature falls below 18°C (65°F)

Autumn shoulder - begins with the termination of high summer and ends with the onset of winter.

At a number of localities there is no high summer period. That is, the mean daily maximum temperature is never higher than 18°C (65°F) at any time during the summer. In these cases it seems logical to make the mid-point of summer the dividing line between the spring shoulder and the autumn shoulder.

Figure 4 was constructed on the basis of the above criteria. The schematic representation in the figure was intended to depict the seasonal patterns and the periods of the year in which tourists pursue the various outdoor activities. While this figure indicates that weather conditions are suitable for landscape touring throughout the year, the line for touring is broken, as there will be interruptions during the winter season. For brief periods of perhaps several consecutive days on the Island of Newfoundland and in Southern Labrador, during the passage of storms, snow, freezing rain or wind sometimes make driving itself hazardous and, occasionally, impossible. In any case, landscape touring is strictly a local activity during the winter.

The Winter Season

Since the winter season has been defined as the snow-cover season, it would be desirable to have extensive records of the beginning and ending of the snow-cover season, and of measurements of snow depth. Such information has been organized on a national scale by Potter (1965). Information is presented in a form convenient for use in outlining the snow-cover season, and the publication contains data for ten stations in the Island of Newfoundland, five stations in Labrador and an additional twenty-five stations were found to be useful in neighbouring Quebec and the Maritimes. In order to prepare regional maps in more detail than this information permits, a method used by Gates (1975) was tested against Potter's snow cover information for both Island and Labrador sites. It was found that the date on which the mean minimum temperature in the spring rose to -0.6°C (31°F) and the date the mean daily maximum in the autumn fell to 4.4°C (40°F) agreed very closely with Potter's median dates for the first and last reports of one inch of snow on the ground. This made available estimated median dates of the first and last snow cover for fifty-five new locations on the Island of Newfoundland, the Maritimes, Labrador and adjacent regions of Quebec.

In discussing variations from one winter to another, Potter (1965) notes that the dates of the first and last snow cover can be earlier or later than the median date by as much as four weeks. Also, it is normal for the snow cover to disappear and reappear at the start and finish of the season, as is illustrated in Figures 5 to 9. Consequently, the period of reliable or continuous snow cover is usually shorter than

the complete winter. Indeed, during some winters, stations in southern parts of the Island of Newfoundland may never acquire a stable or lasting snow cover. It cannot be emphasized too much that variations from year to year are great. In Figures 5 to 9, the top graph represents a typical year with lighter snow cover and the bottom a typical year with heavier snow cover. Potter's (1965) values for reliability, percentages of the winter season when snow is actually present on the ground, are given in Figure 10. In areas where skiing is known to be satisfactory his values are 80 per cent or higher. His snow cover frequency graphs, Figure 11, give for six locations some idea of when the snow cover is most reliable. Changes in snow cover through the winter (median values of snow depth at the end of each month) are illustrated in Figures 12 to 19.

That part of the winter during which the air temperature seldom rises above the freezing point is likely the best time for good snow quality. This interval may be approximated by the period during which the daily maximum temperature does not exceed $0^{o}C$ ($32^{o}F$). This interval is necessarily shorter than the period during which the mean daily temperature is equal to or less than $0^{o}C$ (see Figures 20, 21, 22), but the two periods are related. From Table 2, it can be seen that in Labrador the mean daily maximum temperature falls to $0^{o}C$ about 15 days later than does the mean daily temperature, while on the Island of Newfoundland the same event occurs about 20 days later. The mean daily maximum rises to $0^{o}C$ in spring about 22 days earlier in Labrador and about 25 to 30 days earlier on the Island than does the mean daily temperature.

The Summer Season

The period immediately following the disappearance of the snow cover, designated as the *spring thaw*, has been given a length, arbitrarily, of two weeks. While it is recognized that the drying of the landscape will take longer in some areas than in others, data are not directly available to document this. The first day of the complete summer season was, therefore, calculated as 15 days following the last day of the winter season.

To examine the rates of the temperature rise and fall throughout the Province in spring and autumn, graphs were prepared for all stations using the mean daily maximum temperatures. The mean monthly values were plotted on the 15th day of the month. A few examples are given in Figure 23. By interpolation, these graphs yield the average dates on which the mean daily maximum temperatures rise or fall to 18°C (65°F). These dates mark the beginning and ending of high summer at each station. It is important to note that long-term means (30 years) were used, as variations from one year to another can be large. Figure 24 illustrates graphs of actual maximum temperature at Gander in a warm summer, 1967, and in a cool summer, 1968.

III. SEASONAL LENGTH PATTERNS

(a) Introduction

The following descriptions of the tourism and recreation seasons are based mainly on charts of beginning and ending dates of seasons and season length (Figures 10 and 25 to 35). The reader is also referred to Table 3, in which data are presented in tabular form for a number of stations, and to Figures 36 and 37, in which the season lengths are shown in diagrammatic form for a number of stations.

(b) The Winter Season

Labrador

Winter, with its snow cover, comes to northern Labrador in early October and gradually progresses southward to reach southeastern Labrador near the end of October or early November (Figure 25). This, naturally, is a result of the effects of latitude and the outbreaks of cold air from the northwest.

The median date of the beginning of winter for Schefferville, September 27, is about three weeks earlier than that for Hopedale or Cape Harrison, localities on the coast at approximately the same latitude. The elevation of Schefferville (512 m, 1681 ft.) and its position near the centre of the Labrador landmass, no doubt, contribute to the early onset of winter. Not until about two weeks later than Schefferville do Labrador City, Wabush and Churchill Falls usually see the arrival of winter. Directly to the east, in the Goose Bay area, it does not arrive until another two weeks have passed. The delay in the arrival of

winter in the area of Hamilton Inlet and Lake Melville in all likelihood, is matched by similar delays in many nearby inlets along the coast, wherever there is an effective sheltering by higher terrain.

After a period, characterized by a continually frozen landscape, frequent low temperatures, and relatively few major storms compared to the Island of Newfoundland, winter comes to an end about mid-May in Hamilton Inlet (Figure 26) and along the coast southward to the Strait of Belle Isle. Toward the end of May the snow begins to disappear in western Labrador. Farther north on the coast, at Nain and Hebron for example, it is early to mid-June before this happens, and still later in June near the Torngat Mountains.

The length of the winter season (Figure 10) ranges from about 200 days along the south Labrador coast to about 260 days over extreme northern Labrador.

Island of Newfoundland

The snow comes to the Great Northern Peninsula early in November (Figure 25) and by mid-November to much of the higher ground in the western half of Newfoundland. During the third and fourth weeks of November winter begins over all of the remainder of the Island except the Avalon Peninsula and the most southerly coast of the Burin Peninsula. On the Avalon Peninsula the snow generally arrives during the first two weeks of December. The progression of the season is fairly logical, from the northwest toward the southeast, except at Gander which has a rather early date (November 2) compared to surrounding points. Very likely

this is a result of the elevation (147 m, 482 ft.) of Gander Airport, the surrounding upslope terrain, and the occurrence of light snow in the cold periods that follow the passage of the late October and early November depressions.

The final disappearance of snow begins on the Avalon and Burin Peninsulas in middle and late April (Figure 26). This progresses toward the northwest, occurring in central localities early in May and on the hills of the Great Northern Peninsula after mid-May.

The West Coast area is worthy of comment. Note the early disappearance of snow at Stephenville and Daniel's Harbour. The more frequent easterly winds at this time of year, blowing downslope from the Long Range Mountains onto the coast, bring about the melting of the snow at about the same time as it disappears in southeastern regions of the Island.

(c) The Spring Thaw

In cooler maritime climate the spring thaw will vary considerably from the two-week period arbitrarily chosen for it. Two weeks may be realistic for inland points, but four weeks may be closer to reality for coastal points, especially where there is sea ice nearby. While the late-winter period of unreliable snow cover with its one or more disappearances and reappearances is still technically called winter in this study, Newfoundlanders think of this as a part of spring.

(d) The Summer Season

The complete summer season (Figure 4) is composed of the spring shoulder, high summer, and autumn shoulder. Thus, the length of the complete summer (Figure 27) is the sum of its component parts (Figures 28, 29, 30). In areas where the mean daily maximum temperature does not reach 18°C (65°F) at any time during the summer, there is, of course, no high summer (Figure 29), and the lengths of the spring and autumn shoulders (Figures 28 and 30) are indeterminate. In Figure 31, the areas of no high summer are again shown, but at selected stations within these areas the highest mean daily maximum temperatures during the summer are given along with their dates of occurrence. Many of these means reach 15½°C (60°F) or more. As a result, Table 4 was prepared to indicate the length of period during which the mean daily maximum is higher than 15½°C (60°F) at a number of stations that do not have any high summer.

Labrador North of Latitude 54°N

The spring shoulder of the summer season begins over northern Labrador during the latter half of June (Figure 32). However, the mean daily maximum temperature is generally less than 18°C (65°F) at the height of the season, so that virtually the whole area does not have a high summer. The autumn shoulder ends with the beginning of winter (Figure 25), so that the length of the complete summer season (Figure 27) ranges from about 150 days at the coast near Cape Harrison to about 100 days over extreme northern Labrador.

Because the area north of the 54th parallel has been indicated as an area of no high summer, this is not to say that there is no warmth during the summer in this area. On the contrary, temperatures on warm days are commonly in the twenties. Some of the highest temperatures recorded in this area are 37°C (98°F) at Cape Harrison and 33°C (92°F) at Hopedale (Table 5). Nevertheless, these warm periods are interspersed with frequent cool periods, resulting in averages of daily maximum temperatures for the months of July and August being less than 18°C (65°F).

Labrador South of Latitude 54°N

In the coastal area south of Cartwright and in the Lake Melville area, the spring shoulder of the summer season begins at the end of May or early in June (Figure 32) and progresses gradually northward. In western Labrador it begins at most locations simultaneously, generally in the period, June 9 to 12.

At the end of June or early July high summer comes to southern Labrador (Figure 33), appearing first at Goose Bay and in the Lake Melville area. At other points, for example, Cartwright on the coast and Churchill Falls and Labrador City inland, it is mid-July when high summer arrives. At some coastal localities, particularly along the Strait of Belle Isle, there is no high summer, as the mean daily maximum temperature does not reach 18°C (65°F) during the course of the summer.

Lowering temperatures are apparent as mid-August approaches, and by the end of the month maximum temperatures are often near 13°C (55°F)

and night-time minimum readings near 4°C (40°F). Except in the Lake Melville area the autumn shoulder of the summer season usually has begun by August 10 (Figure 34). By contrast, at Goose Bay and Northwest River the end of high summer and the beginning of the autumn shoulder usually does not occur until late August or early September.

The autumn shoulder ends with the beginning of winter (Figure 25), so that the length of the complete summer season (Figure 27) ranges from about 160 days along the south Labrador coast to about 120 days in western Labrador. Of this period, the length of high summer (Figure 29) ranges from about 60 days in the Goose Bay area to zero along the outer south Labrador coast.

Island of Newfoundland

The spring shoulder of the summer season begins over the southern sections of the Island in late April or early May (Figure 32), progressing regularly northward to reach central and northern parts of the Island by the end of May. Spring comes to the West Coast at about the same time as it does to the Avalon Peninsula, that is, ten to twenty days earlier than to nearby parts of the central and northern sections of the Island.

High summer follows on the date on which the mean daily maximum temperature reaches 18°C (65°F). Such dates are analyzed in Figure 33. This chart indicates that high summer comes first to central sections of the Island of Newfoundland from Deer Lake to Bishop's Falls. This area, remote from the cold sea, is representative of the interior of the Island.

The area of early arrival of high summer is displaced a little to the northeast of the centre of the Island by the prevailing southwesterly winds.

Along the South Coast and in the Strait of Belle Isle, where winds are frequently onshore, there is no high summer, as the average of the daily maximum temperatures does not reach 18°C (65°F) at the height of the summer. This effect is normally confined closely to the coastline, as several miles inland the warmth of the sun is felt in the afternoon almost as much as it is in central sections of the Island.

Temperatures fall in late August and early September, but it is in the centre of the Island again and along the southern shore of Conception Bay that afternoons remain warm through the first week of September, thus delaying the arrival of the autumn shoulder of the summer season (Figure 34).

The autumn shoulder ends with the beginning of winter (Figure 25), so that the length of the complete summer season (Figure 27) ranges from about 220 days over southeast coastal regions of the Island to about 160 days over the Great Northern Peninsula. Of this period, the length of high summer (Figure 29) ranges from about 80 days in the central, interior parts of the Island to zero along some of the exposed outer coastal islands.

(e) Comparison of Lengths of Summer and Winter Seasons

It is interesting to see at a glance a comparison of the lengths of the complete summer and winter season as is mapped in Figure 35. Summer is equal in length to winter along the line drawn just north of Baie Verte and Daniel's Harbour. On the Avalon Peninsula and the West Coast summer is two months or more longer than winter, whereas in Labrador west and north of Goose Bay the winter is two months or more longer than summer.

TABLE 2

COMPARISON OF LENGTHS OF PERIODS WHEN MEAN DAILY TEMPERATURE IS LESS THAN 0°C (32°F) AND MEAN DAILY MAXIMUM IS LESS THAN 0°C (32°F)

Station	Mean daily temp. falls to 0°C	Mean daily max. falls to 0°C	Difference	Mean daily max. rises to 0°C	Mean daily temp. rises to 0°C	Difference
Wabush Lake	Oct. 16	Oct. 30	14	Apr. 13	May 6	23
Churchill Falls	Oct. 16	Nov. 1	16	Apr. 18	May 7	19
Goose Bay	Nov. 1	Nov. 15	14	Apr. 1	Apr. 25	24
Cartwright	Nov. 6	Nov. 22	16	Apr. 6	Apr. 29	23
Daniel's Harbour	Nov. 29	Dec. 15	16	Mar. 21	Apr. 15	25
Stephenville	Dec. 3	Dec. 22	19	Mar. 6	Apr. 4	29
Deer Lake	Nov. 24	Dec. 12	18	Mar. 7	Apr. 11	35
Buchans	Nov. 18	Dec. 6	18	Mar. 26	Apr. 20	25
Grand Falls	Nov. 29	Dec. 18	20	Mar. 6	Apr. 8	29
Gander	Nov. 27	Dec. 14	17	Mar. 12	Apr. 11	30
St. John's	Dec. 8	Jan. 6	29	Mar. 2	Apr. 8	37

TABLE 3

MEAN BEGINNING AND ENDING DATES OF SEASONS AND SEASON LENGTHS

Locality	MEAN DATES					LENGTHS OF SEASONS IN DAYS				
	WINTER		COMPLETE SUMMER							
	First day	Last day	Spring shoulder First day	High summer First day	High summer Last day	Winter	Spring shoulder	High summer	Autumn shoulder	Complete summer
LABRADOR										
NORTHERN HALF OF COAST										
Hebron	Oct. 16	Jun. 10	Jun. 25	NHS	NHS	238	-	0	-	113
Nain	Oct. 13	Jun. 10	Jun. 25	NHS	NHS	241	-	0	-	110
Hopedale	Oct. 25	May 31	Jun. 15	NHS	NHS	219	-	0	-	132
Cape Harrison	Oct. 25	Jun. 6	Jun. 21	NHS	NHS	225	-	0	-	126
SOUTHERN HALF OF COAST										
Northwest River	Oct. 30	May 15	May 30	Jul. 2	Sep. 9	198	33	70	50	153
Goose Bay	Oct. 23	May 15	May 30	Jun. 28	Aug. 23	205	29	57	60	146
Cartwright	Oct. 27	May 20	Jun. 4	Jul. 14	Aug. 8	206	40	26	79	145
Battle Harbour (Loran)	Nov. 4	May 19	Jun. 3	NHS	NHS	197	-	0	-	154
INTERIOR PLATEAU										
Fort Chimo (P.Q.)	Oct. 13	May 22	Jun. 6	NHS	NHS	222	-	0	-	129
Indian House Lake (P.Q.)	Oct. 8	Jun. 6	Jun. 21	NHS	NHS	242	-	0	-	109
Border (P.Q.)	Oct. 8	Jun. 7	Jun. 22	NHS	NHS	243	-	0	-	108
Schefferville (P.Q.)	Sep. 27	May 27	Jun. 11	NHS	NHS	243	-	0	-	108
Churchill Falls	Oct. 13	May 26	Jun. 10	Jul. 12	Aug. 9	226	32	29	64	125
Wabush Lake	Oct. 12	May 25	Jun. 9	Jul. 13	Aug. 7	226	34	26	65	125
Lake Eon (P.Q.)	Oct. 14	May 23	Jun. 7	Jul. 15	Aug. 5	222	38	22	69	129

Table 3 (Cont'd)

Locality	MEAN DATES					LENGTHS OF SEASONS IN DAYS				
	WINTER		COMPLETE SUMMER							
	First day	Last day	Spring shoulder First day	High summer First day	High summer Last day	Winter	Spring shoulder	High summer	Autumn shoulder	Complete summer
ISLAND OF NEWFOUNDLAND										
WEST COAST										
Daniel's Harbour	Nov. 19	Apr. 12	Apr. 27	Jul. 22	Aug. 10	145	86	20	100	206
Stephenville	Nov. 20	Apr. 15	Apr. 30	Jul. 6	Aug. 28	147	67	54	83	204
St. Georges	Nov. 24	Apr. 15	Apr. 30	Jul. 14	Aug. 20	143	75	38	95	208
St. Andrews	Nov. 29	Apr. 24	May 9	Jul. 9	Aug. 27	147	61	50	93	204
EAST COAST										
St. Anthony	Nov. 13	May 4	May 19	Jul. 25	Aug. 3	173	67	10	101	178
Springdale	Nov. 17	May 8	May 23	Jun. 19	Sep. 6	173	27	80	71	178
Twillingate	Nov. 14	May 3	May 18	Jul. 9	Aug. 21	171	52	44	84	180
Terra Nova National Park	Nov. 20	Apr. 29	May 14	Jun. 24	Sep. 5	161	41	74	75	190
Bonavista	Nov. 24	May 6	May 21	Jul. 12	Aug. 18	164	52	38	97	187
SOUTH COAST AND AVALON										
St. John's A	Nov. 28	May 4	May 19	Jul. 5	Aug. 26	158	47	53	93	193
Argentia	Dec. 5	Apr. 8	Apr. 23	NHS	NHS	125	-	0	-	226
St. Lawrence	Nov. 26	Apr. 9	Apr. 24	NHS	NHS	135	-	0	-	216
Grand Bank	Nov. 27	Apr. 11	Apr. 26	Jul. 14	Aug. 25	136	79	43	93	215
Burgeo	Nov. 26	Apr. 21	May 6	NHS	NHS	147	-	0	-	204
GRAND LAKE LOWLANDS										
Deer Lake A	Nov. 21	Apr. 30	May 15	Jun. 16	Sep. 6	161	32	83	75	190

Table 3 (Cont'd)

Locality	MEAN DATES					LENGTHS OF SEASONS IN DAYS				
	WINTER		COMPLETE SUMMER							
	First day	Last day	Spring shoulder First day	High summer First day	High summer Last day	Winter	Spring shoulder	High summer	Autumn shoulder	Complete summer
INTERIOR										
Buchans	Nov. 16	May 5	May 20	Jun. 27	Aug. 29	171	38	64	78	180
Grand Falls	Nov. 22	Apr. 30	May 15	Jun. 19	Sep. 9	160	35	83	73	191
Rattling Brook	Nov. 21	Apr. 29	May 14	Jun. 14	Sep. 9	160	31	88	72	191
Gander	Nov. 2	May 6	May 21	Jun. 25	Sep. 2	186	35	70	60	165
MARITIMES										
Halifax, N.S.	Dec. 5	Apr. 3	Apr. 18	Jun. 10	Sep. 22	120	53	105	73	231
Fredericton, N.B.	Nov. 20	Apr. 13	Apr. 28	May 22	Sep. 21	145	24	123	59	206
Charlottetown, P.E.I.	Nov. 20	Apr. 19	May 4	Jun. 13	Sep. 15	151	40	95	65	200

NHS - no high summer

TABLE 4

LENGTH OF PERIOD MEAN DAILY MAXIMUM TEMPERATURE IS HIGHER THAN 15½°C (60°F) AT STATIONS WITH NO HIGH SUMMER

Station	Period mean daily maximum temperature exceeds 15½°C(60°F)	No. of days
Fort Chimo (P.Q.)	July 6 - Aug. 14	39
Nain	July 16 - Aug. 14	29
Indian House Lake (P.Q.)	July 3 - Aug. 14	42
Hopedale	July 20 - Aug. 6	17
Cape Harrison	July 6 - Aug. 24	49
Border (P.Q.)	July 10 - Aug. 8	29
Schefferville (P.Q.)	July 1 - Aug. 13	44
Menihek Rapids	July 2 - Aug. 14	44
Harrington Hr. (P.Q.)	July 16 - Aug. 20	35
Gethsemanie (P.Q.)	July 10 - Aug. 24	45
Burgeo	July 12 - Sept. 10	60
Burin	July 8 - Sept. 6	60
Argentia	July 9 - Sept. 11	64
Cape Race	July 18 - Sept. 2	46

TABLE 5

EXTREME ANNUAL MAXIMUM AND MINIMUM TEMPERATURE
AT SELECTED STATIONS

	°C	°F		°C	°F
LABRADOR					
Northern Half of Coast			*Interior Plateau*		
Hopedale	33.3/-40.0	92/-40	Fort Chimo, P.Q.	32.2/-46.7	90/-52
Cape Harrison	36.7/-35.6	98/-32	Schefferville, P.Q.	31.7/-50.6	89/-59
			Wabush Lake	31.1/-47.8	88/-54
Southern Half of Coast			Churchill Falls (Twin Falls)	30.6/-43.9	87/-47
Goose Bay	37.8/-39.4	100/-39	Lake Eon, P.Q.	28.9/-46.1	84/-51
Cartwright	36.1/-37.8	97/-36			
Battle Harbour	28.9/-32.8	84/-27			
ISLAND OF NEWFOUNDLAND					
West Coast			*South Coast and Avalon*		
Daniel's Harbour	28.9/-39.4	84/-39	St. John's A	30.6/-23.3	87/-10
Corner Brook	34.4/-31.7	94/-25	Argentia	26.1/-20.0	79/- 4
Stephenville	30.6/-27.2	87/-17	Grand Bank	30.0/-20.0	86/- 4
St. Andrews	32.2/-28.9	90/-20	Burgeo	26.1/-23.9	79/-11
East Coast			*Interior*		
St. Anthony	31.1/-32.2	88/-26	Gander	35.6/-27.2	96/-17*
Twillingate	34.4/-26.1	94/-15	Grand Falls	34.4/-33.3	94/-28
Bonavista	30.6/-24.4	87/-12	Buchans	34.4/-37.2	94/-35
Grand Lake Lowlands					
Deer Lake	35.6/-37.2	96/-35			

Records to 1970
* New record low -30.9°C (-24°F) February 1975.

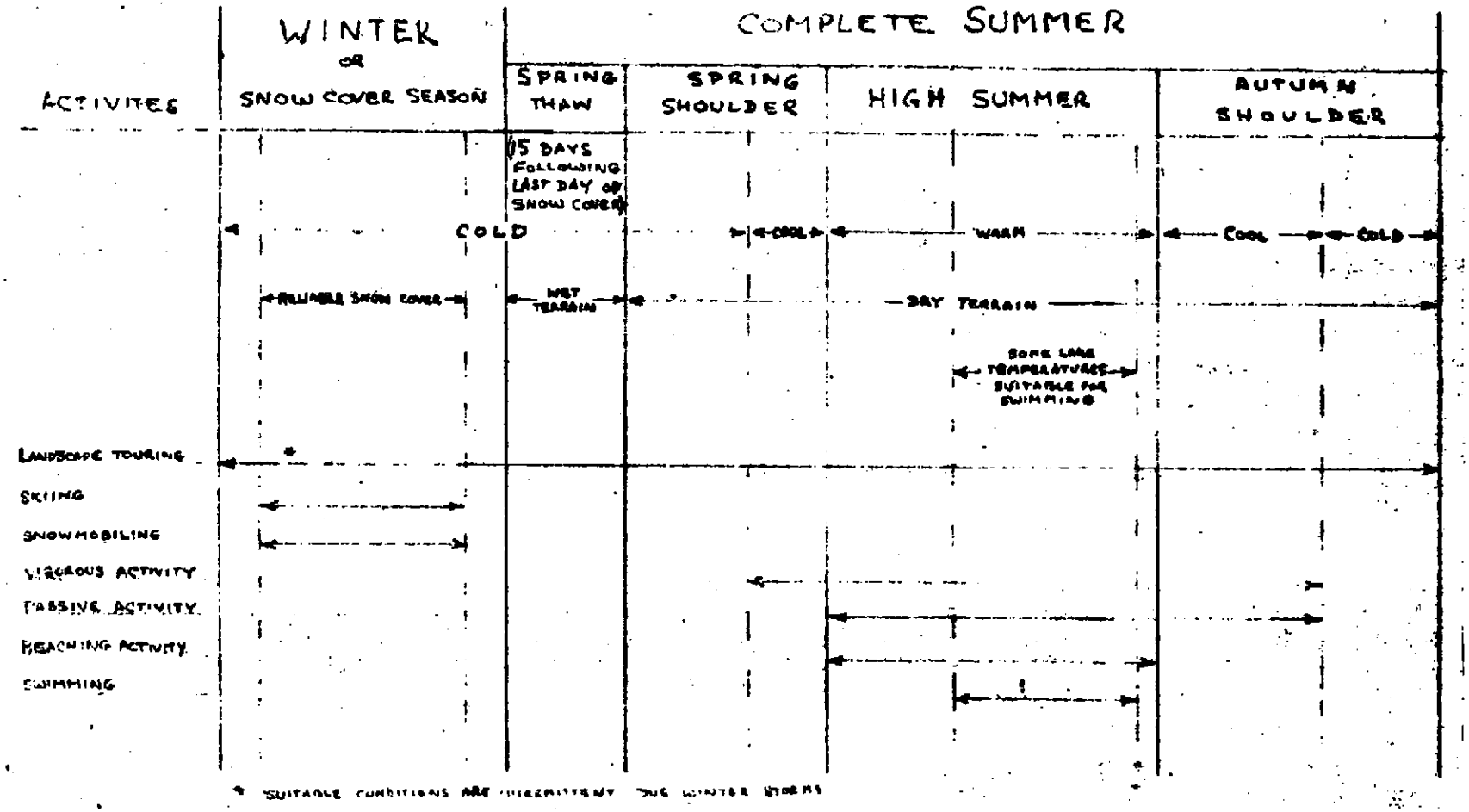


FIG. 4 TOURISM AND RECREATION SEASONS

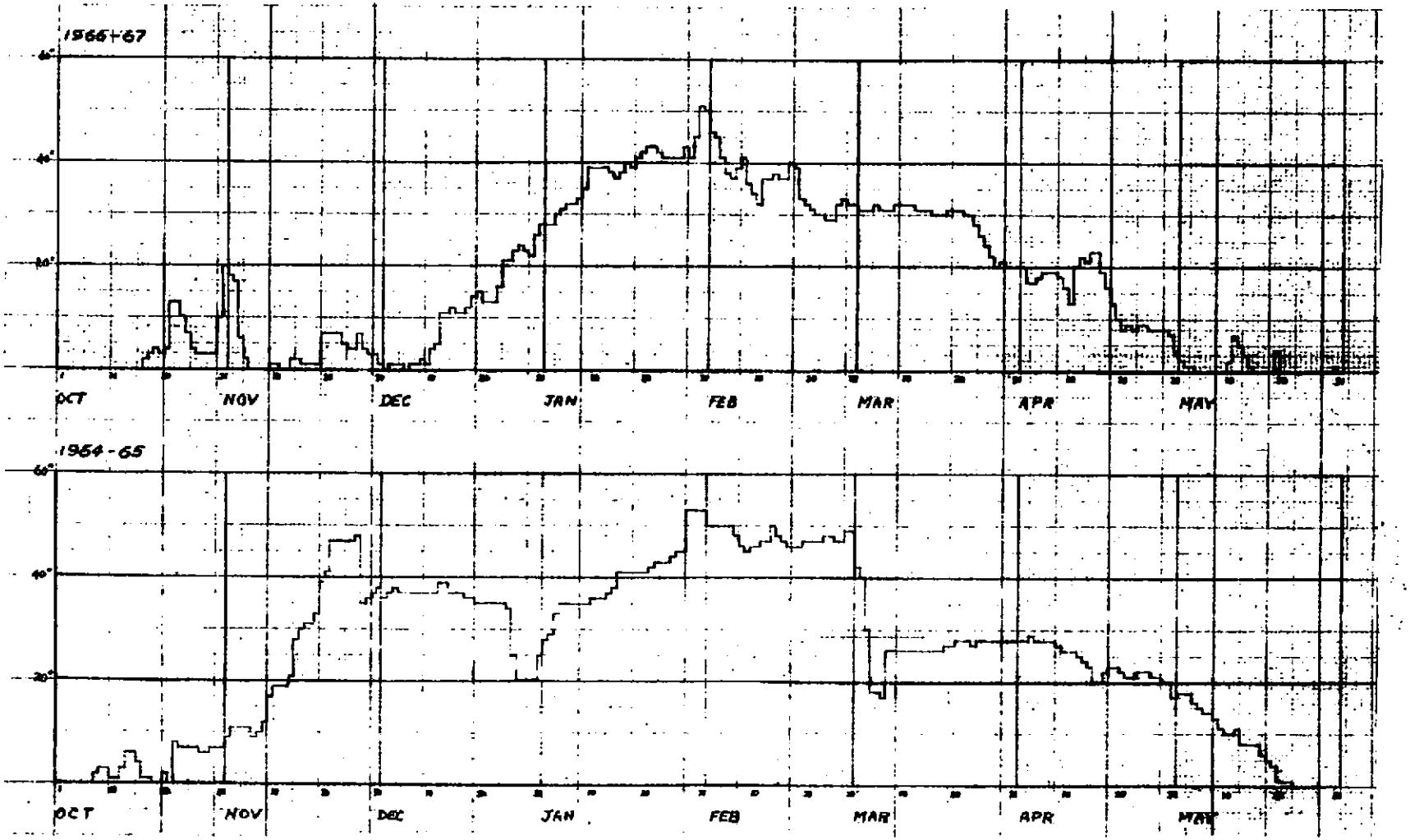


FIG. 5 DAILY SNOW DEPTHS FOR TYPICAL WINTERS OF LIGHT AND HEAVY SNOW COVER - WABUSH LAKE

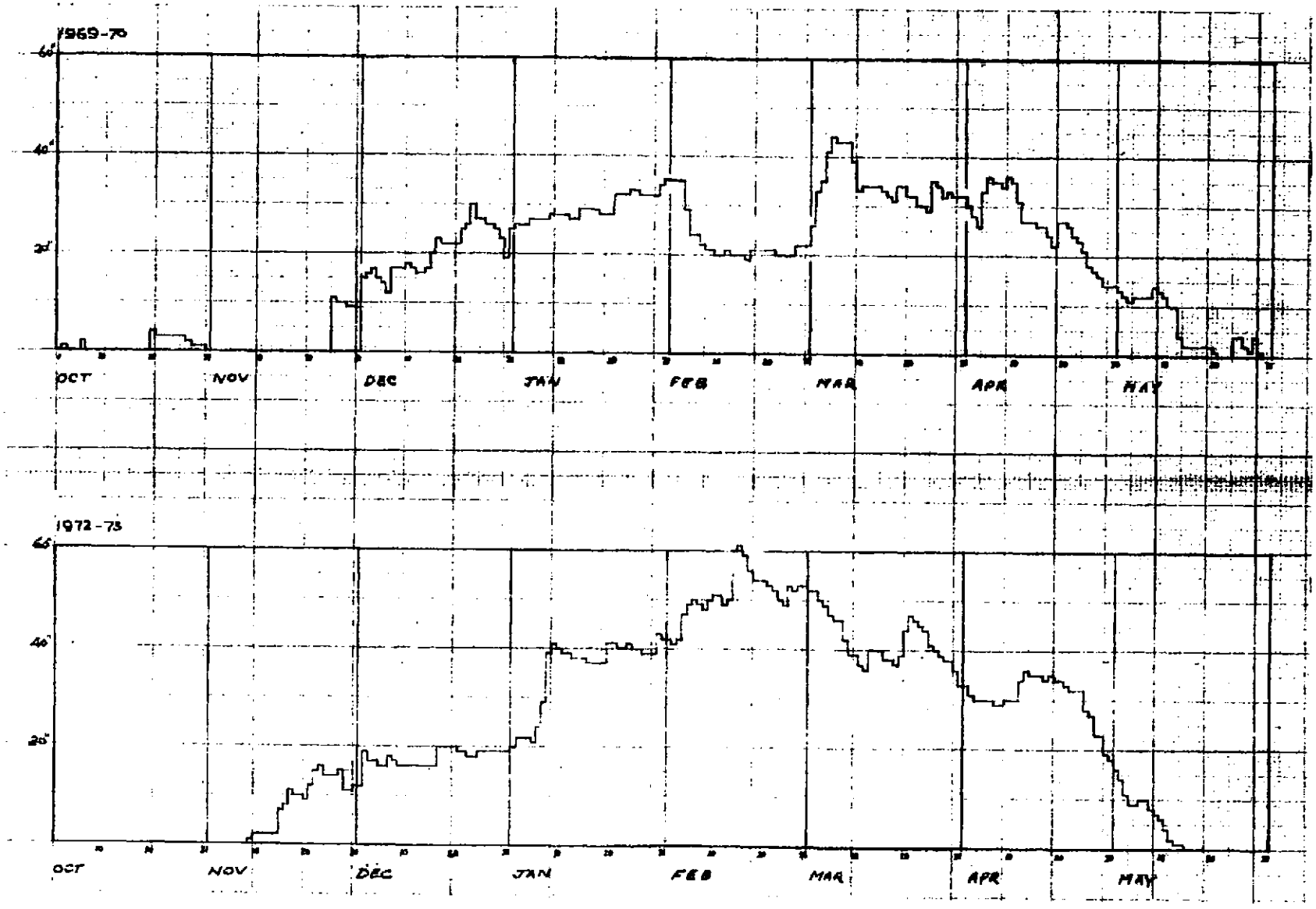


FIG. 6 DAILY SNOW DEPTHS FOR TYPICAL WINTERS OF LIGHT AND HEAVY SNOW COVER - GOOSE BAY

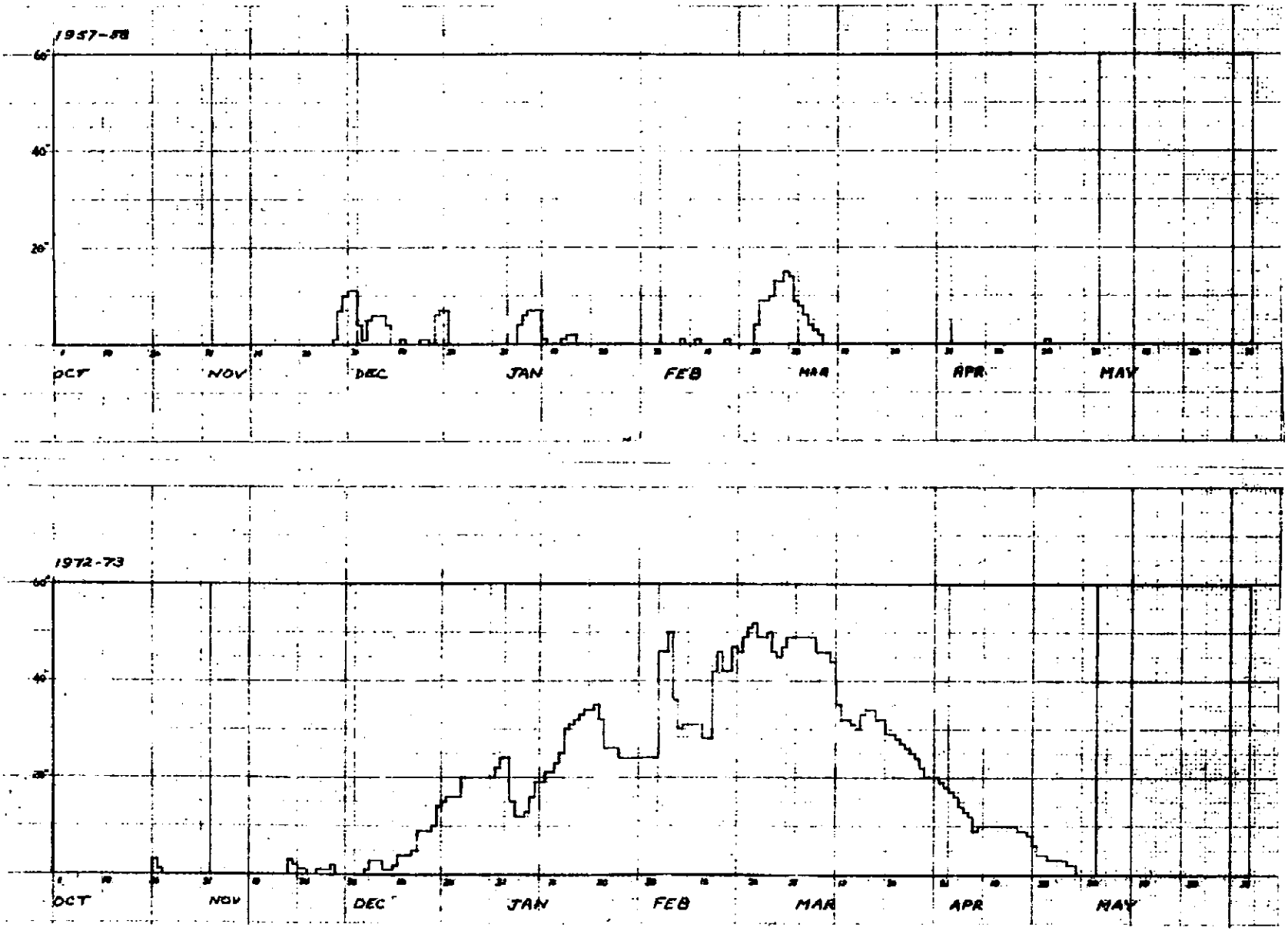


FIG. 7 DAILY SNOW DEPTHS FOR TYPICAL WINTERS OF LIGHT AND HEAVY SNOW COVER - STEPHENVILLE

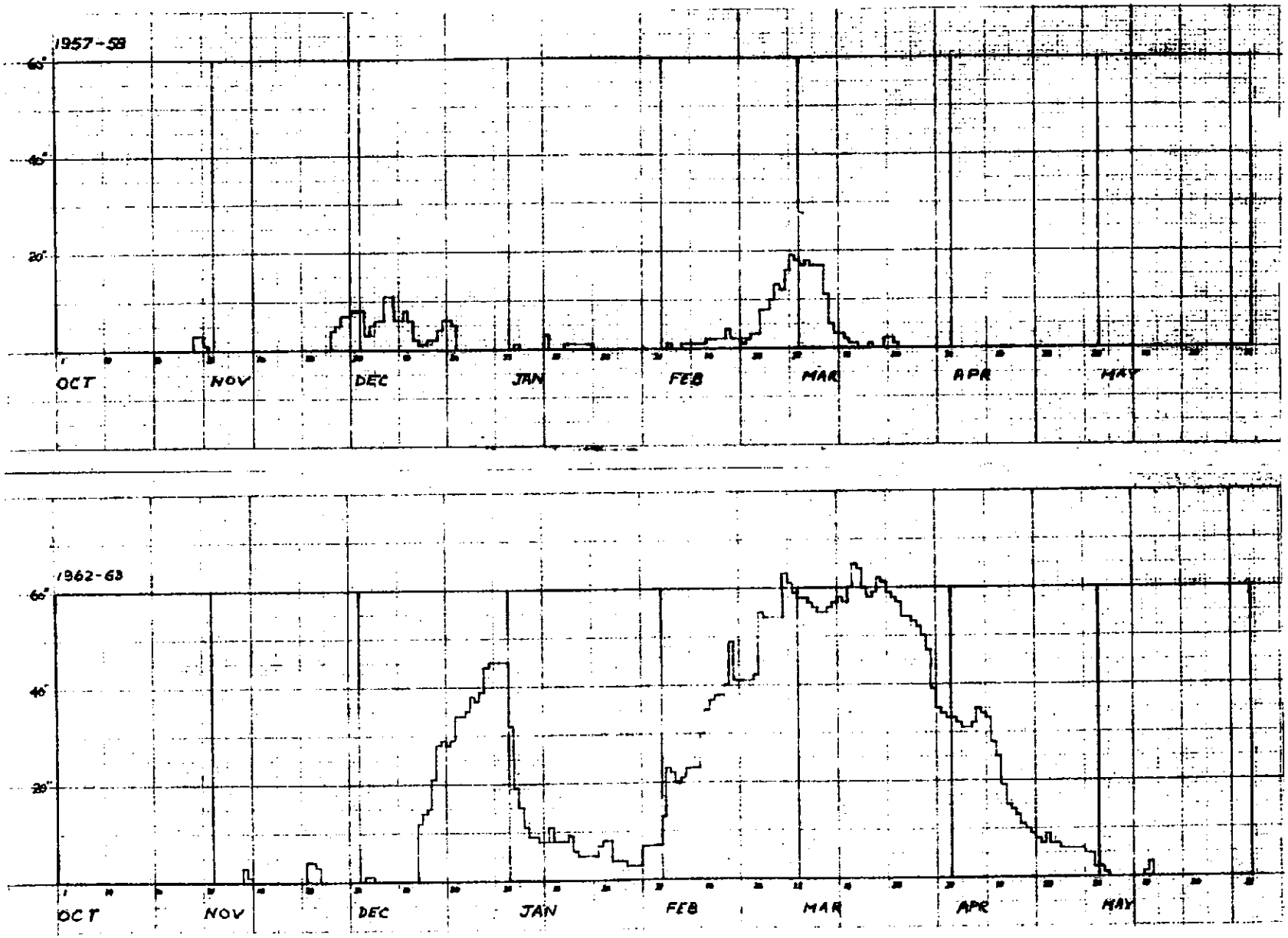


FIG. 3 DAILY SNOW DEPTHS FOR TYPICAL WINTERS OF LIGHT AND HEAVY SNOW COVER - BUCHANS

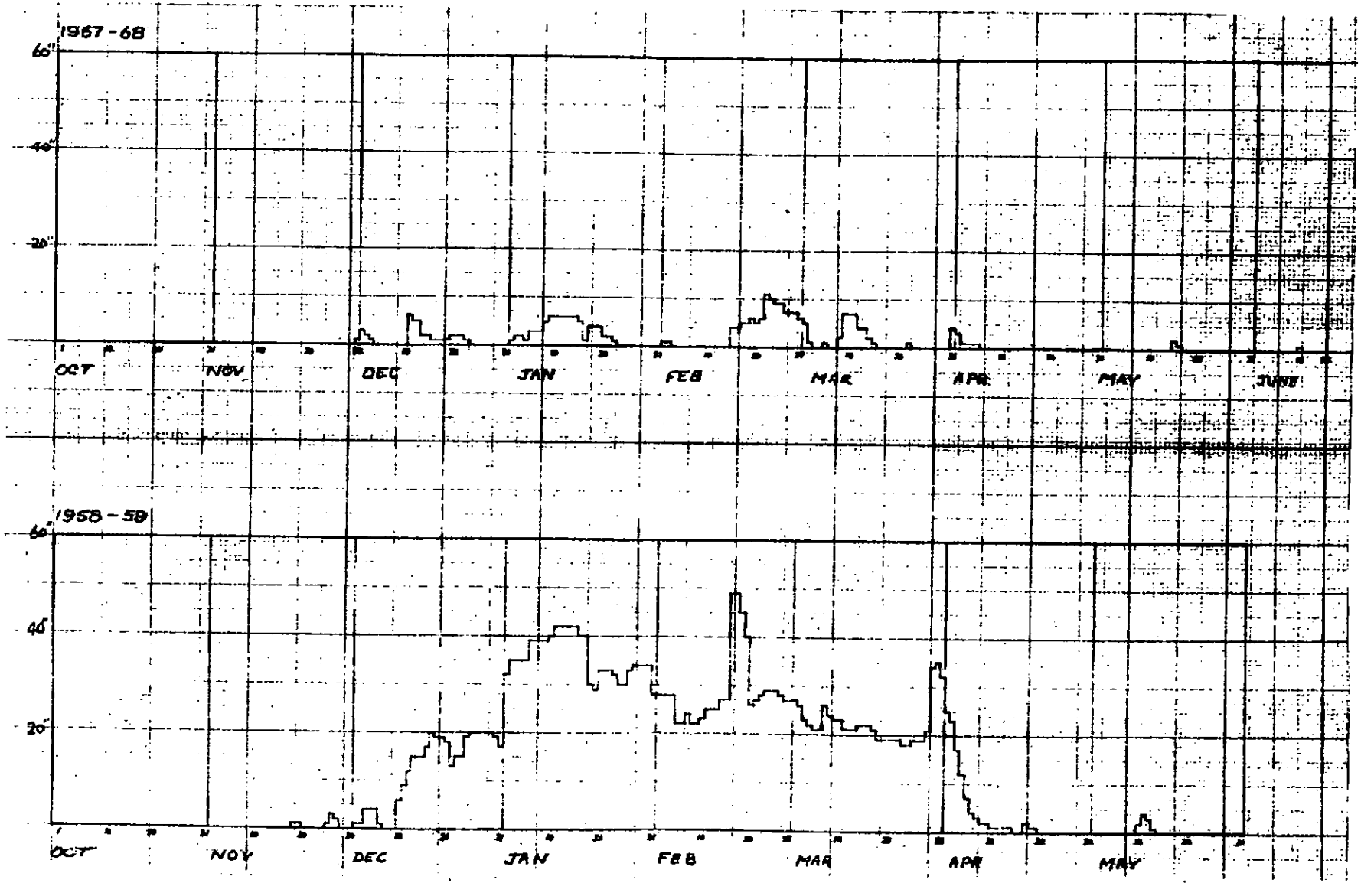


FIG. 9 DAILY SNOW DEPTHS FOR TYPICAL WINTERS OF LIGHT AND HEAVY SNOW COVER - ST. JOHN'S

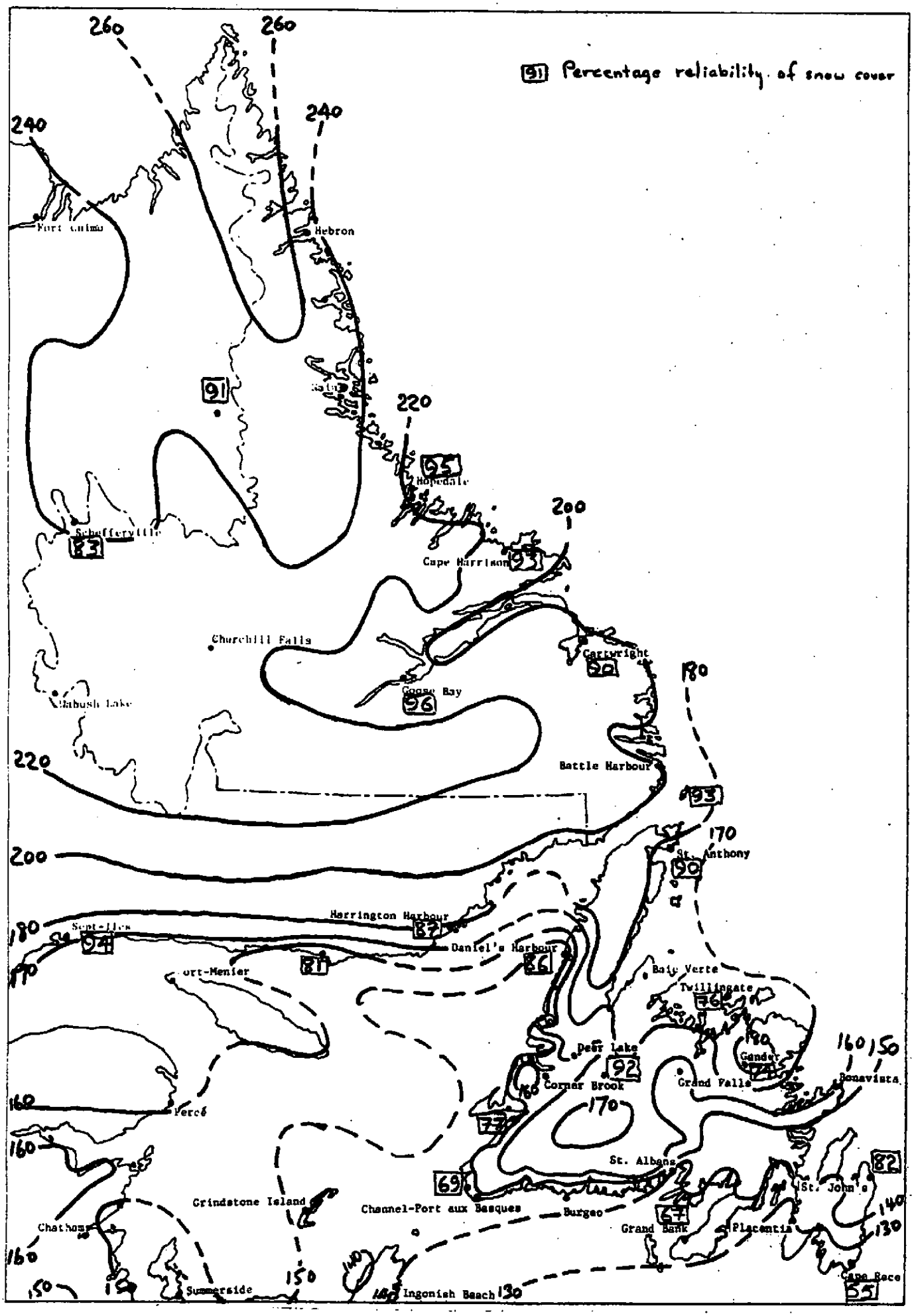


FIG. 10 MEAN LENGTH OF THE WINTER SEASON AND PERCENTAGE RELIABILITY OF A SNOW COVER

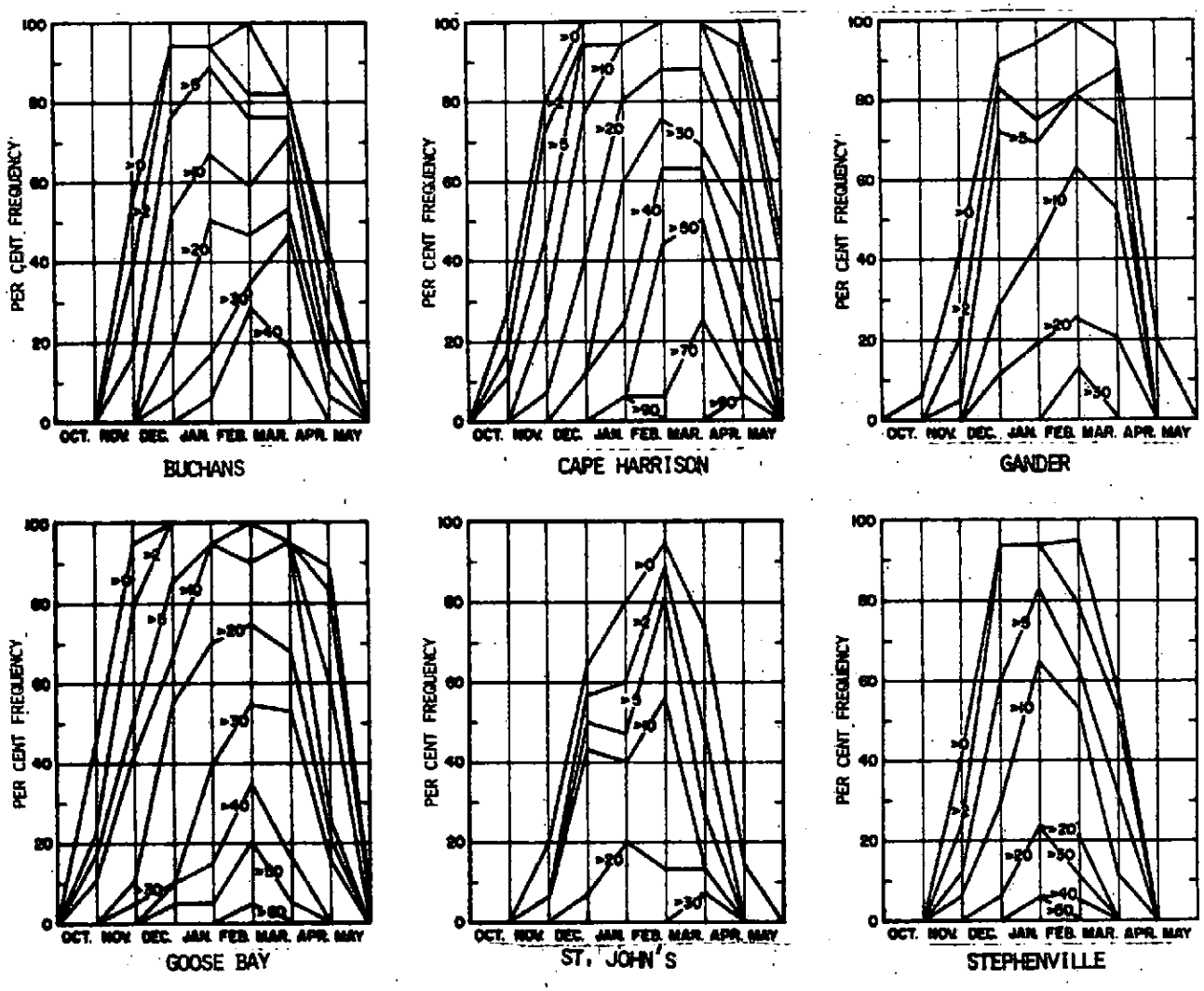


FIG. 11 PERCENTAGE FREQUENCY OF SNOW COVER THROUGH THE WINTER AT SIX LOCALITIES

(POTTER, 1965)

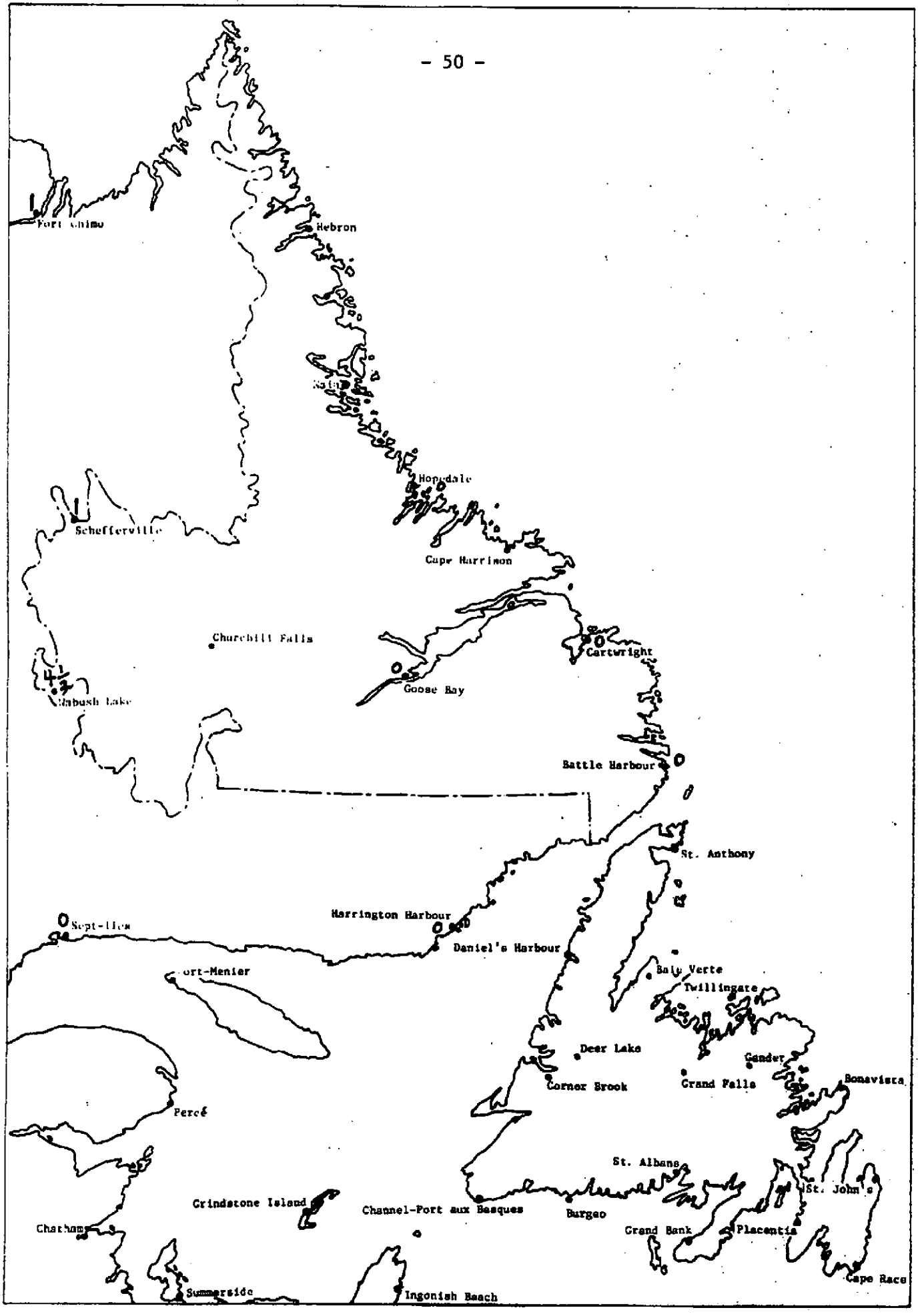


FIG. 12 MEDIAN DEPTH OF SNOW COVER AT THE END OF OCTOBER

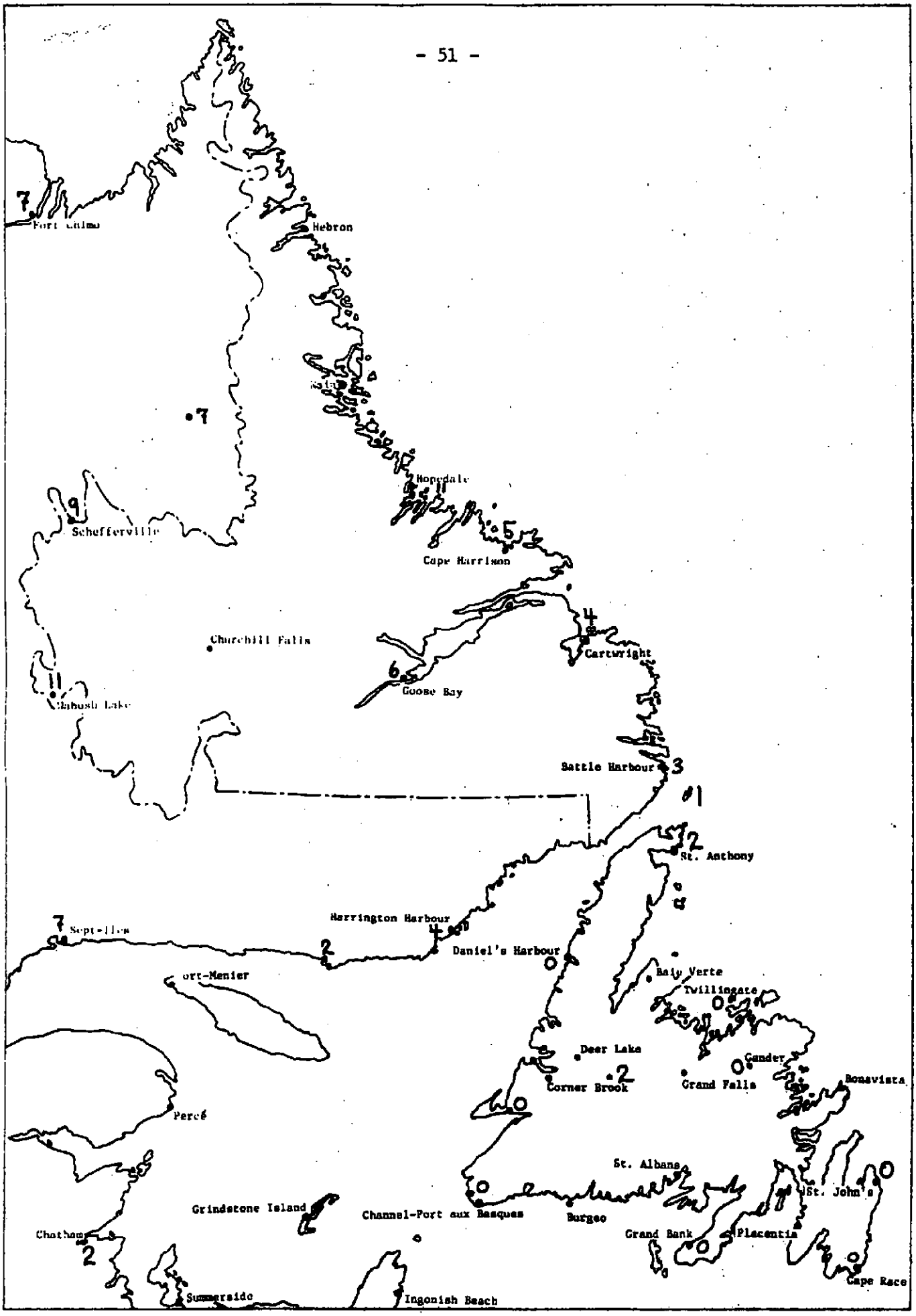


FIG. 13 MEDIAN DEPTH OF SNOW COVER AT THE END OF NOVEMBER

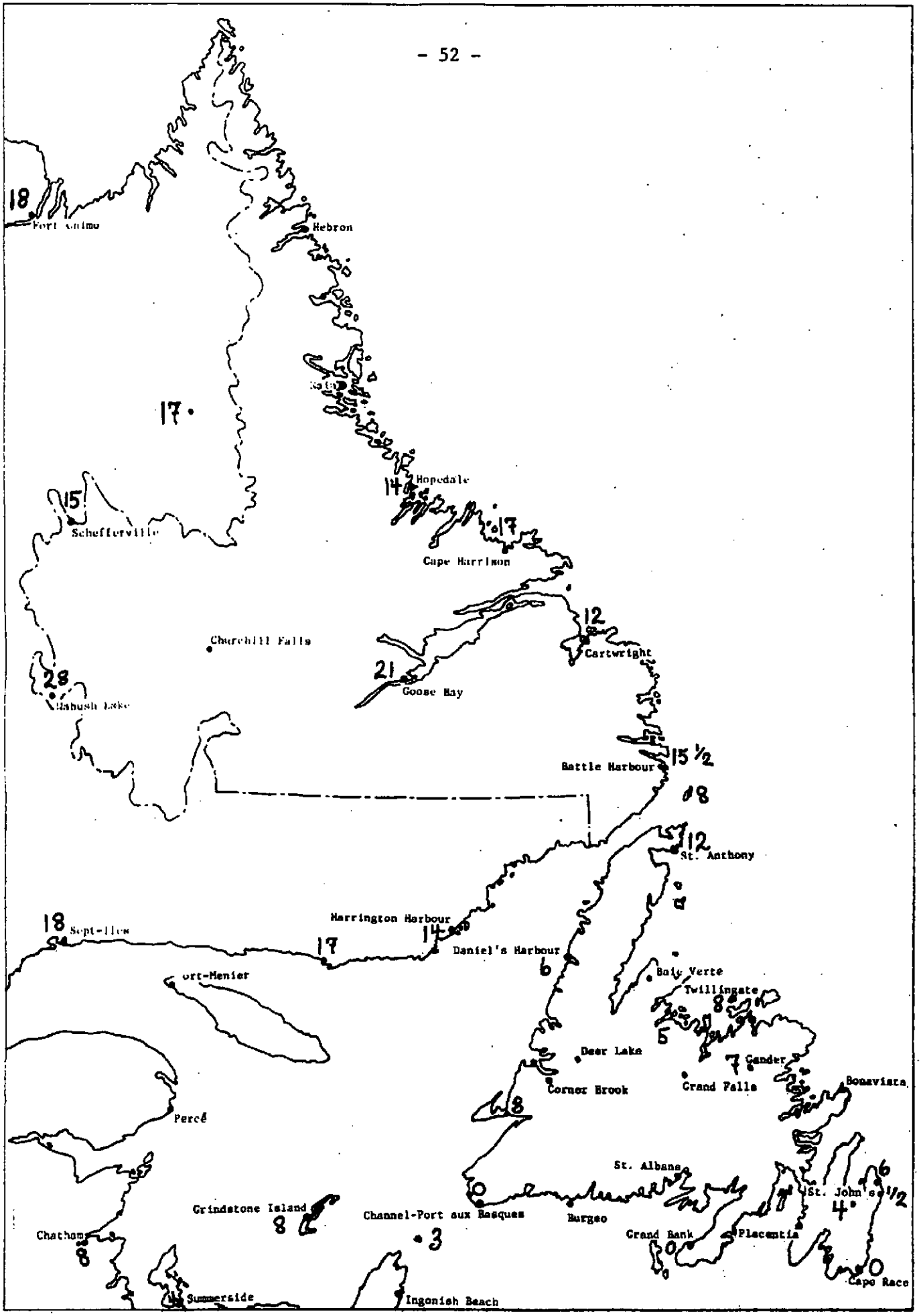


FIG. 14 MEDIAN DEPTH OF SNOW COVER AT THE END OF DECEMBER

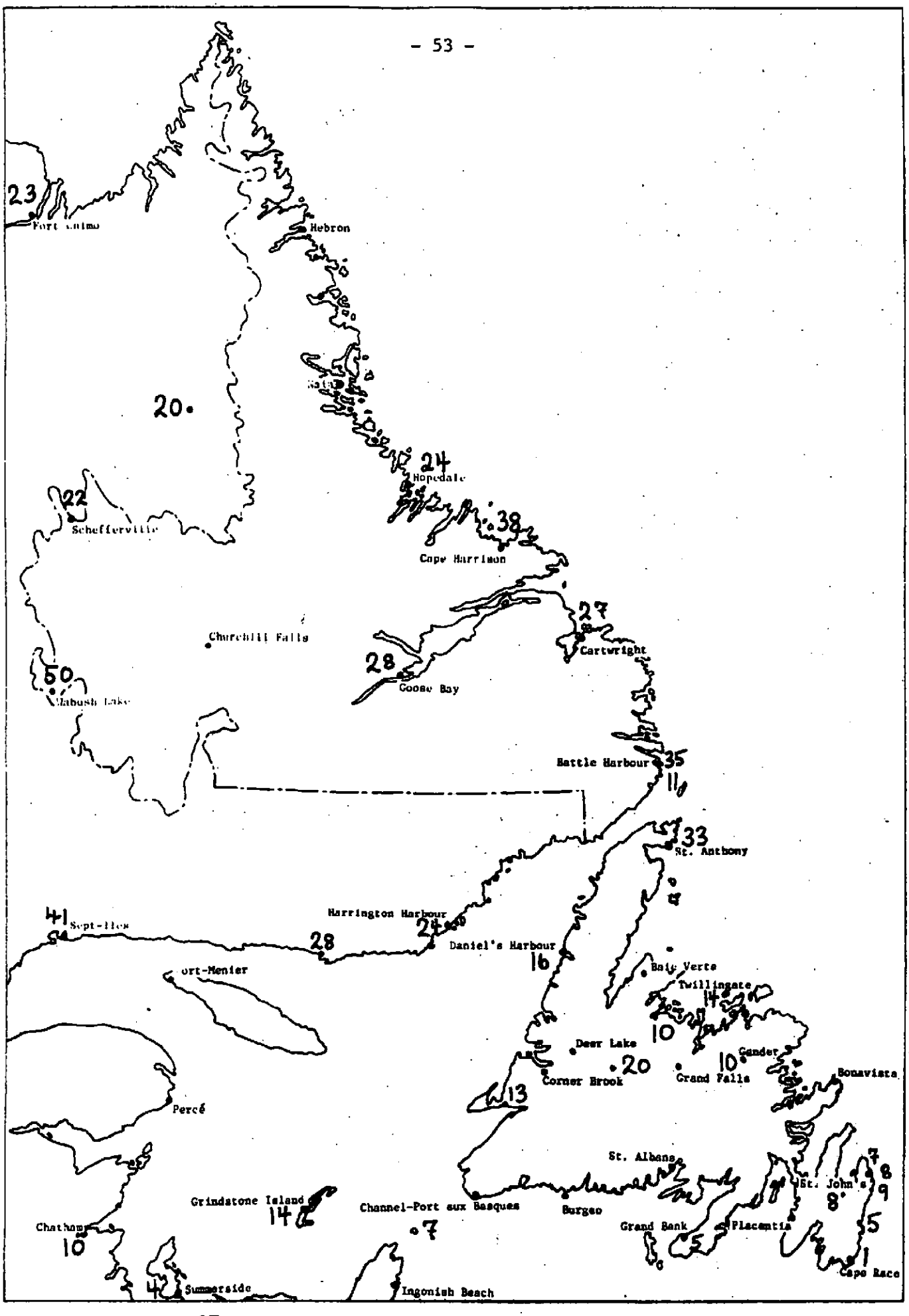


FIG. 15 MEDIAN DEPTH OF SNOW COVER AT THE END OF JANUARY

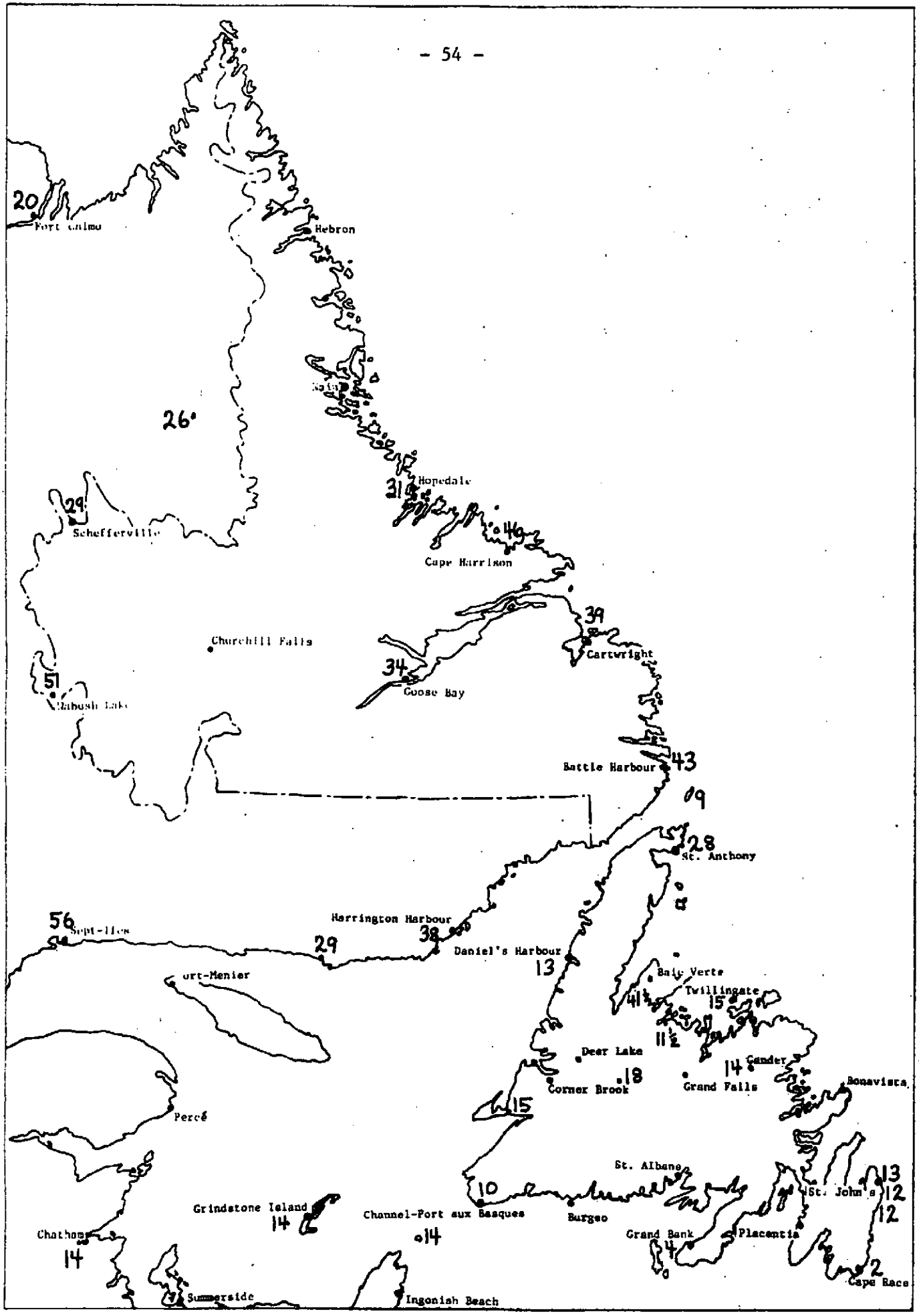


FIG. 16 MEDIAN DEPTH OF SNOW COVER AT THE END OF FEBRUARY

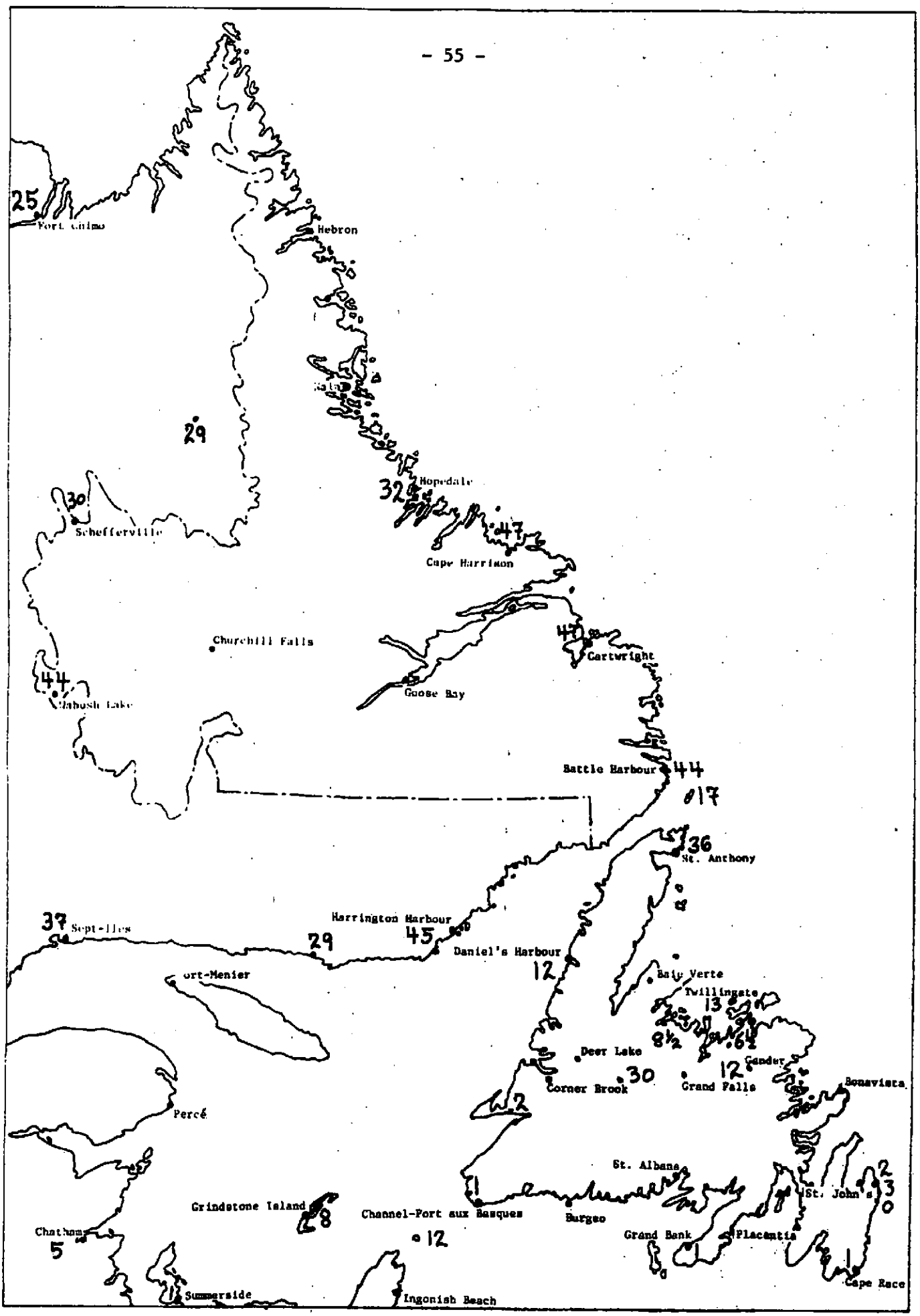


FIG. 17 MEDIAN DEPTH OF SNOW COVER AT THE END OF MARCH

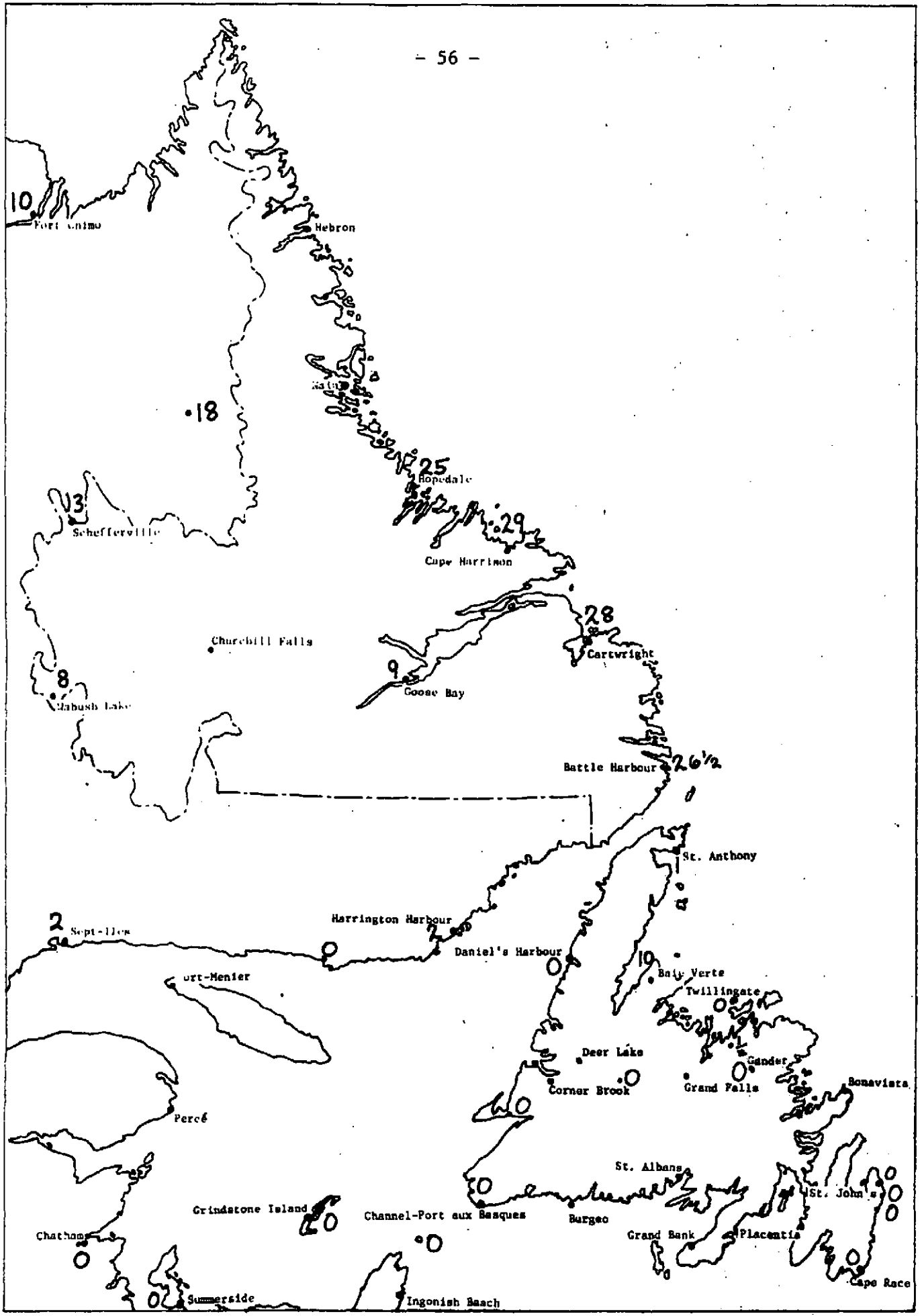


FIG. 18 MEDIAN DEPTH OF SNOW COVER AT THE END OF APRIL

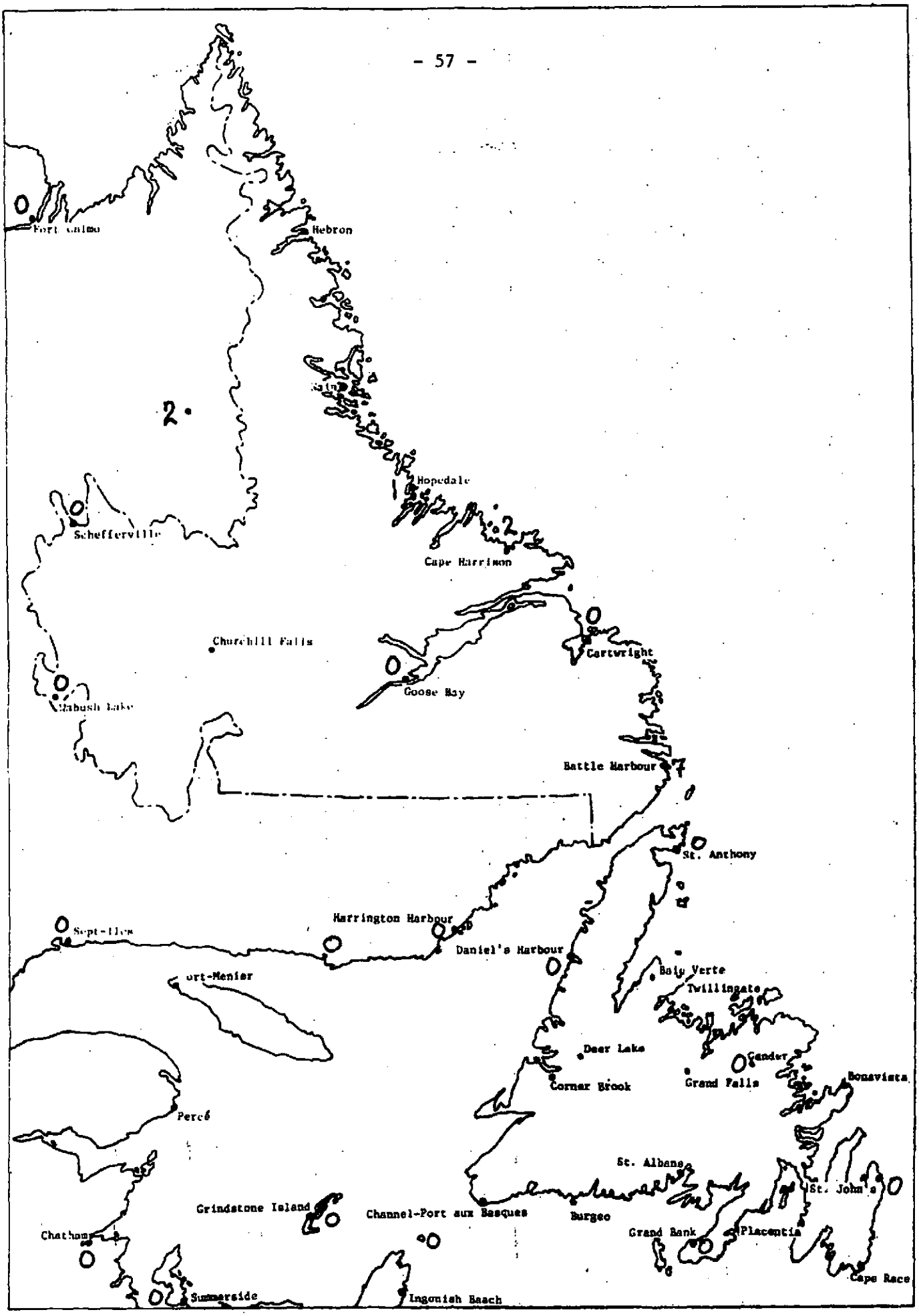


FIG. 19 MEDIAN DEPTH OF SNOW COVER AT THE END OF MAY

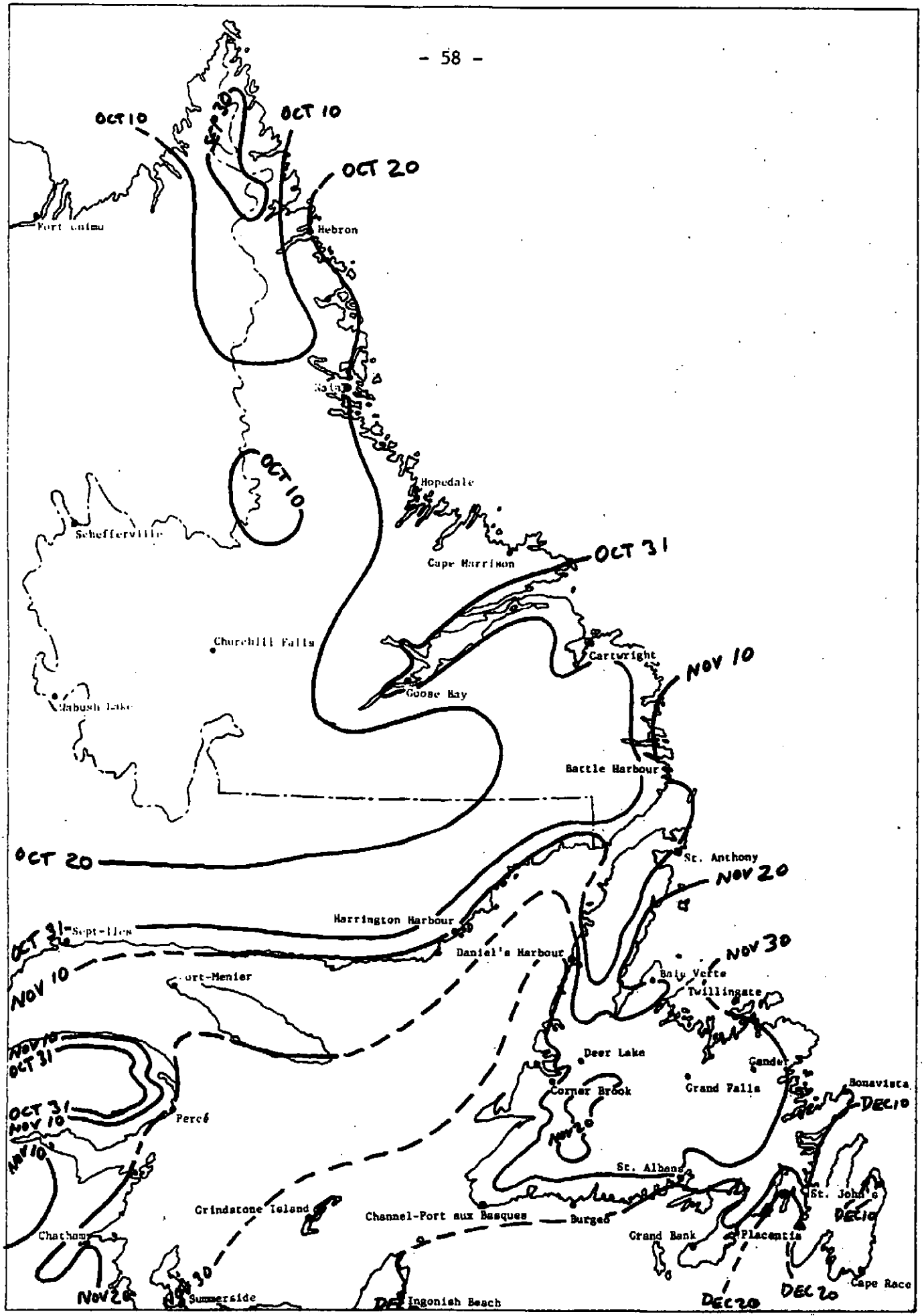


FIG. 20 DATE IN AUTUMN ON WHICH MEAN DAILY TEMPERATURE FALLS TO $0^{o}C$ ($32^{o}F$)

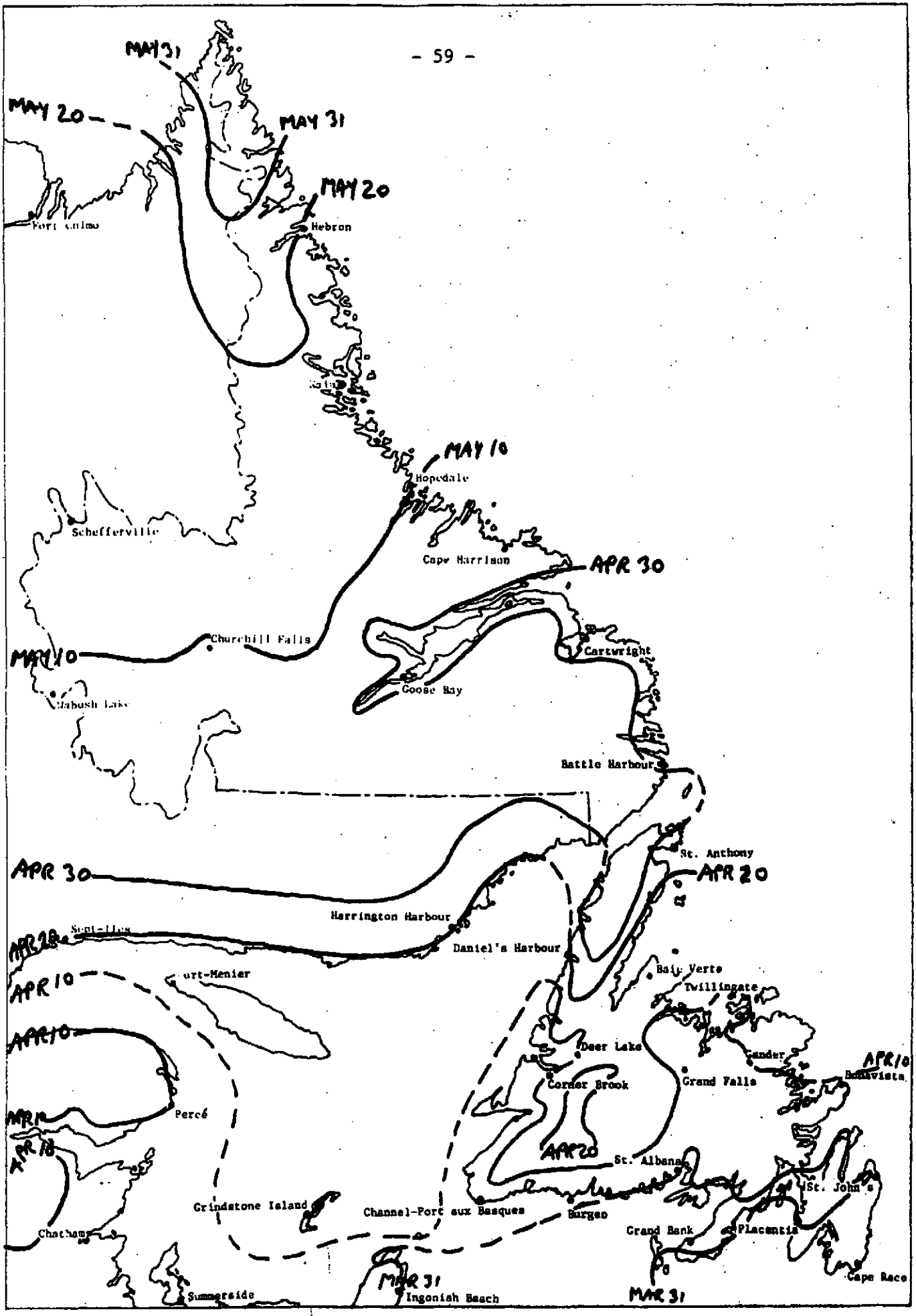


FIG. 21 DATE IN SPRING ON WHICH MEAN DAILY TEMPERATURE RISES TO 0^{0}C (32^{0}F).

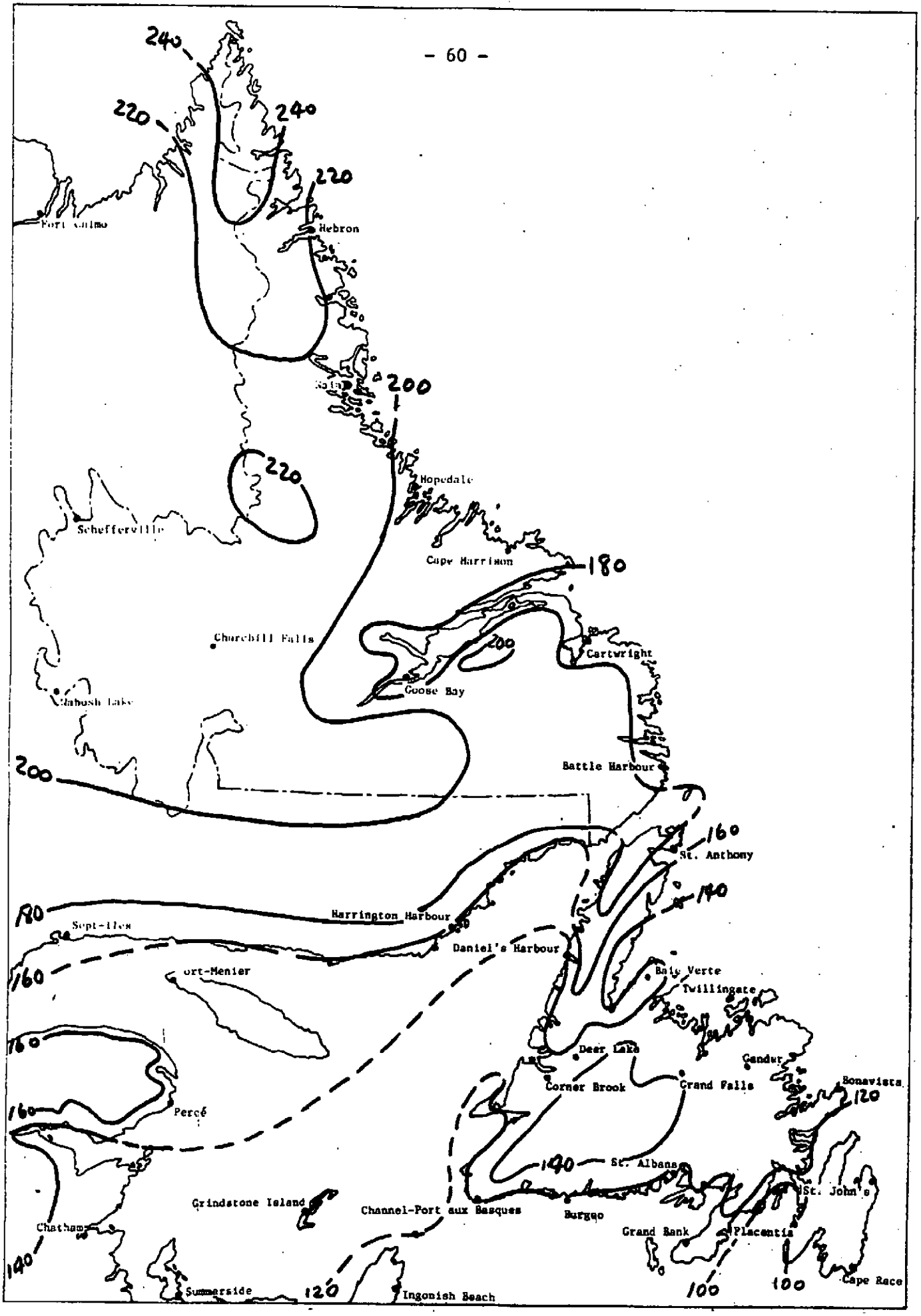


FIG. 22 LENGTH OF PERIOD MEAN DAILY TEMPERATURE IS LESS THAN $0^{0}C$ ($32^{0}F$)

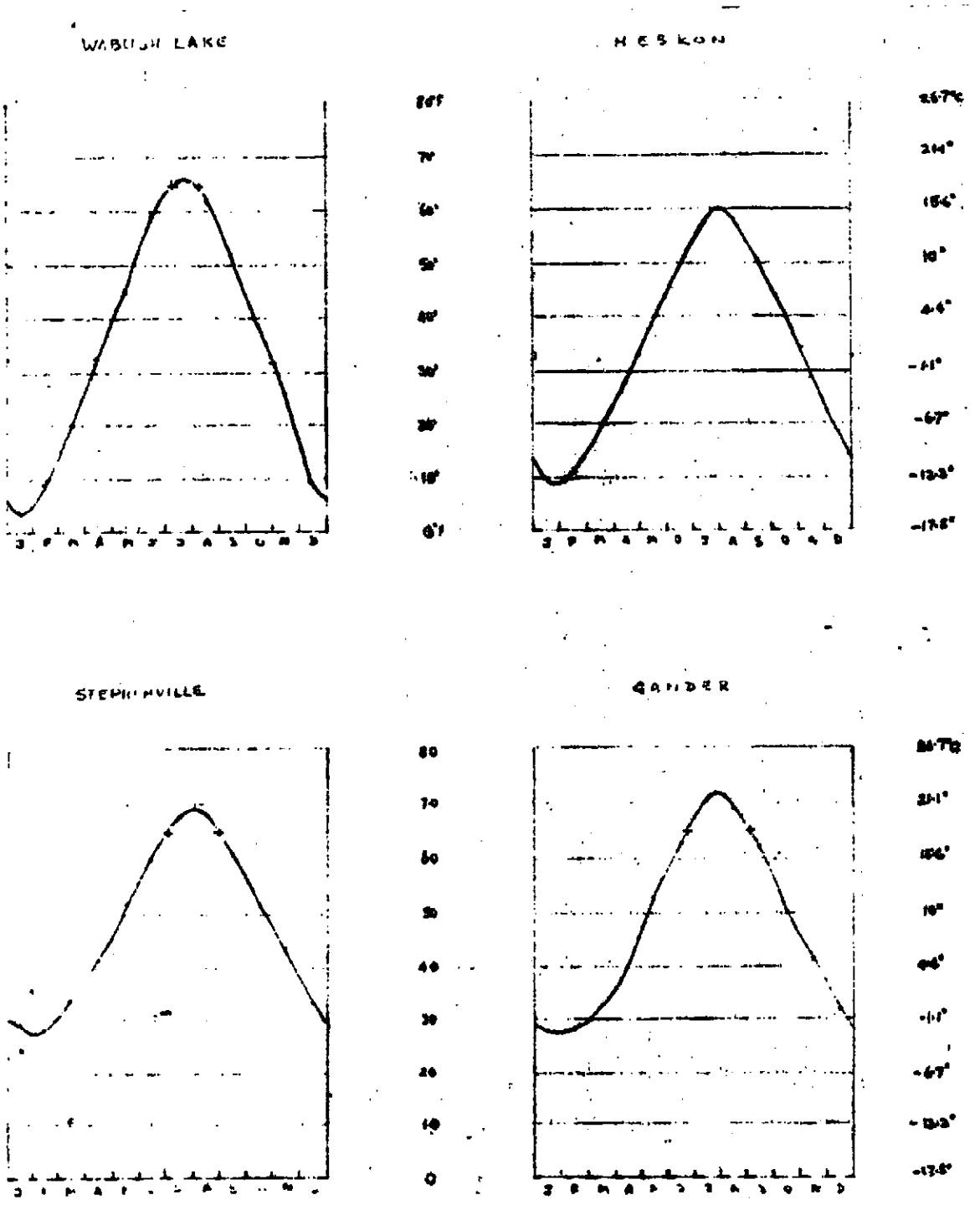


FIG. 23 MEAN DAILY MAXIMUM TEMPERATURE BY MONTHS AT FOUR REPRESENTATIVE STATIONS

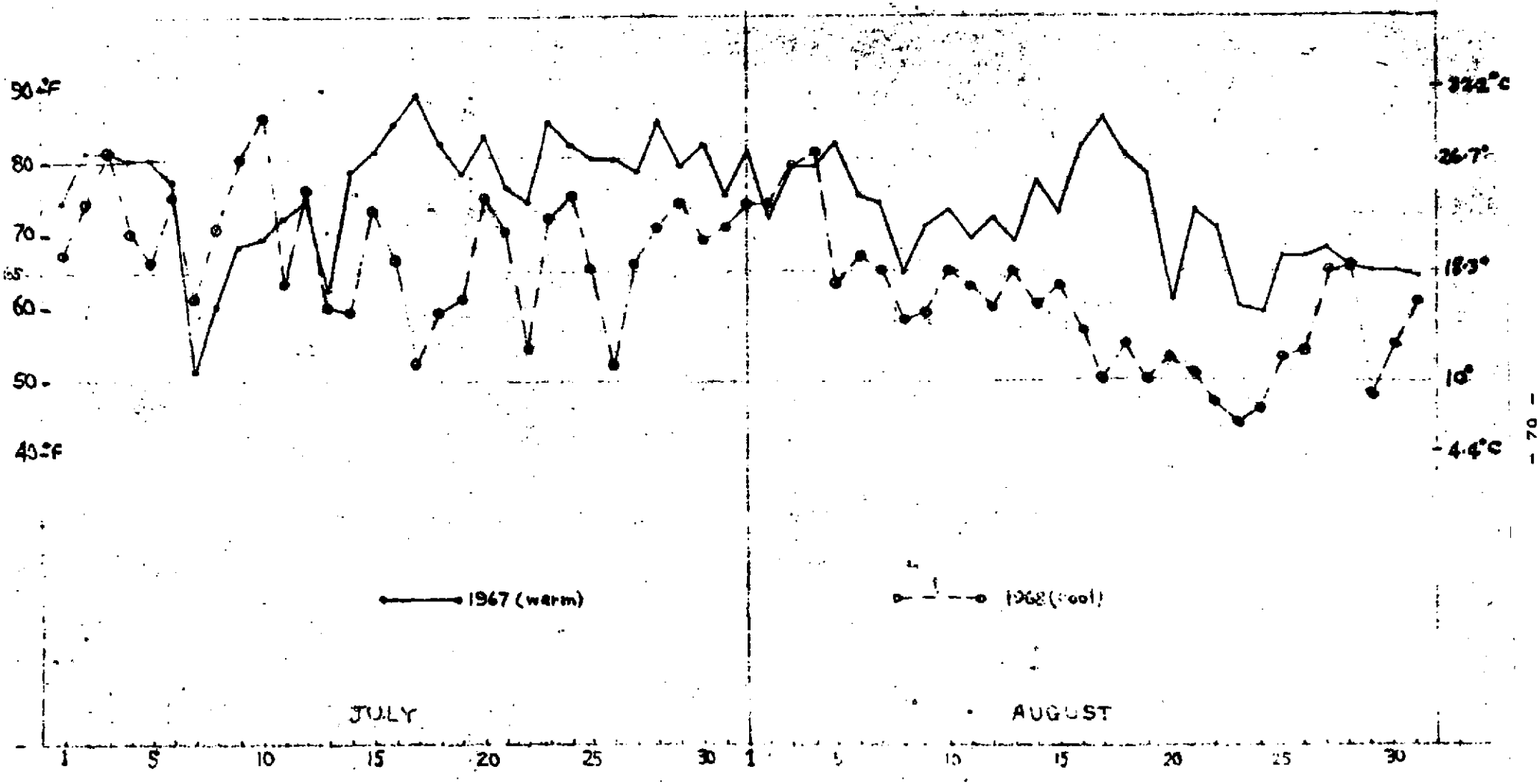


FIG. 24 DAILY MAXIMUM TEMPERATURES AT GANDER IN THE SUMMERS OF 1967 AND 1968

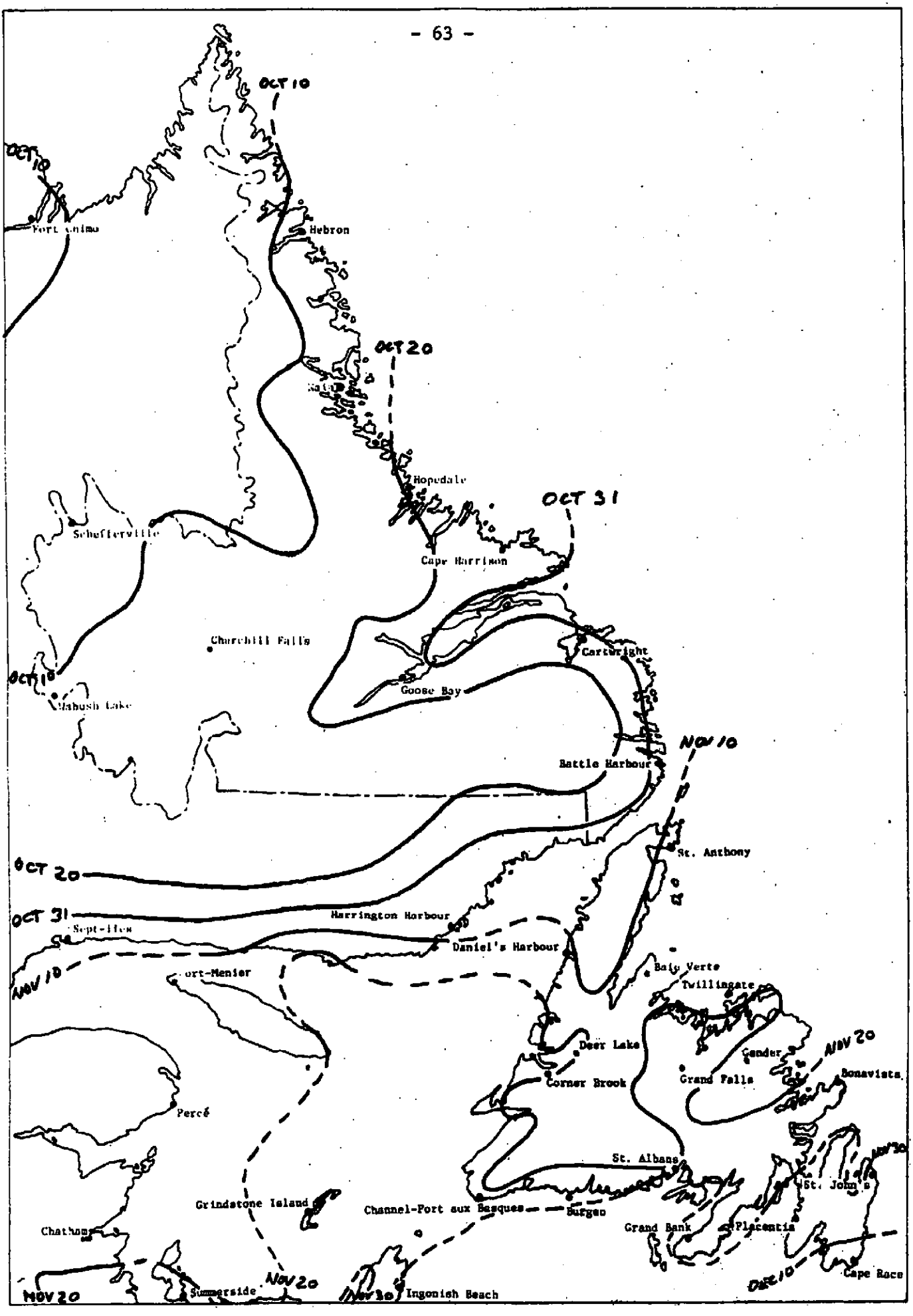


FIG. 25 MEAN DATE OF FIRST DAY OF WINTER SEASON

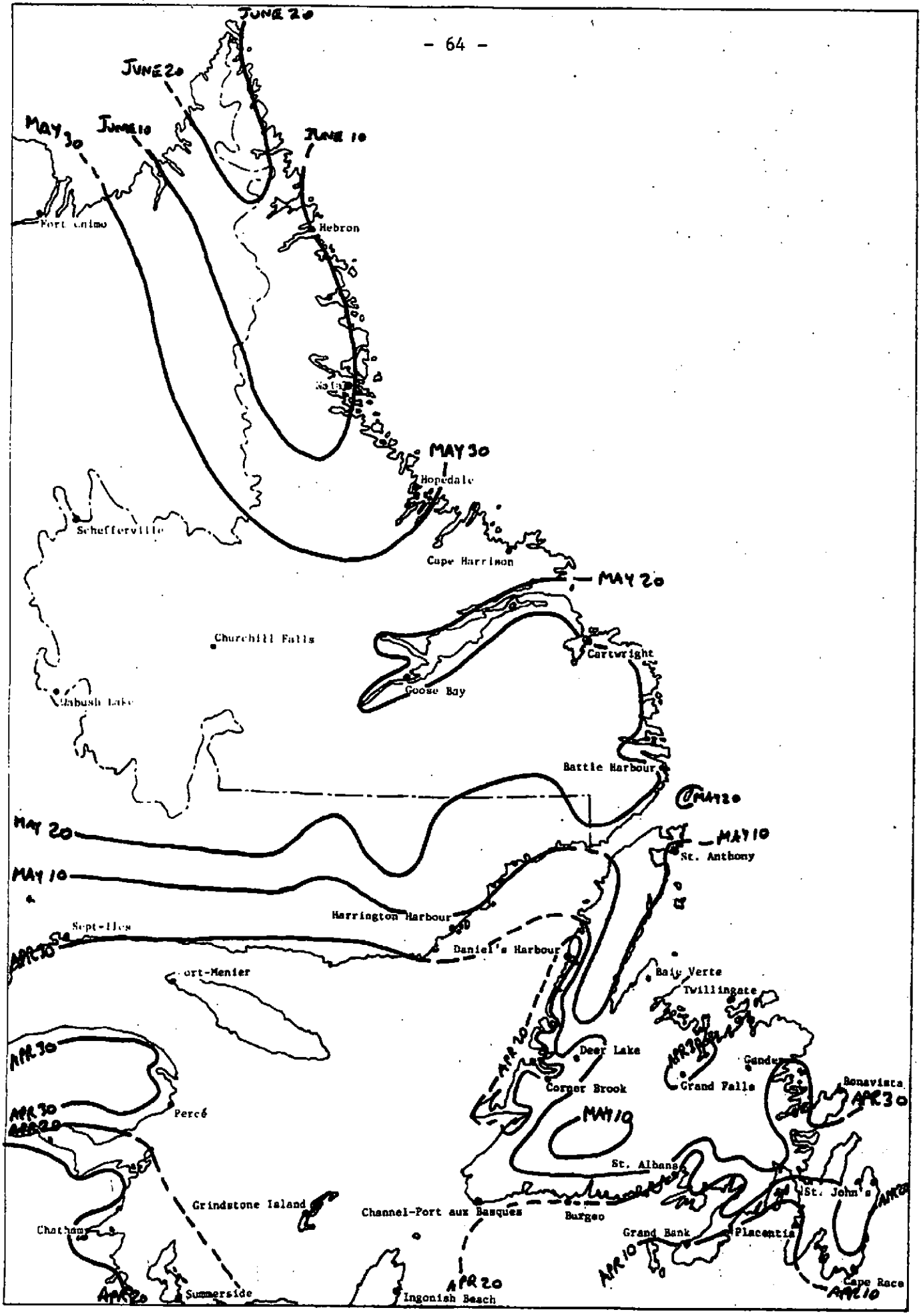


FIG. 26 MEAN DATE OF LAST DAY OF WINTER SEASON

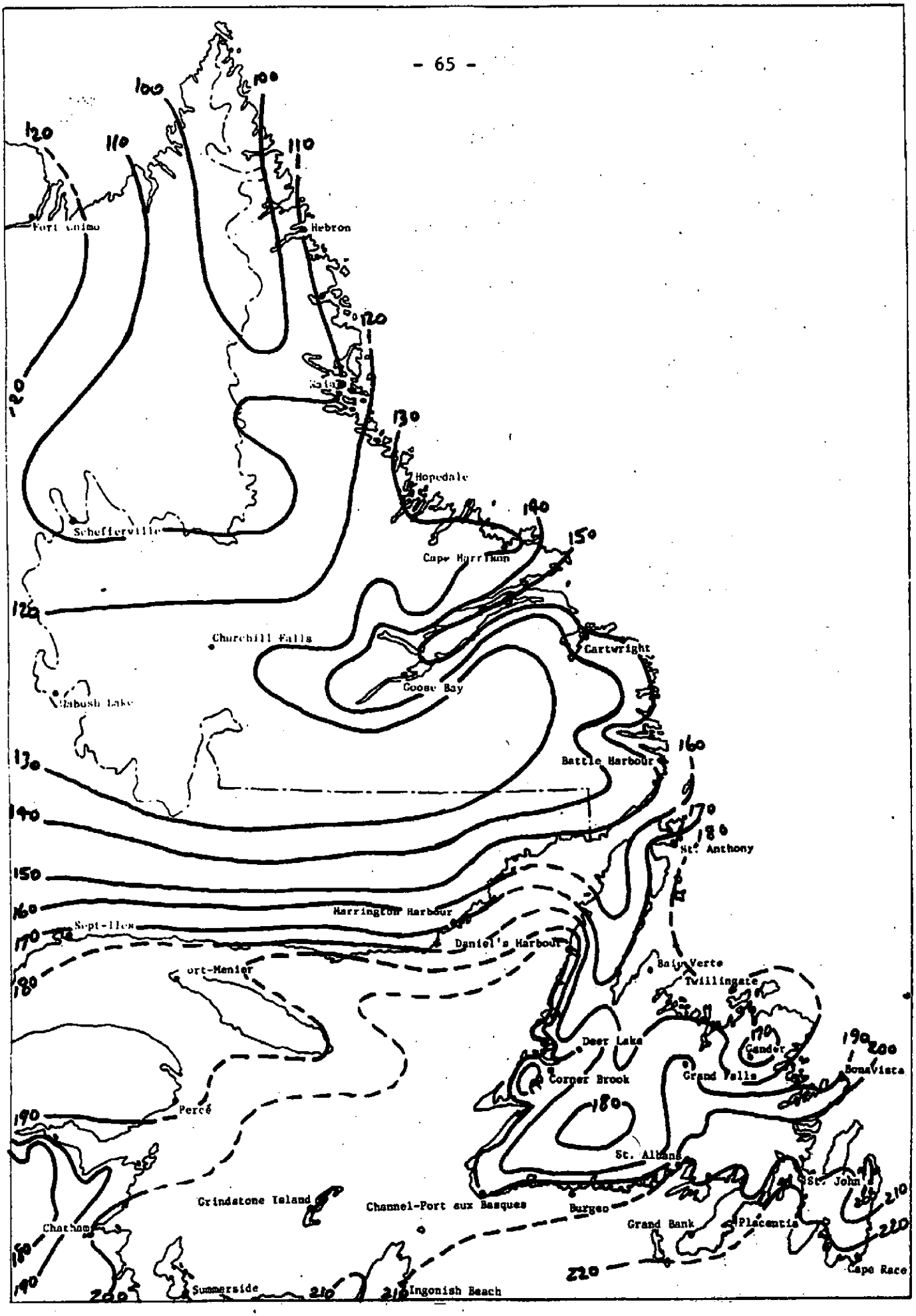


FIG. 27 MEAN LENGTH OF THE COMPLETE SUMMER SEASON

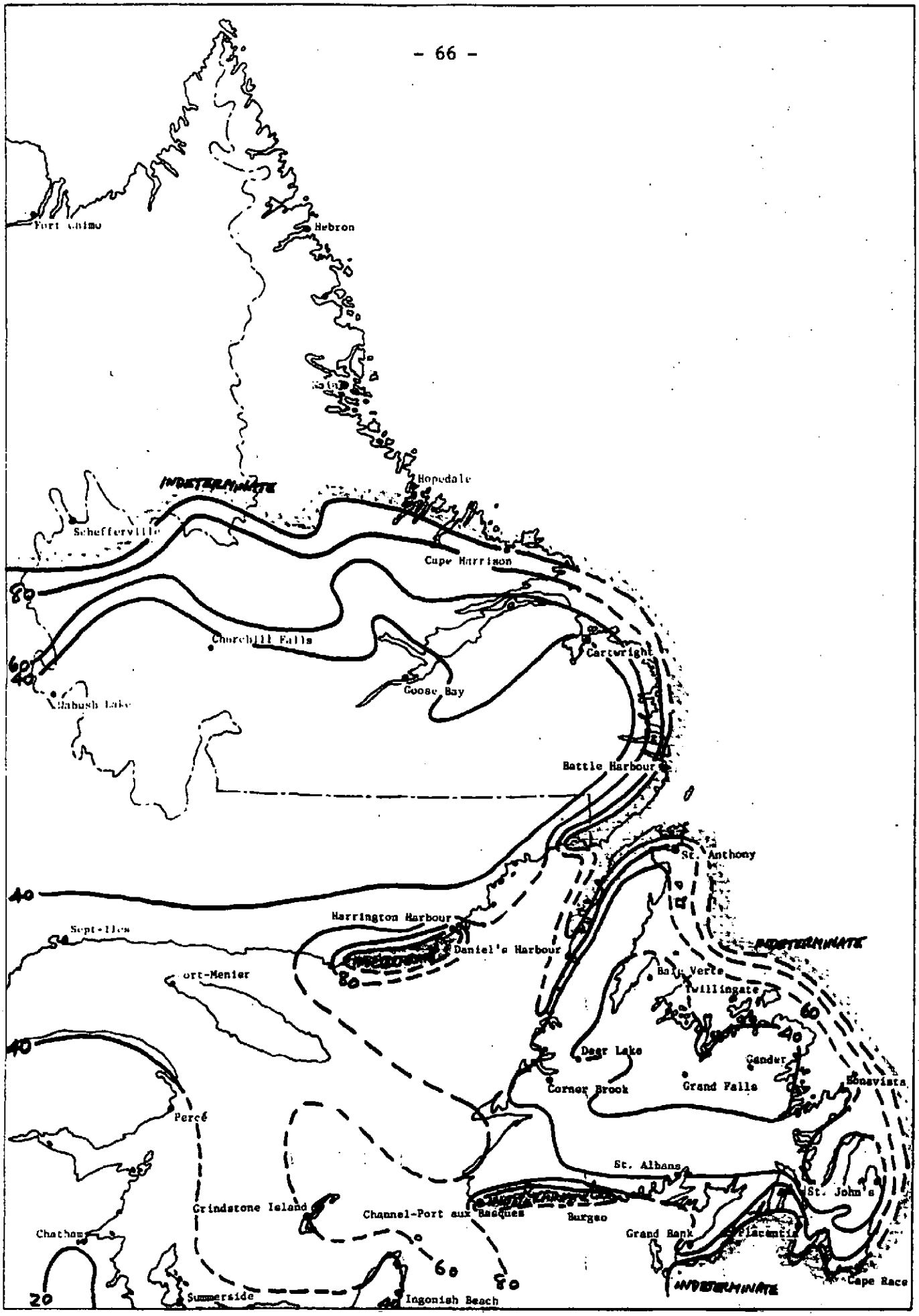


FIG. 28 MEAN LENGTH OF THE SPRING SHOULDER OF THE SUMMER SEASON

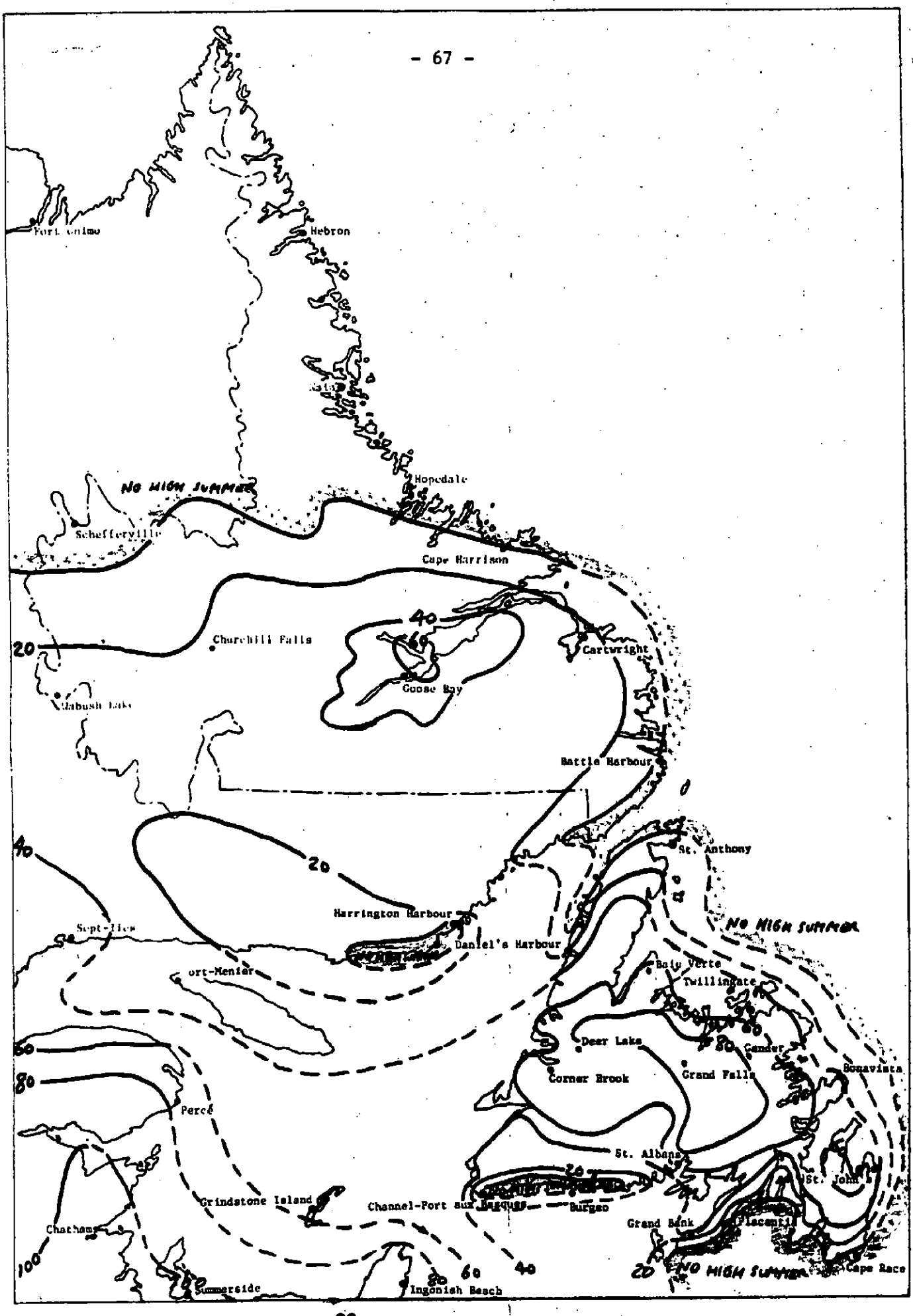


FIG. 29 MEAN LENGTH OF HIGH SUMMER

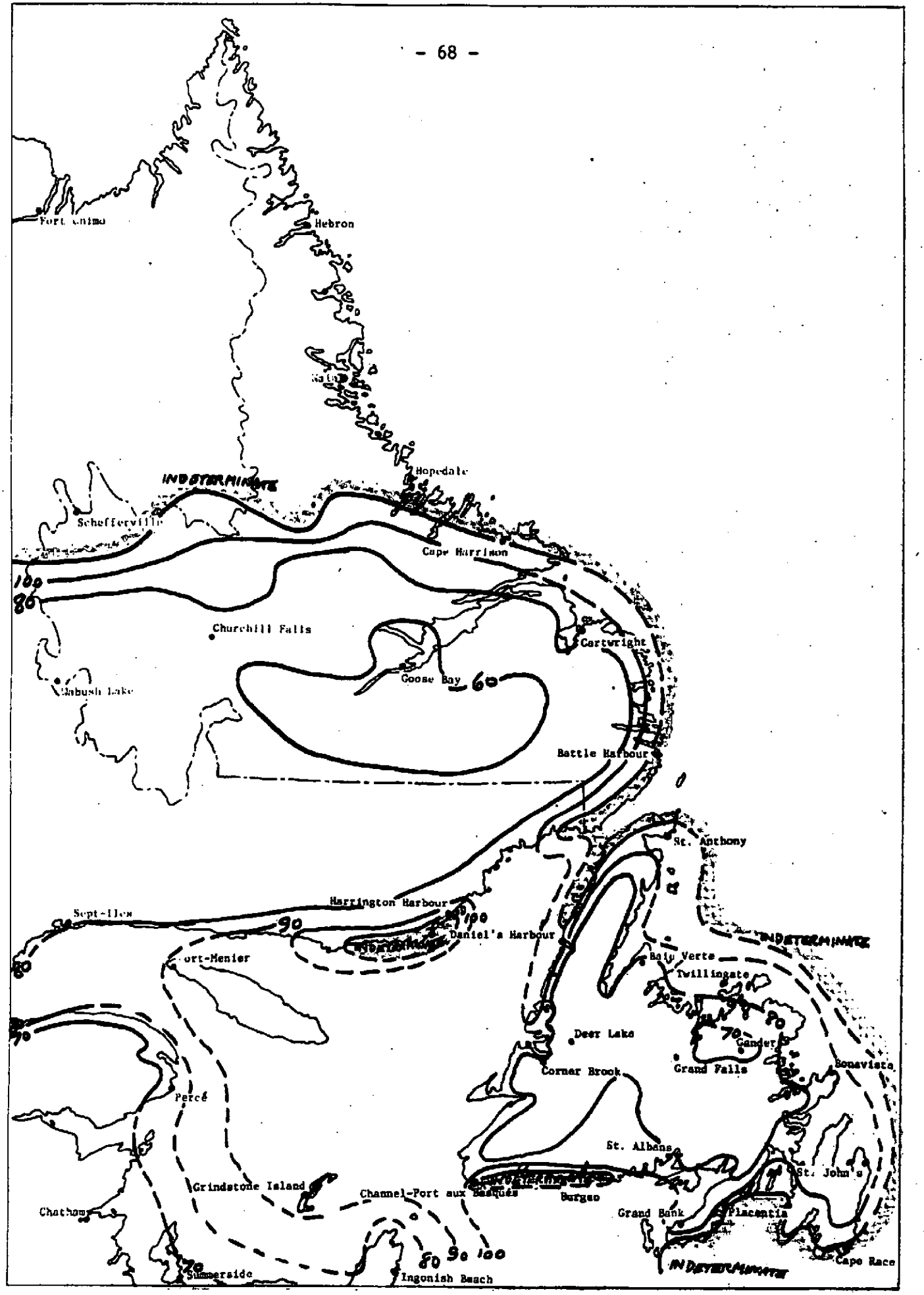


FIG. 30 MEAN LENGTH OF THE AUTUMN SHOULDER OF THE SUMMER SEASON

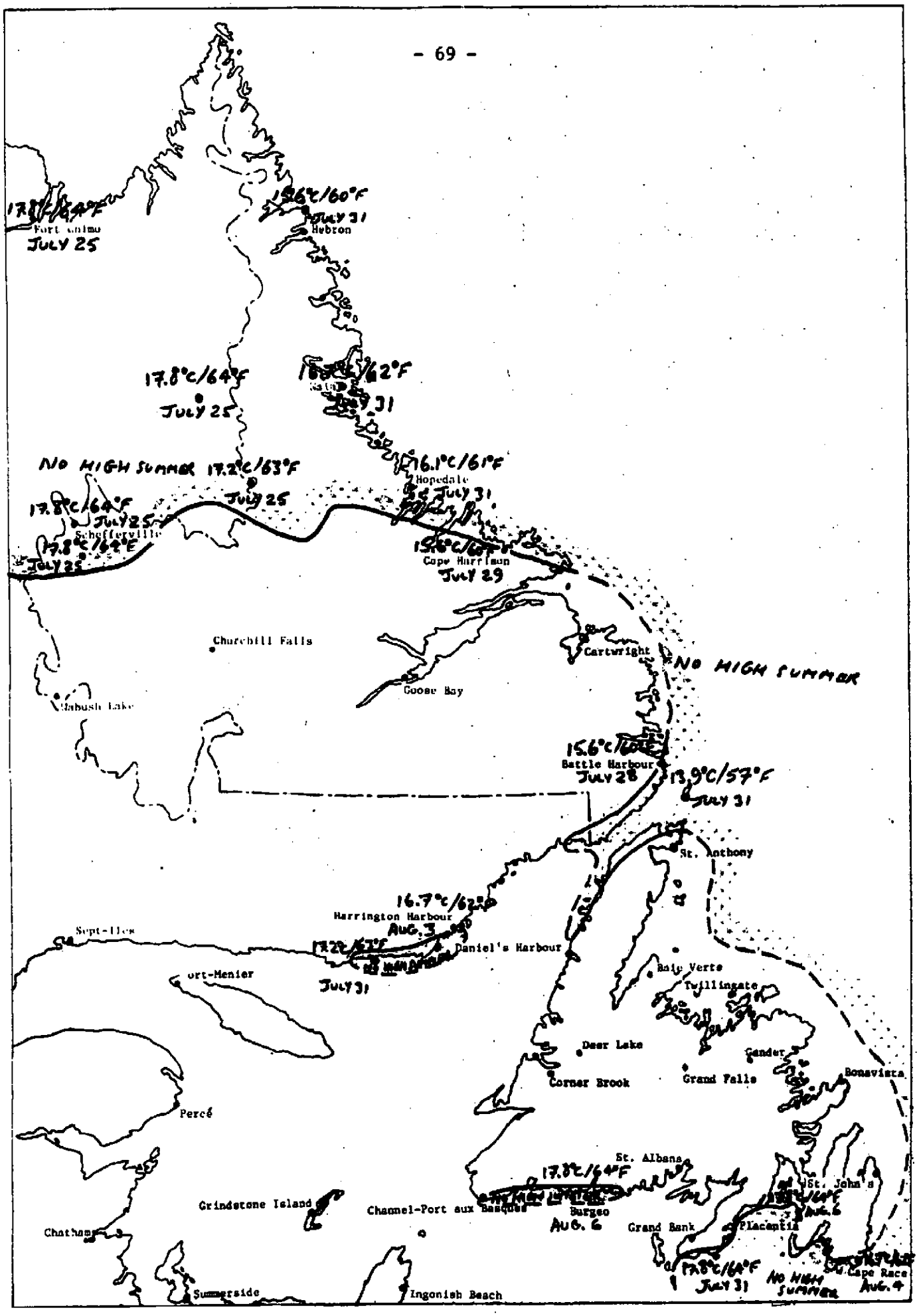


FIG. 31 AREAS OF NO HIGH SUMMER WITH VALUES OF HIGHEST MEAN DAILY MAXIMUM AND THEIR DATES OF OCCURRENCE AT SELECTED STATIONS

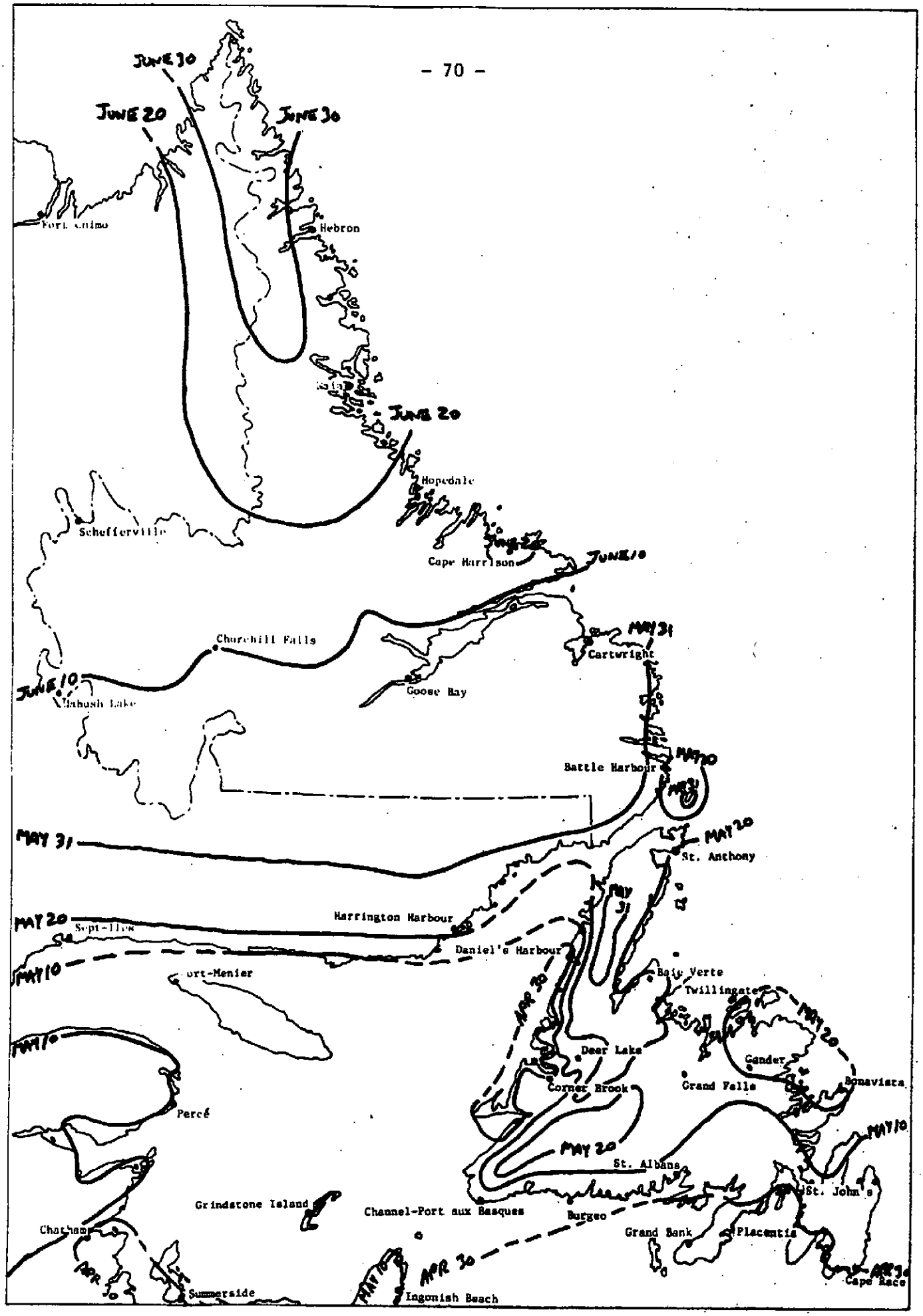


FIG. 32 MEAN DATE OF FIRST DAY OF THE SPRING SHOULDER OF THE SUMMER SEASON

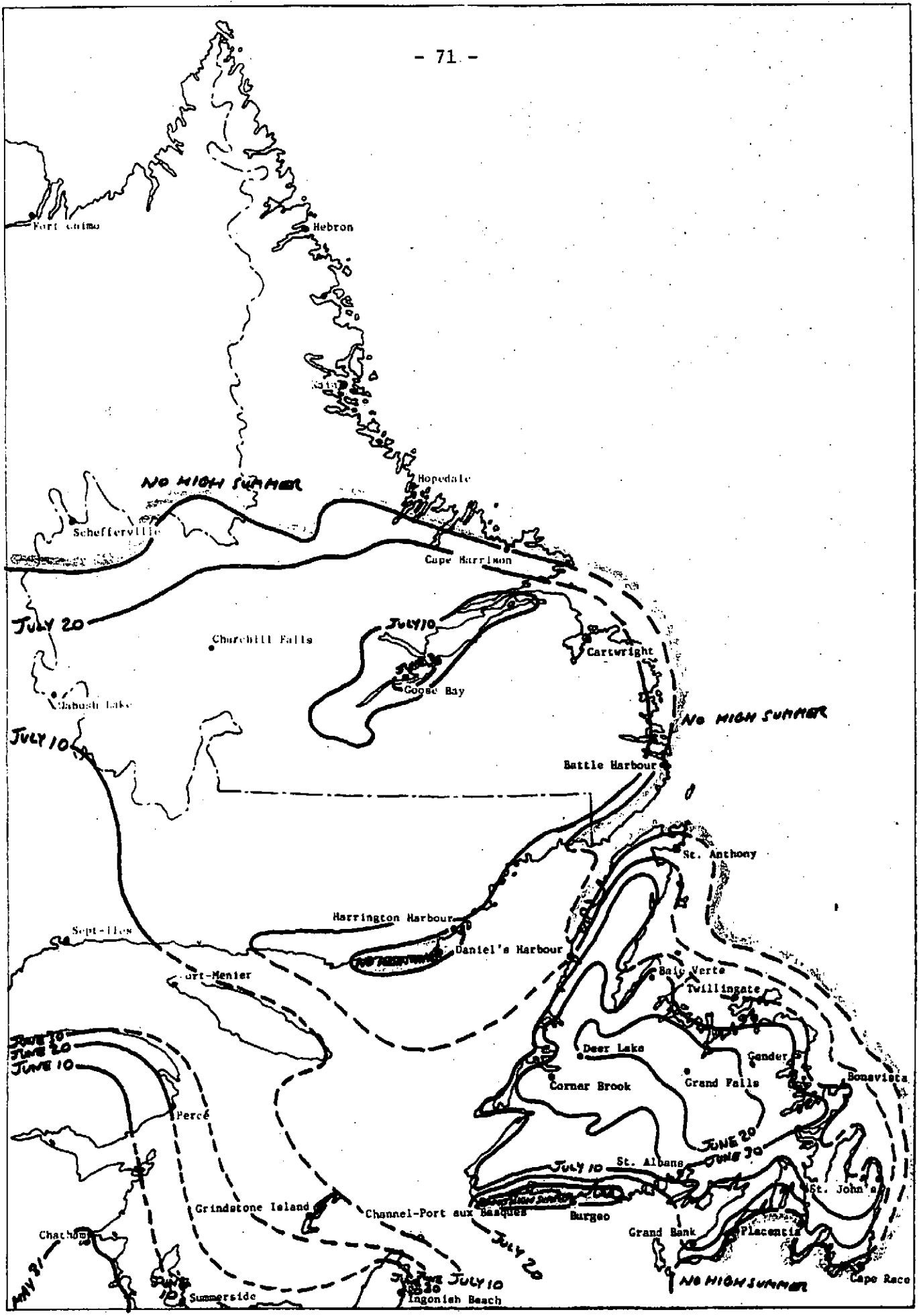


FIG. 33 MEAN DATE OF FIRST DAY OF HIGH SUMMER

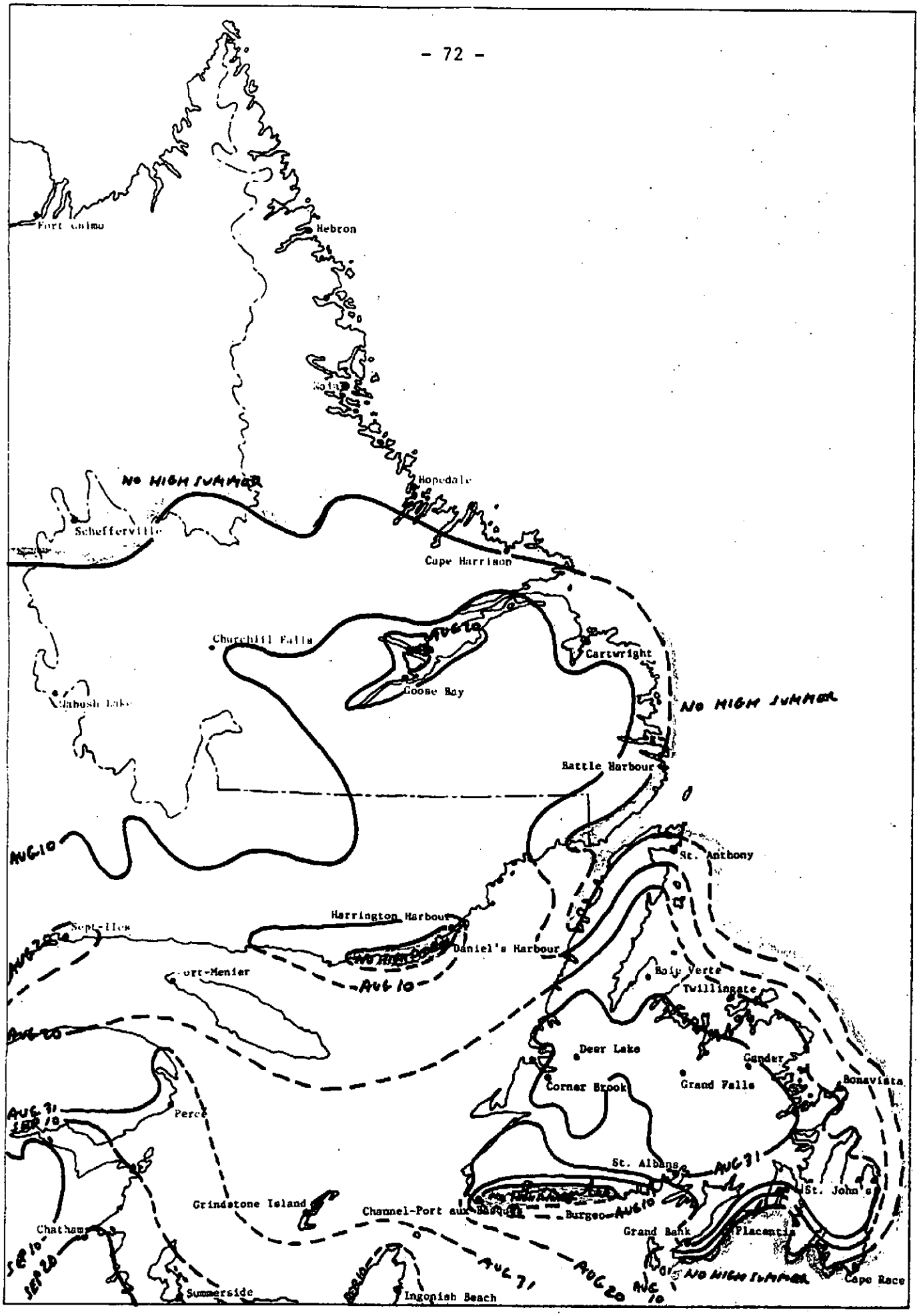


FIG. 34 MEAN DATE OF LAST DAY OF HIGH SUMMER

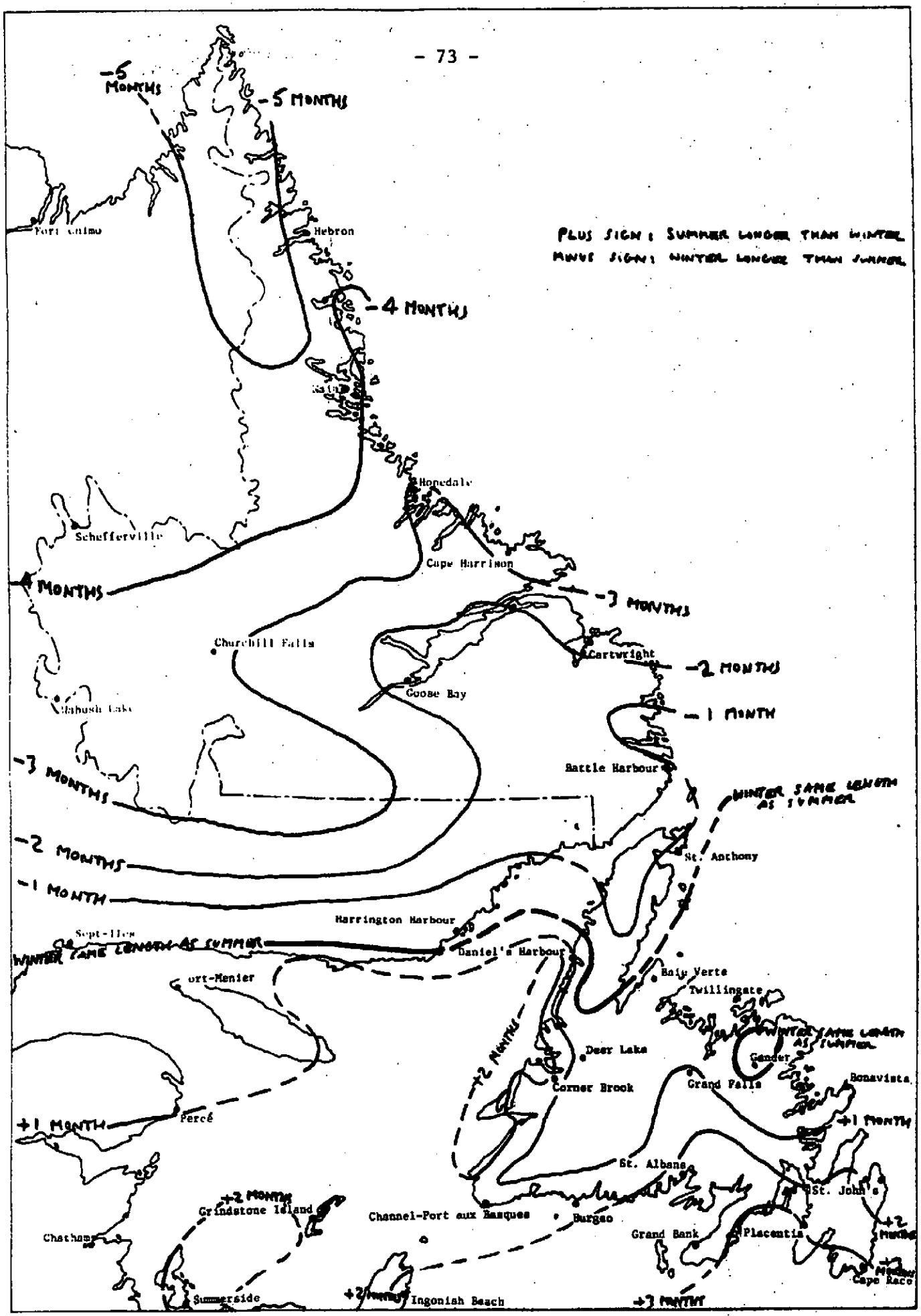


FIG. 35 COMPARISON OF LENGTHS OF SUMMER AND WINTER SEASONS

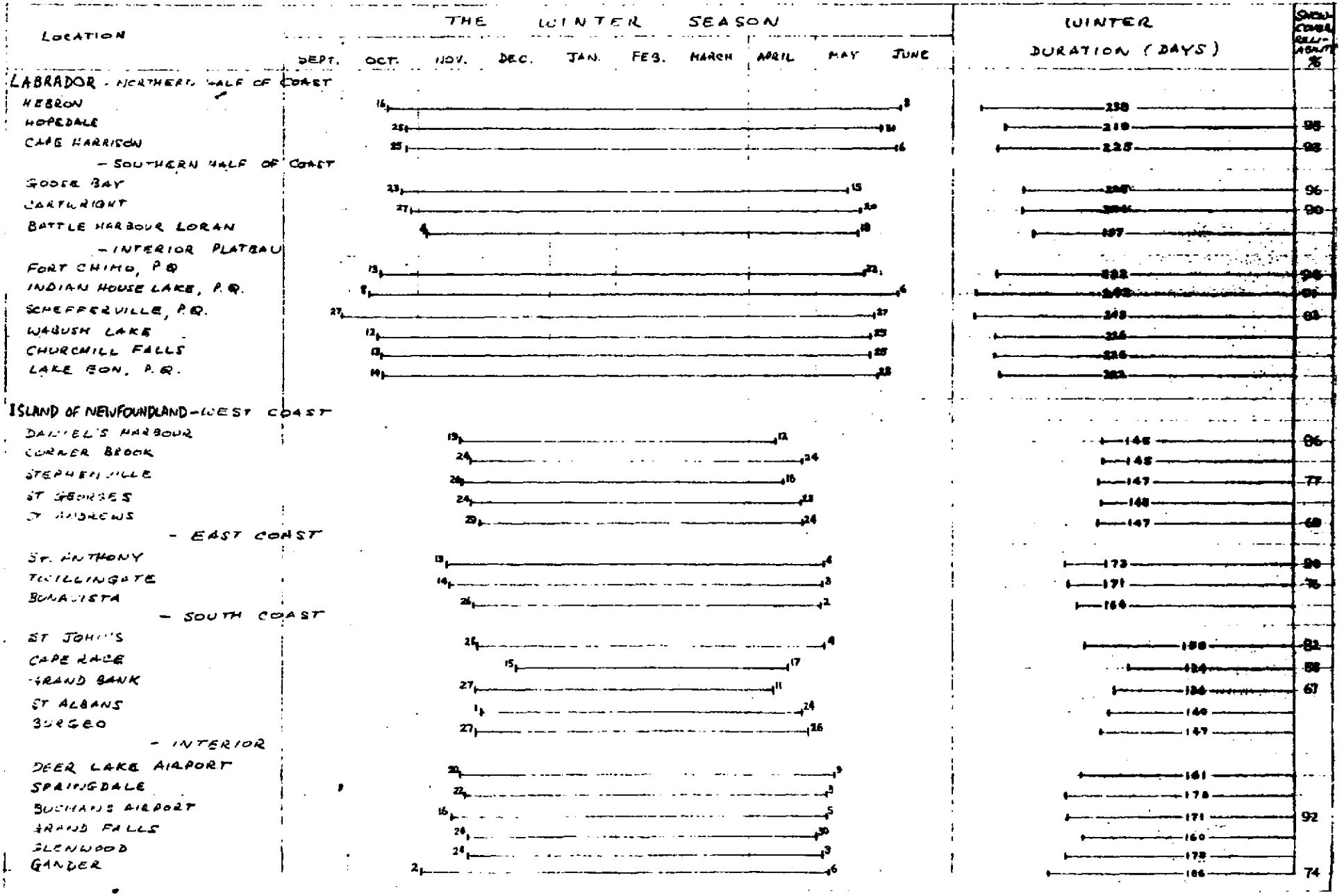


FIG. 36 WINTER SEASON LENGTHS IN DIAGRAMMATIC FORM FOR SELECTED STATIONS

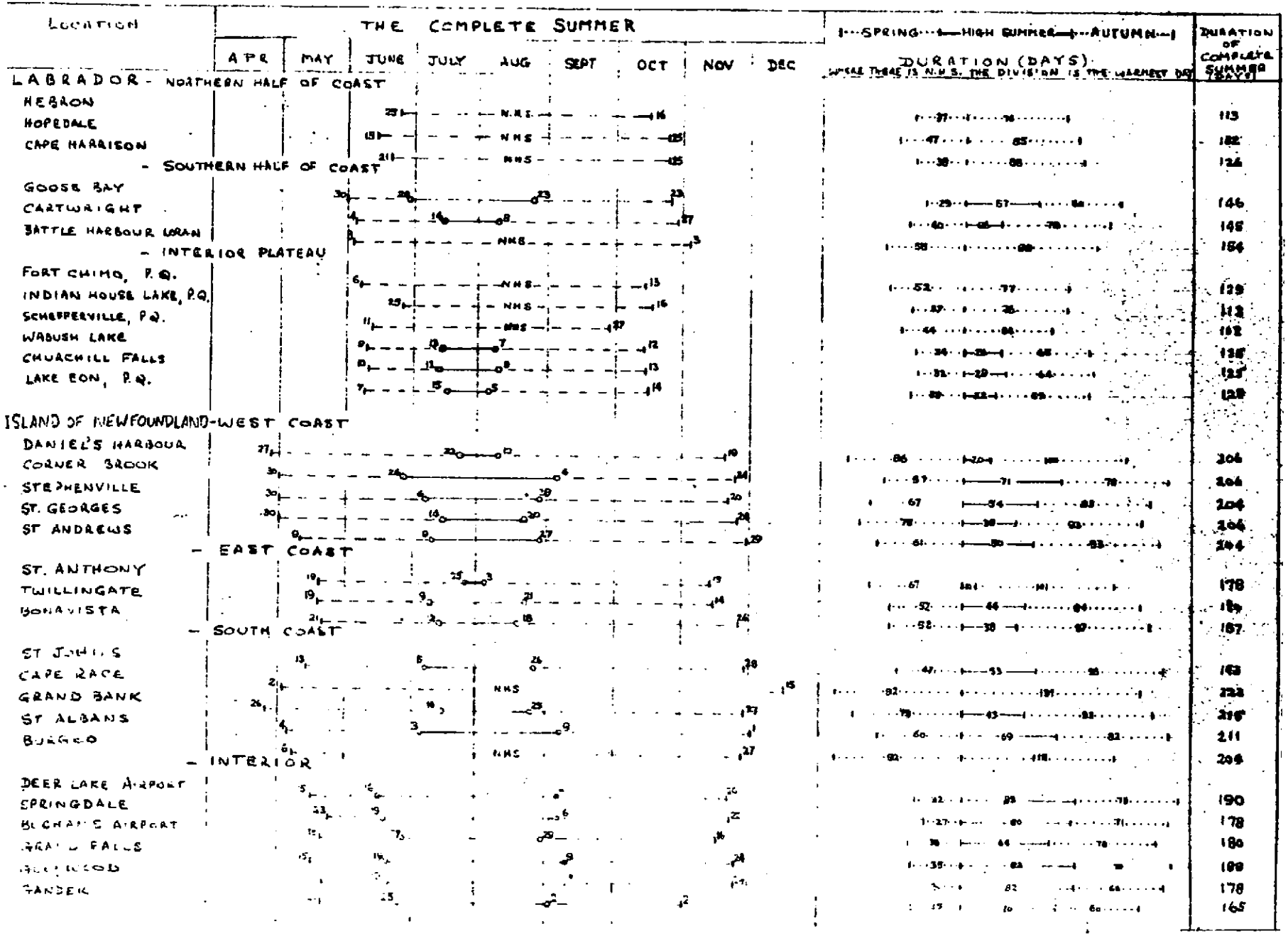


FIG. 37 SUMMER SEASON LENGTHS IN DIAGRAMMATIC FORM FOR SELECTED STATIONS

PART C

SEASONAL CLIMATIC QUALITY CHARACTERISTICS

I. CRITERIA FOR EVALUATION OF CLIMATIC QUALITY

In the detailed evaluation of climate quality, the concept of "suitable days" was used, a *suitable day* being one in which there were at least five hourly reports (not necessarily consecutive) of "suitable weather" between 10:00 a.m. and 6:00 p.m. The criteria for suitable weather presented in Table 6 are based on Crowe, McKay and Baker (1973) and modifications by Gates (1975). An additional activity, *yachting*, has been added.

In applying these criteria to the climate of Newfoundland and Labrador, some points are worthy of comment:

1. The *humidex* seldom is sufficiently high in Newfoundland and Labrador to cause discomfort, and so was not considered to be a significant factor. Temperatures which normally would be associated with the humidex values used as criteria are given in the adjoining column for those not accustomed to the use of humidex.

2. Temperatures lower than -14°C (6°F) in the case of skiing and -21°C (-6°F) in the case of snowmobiling are usually unsuitable for these activities. It is common knowledge that local residents, however, used to lower temperatures, persist with their skiing and snowmobiling with temperatures even as low as -29°C (20°F). So, it must be remembered that in general, values in the table were chosen keeping the *visiting* tourist in mind.

Up to eighteen years of weather records were searched to discover the number of days that could be designated "suitable" for the various tourist and outdoor recreation activities, except yachting, according to the criteria listed in Table 6. Calculations were carried out for each ten-day period in the year, and the number of suitable days in each ten-day period was expressed as a percentage. These percentages are a convenience in relating climate to the enjoyment of the outdoors. Calculations were made for ten stations in Labrador and neighbouring Quebec and for thirteen on the Island of Newfoundland (see Figure 3). Values for fifteen stations in the Maritimes were also used, taken from Gates (1975).

The suitable-day data are presented in Tables 7 to 11 according to type of activity, while figures 38 to 60 show the variations of the percentages through the year at the individual stations. Mid-month values are plotted on Figures 61 to 97 for the various activities to show the spatial variations. Because of the scarcity of data and because in a few cases the stations may be located at non-representative sites, no attempt has been made to analyse these charts (Figures 61 to 97) by drawing isopleths. In the following sections, some of the considerations involved in choosing the criteria (Table 6) for the various activities are discussed.

A Year-round Activity-Landscape Touring

For a day to be classed suitable for landscape touring by automobile the temperature must lie in the range -24°C (-12°F) to 24°C (75°F).

Visibility must be greater than 5 km or 3 mi., and wind speeds less than 40 km/h or 25 mi/h. In addition, no appreciable precipitation is allowed.

Driving for pleasure takes place mainly during the warm season, but may be carried out year-round, except for brief interruptions during winter storms. Wide variations in temperature are tolerable on a motor trip because of the protection afforded by the automobile. Visibility is a prime importance in the enjoyment of landscape viewing.

Winter Activities

On a day suitable for skiing or snowmobiling the snow depth must average 5 cm (2 in.) or more, the wind must be less than 24 km/h (15 mi/h), and the visibility be greater than 1 km (1/2 mi.). For skiing the temperature may be as low as -14°C (6°F), but for snowmobiling -21°C (-6°F) was considered a reasonable lower limit because more clothing can be worn. Only light snow or flurries were allowed.

In a particular locality a well chosen site will be a favourable factor. On cold days ski slopes facing the sun may be more enjoyable. The effect of the wind may be minimized by locating the slope in a wooded area, or by choosing a site facing away from the prevailing winter winds, so that skiers move downslope with the wind rather than against it.

Summer Activities

Vigorous Activities, including hiking and the more energetic sports, such as football, soccer, bicycling, similarly are more enjoyable in a relatively light wind and in sunshine (cloud cover less than eight-

tenths). It was judged in the case of hunting and the energetic sports, a better visibility, greater than 3 km (2 miles) was warranted, and that an upper limit of approximately 24°C (75°F) should be placed on temperature. No appreciable precipitation was allowed.

Beaching Activities, except for water-based sports such as swimming, have as a prime objective enjoyment of the warmth of the sun and exposure to it (cloud cover less than eight-tenths). Temperatures should be greater than 16°C (60°F) with at least some sunshine, a wind of less than 24 km/h (15 mi/h), and a visibility greater than 1½ km (1 mile). No precipitation was allowed. The weather requirements for *swimming* are essentially the same as those for beaching, except that water temperatures have also to be considered.

Yachting, or Coastal Touring by Boat. In other provincial climate studies yachting in coastal waters has not been dealt with. After considerable discussion with active yachting enthusiasts, it was found that the criteria selected for landscape touring were close to those desirable for yachting. Consider the criteria for landscape touring. Although a limit of 32 km/h (20 mi/h) is probably more suitable for small boats, the upper limit of 40 km/h (25 mi/h) was accepted as suitable as the upper limit for yachting. No limitations were imposed on the suitability of a day for yachting by the wide range of acceptable temperatures, nor by considerations of cloud cover. Only two of the criteria were selected differently for yachting. Visibilities of 10 km (6 mi.) or more would have been preferred for pilotage and viewing the scenery, and days with a little light precipitation could have been tolerated as suitable.

The inclusion of days with some light precipitation would have raised slightly the percentages of suitable days for yachting over those for landscape touring, but the exclusion of days with visibilities from 5 to 8 km (3 to 5 mi.) would have lowered them. Another factor, which should be taken into account, is that, when winds are blowing from the land, wind speeds at sea are known by experience to be stronger than speeds reported from coastal stations. Such a difference, which is difficult to estimate quantitatively, would tend to limit or lower the number of days suitable for yachting. Nevertheless, since it is not expected these differences would have produced a significantly different pattern in the percentages, nor changed the actual values much, it was proposed, rather than to perform an additional computer run, to reduce the values of the suitable day percentages for landscape touring by ten per cent, and to consider the resulting values reasonable percentages of suitable days for yachting. It must be pointed out, however, that while landscape viewing can be considered a year-round pursuit, and is certainly a prime activity throughout the complete summer season, the season length for yachting on the other hand, is comparatively short due to the short ice-free period.

II. WINTER QUALITY ANALYSIS

(a) Landscape Touring (Figures 61-66)

Labrador

At Goose Bay (Figure 40) the frequency of suitable days for landscape touring is relatively high in early and late winter.

In mid-winter, however, strong winds, blowing snow and, particularly, low temperatures, have a limiting effect, and the percentage frequencies drop into the fifties. The same situation exists at the coastal stations, although at Cartwright (Figure 41), values remain in the sixties. In constrast, on the interior plateau the percentage of suitable days drop significantly lower at mid-winter, to the twenties and thirties. Low temperatures account for this effect over central and western Labrador, where the January mean temperatures at Churchill Falls and Wabush Lake are 3^{o} to $4^{o}C$ (6^{o} to $8^{o}F$) lower than at Goose Bay.

Island of Newfoundland

During the winter the Grand Lake lowlands (Deer Lake, Figure 60) and parts of the South Coast (Burgeo, Figure 57 and Argentia, Figure 55) and East Coast (St. Anthony, Figure 51 and Bonavista, Figure 53) have fairly high percentages of suitable days, in the fifties and sixties. On the other hand, lower values, in the thirties and forties, appear in January at some stations on the West and East Coasts of the Island. This depression of the percentage values appears to be due to the prevalence of snow flurries with onshore winds at this time of year, and in some areas due to frequent strong winds, such as at St. John's Airport (Figure 54), which is a very exposed locality.

(b) Skiing and Snowmobiling (Figures 67-81)

Labrador

The characteristics of the Labrador climate during the whole

winter strongly supports skiing and snowmobiling as far as snow cover is concerned. At these latitudes the snow cover is reliable even in years when snowfall is less than normal. The snow cover comes, and except for a very short unreliable period early and late in the winter, it persists (see Figures 5 and 6). Potter (1965) calculated the percentage of days in the winter season that snow was actually reported to a depth of 2.5 cm (1 in.). He took this percentage as a measure of the reliability of the snow cover. Potter's snow cover reliability percentages for the winter season (see Figure 10) range from 83 per cent at Schefferville to 96 per cent at Goose Bay. Values throughout all Labrador indicate that the snow cover is highly reliable from one year to the next and throughout each winter season.

In addition to a reliable snow cover, winds are relatively light in the winter season in Labrador, and the occurrences of rain and freezing rain are very few from December to April. However, one feature of the climate that reduces the suitable day percentages for skiing and snowmobiling is the low temperatures of December, January and February. Normally at lower latitudes, values peak in February. However, in Labrador actual percentages are depressed as the daytime temperatures drop below -14°C (-6°F) for skiing and below -21°C (-6°F) for snowmobiling. This results in graphs with two peaks, indicating two optimum periods for these activities. An example is seen in the graphs for Wabush Lake (Figure 45), which peak in November and in April. As a rule, the earlier optimum period is cut comparatively short as temperatures drop quickly during the early stages of winter. Another factor that may shorten this period in some years is the late arrival of snow cover.

On the other hand, the second optimum period in March and April has more suitable weather, that is, higher percentages of suitable days, and it lasts longer and has an entirely reliable snow cover.

Island of Newfoundland

As is generally the case, shortly after the median date of the first 2.5 cm (1 in.) of snow cover, that is, the beginning of winter, the frequency of suitable days rises above 20 per cent. The frequencies all over the island exhibit a similar pattern, the highest values occurring in January and February. It must be noted, however, that on the Island of Newfoundland the percentage values generally are low, not rising above the thirties, except on the West Coast, over the Great Northern Peninsula, and, no doubt, on the Long Range (no data are available for the Long Range). Stephenville (Figure 49) has the highest number of suitable days, over 50 per cent for three consecutive months, almost 60 per cent near the end of January.

In listing the factors to account for the poor percentages of suitable days for skiing and snowmobiling, the poor reliability of the snow cover would come first. In southern and eastern parts of the Island the snow cover is quite variable, frequently disappearing during the winter (see Figures 7 to 9). Potter's calculations of reliability (see Figure 10) give high figures only for Buchans, 92 per cent, and for Daniel's Harbour, 86 per cent. His other reliability figures on the Island range from the seventies down to 55 per cent at Cape Race.

Other factors that militate against consistently good skiing weather in the south and east as compared to that in the Stephenville-Deer Lake area are the strong winds (Table 12), the greater frequency of rain (Table 13), and the greater frequency of freezing rain (Table 14).

It should be noted that no daily snow cover data were availalbe for Burgeo or Deer Lake. As a result, no skiing or snowmobiling data are shown for these localities (Figures 57 and 60).

III. SUMMER QUALITY ANALYSIS

(a) Landscape Touring (Figures 82-87)

Labrador

Weather conditions for landscape touring are generally very good through most of Labrador during the summer. From 73 to 85 per cent of the days are suitable during the complete summer. The percentages at Battle Harbour (Figure 42), the only station at which the values do not reach 80 per cent, are lower, probably because of the normally strong winds and the occurrence of fog at the island site. This situation probably exists all along the south Labrador coast, particularly in early summer.

Island of Newfoundland

Similarly, on the Island of Newfoundland, weather conditions are generally very good for landscape touring. This is particularly so at inland localities. The greatest number of suitable days are

indicated for Stephenville (Figure 49), St. Andrews (Figure 50), and Deer Lake (Figure 60) in the west and for St. Anthony (Figure 51), Twillingate (Figure 52), and Bonavista (Figure 53) on the East Coast. The low values for the Daniel's Harbour area (Figure 48) are most likely due to the strong winds funnelling along the coastal plain and to the occurrence of sea fog drifting onto the coast. The South Coast, affected by onshore winds, is plagued by sea fog, so that June, July and August are poor for landscape touring. Weather conditions improve on the South Coast in late August as winds tend to be westerly or north-westerly more frequently in the outbreaks of cooler and drier air that are typical of late summer.

(b) Vigorous Activities (Figures 88-93)

Labrador

The warm days with light winds (suitable for most outdoor recreation) which occur from late June to late August are interspersed from time to time with periods of cooler weather. As a consequence, the percentages of suitable days for vigorous activities rise only into the thirties or forties at most inland localities of Labrador at mid-summer. The percentages for Churchill Falls (Figure 46) are over forty from July 10 to August 10, approximately. The Goose Bay (Figure 40) area has percentages in the thirties, but over a longer period, from June 10 to the end of August. Stations on the Labrador Coast have the least consistently favourable weather, due to lower temperatures and poor visibilities. This is particularly true south of Cartwright early in the summer.

Island of Newfoundland

Of the stations studied in the Island of Newfoundland, Deer Lake (Figure 60) has the highest number of days suitable for vigorous summer outdoor activities. In late July and early August the percentage rises at Deer Lake to 57, with percentages over forty persisting from late June to early September. Stephenville (Figure 49) and St. Andrews (Figure 50) on the southern part of the West Coast have percentages over forty throughout July and August, as do Twillingate (Figure 52) and Bonavista (Figure 53) on the East Coast from approximately July 10 to the middle of August. A good deal of outdoor recreational activity does take place, but there are interruptions due to poor days, as the generally low percentages indicate.

(c) Beaching Activities (Figures 94-97)

Beaching activities require temperatures in the upper teens or higher, cloud cover less than eight-tenths, and a wind of less than 24 km/h (5 mi/h). Days suitable for beaching, naturally, will then be confined to the periods of high summer. As indicated by the suitability-day percentages, the frequency of such days is likely to be one out of three or one out of four in areas removed from the coast of the Island of Newfoundland. In Labrador the lack of consistent or continual summer warmth appears to be the limiting factor, and on the Island of Newfoundland it would appear to be the combined effect of temperature and wind.

(d) Water-based Activities

Two water-based activities, swimming and yachting, are dealt with separately from the other summer activities, as they were not directly analyzed by the computer techniques described earlier.

Swimming

The weather requirements for swimming are the same as those for beaching. However, water temperatures are of primary concern. Mean water temperatures recorded in the provincial parks on the Island of Newfoundland are presented in Table 15 for various time periods through the summer, while mean mid-summer temperatures (August 5) are shown in map form in Figure 98. These data were supplied by the Provincial Parks Branch, Province of Newfoundland-Labrador. Unfortunately, little data are available for Labrador. From the table of water temperatures it can be seen how the lakes and ponds warm up, reaching the highest temperature generally in early August. There appears to be four areas on the Island of Newfoundland where the water temperatures eventually reach 21-23°C (70 - 73°F). These areas run from St. Andrews to Stephenville, from Deer Lake to Springdale, from Grand Falls to the Terra Nova National Park, and over the northern half of the Avalon Peninsula.

Temperatures in the salt water surrounding the Island may be estimated from the charts of water temperatures, reproduced from the U. S. Navy (1967). These are shown in Figures 99-102 for the months of May to August, inclusive. Needless to say, few will be tempted to swim in the cold ocean, but it should be remembered it can be very pleasant at

the edge of the ocean on a fine summer day when winds are blowing from the land.

Yachting

The portion of the summer season suitable for yachting is determined primarily by the ice-free period. In the spring and early summer, ice conditions prohibit or seriously hamper yachting over much of Newfoundland's waters, especially along the Labrador Coast. Even in the ice-free season, the ocean waters are so cold (see Figures 99-102) that there is always danger to life from capsizing. Although the ice does not reform until about December, the effective end to the yachting season is in late summer or early autumn. This results from lowering air temperatures, cloudiness, rain, snow and the increasing risk of autumnal gales.

Figure 103 shows the mean southern limits of ice in spring and early summer. This composite map was adapted from the work of Bradford (1972 and 1973). The East Coast of the Island is usually ice-free south of Cape Freels by early June, but it is usually late in the month before the remainder of the East Coast and the Strait of Belle Isle is ice-free. While Hamilton Inlet and Lake Melville are usually ice-free by mid-June, ice persists along the Labrador Coast north of Cape Harrison until mid-July. However, conditions are quite variable from place to place and year to year, depending greatly on prevailing winds. Figures 104 to 109, supplied by the Ice Forecasting Central, Ottawa, illustrate what can happen in a good year when ice disappears

early and in a bad year when the Arctic ice lingers for much of the summer.

It should be pointed out that even when most of the ice has disappeared from the coastal waters, icebergs remain. While the number of icebergs varies from year to year, they can be found off the coast of Labrador and off the east coast of the Island well into August some summers, and as far south as the Avalon Peninsula.

It was suggested previously that the percentages of suitable days for yachting could be estimated by lowering the values for landscape touring by ten per cent. This has been done for the ice-free season, for during this short period the weather along most of the North Labrador Coast should be good for yachting, with the percentages of suitable days being probably in the sixties and seventies. Although the prevailing wind in summer is north at Hopedale, the visibility there is not restricted often. Farther south along the coast, the prevailing winds are northwesterly or westerly off the land, and at Battle Harbour near the southern end of the coast, south. These southerly winds bring much fog to the regions adjacent to the Straits of Belle Isle, so the percentage of suitable days drop into the sixties and fifties and probably lower at some locations.

Good percentages of suitable days for yachting from May to October are found along the East Coast of the Island of Newfoundland and on the southern half of the West Coast. Percentages could be expected in the sixties and seventies. On the South Coast and on the northern

half of the West Coast the percentages of suitable days would be low, probably in the forties. These low percentages of suitable days are due to the frequent presence of fog and the prevailing onshore winds. Caution is advisable in using landscape touring percentages as an aid in the Stephenville and St. Andrews areas of the West Coast. While it is true ocean temperatures are 2 - 5°C (5 - 10°F) warmer there than along parts of the East Coast, fog banks over the sea do occur with a moderate frequency and lie not far off the coast during the day.

Some supplementary climatological data relevant to yachting are presented in Tables 16, 17, 18 (visibility frequency data), and in Tables 12 and 19 (wind data). This information may also be used to assess inland waters for boating with refinements from nearby meteorological stations.

TABLE 6

CLIMATIC CRITERIA FOR DESIGNATION OF A SUITABLE DAY BY ACTIVITY OR ACTIVITY GROUPING

CLIMATIC CRITERIA FOR DESIGNATION OF SUITABLE DAYS							
Activity	Humidex	Temperature Degrees C F	Visibility km mi	Cloud Amt.	Wind km/h mi/h	Snow Cover	Precipitation
YEAR-ROUND							
Landscape Touring	-12 to 89	-24 to 24°C -12 to 75°F	greater than 5 km 3 mi	N/A	less than 40 km/h 25 mi/h	N/A	Nil
WINTER							
Skiing	greater than 6	greater than -14°C 6°F	greater than 1 km ½ mi	N/A	less than 24 km/h 15 mi/h	5 cm, 2 in. or more	Nil or light snow or flurries
Snowmobiling	greater than -6	greater than -21°C - 6°F	greater than 1 km ½ mi	N/A	less than 24 km/h 15 mi/h	5 cm, 2 in. or more	Nil or light snow or flurries
SUMMER							
Vigorous Activity	55 to 89 inclusive	12 to 24°C 54 to 75°F inclusive	greater than 3 km 2 mi	less than 8/10	less than 32 km/h 20 mi/h	N/A	Nil
Beaching Activity	greater than 64	greater than 16°C 60°F	greater than 1½ km 1 mi	less than 8/10	less than 24 km/h 15 mi/h	N/A	Nil
Yachting		-24 to 24°C -12 to 75°F	greater than 8 km 5 mi	N/A	less than 40 km/h 25 mi/h	N/A	Nil or light rain

N/A - Does not apply significantly.

TABLE 7

MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING

	JAN			FEB			MAR			APR			MAY			JUN			JUL			AUG			SEP			OCT			NOV			DEC		
	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25
LABRADOR																																				
NORTHERN HALF OF COAST																																				
Hopedale	57	56	57	59	61	63	65	66	69	73	75	75	75	76	76	75	76	79	82	83	83	83	82	81	81	81	79	78	78	77	74	68	64	63	61	58
Cape Harrison	53	53	57	61	62	63	63	61	59	59	61	66	72	76	78	81	83	81	78	79	81	83	82	78	75	75	75	74	73	72	70	66	63	60	59	56
SOUTHERN HALF OF COAST																																				
Goose Bay	54	54	58	64	69	69	67	66	68	70	73	76	77	78	77	77	78	79	80	82	84	84	84	83	82	81	80	80	81	80	74	68	65	64	61	56
Cartwright	63	64	69	72	70	66	62	63	68	71	72	71	72	74	76	78	80	82	85	86	85	83	82	81	80	81	82	81	79	78	75	72	71	70	67	64
Battle Harbour	56	58	61	62	64	64	60	57	58	59	60	63	66	68	70	68	66	64	65	65	64	65	70	74	77	77	76	75	73	72	67	62	59	58	58	56
INTERIOR PLATEAU																																				
Fort Chimo (P.Q.)	34	30	29	31	34	42	53	64	72	76	79	80	79	78	79	81	83	85	86	88	88	87	85	83	82	80	76	75	75	74	73	69	63	55	46	40
Schefferville (P.Q.)	27	26	30	37	44	52	60	66	70	73	74	72	70	71	74	76	78	80	81	80	79	76	75	75	74	71	68	64	60	56	50	45	42	40	35	30
Wabush Lake	35	37	42	49	57	64	69	71	73	76	79	80	79	80	80	80	83	85	87	85	84	84	83	83	82	80	75	70	69	67	62	57	53	50	45	39
Churchill Falls	30	35	42	49	55	57	57	60	65	69	70	71	73	76	73	70	72	76	80	81	81	82	83	81	78	72	65	62	65	66	63	58	51	43	34	29
Lake Eon (P.Q.)	44	44	48	54	61	66	69	69	70	72	75	76	75	77	79	81	82	84	86	87	86	86	85	85	85	83	79	77	76	74	68	60	55	54	52	49
ISLAND OF NEWFOUNDLAND																																				
WEST COAST																																				
Daniel's Harbour	30	30	33	37	39	42	46	51	53	54	60	66	64	61	59	56	53	51	53	57	63	66	67	69	69	66	63	60	58	59	60	56	51	48	43	35
Stephenville	44	45	47	50	52	56	61	64	65	68	73	78	81	82	83	84	84	84	83	84	87	88	87	87	89	89	88	87	86	83	77	70	63	57	51	46
St. Andrews	43	45	47	50	54	61	66	66	67	70	76	82	85	85	86	87	89	90	89	90	91	92	91	90	89	88	87	86	85	80	73	67	64	58	50	44
EAST COAST																																				
St. Anthony	64	63	62	63	64	66	67	68	68	69	71	72	74	75	76	77	78	79	80	81	83	84	85	87	88	86	83	81	78	76	73	69	67	66	66	66
Twillingate	47	46	47	49	52	54	57	59	62	66	69	70	73	79	81	82	84	85	86	86	86	87	87	87	85	81	78	76	74	70	64	59	55	52	51	49
Bonavista	55	54	54	55	56	59	60	61	63	66	67	68	68	72	77	80	82	86	88	89	89	87	85	86	87	86	82	80	77	73	69	65	63	61	60	53
SOUTH COAST AND AVALON																																				
St. John's	43	44	45	44	41	39	41	45	50	54	56	58	61	65	69	72	76	80	83	83	82	79	78	79	79	76	73	70	68	64	59	55	52	50	49	46
Argentia	59	60	62	65	65	64	64	65	66	68	71	74	74	73	72	69	66	64	63	63	64	66	69	73	76	76	75	74	74	72	70	69	69	68	64	61
St. Lawrence	49	51	55	55	51	50	54	57	57	57	61	64	63	63	63	60	56	54	54	53	49	48	52	59	65	66	64	62	63	63	62	58	55	55	54	51
Burgeo	58	60	61	55	50	52	58	61	63	65	67	65	61	62	66	64	57	53	54	54	52	51	53	58	66	72	73	72	73	73	69	64	63	66	66	51
INTERIOR																																				
Gander	44	43	45	45	45	44	44	45	49	51	54	57	64	70	73	73	75	79	81	80	79	79	79	79	78	74	71	70	69	64	59	55	53	50	48	46
Buchans	47	47	50	52	52	53	55	56	58	61	65	70	75	77	76	75	78	80	80	79	79	78	78	79	78	74	72	72	71	69	66	63	58	54	51	49
GRAND LAKE LOWLANDS																																				
Deer Lake	63	66	69	67	64	63	65	67	67	67	73	80	82	82	82	83	84	85	89	89	88	85	82	83	88	89	87	84	83	83	78	71	66	65	65	64
MARITIMES																																				
Halifax	61	63	64	62	65	67	68	68	70	70	72	76	78	79	82	83	83	82	79	80	82	82	81	83	86	84	80	79	78	71	72	70	67	65	62	60
Charlottetown	59	61	66	69	71	71	69	71	72	73	78	84	86	86	87	87	88	89	17	85	85	86	86	86	88	89	88	87	84	82	77	75	71	65	60	60
Fredericton	69	71	74	76	78	77	76	78	79	79	81	83	84	85	84	83	81	80	73	75	75	76	76	79	84	85	84	86	87	84	79	74	72	73	70	67

TABLE 8

MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING

	SEP			OCT			NOV			DEC			JAN			FEB			MAR			APR			MAY			JUN		
	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25
LABRADOR																														
NORTHERN HALF OF COAST																														
Hopedale				1	2	7	18	31	37	36	31	26	22	20	22	25	27	28	32	39	46	56	69	65	58	45	30	16	7	2
Cape Harrison				1	4	10	17	24	28	28	27	27	26	23	21	24	30	34	37	41	45	48	53	57	60	58	52	40	23	10
SOUTHERN HALF OF COAST																														
Goose Bay			1	3	6	13	26	39	46	43	36	32	30	30	33	38	41	45	51	57	59	60	62	59	47	31	15	5	1	
Cartwright					1	4	12	23	33	37	37	35	31	31	32	36	39	40	40	43	48	52	54	53	48	36	18	5	1	
Battle Harbour							4	7	12	18	23	27	27	28	29	30	31	32	32	33	36	36	37	38	36	28	16	5		
INTERIOR PLATEAU																														
Fort Chimo (P.Q.)			2	8	18	31	42	46	41	31	20	14	11	11	11	12	14	17	23	31	40	51	62	68	65	53	34	17	6	1
Schefferville (P.Q.)	2	4		12	23	36	46	50	43	32	22	16	15	16	17	19	22	26	33	40	48	57	64	61	52	37	23	12	4	
Wabush Lake	1	6		15	28	41	53	61	58	45	31	24	22	23	24	27	32	40	51	61	69	74	75	70	56	36	17	5	1	
Churchill Falls	1	6		14	19	25	34	43	44	36	26	20	19	18	18	21	29	35	39	44	50	56	61	62	60	53	40	24	11	3
Lake Eon (P.Q.)	2	4		9	16	26	39	51	52	46	37	32	29	28	30	35	41	48	57	64	68	70	73	74	69	58	40	21	7	2
ISLAND OF NEWFOUNDLAND																														
WEST COAST																														
Daniel's Harbour						1	1	4	11	18	25	31	39	44	44	40	36	38	41	42	39	24	24	16	9	3				
Stephenville						1	2	5	12	27	44	54	56	57	58	59	57	56	55	51	44	34	22	11	4	1				
St. Andrews							1	4	9	19	32	40	39	39	41	46	49	51	49	43	35	25	14	5	2					
EAST COAST																														
St. Anthony				1	3	5	8	15		24	34	39	40	39	40	42	42	42	43	44	47	50	49	41	25	10	2			
Twillingate							1	3		7	12	16	19	20	21	24	27	29	31	34	35	31	24	15	7	2				
Bonavista								1		4	9	13	16	19	22	23	25	26	27	27	25	21	16	10	5	1				
SOUTH COAST AND AVALON																														
St. John's							2	5		11	16	19	22	25	28	28	25	24	24	24	22	16	10	6	3	1				
Argentia								1		4	7	11	14	16	16	18	20	20	18	15	9	4	2	2	1					
St. Lawrence							1	1		3	4	7	12	17	17	15	15	18	19	16	11	4	1	1						
Burgeo												M	I	S	S	I	N	G												
INTERIOR																														
Gander				1	3	5	8	13		21	29	34	34	34	34	36	37	38	38	39	39	35	28	19	11	4	1			
Buchans					1	3	7	14		22	31	36	37	33	31	31	34	35	34	34	35	37	36	27	15	5	1			
GRAND LAKE LOWLANDS																														
Deer Lake												M	I	S	S	I	N	G												
MARITIMES																														
Halifax										18	28	37	41	44	47	49	54	55	45	35	27									
Charlottetown										25	33	33	33	37	42	49	50	51	50	49	43	31	21							
Fredericton										39	46	51	51	51	53	57	61	63	61	52	42	26								
Truro										23	30	33	32	33	38	43	45	41	34	30	22									
Campbellton									32	50	57	61	64	58	58	65	70	72	74	73	71	66	50	22						

TABLE 9

MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SNOWMOBILING

	SEP			OCT			NOV			DEC			JAN			FEB			MAR			APR			MAY			JUN		
	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25
LABRADOR																														
NORTHERN HALF OF COAST																														
Hopedale				1	2	7	18	32	41	44	44	42	41	43	44	44	45	47	50	54	57	61	65	65	58	45	30	16	7	2
Cape Harrison				1	4	10	17	24	30	32	34	36	36	34	36	42	47	49	49	49	49	50	53	57	59	58	52	40	23	10
SOUTHERN HALF OF COAST																														
Goose Bay		1		3	6	13	26	41	52	56	55	53	51	52	57	62	64	66	66	66	63	61	62	59	47	31	15	5	1	
Cartwright					1	4	12	24	36	45	50	51	51	53	54	53	56	57	53	49	50	53	54	53	48	36	19	5	1	
Battle Harbour							4	7	12	19	29	31	34	36	37	37	38	38	36	34	36	36	37	38	36	28	16	5		
INTERIOR PLATEAU																														
Fort Chimo (P.Q.)		2		8	18	32	46	55	58	53	43	34	27	24	24	26	31	36	44	54	62	67	71	72	66	53	34	17	6	1
Schefferville (P.Q.)	2	4		12	23	39	51	58	59	52	42	34	33	33	34	36	41	48	54	59	64	67	66	61	52	37	23	12	4	
Wabush Lake	1	6		15	28	41	54	64	68	62	51	46	43	42	45	52	60	66	72	77	79	79	77	70	56	36	17	5	1	
Churchill Falls	1	6		14	19	26	37	51	57	52	42	37	36	36	37	41	49	53	55	57	60	61	63	63	60	53	40	24	11	3
Lake Eon (P.Q.)	2	4		9	16	26	40	56	65	66	62	57	54	54	57	62	66	70	72	74	73	72	74	75	69	58	40	21	7	1
ISLAND OF NEWFOUNDLAND																														
WEST COAST																														
Daniel's Harbour						1	2	4	11	19	26	33	40	44	44	41	37	40	43	43	40	34	24	16	9	3				
Stephenville						1	2	5	13	27	44	54	57	59	62	63	62	59	56	52	44	34	22	11	4	1				
St. Andrews							1	4	9	19	32	40	40	40	43	48	51	53	50	53	35	25	14	6	2					
EAST COAST																														
St. Anthony					1	3	5	8	16	26	36	44	46	47	48	50	50	49	47	47	48	50	49	41	25	10	2			
Twillingate								1	3	7	12	17	19	21	23	26	29	31	32	35	35	31	24	15	7	2				
Bonavista									1	4	9	13	16	19	22	23	25	26	28	27	25	21	16	10	5	2				
SOUTH COAST AND AVALON																														
St. John's								2	5	11	16	20	23	26	29	29	27	25	25	24	22	16	10	6	3	1				
Argentia									1	4	7	11	14	16	16	18	20	20	19	14	9	3	2	2	1					
St. Lawrence							1	1	1	3	5	8	13	18	18	16	16	18	19	16	11	4	1	1						
Burgeo													M	I	S	S	I	N	G										
INTERIOR																														
Gander					1	3	6	8	13	21	30	34	35	35	35	37	38	38	39	39	39	35	28	19	11	4	1			
Buchans						1	3	8	14	22	32	39	40	38	38	40	40	38	36	35	36	38	36	27	15	5	1			
GRAND LAKE LOWLANDS																														
Deer Lake													M	I	S	S	I	N	G										
MARITIMES																														
Halifax										18	28	37	42	47	49	51	55	55	45	35	27									
Charlottetown										25	35	37	37	42	48	51	53	53	50	49	42	31	20							
Fredericton										35	51	56	56	57	60	62	64	65	62	52	42	26								

TABLE 10

MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR VIGOROUS ACTIVITIES

	APR			MAY			JUN			JUL			AUG			SEP			OCT			NOV	
	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25
LABRADOR																								
NORTHERN HALF OF COAST																								
Hopedale						1	4	8	14	19	23	26	24	21	18	13	8	4	1					
Cape Harrison				1	3	7	11	14	15	19	24	29	31	27	20	13	9	5	3	1	1			
SOUTHERN HALF OF COAST																								
Goose Bay	1	3		5	10	16	24	29	30	32	34	35	34	33	30	24	17	10	5	3	2	1		
Cartwright				1	4	9	16	22	27	30	33	34	33	31	28	23	15	8	3					
Battle Harbour							1	2	3	5	7	9	11	12	11	8	5	3	2					
INTERIOR PLATEAU																								
Fort Chimo (P.Q.)				1	1	4	9	16	23	29	34	34	28	21	17	13	8	4	2	1				
Schefferville (P.Q.)				2	4	8	15	21	25	29	31	29	24	19	16	12	8	4	2					
Wabush Lake			1	3	5	10	19	29	33	34	35	35	33	28	23	16	11	6	4	2	1			
Churchill Falls				2	4	8	14	23	31	37	43	45	40	31	21	12	6	3	3	2	1			
Lake Eon (P.Q.)				2	4	9	16	23	27	29	32	33	32	29	25	19	12	8	4	2	1			
ISLAND OF NEWFOUNDLAND																								
WEST COAST																								
Daniel's Harbour			1	1	1	0	1	4	10	15	18	21	23	21	18	18	17	12	6	2				
Stephenville	1	2		3	4	7	14	25	36	43	45	46	46	44	42	39	33	24	15	8	3			
St. Andrews			1	3	6	10	15	24	34	41	44	44	44	43	41	35	27	18	11	6	3	2	1	
EAST COAST																								
St. Anthony					2	4	7	12	19	26	33	36	35	32	27	22	14	8	4	1				
Twillingate			1	3	6	10	15	22	32	39	41	41	42	41	37	30	22	14	8	3	2			
Bonavista			1	3	7	11	16	23	31	37	41	42	47	39	34	30	25	18	11	5	3	2	1	
SOUTH COAST AND AVALON																								
St. John's	1	2		3	7	11	17	23	30	36	38	37	37	37	35	30	22	16	10	5	3	2	1	
Argentia				1	1	2	2	5	13	21	26	29	31	34	37	37	32	21	11	4	1	1		
St. Lawrence							1	5	11	21	27	28	28	29	32	34	31	21	11	5	2			
Burgeo						2	7	14	23	29	30	29	28	30	32	34	33	25	15	7	2			
INTERIOR																								
Gander	1	3		7	11	16	21	27	32	35	35	35	34	34	33	31	27	20	13	7	3	1		
Buchans		1		5	9	14	18	22	25	26	28	30	30	26	23	21	17	12	8	5	3	1		
GRAND LAKE LOWLANDS																								
Deer Lake	1	2	4	8	15	25	33	39	44	47	49	50	50	46	43	42	37	25	14	7	3	1		
MARITIMES																								
Shearwater (Dartmouth)					24	35	41	47	50	52	53	52	53	57	57	54	49	42	33	22				
Halifax					28	37	45	49	48	45	48	51	52	54	52	49	46	40	31	24				
Charlottetown					20	31	40	46	52	54	52	51	51	51	50	48	41	35	27	18				
Fredericton				30	36	41	43	44	45	46	45	46	49	50	52	54	48	40	29	21				

TABLE 11

MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR BEACHING ACTIVITIES

	APR			MAY			JUN			JUL			AUG			SEP			OCT			Period of High Summer
	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	
LABRADOR																						
NORTHERN HALF OF COAST																						
Hopedale								2	4	5	5	5	4	2	1	1						NHS
Cape Harrison						1	2	2	4	7	12	15	13	9	7	4	2	1				NHS
SOUTHERN HALF OF COAST																						
Goose Bay				1	2	4	7	11	15	20	24	24	21	17	13	9	7	4	2	1		June 28-August 23
Cartwright							1	4	9	14	18	20	18	13	9	6	3	1				July 14-August 8
Battle Harbour										NO SUITABLE DAYS												NHS
INTERIOR PLATEAU																						
Fort Chimo (P.Q.)						1	2	4	8	11	13	13	10	7	5	4	2	1				NHS
Schefferville (P.Q.)							3	5	7	10	13	12	8	6	3	2	2					NHS
Wabush Lake						1	3	6	10	14	16	16	14	11	7	5	4	3	2	1		July 13-August 7
Churchill Falls							2	5	11	19	26	27	23	16	8	3	1	1	2	1		July 12-August 9
Lake Eon (P.Q.)				1	2		5	7	9	12	16	18	16	12	8	5	3	2	1			July 15-August 5
ISLAND OF NEWFOUNDLAND																						
WEST COAST																						
Daniel's Harbour									1	2	4	9	11	8	3	1						July 22-August 10
Stephenville							2	7	14	21	27	32	34	30	23	17	11	7	4	1		July 6-August 28
St. Andrews						1	3	6	11	19	26	31	32	29	23	15	8	3	1			July 9-August 27
EAST COAST																						
St. Anthony									2	5	8	11	9	7	4	2	1					July 25-August 3
Twillingate				1	2	4	8	13	19	23	25	24	20	14	8	4	2	1				July 9-August 21
Bonavista				1	2	4	6	10	14	17	19	19	17	11	5	3	2	1				July 12-August 18
SOUTH COAST AND AVALON																						
St. John's					1	2	5	9	13	16	17	17	15	11	7	4	2	1				July 5-August 26
Argentia								1	2	5	8	12	13	10	7	4	2	1				NHS
St. Lawrence										2	5	7	6	4	2	1						NHS
Burgeo								1	4	8	12	14	13	10	7	7	6	4	2			NHS
INTERIOR																						
Gander				1	3		6	10	15	20	23	25	24	20	15	11	7	5	3	1		June 25-September 2
Buchans				1	3		4	6	8	9	10	13	13	9	6	4	3	1				June 27-August 29
GRAND LAKE LOWLANDS																						
Deer Lake				1	4		9	15	23	28	32	36	36	31	24	19	14	9	4	2		June 16-September 6
MARITIMES																						
Halifax									19	26	33	40	43	43	42	38	32	22				
Charlottetown									21	30	40	46	46	41	35	30	23					
Fredericton								25	34	40	44	48	51	48	45	43	38	27	17			
Moncton									25	32	37	39	39	37	35	33	30	21				
Greenwood								23	33	42	45	47	48	47	42	39	33	25	19			

NHS - No high summer

TABLE 12

MEAN MONTHLY WIND SPEEDS AND OBSERVED AND CALCULATED MAXIMUM GUST SPEEDS (MPH)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Maximum observed Hourly speed (mph)	Maximum observed Gust (mph)	Calculated probable maximum gust (mph)
								LABRADOR								
Hopedale	13.5	13.0	13.8	12.0	10.5	10.7	10.0	10.8	12.5	13.7	14.6	15.3	12.5	NNW 64	73	88
Cape Harrison	13.8	14.8	15.2	14.1	11.0	9.8	9.1	10.4	14.2	14.6	15.3	15.0	13.1	WNW 75	--	103
Goose Bay	10.5	9.8	10.5	10.4	9.3	9.0	8.6	8.8	10.1	10.0	10.2	11.0	9.9	NNW 48	80	68
Cartwright	12.9	12.9	13.8	13.3	10.6	10.3	8.6	8.7	11.0	12.8	14.1	14.6	12.0	SVL 64	80	88
Battle Harbour Loran	18.7	18.5	18.2	17.3	13.8	13.8	12.8	12.8	14.9	16.3	18.0	19.2	16.2	SVL 80	86	109
Border (P.Q.)	13.3	13.0	12.4	12.1	12.1	11.0	10.2	10.6	12.9	13.7	13.4	14.4	12.4	W 66	--	91
Schefferville (P.Q.)	10.8	11.0	10.7	10.6	11.3	11.2	10.6	10.8	12.3	12.3	11.5	11.3	11.2	S 60	92	83
Churchill Falls A	10.5	10.2	11.9	11.2	11.7	11.0	9.3	9.1	11.0	10.2	9.3	10.3	10.5	SW 38	63	55
Wabush Lake	8.3	7.9	8.5	8.8	8.9	8.7	8.7	7.9	8.8	9.2	8.5	8.0	8.5	W 50	70	70
Lake Eon A (P.Q.)	8.4	8.4	9.1	8.9	8.2	8.0	7.6	7.5	8.9	8.9	8.1	7.7	8.3	SW 60	65	83
Cape Whittle (P.Q.)	21.9	20.6	18.8	18.0	15.9	15.1	14.9	14.8	17.3	19.2	21.4	20.7	18.2	NE 84	--	114
Harrington Hr. (P.Q.)	15.8	15.5	15.9	13.7	11.8	11.6	10.4	11.4	13.0	13.8	15.2	15.9	13.7	SW 60	--	83
Natashquan (P.Q.)	12.2	13.0	12.9	11.2	9.4	10.1	9.1	9.3	10.6	11.5	12.3	11.2	11.2	SW 56	--	78
Grindstone Island (P.Q.)	24.0	21.7	19.2	20.8	17.7	16.6	16.5	17.2	18.8	20.6	21.8	21.6	19.7	W 80	--	109

Table 12 (Cont'd)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Maximum observed Hourly speed (mph)	Maximum observed Gust (mph)	Calculated probable maximum gust (mph)
ISLAND OF NEWFOUNDLAND																
Stephenville	11.8	11.3	10.3	9.6	8.2	7.1	6.6	7.9	8.1	9.0	10.1	11.3	9.3	NNW 71	85	97
St. Andrews	13.8	13.0	11.9	9.8	8.8	7.6	7.5	8.1	9.0	10.1	12.6	13.5	10.5	SVL 90	--	122
St. Anthony	15.0	14.4	15.0	13.2	11.0	10.3	10.0	11.0	12.2	12.4	13.3	14.0	12.7	SVL 70	85	96
St. Anthony A	13.5	13.5	12.8	12.5	11.6	12.3	11.2	10.9	11.4	12.5	13.1	13.7	12.4	N 70	100	96
Twillingate	20.8	18.5	16.9	14.8	12.7	12.8	12.9	13.5	16.0	17.9	19.1	21.0	16.4	SSW 72	--	99
Comfort Cove 1	17.7	14.9	16.2	14.8	12.3	13.8	13.9	15.7	17.6	17.2	19.3	17.1	15.9	SW 64	--	88
Comfort Cove 2	16.9	17.7	15.4	14.9	14.8	15.4	15.6	15.4	16.3	18.0	16.8	15.9	16.1	SW 82	78	111
Bonavista	20.5	18.7	16.8	15.8	13.8	13.8	13.4	14.5	15.4	18.0	18.1	19.4	16.5	SVL 70	102	96
St. John's A	16.8	16.9	16.3	15.7	14.5	13.9	13.3	13.5	13.7	14.8	15.6	16.5	15.1	N 85	120	115
Cape Race	20.2	21.6	20.5	17.5	15.7	14.4	13.5	13.8	15.3	16.1	18.5	19.3	17.2	N 82	--	111
Argentia	16.9	16.5	15.6	14.4	12.8	12.0	12.0	12.3	12.7	13.9	16.2	17.1	14.4	N 70	85	96
St. Lawrence	19.6	20.2	18.5	17.9	14.4	11.9	11.4	12.5	13.9	16.3	18.2	19.7	16.2	WSW 90	--	122
Grand Bank	17.9	16.3	16.1	14.0	11.7	12.0	11.5	12.1	12.4	13.8	15.4	16.0	14.1	NE 66	--	91
St. Albans	6.5	7.1	7.8	8.2	7.5	7.2	6.5	7.1	6.5	7.5	7.5	6.8	7.2	NW 36	--	52
Burgeo	18.2	18.4	17.1	16.1	13.8	11.1	9.7	11.7	12.3	14.2	18.4	18.5	15.0	SW 80	100	109
Port aux Basques	19.2	18.1	15.2	14.7	13.0	11.5	10.4	10.8	11.3	13.8	16.2	17.8	14.3	WNW 72	100	99

Table 12 (Cont'd)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Maximum observed Hourly speed (mph)	Maximum observed Gust (mph)	Calculated probable maximum gust (mph)
Deer Lake A	9.6	10.1	9.9	10.1	9.6	9.0	8.5	8.3	8.1	8.8	8.9	8.7	9.1	WSW 50	70	70
Buchans A	15.4	15.4	16.0	13.8	11.9	11.5	10.8	11.4	12.1	12.8	13.6	14.7	13.3	SSE 65	--	90
Gander	15.2	14.8	14.4	13.8	12.4	11.5	10.7	10.7	11.6	12.8	13.5	14.1	13.0	SVL 65	100	90

SVL - Several directions

TABLE 13

MEAN MONTHLY NUMBER OF DAYS WITH MEASURABLE RAINFALL
(1941-1970)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
LABRADOR													
NORTHERN HALF OF COAST													
Hopedale	1	1	2	3	8	12	15	15	14	9	4	2	86
Cape Harrison	1	1	1	4	8	12	15	15	15	9	5	2	88
SOUTHERN HALF OF COAST													
Goose Bay	1	1	2	4	11	15	16	16	13	11	5	2	97
Cartwright	3	2	2	4	11	14	15	16	14	12	6	3	102
Battle Harbour	2	*	1	4	5	8	7	8	7	6	5	1	54
Battle Harbour Loran	2	3	4	4	10	13	13	14	10	11	9	4	97
INTERIOR PLATEAU													
Fort Chimo (P.Q.)	*	*	*	1	5	11	13	15	15	7	2	*	69
Schefferville (P.Q.)	1	*	1	2	8	14	18	19	14	8	2	2	89
Wabush Lake	*	1	1	2	7	13	17	19	14	8	4	1	87
Churchill Falls	0	0	1	2	7	12	14	13	11	7	3	0	70
Lake Eon (P.Q.)	1	1	1	2	9	14	16	17	13	10	4	2	90
ISLAND OF NEWFOUNDLAND													
WEST COAST													
Daniel's Harbour	3	2	3	5	10	12	12	13	12	12	11	4	99
Corner Brook	4	4	5	7	13	13	14	15	14	17	13	6	125
Stephenville	6	5	5	9	13	13	13	14	13	15	14	8	128
St. Andrews	7	5	6	9	12	12	11	12	14	15	14	8	125
EAST COAST													
St. Anthony	3	2	3	5	9	11	10	12	11	11	9	3	89
Twillingate	5	4	4	7	10	12	12	12	11	12	11	6	106
Bonavista	6	7	7	8	11	12	10	14	12	15	14	9	125
SOUTH COAST AND AVALON													
St. John's A	9	8	9	12	14	13	13	15	14	17	16	11	151
St. John's	8	7	8	10	13	10	10	13	13	16	16	10	134
Argentia	10	8	9	13	12	13	13	14	11	12	14	12	141
St. Lawrence	6	7	6	8	11	9	9	11	11	11	13	10	112
Burgeo	6	5	6	8	12	12	13	13	12	13	13	9	122
Grand Bank	7	6	7	9	11	12	11	11	11	13	14	9	121
INTERIOR													
Gander	6	6	7	9	13	14	13	16	15	15	13	8	135
Grand Falls	3	4	5	6	11	13	14	14	12	14	12	6	114
Springdale	3	2	3	3	8	10	9	11	9	10	9	4	81
Buchans A	4	3	3	6	10	12	13	14	12	12	10	5	104
GRAND LAKE LOWLANDS													
Deer Lake	4	3	4	7	12	13	13	14	13	15	12	5	115

* less than one-half day

TABLE 14

MEAN MONTHLY PERCENTAGE OF TIME WITH FREEZING RAIN OR FREEZING DRIZZLE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Period of record
LABRADOR													
Fort Chimo (P.Q.)	0.2	0.2	0.3	0.1	0.3	0.1	*			0.3	0.8	0.2	1957-66
Schefferville (P.Q.)	1.8	1.6	1.0	0.4	0.1	*			*	0.7	1.8	1.0	1957-66
Goose Bay	1.4	0.9	0.6	0.3	*						0.8	1.3	1957-66
ISLAND OF NEWFOUNDLAND													
Daniel's Harbour	0.5	0.7	0.8	0.2	0.1						0.3	0.7	1966-72
Stephenville	1.0	0.7	0.7	0.4							0.2	0.4	1957-66
St. John's A	4.1	6.5	5.5	4.9	0.9						0.3	1.9	1957-66
Argentia	0.5	0.7	0.7	0.2							*	0.3	1953-70
Gander	4.8	5.7	5.6	3.0	1.2	*				*	0.7	3.1	1957-66
MARITIMES													
Halifax	1.9	1.8	1.8	0.5	*						*	1.0	
Truro	1.0	0.8	0.5	0.1							*	0.6	
Greenwood	1.2	1.1	0.4	0.1							0.1	0.5	
Fredericton	1.0	1.6	0.7	0.2							0.3	1.0	

* < 0.05%

TABLE 15

MEAN FRESH-WATER TEMPERATURES IN PROVINCIAL PARKS (^{o}C)
(A, B, etc. - LETTER INDENTIFIERS REFER TO FIGURE 98)

	Park	JUN 5	JUN 15	JUN 25	JUL 5	JUL 15	JUL 25	AUG 5	AUG 15	AUG 25	SEP 5
A	La Manche	14	16	19	20	21	22	21	19	17	16
B	Cochrane Pond	12	15	17	18	20	21	21	20	17	16
C	Butter Pot	11	14	16	16	17	18	19	18	15	14
D	Gushue's Pond	13	15	16	17	20	20	20	19	17	15
E	Northern Bay Pool	14	18	20	18	21	22	23	21	19	17
F	Belleview Beach (Broad Lake)*	9	12	13	13	15	17	18	16	15	15
G	Jack's Pond	11	14	14	17	18	19	20	20	18	17
H	Frenchman's Cove	13	15	16	17	18	19	20	19	16	15
I	Lockston Path	9	11	14	15	16	18	19	18	15	15
J	Square Pond	11	14	16	17	19	21	20	19	18	16
K	David Smallwood	12	15	17	18	20	21	21	20	17	15
L	Windmill Bight Pond	10	13	15	16	18	20	20	18	14	12
M	Jonathan's Pond	10	13	15	18	19	20	20	17	15	13
N	Glenwood	13	16	18	18	20	21	21	19	17	15
O	Notre Dame	12	16	17	18	19	22	22	20	18	16
P	Dildo Run	9	13	14	15	16	17	18	18	16	15
Q	Beothuck	13	15	17	18	19	20	20	17	16	15
R	Aspen Brook	12	14	16	16	16	18	18	16	13	11
S	Mary March	11	11	14	15	16	18	20	18	16	13
T	Catamaran	10	12	15	18	20	20	20	18	16	15
U	Indian River	12	15	17	19	21	22	23	20	18	16
V	Flat Water Pond	8	10	16	15	19	20	21	19	18	14
W	Squires Memorial	10	13	17	18	19	21	22	20	17	15
X	Sop's Arm	7	11	14	17	19	20	20	18	14	14
Y	River of Ponds	9	10	11	13	15	17	17	17	16	15
Z	Blue Ponds	11	14	16	17	18	19	20	19	18	17

Table 15 (Cont'd)

Park	JUN 5	JUN 15	JUN 25	JUL 5	JUL 15	JUL 25	AUG 5	AUG 15	AUG 25	SEP 5
AA Barachois Pond	12	14	16	17	19	20	21	20	18	17
BB Picadilly Head	10	11	12	14	15	17	17	18	18	16
CC Crabbes River	11	14	16	19	21	21	22	21	19	15
DD Grand Codroy	13	17	18	20	22	22	23	21	18	16
EE Mummichog	13	18	18	19	21	23	23	23	19	16
FF John T. Cheeseman (S)	8	8	8	11	13	13	15	14	13	11
John T. Cheeseman Swimming Pool	9	10	10	13	14	14	16	16	14	12

(S) Gulf of St. Lawrence

* Broad Lake is a barachois pond (salt and fresh water mixed)

Note: 15.5^{o} is rounded off to 15.

TABLE 16

MEAN MONTHLY PERCENTAGE OF TIME WITH VISIBILITY LESS THAN 10 KM (6 MI)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
LABRADOR													
NORTHERN HALF OF COAST													
Hopedale	26	22	28	23	19	17	15	14	8	12	19	21	19
Cape Harrison	33	28	38	33	20	18	17	12	13	12	19	22	22
SOUTHERN HALF OF COAST													
Goose Bay	19	16	22	13	9	6	6	4	5	8	17	18	12
Cartwright	18	19	29	23	21	13	11	12	9	10	19	20	17
Battle Harbour	21	21	28	25	25	25	26	24	14	14	23	22	22
Belle Isle	26	26	32	33	37	38	43	36	26	25	31	30	32
ISLAND OF NEWFOUNDLAND													
WEST COAST													
Daniel's Harbour	36	35	27	19	15	18	20	15	10	13	16	30	21
Stephenville	35	35	25	14	13	15	20	14	10	11	12	24	19
St. Andrews	27	25	17	14	10	9	10	6	7	6	12	22	14
EAST COAST													
St. Anthony	26	28	29	29	24	22	21	19	15	19	27	27	24
Twillingate	30	27	34	27	19	16	12	10	9	11	16	18	19
Bonavista	26	24	28	31	25	19	16	16	11	15	23	21	21
SOUTH COAST AND AVALON													
St. John's A	34	34	38	38	31	26	26	26	20	22	28	31	30
Cape Race	32	31	31	34	37	44	54	44	27	25	24	24	34
St. Lawrence	28	32	31	28	39	46	55	48	22	23	28	25	34
Grand Bank	23	21	19	23	22	26	30	22	17	18	19	21	22
St. Alban's	9	16	18	10	11	15	18	16	9	9	17	15	14
Burgeo	26	35	32	29	41	48	55	48	29	26	30	26	35
INTERIOR													
Deer Lake	22	21	16	11	8	8	8	9	9	9	12	19	13
Gander	31	27	32	35	22	20	13	16	14	18	27	26	23

TABLE 17

MEAN MONTHLY PERCENTAGE OF TIME WITH VISIBILITY LESS THAN 1 KM (5/8 MI)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
LABRADOR													
NORTHERN HALF OF COAST													
Hopedale	7	9	10	5	3	3	3	3	0	1	3	6	4
Cape Harrison	11	10	10	8	4	4	5	3	2	2	4	5	6
SOUTHERN HALF OF COAST													
Goose Bay	2	1	2	1	0	0	0	0	0	1	1	1	1
Cartwright	6	6	10	6	5	2	3	4	2	2	4	6	4
Battle Harbour	6	8	9	8	11	10	15	12	5	4	7	10	9
Belle Isle	15	18	18	21	30	30	37	31	21	20	23	18	24
ISLAND OF NEWFOUNDLAND													
WEST COAST													
Daniel's Harbour	5	8	4	3	4	6	7	3	2	2	1	4	4
Stephenville	5	7	2	1	2	2	2	1	1	1	1	1	2
St. Andrews	5	3	3	2	2	3	2	1	1	1	1	2	2
EAST COAST													
St. Anthony	4	5	6	8	8	8	5	4	4	4	4	5	5
Twillingate	5	7	7	5	4	4	2	1	1	1	3	3	4
Bonavista	7	8	10	12	11	7	6	3	3	3	6	6	7
SOUTH COAST AND AVALON													
St. John's A	8	10	13	16	13	8	8	6	5	4	7	7	9
Cape Race	15	15	15	20	28	35	46	36	19	16	13	13	23
St. Lawrence	8	9	11	9	26	37	43	36	12	11	11	8	18
Grand Bank	4	3	2	2	3	5	6	2	2	2	1	3	3
St. Alban's	3	4	4	3	3	4	6	3	3	3	7	3	4
Burgeo	4	8	8	7	19	29	37	27	10	8	5	6	14
INTERIOR													
Deer Lake	1	2	1	0	0	0	1	1	2	1	2	1	1
Gander	5	5	6	6	5	3	2	2	2	2	5	5	4

TABLE 18

MEAN MONTHLY PERCENTAGE OF TIME WITH FOG OR ICE FOG (VISIBILITY LESS THAN OR EQUAL TO 10 KM /6 MI)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Period of record
LABRADOR													
Fort Chimo (P.Q.)	3.0	3.4	3.6	3.0	3.5	5.4	6.6	7.6	4.4	2.7	2.0	2.3	1957-66
Schefferville (P.Q.)	8.6	6.1	4.0	2.3	6.0	5.8	6.0	5.7	5.8	7.3	6.8	5.0	1957-66
Goose Bay	4.0	4.2	4.8	4.5	7.4	6.8	7.8	5.0	5.1	7.5	6.2	3.4	1957-66
ISLAND OF NEWFOUNDLAND													
Daniel's Harbour	2.1	2.3	5.6	6.9	15.0	21.5	21.2	17.0	11.7	13.6	8.4	5.1	1966-72
Stephenville	3.6	3.2	4.1	9.8	10.9	11.9	14.4	9.2	8.3	7.8	7.7	4.6	1957-66
St. John's A	19.2	23.9	25.8	28.3	31.2	26.3	25.2	20.5	16.3	21.0	23.7	16.8	1957-66
Argentia	13.6	12.1	16.4	22.8	27.4	36.3	41.0	31.1	21.0	18.4	16.5	12.1	1953-70
Gander	14.7	16.8	20.3	22.6	19.6	17.6	13.5	12.7	12.1	16.5	20.0	12.8	1957-66

TABLE 19

MOST FREQUENT WIND DIRECTION WITH PERCENTAGE OF TIME BY MONTHS. (WIND DIRECTIONS OF SECONDARY IMPORTANCE ARE GIVEN BELOW THE PREVAILING DIRECTION FOR THE MONTH.)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Period of wind record
						L A B R A D O R								
Hopedale	SW	SW	NNW	NNW	N	N	N	N	WSW	WSW	WSW	WSW	WSW	
	15	15	19	18	14	11	11	10	12	15	12	15	10	1963-72
Cape Harrison	W	WNW	WNW	WNW	WNW	NW	NW	NW	WNW	W	W	W	WNW	
	15	17	25	21	13	15	12	11	13	17	16	19	14	1955-61
					S						S			
					10						10			
Goose Bay	WSW	WSW	W	NE	NE	NE	W	WSW	WSW	W	W	WSW	WSW	
	20	17	13	16	14	13	11	12	15	15	16	23	13	1955-72
							NE							
							11							
Cartwright	SSW	SSW	NW	NNW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	WNW	SSW	
	15	17	14	16	12	14	17	16	17	14	15	14	14	1963-72
		NW	SSW	SSW	NNW	N	N	N		WNW		SSW		
		12	13	10	11	11	10	10		10		11		
Battle Harbour Loran	W	NW	NNW	N	S	S	S	S	S	W	W	W	S	
	17	13	15	16	19	20	26	20	14	10	12	16	13	1957-72
				S	N	N				S	S			
				10	13	11				10	11			
Border (P.Q.) *	NW	NW	NW	NW	NW	NW	W	W	W	W	SW	NW	NW	
	23	19	23	22	22	21	20	18	24	24	22	23	21	1965-72
Schefferville (P.Q.)	NW	NW	NNW	NNW	NW	NNW	NW	NW	NW	W	NW	NW	NW	
	16	18	17	14	14	12	11	12	13	11	13	19	15	1955-72
	SSE				SSE	SSE					SSE			
	10				11	10					10			

Table 19 (Cont'd)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Period of wind record
Churchill Falls	W 17	W 19	W 12 NE 12	NW 12 ENE 11	NW 12	W 15	W 17	W 14	W 18	W 18	W 11 ESE 10	W 21	W 15	1968-72
Wabush Lake	W 11	W 12	N 11	N 12	N 10	W 8	W 10	W 11	W 13	W 12 S 10	W 10 S 10	W 12	W 10	1961-72
Lake Eon (P.Q.)	WNW 13	WNW 15	WNW 12	NW 11	WNW 10	SSW 11	SSW 13	SSW 12	SW 12 W 12	NW 12 W 10	NW 10	NW 16	NW 11	1955-72
Cape Whittle (P.Q.) *	NE 27 NW 24	N 21 W 18	N 21 SW 15	NE 22 SW 15	SW 18 E 18	SW 21 E 15	S 31	SW 22	SW 24	W 25	W 18 NE 15	N 25 W 21	W 18	1963-68
Harrington Hr. (P.Q.) *	W 26 NE 19	W 26 NE 17	NE 26 SW 16	NE 26 SW 21	SW 34 NE 18	SW 38 NE 15	SW 45	SW 43	SW 37	SW 27	SW 19 NE 15	W 22 N 21	SW 26	1966-72
Natashquan (P.Q.)	NW 31	NW 30 NE 15	N 19 W 18	W 19 NE 17	SW 15	W 19	W 25	W 26	W 24	W 21 N 15	NE 21 W 16	NW 29 NE 25	W 18	1969-72
Grindstone (P.Q.) (also 16 pts.)	NW 27	NW 24	N 25	N 24	S 21 NW 16	SW 23	SW 33	W 24	SW 22	NW 19 N 16	NW 24	NW 25	NW 19	1958-68

Table 19 (Cont'd)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Period of wind record
						I S L A N D O F N E W F O U N D L A N D								
Stephenville	W 16 ENE 10	W 14 ENE 10	ENE 12 W 10	ENE 11 WSW 11	WSW 14 ENE 10	WSW 16 ENE 10	WSW 17	WSW 16	WSW 12	W 12	W 14 ENE 10	W 16	W 12	1956-72
St. Andrews	WNW 14 NE 10	NW 11	NE 10 NW 10	NW 9	S 9	SW 12	S 13	S 13	SSW 12	WNW 9	WNW 11	WNW 13	NW 9	1955-66
St. Anthony	W 24 N 11	W 20 N 13	N 20 W 13	N 11 W 10	N 11	S 11 W 10	W 13 S 13	SW 16 S 11	W 16	W 16	W 19	W 27	W 16	1955-65
St. Anthony A	SW 12 N 11	SW 16 N 10	SW 14 NNE 11	SW 12 N 12	NE 12 SW 11	SW 20	SW 22	SW 15 NE 10	SW 19	SW 16	S 17	SW 12 N 11	SW 15	1966-70
Twillingate	W 12	WNW 12	NNE 10	NNE 11	S 11	SSW 11	SSW 17	SSW 13	SW 13	SSW 12	W 12	W 13	W 10	1955-66
Comfort Cove 1	* SW 17 NE 16	SW 17 NE 16	NE 24 SW 16	SW 31 NE 15	SW 34 N 15	SW 37	SW 51	SW 50	SW 39	SW 29	SW 28	SW 24	SW 31	1955-65
Comfort Cove 2	W 13	SW 12	SW 14	SW 12 NE 10	SW 22	SW 23	SW 23	SW 22	SW 16	SW 16	SW 11	E 11	SW 15	1966-72
Bonavista	W 20	W 12	WSW 10	WSW 10 NNW 10	SW 14	SW 19	SW 20	SW 17	WSW 16	WSW 13	W 13	W 18	WSW 11	1959-72

Table 19 (Cont'd)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Period of wind record
St. John's A		W	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	WSW	
		17	15	13	15	18	24	27	26	20	17	13	15	17	1955-72
Cape Race	*	W	NW	NE	SW	NE	SW	SW	SW	SW	W	SW	W	SW	
		28	23	27	25	30	37	44	36	28	25	22	22	26	1955-69
		NE	NE	NW	NE	SW	NE	NE	NE	NE	NE	NE			
		17	23	21	20	25	26	17	16	17	17	17			
Argentia		W	W	N	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	WSW	SSW	
		11	10	11	20	29	37	41	35	26	16	11	12	20	1956-69
St. Lawrence		WNW	W	W	W	W	WSW	WSW	WSW	W	W	W	W	W	
		17	15	14	15	18	22	25	21	16	18	10	13	16	1966-72
Grand Bank	*	NW	NW	NW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	
		29	28	29	27	25	34	40	36	38	31	24	26	28	1957-66
		SW:NE	SW:NE	NE	NE	NE						NE	NE		
		24:15	19:16	25	16	12						10	11		
St. Albans	*	NW	NW	SW	NW	SW	SW	SW	SW	SW	NW	NW	NW	SW	
		29	25	22	20	23	33	29	40	26	25	22	29	23	1968-72
			SW	NW	SW	NW			NW	NW	SW	SW	SW		
			16	16	16	17			17	23	24	18	16		
Burgeo		WNW	NW	W	E	E	E	E	E	E	W	WNW	WNW	W	
		20	19	13	14	19	19	20	16	13	15	12	15	12	1966-72
				NE	W	W	W	W	W	W		E		E	
				11	13	12	10	12	13	12		12		12	
Port aux Basques		NW	W	E	E	E	E	E	E	E	E	E	NW	E	
		18	17	15	23	30	38	39	25	21	15	21	15	21	1966-72
			E	WNW	WNW	WNW	WNW	WNW	WNW	WNW	W	NW	E		
			11	12	15	16	15	15	12	14	14	12	10		
Deer Lake A		SW	SW	SW	NE	SW	SW	SW	SW	SW	SW	NE	NE	SW	1965-72
		18	21	19	24	19	22	24	21	20	21	19	18	20	
		NE	NE	NE	SW	NE	NE		NE	NE	NE	SW	SW		
		16	15	18	14	16	13		11	12	11	18	17		

Table 19 (Cont'd)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Period of wind record
Buchans A	W	WNW	NW	NW	NW	NW	S	W	W	NW	WNW	W	NW	
	13	17	18	15	11	10	11	11	13	12	13	15	12	1955-65
			NNE			S		SSW						
			10			10		10						
Gander	W	WNW	NNW	NNW	WSW	SW	SW	WSW	WSW	WSW	W	W	WSW	
	15	12	12	12	9	12	14	14	14	14	12	13	12	1955-72
			W	WSW										
			10	10										

* Eight-Point Compass Anemometer
For a secondary direction to be recorded here it must occur at least 10% of the time (15% for the 8-direction anemometer). Directions must differ at least 90°.

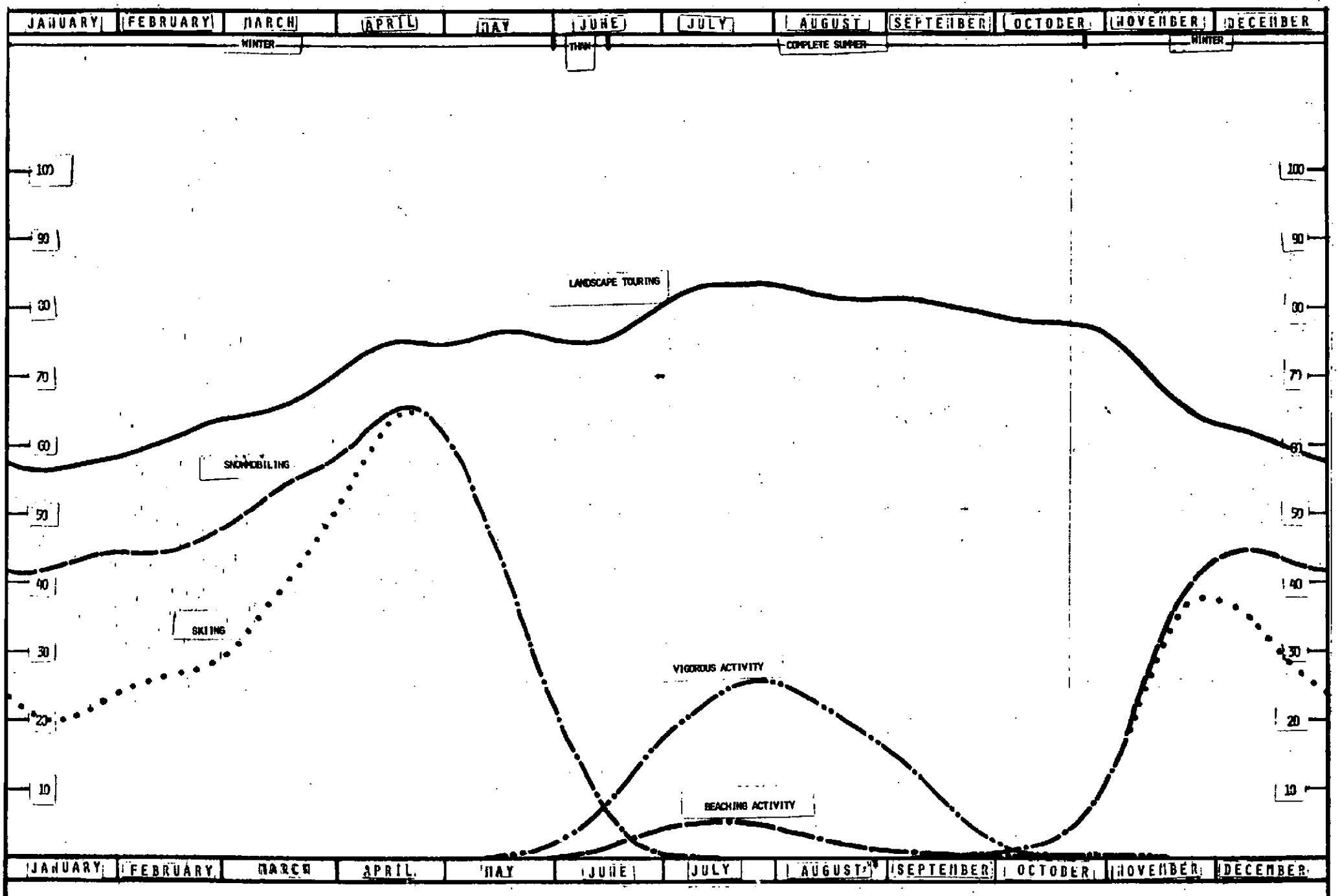


FIG. 38 ANNUAL VARIATION OF SUITABLE DAYS - HOPEDALE

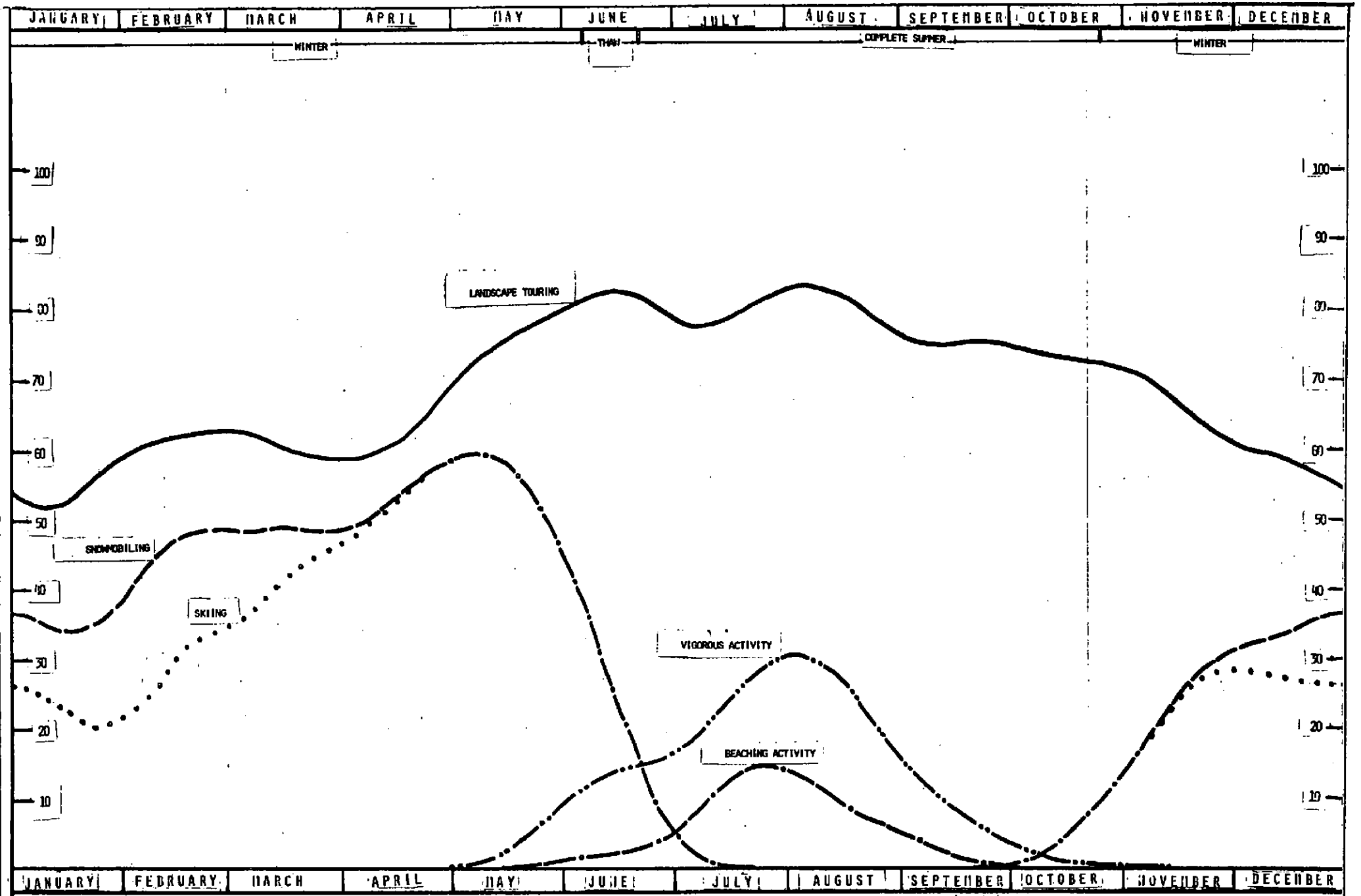


FIG. 39 ANNUAL VARIATION OF SUITABLE DAYS - CAPE HARRISON

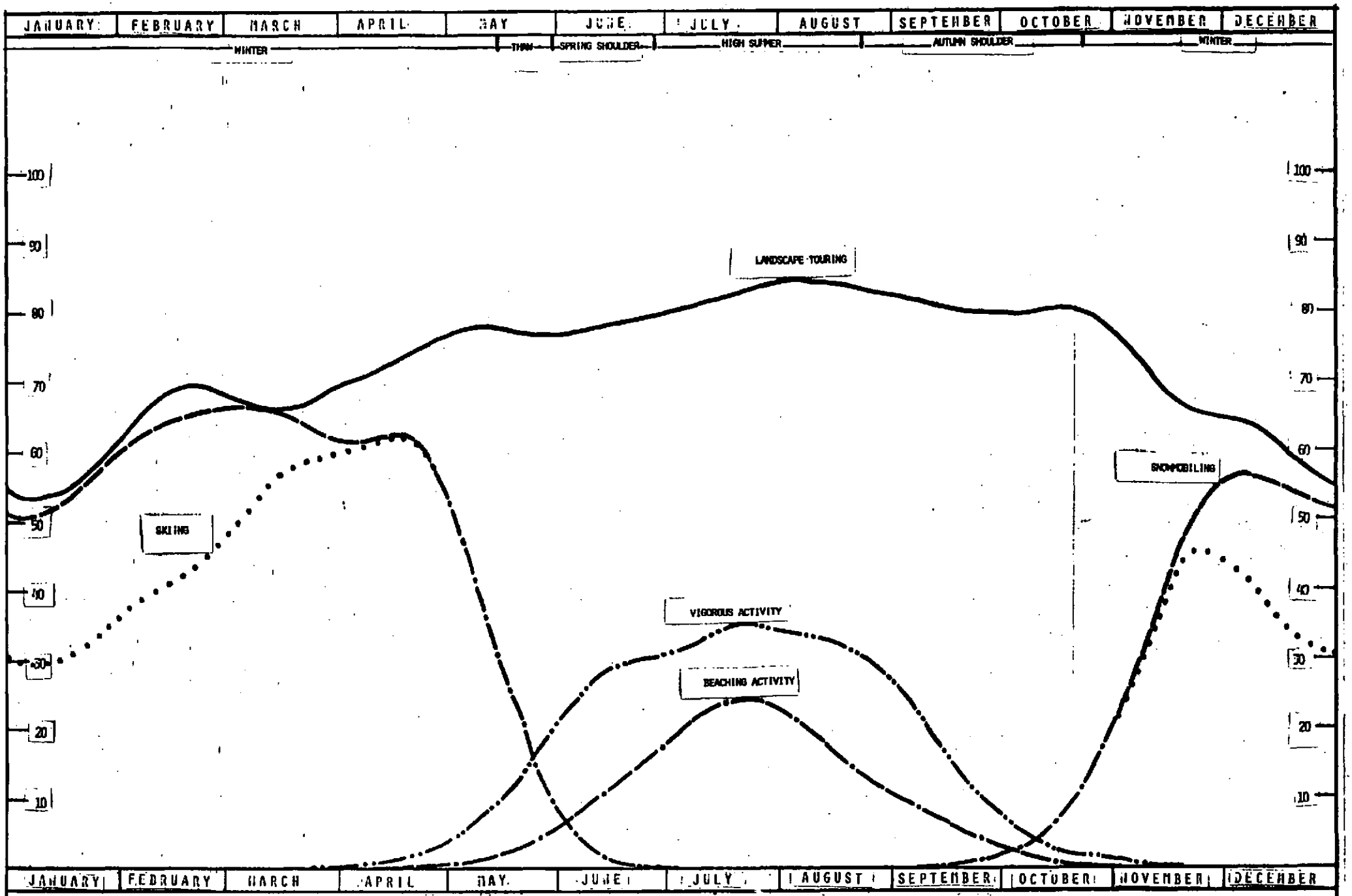


FIG. 40 ANNUAL VARIATION OF SUITABLE DAYS - GOOSE BAY

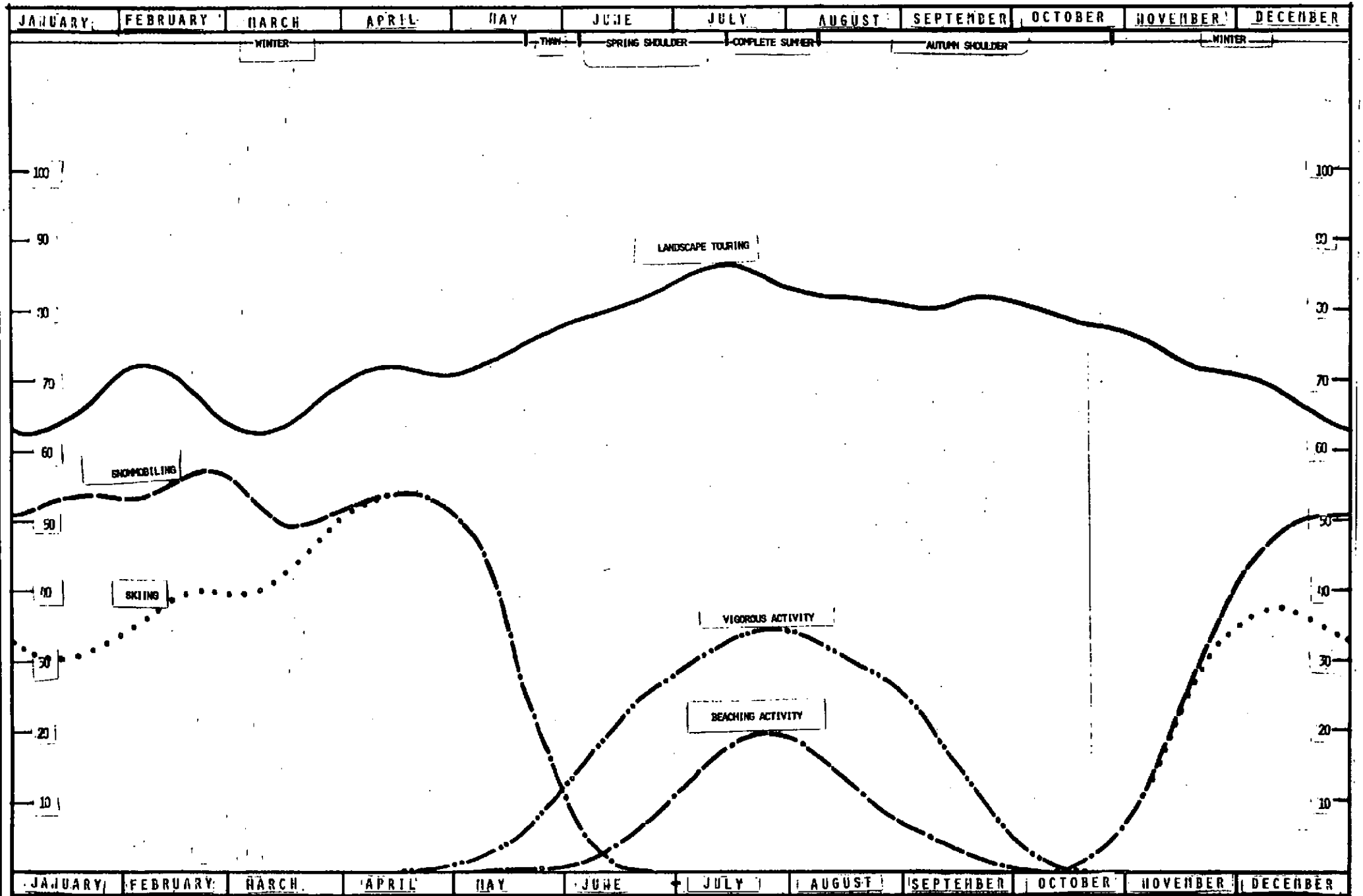


FIG. 41 ANNUAL VARIATION OF SUITABLE DAYS - CARTWRIGHT

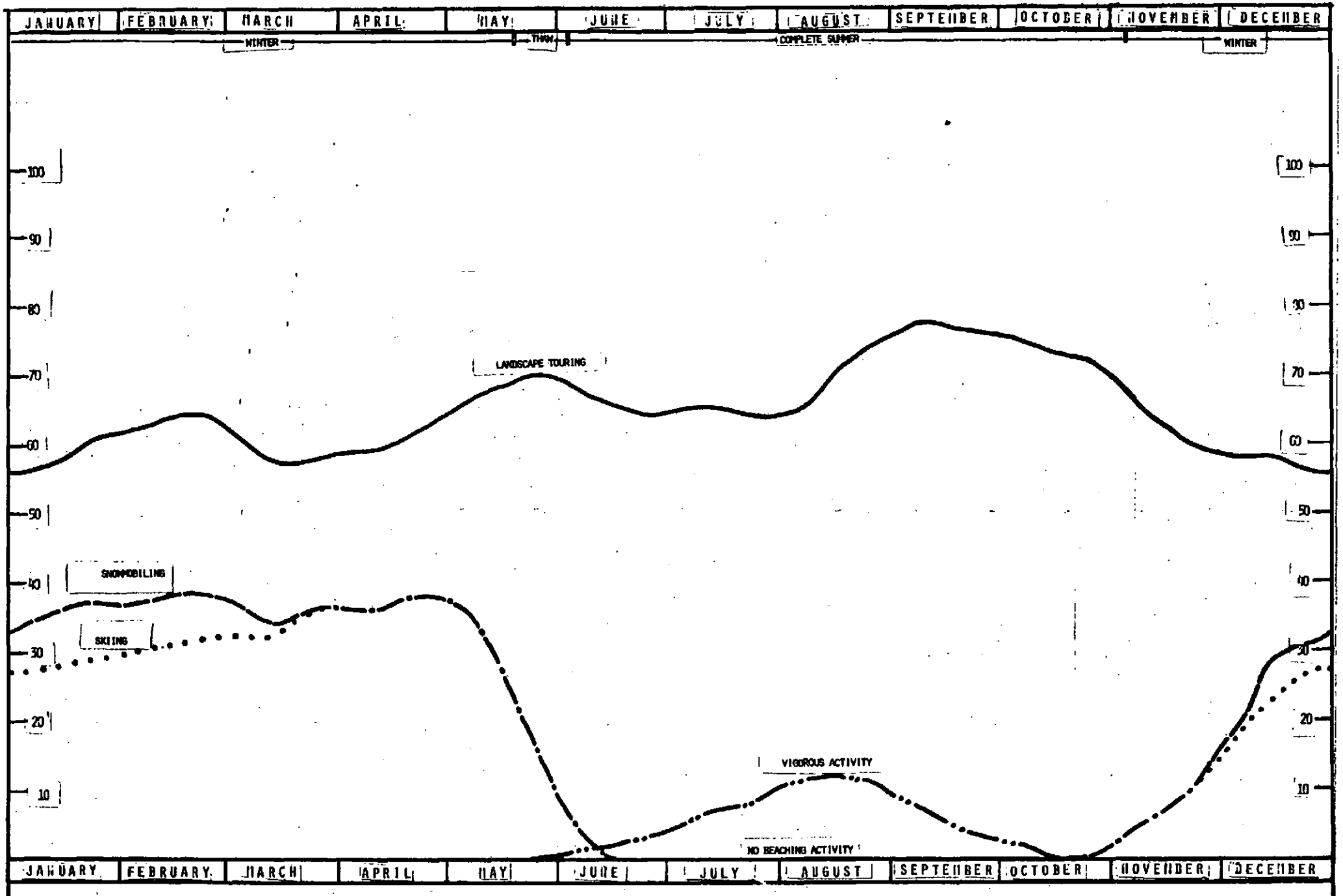


FIG. 42 ANNUAL VARIATION OF SUITABLE DAYS - BATTLE HARBOUR

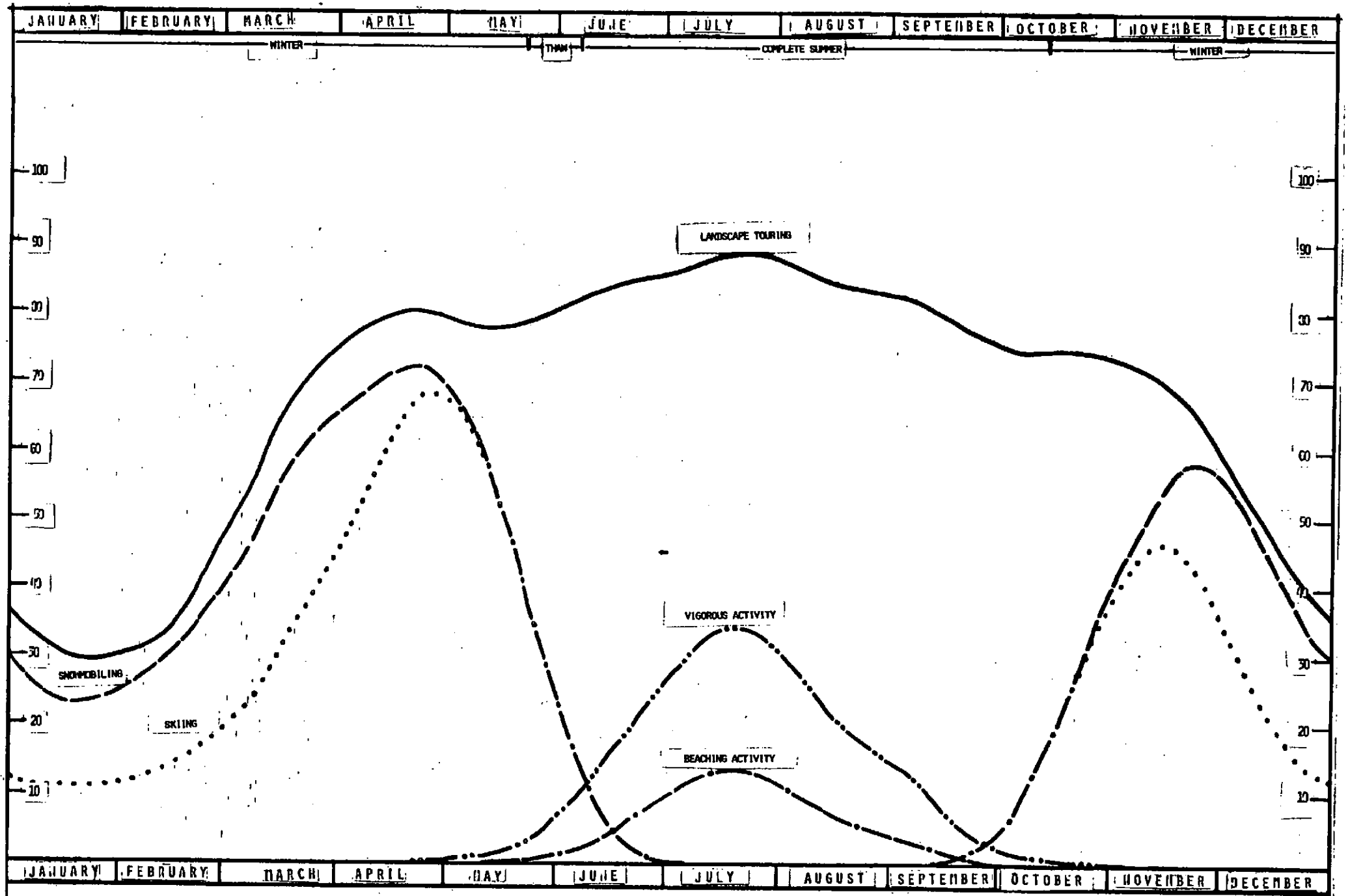


FIG. 43 ANNUAL VARIATION OF SUITABLE DAYS - FORT CHIMO

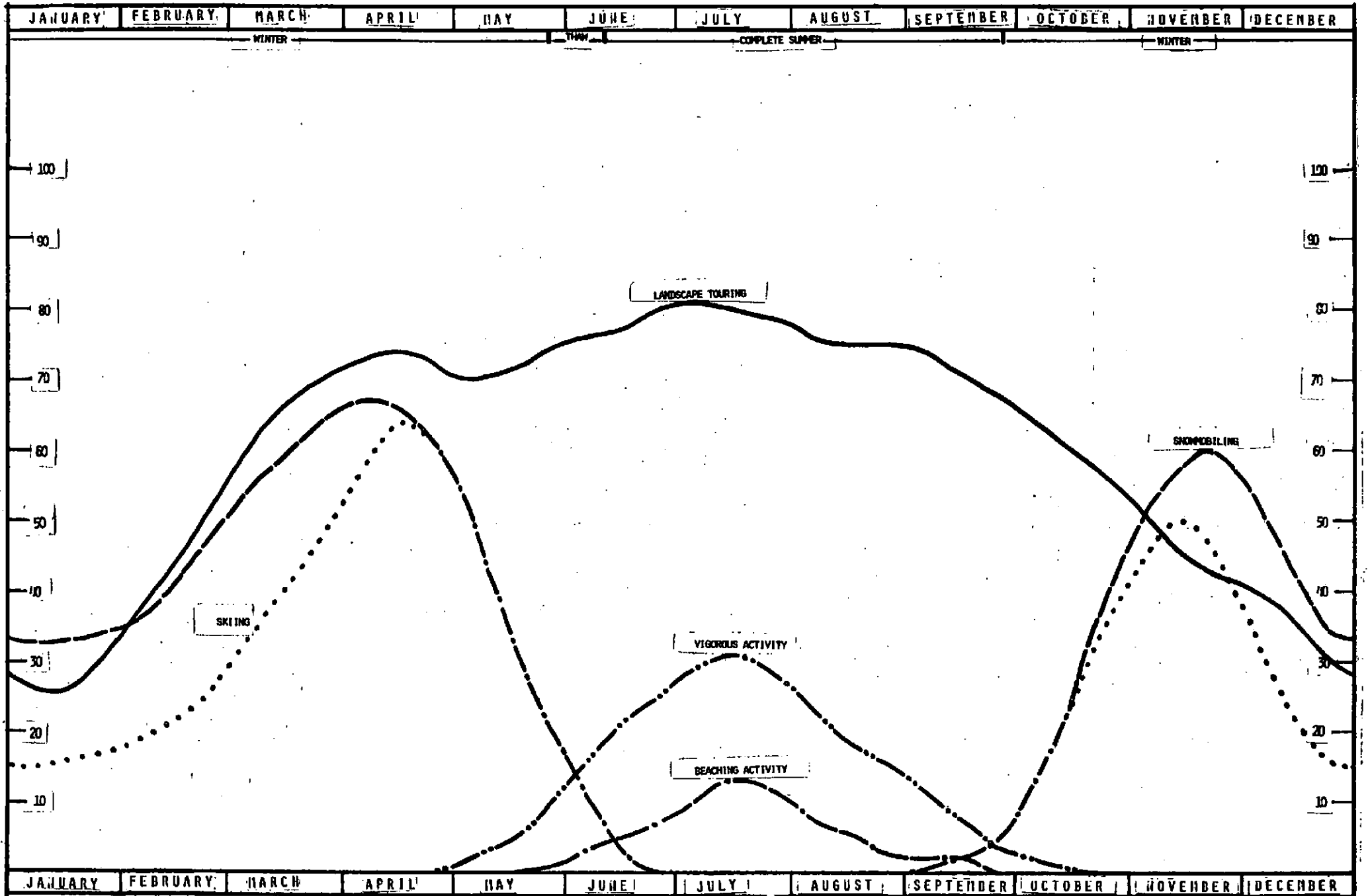


FIG. 44 ANNUAL VARIATION OF SUITABLE DAYS - SCHEFFERVILLE

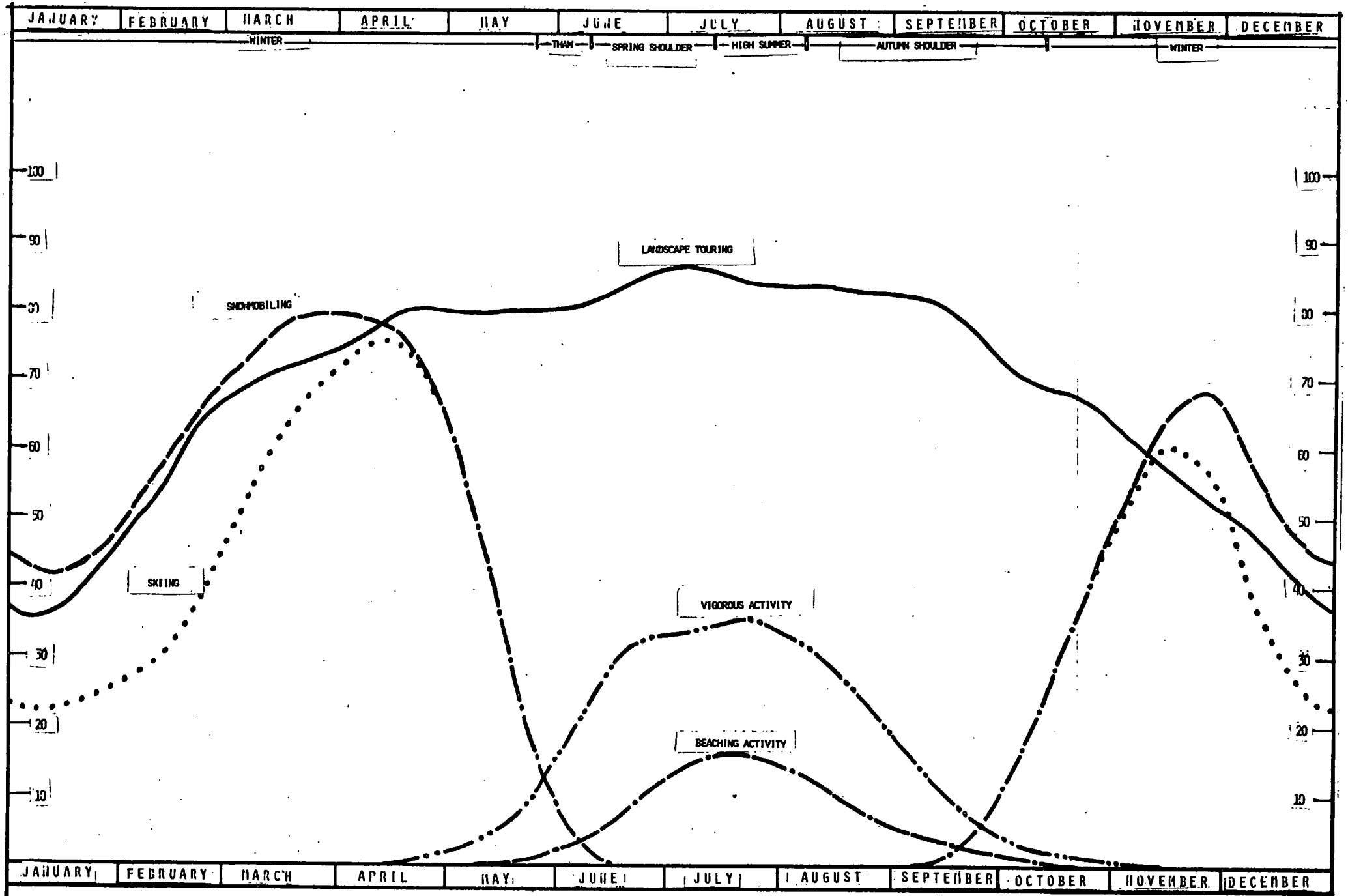


FIG. 45 ANNUAL VARIATION OF SUITABLE DAYS - WABUSH LAKE

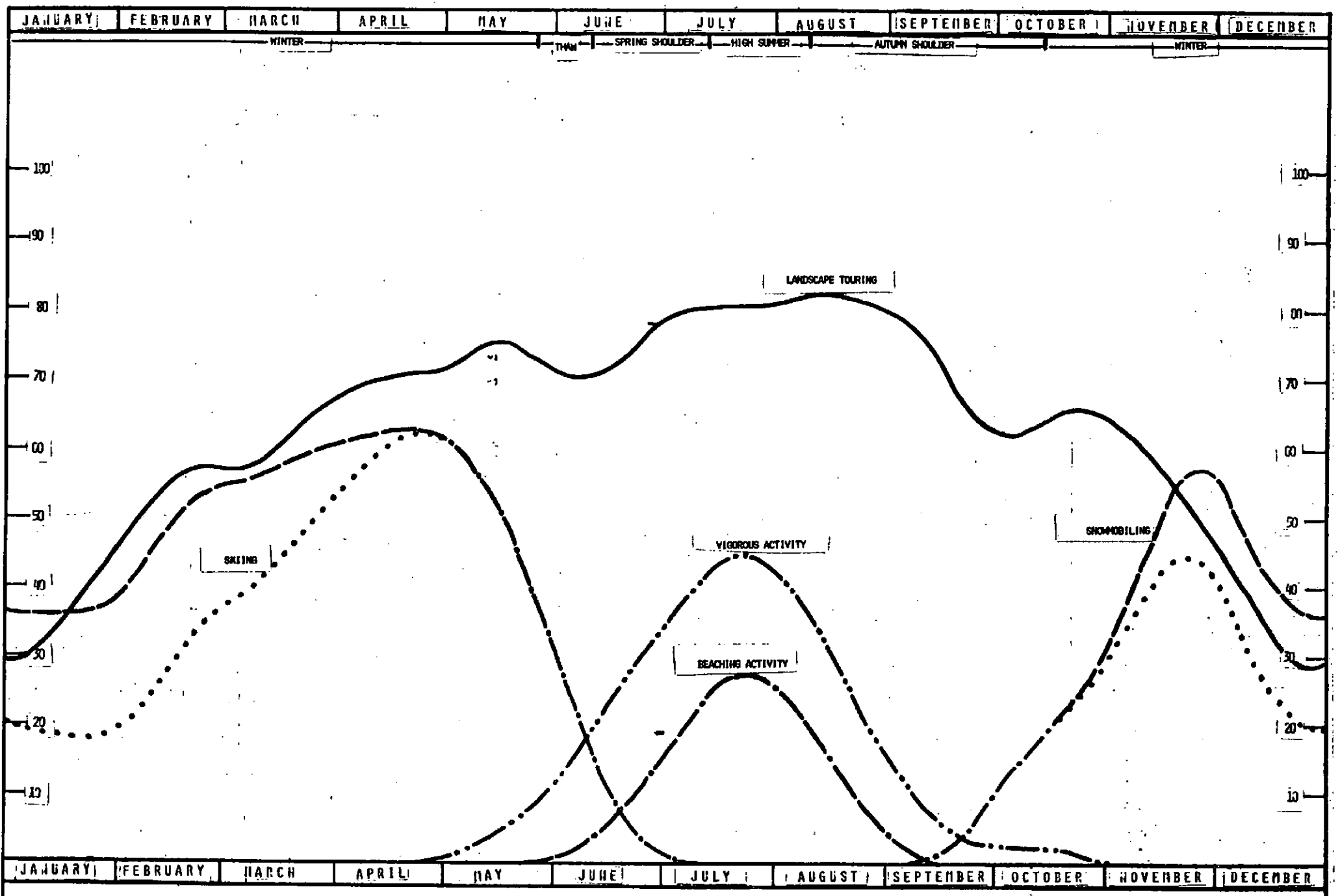


FIG. 46 ANNUAL VARIATION OF SUITABLE DAYS - CHURCHILL FALLS

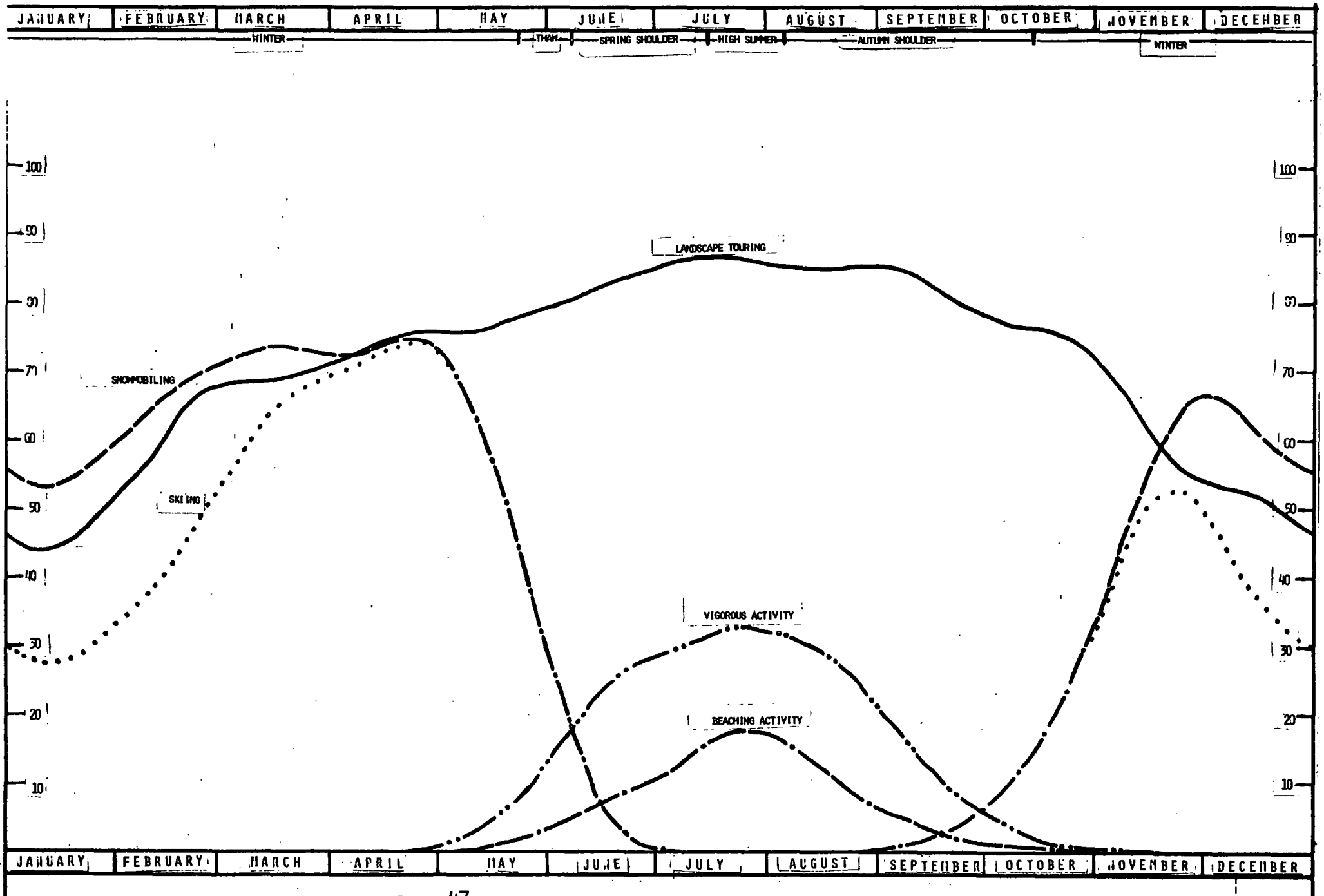


FIG. 47 ANNUAL VARIATION OF SUITABLE DAYS - LAKE EON

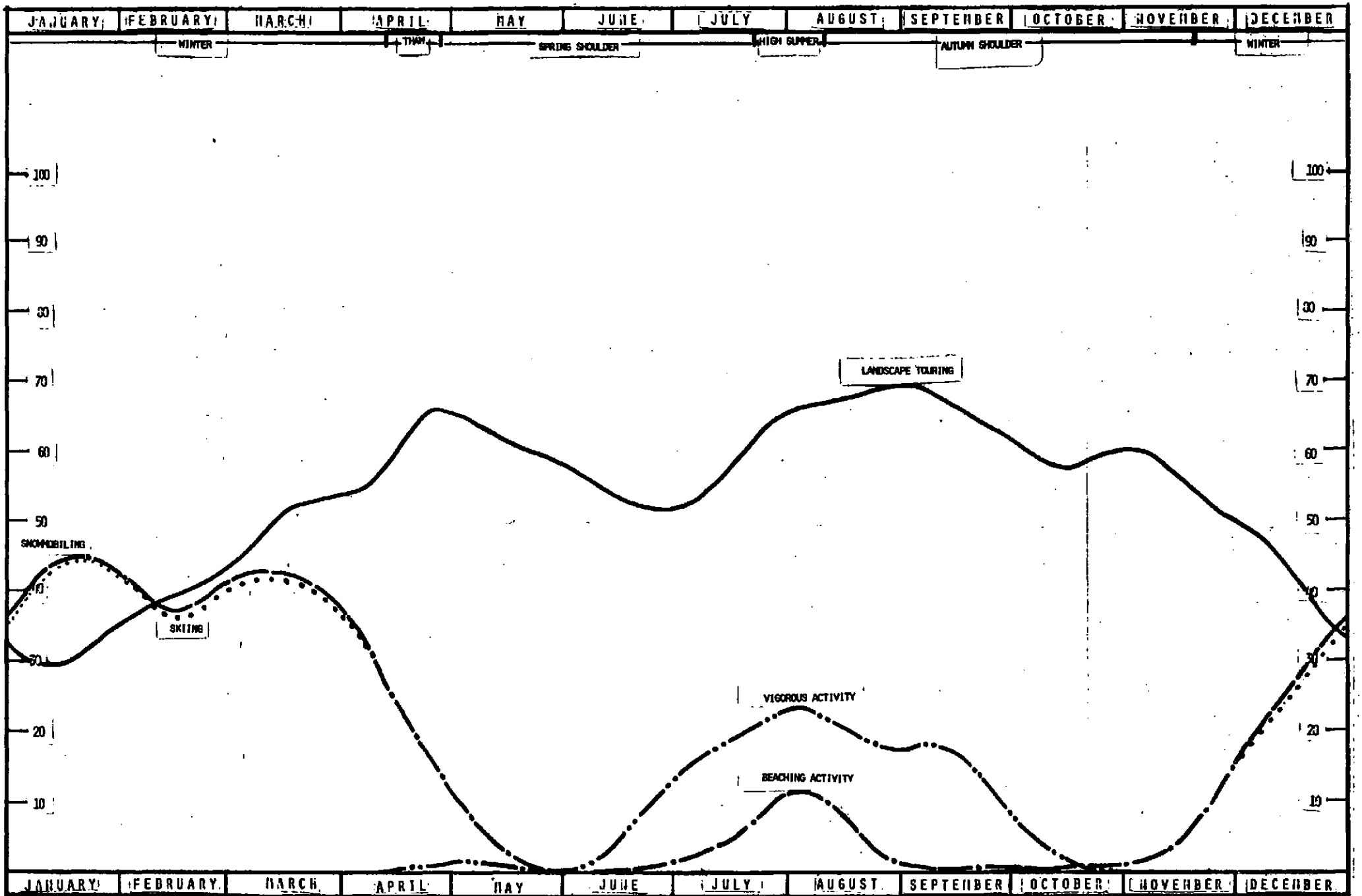


FIG. 48 ANNUAL VARIATION OF SUITABLE DAYS - DANIEL'S HARBOUR

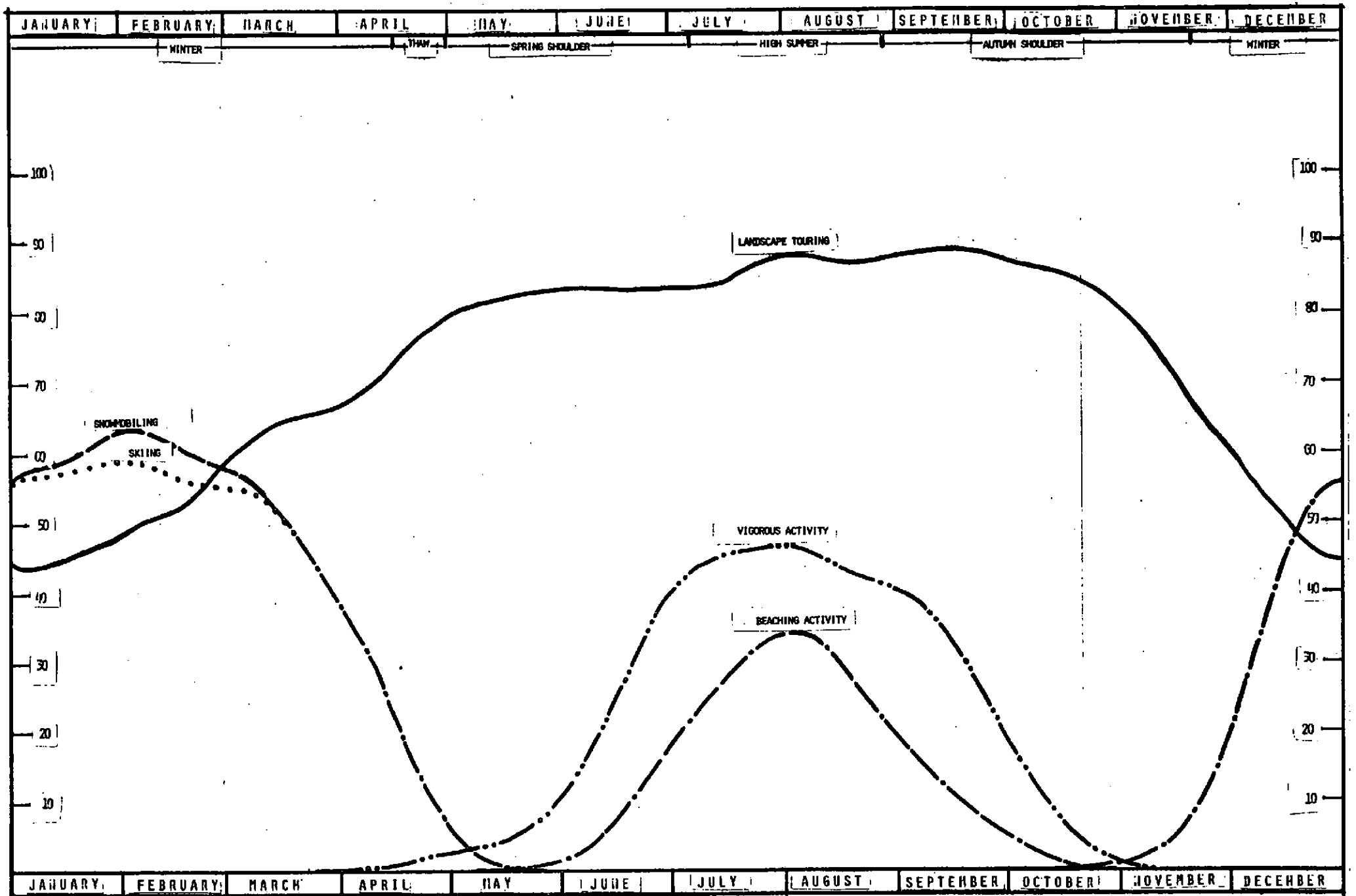


FIG. 49 ANNUAL VARIATION OF SUITABLE DAYS - STEPHENVILLE

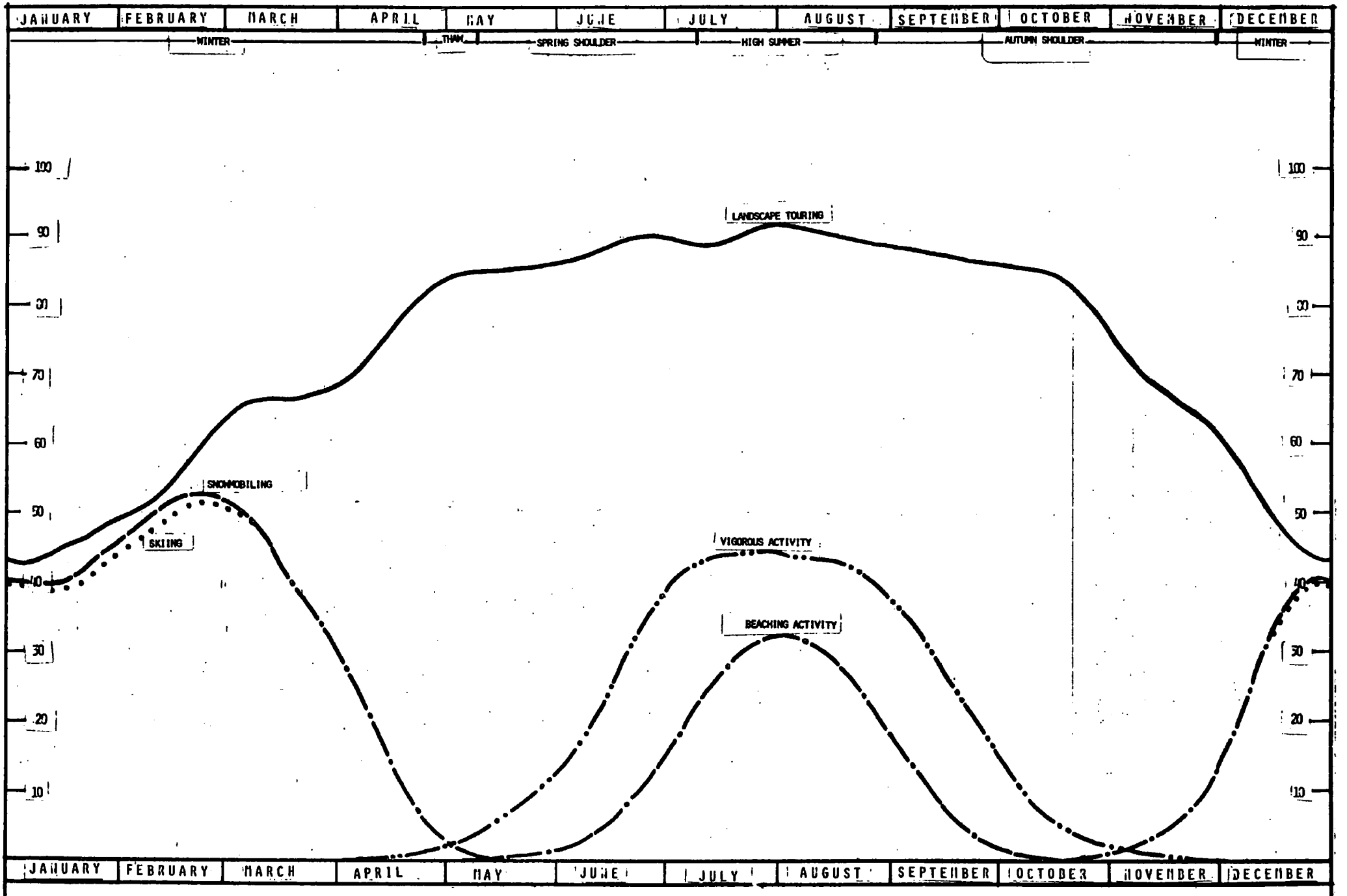


FIG. 50 ANNUAL VARIATION OF SUITABLE DAYS - ST. ANDREWS

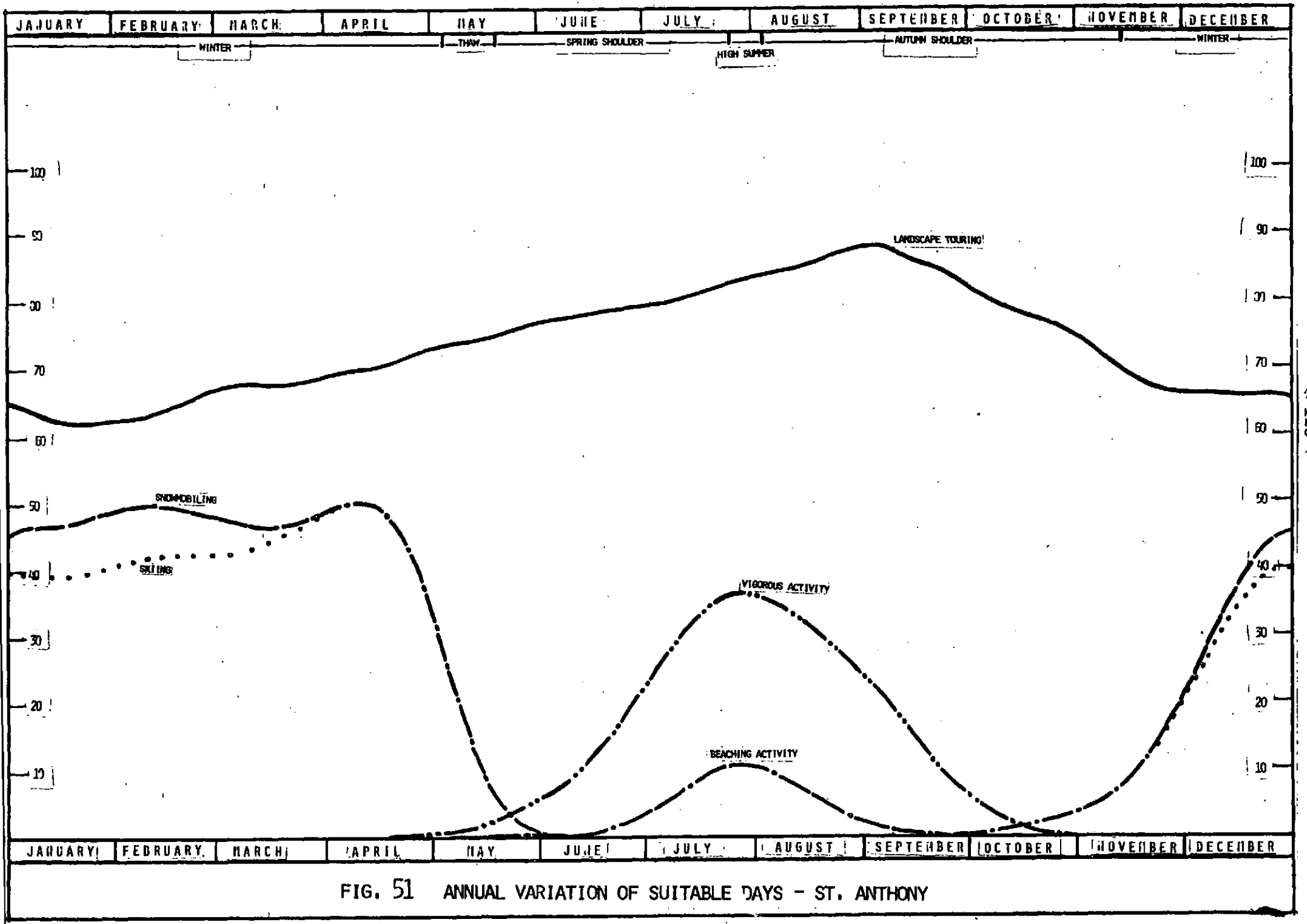


FIG. 51 ANNUAL VARIATION OF SUITABLE DAYS - ST. ANTHONY

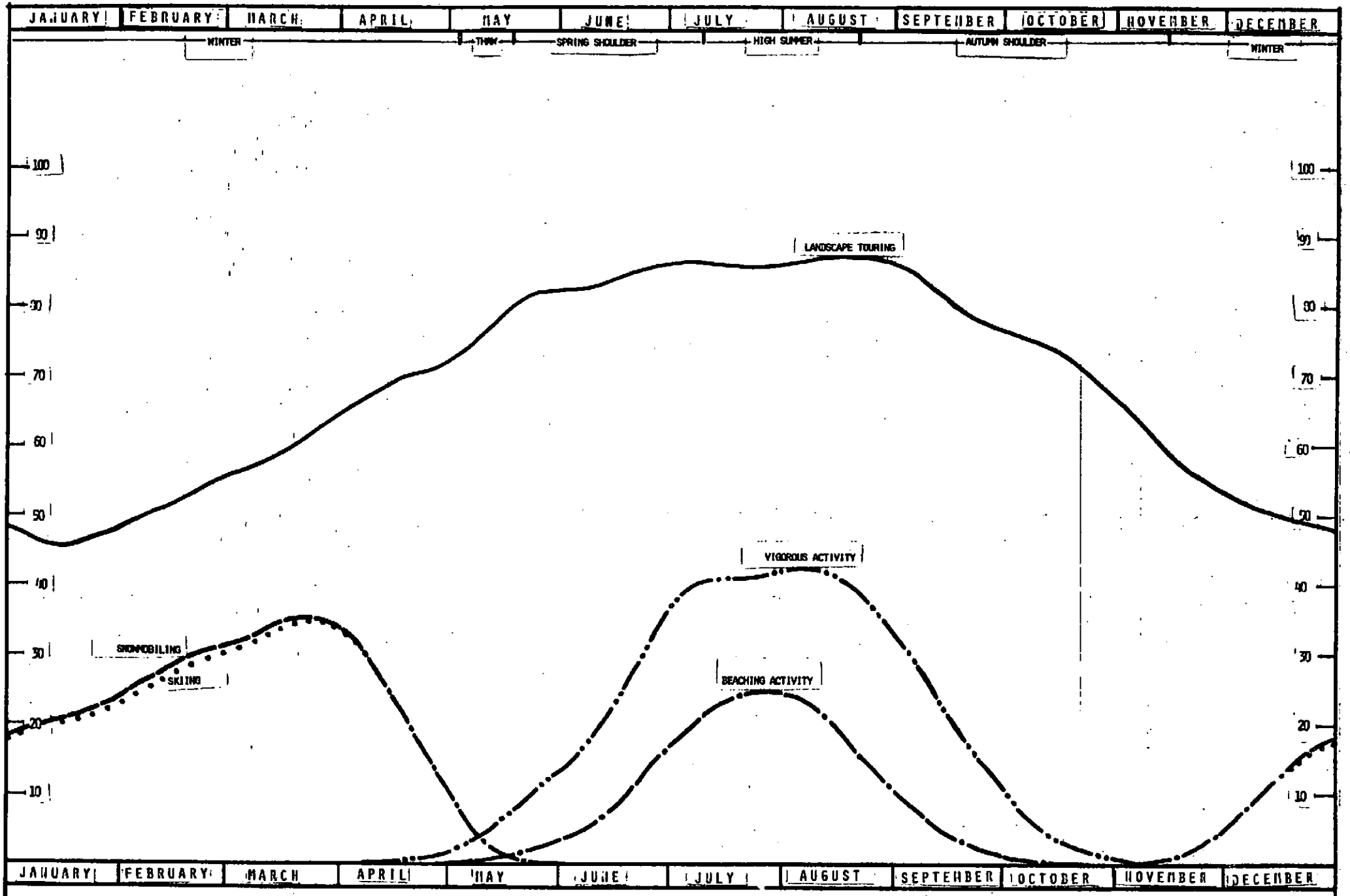


FIG. 52 ANNUAL VARIATION OF SUITABLE DAYS - TWILLINGATE

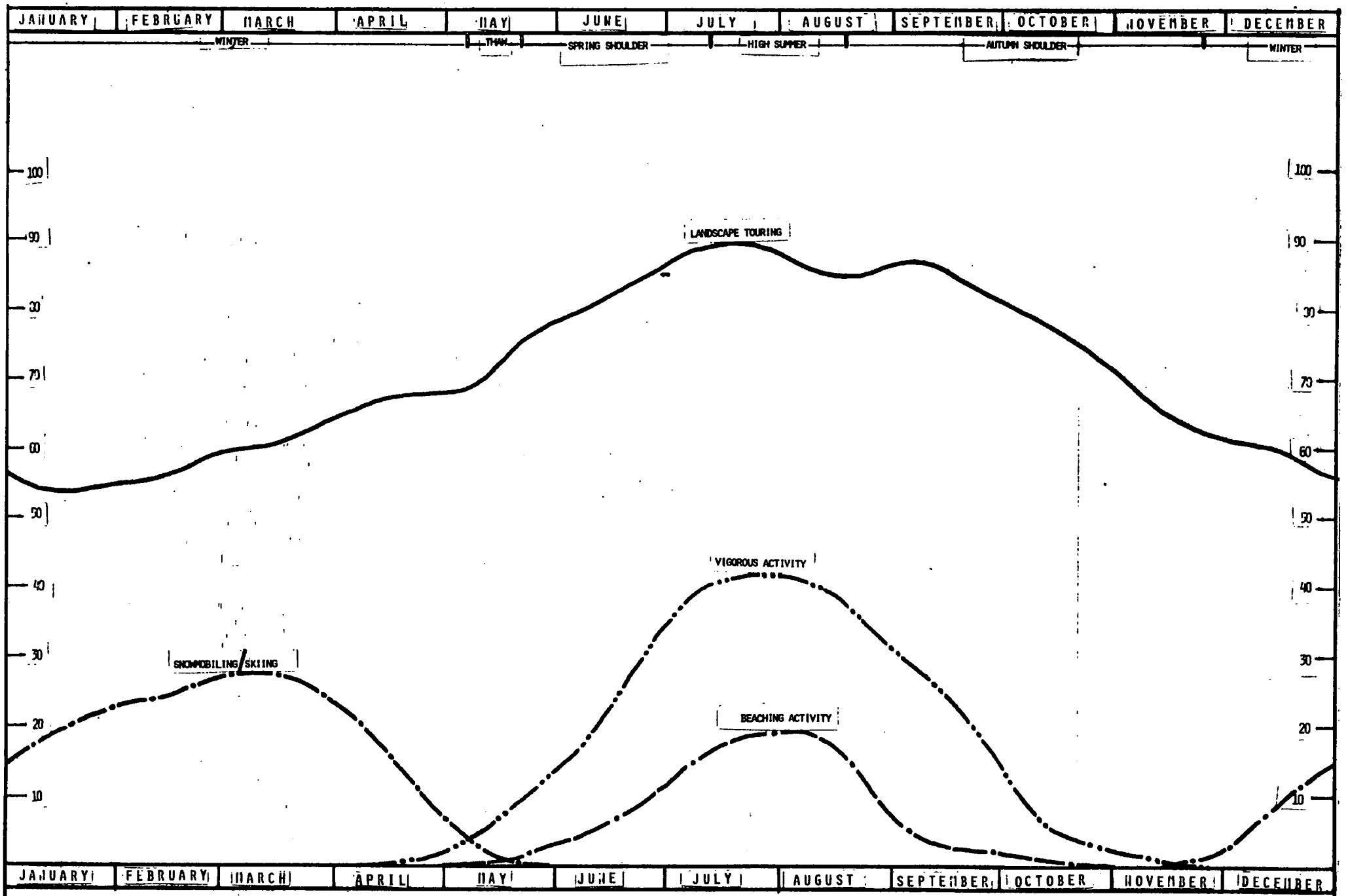


FIG. 53 ANNUAL VARIATION OF SUITABLE DAYS - BONAVISTA

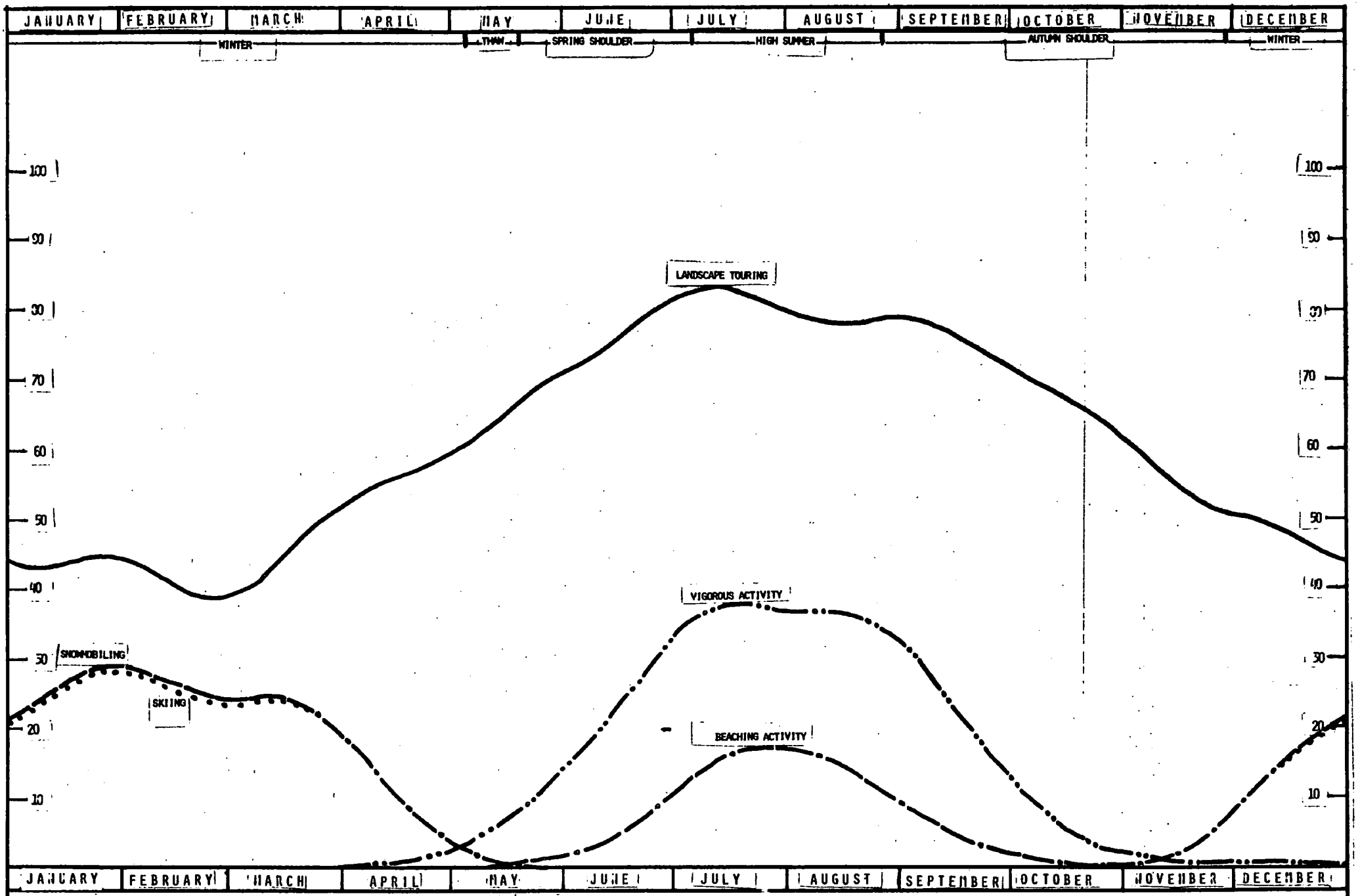


FIG. 54 ANNUAL VARIATION OF SUITABLE DAYS - ST. JOHN'S

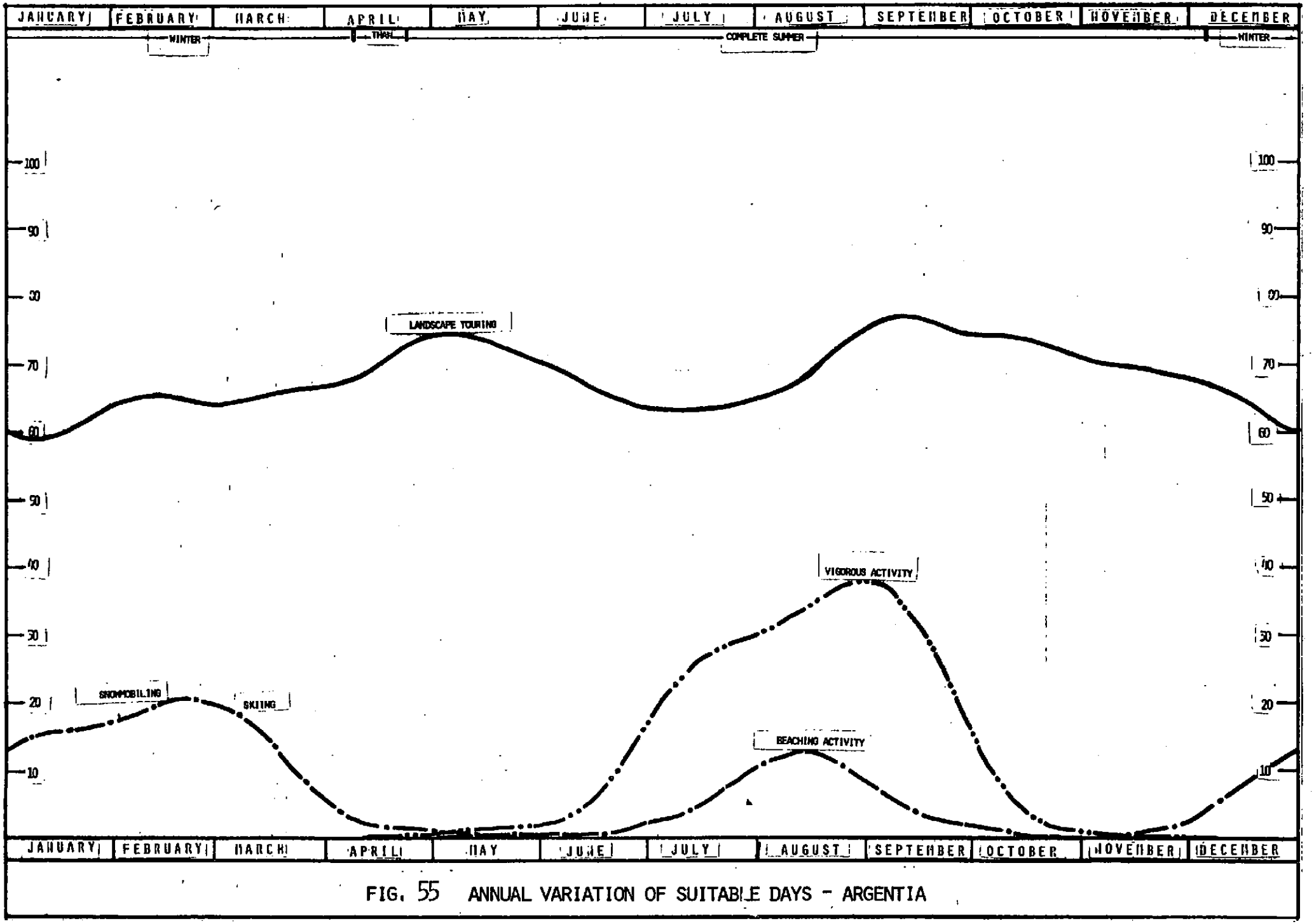


FIG. 55 ANNUAL VARIATION OF SUITABLE DAYS - ARGENTIA

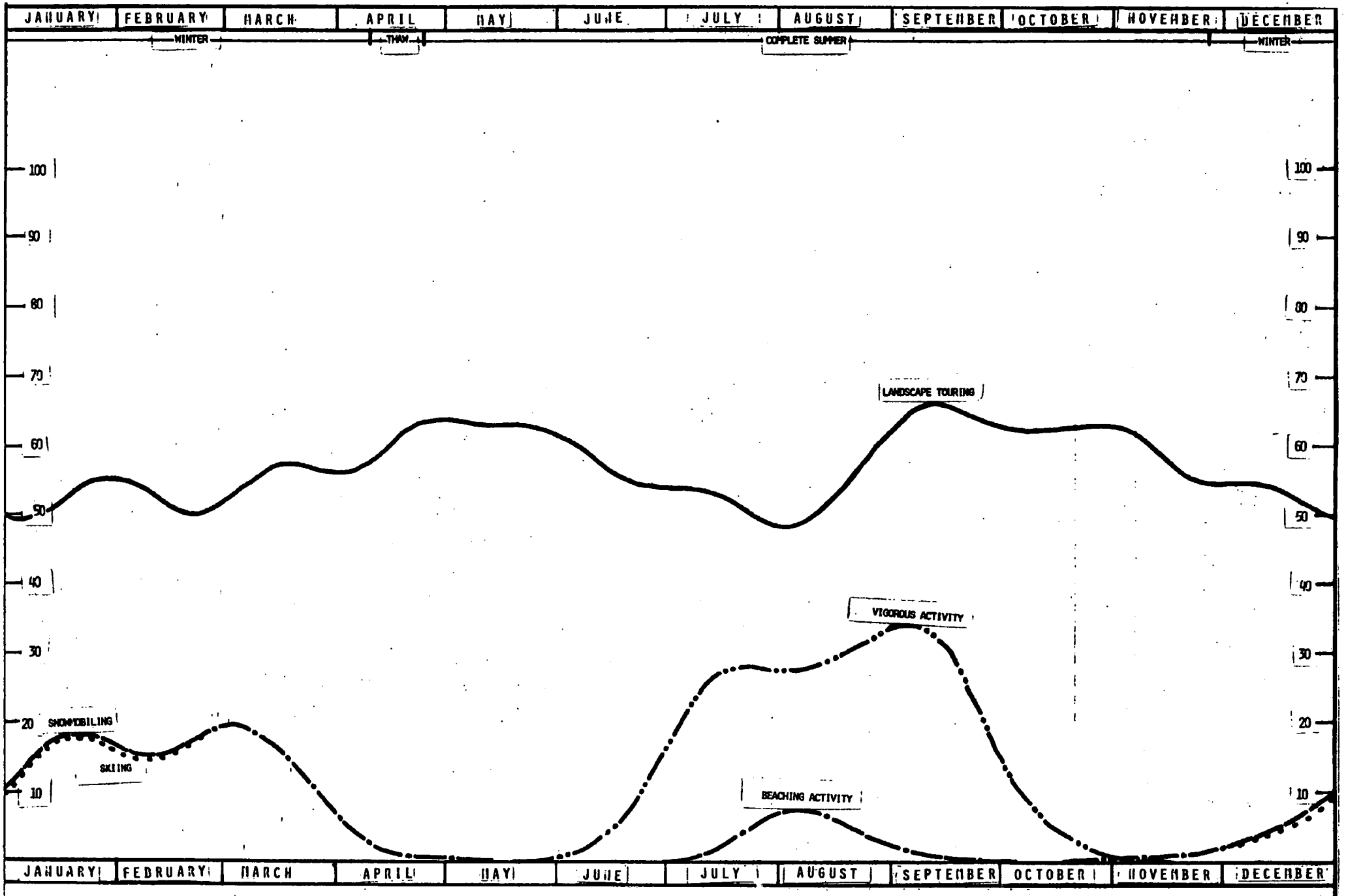


FIG. 56 ANNUAL VARIATION OF SUITABLE DAYS - ST. LAWRENCE

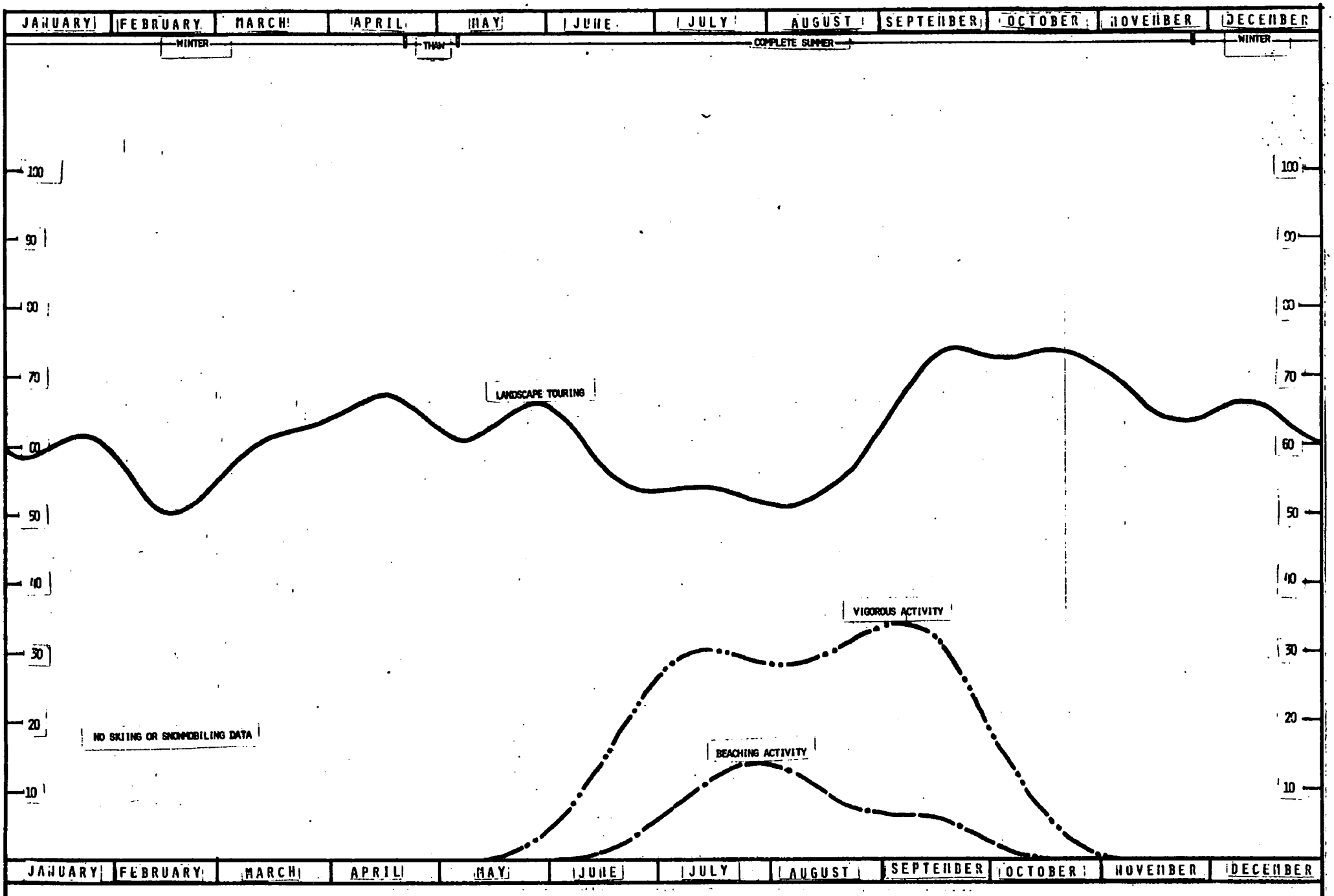


FIG. 57 ANNUAL VARIATION OF SUITABLE DAYS - BURGEO

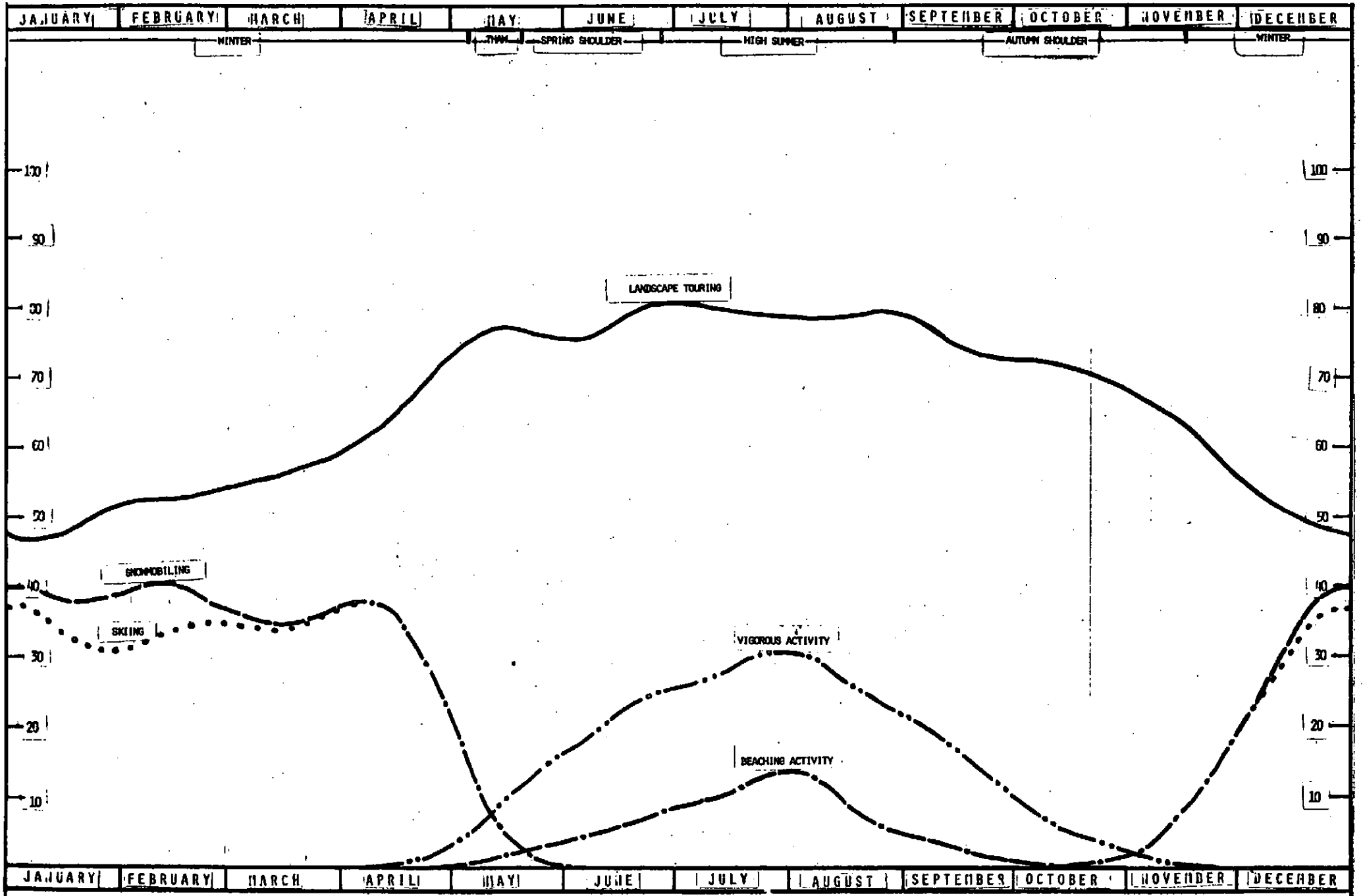


FIG. 53 ANNUAL VARIATION OF SUITABLE DAYS - BUCHANS

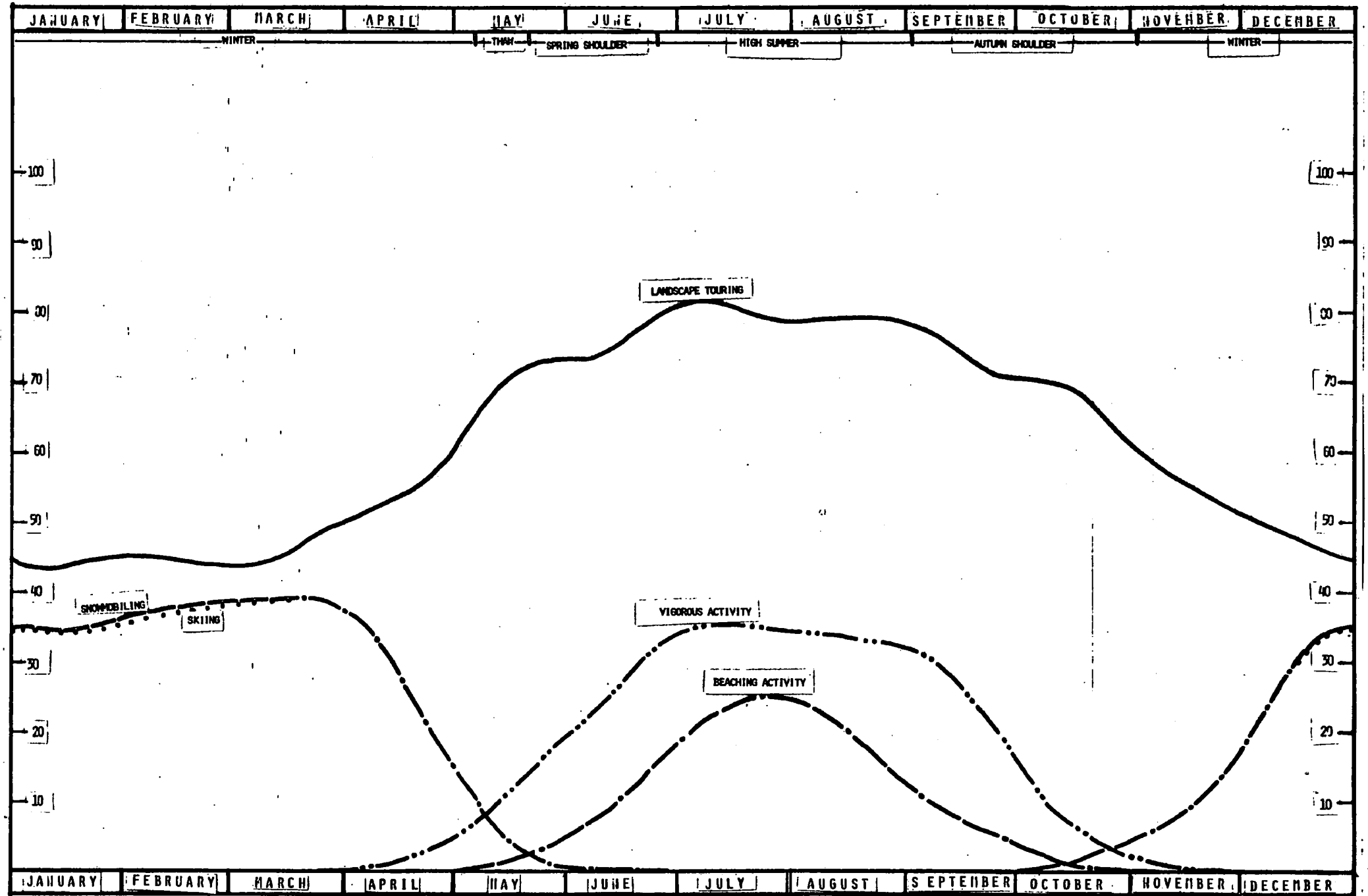


FIG. 59 ANNUAL VARIATION OF SUITABLE DAYS - GANDER

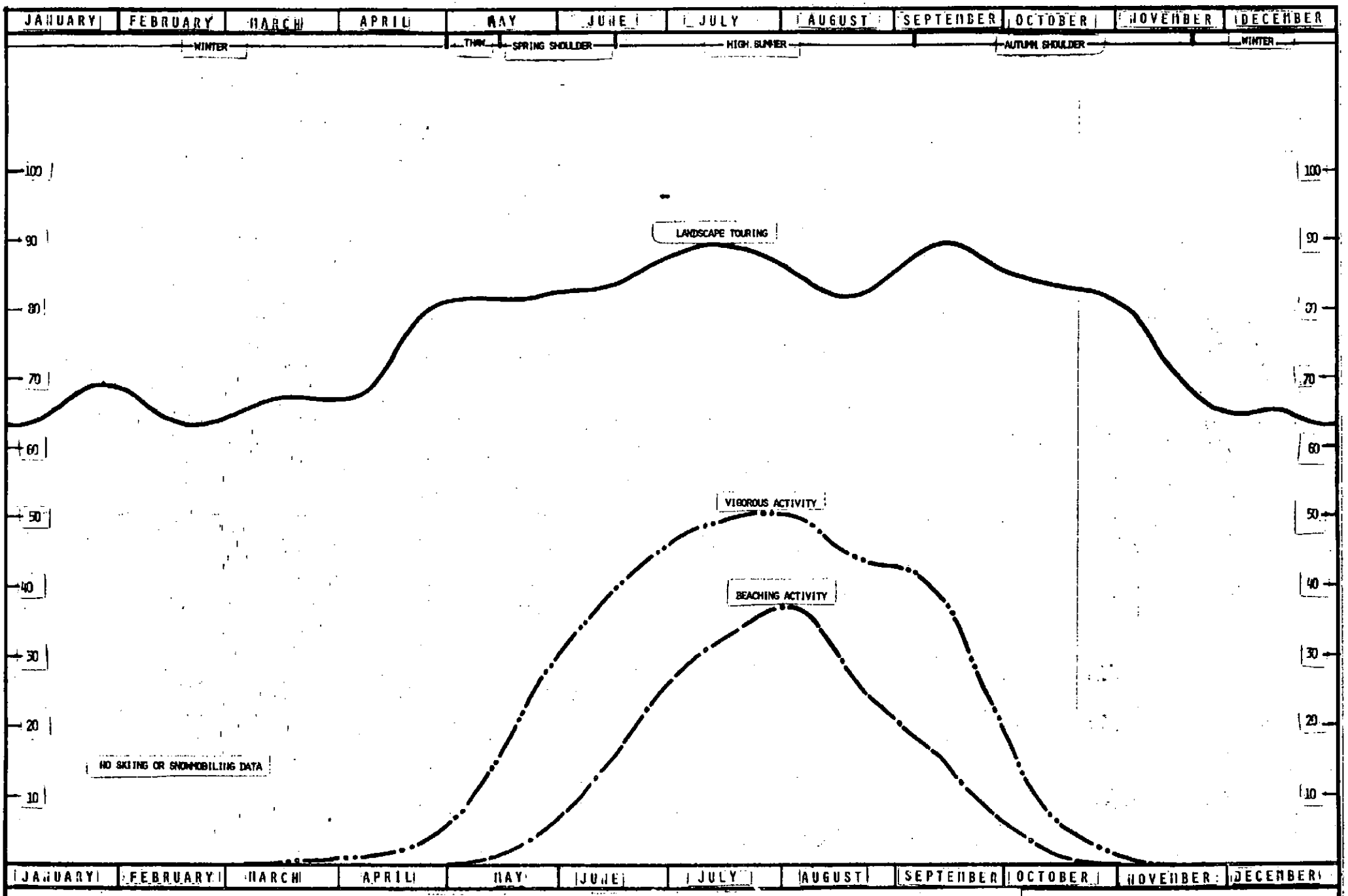


FIG. 60 ANNUAL VARIATION OF SUITABLE DAYS - DEER LAKE

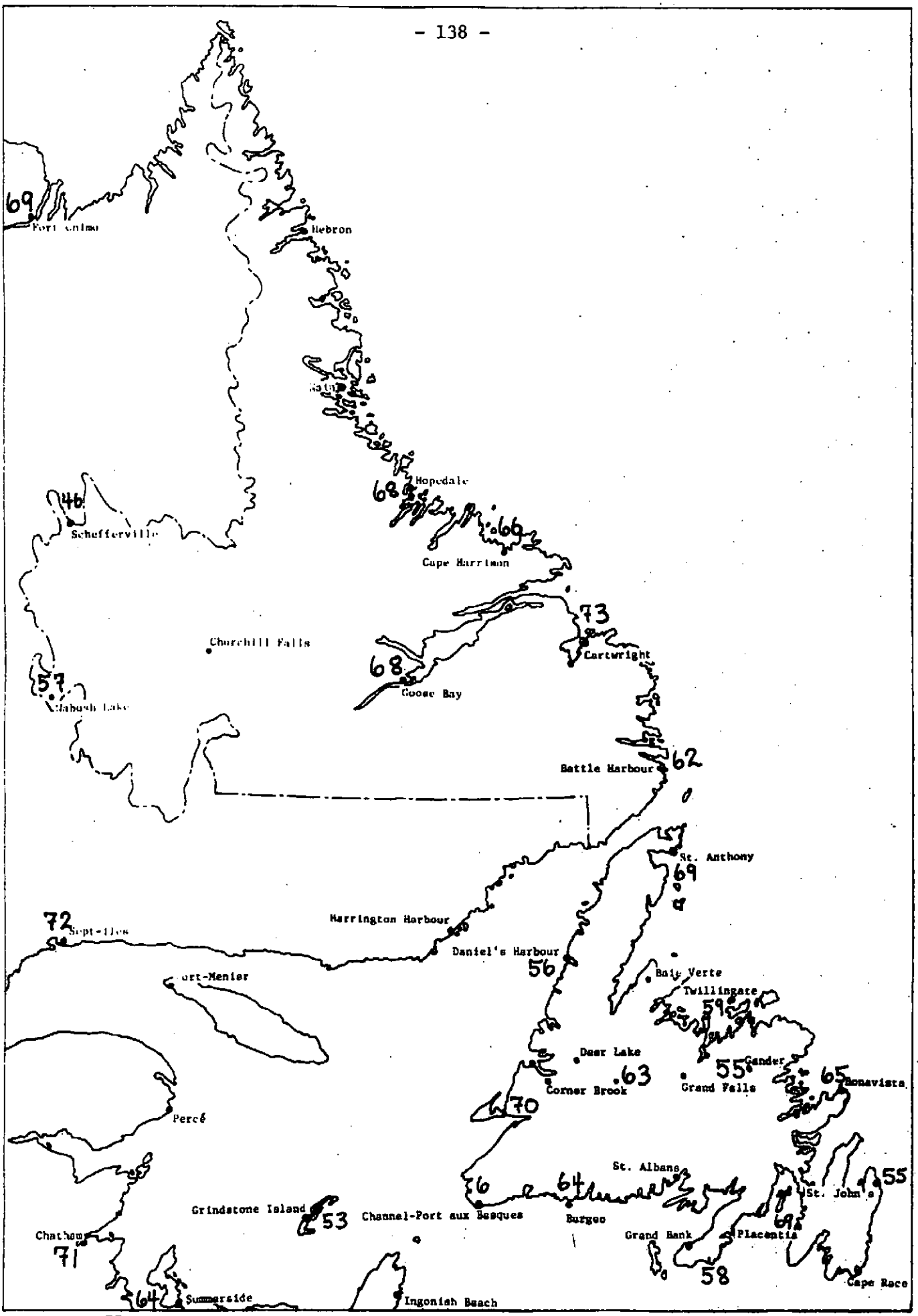


FIG. 61 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-NOVEMBER

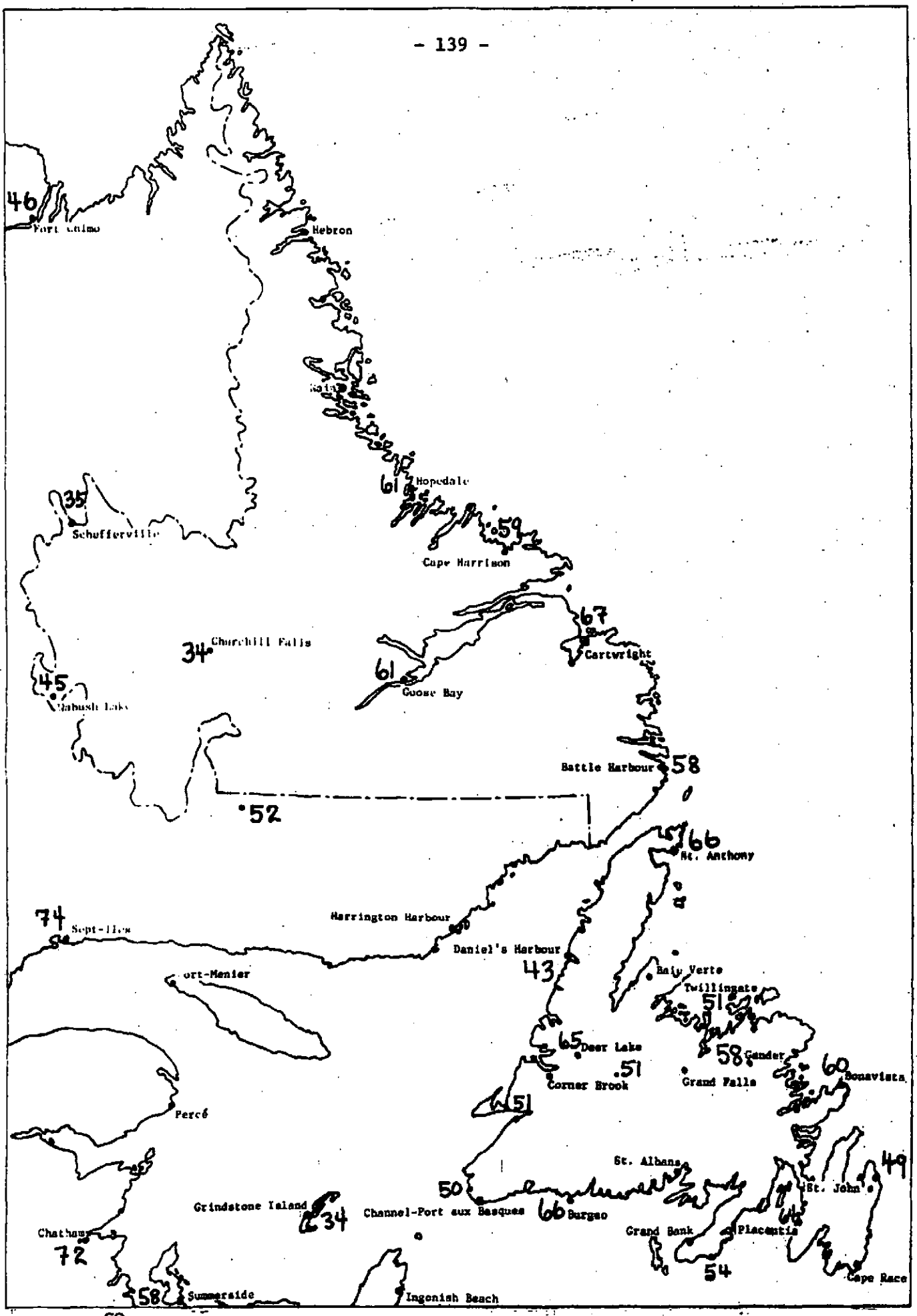


FIG. 62 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-DECEMBER

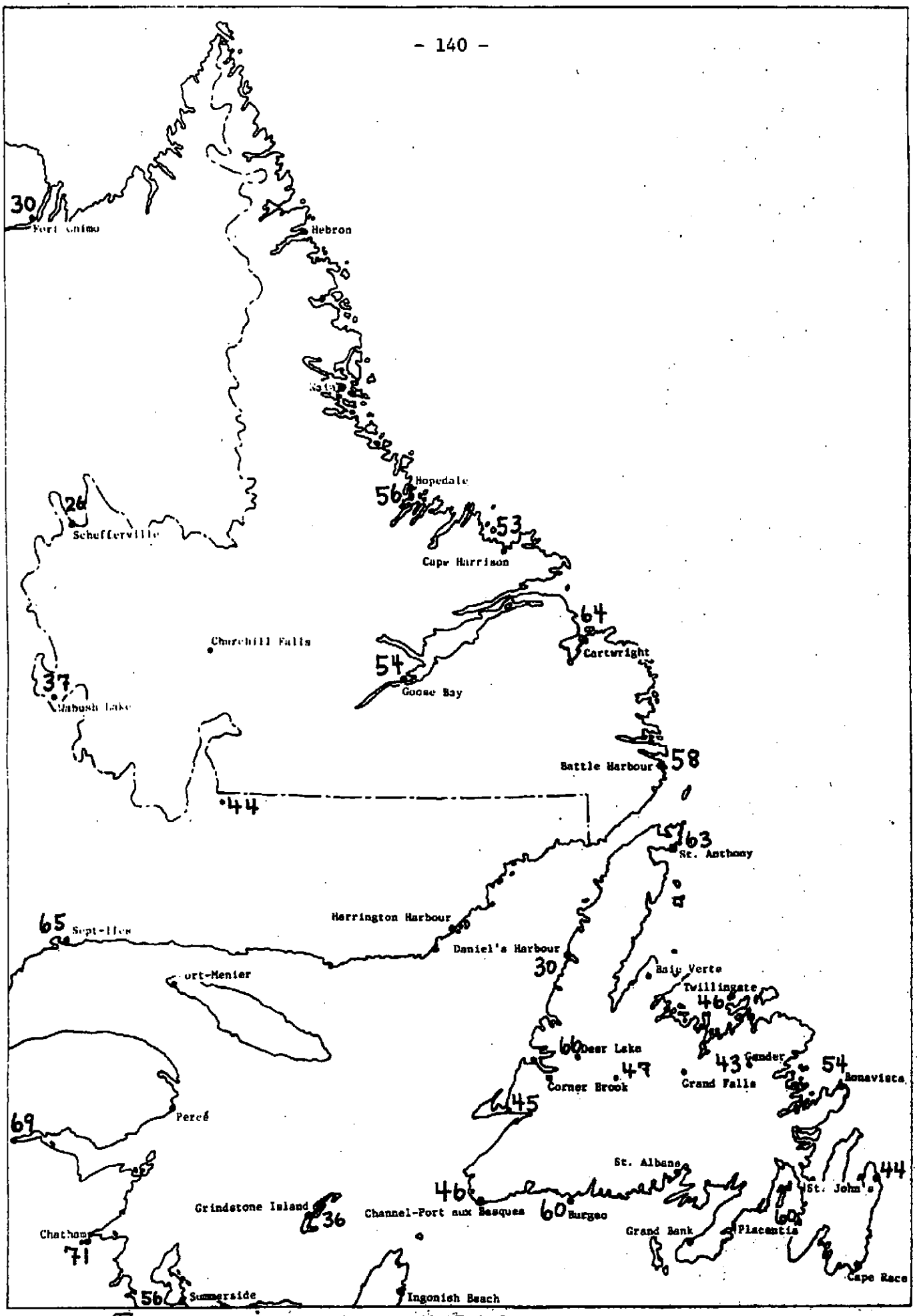


FIG. 63 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-JANUARY

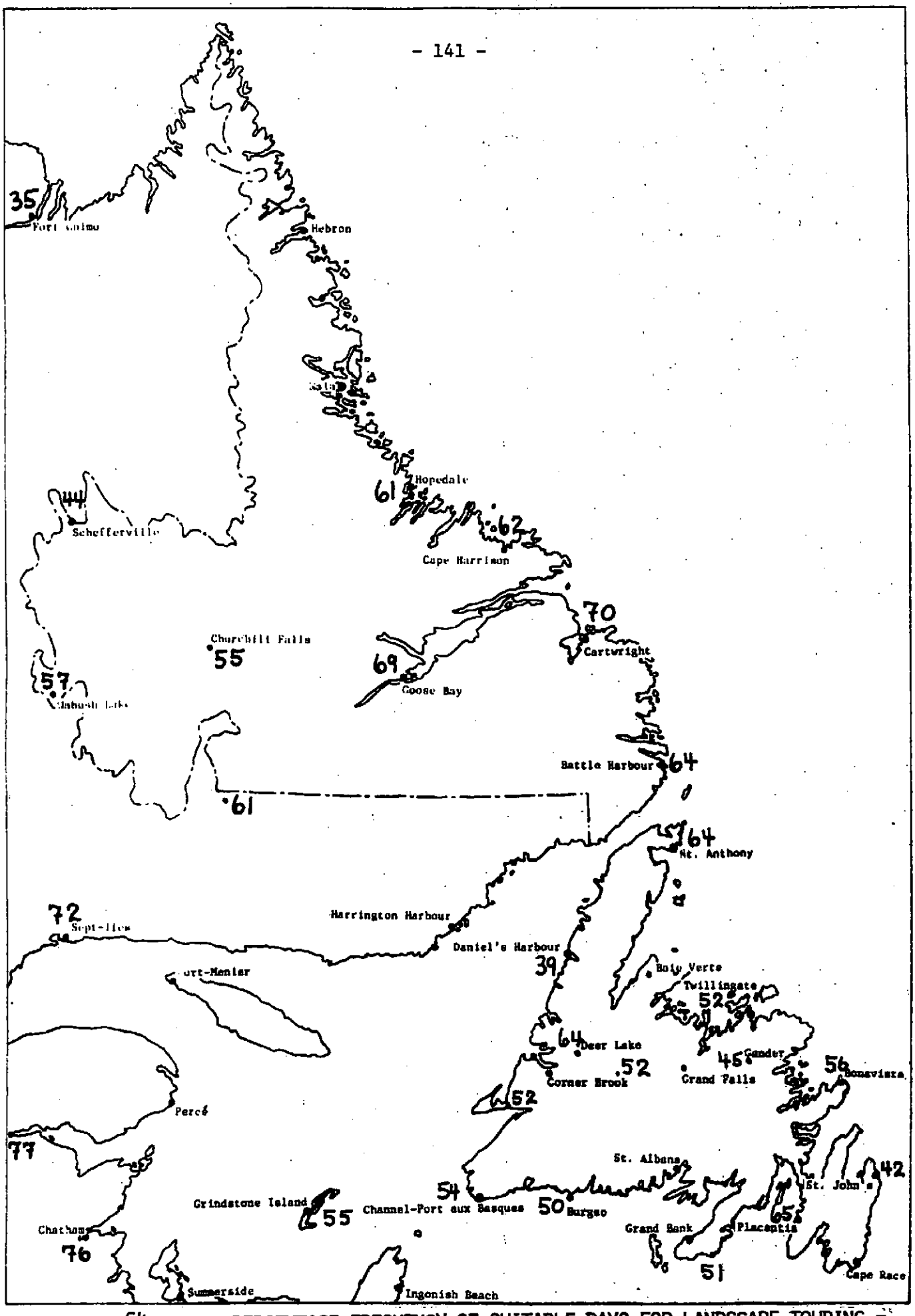


FIG. 64 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-FEBRUARY

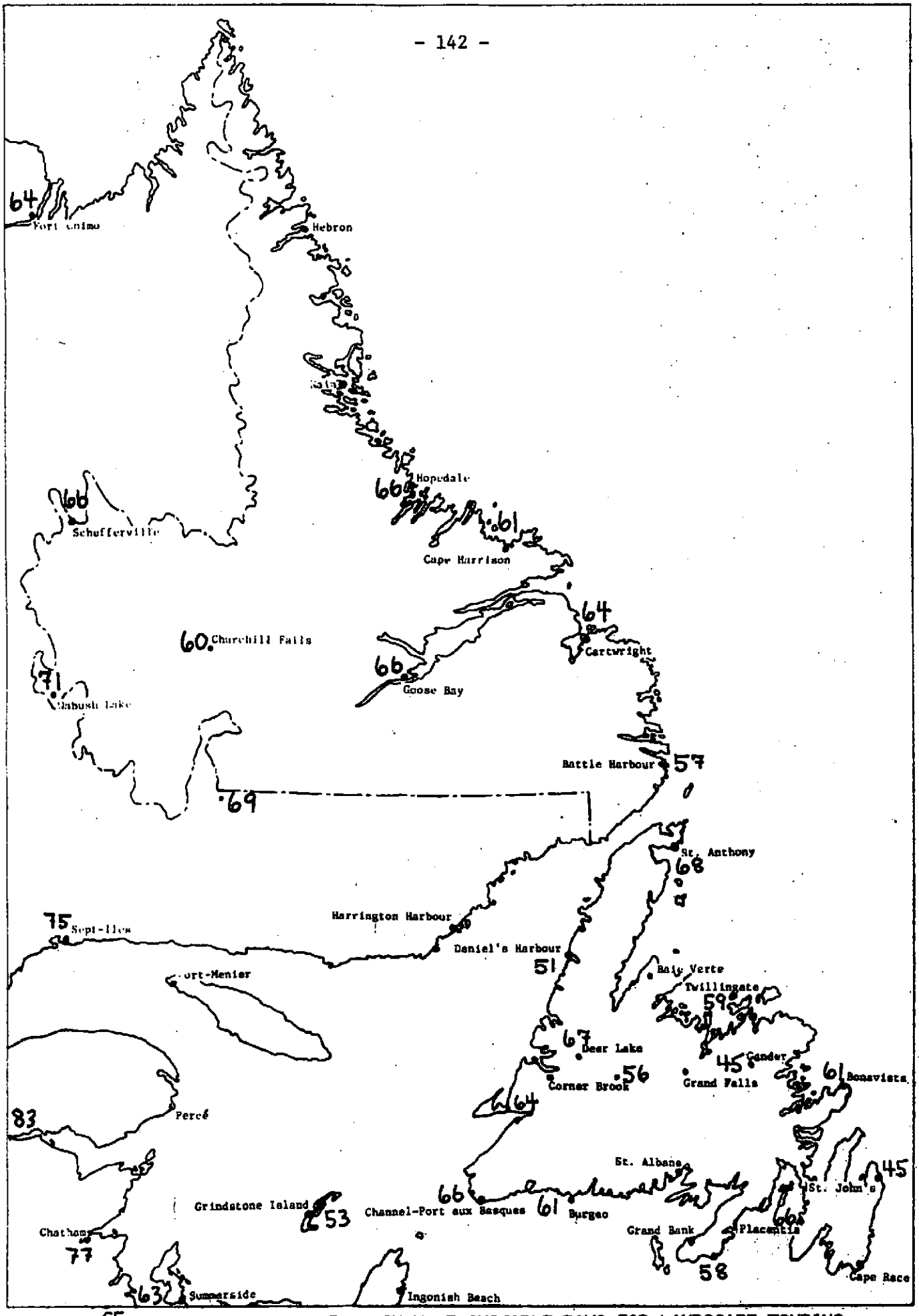


FIG. 65 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-MARCH

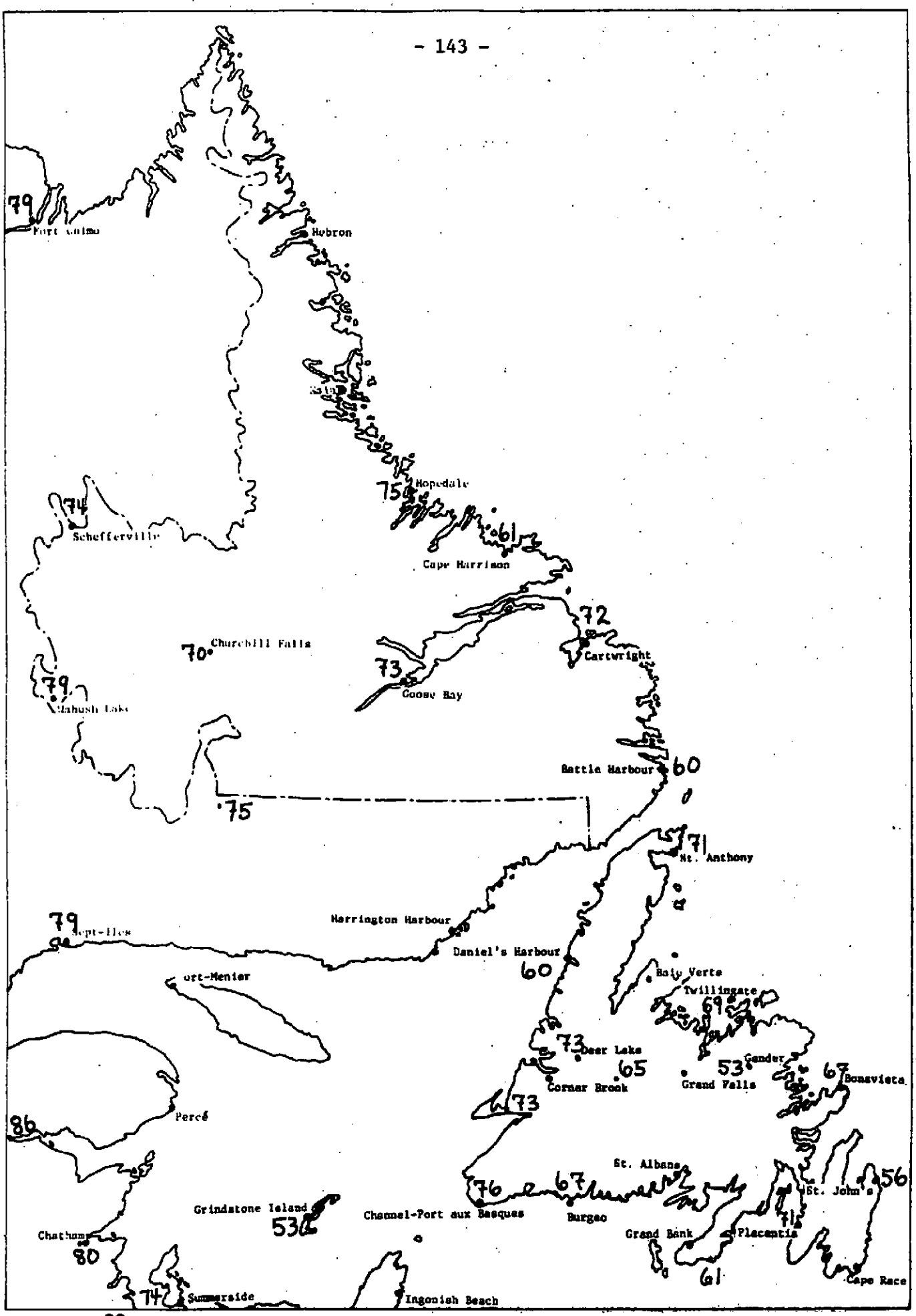


FIG. 66 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-APRIL

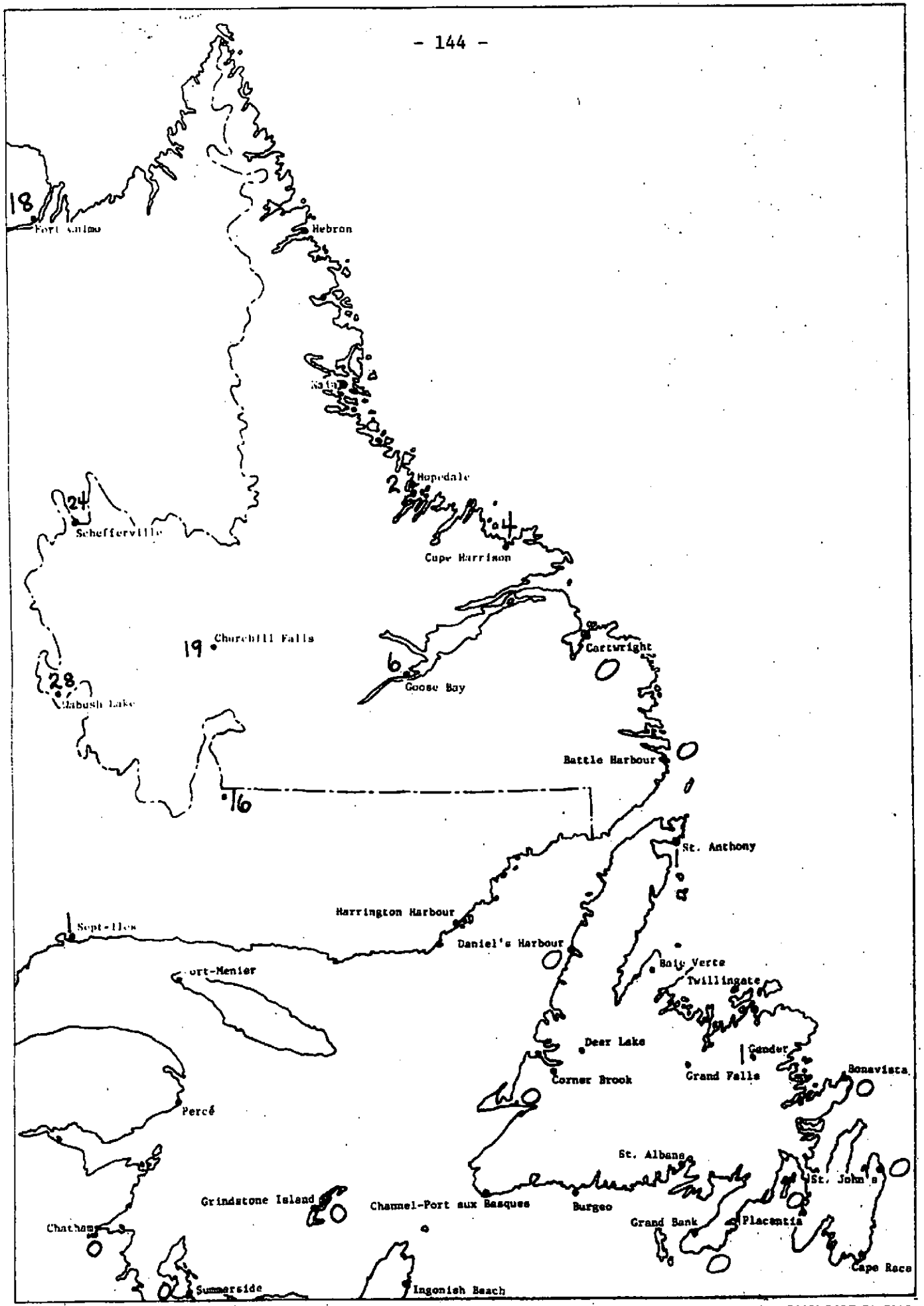


FIG. 67 MEAN PERCENTAGE OF FREQUENCY OF SUITABLE DAYS FOR SKIING AND SNOWMOBILING - MID-OCTOBER

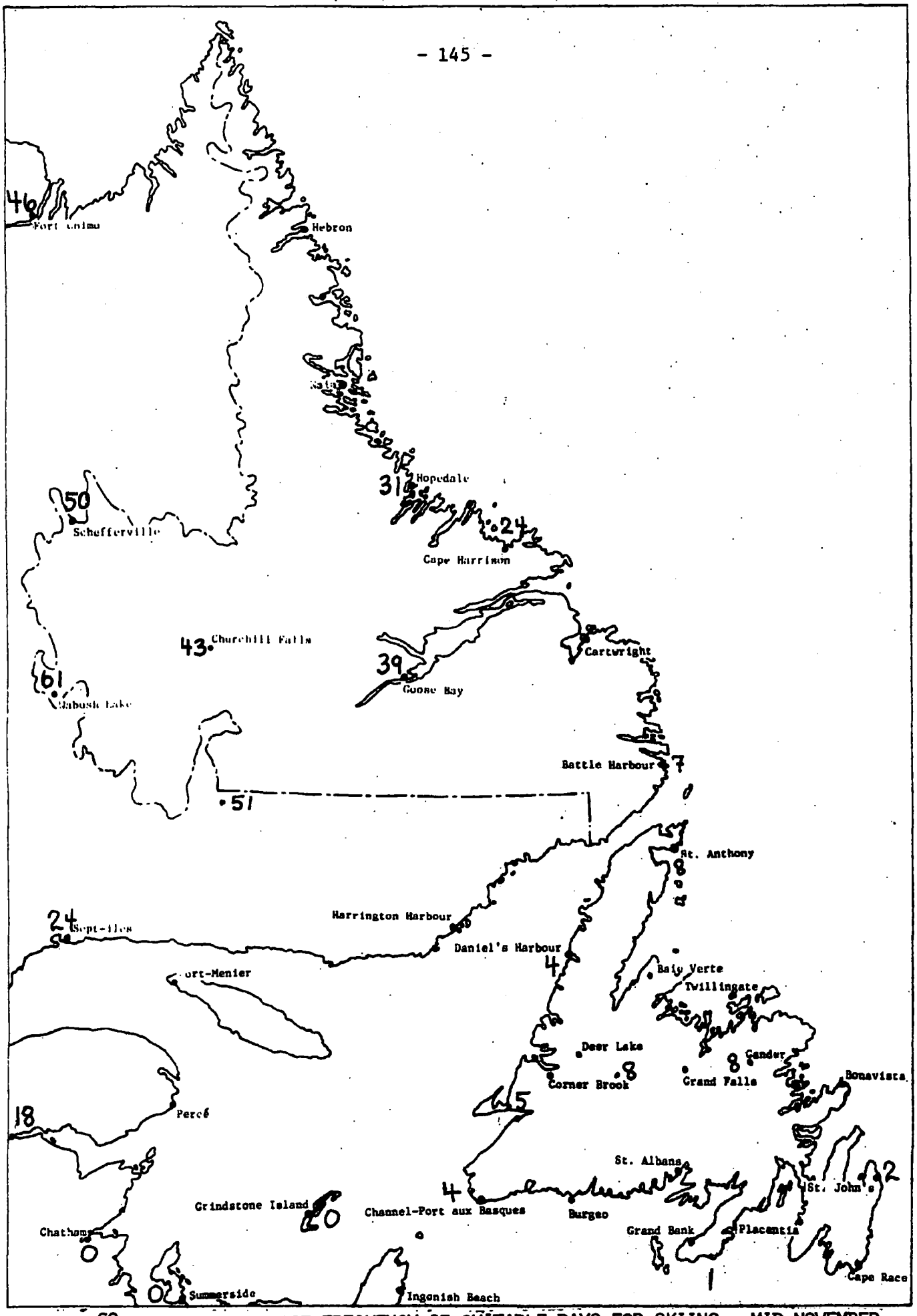


FIG. 68 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING - MID-NOVEMBER

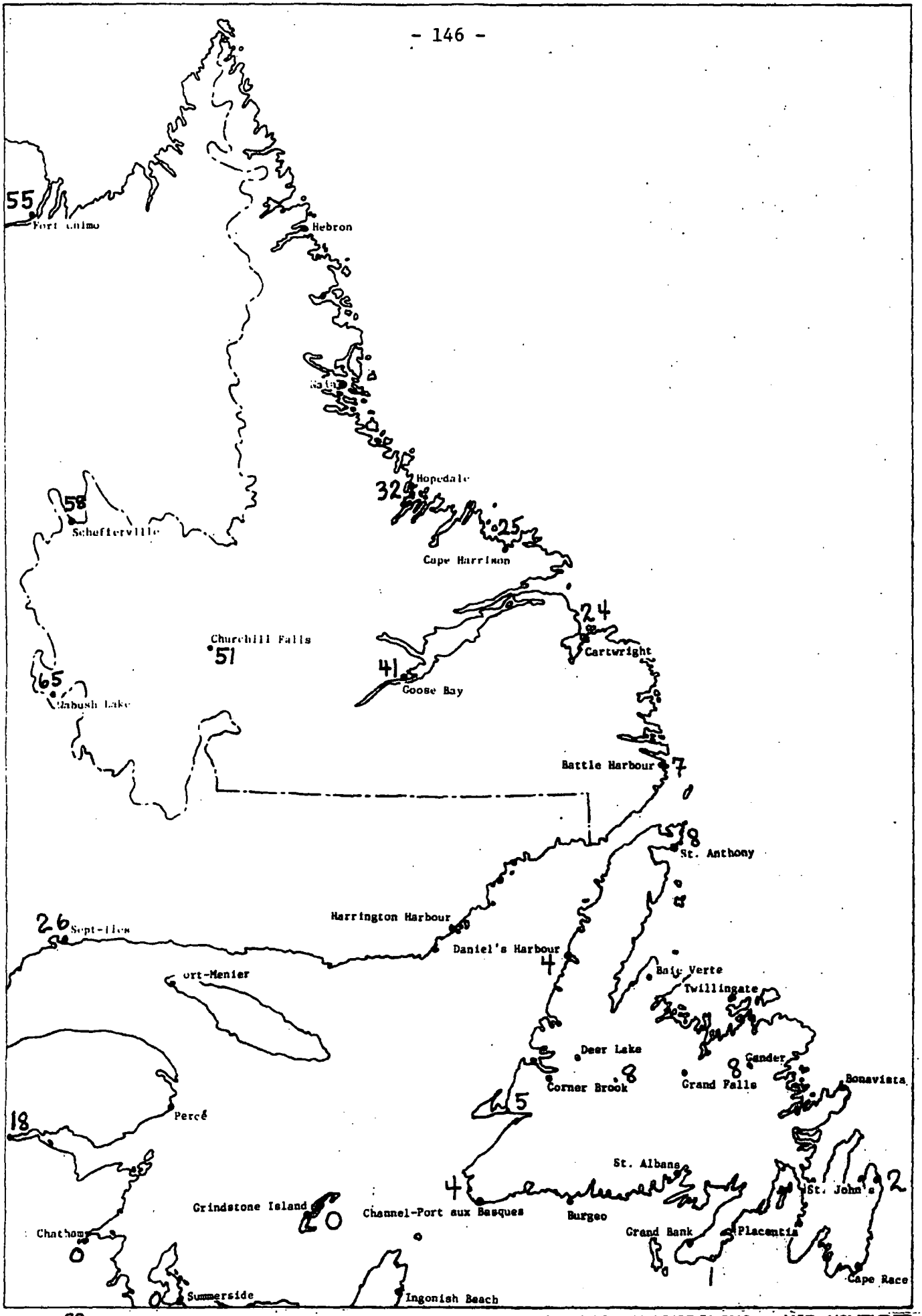


FIG. 69 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SNOWMOBILING - MID-NOVEMBER

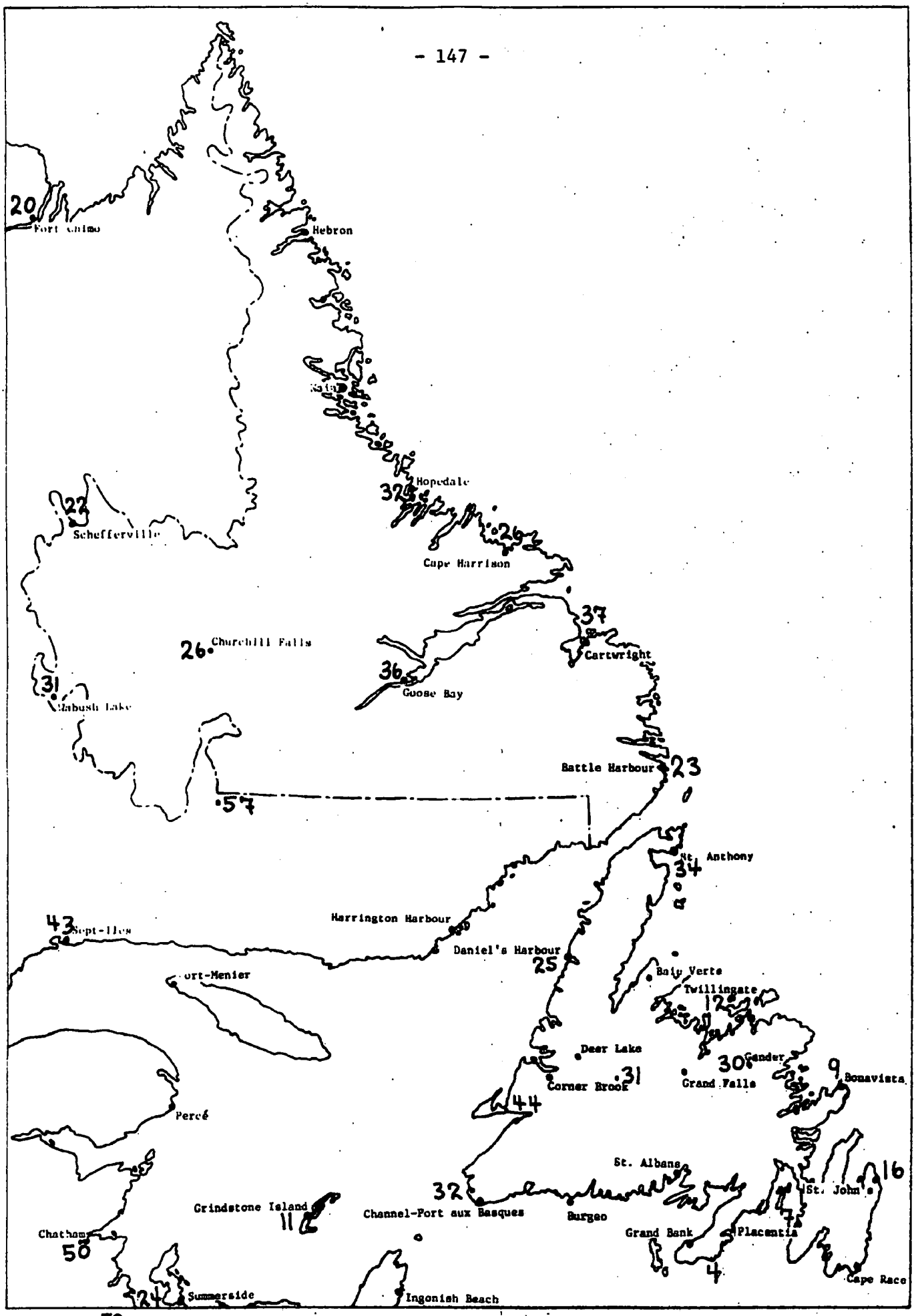


FIG. 70 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING - MID-DECEMBER

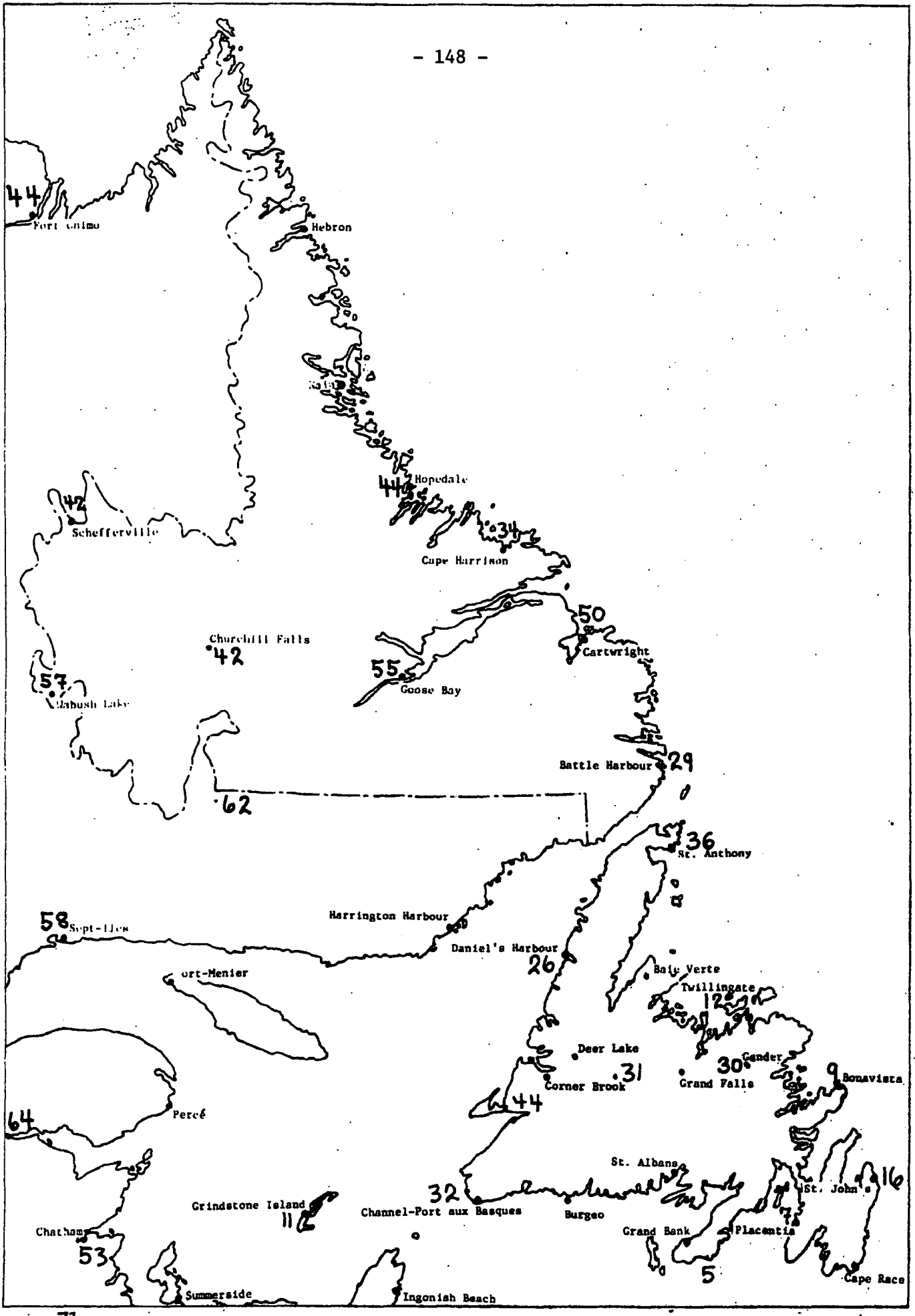


FIG. 71 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SNOWMOBILING - MID-DECEMBER

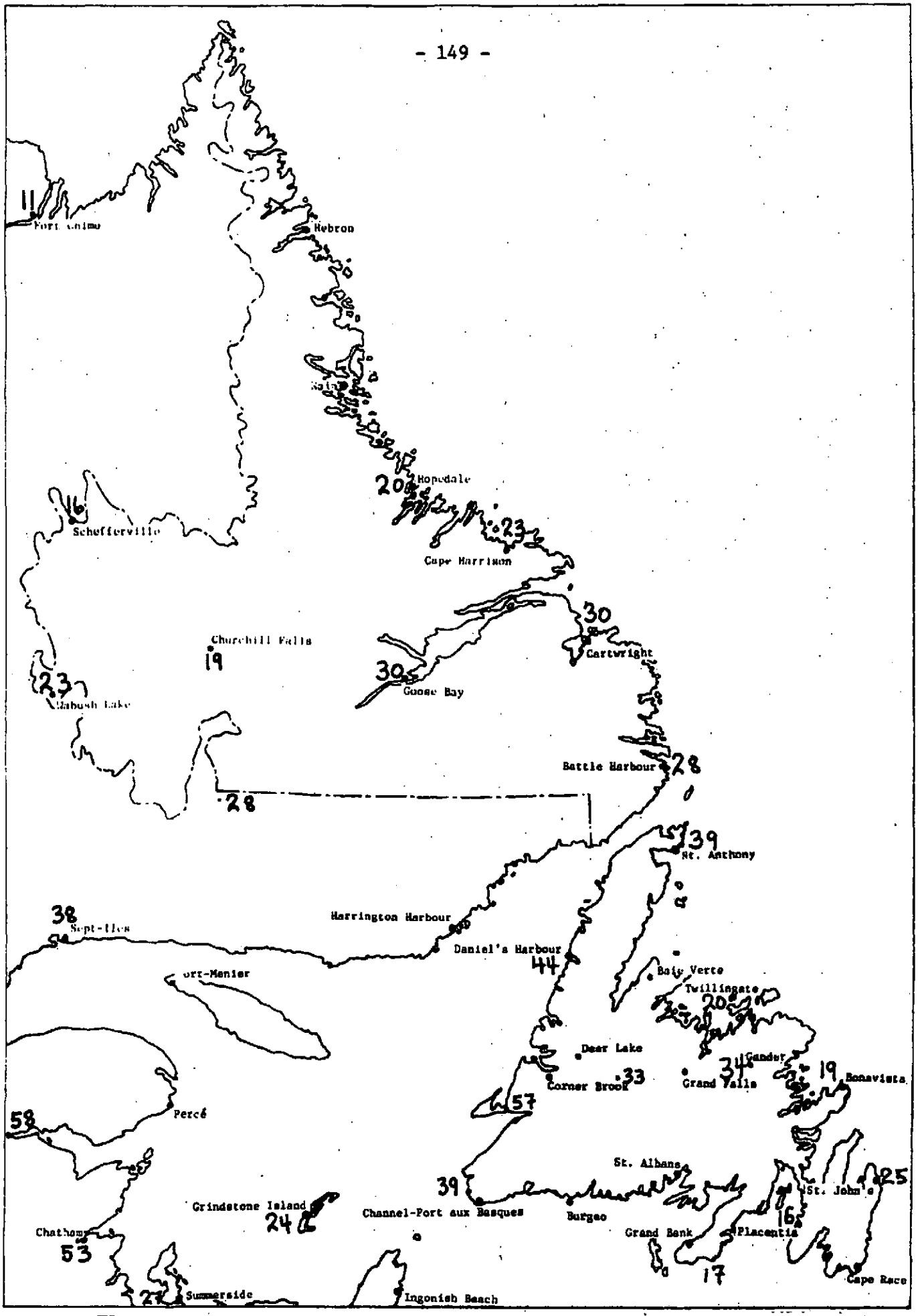


FIG. 72 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING - MID-JANUARY

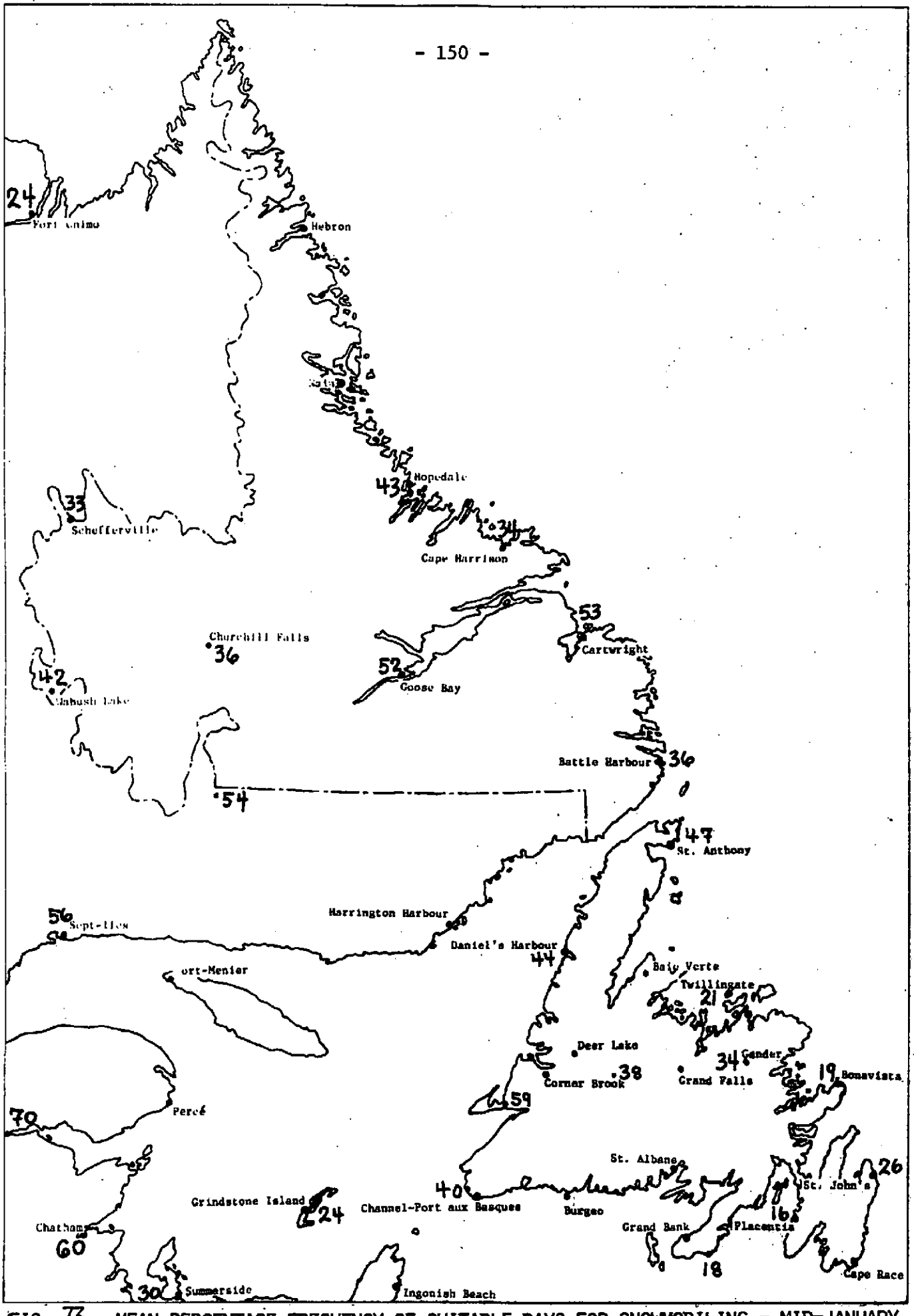


FIG. 73 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SNOWMOBILING - MID-JANUARY

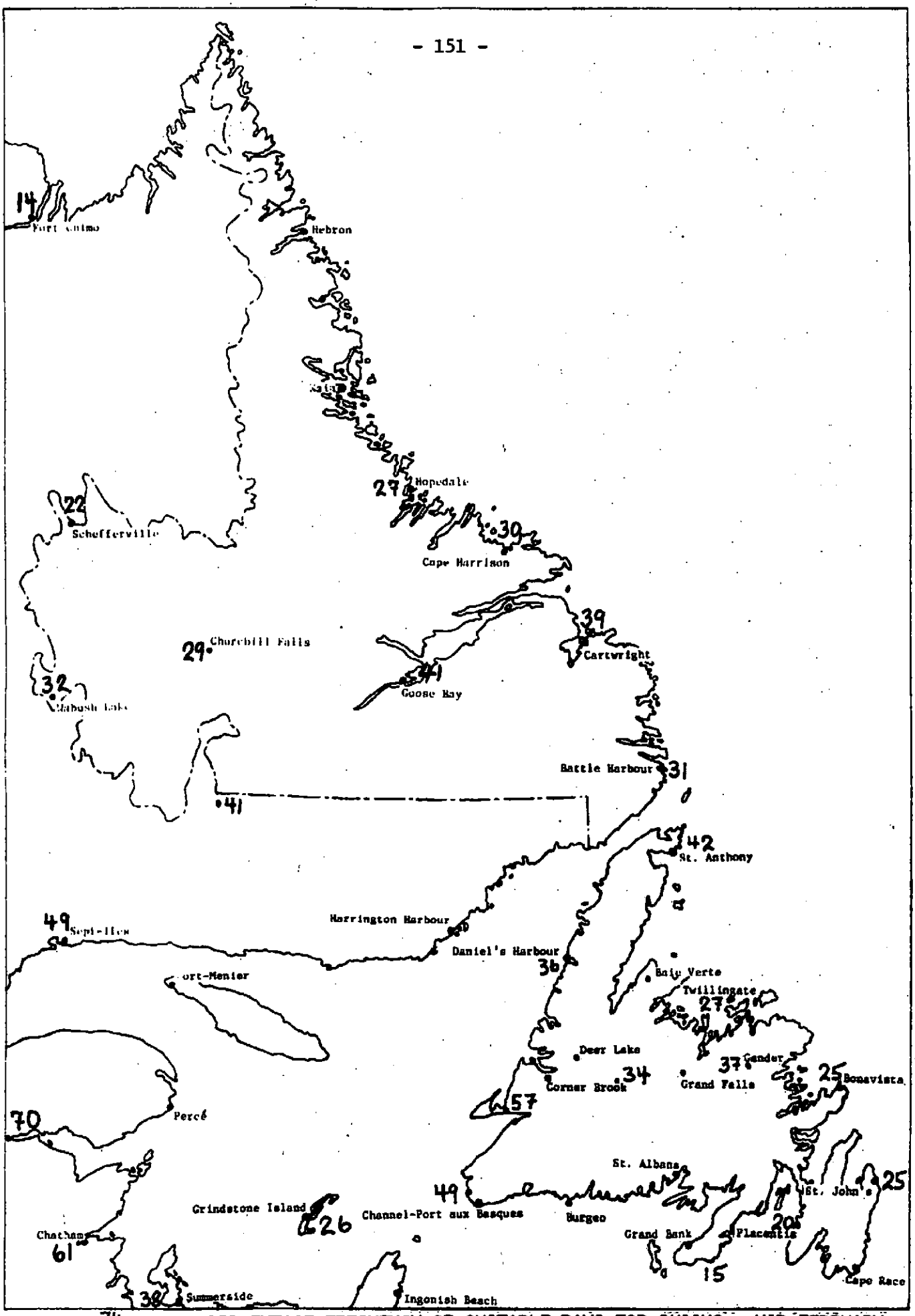


FIG. 74 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING - MID-FEBRUARY

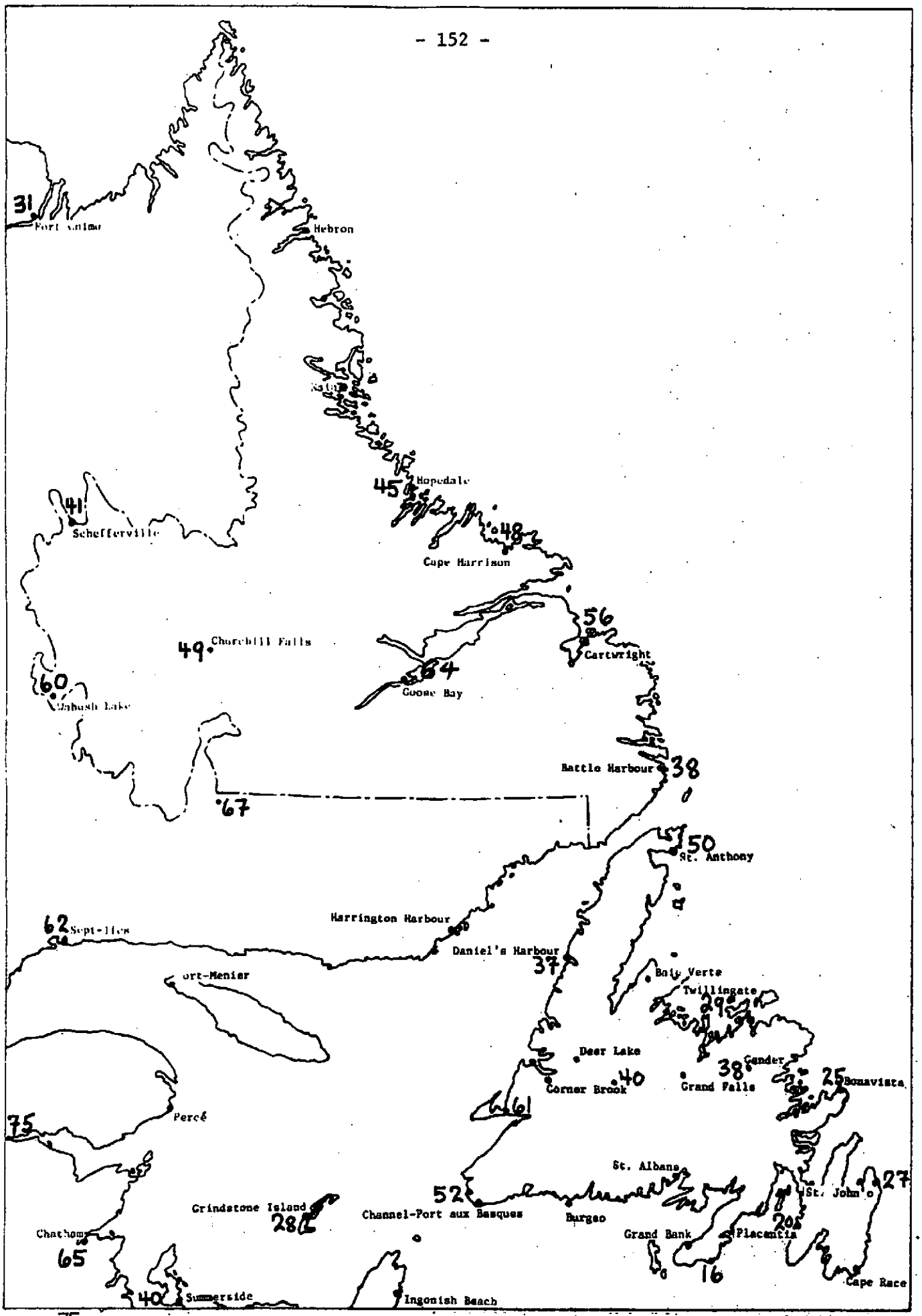


FIG. 75 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SNOWMOBILING - MID-FEBRUARY

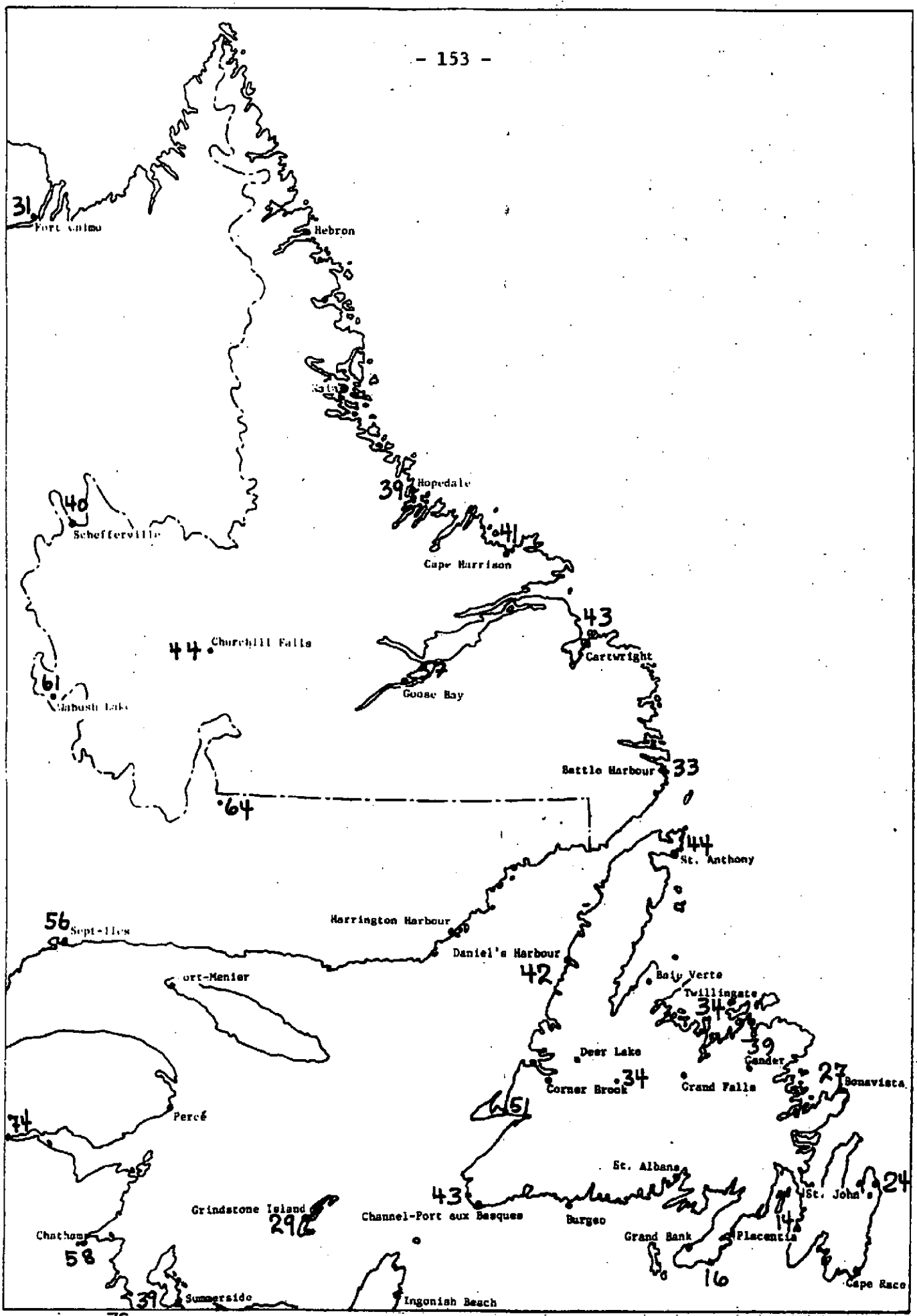


FIG. 76 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING - MID-MARCH

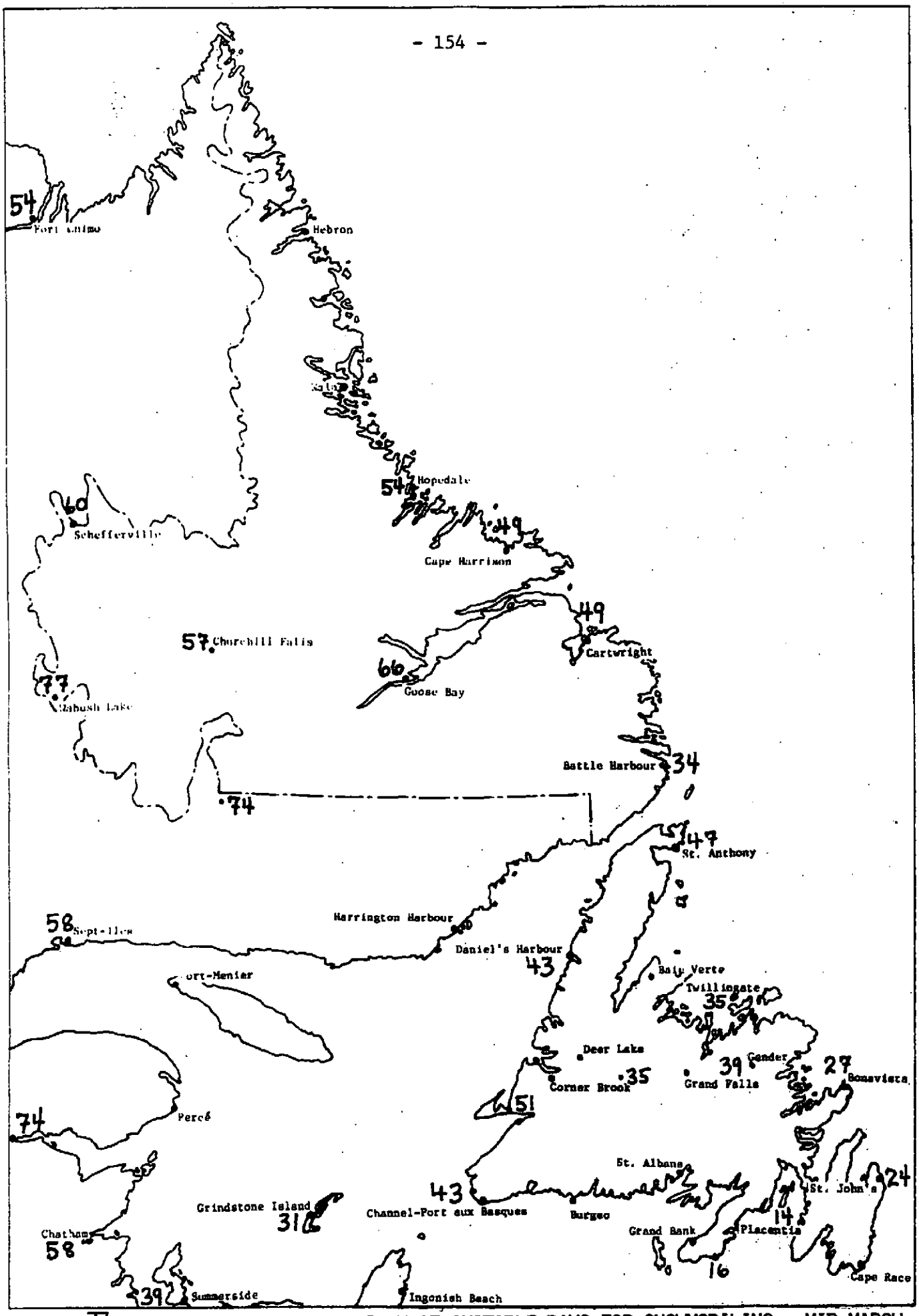


FIG. 77 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SNOWMOBILING - MID-MARCH

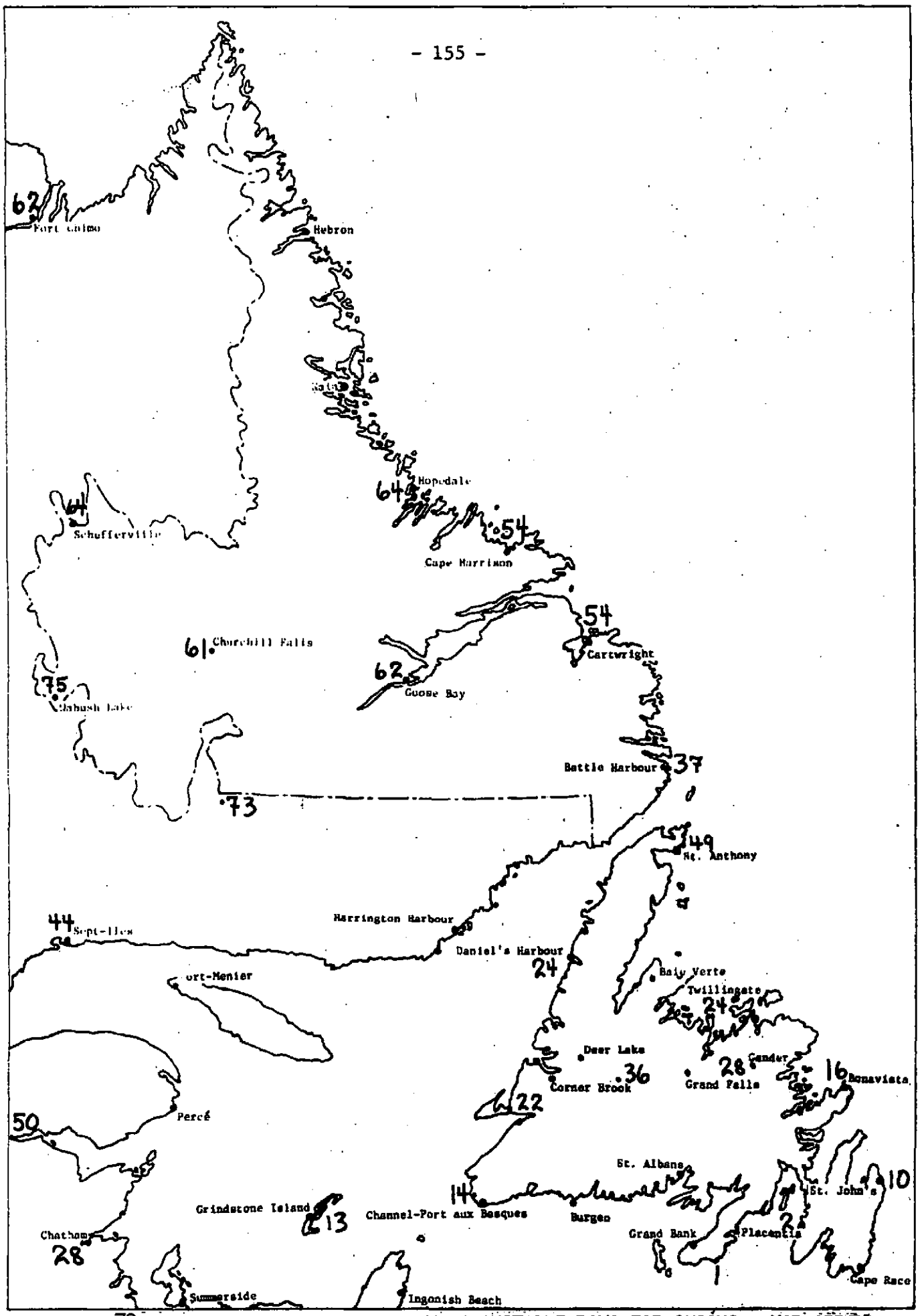


FIG. 78 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING - MID-APRIL

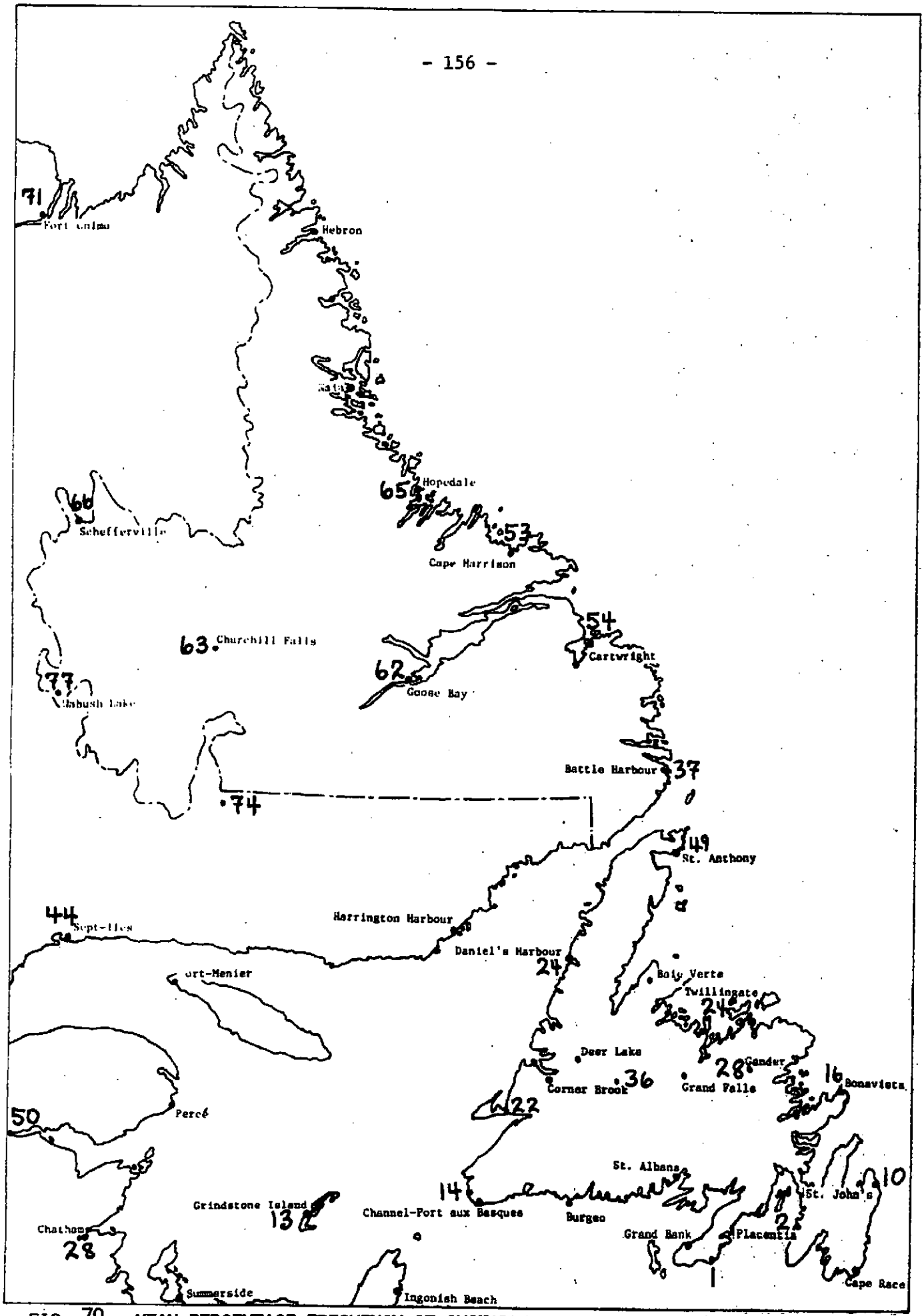


FIG. 79 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SNOWMOBILING - MID-APRIL

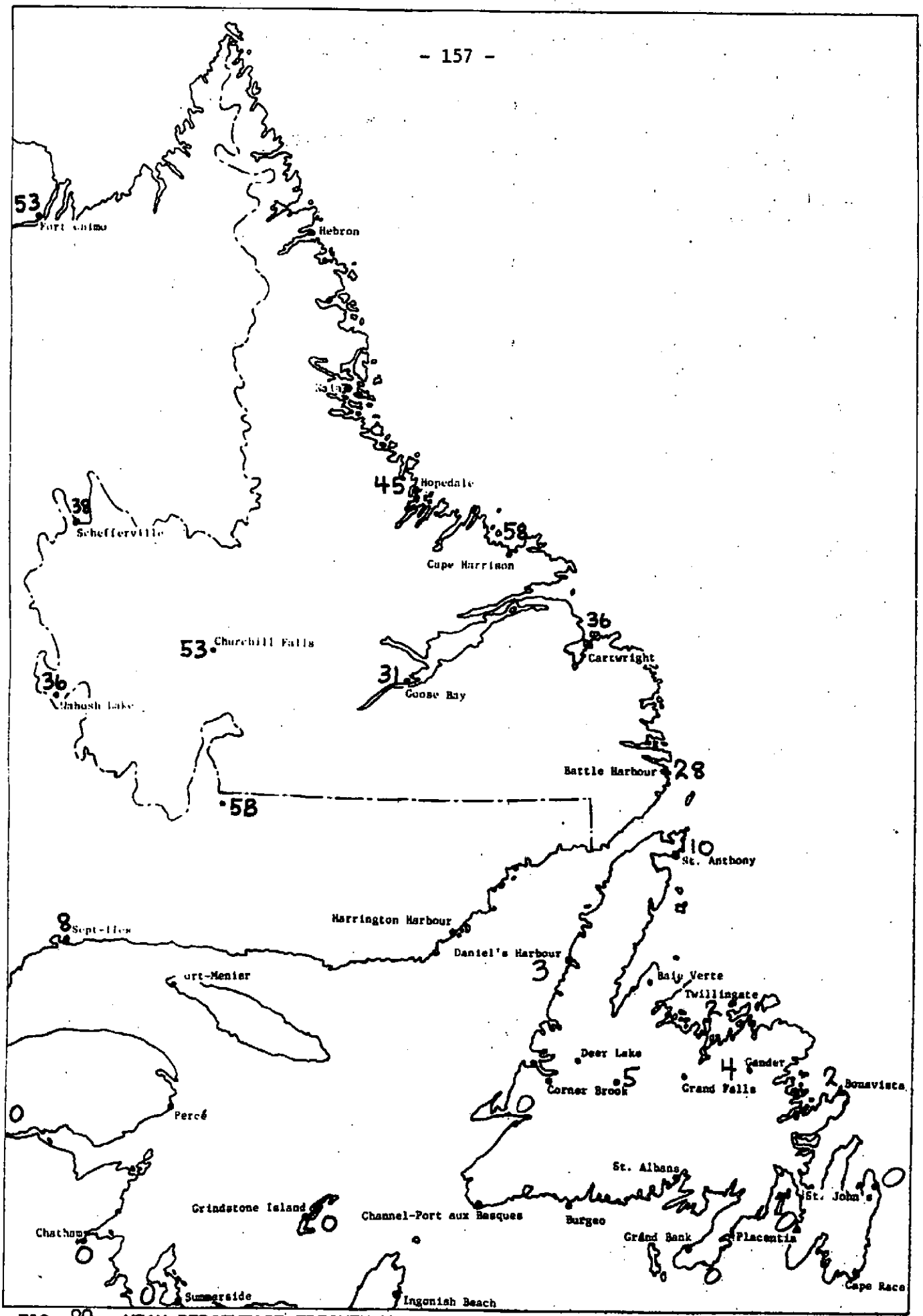


FIG. 80 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING AND SNOWMOBILING - MID-MAY

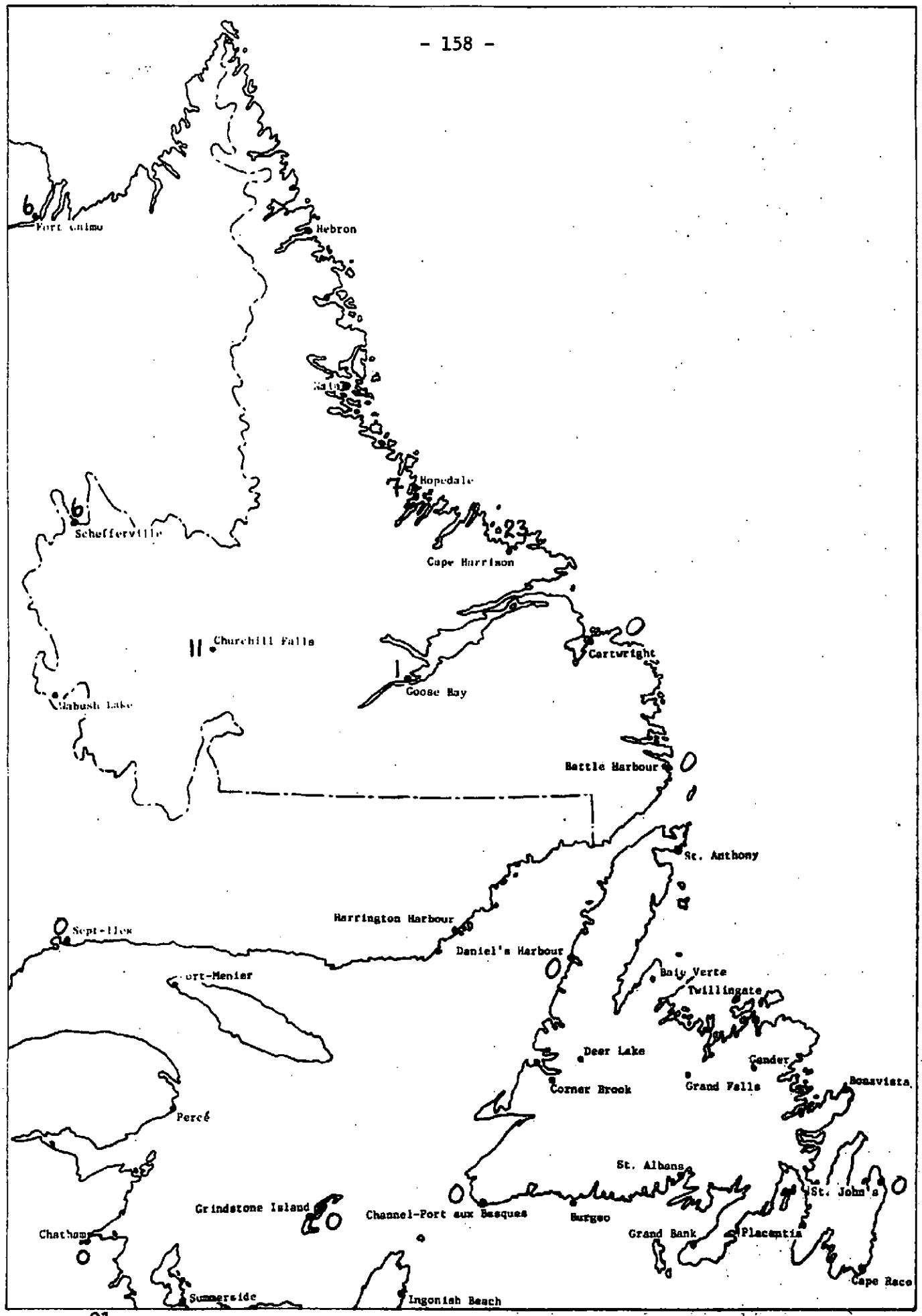


FIG. 81 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR SKIING AND SNOWMOBILING - MID-JUNE

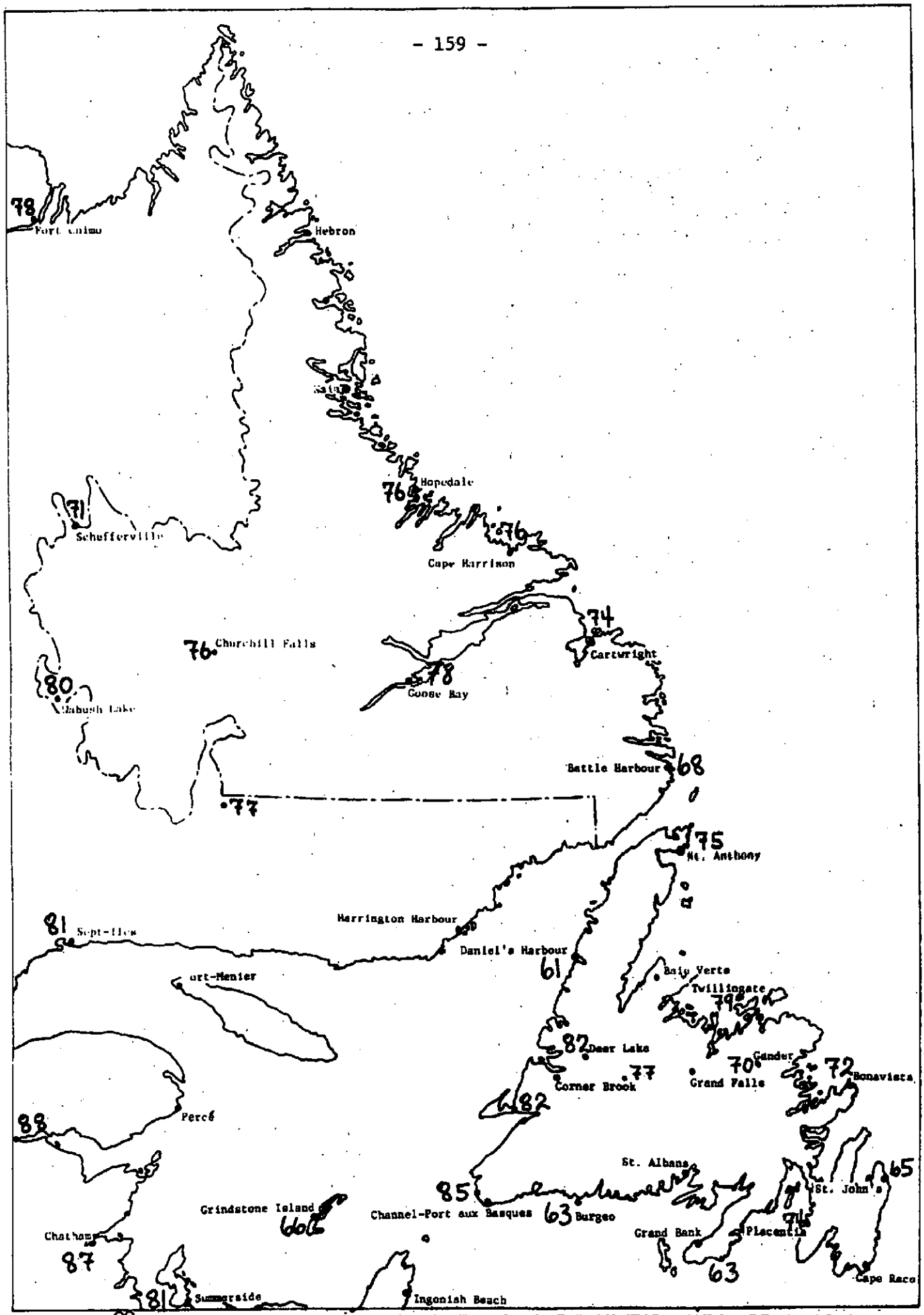


FIG. 82 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-MAY

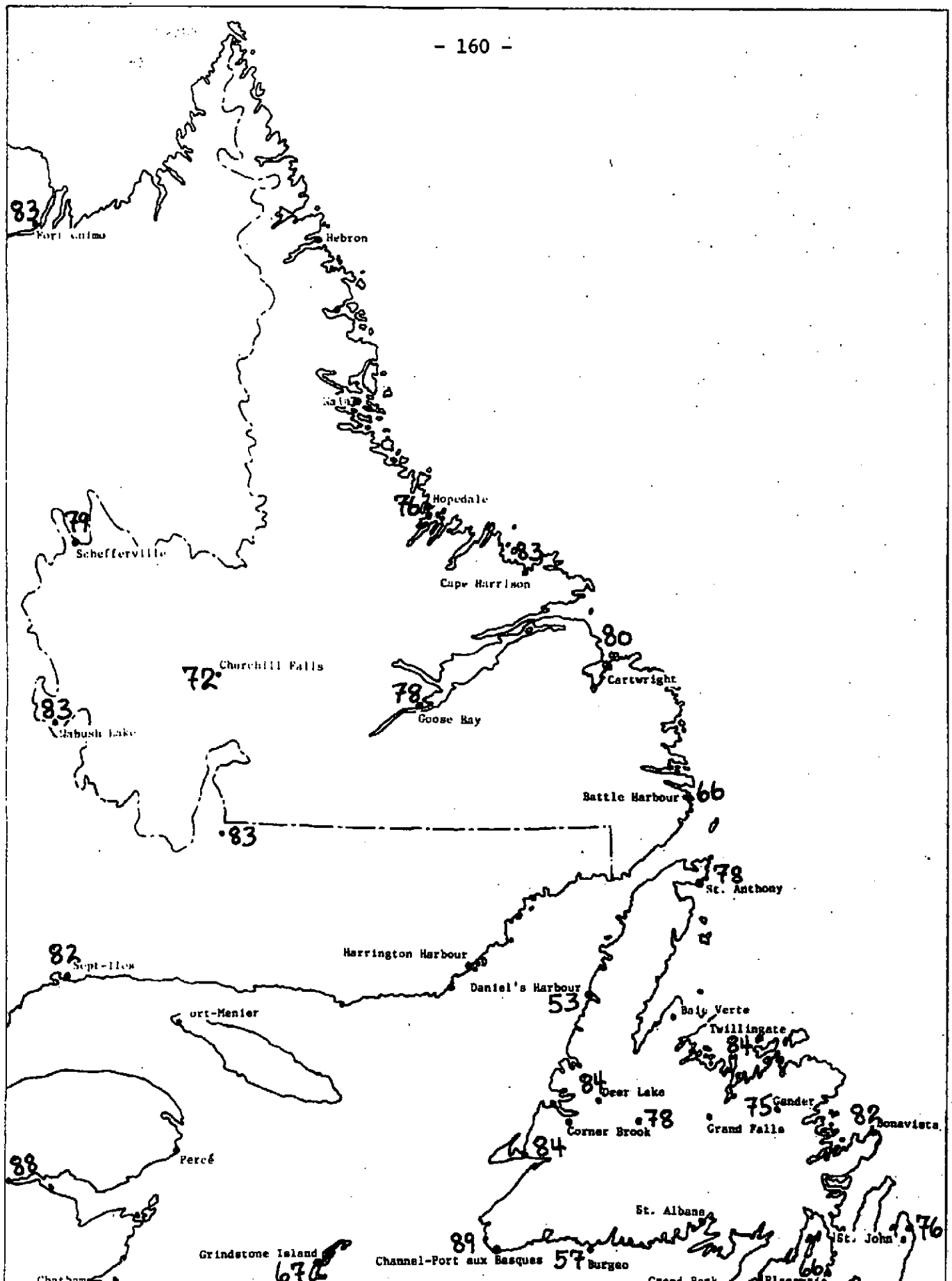


FIG. 83 · MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-JUNE

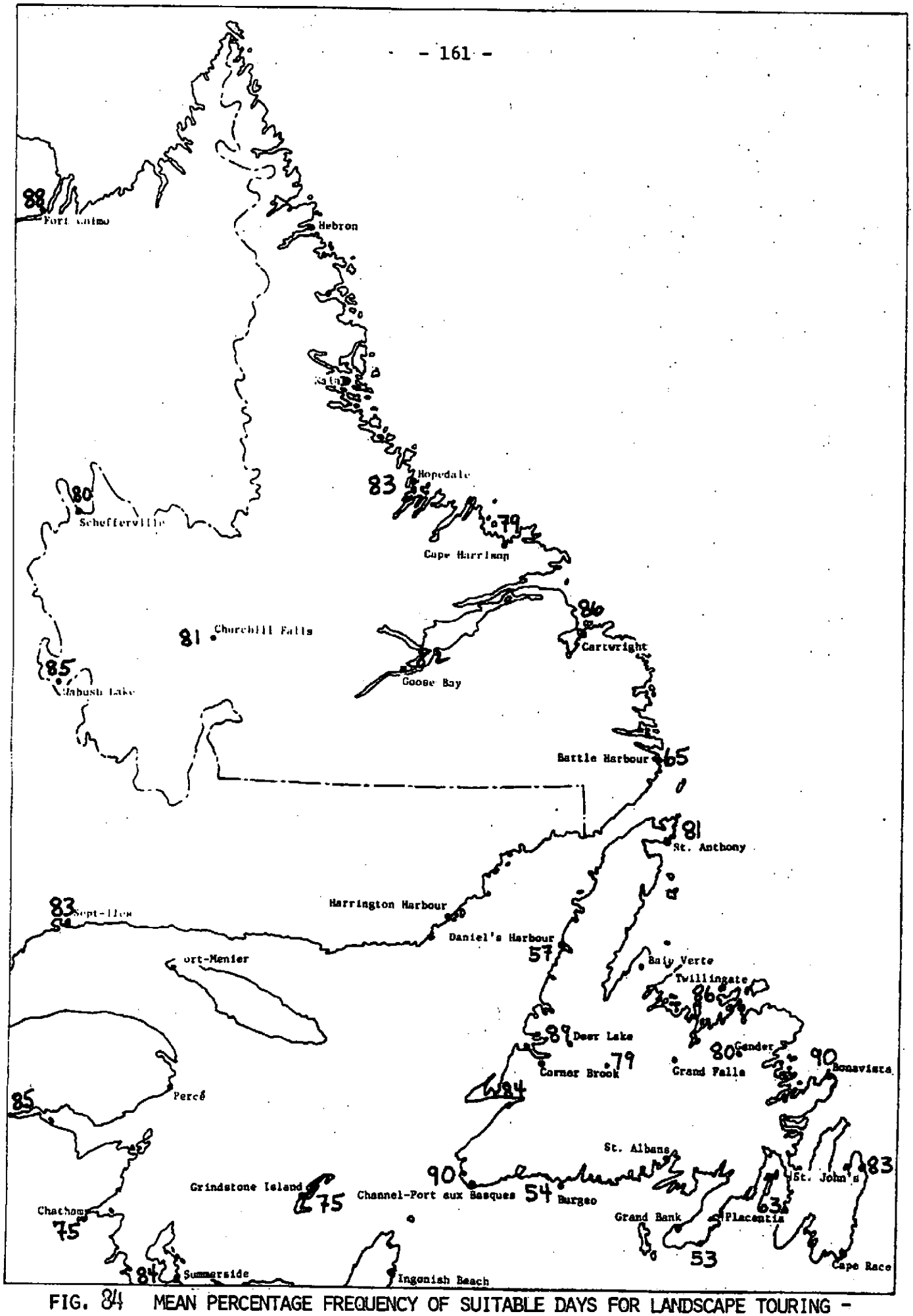


FIG. 84 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - - MID-JULY

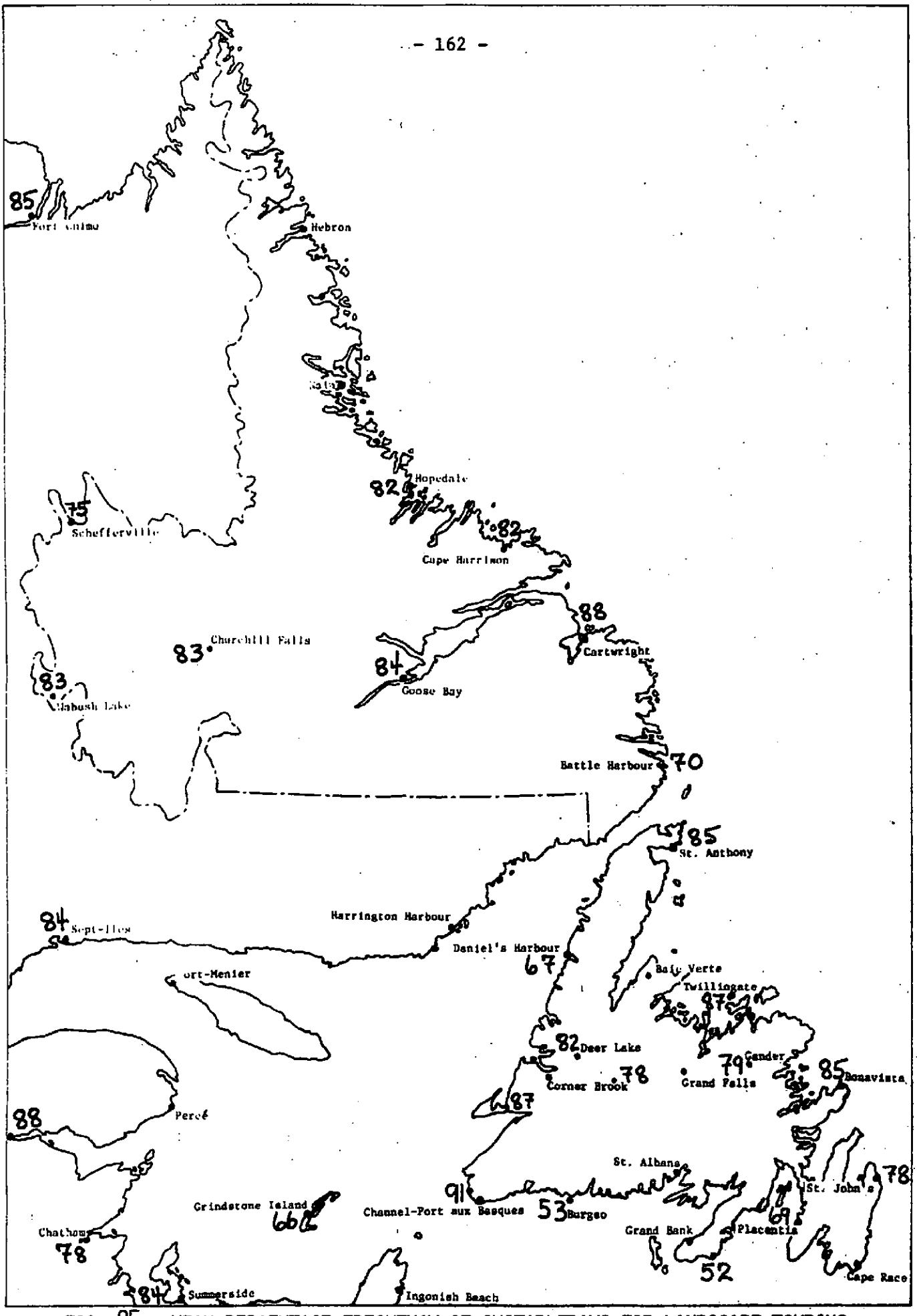


FIG. 85 MEAN PERCENTAGE FREQUENCY OF SUITABLEDAYS FOR LANDSCAPE TOURING - MID-AUGUST

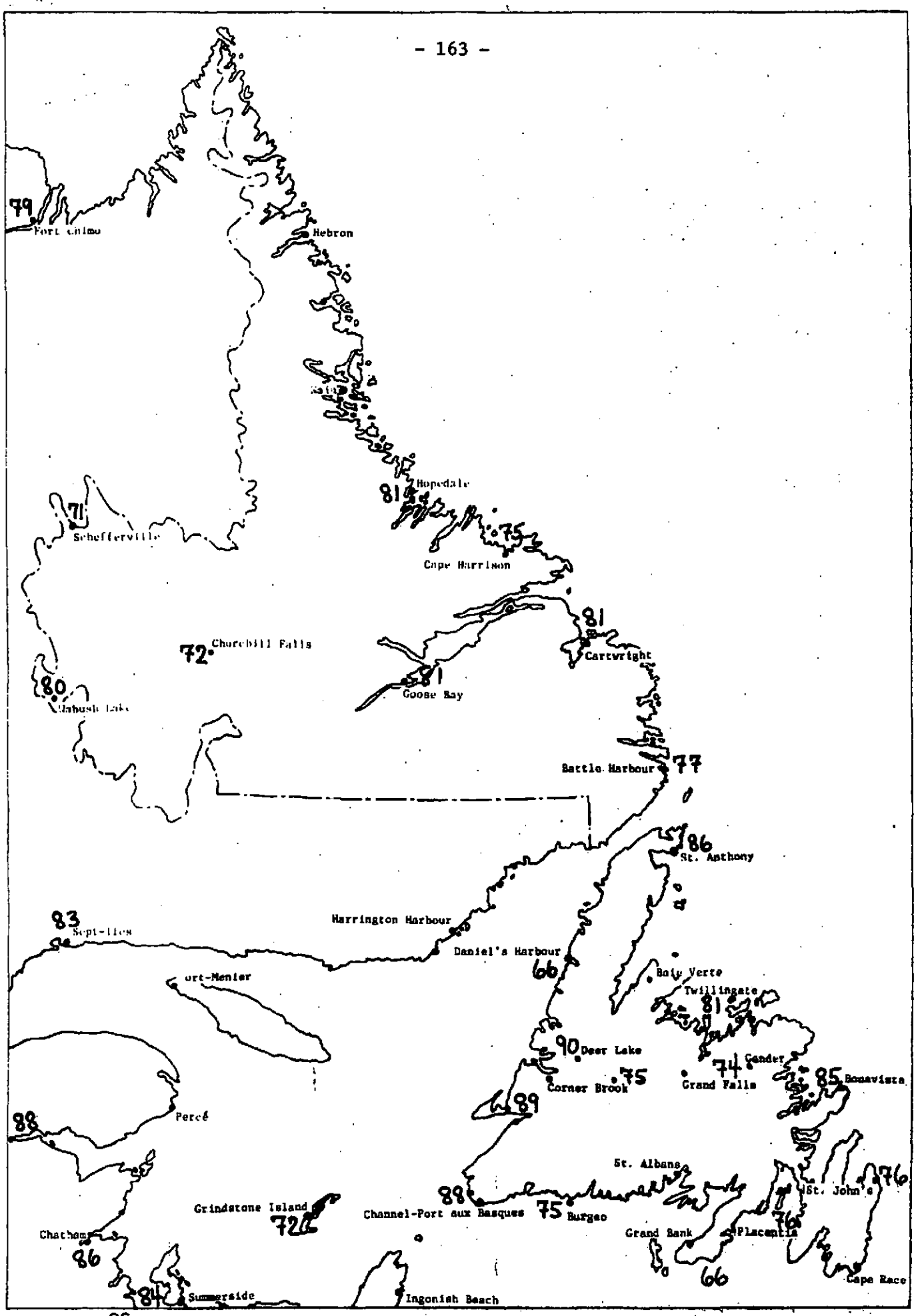


FIG. 86 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-SEPTEMBER

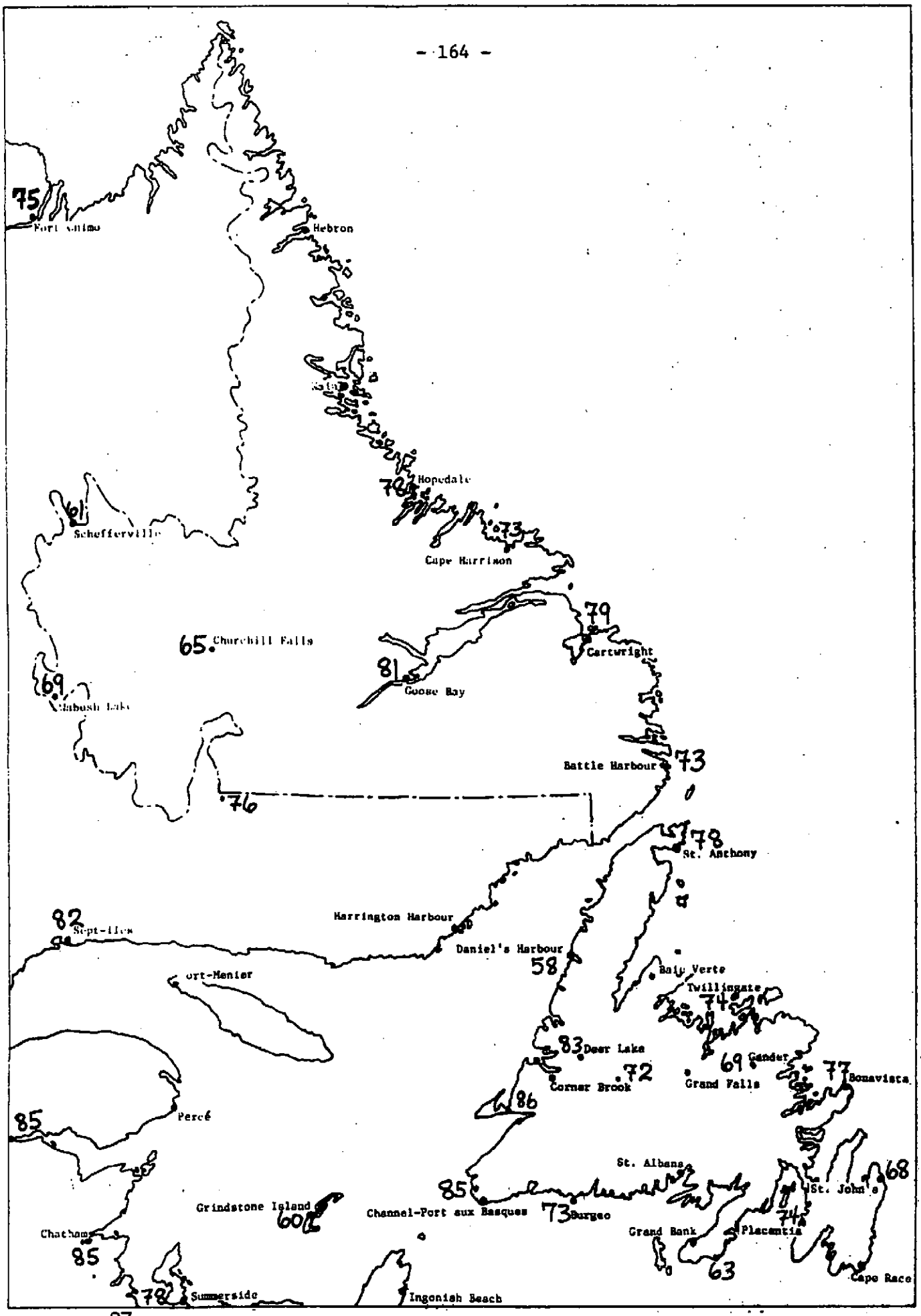


FIG. 87 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR LANDSCAPE TOURING - MID-OCTOBER

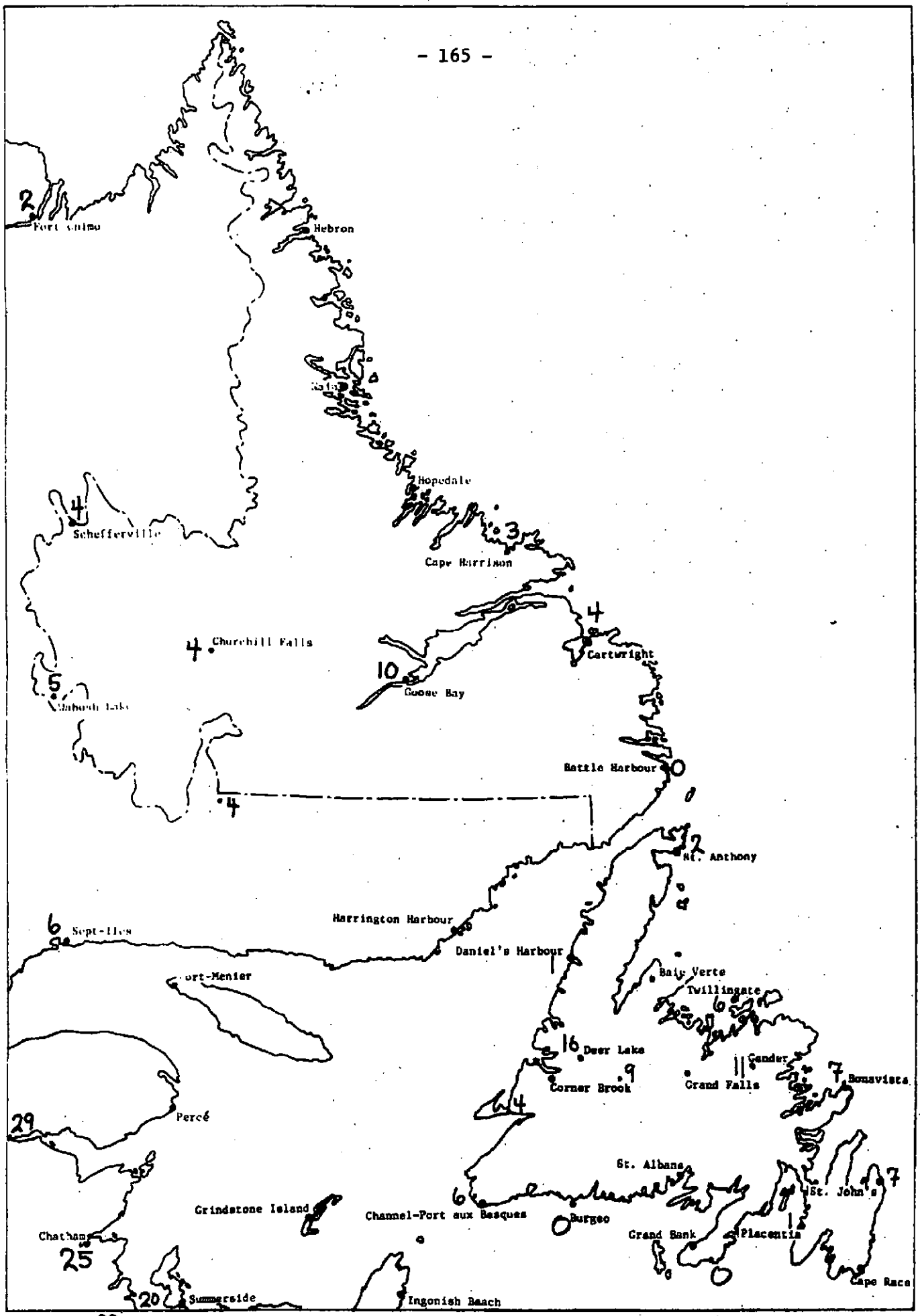


FIG. 88 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR VIGOROUS ACTIVITIES - MID-MAY

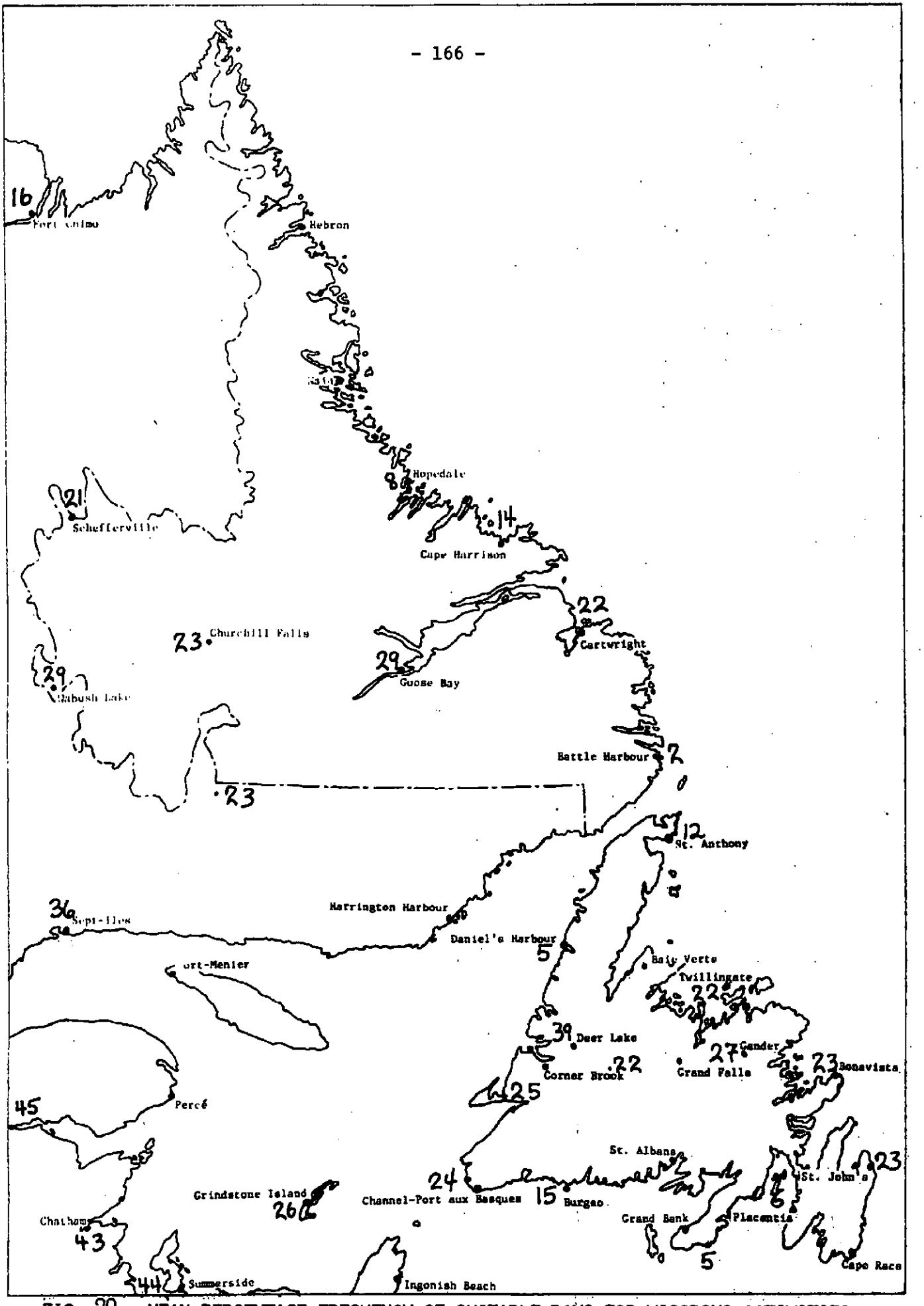


FIG. 89 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR VIGOROUS ACTIVITIES - MID-JUNE

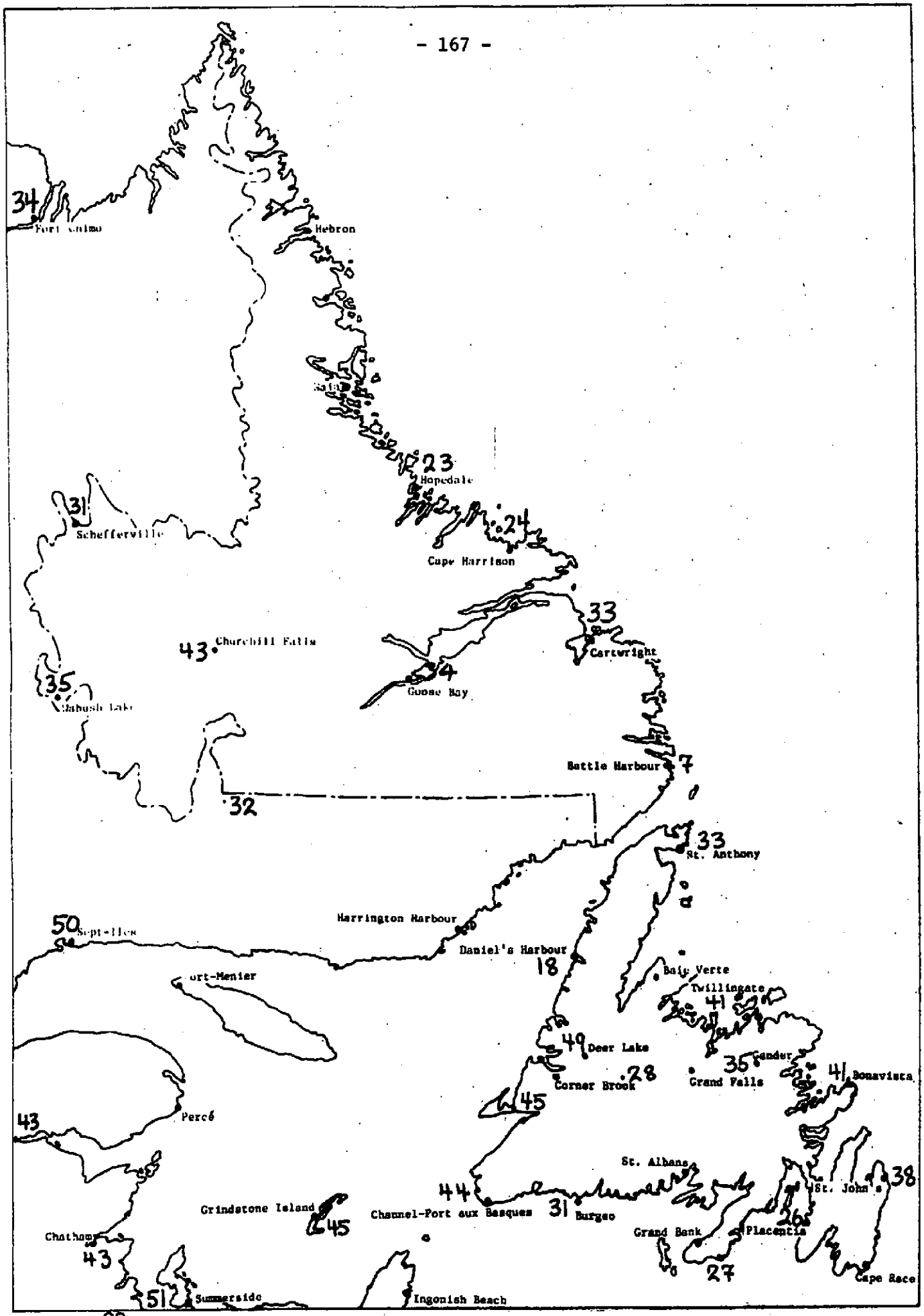


FIG. 90 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR VIGOROUS ACTIVITIES - MID-JULY

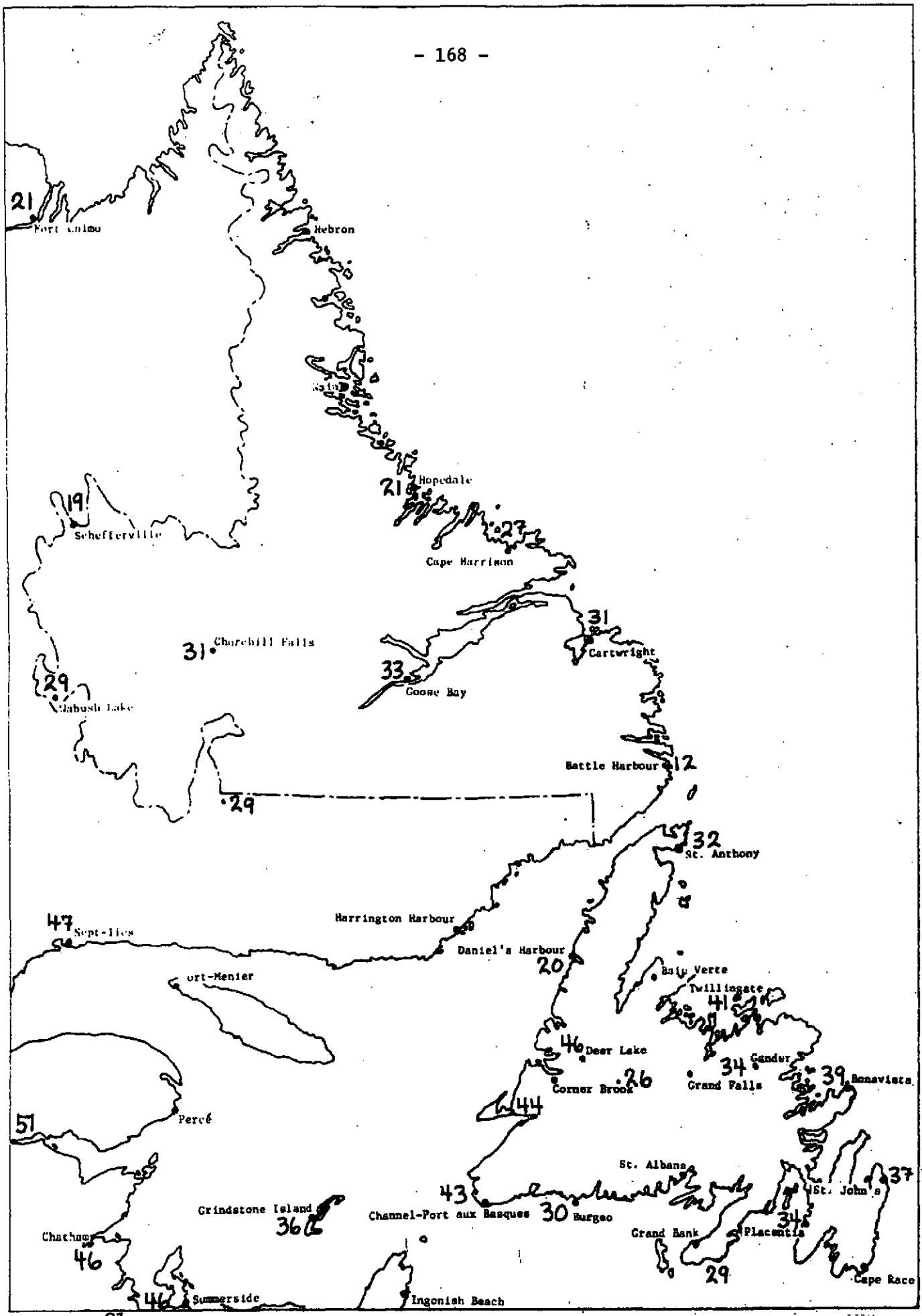


FIG. 91 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR VIGOROUS ACTIVITIES - MID-AUGUST

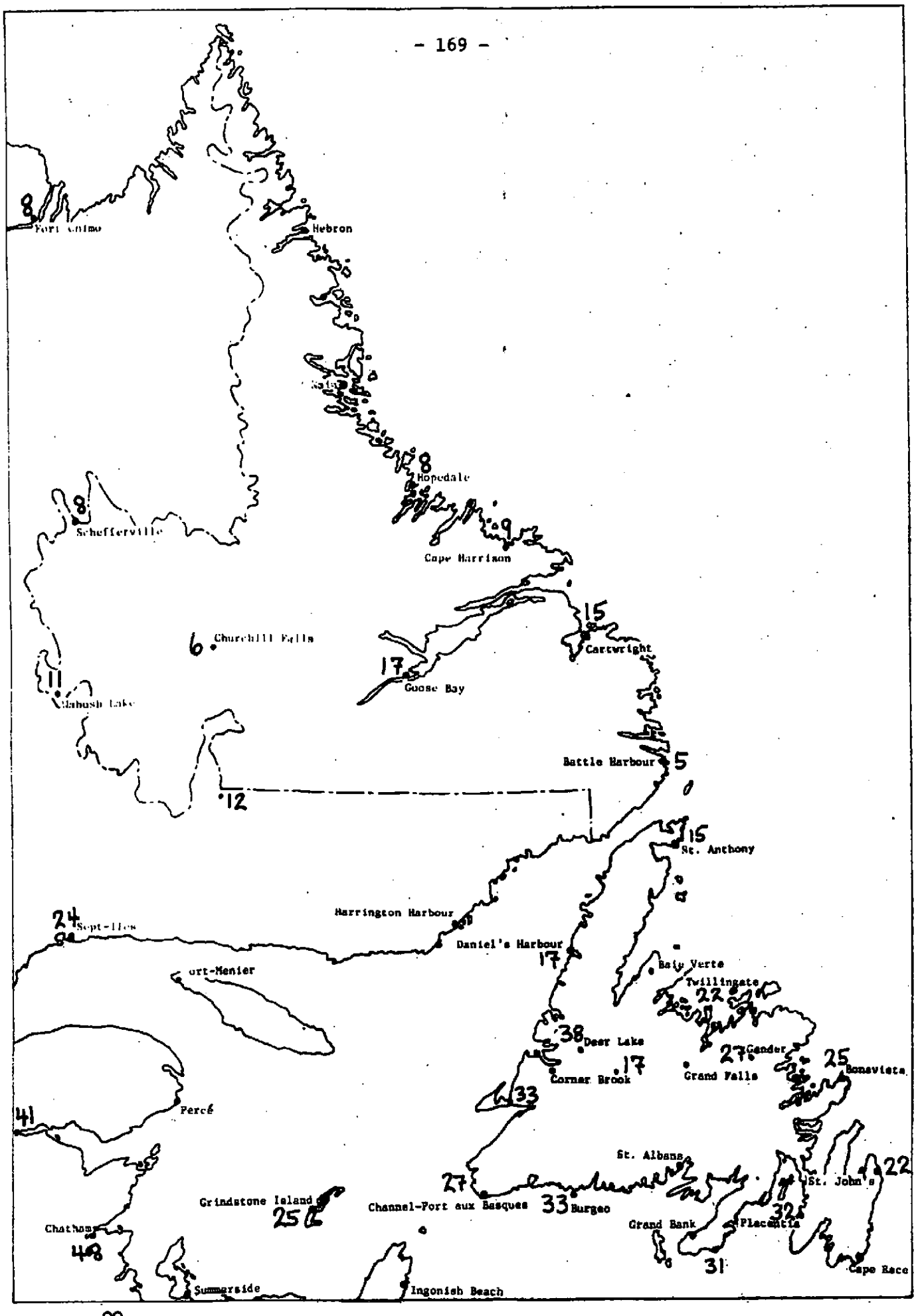


FIG. 92 MEAN PERCENTAGE FREQUENCY OF SUITABLEDAYS FOR VIGOROUS ACTIVITIES - MID-SEPTEMBER

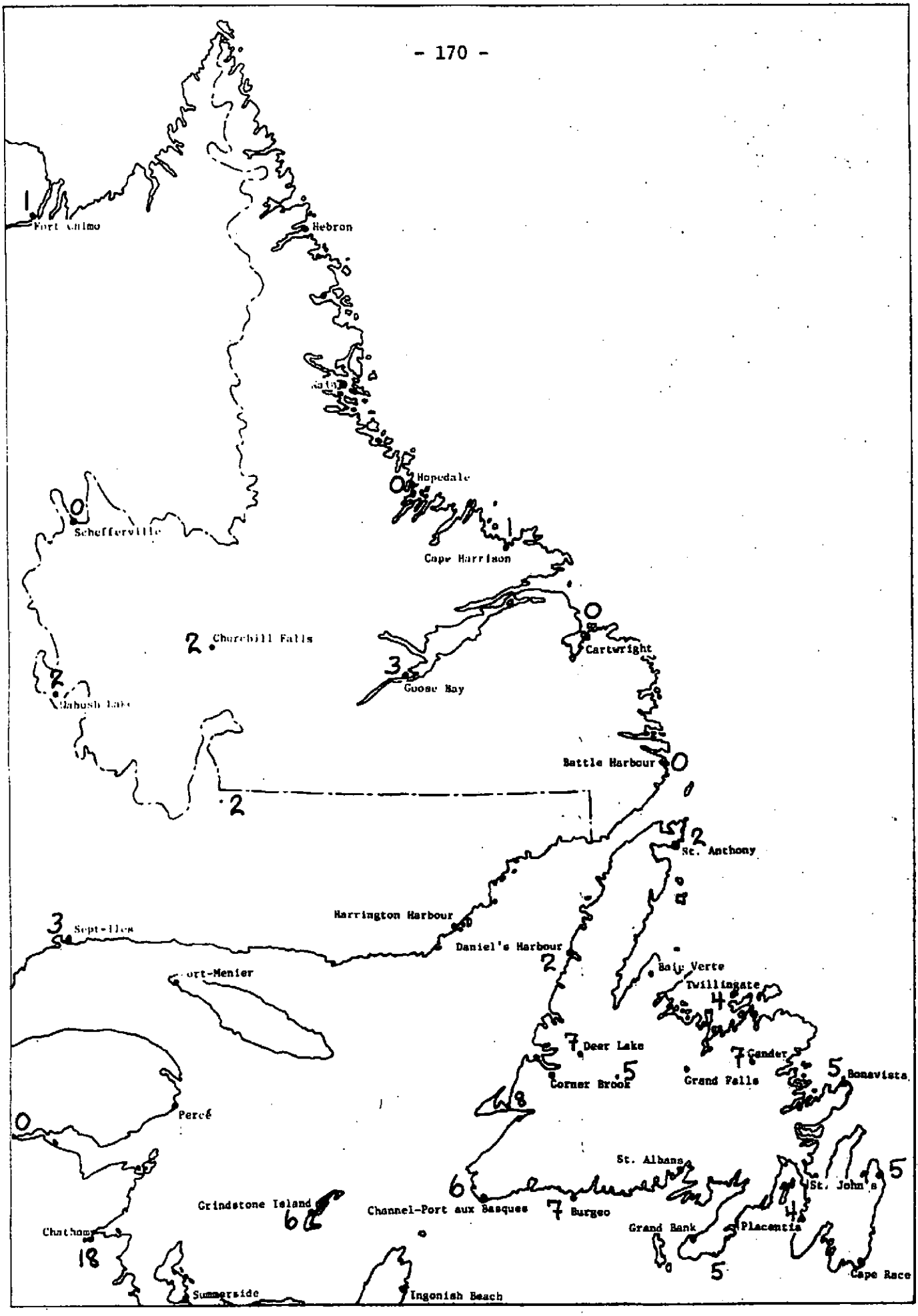


FIG. 93 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR VIGOROUS ACTIVITIES - MID-OCTOBER

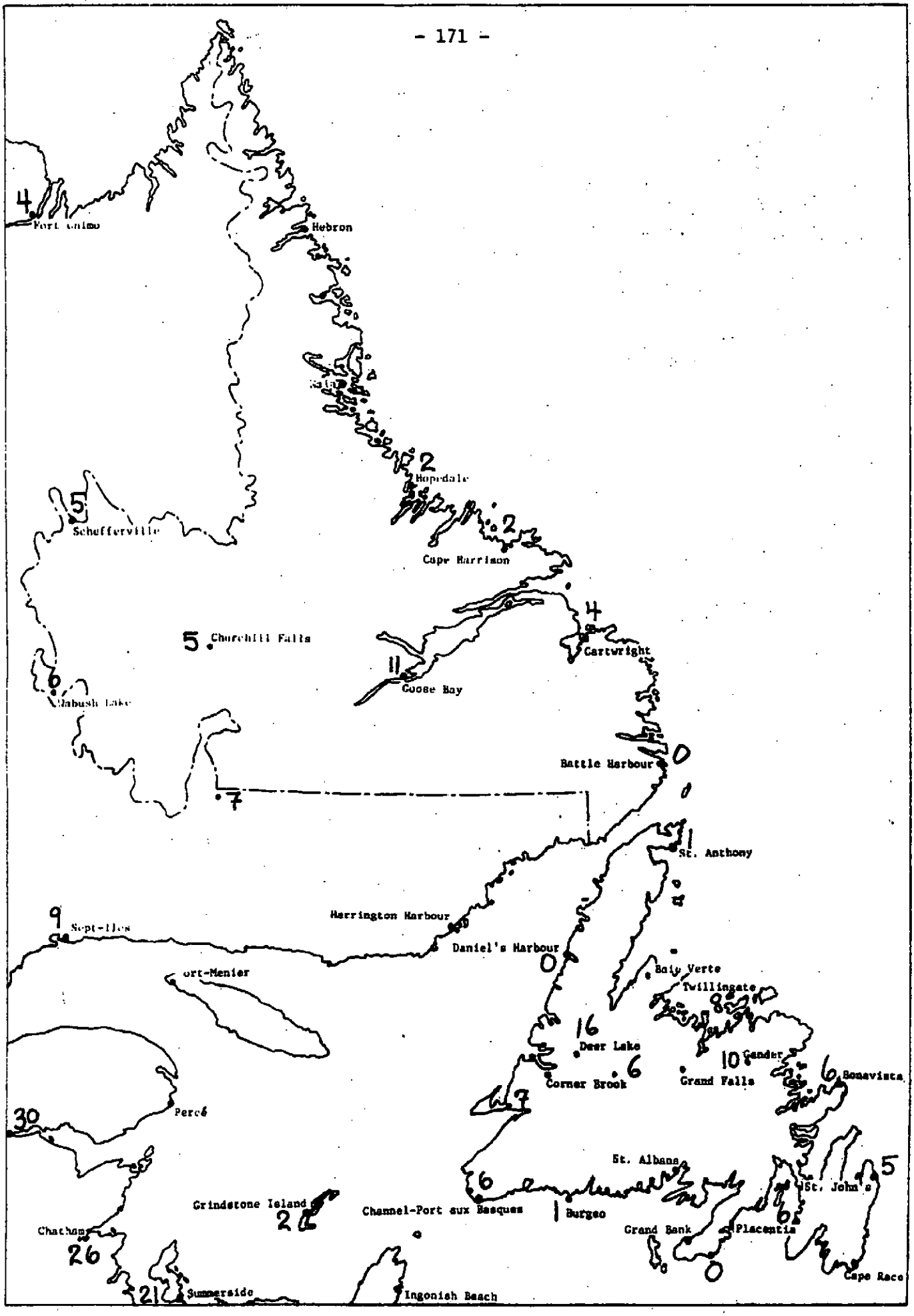


FIG. 94 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR BEACHING ACTIVITIES - MID-JUNE

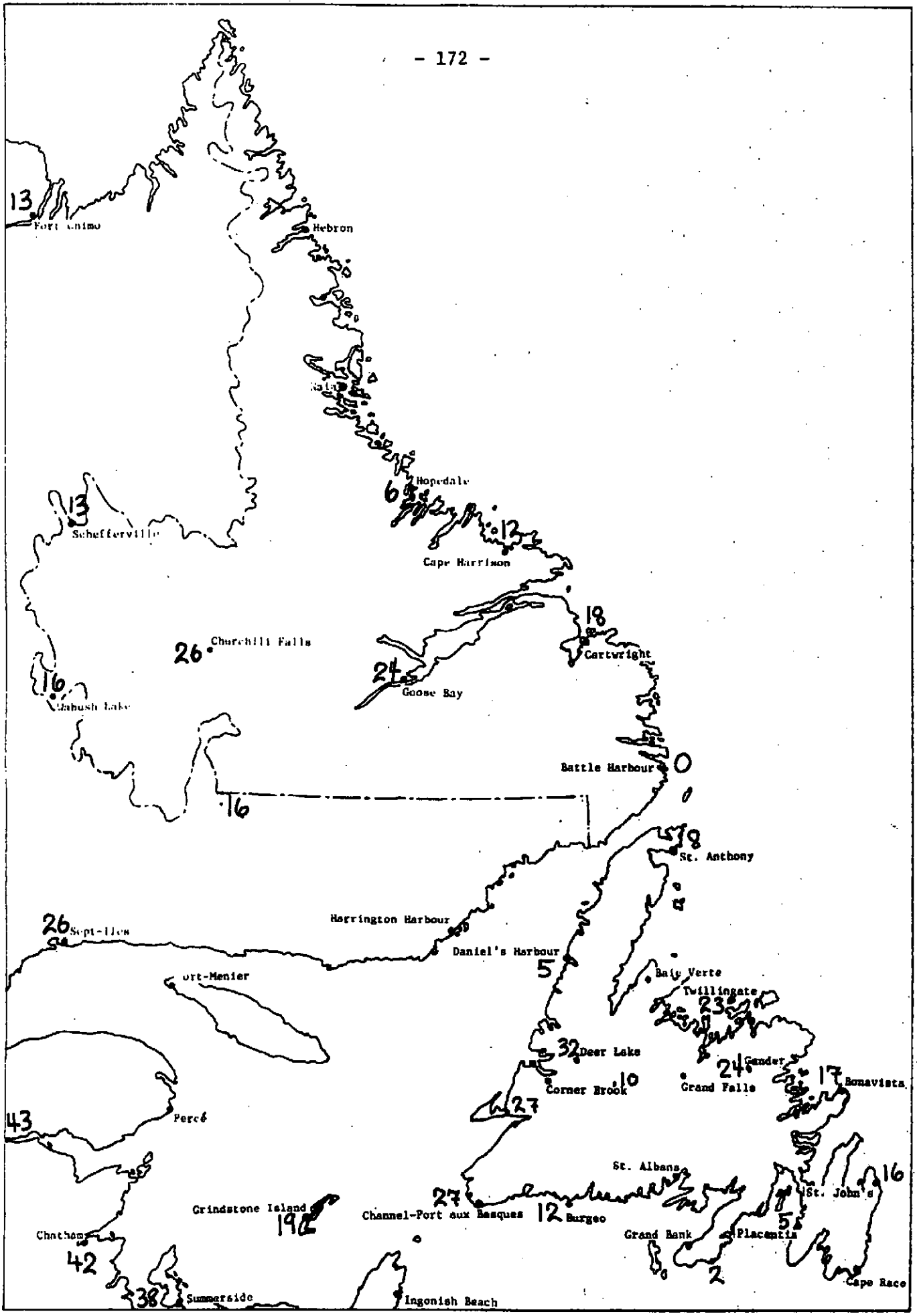


FIG. 95 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR BEACHING ACTIVITIES - MID-JULY

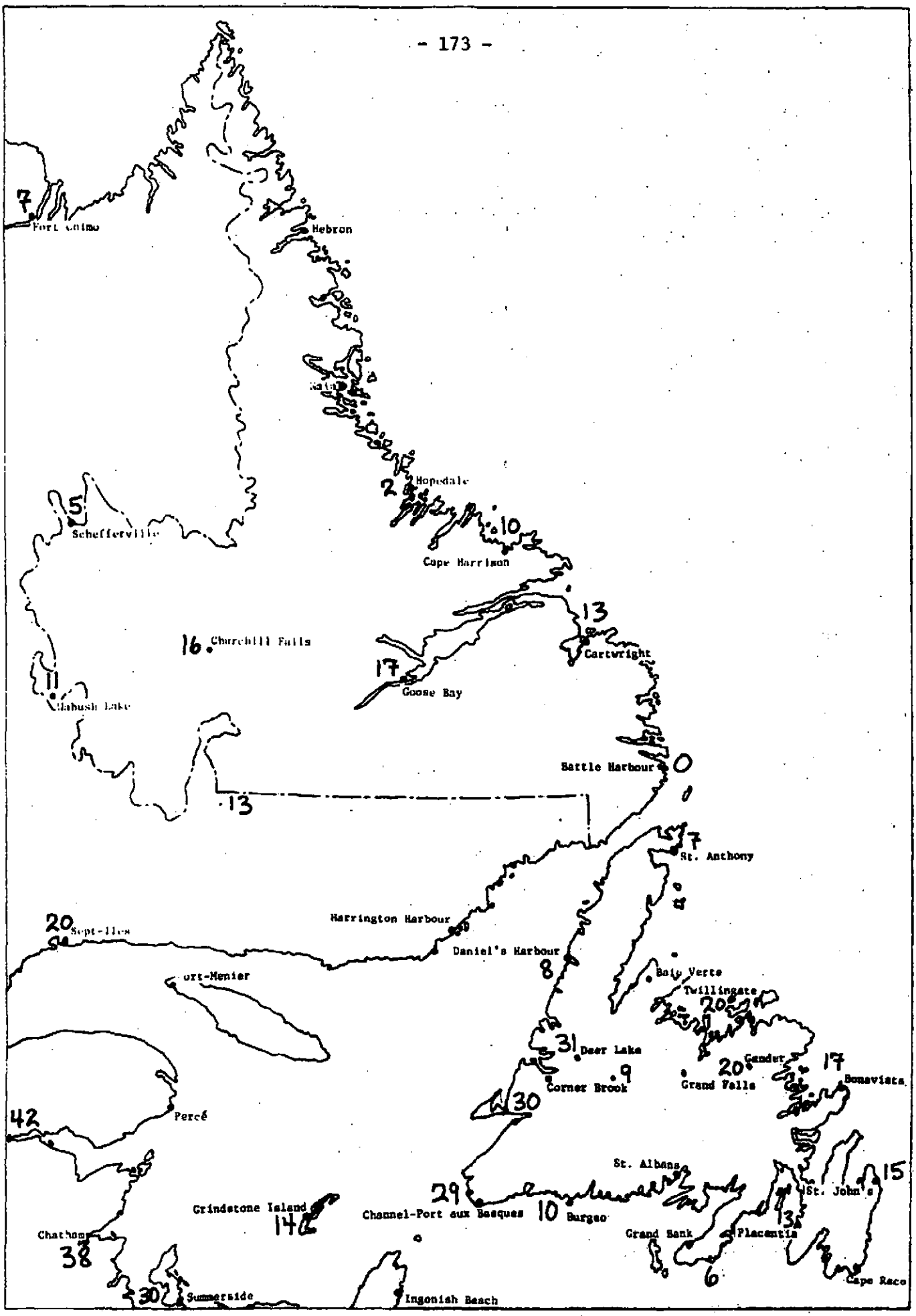


FIG. 96 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR BEACHING ACTIVITIES - MID-AUGUST

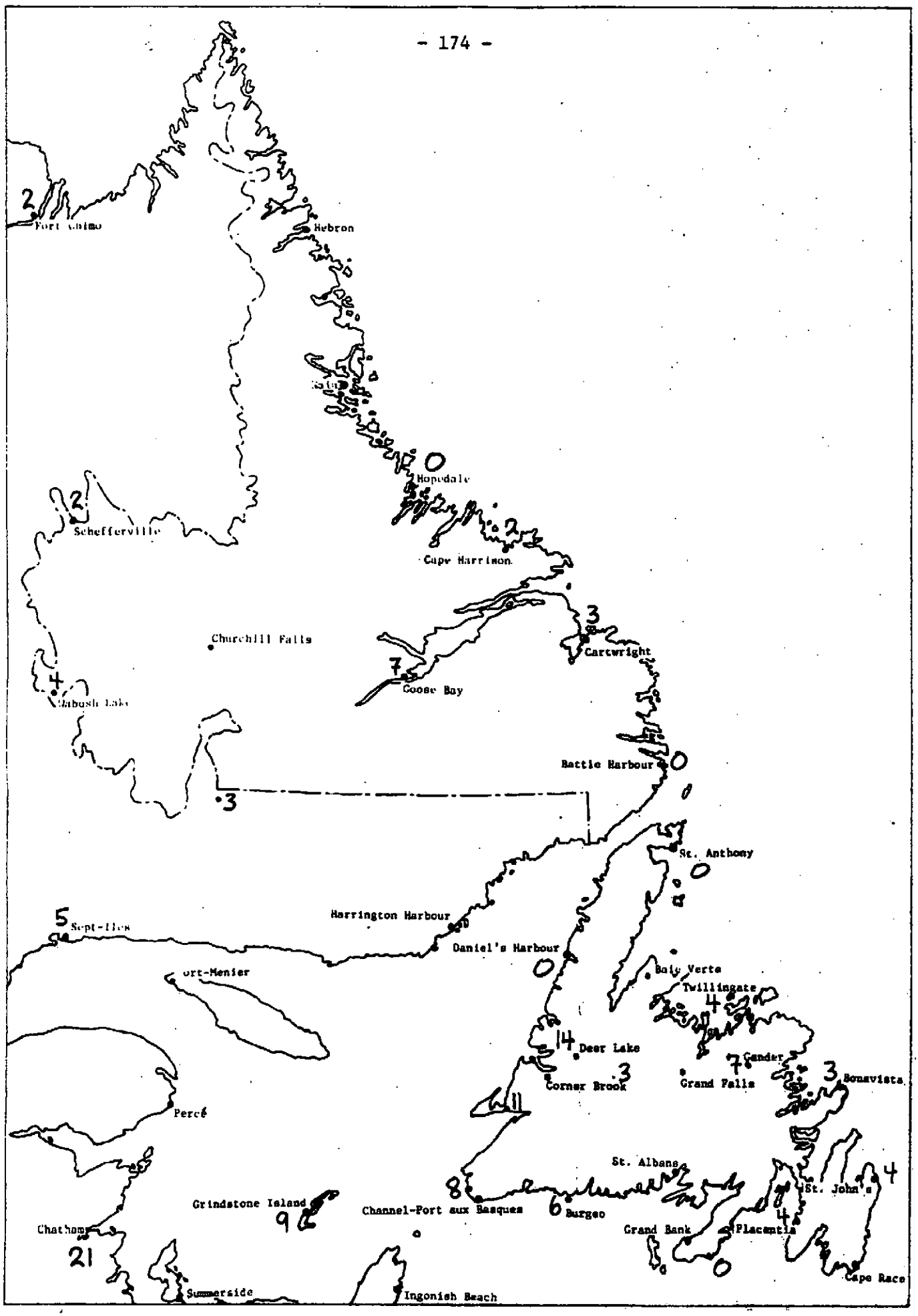


FIG. 97 MEAN PERCENTAGE FREQUENCY OF SUITABLE DAYS FOR BEACHING ACTIVITIES - MID-SEPTEMBER

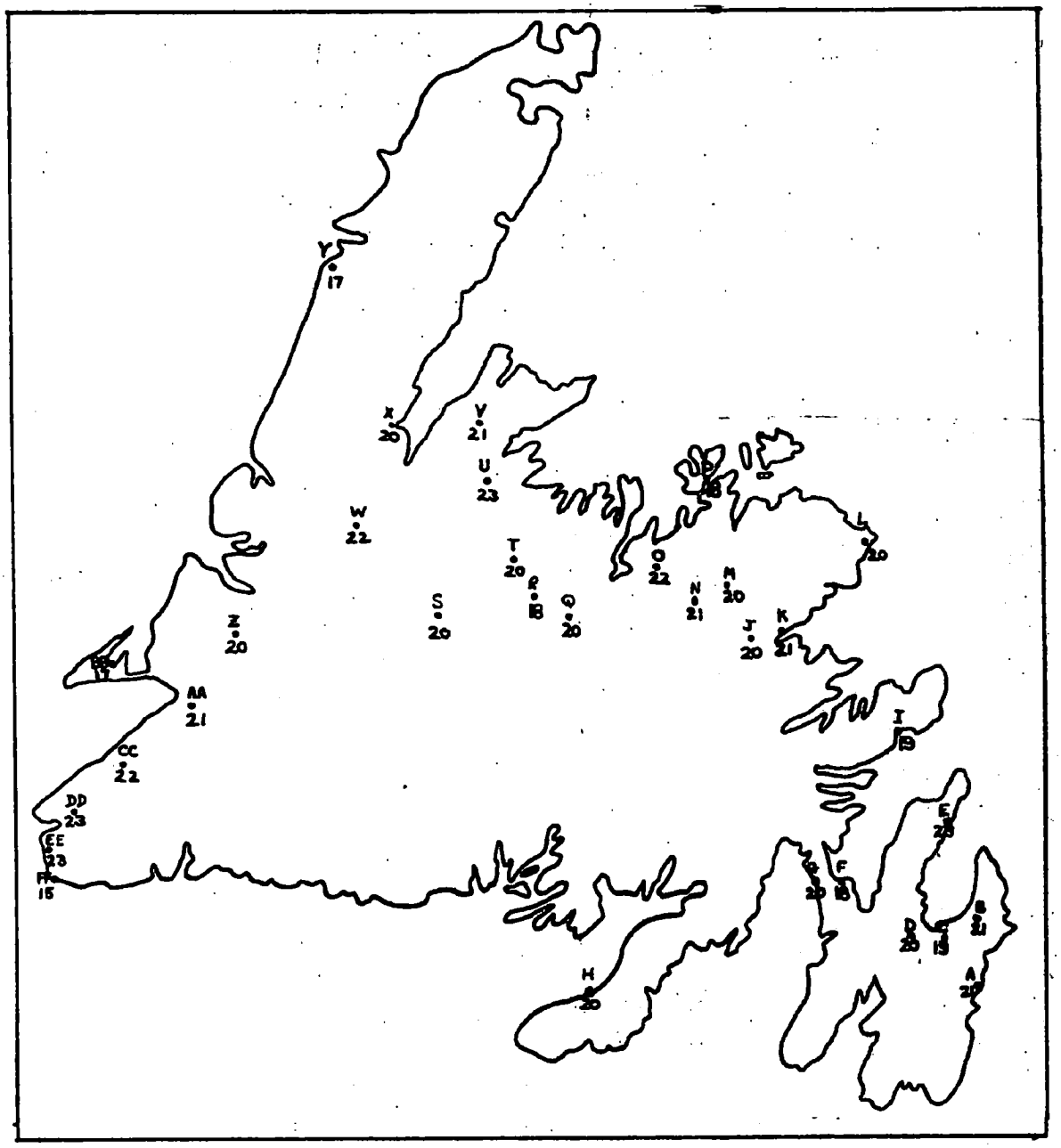


FIG. 98 MEAN FRESH-WATER TEMPERATURES IN PROVINCIAL PARKS AT MID-SUMMER (AUGUST 5) (°C) TO IDENTIFY PARKS REFER TO TABLE 15

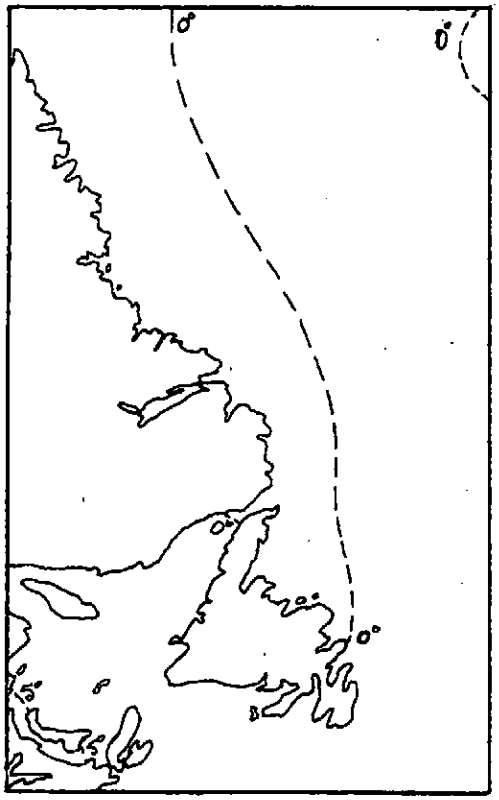


FIG. 99 MEAN OCEAN TEMPERATURE
MAY (°C)

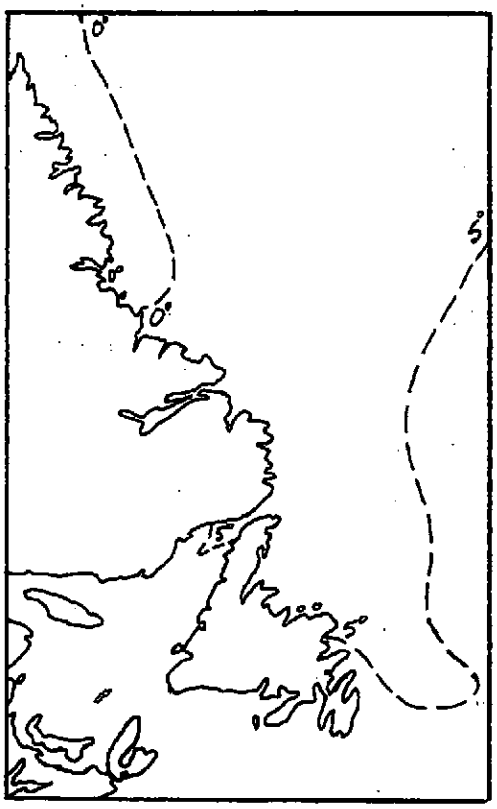


FIG. 100 MEAN OCEAN TEMPERATURE
JUNE (°C)

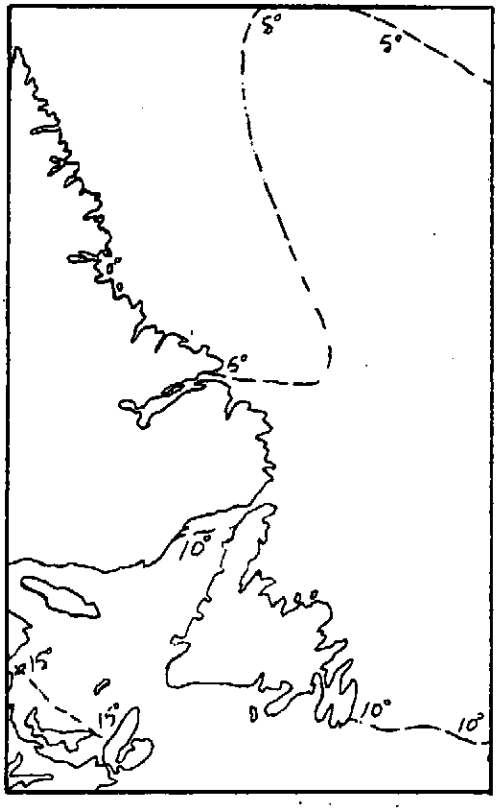


FIG. 101 MEAN OCEAN TEMPERATURE
JULY (°C)

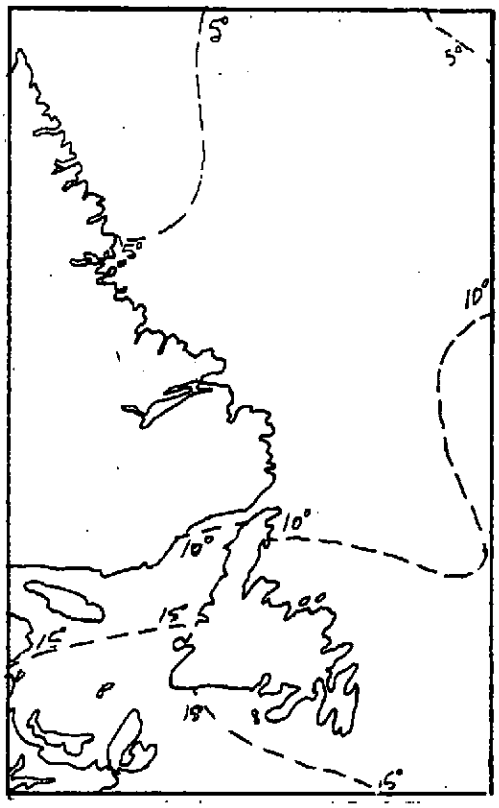


FIG. 102 MEAN OCEAN TEMPERATURE
AUGUST (°C)

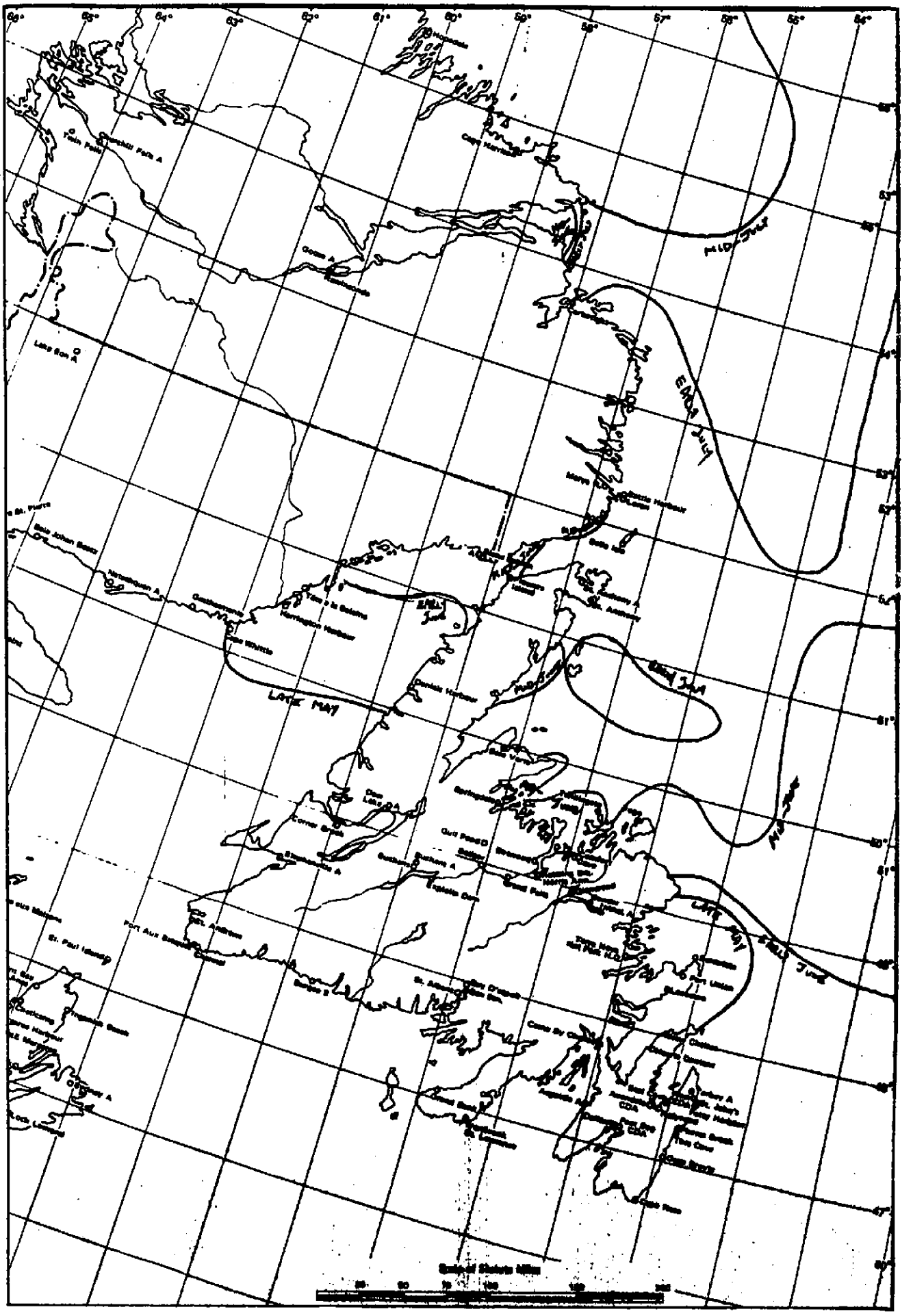


FIG. 103 MEAN SOUTHERN LIMITS OF ICE IN SPRING AND EARLY SUMMER

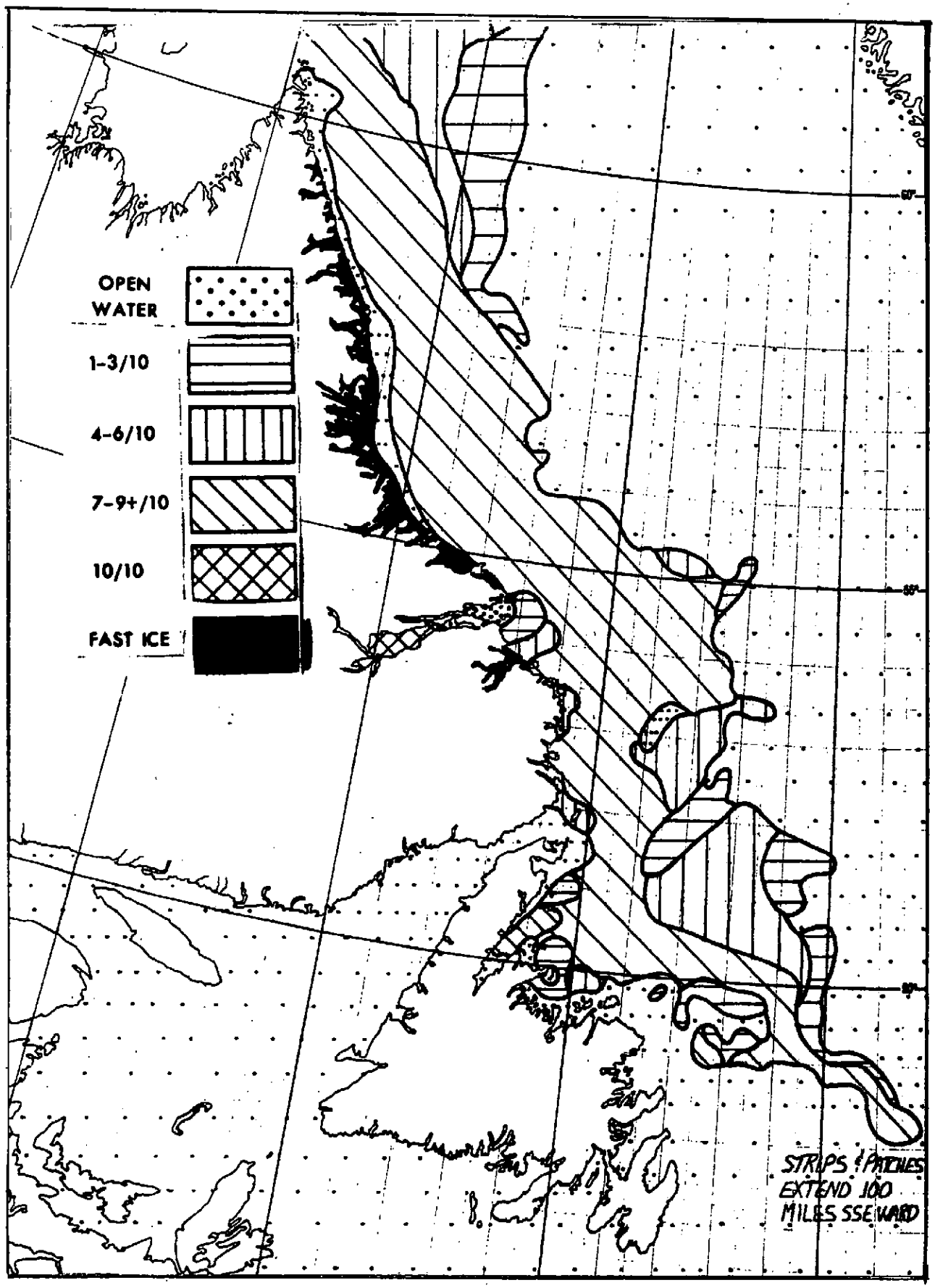


FIG. 104 ICE CONDITIONS IN A TYPICAL BAD YEAR - EARLY JUNE

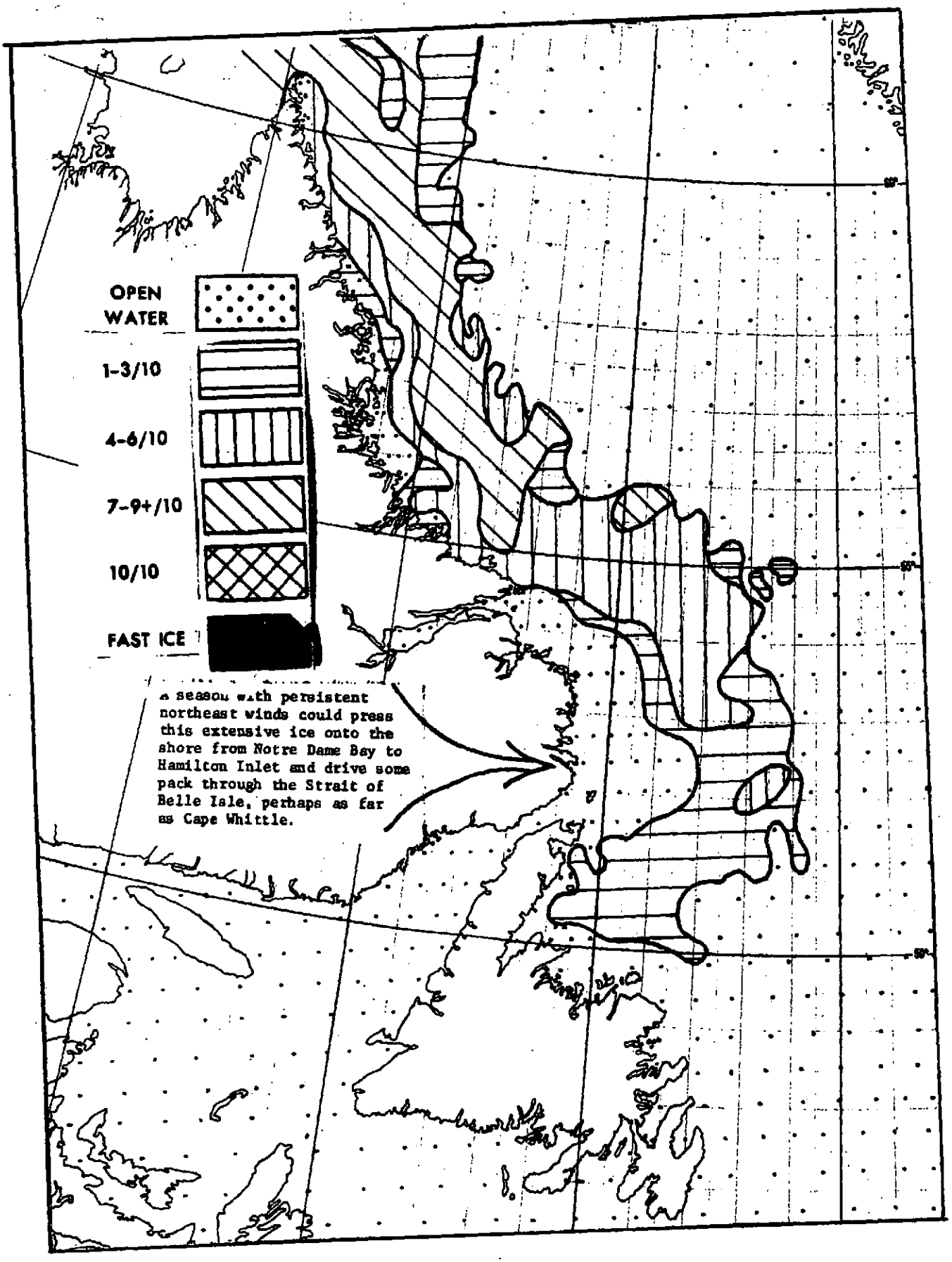


FIG. 105 ICE CONDITIONS IN A TYPICAL BAD YEAR - EARLY JULY

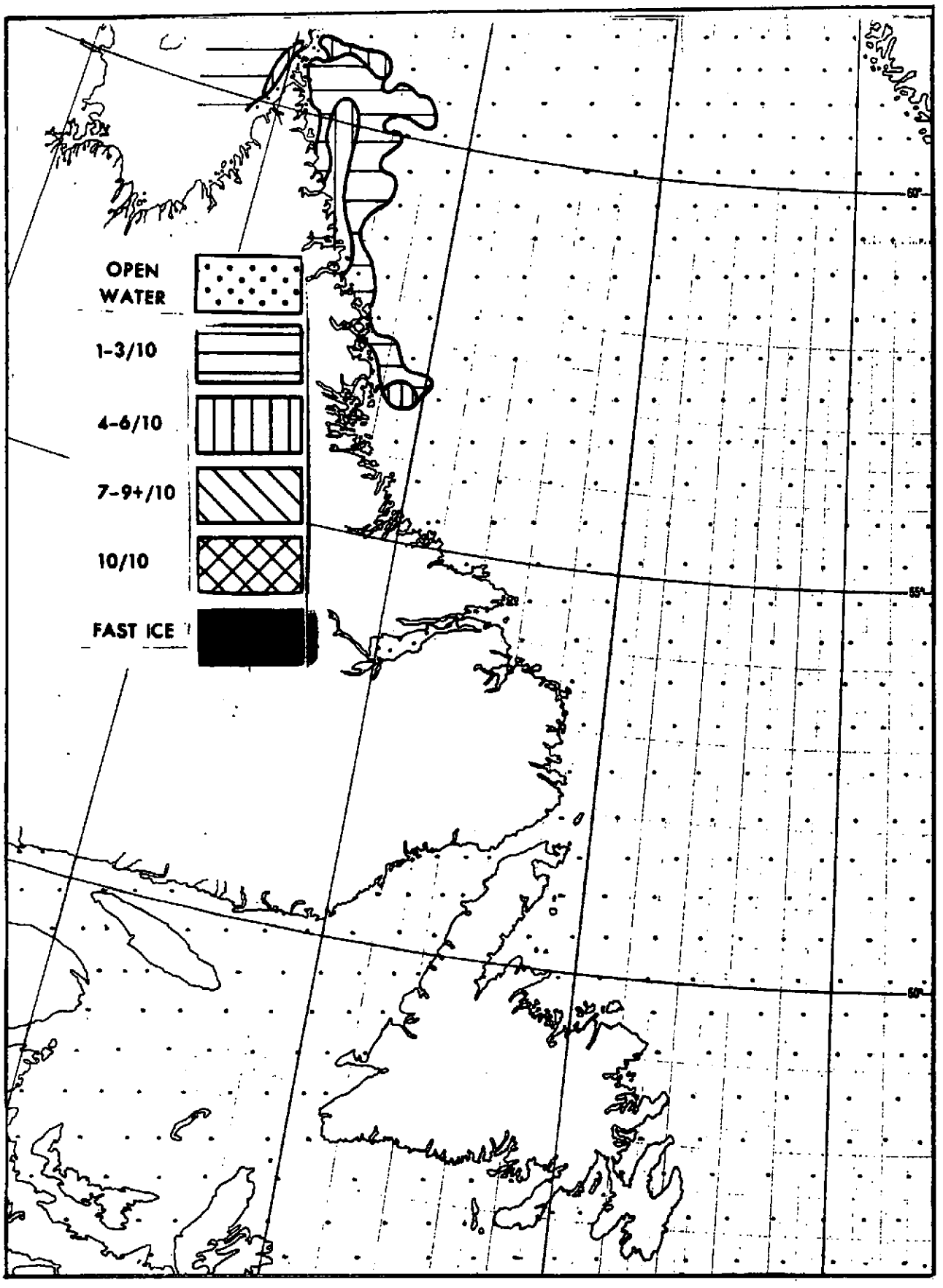


FIG. 106 ICE CONDITIONS IN A TYPICAL BAD YEAR - EARLY AUGUST

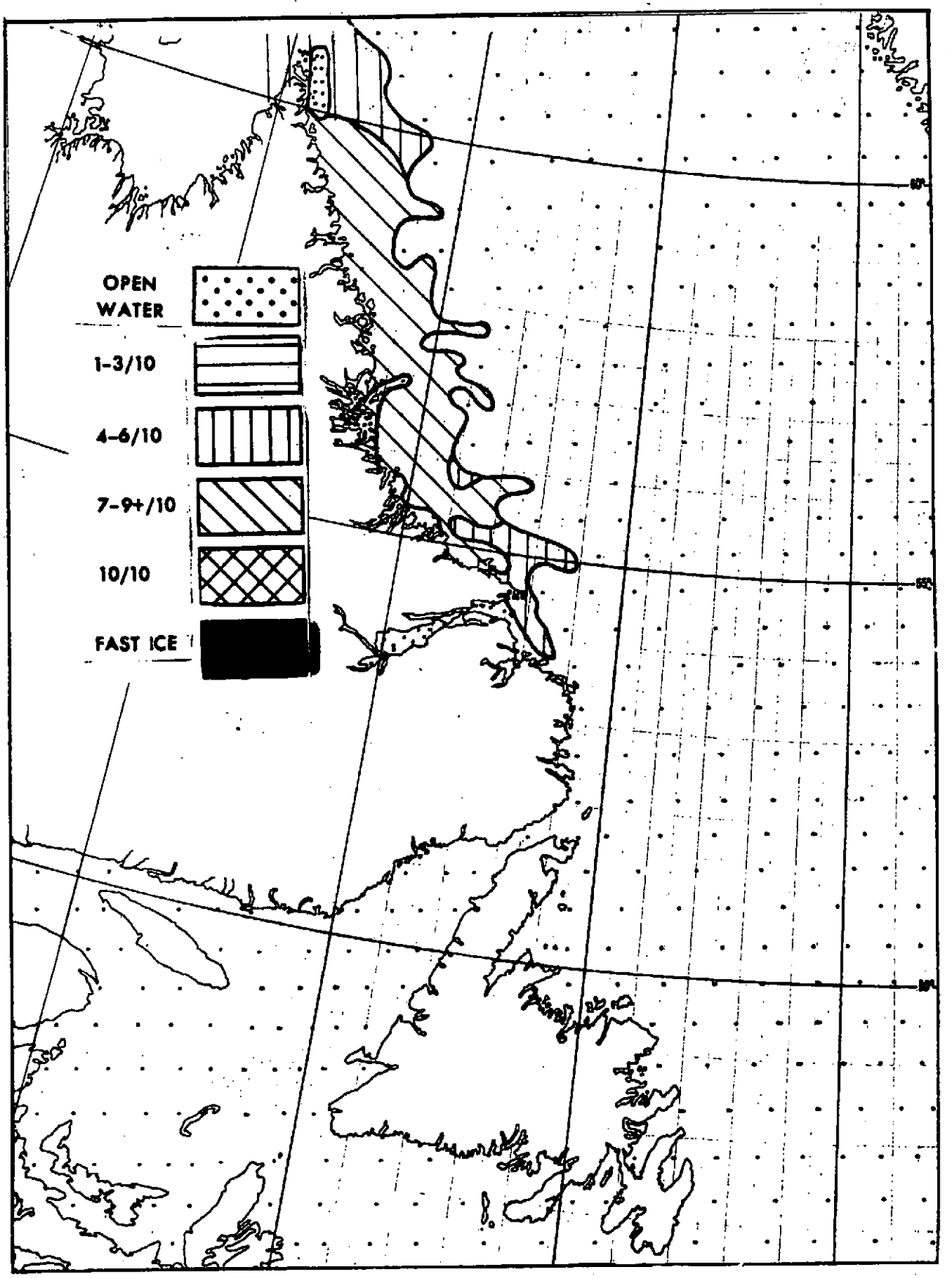


FIG. 107 ICE CONDITIONS IN A TYPICAL GOOD YEAR - EARLY JUNE

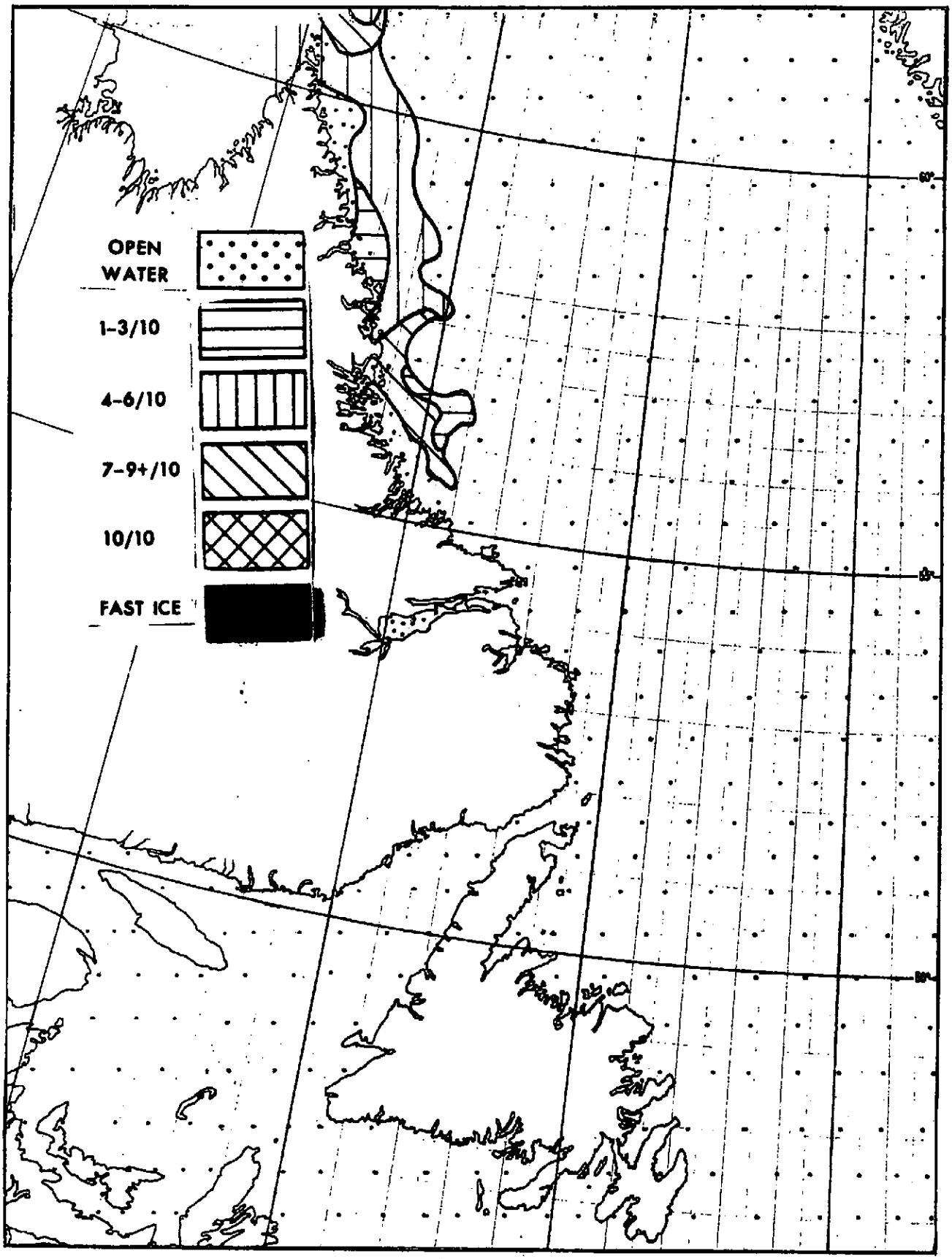


FIG. 103 ICE CONDITIONS IN A TYPICAL GOOD YEAR - EARLY JULY

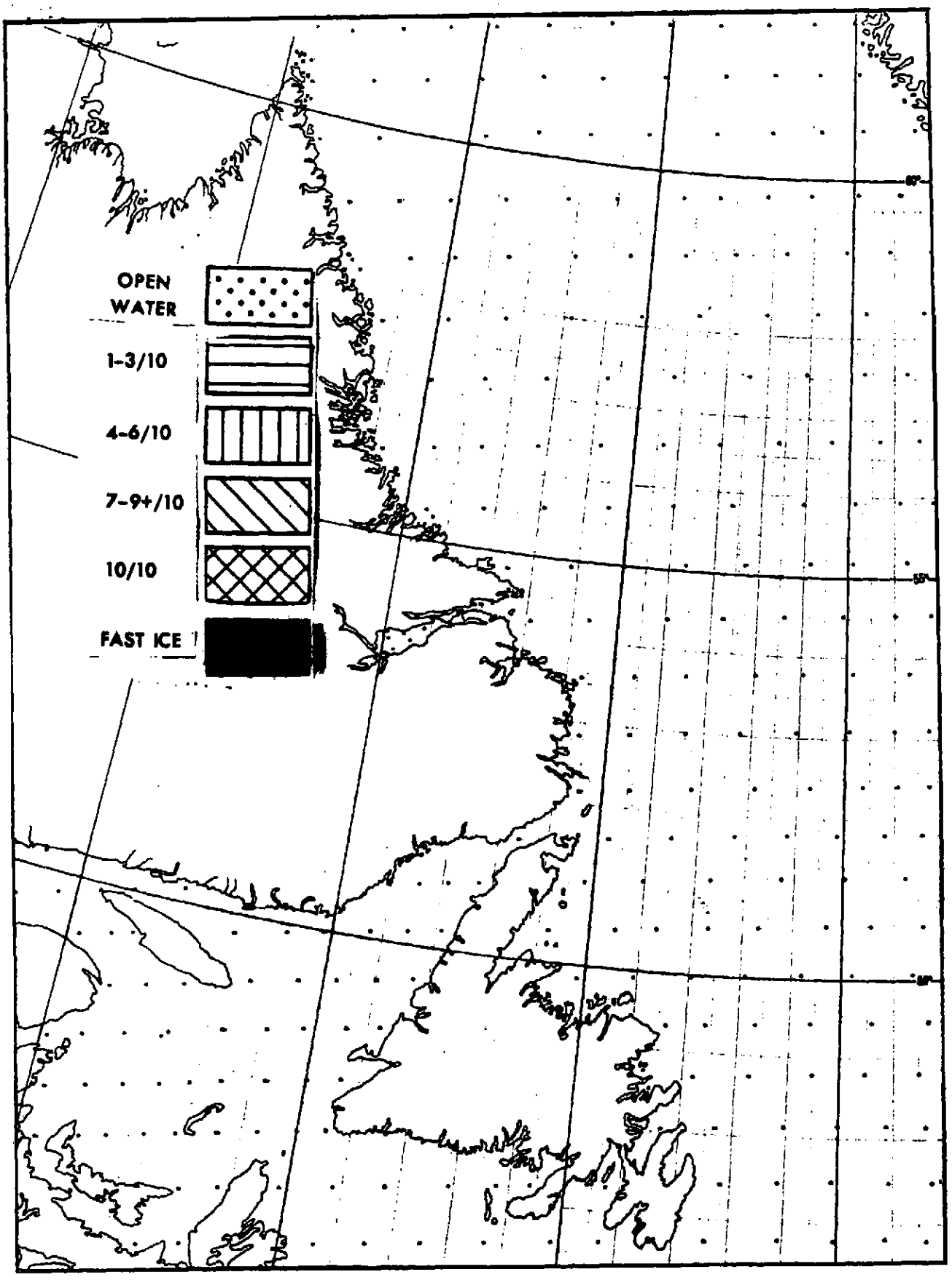


FIG. 109 ICE CONDITIONS IN A TYPICAL GOOD YEAR - EARLY AUGUST

PART D

SOME ADDITIONAL CLIMATIC PERSPECTIVES

I. INTRODUCTION

In this part, some additional climatic perspectives that are relevant to tourism and outdoor recreation are outlined. Most of this material is of general interest to both seasonal and quality analysis. To avoid duplication in these earlier parts, it is presented here separately. First of all, a discussion is presented from the viewpoint of recreation climate of four major climatic elements, temperature, precipitation, sunshine (cloud) and wind. Next, two important factors that affect winter recreation, wind chill and snow quality, are discussed. Finally, the problems of airport access are discussed.

II. THE MAIN CLIMATIC ELEMENTS

(a) Temperature

Temperature is a major climatic determinant, even affecting the form of precipitation, whether rain or snow. Man's physical comfort and psychological perspective are intrinsically bound up in some measure with temperature variations. Recreation and tourism activities, being essentially outdoor in nature, are obviously highly dependent on temperature, and it is principally the temperature regime which determines the recreation seasons.

The mean annual temperature (Figure 110) is calculated by averaging both the daily maximum and daily minimum temperatures over the whole year. It is, thus, a measure of the relative warmth or coldness

of a locality and is most pertinent when it is used in a comparative sense between stations. Over Newfoundland and Labrador, mean annual temperatures range from near 6°C (43°F) over the Avalon Peninsula to -5°C (23°F) in northern and western Labrador, where winters are cold in areas removed from the moderating influence of the Atlantic. These values can be compared with those from other Canadian localities, as is shown in Table 20.

Of more significance than the mean annual temperature is the difference between the means of the warmest and coldest months. This difference, called the mean annual range, gives a measure of the continentality of the climatic regime as a station. If the range is high (normally cold winters and warm or hot summers), the station has a continental regime, while if the range is low (normally mild winters and cool summers), it has an oceanic regime. The pattern of mean annual range across the Province is given in Figure 111. This chart illustrates the effect of the ocean. The smallest ranges occur over the Island, about 20 Celsius degrees (36 Fahrenheit degrees) along the coasts and about 24 Celsius degrees (44 Fahrenheit degrees) in the interior, comparable to values in Nova Scotia and Prince Edward Island. In Labrador the range is greater, from 22 Celsius degrees (40 Fahrenheit degrees) at the coast to ranges of more than 33 Celsius degrees (59 Fahrenheit degrees) inland, greater than those found in New Brunswick.

Extreme annual maximum and minimum temperatures over the Province are given in Table 5 and are also shown in map form in Figures 112 and 113, respectively. These values are the highest and lowest

temperatures ever reported at the stations for their complete period of record. These extremes must be used with caution, as the length of the climatic records at the individual stations varies considerably, and generally the longer the period of climatic records the greater the extremes. Nevertheless, these data give an indication of the relative differences of the climate from one area to another. The highest temperatures recorded in Labrador and the Island of Newfoundland, respectively, are 37.8°C (100°F) at Goose Bay and 36.1°C (97°F) at Glenwood. At many inland points both in Labrador and on the Island of Newfoundland, extremely high values in the 32 to 36°C (90 to 97°F) range undoubtedly have occurred. Values are somewhat lower at the coast. The cold continental winter on the interior plateau of Labrador provides us with the lowest records in the Province, -47.8°C (-54°F) at Wabush and -43.9°C (-47°F) at Churchill Falls. On the Island of Newfoundland, all-time minimum temperature records were broken over the interior during February, 1975, when -30.9°C (-24°F) was recorded at Gander and -45°C (-49°F) at Badger. It appears that the coldest area is in the western half of the interior of the Island. Considerably higher extreme minima occur in coastal areas.

The day on which the mean daily temperature falls to the freezing point in autumn (Figure 20) is important, as from then onward, through the winter, there are freezing temperatures at some time in almost every day. While this statement seems trivial at first glance, with large areas of Labrador and inland portions of the Island remaining well below the freezing point for days on end during the heart of the

winter, it is important to realize that thaws are not infrequent during the winter months along the South Coast of the Island and over the Avalon Peninsula. The mean daily temperature falls to 0°C (32°F) first in the Torngat Mountains of Northern Labrador in early October. The sub-freezing values occur in Southern Labrador and over the Northern Peninsula of the Island one month later in early November and on the Avalon Peninsula in early December.

Similarly, the date that the mean daily temperature rises to 0°C (32°F) in spring (Figure 21) gives the date after which a thaw can be expected to occur on practically every day. The mean daily temperature rises to the melting point on the Avalon Peninsula first, near the beginning of April. Over the Northern Peninsula of the Island and in Southeastern Labrador it occurs near the beginning of May and in Northern Labrador near the end of May.

Figure 22 illustrates the length of period that the mean daily temperature is lower than the freezing point. This sub-freezing period is about eight months long in the Torngat Mountains of Northern Labrador, six months long at the latitudes of Goose Bay and St. Anthony, and four months long over southern portions of the Island.

(b) Precipitation

While the *comfort* of the tourist or recreationist is highly dependent on temperature, the *quality* of his experience is dependent, in addition, on other weather parameters. One of the most significant of these is the occurrence or absence of precipitation.

Figure 114 shows the distribution of mean total annual precipitation and Figure 115 of mean annual snowfall. The total annual precipitation is the sum of rainfall and melted snowfall. Ten centimetres of snow, when melted, yield on the average one centimetre (or ten millimetres) of water. Using this relationship, Table 21 was constructed to show the percentage of total annual precipitation falling as rain and snow. The amount of rain contributing to the total annual precipitation will vary from one area to another. Stations in Labrador report about 50 per cent of their annual precipitation in the form of rain and 50 per cent as snow. The values for Stephenville, Bonavista and St. John's show that approximately 75 per cent of the total falls as rain and about 25 per cent as snow. The elevations of the various stations are given in Table 21. Although other factors such as latitude and proximity to the ocean are of major importance, elevation does have a significant influence on precipitation amounts and on the relative contribution of rain to snow. Maximum precipitation and snowfall amounts (as shown in Figures 114 and 115) over the mountains of Labrador and the western part of the Island were estimated with reference to the work of Solmon et al (1968), but adjustments were made where their amounts appeared to be excessive.

In Figure 114, a general decline can be seen from the higher total annual precipitation values in the southern part of the Island (1200 to 1800 mm) to the lower values in extreme northern Labrador (400 to 600 mm). Superimposed on this pattern are areas of maximum precipitation amounts, notably just inland in the Port-aux-Basques to Baie d'Espoir area, over the Long Range, and in Southeastern Labrador

and extreme Eastern Quebec between Goose Bay and Harrington Harbour. It is suggested that those maximum areas are a result of the frequent passage of depressions through the Gulf of St. Lawrence and across the Island, the effect of elevation, and along the western shore of the Island, the frequent deposition of snow by cold air outbreaks crossing the Gulf of St. Lawrence. Similar patterns are discernible in the precipitation patterns for July (Figure 116), August (Figure 117), October (Figure 118), the total summer period, June to September (Figure 119) and in January snowfall pattern (Figure 120), although not to such a marked degree.

Some similarities can be found between the patterns of total annual snowfall (Figure 115) and total annual precipitation (Figure 114). However, the area of greatest snowfall appears in Southeastern Labrador. This is to be expected since rain constitutes a far greater part of the total winter precipitation on the Island of Newfoundland than it does in Labrador.

Tables 13, 22 and 23 show the average number of days by month of measurable rainfall, snowfall and total precipitation, respectively. Because rain and snow sometimes occur on the same day, the sum of the days with snow and rain is usually higher than the days with total precipitation. Measurable rainfall and total precipitation are defined as 0.01" (0.2 mm) and measurable snowfall as 0.1" (0.2 cm). Because many of the days with measurable precipitation report relatively small amounts, the ratio of days with measurable snow to measurable rain is extremely variable from place to place. This is particularly

true over the Island of Newfoundland. While approximately three-quarters of the total precipitation falls as rain and one-quarter as snow over the Island, the ratio of snow days to rain days averages 0.51 and varies from 0.78 at Stephenville to 0.15 at St. Lawrence. Over Labrador, about half the total annual precipitation falls as snow and half as rain. The ratio of snow days to rain days corresponds well on the average (1.04, including data from Fort Chimo, Schefferville and Lake Eon, P.Q), but varies from 1.38 at Wabush Lake to 0.73 at Battle Harbour Loran.

Tables 24, 25 and 14 give the per cent of total time by month with snow, rain or drizzle, and freezing rain or freezing drizzle, respectively. The data are not only given for Labrador and the Island, but also for some locations in the Maritime Provinces for the sake of comparison. These data were not calculated for the year. Considerable variability occurs from station to station, particularly in the case of snow (Table 24). Those areas which are prone to snowflurry activity display strong anomalies. For instance, snow is reported 60% of the total time in January at Daniel's Harbour as compared with about 17% at Argentia.

(c) Sunshine and Cloudiness

The *quality* of tourist or recreation experience can be greatly enhanced by sunshine. In particular, during the cold winter months, the presence of sunshine can ameliorate the effects of low temperatures, making such outdoor pursuits as skiing and snowmobiling more *comfortable* as well. The opposite of sunshine is cloudiness. Although many pursuits

can be enjoyable during a cloudy day, an overcast day may be psychologically depressing to many people.

In Table 26 the average number of hours with bright sunshine are presented for thirteen locations in Labrador and the Island by month and year. Since the length of day changes considerably from summer to winter (Table 27), the mean percentage of bright sunshine to total hours of daylight is given in Table 28. It can be seen from these tables that more sunshine is experienced in western Labrador from January to May than at most other locations in Labrador and the Island. Also, the hours of sunshine are comparatively low in June, July and August at Colinet (Peat Bog), Placentia and Burgeo. This is due to the prevalence of sea fog on the coast in summer. Note how the hours of sunshine recover in September as the cooler and drier air of autumn arrives.

Even if part of the sky is cloudy, the fact that the sun is able to shine through the breaks encourages outdoor activity. Consequently, Table 29 was prepared, giving the mean number of days each month on which the afternoon (3 p.m.) cloud cover amounted to seven-tenths or less. These days were termed "sunny days".

In Labrador, the sunniest months fall in the winter season. Since the landscape is frozen, there is little moisture available to produce cloud. Along the coast, when ice becomes solid to 40 or 50 miles out from shore, the continental quality of the inland climate frequently extends to the edge of the ocean. By contrast, in summer

the numerous lakes and rivers, making up a large percentage of the landscape, and the open Atlantic add a significant amount of cloud-producing moisture to the air.

On the Island, the months of summer are the sunniest at most points. Along the South Coast, because of the summer fog, sunshine appears to be distributed more evenly throughout the year. The low amounts of sunshine on the West Coast in winter are due to the frequent cloud cover and snow flurries that move in from the Gulf of St. Lawrence during onshore flow conditions.

Table 30 gives the average number of days with no sunshine by month. These are the dull, depressing days. The longest periods occur along the South Coast, where there are many days with fog and low cloud during the summer months. In general, the winter months are much duller than the summer, and the Province as a whole has more overcast days than the Maritimes.

(d) Wind

While a cooling breeze may enhance a recreation experience on a hot day, in general, the quality of the pursuit diminishes with increasing wind strength. High speeds may inhibit outdoor activity, especially in the case of winter activities.

Table 12 lists mean monthly wind speeds for all available stations in the Province and adjacent areas of Quebec. Considerable variation occurs from station to station, due largely to exposure

differences. For example, coastal stations have stronger winds for the most part than inland stations. Stations in valleys usually have lighter winds than those at higher elevations, although when the long axis of the valley is oriented parallel to the prevailing wind very strong winds frequently occur. At practically all stations, the winter season is decidedly more windy than the summer. Gust speeds are not measured at all stations. However, probable maximum gust speeds can be calculated from maximum observed hourly wind speeds. These two values, maximum observed and maximum calculated gust speeds are given in Table 12. Although there are some exceptions, the calculated probable maximum gust speeds were usually higher than the observed. It may be noted at many exposed localities hourly winds as high as 70 m.p.h., and gusts of 100 m.p.h. have been reported.

The most frequent wind direction with the percentage of time is given in Table 19. Differences from station to station are mostly due to differing local exposure. Winds are predominantly westerly the year round in the latitudes of Newfoundland and Labrador, but variations both from station to station and from month to month are marked, particularly with regard to northerly and southerly components. Some of this variation is no doubt due to topographic features, but shifting positions of mean storm tracks through the year also play an important role. Along the South Coast of the Island, summer winds are frequently easterly in direction. In Table 19, secondary directions are also given.

III. TWO IMPORTANT FACTORS WHICH AFFECT WINTER RECREATION

(a) Wind Chill

The sensation of relative warmth or coolness to a person in the open air depends on both air temperature and wind speed. The term, "wind chill", is normally used to define an excessive heat loss or rate of cooling produced by a combination of low temperature and strong winds. Wind chill is obviously very significant for winter recreation pursuits, as it can cause not only serious discomfort, but also at times present the danger of frostbite or even death.

Calculations of heat loss experienced by a person in the open were made by Siple and Passel (1945) and expressed in units of Kilocalories per square metre per hour ($Kcal/m^2/hr$). Their nomogram of dry-shade atmospheric cooling is reproduced as Figure 121. Table 31 shows the relationship between various levels of this wind chill unit and average degrees of comfort. The value of 1400 $Kcal/m^2/hr$ is particularly significant, as this is, on the average, the threshold, above which exposed human flesh begins to freeze.

Figure 122 gives the pattern of mean wind-chill values for the month of January. The pattern is necessarily generalized, as wind is so dependent on topography. However, the 1400 $Kcal/m^2/hr$ isopleth lies just north of Goose Bay, Labrador.

In Table 32, the mean wind-chill values are tabulated from December to April at a number of stations. January is usually the "coldest" month, but at Stephenville and St. John's, February shows the

highest values of wind chill.

Variations in wind chill, and consequently in comfort, occur with variations in wind or temperature or both. For example, the heat of a mid-summer day may be relieved by a breeze, or the effect of low temperatures on a cold day will be greatly increased by an increase in wind speed. In some instances the wind chill may not change over short periods, such as a day. For example, there will be times of day when both wind speed and temperature tend to be high and other times, as in the morning and evening when both are low, resulting in a relatively steady wind chill, barring any marked changes in the weather. However, large variations occur from day to day when mild spells are replaced by cold snaps, and vice versa.

A method was developed for the U. S. Army by Westbrook (1961) to predict the frequency of occurrence of certain critical wind-chill values from means of temperature and wind speed (see Figure 123). From his nomogram the percentage of time during which the wind chill can be expected to reach or exceed 1400 Kcal/m^2/hr (frostbite threshold) was calculated for the stations listed in Table 32. This frostbite threshold is reached about a third of the time or more in mid-winter over the interior of Labrador, but only less than ten per cent of the time over coastal areas of the Island.

(b) Snow Quality

Snow quality for winter sports can be seriously lowered by rain or freezing rain. In general, at any one location, the frequency

of rain (see Tables 13 and 25) appears to change little from December to March, although, naturally, at the beginning and ending of the snow cover season, rain is much more frequent than in the middle of winter. The variation from station to station is considerable, five to ten per cent of the hours in January being rainy over the Island, but only about one per cent over Labrador. The frequency of freezing rain (see Table 14) is much less than that of rain. Similarly, the frequency varies little from month to month at the height of winter, and it is near zero at the start and finish of the snow cover season. The higher frequencies of freezing rain at St. John's and Gander are related to an area of maximum occurrence on the East Coast of Newfoundland between these two points.

IV. AIRPORT ACCESS

Any study of the impact of regional climate on recreation and tourism must treat travel to and from the recreation area as a fundamental factor. This is important in the case of the Island of Newfoundland and especially so for Labrador, where the tourist has to travel great distances. Much of the travel is necessarily by aircraft, again particularly so in the case of Labrador.

The access problem can be examined from two viewpoints, regional and local. It is one problem for a tourist to be able to fly into a general area of interest such as St. John's, St. Anthony or Goose Bay. It is quite another problem for him to be able to get to the recreation site, which may be a few dozen miles away across barren

terrain or along fog-enshrouded coasts.

Air travel is limited mainly by the occurrence of very low cloud and/or visibility. When thick layers of cloud cover more than half the sky, this is referred to as a ceiling. Table 33 gives the percentage of time ceilings are below 1000 feet above ground and/or visibilities below three miles for the major airports of Goose Bay, Schefferville (Quebec), St. John's, Gander and Stephenville. These 1000-foot and three-mile values may be considered the lower limits for visual-flight-rule flying. Tables 34 and 35 give the percentages of time ceilings are below 500 and 200 feet and/or visibilities below one mile and one-half mile, respectively, for the same major airports. These limits may be considered the lower limits for operation of aircraft, the choice between the limits depending upon the type of aircraft and the airport in question.

Tables 33 to 35 indicate that the Goose Bay, Schefferville and Stephenville airports are serviceable most of the time. By comparison, using the average annual figures, Gander and St. John's airports have ceilings and visibilities below 1000 feet and three miles 29 to 36 per cent of the time and below the lowest usable limits, 200 feet and one-half mile, about 4 to 10% of the time. During the months of March, April and May, Gander and St. John's experience poor flying weather most frequently. While there is some blowing snow in March (see Table 36), generally it is the high frequency of fog (see Tables 17 and 18) which lowers the serviceable hours at this time of year.

Data on ceilings and visibilities are not available for other airports in Newfoundland and Labrador. Fog data shown in Tables 17, (visibility less than 5/8 mile) and 18 (visibility less than or equal to 6 miles) indicate that fog is a major problem along the South Coast and Avalon Peninsula of the Island, through the Strait of Belle Isle, and along the south Labrador Coast, particularly in the late spring and early summer.

Thunderstorms can be a hazard to small aircraft travel, particularly if severe, widespread, or in a line formation such as a squall line or cold front. Table 37 gives the average number of hours in each month with thunder reported.

Freeze-up and break-up data of ice in rivers, lakes and bays are useful to operators of small aircraft and to shipping agencies. These are shown in Table 38. Pontoon aircraft cannot be operated after the arrival of *first permanent ice*. Communities dependent on this mode of transportation are thus cut off until the *complete freeze-over*, when aircraft equipped with skiis can be used. Similarly, in spring aircraft with skiis cannot be used after the *first deterioration*, and the community is again cut off until the water body is *completely free of ice*, when aircraft with pontoons can again be used.

From Table 38, it is seen that the spring break-up, that is, the time between the first deterioration and the complete absence of ice, occurs earliest, in March, along the South Coast of the Island of Newfoundland. Over the remaining coasts of the Island, break up occurs

in April, but over inland lakes and rivers it is delayed until late April or early May. Along the southern half of the Labrador Coast, spring break-up occurs during May, but along the northern half of the coast and over the interior plateau, it is delayed until late May or early June.

The autumn freeze-up, that is, the time between the arrival of the first permanent ice and the complete freeze-over, occurs first, in late October and early November, over the interior plateau of Labrador. Along the Labrador Coast, the freeze-up occurs later in November or December. Both along the coast of the Island and inland, freeze-up occurs in December or in January.

TABLE 20

MEAN ANNUAL TEMPERATURE AT A NUMBER OF CANADIAN LOCALITIES

	Celsius	Fahrenheit
Halifax, N.S	7.6°	45.6°
Charlottetown , P.E.I.	5.6°	42.0°
Fredericton, N.B.	5.4°	41.8°
Natashquan , P.Q.	1.4°	34.5°
Baie Comeau, P.Q.	1.4°	34.5°
Timmins, Ont.	1.4°	34.5°
Winnipeg, Man.	2.3°	36.2°
Dawson, Y.T.	-4.7°	23.6°
Yellowknife, N.W.T.	-5.6°	22.0°

TABLE 21

PERCENTAGE OF TOTAL ANNUAL PRECIPITATION FALLING AS RAIN AND SNOW

	Total Annual Precipitation	
	Per cent as Rain	Per cent as Snow
LABRADOR		
Wabush Lake (1807' - 551 km)	52	48
Churchill Falls (1426' - 435 km)	46	54
Goose Bay (144' - 44 km)	55	45
Cartwright (47'- 14 km)	54	46
ISLAND OF NEWFOUNDLAND		
St. Anthony (57' - 17 km)	63	37
Stephenville (44'- 13 km)	74	26
Buchans (906'- 276 km)	68	32
Gander (482' - 147 km)	67	33
Bonavista (82'- 25 km)	76	24
St. John's A (463' - 141 km)	76	24

TABLE 22

MEAN NUMBER OF DAYS WITH MEASURABLE SNOWFALL (1941-1970)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
LABRADOR													
NORTHERN HALF OF COAST													
Hopedale	13	10	11	10	7	1	*	0	1	6	11	13	83
Cape Harrison	15	12	13	12	7	2	0	0	*	5	12	12	90
SOUTHERN HALF OF COAST													
Goose Bay	16	13	14	11	6	1	0	0	1	5	12	15	94
Cartwright	15	13	15	12	7	1	0	0	*	4	10	13	90
Battle Harbour	8	8	8	5	3	*	0	0	0	1	5	7	45
Battle Harbour Loran	13	11	13	10	4	1	0	0	0	2	7	12	73
INTERIOR PLATEAU													
Fort Chimo (P.Q.)	11	11	12	10	7	2	0	0	2	10	14	15	94
Schefferville (P.Q.)	15	13	13	11	10	2	*	*	6	13	17	15	115
Wabush Lake	19	14	15	12	9	1	*	0	4	12	17	17	120
Churchill Falls	8	5	7	6	5	1	0	0	1	4	8	6	51
Lake Eon (P.Q.)	17	14	15	13	10	2	0	*	2	9	16	17	115
ISLAND OF NEWFOUNDLAND													
WEST COAST													
Daniel's Harbour	14	11	11	7	2	0	0	0	*	1	6	12	64
Corner Brook	22	18	14	9	2	*	0	0	0	2	9	20	96
Stephenville	22	19	14	9	1	*	0	0	0	1	7	19	92
St. Andrews	16	13	11	5	1	0	0	0	0	*	5	15	66
EAST COAST													
St. Anthony	10	10	9	6	2	*	0	0	0	1	5	9	52
Twillingate	12	11	10	7	2	*	0	0	*	1	4	10	57
Bonavista	12	11	10	8	3	*	0	0	0	1	3	10	58
SOUTH COAST AND AVALON													
St. John's A	17	16	15	10	3	*	0	0	*	2	6	16	85
St. John's	13	11	11	6	2	*	0	0	0	1	3	10	57
Argentia	9	10	7	3	1	0	0	0	0	*	1	6	37
St. Lawrence	6	5	3	1	0	0	0	0	0	*	*	2	17
Burgeo	9	9	6	3	*	0	0	0	0	*	1	7	35
Grand Bank	11	10	8	4	*	0	0	0	0	*	2	10	45
INTERIOR													
Gander	17	16	16	12	4	*	0	0	*	3	18	16	92
Grand Falls	11	10	10	8	2	*	0	0	*	1	5	9	56
Springdale	6	7	7	4	*	0	0	0	0	*	2	6	32
Buchans A	16	13	12	9	2	*	0	0	0	2	7	15	76
GRAND LAKE LOWLANDS													
Deer Lake	14	10	10	5	1	*	0	0	0	*	5	12	57

*less than one-half day

TABLE 23

MEAN NUMBER OF DAYS WITH MEASURABLE TOTAL PRECIPITATION (1941-1970)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
LABRADOR													
NORTHERN HALF OF COAST													
Hopedale	14	11	12	12	13	13	15	15	14	13	13	14	159
Cape Harrison	15	12	13	15	13	13	15	15	15	12	15	13	166
SOUTHERN HALF OF COAST													
Goose Bay	16	13	15	13	13	15	16	16	14	14	15	16	176
Cartwright	16	15	16	15	15	14	15	16	14	14	14	15	179
Battle Harbour	10	8	9	9	8	8	7	8	7	7	10	8	99
Battle Harbour Loran	14	12	15	13	12	13	13	14	10	12	14	14	156
INTERIOR PLATEAU													
Fort Chimo (P.Q.)	11	11	12	10	11	12	13	15	16	15	14	15	155
Schefferville (P.Q.)	15	13	14	12	14	15	18	19	17	18	18	15	188
Wabush Lake	19	14	15	13	14	14	17	19	16	18	19	17	195
Churchill Falls	8	5	8	8	11	13	14	13	11	10	10	6	117
Lake Eon (P.Q.)	17	14	15	15	16	15	16	17	14	16	19	17	191
ISLAND OF NEWFOUNDLAND													
WEST COAST													
Daniel's Harbour	16	13	12	10	11	12	12	13	12	13	15	15	154
Corner Brook	25	20	17	15	15	13	14	15	14	18	20	24	210
Stephenville	24	20	17	14	14	14	14	15	14	17	19	23	205
St. Andrews	20	16	15	12	12	12	11	12	14	15	17	20	176
EAST COAST													
St. Anthony	13	11	12	10	10	11	10	12	11	12	14	12	138
Twillingate	16	13	13	12	11	12	12	12	11	13	14	15	154
Bonavista	16	15	15	14	13	12	10	14	12	16	16	16	169
SOUTH COAST AND AVALON													
St. John's A	22	20	20	18	16	13	13	15	14	18	19	22	210
St. John's	18	16	17	14	14	10	10	13	13	16	17	17	175
Argentia	16	15	13	13	13	12	13	13	11	13	15	16	163
St. Lawrence	11	11	9	9	11	9	9	11	11	11	13	12	127
Burgeo	13	13	10	10	12	12	13	13	12	13	14	15	150
Grand Bank	17	15	13	12	12	12	11	11	11	13	16	16	159
INTERIOR													
Gander	20	19	19	17	15	15	13	16	15	17	18	20	204
Buchans A	18	14	15	13	11	12	13	14	12	13	15	18	168
Grand Falls	13	13	15	13	13	13	14	14	12	14	15	14	163
Springdale	9	9	9	7	8	10	9	11	9	10	11	10	112
GRAND LAKE LOWLANDS													
Deer Lake	17	12	13	11	13	13	13	14	13	15	16	16	166

TABLE 24

MEAN MONTHLY PERCENTAGE OF TIME WITH SNOW

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Period of record
LABRADOR													
Fort Chimo (P.Q.)	22.9	22.4	21.0	17.6	16.3	3.5	0.1		3.2	21.6	29.4	29.9	1957-66
Schefferville (P.Q.)	36.2	37.2	31.5	28.4	24.5	4.5	0.2	0.7	8.3	31.6	48.4	40.7	1957-66
Goose Bay	30.6	26.7	30.8	23.4	7.9	1.1			1.2	9.0	24.8	25.8	1957-66
ISLAND OF NEWFOUNDLAND													
Daniel's Harbour	60.0	47.2	35.0	22.3	5.1	0.1			0.1	4.8	19.3	46.6	1966-72
Stephenville	48.5	40.1	25.3	15.3	3.0				0.2	1.8	14.2	38.9	1957-66
St. John's A	35.1	34.7	31.7	19.7	5.8	0.7			0.1	1.7	9.8	28.2	1957-66
Argentia	17.3	18.3	15.7	8.7	2.1					0.6	3.7	12.5	1953-70
Gander	38.9	38.8	39.5	30.2	8.1	1.0			0.2	4.5	16.0	33.8	1957-66
MARITIMES													
Halifax	26.7	24.8	19.5	10.2	1.4					0.9	7.3	24.6	
Truro	23.8	22.8	18.5	9.1	1.0					1.0	6.8	23.3	
Greenwood	28.5	25.6	18.7	6.9	0.8					0.7	5.5	24.2	
Fredericton	19.7	20.3	14.9	8.4	0.5					1.1	6.6	17.9	

TABLE 25

MEAN MONTHLY PERCENTAGE OF TIME WITH RAIN OR DRIZZLE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Period of Record
LABRADOR													
Fort Chimo (P.Q.)	0.4	0.4	0.4	1.0	7.5	14.7	14.6	18.1	17.3	7.9	2.1	0.1	1957-66
Schefferville (P.Q.)	0.6	0.7	1.5	2.0	12.5	21.0	23.2	26.5	21.3	9.8	2.3	0.9	1957-66
Goose Bay	1.5	1.3	4.0	6.0	19.4	22.2	22.0	18.6	18.1	15.3	6.7	2.1	1957-66
ISLAND OF NEWFOUNDLAND													
Daniel's Harbour	4.6	3.8	5.7	7.2	20.0	23.4	16.8	19.2	17.4	19.7	16.6	7.9	1966-72
Stephenville	5.6	3.8	4.9	9.8	13.3	16.7	13.1	12.7	14.6	17.1	17.8	7.0	1957-66
St. John's A	9.1	8.2	10.2	13.4	19.3	20.8	17.4	18.1	20.1	22.5	24.3	13.2	1957-66
Argentia	10.1	8.9	9.3	14.2	16.6	17.1	15.7	14.6	13.6	17.4	18.2	11.3	1953-70
Gander	8.1	7.9	10.8	14.2	20.0	25.5	21.0	20.1	23.1	23.5	20.5	9.1	1957-66
MARITIMES													
Halifax	6.4	5.1	7.3	14.0	17.3	15.0	13.9	14.5	15.6	16.3	23.6	12.2	
Truro	5.7	4.8	7.1	12.1	14.9	12.7	10.0	11.6	12.4	14.4	18.1	9.9	
Greenwood	7.8	5.2	7.1	14.2	14.0	11.0	9.4	10.1	11.9	15.8	20.9	9.2	
Fredericton	4.1	2.3	5.3	11.3	14.2	11.8	10.7	10.7	11.3	14.3	18.3	6.1	

TABLE 26

MEAN NUMBER OF HOURS WITH BRIGHT SUNSHINE BY MONTHS

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Number of years
LABRADOR														
NORTHERN HALF OF COAST														
No records														
SOUTHERN HALF OF COAST														
Goose Bay	84	114	136	141	172	187	196	181	126	94	66	67	1565	10 or more
INTERIOR PLATEAU														
Schefferville (P.Q.)	82	117	165	191	168	198	188	145	101	67	45	61	1528	10 or more
Churchill Falls	100	122	144	162	199	188	208	175	102	67	45	72	1584	5-7
Border (P.Q.)	(77)	117	146	178	183	196	216	162	109	76	40	56	1556	5-7, Jan. 3
ISLAND OF NEWFOUNDLAND														
WEST COAST														
Daniel's Harbour	(63)	74	112	141	174	150	213	181	147	98	41	28	1422	3-5, Jan. 2
Stephenville	46	76	106	145	167	177	222	185	137	108	51	32	1452	5-7
EAST COAST														
Gander	(see below)													
St. John's	(see below)													
SOUTH COAST AND AVALON														
St. John's A	64	76	89	116	158	188	213	184	145	111	62	52	1458	10 or more
St. John's CDA	70	78	92	114	166	193	224	191	150	109	65	56	1508	10 or more
Avondale						191	199	183	140					10 or more
Colinet Peat Bog						161	176	158	140					10 or more
Placentia	79	90	96	109	(94)	103	134	161	153	102	58	63	1242	2-4, May 1
Burgeo	93	95	121	146	152	162	155	158	155	123	71	72	1503	6-7
INTERIOR														
Gander	73	85	102	116	155	169	202	180	145	112	62	60	1461	10 or more

Table 26 (Cont'd)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Number of years
M A R I T I M E S														
Halifax	93	117	144	162	204	206	230	219	176	154	93	85	1883	10 or more
Charlottetown	83	105	137	156	199	215	244	220	180	133	72	59	1803	10 or more
Fredericton	103	118	141	160	201	203	234	218	166	140	85	91	1860	10 or more

* where the record is 10 or more years long 1941-1970 records were used.
where the record is less than 10 years all available records to 1974 were used.

TABLE 27

SUNRISE AND SUNSET TIMES (LST) AND LENGTHS OF DAYLIGHT THROUGH THE YEAR AT THREE LOCALITIES

Date	LAT 56½°N (Nain)		LAT 53°N (Goose)		LAT 48°N (Clarenville)	
	Sunrise-sunset	Hours sun is above horizon	Sunrise-sunset	Hours sun is above horizon	Sunrise-sunset	Hours sun is above horizon
		hrs. min.		hrs. min.		hrs. min.
Apr. 21	0442-1917	14 : 35	0452-1907	14 : 15	0502-1857	13 : 55
May 21	0336-2018	16 : 42	0355-1959	16 : 04	0415-1938	15 : 23
Jun. 21	0309-2054	17 : 45	0334-2030	16 : 56	0400-2004	16 : 04
Jul. 21	0336-2035	16 : 59	0401-2011	16 : 10	0422-1950	15 : 28
Aug. 21	0440-1925	14 : 45	0450-1915	14 : 25	0502-1904	14 : 02
Sep. 21	0540-1806	12 : 26	0541-1805	12 : 24	0543-1804	12 : 21
Oct. 21	0642-1647	10 : 07	0634-1655	10 : 21	0626-1703	10 : 37
Nov. 21	0752-1539	7 : 47	0735-1556	8 : 21	0715-1616	9 : 01
Dec. 21	0834-1523	6 : 49	0812-1545	7 : 33	0747-1609	8 : 22
Jan. 21	0818-1604	7 : 46	0802-1622	8 : 20	0741-1641	9 : 00
Feb. 21	0711-1717	10 : 06	0704-1724	10 : 20	0655-1732	10 : 37
Mar. 21	0601-1815	12 : 14	0601-1814	12 : 13	0602-1814	12 : 12

TABLE 28

MEAN PERCENTAGE OF BRIGHT SUNSHINE TO TOTAL HOURS OF DAYLIGHT BY MONTHS

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Number of years
LABRADOR													
NORTHERN HALF OF COAST													
No Records													
SOUTHERN HALF OF COAST													
Goose Bay	36	40	34	34	34	37	40	37	32	30	24	34	10-11
INTERIOR PLATEAU													
Schefferville (P.Q.)	35	44	47	42	35	33	36	32	28	19	19	30	9-10
Churchill Falls	39	44	39	38	40	37	41	39	27	21	19	31	5-7
Border (P.Q.)	(32)	43	40	42	36	38	42	35	29	23	16	25	5-7, except Jan. 3
ISLAND OF NEWFOUNDLAND													
WEST COAST													
Daniel's Harbour	(24)	26	30	34	36	31	43	41	39	29	15	11	3-5 except Jan. 2
Stephenville	17	26	29	35	36	37	46	42	36	32	18	12	5-7
EAST COAST													
Gander	(see below)												
St. John's	(see below)												
SOUTH COAST AND AVALON													
St. John's A	28	29	24	28	33	39	46	42	38	29	24	20	10-11
St. John's CDA	30	30	26	28	33	40	48	42	39	28	24	21	10-11
Avondale						34	42	41	39				9-10
Colinet Peat Bog						30	36	34	37	(25)			9-10 except Oct. 7
Placentia	28	31	(26)	(26)	(20)	(21)	28	37	41	30	20	24	3-4 except below *
Burgeo	34	33	33	36	32	34	32	36	41	37	24	27	6-7
INTERIOR													
Gander	34	38	27	30	34	37	46	42	40	32	24	25	10-11
MARITIMES													
Halifax	37	41	38	38	48	47	42	49	44	43	33	29	
Charlottetown	33	45	38	43	40	49	50	50	45	40	27	20	
Fredericton	40	50	39	42	44	47	48	48	43	40	31	34	

* March, April and June 2, May 1

TABLE 29

MEAN NUMBER OF SUNNY DAYS (7/10 OR LESS CLOUD COVER AT 1500 N.S.T.)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Years of Record
LABRADOR														
NORTHERN HALF OF COAST														
Hopedale	13	12	14	12	11	12	12	11	10	11	9	12	139	10
Cape Harrigon	13	11	12	11	10	11	10	11	9	9	9	13	129	14
SOUTHERN HALF COAST														
Goose Bay	12	11	11	10	10	11	10	9	9	9	7	12	121	11
Cartwright	13	12	11	10	12	11	11	12	11	10	7	13	133	10
Battle Harbour	13	12	12	10	11	10	14	12	13	12	9	13	141	10
INTERIOR PLATEAU														
Wabush Lake	15	14	16	13	12	10	12	10	7	7	7	14	137	11
Schefferville (P.Q.)	15	13	14	14	10	9	8	8	9	5	7	13	125	10
ISLAND OF NEWFOUNDLAND														
WEST COAST														
Daniel's Harbour	6	8	11	11	13	12	13	12	11	11	6	5	119	11-14
Stephenville	3	6	7	8	11	12	13	12	12	8	3	3	98	10
St. Georges	5	5	8	10	10	6	11	11	11	7	4	5	93	3-4
St. Andrews	3	5	9	9	12	12	13	12	12	9	5	3	104	16-18
EAST COAST														
Belle Isle	11	11	12	10	11	10	11	12	11	12	10	11	132	19-20
St. Anthony	12	12	11	10	11	10	14	14	13	11	10	11	139	14-15
Twillingate	9	9	10	11	11	13	17	14	15	13	9	10	141	10
Fogo	8	8	12	11	11	11	16	13	13	12	7	8	130	7-9
Botwood	9	9	10	7	9	9	11	11	9	9	7	9	109	8-10
Bonavista	9	9	9	9	9	12	15	12	12	10	7	7	127	10

Table 29 (Cont'd)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Number of Years
SOUTH COAST AND AVALON														
St. John's A	7	7	8	8	10	11	13	11	13	11	6	8	113	19
Cape Race	10	10	12	10	11	10	11	11	13	12	8	9	127	18-20
Argentia	7	9	9	9	11	10	12	11	14	11	7	7	117	9-10
Grand Bank	6	8	11	11	12	13	15	14	13	13	8	7	131	17-19
Burgeo	13	10	12	11	10	11	10	12	14	13	7	10	133	7-8
Port aux Basques	6	7	11	10	10	11	12	13	14	11	6	7	118	8-9
INTERIOR														
Deer Lake	12	10	11	10	12	13	16	15	14	9	7	8	137	9-10
Buchans	9	10	11	9	10	11	13	12	12	10	7	9	123	16-18
Gander	8	7	8	7	7	9	11	10	11	9	6	8	101	20

TABLE 30

MEAN NUMBER OF DAYS EACH MONTH WITH NO SUNSHINE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Number of years
LABRADOR														
NORTHERN HALF OF COAST														
No Records														
SOUTHERN HALF OF COAST														
Goose Bay	12	8	10	7	6	5	3	5	6	8	14	12	96	10-11
INTERIOR PLATEAU														
Schefferville (P.Q.)	11	6	6	6	6	4	3	5	6	10	14	13	90	9-10
Churchill Falls	10	8	7	6	4	4	2	3	6	8	15	13	86	5-7
Border (P.Q.)	(14)	9	8	8	5	7	4	8	5	10	16	16	110	5-7except Jan. 3
ISLAND OF NEWFOUNDLAND														
WEST COAST														
Daniel's Harbour	(13)	9	8	5	7	10	6	4	5	9	14	16	106	3-5except Jan. 2
Stephenville	11	8	9	8	7	7	4	4	5	7	11	17	98	5-7
EAST COAST														
Gander	(see below)													
St. John's	(see below)													
SOUTH COAST AND AVALON														
St. John's A	11	9	11	10	8	4	2	4	5	8	12	13	97	10-11
St. John's CDA	11	9	10	10	8	4	2	4	5	8	11	14	96	10-11
Avondale						6	3	4	5					9-10
Colinet Peat Bog						7	6	7	6	9				7-10
Placentia	8	7	9	6	(13)	10	7	8	4	7	11	11	101	2-4 except May 1
Burgeo	10	10	10	9	10	10	10	9	6	8	11	13	116	6-7
INTERIOR														
Gander	10	8	11	10	6	6	3	4	5	8	11	13	95	10-11
MARITIMES														
Halifax	8	8	7	6	4	3	4	4	5	7	10	10	76	
Charlottetown	12	9	9	8	6	4	4	4	6	7	13	14	96	
Fredericton	9	6	6	6	5	4	3	4	6	6	11	11	77	

TABLE 31

RELATIONSHIP BETWEEN WIND-CHILL VALUES AND AVERAGE DEGREES OF COMFORT

Wind Chill ($Kcal/m^2/hr.$)	Degree of Comfort
600	Considered as comfortable when dressed in wool underwear, socks, mitts, ski boots, ski headband, and thin cotton windbreaker suits, and while skiing over level snow at above 3 m.p.h. (Metabolic output about 200 $Kcal/m^2/hr.$)
1000	Considered unpleasant for travel on foggy and overcast days.
1200	Considered unpleasant for travel on clear sunlit days.
1400	Freezing of exposed human flesh begins, depending upon degree of activity, amount of solar radiation, character of skin, and circulation. Travel, or living in temporary shelter, becomes disagreeable.
2000	Travel, or living in temporary shelter, becomes dangerous. Exposed areas of flesh will freeze within less than 1 minute for the average individual.
2300	Exposed areas of flesh will freeze within less than ½ minute for the average individual.

TABLE 32

MEAN WIND-CHILL VALUES AND ESTIMATED PERCENTAGE OF TIME WIND-CHILL VALUES ARE 1400 Kcal/m^2/hr. OR GREATER

Station	Dec.	Jan.	Feb.	Mar.	Apr.
LABRADOR					
Hopedale	1300 22%	1400 30	1380 30	1270 20	1160 12
Wabush Lake	1305 23%	1450 34	1400 31	1220 16	1040 5
Goose Bay	1250 18%	1360 26	1280 21	1150 11	950 2
Cartwright	1220 16%	1320 24	1280 21	1200 14	1030 4
ISLAND OF NEWFOUNDLAND					
St. Anthony	1140 10%	1250 18	1220 16	1120 8	980 3
Stephenville	980 3%	1060 6	1080 7	980 3	840 < 1
Gander	1070 6%	1170 11	1160 11	1070 6	930 1
St. John's A	1030 4%	1120 8	1130 9	1070 6	950 2

TABLE 33

PERCENTAGE OF TIME CEILING IS LESS THAN 1000 FEET AND/OR VISIBILITY LESS THAN 3 MILES

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Goose Bay	16	11	15	12	8	7	7	5	4	8	13	13	10
Schefferville (P.Q.)	21	18	15	14	14	10	9	10	13	20	26	20	16
St. John's A'	36	38	42	44	42	37	36	33	28	30	37	32	36
Gander	33	32	36	37	32	27	21	22	18	24	32	30	29
Stephenville	20	20	15	12	11	12	13	9	7	7	8	17	13

TABLE 34

PERCENTAGE OF TIME CEILING IS LESS THAN 500 FEET AND/OR VISIBILITY LESS THAN 1 MILE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Goose Bay	4	4	5	4	3	2	2	2	2	3	5	4	3
Schefferville (P.Q.)	5	6	5	4	4	3	3	3	4	6	8	7	5
St. John's A	23	24	27	31	32	27	25	20	16	18	23	18	24
Gander	18	17	19	20	19	15	10	10	8	12	16	14	15
Stephenville	7	8	5	4	5	6	7	4	2	3	3	6	5

TABLE 35

PERCENTAGE OF TIME CEILING IS LESS THAN 200 FEET AND/OR VISIBILITY LESS THAN ½ MILE

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Goose Bay	1	1	1	1	1	*	*	*	*	1	1	1	1
Schefferville (P.Q.)	2	2	1	1	1	*	*	*	1	1	1	2	1
St. John's A	10	11	13	15	16	12	10	7	5	6	8	6	10
Gander	5	6	6	6	6	5	3	3	2	3	5	3	4
Stephenville	3	3	1	1	1	2	2	1	1	1	1	2	2

* less than 0.5%

TABLE 36

MEAN MONTHLY PERCENTAGE OF TIME WITH BLOWING SNOW

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Number of Years
L A B R A D O R													
Fort Chimo (P.Q.)	9.2	6.8	4.8	3.3	0.7	0.1				1.7	2.9	7.1	1957-66
Schefferville (P.Q.)	9.2	7.6	3.7	2.3	0.9			0.1	0.2	1.5	4.9	7.2	1957-66
Goose Bay	3.8	2.4	3.1	1.5	0.4					0.5	1.0	2.5	1957-66
I S L A N D O F N E W F O U N D L A N D													
Daniel's Harbour	9.9	10.0	4.3	1.1	0.2						0.1	4.9	1966-72
St. John's A	6.4	7.8	6.4	1.8	0.4					*	0.2	3.8	1957-66
Argentia	6.3	6.7	4.3	0.8							0.1	4.1	1953-70
Gander	8.1	7.6	6.5	2.3	0.1						0.3	3.9	1957-66
M A R I T I M E S													
Halifax	2.6	3.2	1.9	0.3							0.1	1.9	
Charlottetown	4.8	4.7	4.7	1.5	0.2							3.6	
Fredericton	1.4	1.5	1.2	*							*	1.3	
Moncton	3.0	3.9	5.0	1.3							*	2.5	

* less than 4 occurrences in 10 years

TABLE 37

MEAN NUMBER OF HOURS WITH THUNDERSTORMS BY MONTH

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
LABRADOR													
Fort Chimo (P.Q.)					0.1	1.3	0.5	0.2	0.6	0.1			2.8
Schefferville (P.Q.)						1.1	2.2	0.5	0.5				4.3
Goose Bay					0.2	1.3	3.5	1.4	0.1	0.2			6.7
ISLAND OF NEWFOUNDLAND													
Daniel's Harbour					0.6	2.6	5.9	5.4	0.6	0.1			15.2
Stephenville				0.1	0.1	1.1	2.3	2.5	0.3	0.2			6.6
St. John's A					0.1	1.0	0.6	1.1	0.7	0.2	0.4		4.1
Argentia	0.1			2.4	0.7	1.1	1.3	1.8	0.8	0.2	0.5	0.1	9.0
Gander						1.0	1.4	0.7	0.3	0.2			3.6
MARITIMES													
Fredericton		0.1		0.1	2.3	5.5	7.1	5.6	1.0	0.4	0.2	0.1	22.4
Halifax	0.1	0.3		0.3	0.8	2.4	2.6	2.4	0.3	0.7	0.2		10.1
Sydney				0.2	0.5	1.9	2.3	2.1	0.3	0.2	0.2		7.7

TABLE 38

MEAN DATES OF FREEZE-UP AND BREAK-UP OF LAKES, BAYS AND RIVERS

Station	Lake, bay or river	First permanent ice	Complete freeze-over	First deterior-ation	Completely free of ice
		L A B R A D O R			
NORTHERN HALF OF COAST					
Hopedale	Hopedale Harbour(s)*	Dec. 8	Dec. 21	May 20	Jun. 11
Cape Harrison	Labrador Sea(s)	Nov. 10	--	May 20	Jun. 14
SOUTHERN HALF OF COAST					
Cartwright	Cartwright Harbour (s)*	Dec. 18	Dec. 27	May 6	May 19
Goose	Churchill River	Nov. 12	Nov. 28	May 7	May 20
	Goose Bay*	Nov. 20	Nov. 26	May 4	May 24
	Goose River	Nov. 8	Nov. 17	May 4	May 15
	Terrington Basin	Nov. 3	Nov. 15	May 9	May 24
INTERIOR PLATEAU					
Border (P.Q.)	"Lake"*	Oct. 20	Nov. 15	May 27	Jun. 16
Schefferville (P.Q)	Knob Lake	Oct. 21	Oct. 28	May 22	Jun. 12
Churchill Falls	Mount Hyde Lake*	Oct. 18	Oct. 23	May 21	Jun. 17
(Near Churchill Falls)	Sona Lake*	Nov. 6	Nov. 7	May 23	May 30
Wabush Lake	Wabush Lake*	Oct. 25	Oct. 26	May 15	Jun. 5
	Little Wabush Lake*	Oct. 22	Oct. 27	May 22	Jun. 4
Lake Eon (P.Q.)	Lake Eon	Oct. 31	Nov. 8	May 18	Jun. 10

Table 38 (Cont'd)

Station	Lake, bay or river	First permanent ice	Complete freeze-over	First deterior-ation	Completely free of ice
	I S L A N D O F N E W F O U N D L A N D				
WEST COAST					
Daniel's Harbour	"Lake"	Dec. 1	Dec. 13	Apr. 29	May 2
Corner Brook	Humber Arm(s)*	--	Dec. 10	--	--
Stephenville	Stephenville Pond(s)*	Jan. 6	Jan. 22	Mar. 20	Apr. 17
St. Andrews	Little Codroy River	Dec. 13	Jan. 7	Apr. 2	Apr. 9
EAST COAST					
-----	-----				
SOUTH COAST AND AVALON					
St. Alban's	Bay d'Espoir(s)*	Nov. 3	Jan. 4	Mar. 8	Mar. 24
INTERIOR					
Botwood	Botwood Harbour(s)*	Dec. 8	Jan. 10	Apr. 7	May 6
Gander	Deadman's Pond	Dec. 1	Dec. 8	Apr. 29	May 9
Buchans	Red Indian Lake	Dec. 29	Jan. 21	Apr. 23	May 9

(s) salt water

* 1-5 years of data

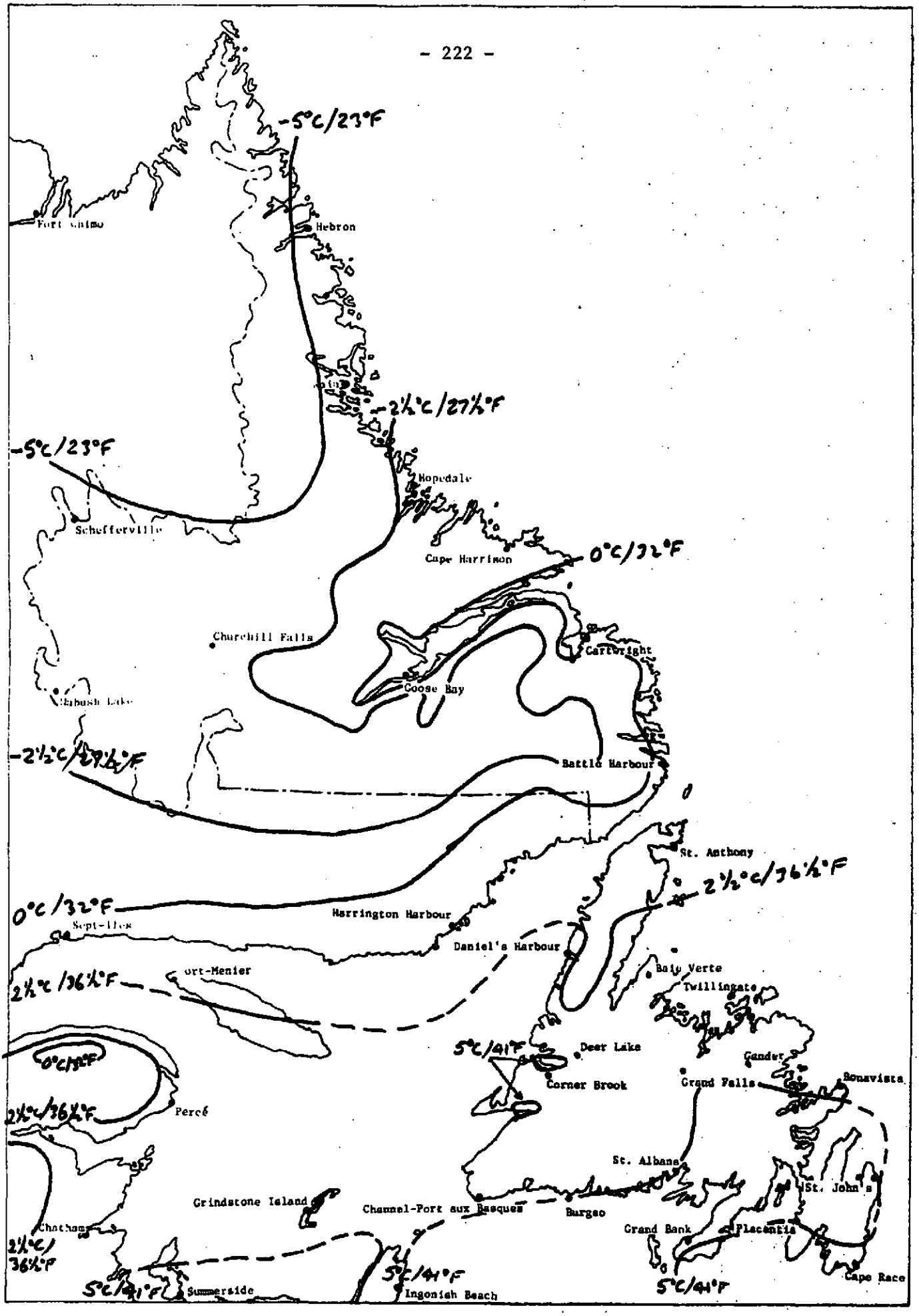


FIG. 110 MEAN ANNUAL TEMPERATURE

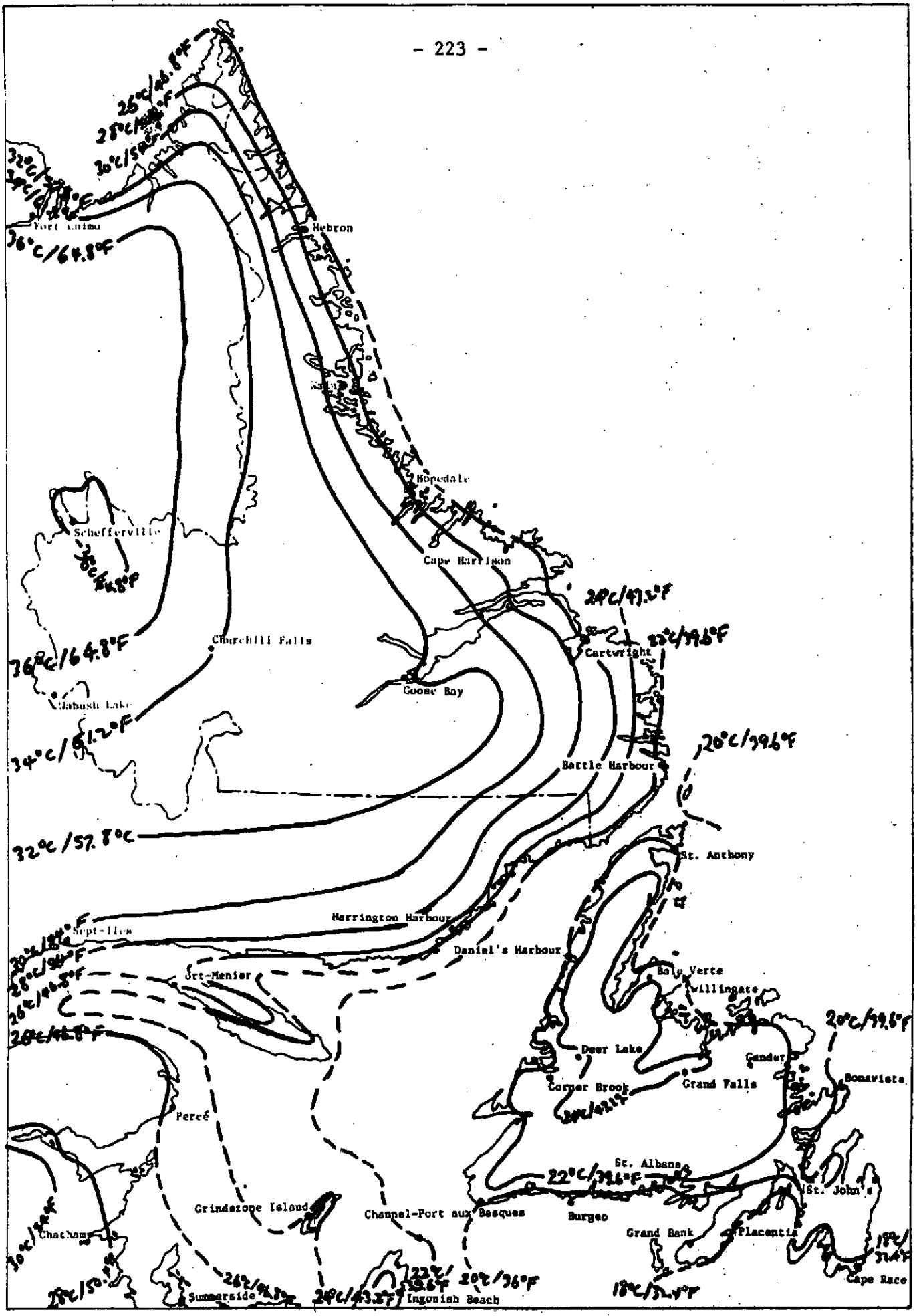


FIG. 111 MEAN ANNUAL RANGE

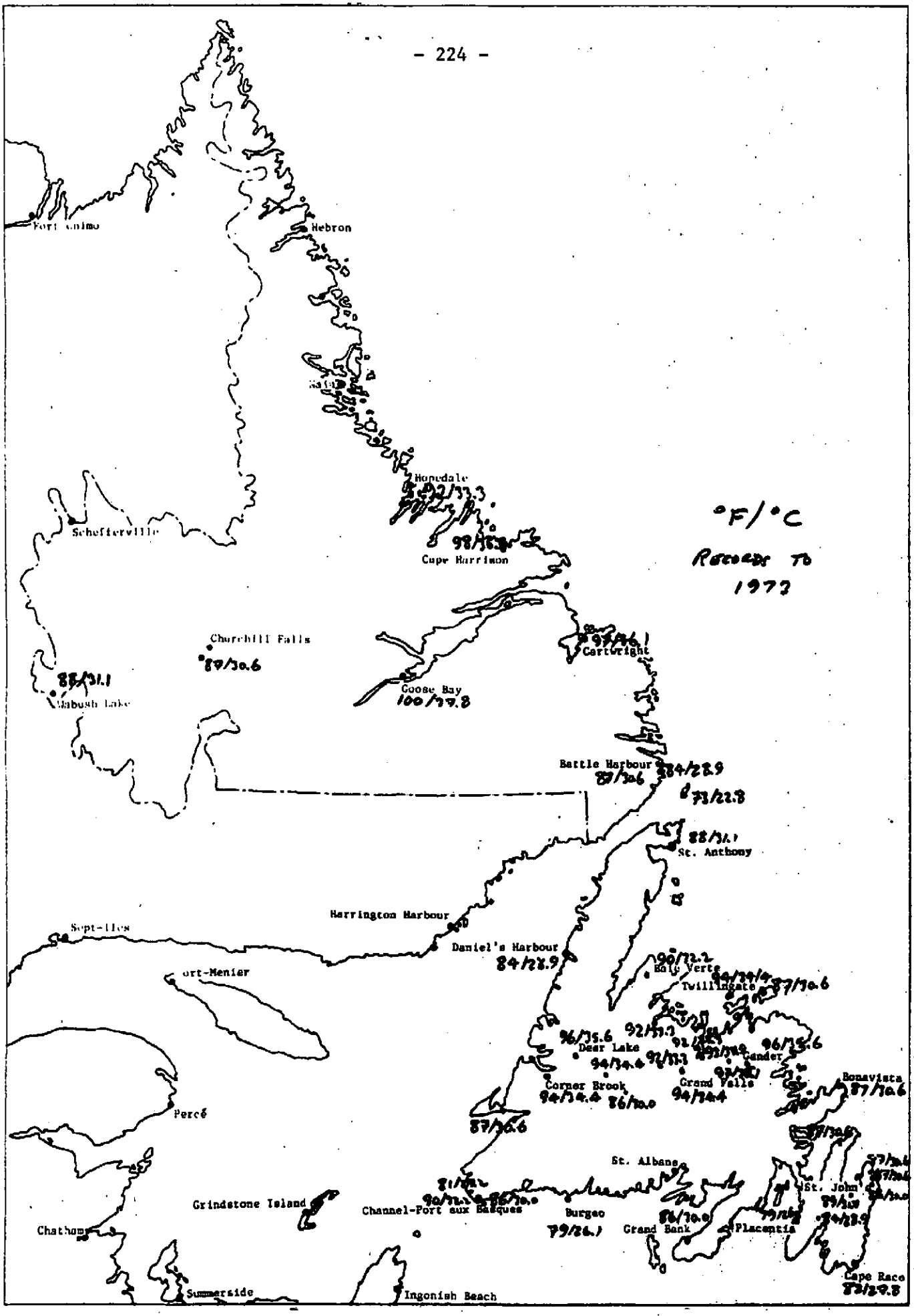


FIG. 112 EXTREME ANNUAL MAXIMUM TEMPERATURE

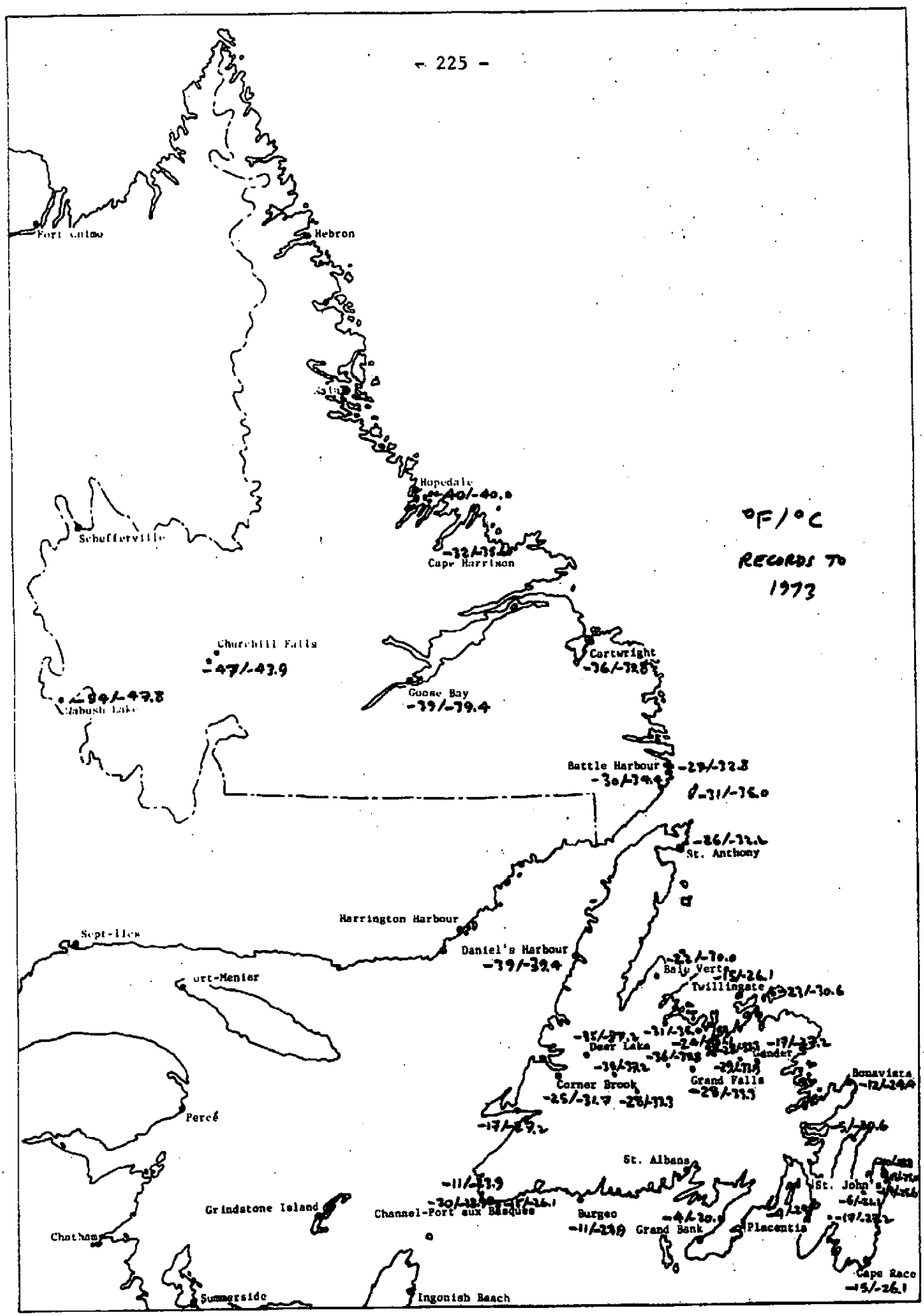


FIG. 113 EXTREME ANNUAL MINIMUM TEMPERATURE

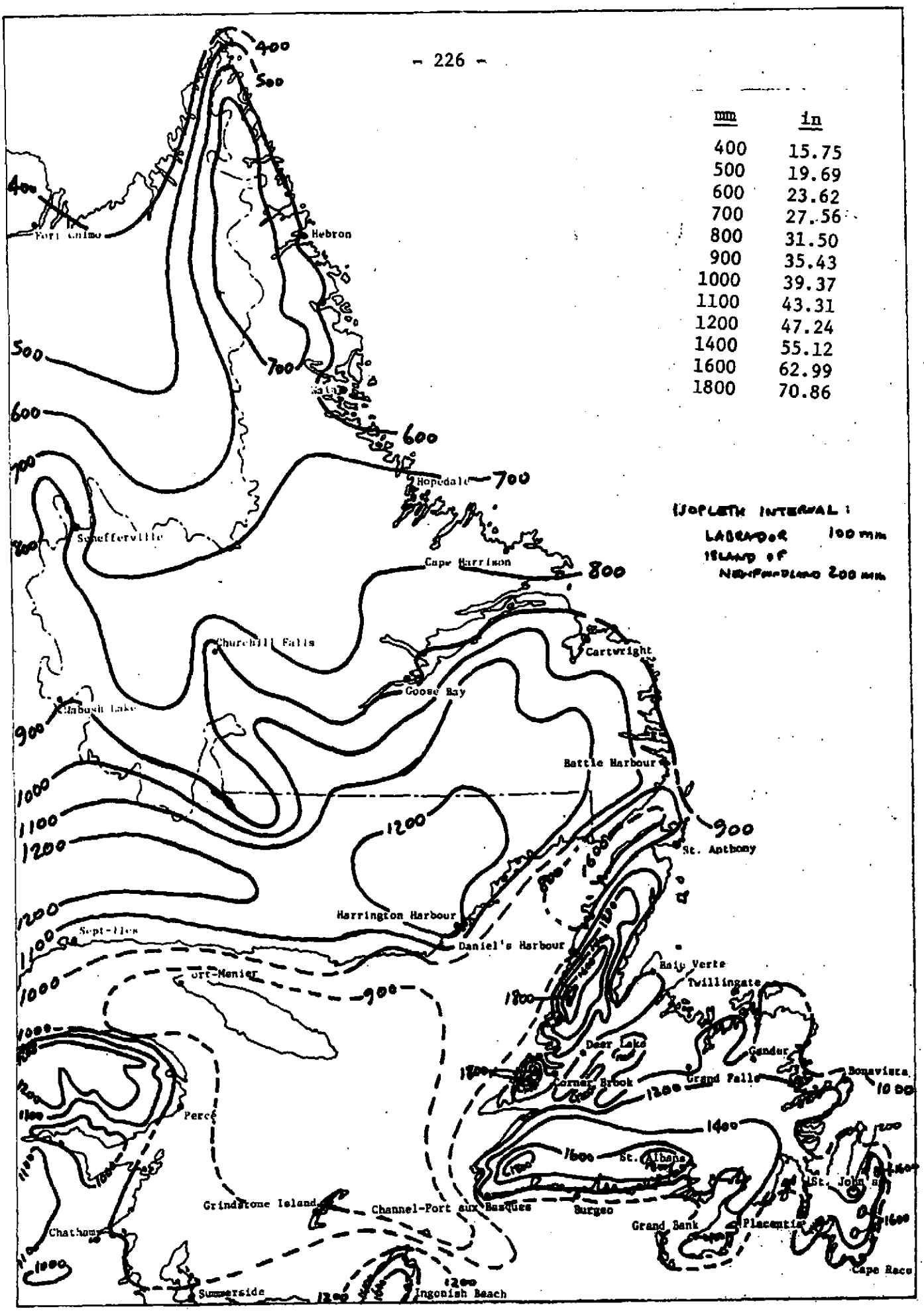


FIG. 114 MEAN TOTAL ANNUAL PRECIPITATION (MM)

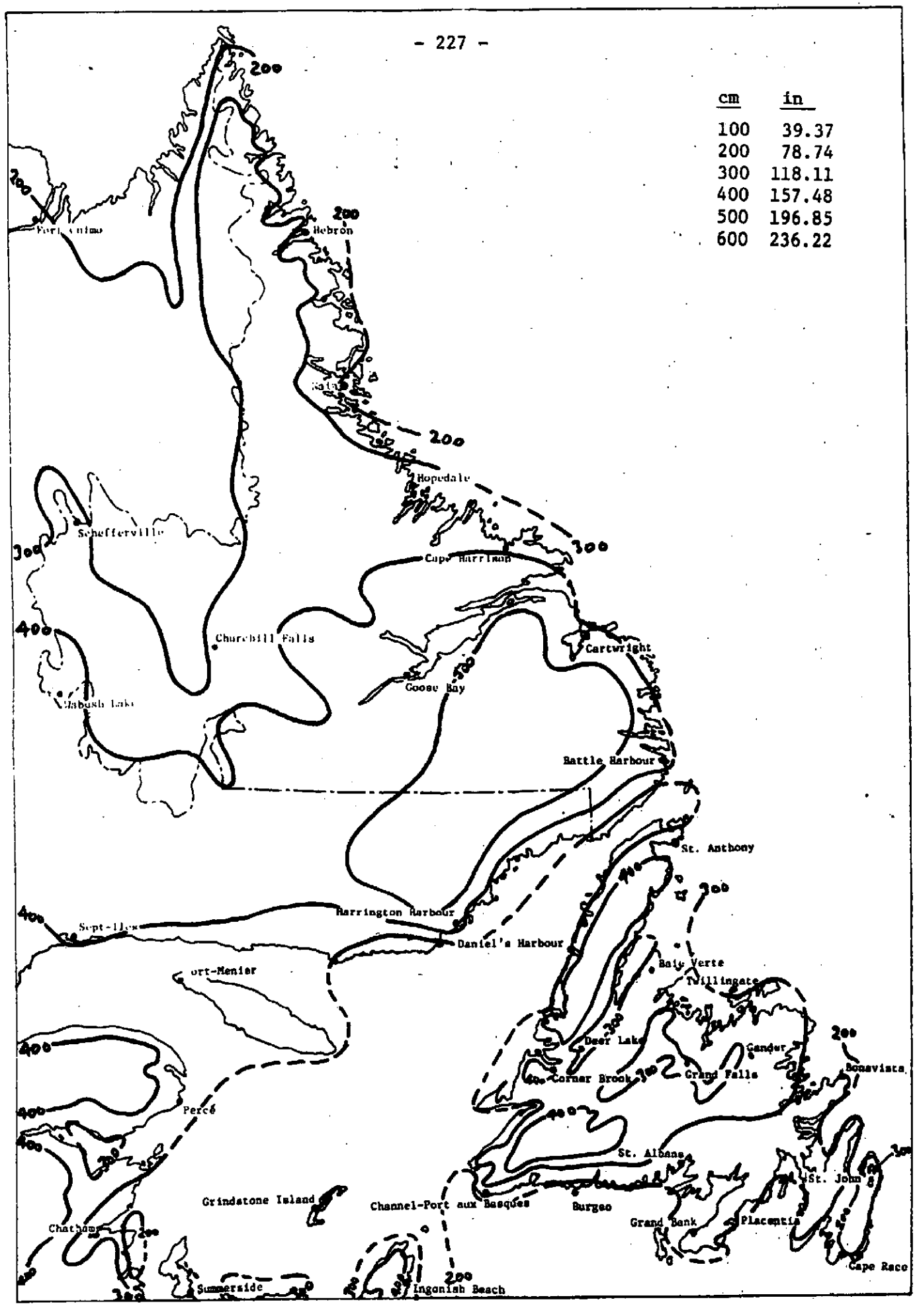


FIG. 115 MEAN TOTAL ANNUAL SNOWFALL (CM)

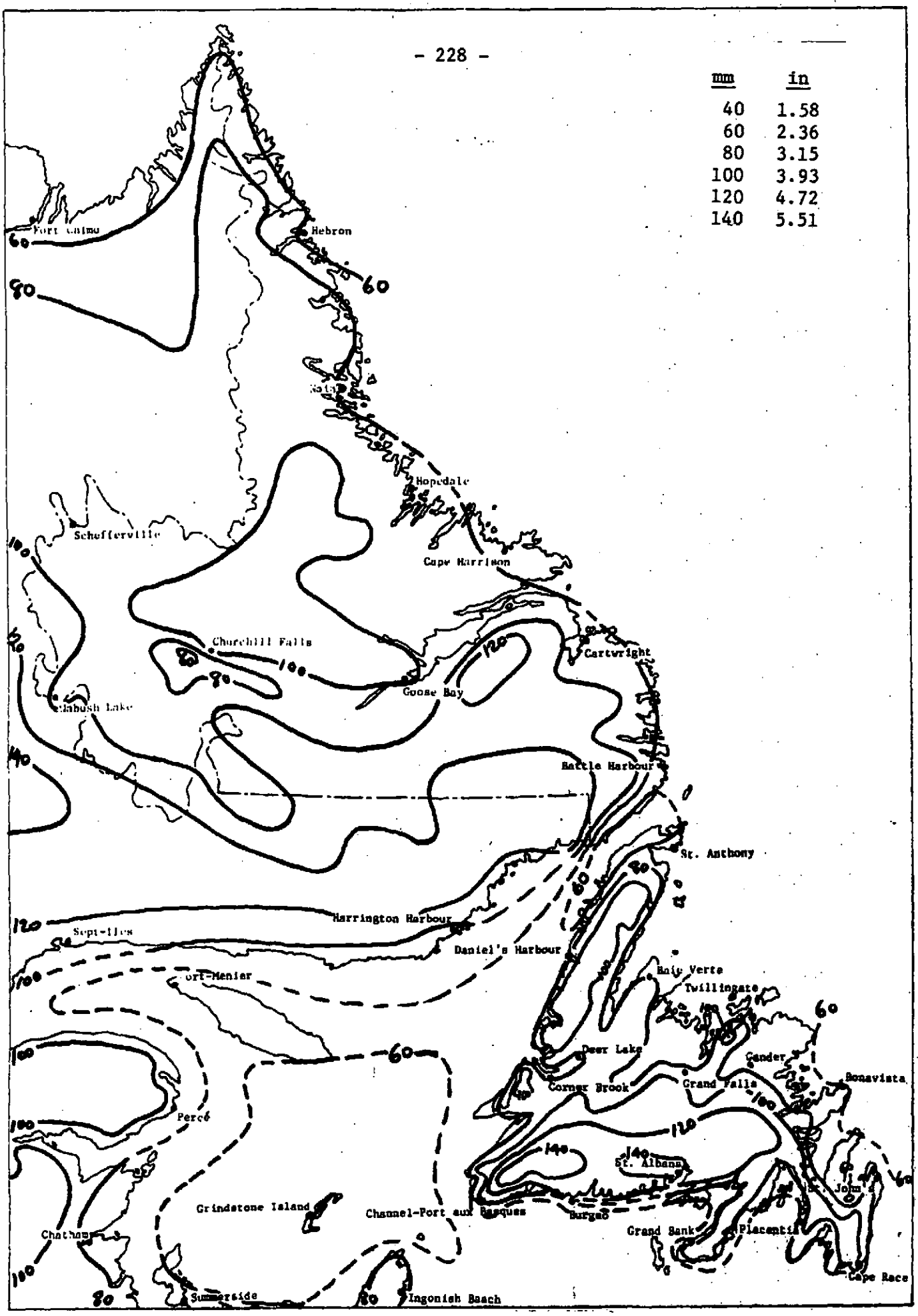


FIG. 116 MEAN JULY TOTAL PRECIPITATION (MM)

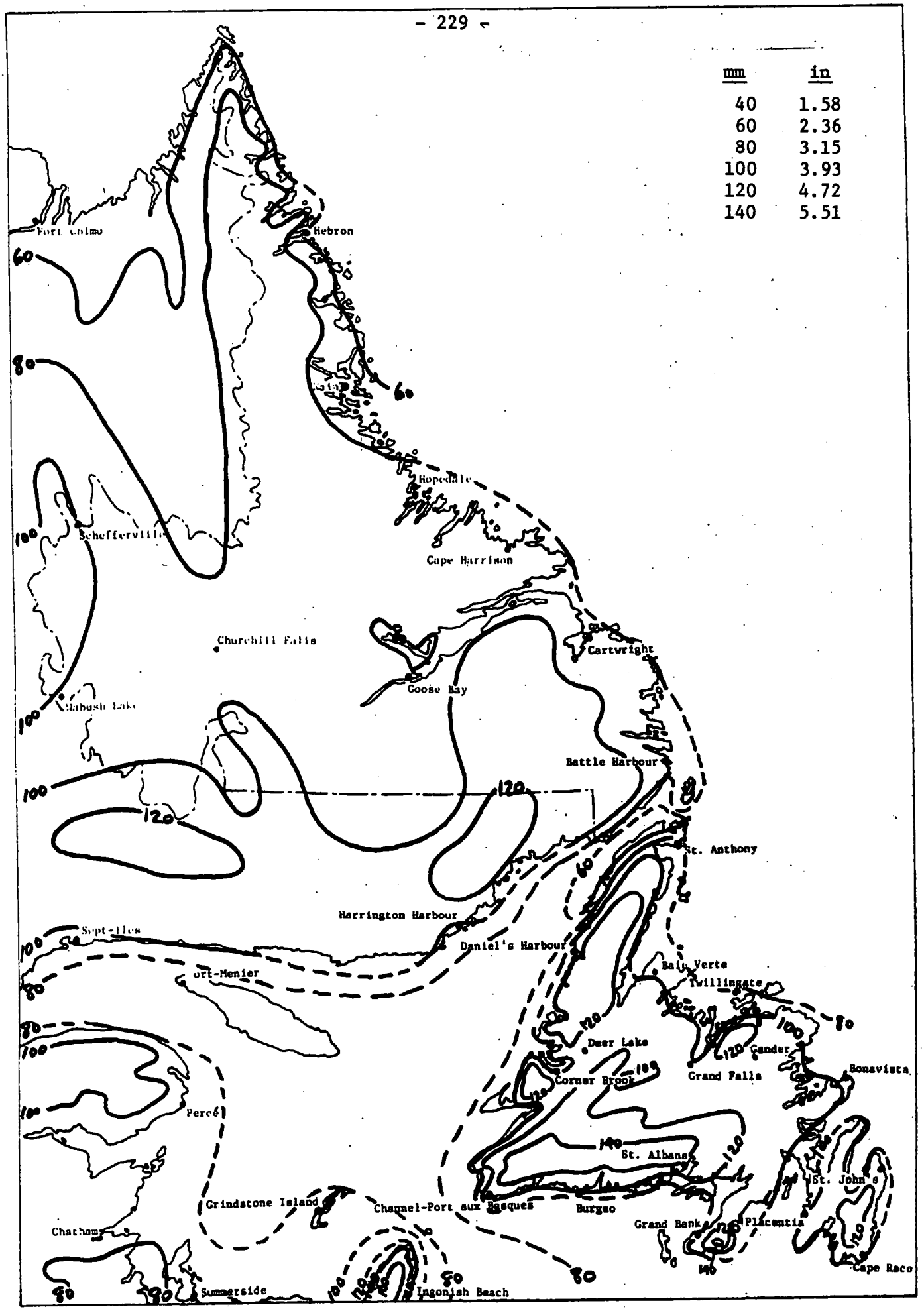


FIG. 117 MEAN AUGUST TOTAL PRECIPITATION (MM)

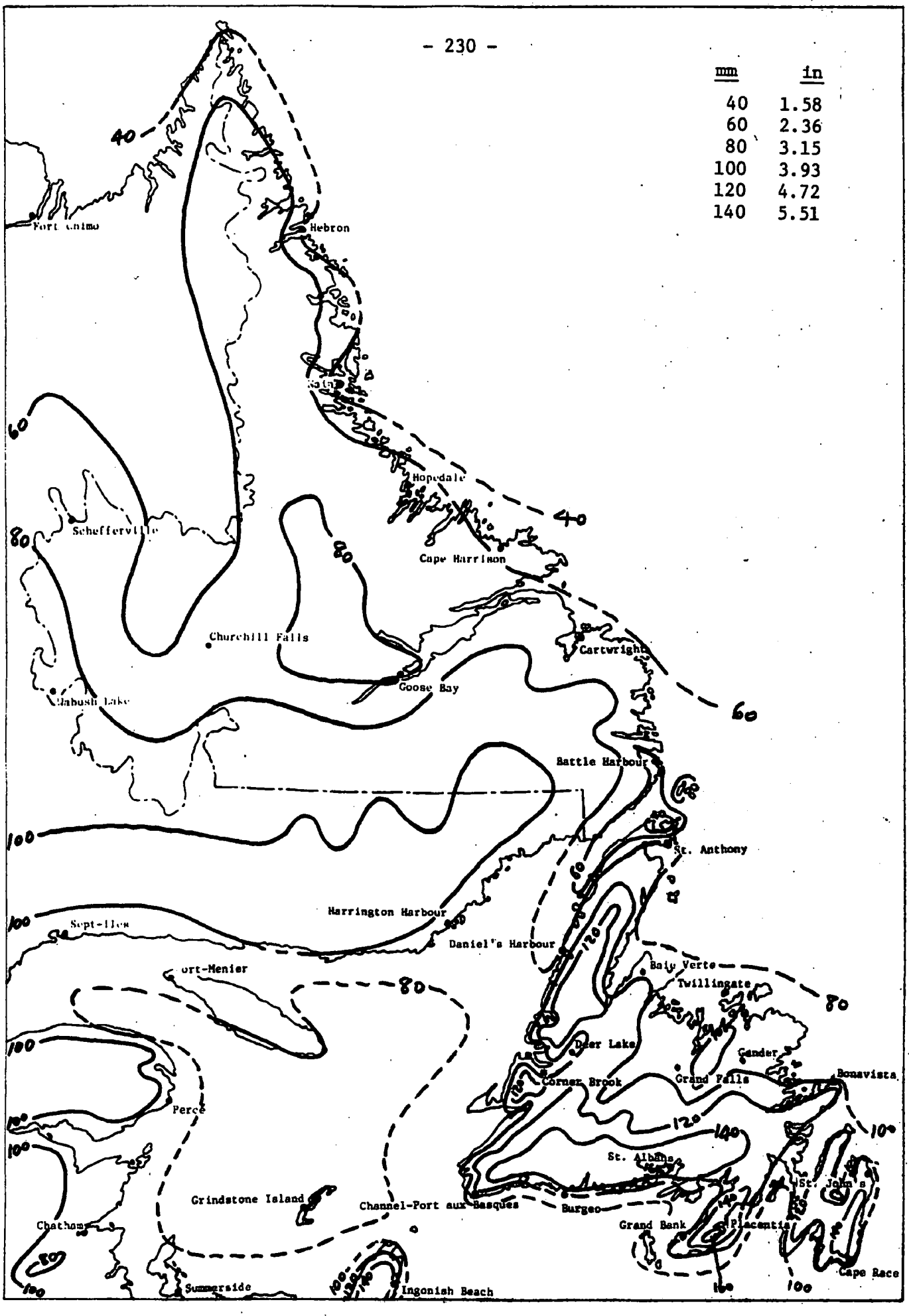


FIG. 118 MEAN OCTOBER TOTAL PRECIPITATION (MM)

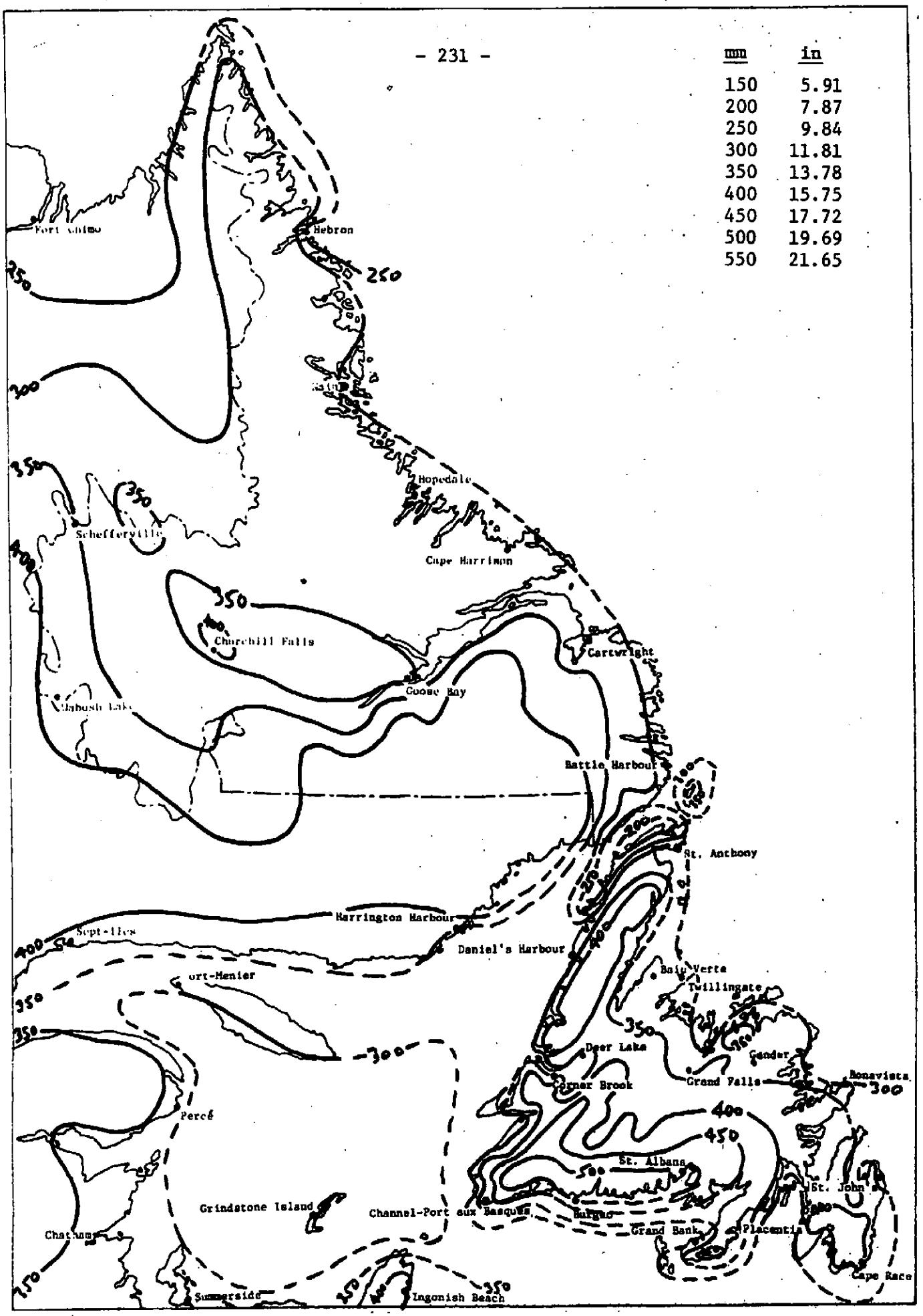


FIG. 119 MEAN JUNE TO SEPTEMBER TOTAL PRECIPITATION (MM)

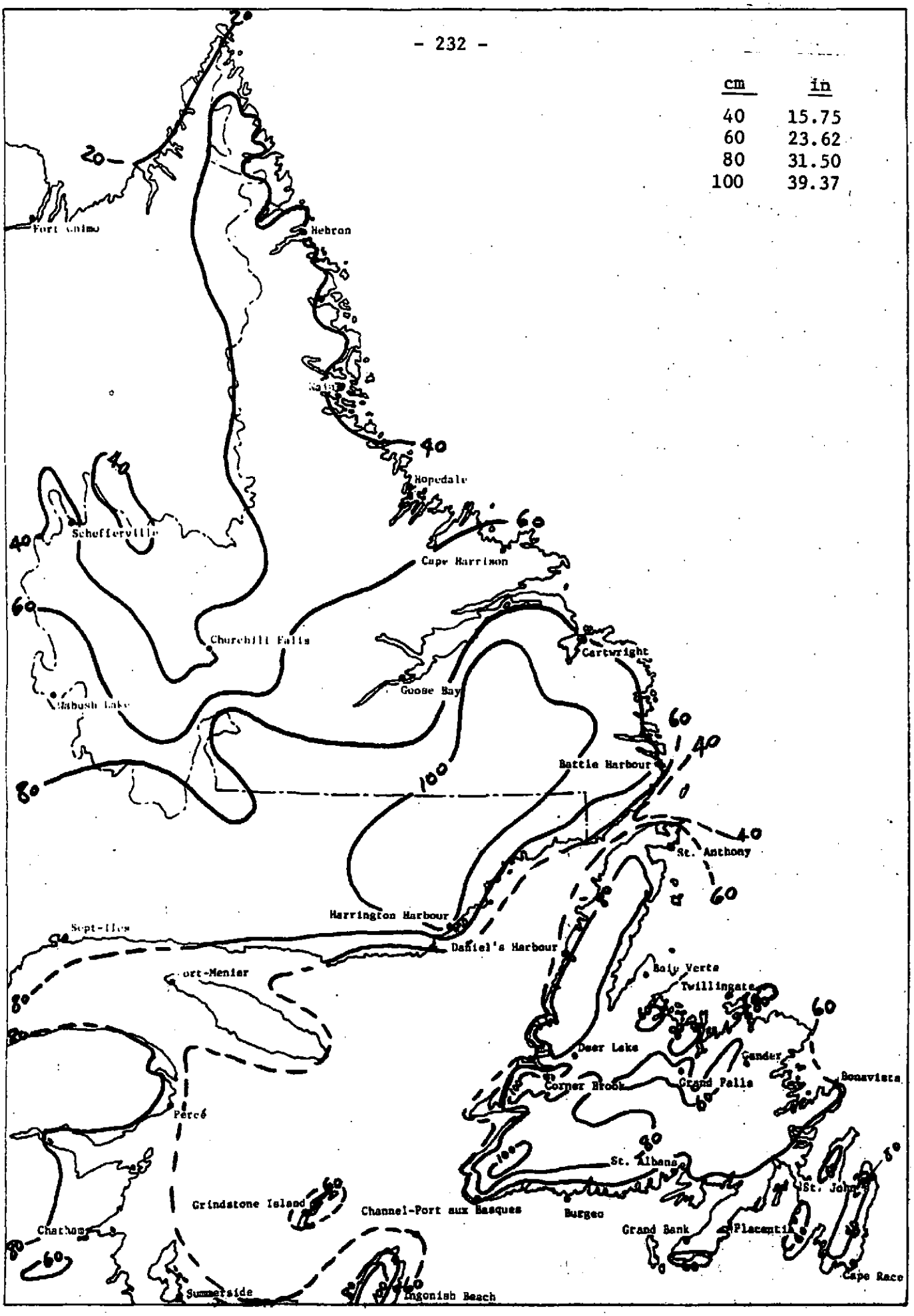
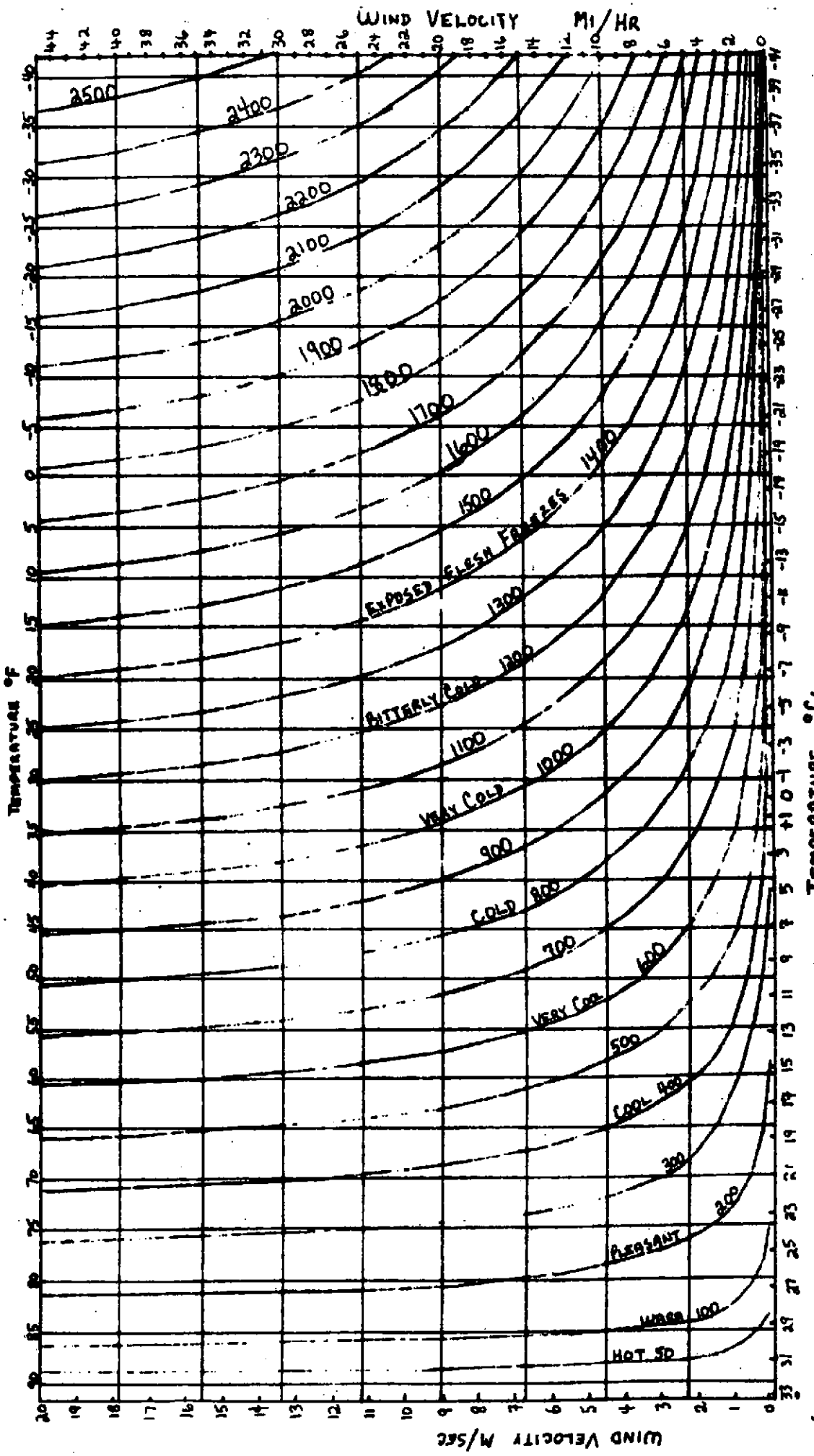


FIG. 120 MEAN JANUARY SNOWFALL (CM)



(Siple and Passel, 1945)

KG CAL / M² / HR

FIG. 121 NOMOGRAM OF DRY-SHADE ATMOSPHERIC COOLING

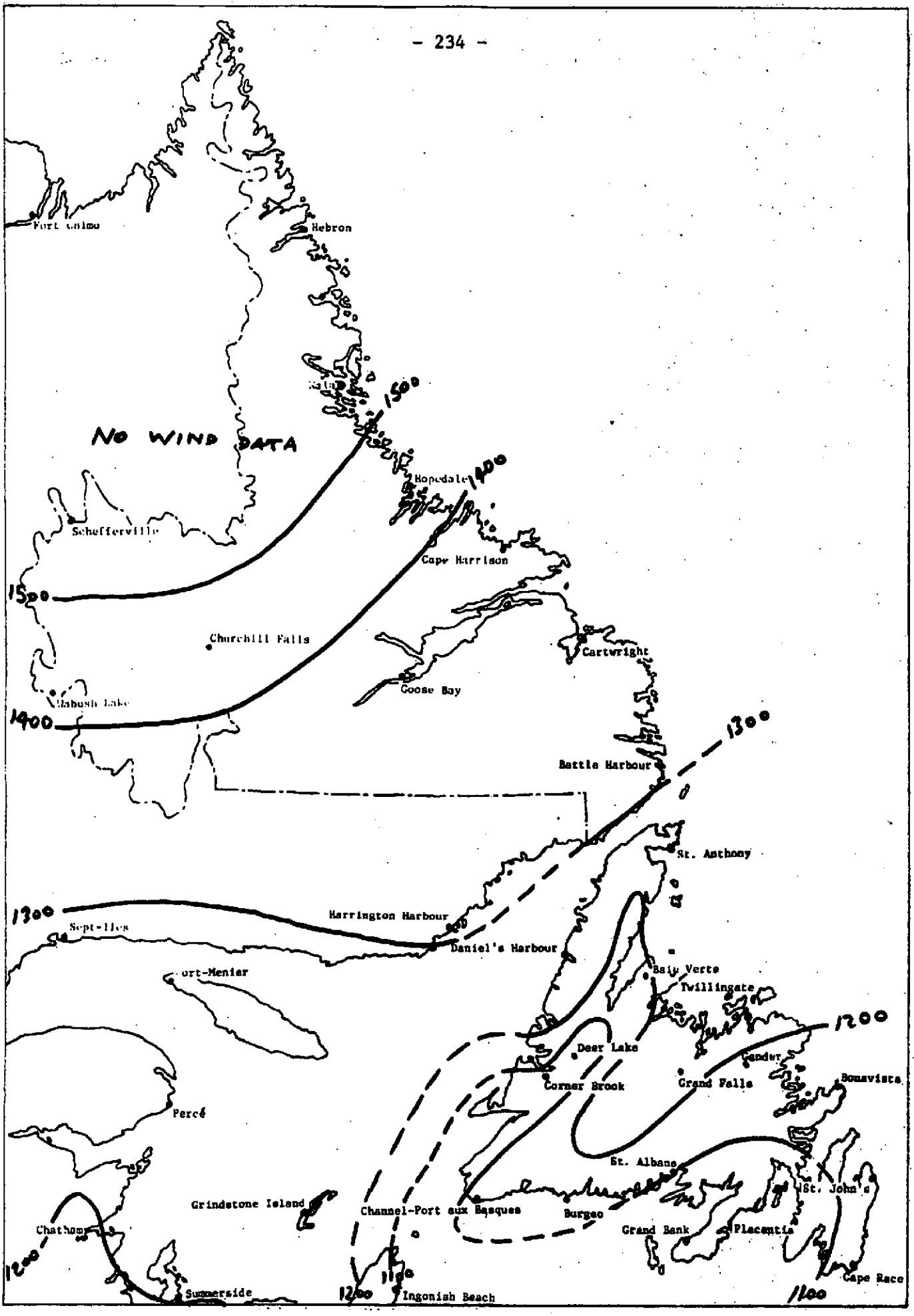


FIG. 122 MEAN JANUARY WIND CHILL (KG CAL/M2/HR)

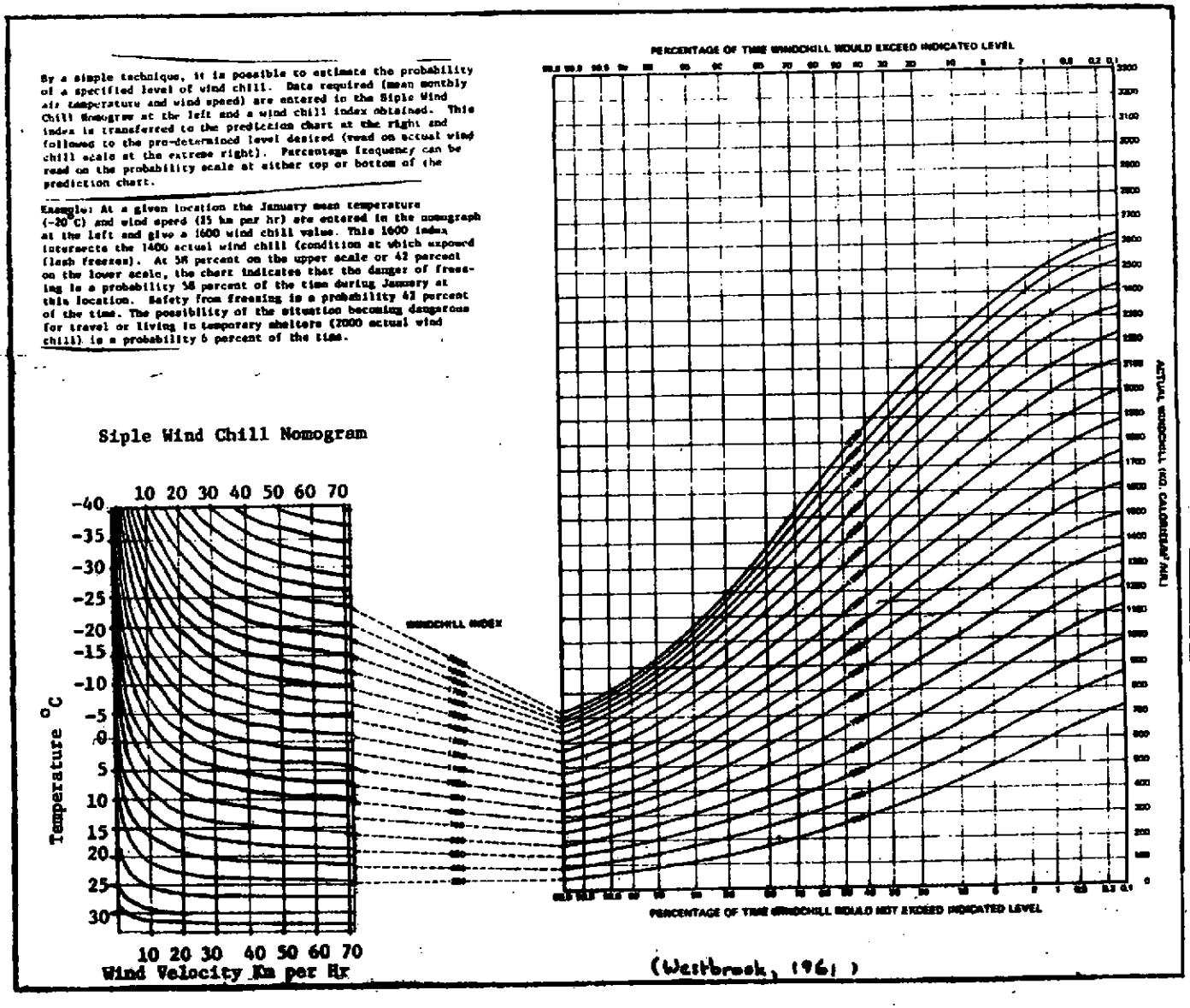


FIG. 123 WIND CHILL PREDICTION CHART

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