(1)

B.C. Coastal Communications, 1977

Communications Canada
Pacific Region
September 1977.

... "It's a very beautiful area but it's also needless to say, a very unforgiving type of area ... very dangerous trying to survive in the area." (From a recorded conversation with Transport Canada's Superintendent of Planning for Civil Aviation, December 1976).

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PART 1

INTRODUCTION

Lying between the 48th and 55th parallels and for the most part rendered inaccessible from the interior by a series of rugged mountain ranges which rise from the sea and form an almost continuous chain stretching from the Alaskan border to the southern end of Vancouver Island, the western coast of Canada consists of a spectacular maze of bays, channels, islands and narrow, steep sided fjords, at once the delight of the tourist and the despair of the stranded traveller.

Scattered along the coast among the valleys and inlets are numerous communities ranging from the descendants of tribes which have occupied the coastal areas from ancient times (e.g. Metlakatla) to logging camps which spring up one year, and perhaps disappear two years later.

Most of these are linked, at least by radio-telephone with the outside world, but many lack regular telephone services, and owing to the nature of the terrain, are either without radio and television altogether, or receive signals of very poor quality.

Purpose The study is intended to provide information about the geographical area, economy, and the inhabitants and social services available to them - with special emphasis on communications - to service as a basis for evaluating future communications proposals in the region.

The purpose is also to identify problems which concern DOC and, where possible to make recommendations regarding their solution.

Method Apart from information in the following pages which has been taken from Statistics Canada and Communications Canada records, and early parts of the study which have drawn on government publications and other writings pertaining to the area, most of the material in this study has been obtained by interview. Opinions expressed should not be regarded as official, therefore, and for this reason participants have not been personally identified. The writer's thanks, however, are due to the many individuals representing both private and government agencies who gave generously of their time, knowledge and experience to make this compilation of facts and opinion possible.

PART 11

THE AREA

The area of the study is:

(a) The Vancouver Island Coast west of the ranges from Port Renfrew to Cape Scott.

(b) The mainland coast west of the Coast Ranges, from Toba Inlet in the south to Kitsault at the head of Observation Inlet in the north.

(c) The Queen Charlotte Islands (see Chart 1).

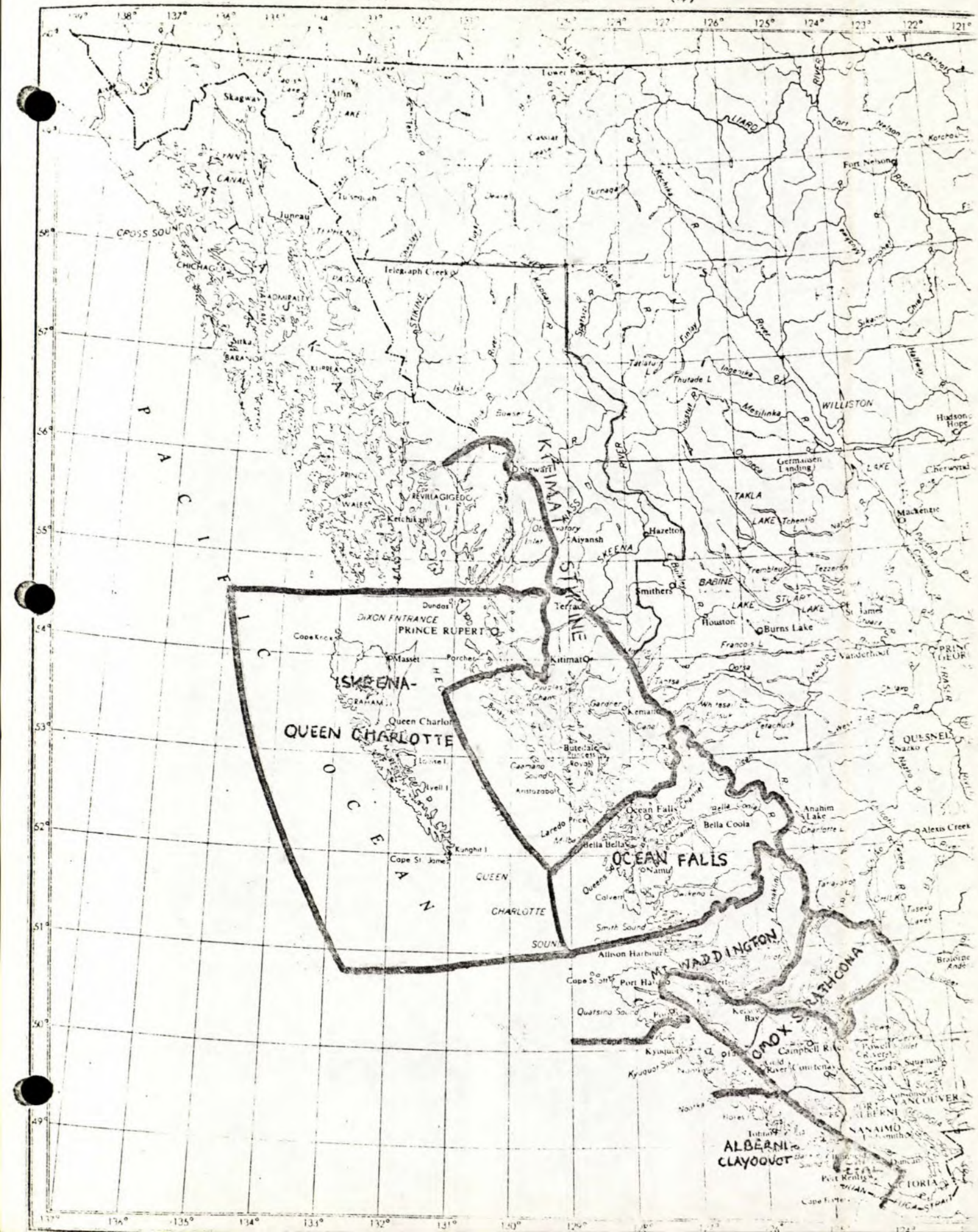
Communities with populations greater than 3000 are relatively well developed and provided with amenities although not always satisfactory T.V. These communities with their 1976 population figures include Port Alberni (19,304) and Port Hardy (3,579) on Vancouver Island; and Kitimat(11,761), Terrace (10,093), and Prince Rupert (14,247) on the northern mainland coast (see Chart 2).

Because social, economic and political fortunes of larger and smaller centres in a region are closely interwoven, it would be impossible to exclude these larger centres in a study of this nature. The focus of the study however is on the smaller communities.

Definitions For the purpose of the DOC rural and remote programmes, towns and villages with populations of less than 1,000 in areas with population densities of less than 1,000 per square mile are classed 'rural'.

Communities beyond the limits of continuous population distribution or the continuity of the transportation and communication systems are

CHART (1) THE STUDY REGION (4)



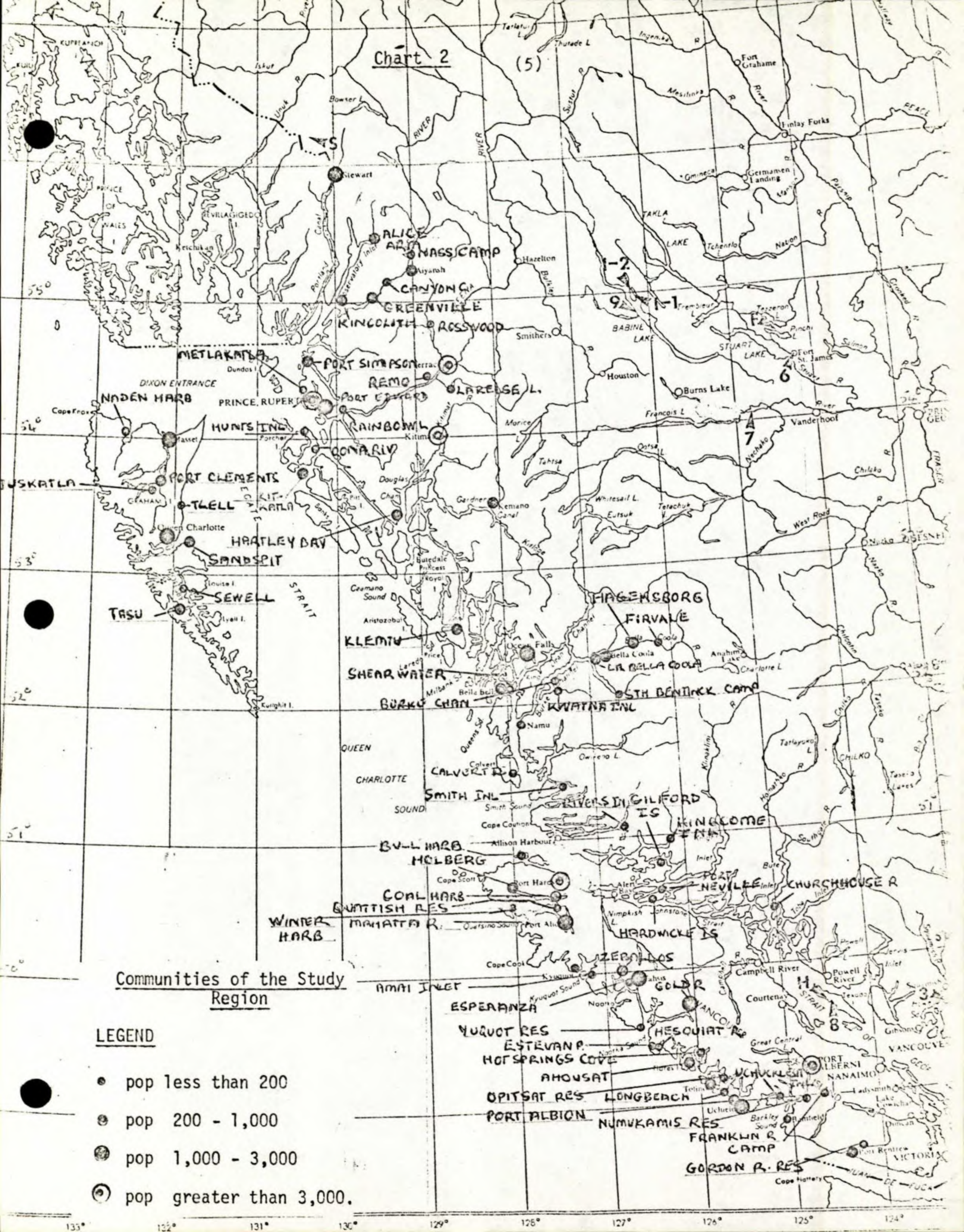


Chart 2

Communities of the Study Region

classed 'remote'.

Both types of communities are found in the study region.

Seven partial or complete regional districts are involved in this study but as the coastal fringes of all have many characteristics in common, for simplicity they will be treated as 'the study region'.

Features The coast-lines throughout are broadly similar, being flanked by a series of ranges which rise steeply to elevations ranging from 3 - 4,000 feet on the Queen Charlotte Islands and to 8,000 feet on the mainland. Innumerable bays, channels and straits reveal the effects of glacial erosion throughout the area. A narrow steep-sided fjord of considerable length, Alberni Inlet almost traverses the ranges of Vancouver Island, and Burke Inlet leading to Bella Coola is 53 miles long. Narrow fringes of lowland are to be found at the outer edges of a few peninsulas and Islands. The north-east corner of Graham Island, Estevan Point between Tofino and Ucluelet and deltas at the heads of some of the coastal inlets, notably North Bentinck Arm, Knight Inlet and Bute Inlet are also of low elevation. The Nass, Skeena, Kitimat and Bella Coola Valleys provide access from the interior to the north coast and the Alberni Valley on Vancouver Island to Ucluelet and Tofino on the west coast of Vancouver Island.

Rainfall is heavy throughout most of the area, 100 inches being measured at numerous places. As a result, podsolisation, a process whereby rainfall dissolves nutrients from the surface layers of soil is also heavy. The climate is well-suited to the growth of coniferous forest. Muskeg has been cited as a major obstacle to development, particularly

in the vicinity of Prince Rupert; and the granite rock is a problem in the construction of houses, highways and railways.

PART III

THE ECONOMY

Dependent mainly upon the harvesting of resources and therefore upon foreign markets and seasonal factors, the economy of the coastal region tends to be exposed to wide swings which bring about extreme variations in prosperity particularly in the smaller communities.

Forestry

The forest industry directly employs about 30% of the labour force, most of it in logging which is dispersed throughout the valleys and inlets of the whole area. Due to improvements in transportation facilities, including the construction of many miles of logging roads, the floating logging camps, which were formerly common features of the coastal forests are being replaced by larger more permanent communities such as Franklin River Camp near Port Alberni and Stoltze Camp in Tahsis Inlet. In other cases, workers are housed in company villages, such as Tahsis and transported daily to their scene of operations.

Before 1970, the coastal areas of B.C., including the whole of Vancouver Island, produced more than 50 percent of the provincial timber harvest,[1] but as a result of rapid industrial expansion in the interior and, it is said, relatively high costs, relatively low productivity and lagging investments in new technology in the coastal region, the situation has now been reversed.[2]

Most of the timber harvested is used in lumber manufacture. Chips produced as a by-product of sawmilling comprise about two thirds of the raw material used for pulp and paper production which is the next largest

wood user.

A comparison between coastal lumber production and that of the interior during the years 1966-1975 presented in Table 1 reflects clearly the swings of the economy.

Lumber production for B.C. in 1974 was valued at $1.5b; pulp and paper at $1.4 b and veneer and plywood at $307.6 m. The value of production in the study region would be less than half of these amounts.

TABLE 1

Production of the B.C. Forest Industry: 1966 - 1975

Year	LUMBER		Total
	Coast	Interior	
	Millions of board feet		
1966	3,680	3,639	7,319
1967	3,913	3,197	7,110
1968	4,144	3,667	7,811
1969	3,911	3,785	7,696
1970	3,790	3,867	7,657
1971	4,186	4,785	8,971
1972	4,028	5,495	9,523
1973	4,403	6,038	10,441
1974	3,405	5,378	8,783
1975	2,504	4,965	7,469

Source: Timber Rights and Forest Policy, Vol. 2, pB4.

Logging:

In 1974, McMillan Bloedel harvested approximately 30 percent of the total provincial cut, B.C. Forest Products 9.6 percent, the second largest percentage, closely followed by Rayonier and Crown Zellerbach with 8 percent each. All are represented in the study area. McMillan Bloedel has logging divisions at Estevan, Franklin River, Sarita and Tofino on Vancouver Island; and at Hecate on the Queen Charlottes. B.C. Forest's coastal operations are all located south of Smith Inlet on the lower mid-coast area and Vancouver Island (see Chart 3). Rayonier's company operations include several on Vancouver Island and one at Sewell in the Queen Charlottes. Additional to these are Rayonier's contract logging operations at Lyell Island, Naka Creek, Heydon Bay and Winter Harbour (see Chart 4). Crown Zellerbach has operations at Kitimat, Bella Coola, Beaver Cove and Sandspit. Other large companies in coastal areas are Tahsis Company with logging at Gold River and Fair Harbour and Eurocan at Kemano and Kitimat. There are also numerous smaller operations.

Sawmills and Pulpmills:

Sawmills are scattered throughout the area including at least five on the Queen Charlotte Islands and one at Bella Bella. Pulp and paper mills are located in larger centres where they can draw on large volumes of high quality water and hydro-power e.g., the Ocean Falls Corporation which is a crown corporation located in the midcoast region; and others at Prince Rupert, Kitimat, Port Alberni, Port Alice and Gold River (see chart 5). The largest of these is the McMillan Bloedei mill at Port Alberni which produces about 600,000 tons of Kraft pulp and 400,000 tons of newsprint annually.

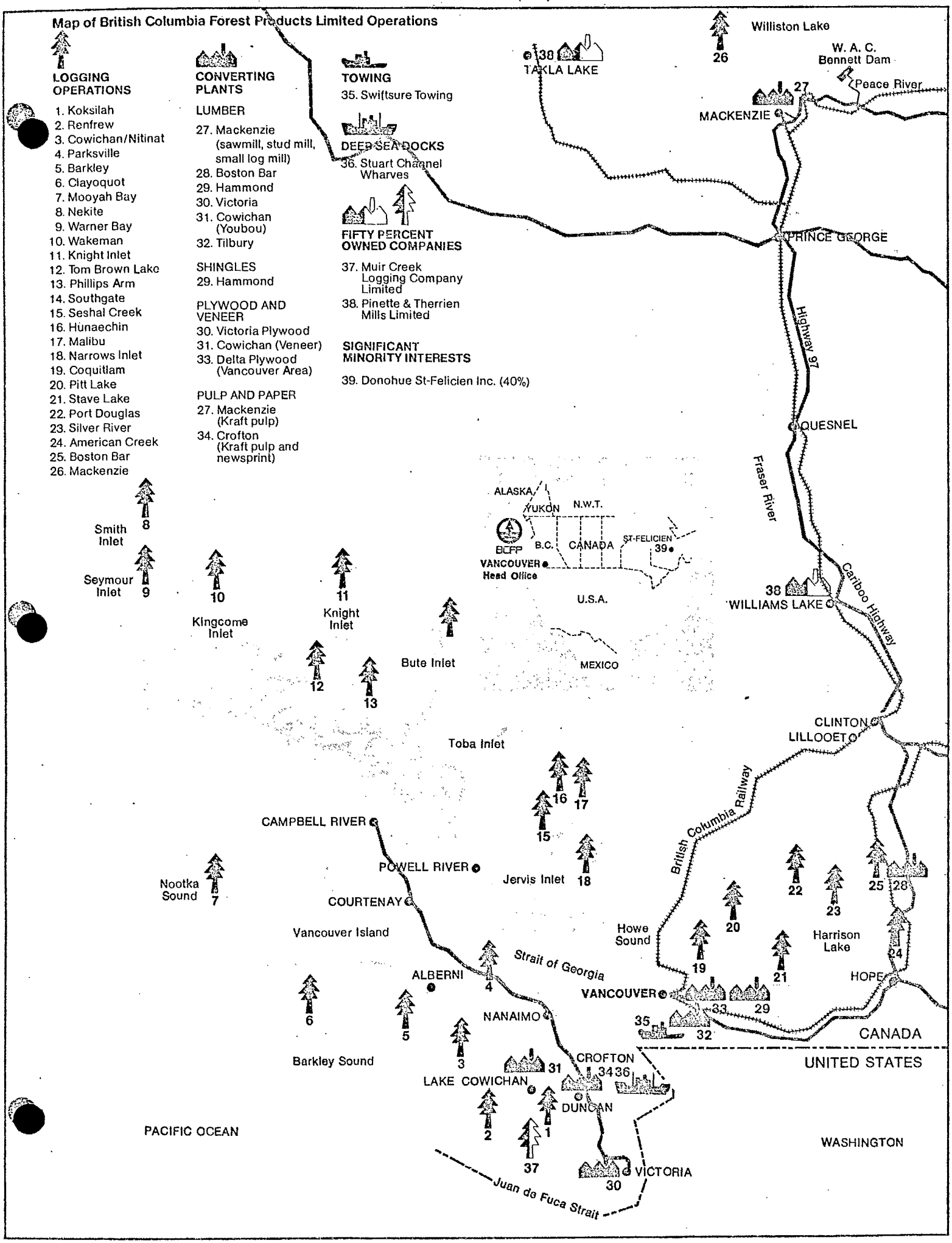
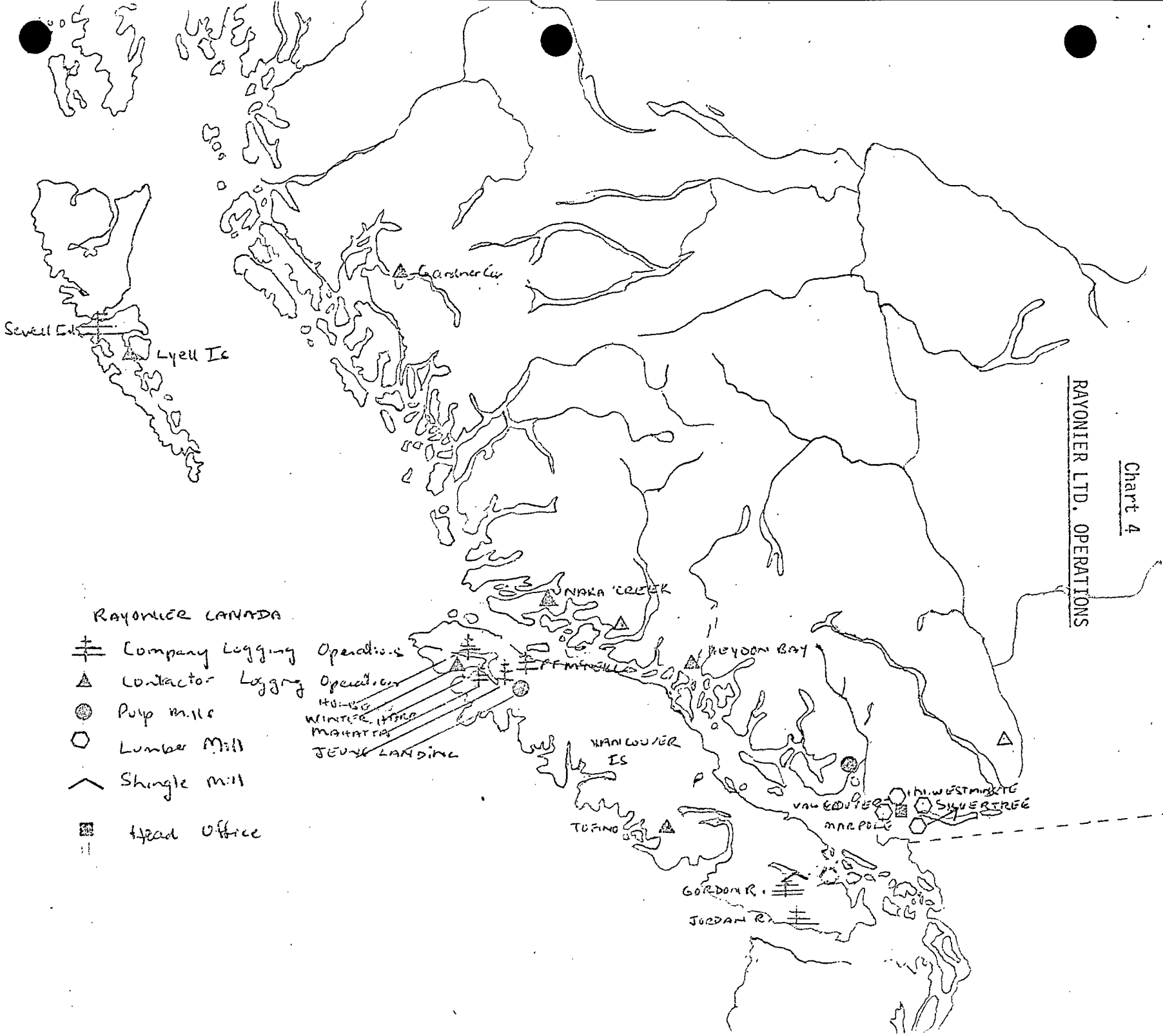
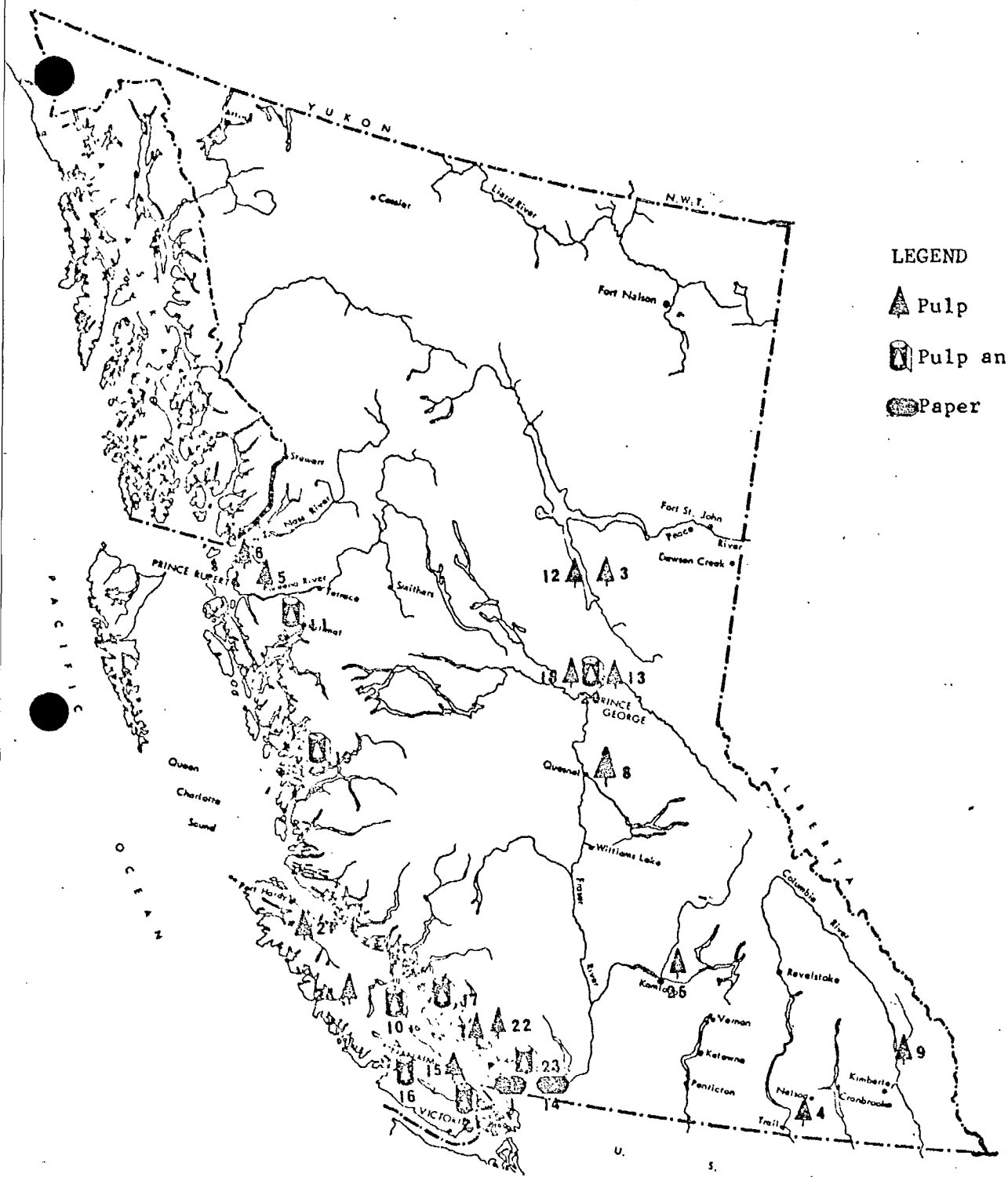

Map of British Columbia Forest Products Limited Operations
LOGGING OPERATIONS
1. Koksilah
2. Renfrew
3. Cowichan/Nitinat
4. Parksville
5. Barkley
6. Clayoquot
7. Mooyah Bay
8. Nekite
9. Warner Bay
10. Wakeman
11. Knight Inlet
12. Tom Brown Lake
13. Phillips Arm
14. Southgate
15. Seshal Creek
16. Hunaechin
17. Malibu
18. Narrows Inlet
19. Coquitlam
20. Pitt Lake
21. Stave Lake
22. Port Douglas
23. Silver River
24. American Creek
25. Boston Bar
26. Mackenzie
CONVERTING PLANTS
LUMBER
27. Mackenzie (sawmill, stud mill, small log mill)
28. Boston Bar
29. Hammond
30. Victoria
31. Cowichan (Youbou)
32. Tilbury
SHINGLES
29. Hammond
PLYWOOD AND VENEER
30. Victoria Plywood
31. Cowichan (Veneer)
33. Delta Plywood (Vancouver Area)
PULP AND PAPER
27. Mackenzie (Kraft pulp)
34. Crofton (Kraft pulp and newsprint)
TOWING
35. Swiftsure Towing
DEEP SEA DOCKS
36. Stuart Channel Wharves
FIFTY PERCENT OWNED COMPANIES
37. Muir Creek Logging Company Limited
38. Pinette & Therrien Mills Limited
SIGNIFICANT MINORITY INTERESTS
39. Donohue St-Felicien Inc. (40%)
Williston Lake
W. A. C. Bennett Dam
Peace River
TAKLA LAKE
MACKENZIE
PRINCE GEORGE
Highway 97
QUESNEL
Fraser River
Cariboo Highway
WILLIAMS LAKE
CLINTON
LILLOOET
British Columbia Railway
ALASKA
YUKON
N.W.T.
B.C.
CANADA
ST-FELICIEN
BCFP
VANCOUVER Head Office
U.S.A.
MEXICO
Smith Inlet
Seymour Inlet
Kingcome Inlet
Knight Inlet
Bute Inlet
Toba Inlet
CAMPBELL RIVER
POWELL RIVER
Jervis Inlet
Nootka Sound
COURTENAY
Vancouver Island
Howe Sound
Harrison Lake
Strait of Georgia
ALBERNI
NANAIMO
VANCOUVER
HOPE
Barkley Sound
LAKE COWICHAN
CROFTON
DUNCAN
VICTORIA
Juan de Fuca Strait
PACIFIC OCEAN
CANADA
UNITED STATES
WASHINGTON

Chart 4

RAYONIER LTD. OPERATIONS



PULP AND PAPER MILLS



1. Belkin Paperboard Limited, Burnaby
2. British Columbia Forest Products Limited, Crofton
3. British Columbia Forest Products Limited, Mackenzie
4. Canadian Cellulose Limited, Castlegar
5. Canadian Cellulose Limited, Prince Rupert
6. Canadian Cellulose Limited, Prince Rupert
7. Canadian Forest Products Limited, Port Mellon
8. Caribou Pulp and Paper Ltd., Quesnel
9. Crestbrook Pulp and Paper Ltd., Skookumchuk
10. Crown Zellerbach Canada Ltd., Duncan Bay
11. Eurocan Pulp and Paper Co. Ltd., Kitimat
12. Finlay Forest Industries Ltd., Mackenzie
13. Intercontinental Pulp Ltd., Prince George
14. MacMillan Bloedel Limited, Annacis Island
15. MacMillan Bloedel Limited, Harmac
16. MacMillan Bloedel Limited, Port Alberni
17. MacMillan Bloedel Limited, Powell River
18. Northwood Pulp and Timber Ltd., Prince George
19. Ocean Falls Corporation, Ocean Falls
20. Prince George Pulp and Paper Limited, Prince George
21. Rayonier Canada (B.C.) Limited, Port Alice
22. Rayonier Canada (B.C.) Limited, Woodfibre
23. Scott Paper Ltd., New Westminster
24. Tahsis Company Limited, Gold River
25. Weyerhaeuser Canada Ltd. Kamloops

Source: B.C. Government Manual of Resources, 1974, p 23.

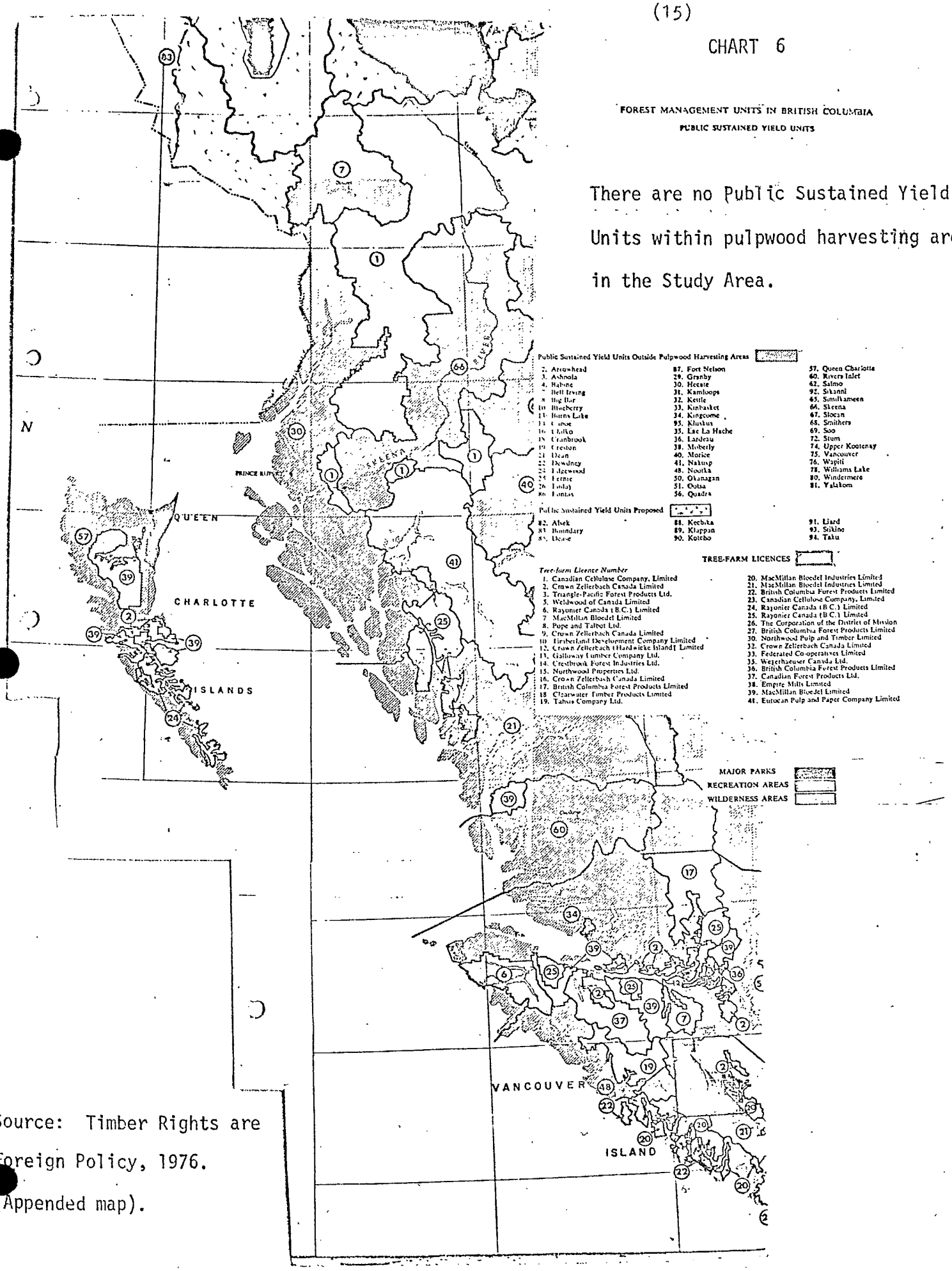
Chart 6 shows forest management units in the area. These consist of Public Sustained Yield Units (PSYU's) and Tree-farm licences for each of which an annual allowable cut is set by the Forest Service. Typically several companies are issued with licences to harvest lumber from a PSYU whereas in the case of a Tree Farm Licence, rights are granted to one company only. A list of PSYU's and companies owning Tree-Farm licences appears on the map and the latter indicates in which areas particular companies are likely to be operating. It will be seen, for example, that B.C. Forest Products, McMillan Bloedel and Rayonier hold exclusive harvesting rights to much of the West Coast of Vancouver Island; and McMillan Bloedel, Crown Zellerbach and Rayonier to large areas of the Queen Charlottes.

Fishing

Somewhat less than 20 percent of B.C.'s fishing fleet of some 6,000 vessels operate from ports in the study area. However more than half of the value of commercial landings is caught in the region, mostly by vessels from elsewhere. In 1973, the landed value of all species of seafish caught in B.C. waters was $130.4 million; in 1974 $101 million. Salmon accounted for about 73 percent of the catch, herring for about 12 percent; halibut for 5.4 percent, groundfish and 'others' for 4.8 percent each (HSU 1974, p. 6).

The main fishing season extends from February to October. Fishing practices reflect, amongst other factors the migratory characteristics of certain species e.g. the months of July to October are the prime season for salmon fishing and during that time fishermen

CHART 6



There are no Public Sustained Yield Units within pulpwood harvesting areas in the Study Area.

Source: Timber Rights are Foreign Policy, 1976. (Appended map).

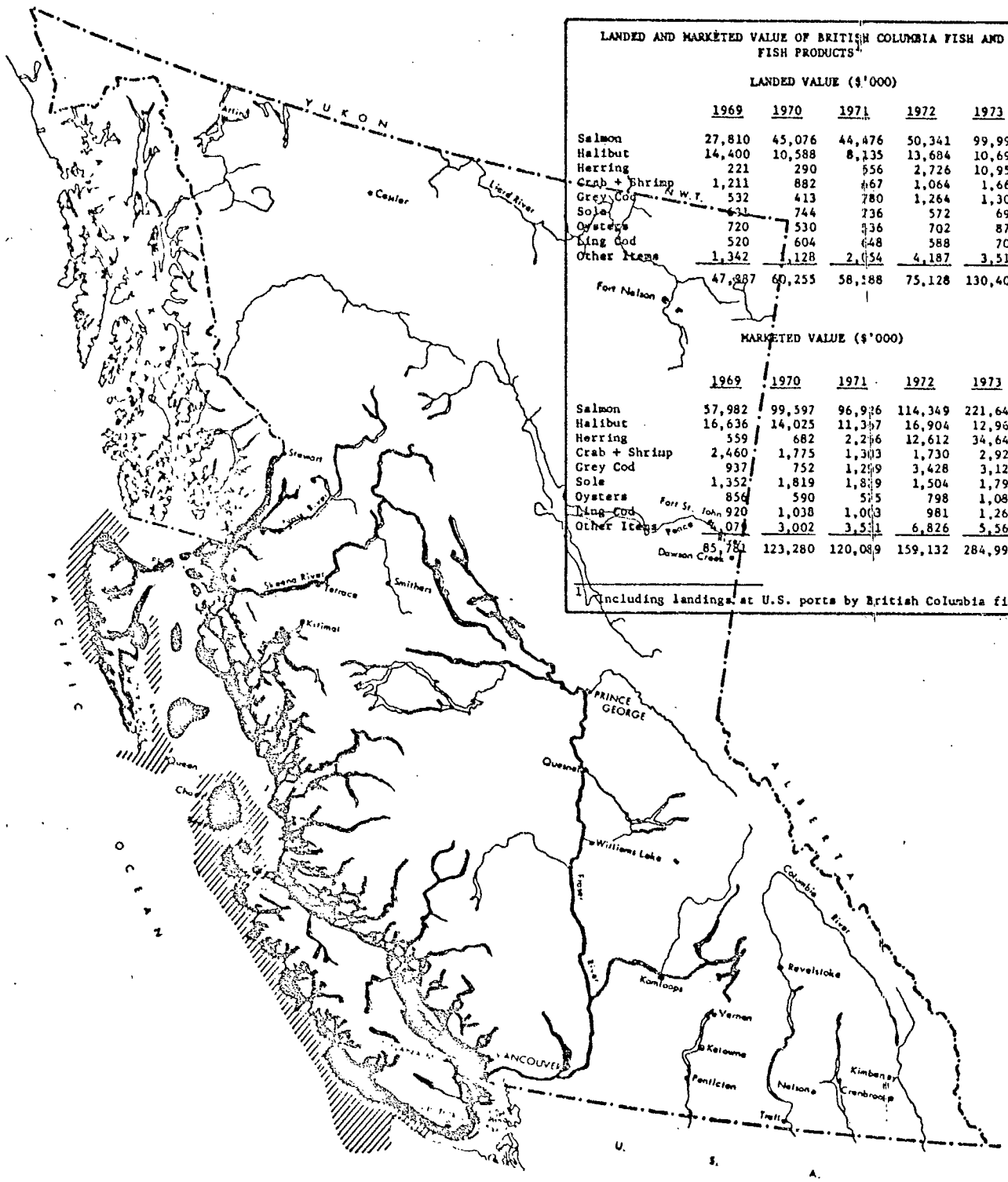
concentrate on this species rather than on the less valuable ground-fish and halibut. Beginning about the second week of March, the herring season is brief, factors which limit its length being herring roe quality and conservation requirements. Other sea fish such as shrimps are harvested throughout the year.

Methods of fishing include gill-netting, purse seining and trolling. Gill-netting is a solo occupation mainly carried out in the bays and inlets of inside waters; purse-seining, a co-operative venture involving 3 - 7 men weilding a huge net called a 'seine' and also conducted close to the shore-line. Trolling, in which the fish-chiefly coho and spring salmon - are caught on steel fishing-lines, takes place up to 40 miles at sea, about 1/4 of the total BC catch being landed by this means. In 1974, 1,564 troll vessels, 3,120 salmon gill-net vessel and 526 seine vessels were licensed to fish for salmon in west coast waters, a total of 5,210 vessels. Salmon fishing grounds and other major fishing areas are indicated in Chart 7; and herring-grounds, in Chart 8. The netting of salmon, it will be seen is confined to areas adjacent to the coast, and is in fact, prohibited seaward of the surf-line.

During the period 1950 - 75 processing plants and the fishing fleet were centralized in Vancouver, Victoria and Prince Rupert. Reasons cited include increased labour and market orientation of processing operations, improvements in boat technology which have resulted in

CHART 7

FISHING INDUSTRY



LANDED AND MARKETED VALUE OF BRITISH COLUMBIA FISH AND FISH PRODUCTS

LANDED VALUE ($'000)

	1969	1970	1971	1972	1973	5 year Average
Salmon	27,810	45,076	44,476	50,341	99,998	53,540
Halibut	14,400	10,588	8,135	13,684	10,698	11,501
Herring	221	290	556	2,726	10,951	2,949
Crab + Shrimp	1,211	882	867	1,064	1,667	1,098
Grey Cod	532	413	780	1,264	1,304	859
Sole	631	744	736	572	698	676
Oysters	720	530	536	702	875	673
King Cod	520	604	648	588	701	612
Other Items	1,342	1,128	2,054	4,187	3,517	2,446
	47,887	60,255	58,188	75,128	130,409	74,354

MARKETED VALUE ($'000)

	1969	1970	1971	1972	1973	5 Year Average
Salmon	57,982	99,597	96,936	114,349	221,642	118,099
Halibut	16,636	14,025	11,367	16,904	12,963	14,379
Herring	559	682	2,256	12,612	34,641	10,150
Crab + Shrimp	2,460	1,775	1,303	1,730	2,920	2,038
Grey Cod	937	752	1,259	3,428	3,128	1,909
Sole	1,352	1,819	1,819	1,504	1,796	1,660
Oysters	856	590	515	798	1,081	780
King Cod	920	1,038	1,003	981	1,266	1,042
Other Items	4,078	3,002	3,511	6,826	5,560	4,600
	85,780	123,280	120,089	159,132	284,997	154,657

1/ Including landings at U.S. ports by British Columbia fishermen

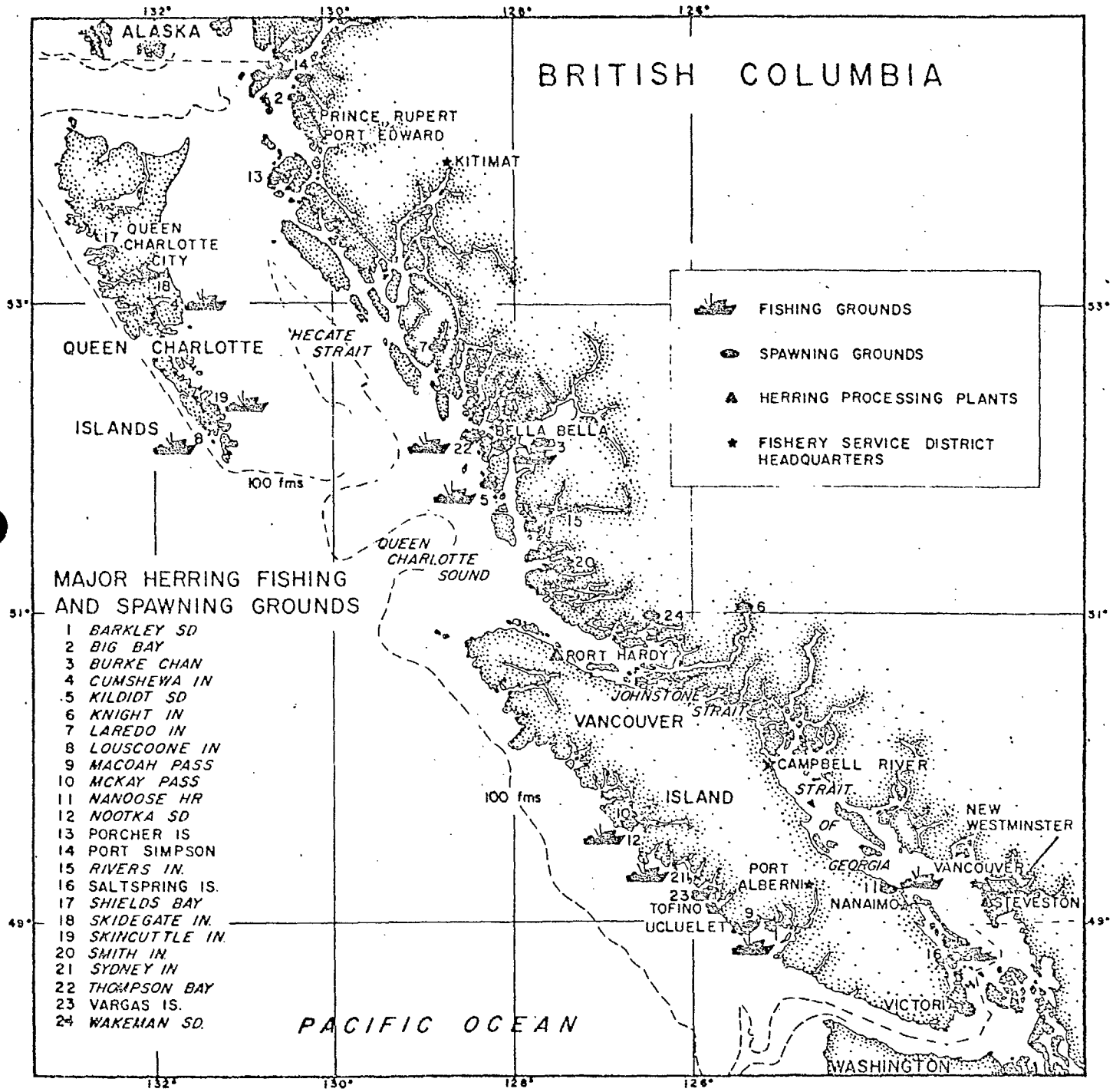
Major Fishing Areas

Salmon Fishing Grounds

Principal Salmon Spawning Areas

Source: BC Government Manual of Resources, 1974, p.31.

MAJOR HERRING FISHING AND SPAWNING GROUNDS



Source: Transport Canada. West Coast Fishing Vessel Casualties Enquiry, 1975.

cheaper transport costs for unprocessed fish over long distances, urbanization of the Canadian population, and economies of scale (Midcoast Study, p. 60). Processing operations outside the main centres include plants at Masset, Klemtu, Butedale, Bella Bella, Port Hardy, Port Albion, Coal Harbour, Ucluelet, and Tofino. Though there is some cold storage capacity along the coast e.g. at Namu, 96 percent of capacity is located at Prince Rupert and Vancouver, Prince Rupert being the second most important fishing area in B.C.

Fishing is the traditional livelihood of the coastal Indians, and the Indian Bands located at Bella Bella, Masset, Bella Coola, and Skidegate are particularly dependent upon fishing and fish processing for employment.

Mining[3]

At present three mines are operating in the study area, Island Copper, Granduc and Tasu.

Island Copper. The Island copper mine is an open-pit mine situated on the North Shore of Rupert Arm, ten miles south of Port Hardy. It is operated by Utah Mines Ltd., and has been in production since 1971. Ore is trucked to the mill where copper and molybdenum concentrates are produced by flotation. Bulk carriers tranship the copper concentrate directly to Japan, while barges carry the molybdenite, encased in 45-gallon drums to Vancouver where it is purchased at the present time by customers from the U.S.

The average number of employees in 1974 was 689 and at present is 850, about 40 percent of whom live at the minesite and a number of the remainder in company provided homes in Port Hardy.

Granduc Mine. This is a copper mine owned by Granduc Mines Ltd., and operated by the Granduc Operating Company. It is situated at the head of Leduc River, in the northern Coast Mountains, 25 miles northwest of Stewart. Both the mine portal, which gives access to the mine by means of a tunnel 11.6 miles long, and the mill are at Tide Camp at the north end of Summit Lake.

Mining is by sub-level caving. After leaving the concentrator the ore is trucked to Stewart loading docks via a gravel-surfaced mining company road about 32 miles long which passes along the valley of the Salmon River and above Salmon Glacier through Hyder Valley.

The daily average number of employees in 1974 was 757, the largest average figure for any of the major metal mines in the province at that time. All employees now live in Stewart and travel to Tide Lake each day by company provided bus.

Tasu. Tasu is an iron and copper-producing mine which is owned and operated by Wesfrob Mines Ltd., a wholly owned subsidiary of Falconbridge Nickel Mines Ltd. It is situated on the south side of Tasu Inlet on Moresby Island and is reached by pontoon-equipped aircraft or boat from Sandspit. Most of the concentrates produced at the mine are sold under contract to Mitsubishi of Japan and shipped directly from the mine by ore carriers. Approximately 175 persons are employed.

A range of housing and services is provided by the mine at the company built and maintained township of Tasu on Gowing Island which is connected by causeway to the mine plant. Services include a post office, hotel, recreation centre and a school which provides education to Grade 7. There is also a small medical hospital for emergencies with a full time doctor and nurse.

Information on the production from these mines is shown in Table 2. The value of metal produced in 1974 was approximately 19 percent of the value of total B.C. metal production.

Table 2

Metal Production, 1974

Mine	Location of Mine	Owner or Agent	Ore Shipped or treated	Product Shipped	Gross Metal Content				
					Gold	Silver	Copper	Molyb	Employment
			1000 tons	1000 tons	1000 oz.	'000 oz.	'000 lb.	'000 lb.	
Island Copper	Port Hardy	Utah Mines Ltd.	11,200.0	C[a] 175.2	42.1	218.9	84,191	1,257.5	689[b]
Granduc	Stewart	Granduc Operating Co.	2,708.7	C 115.1	10.1	617.9	64,056	---	757
Tasu	Tasu Harbour	Wesfrob Mines Ltd.	1,560.0	C 9.3	1.6	68.2	4,010	---	175
				i 1,044.0					
Total					56.4	905.0	153,162	1,257.5	
Total B.C.					162.2	5,841.8	633,936	30,426.2	
Study Area/Total BC production					35%	15%	24%	4%	
Value (approximate)					$9.5 m	$4.2 m	$130 m	$2.4 m	
Total Value (approximate) = $146 m									

Source: BC Department of Mines and Petroleum Resources Annual Report, 1974.

[a] C = Copper concentrate; m = Molybdenum concentrate; i = iron concentrate.

Outlook For Resource Industries

Potential exists for increased forestry development on the Queen Charlottes and Rivers Inlet, with the majority of new jobs over the next 20 years likely to be in the Bella Coola, Ocean Falls region (Midwest Report, p.17)

Fishing may have reached production overcapacity, although such programs as the Department of Fisheries salmon enhancement program and possible future participation in co-operative fish processing operations, for example at Bella Bella, may help to maintain employment in this industry. Ibid, p.18.

Exploration is continually in progress in the mining industry. In the immediate future however, no new mines are being brought into production.

Summary of Sections I - III

The isolation of study area communities is perpetuated by mountainous terrain dividing communities, a fjord coastline with numerous bays and islands, and difficult bedrock to contend with in building highways.

Resource industries provide the economic base for the area and give rise to many communities both of long and short duration. The study area provided something less than one half of the provincial income from the forestry industry, more than half of the landed catch of the fishing industry and about 19 percent of the total value of metal production for B.C.

During the period 1950 - 75 processing plants of both the forestry and fishing industries have been centred in the larger communities.

Emphasis throughout this study will be on the smaller communities, particularly those with populations of less than 1,000.

PART IV

TRANSPORTATION, RECREATION AND TOURISM

Adequate water transportation facilities are essential to the survival of the coastal communities since their economies are based upon resource extraction and most villages are inaccessible by road. Logs must be shipped south to Vancouver or Vancouver Island, and fish sent to Prince Rupert or Vancouver for processing.

A development of signal importance to the region, which as yet is in the planning stages, is a new deep-sea facility at Prince Rupert and an interlinked northern transportation system by means of which coal, grain, potash, timber and other resources will be shipped to southern and overseas ports.

Coastal Passage and Freight Services

Recently a crisis has been precipitated by the removal of a federal subsidy from Northland Navigation Ltd., which provided a freight and passenger service to the small communities along the coast, and the subsequent cancellation of these services. This action was taken by the Government in response to objections from rival companies that Northland was receiving financial assistance on the basis of direct discussions between themselves and DOT without public tendering and without any formal licensing agreements.[4]

Northland's operations were reputed to be efficient and safe and the makeshift arrangements with which they were replaced are inadequate,

particularly the service to Queen Charlotte Islands from Prince Rupert.[5] Northland, however, also had reservations about the economics of continuing to use conventional cargo and passenger ships on the B.C. Coast and as long ago as 1974 had recommended the eventual provision of roll-on roll-off (ro-ro) vessels with limited passenger space to serve the then subsidized ports.[6]

Consideration is being given to various solutions to the problem.* One body of opinion is that air travel is the ultimate answer to providing passenger service to the northern communities and that efforts should be focused on upgrading air facilities throughout the area including navigational aids for aircraft at Bella Bella and an improved ferry service from Prince Rupert to Digby Island airport.[7] In the Bella Coola - Ocean Falls area, Bella Coola businessmen are urging building a proper highway from Williams Lake to Bella Coola with the idea of developing Bella Coola as a second north coast transportation centre with a ferry link to Port Hardy and the new Port Hardy - Kelsey Bay highway.[8] The chief councillor of the Bella Bella Indian Band has stated that a government commission of enquiry is needed to receive input from north coast residents on their transportation problems.[9] Whatever the outcome, the dispute has served to highlight the isolation of the coastal residents.

Besides the federally subsidized service to smaller ports a scheduled BC Highways department ferry service between Kelsey Bay and Prince Rupert has been in operation since 1966. This ferry makes two trips north and south each week, and at present calls at Bella Bella where it takes on board passengers from Bella Bella, Ocean Falls and Shearwater. This

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* Significant progress has since been made towards the resolution of this situation.

latter service will terminate on May 1st, 1977.

Fee structure is a factor which can be used to encourage the use of one form of transportation rather than another, and thus also determine the range of facilities that will be needed for communication and other purposes.

One way ferry fares for car and driver in the summer and off-season respectively are currently $105 and $70; and for single adult passengers $45 and $30. The trip takes 20 hours and is 300 miles long. Passenger movements between Kelsey Bay and Prince Rupert for 1975 and 1976 are shown in Table 3.

Table 3

Passenger Movements between Kelsey Bay and Prince Rupert; 1975 and 1976

Route	Total Vehicles		Total Passengers	
	1975	1976	1975	1976
Kelsey Bay to Pr. Rupert	8,391	7,285	26,199	22,575
Pr. Rupert to Kelsey Bay	8,643	7,676	28,367	24,843

Source: B.C. Ferries

Several factors may have contributed to the diminished volume between 1975 and 1976. Amongst these are an increase in tariff in June 1976; strike threats by both licensed and unlicensed crews during the summer of 1976; and a nation-wide decline in tourist traffic, perhaps due to increased fuel costs. Reduced vehicle and passenger traffic were also reported by Blackball, CPR and Washington State Ferries during this period.

Air Transportation

Total passenger movements through the larger airports on the mid north coast for 1974 and 1975 are listed in table 4 and show Port Hardy to be an important regional transportation throughway.

Table 4

Total Passenger Movements through Selected Airports on the Mid and North Coast; 1974 and 1975.

Airport	Domestic Journeys		Domestic Portions of International Journeys[a]	
	1974	1975	1974	1975
Campbell River	35,270	31,560	2,010	2,990
Comox	29,570	30,980	980	1,150
Port Hardy	58,470	52,800	980	980
Powell River	23,360	22,000	610	760
Pr. Rupert	60,110	55,600	3,570	4,370
Sandspit	23,370	22,710	300	610
Smithers	15,920	14,510	930	1,080
Terrace	56,010	58,080		

Source: Statistics Canada Cat. 51-204

Note: figures include both arrivals and departures

a : Passengers on international flights are probably beginning or completing journeys from these airports according to CP Air.

One way flight costs from Vancouver to Prince Rupert or Sandspit for a single adult passenger, and travel times are approximately $65 and 1.2 hours respectively; i.e. an additional monetary cost of $25 as compared with ferry services, but a saving in time of more than 18 hours. Figures in Table 4 include both arrivals and departures and are therefore not comparable to those for passengers travelling by ferry.

A more complete list of community air facilities is provided in the following table, the majority of which are sea-plane bases only.

Table 5

Communities possessing air facilities (seaplane bases only unless starred).

Community	Landing System	SCH. or Non SCH.[a]	Comm.	Landing System	SCH or Non SCH
* Alert Bay	VFR[b]	s	Port Alice	VFR	ns
Alice Arm		s	*Port Hardy	IFR	s
Bella Bella		s	*Prince Rupert	IFR	s
* Bella Coola	VFR	s	Qu. Char .City		s
Butedale		ns	*Sandspit	IFR	s
Fair Harbour		s	Tahsis		s
Gold River		s	Tasu		s
Hartley Bay		s			
Holberg		ns	*Terrace	IFR	s
Kemano		s			
Klemtu		s	*Tofino	IFR	s
*Mahatta River	VFR	ns	Winter Harbour		ns
Masset		ns	Zeballos		s
Namu		s			
Ocean Falls		s			

Source: Table compiled from Statistics Canada Catalogue 51-204 and conversation with local airline company.

All listed communities have seaplane bases

* Starred communities have airports in addition to seaplane bases.

a Scheduled or nonscheduled flights

b VFR = Visual Flight Rules, IFR = Instrument Flight Rules

Table 5 indicates the scarcity of airports in the region which reflects the fact that there are only a limited number of sites suitable for this purpose.

Information on freight movements through airports was unobtainable from Statistics Canada. However, according to the Mid Coast Study (p. 90) air cargo movements in 1974 were relatively minor compared with air passenger volumes, with the exception of Port Hardy and Sandspit airports where total air cargo movements were almost triple those of such major population centres as Kamloops and Prince George.

Schedule Flights CP Air, PWA, and several small companies provide flights to the following communities.

CP Air: direct flights between Vancouver and Prince Rupert

PWA: flights to Campbell River, Powell River, Port Hardy, Prince Rupert and Sandspit.

Transprovincial Airlines Ltd: Queen Charlotte, Sandspit, Masset, Tasu, Prince Rupert, Hartley Bay, Bella-Bella, Ocean Falls, Kemano, Stewart and Alice Arm.

West Coast Airlines: Tofino, Tahsis, Ocean Falls, Bella Bella,

Bella Coola and Namu.

Island Air: Campbell River, Tahsis, Gold River and Powell River. In addition a number of airline companies supply planes for chartered flights throughout the province , the largest of these being Air West.

At least 200 light aircraft supply scheduled or charter flights in the area.

Barge Transportation

Barge transportation is particularly important on the West Coast of B.C. where more than 90 percent of all freight is transported by this means compared with about one percent on the east coast where most of it is moved by freighter and large laker vessel (a type of vessel used in the lochs on the St. Lawrence Seaway and for the outports on the Labrador coast). Barge transportation however is now on the increase in that region. The gulf of Georgia has the largest concentration of towing industry anywhere in the world.

Reasons for the popularity of barge traffic in B.C. waters as compared with elsewhere are:

(1) nature of the cargo which in part consists of a tremendous supply of forest materials.

(2) nature of the coastline - the inside passage is well-protected with few open stretches.

(3) season length - B.C. barges can be used throughout a 12-month period compared with the east where the St. Lawrence

Seaway is closed from mid December to April and barging must compete with the well-established laker system, which however is also immobilized over the winter.

Of the local barge operations, Seaspan with a fleet of 40 tugs is the largest followed by Rivtow and Gulf of Georgia. Mcmillan Bloedel maintains a subsidiary, Kingcome Navigation for moving its company products which account for about 9 percent of the barge and towing activity along the coast.

Barge operations are mainly unscheduled, volumes to be moved at any particular time varying considerably. Rivtow however also maintains a scheduled service. Products transported include aggregate materials, ore, limestone, building products, fuel, pulp and logs. Certain companies specialise; e.g., Gulf of Georgia carries 60 percent of oil and pe troleum products on the west coast. Companies are unsubsidized.

Ports of call include many small centres both named and unnamed. On the west coast of Vancouver Island most activity is associated with Mcmillan Bloedel's pulp and paper mills at Port Alberni, Tahsis Coy's lumber mill at Tahsis and pulp mill at Gold River (the latter two about 15 miles apart in Nootka Sound) and Rayonier's pulp mill at Port Alice.

Recent developments include a move to eliminate the rafting of logs in favour of self-loading, self-dumping barges which travel to their ports of call empty, loading crews being flown in, usually by chartered plane, to where the men are working. Kingcome Navigation Ltd., for example, has a self-propelled barge which operates almost entirely out of the Queen Charlottes.

Except for Ocean Falls, unloading ports are heavily concentrated in the lower mainland, especially in the Vancouver - Howe Sound area. This can be seen in the following map which shows tons of crude wood materials loaded and unloaded at various centres along the coast (see chart 9). Logs loaded comprise 89 percent of all cargo loaded, and 76 percent of cargo unloaded at B.C. ports.

Main shipping routes may be seen on chart 17 of Part XIII. Traffic in Hecate Strait is not heavy with '995 movements including tug and barge runs' being reported 'for one recent year', compared with 5,964 vessel movements along Tolmie and Grenville Channel - which together provide the 'inside' northcoast passage (Vancouver Province, 6 April, 1977).

A set of new radio regulations to improve the safety of tugboat operations was announced at a recent towboat industry conference at Harrison Hot Springs.[10] Discussion of radio facilities used by barges, other marine vessels and also aircraft including radiophones and other navigational aids will be reserved for later chapters.

Roads

A perusal of chart 9a will reveal how few main roads there are in the study region, the route from Prince George to Prince Rupert being the only well-developed highway on the mainland.

For the 210 miles to Anahim Lake, the Williams Lake - Bella Coola Valley road link is satisfactory but the last 90 miles is narrow and treacherous. A scheduled bus service makes three trips a week to Bella Coola, however, even through out the winter, and a freight service delivers goods according to a similar schedule. Mail is sent by air.

Other main roads in the area link Queen Charlotte City and Masset, Campbell River and Gold River, and Port Alberni, Tofino and Ucluelet. The previously mentioned highway link from Kelsey Bay to Port Hardy is scheduled for completion by 1980 and this should accelerate the development of northern Vancouver Island, and of Port Hardy in particular, the population of which, it is thought, could increase to 8,000 people by 1991 (Mid Coast Study, p. 152).

Railways

The CNR railway line from Prince George to Prince Rupert provides the only railway link in the study region. Forest products, grain and mineral freight comprise the bulk of goods carried.

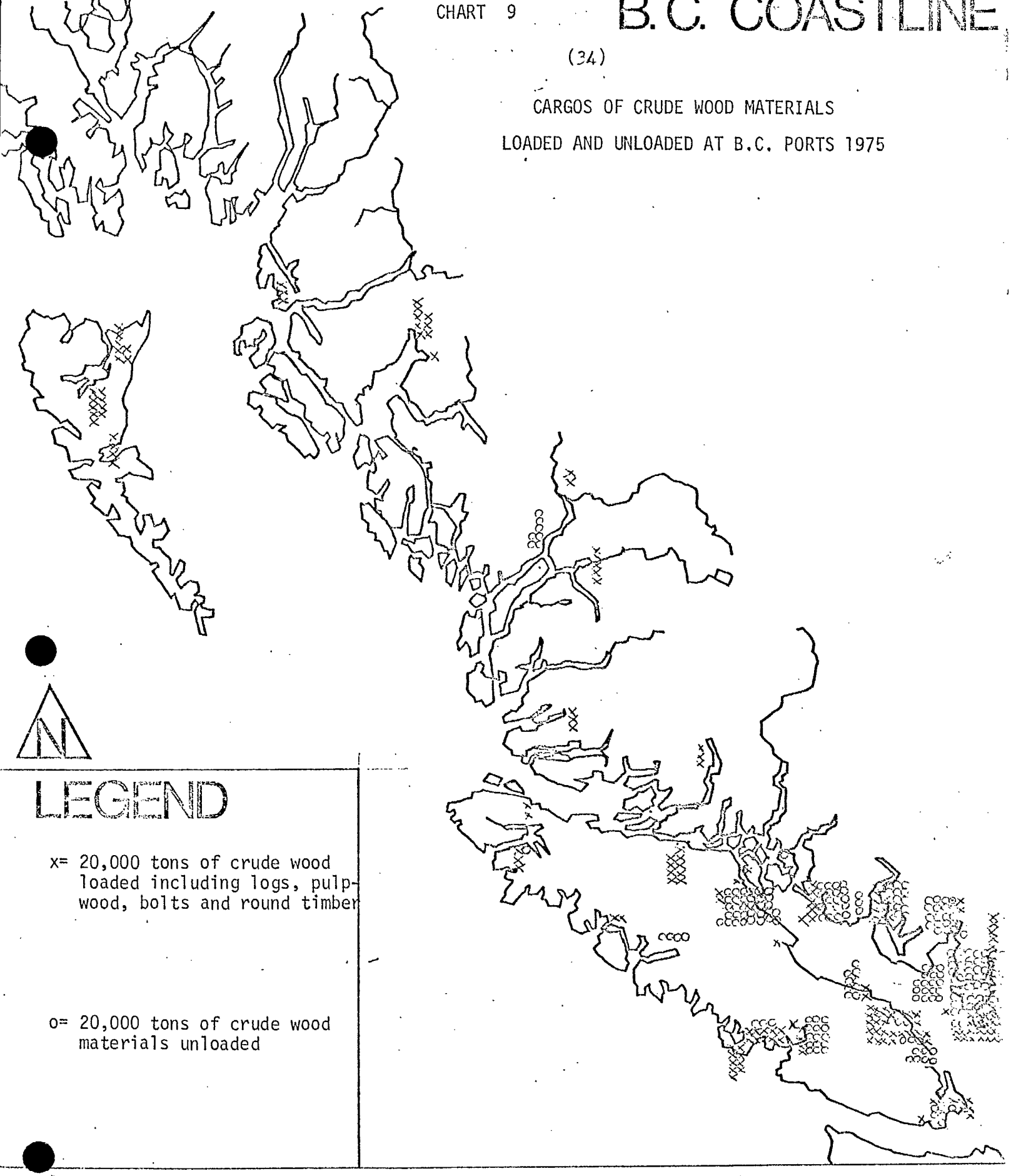
CHART 9

B.C. COASTLINE

(34)

CARGOS OF CRUDE WOOD MATERIALS

LOADED AND UNLOADED AT B.C. PORTS 1975



LEGEND

x= 20,000 tons of crude wood loaded including logs, pulpwood, bolts and round timber

o= 20,000 tons of crude wood materials unloaded

Source: Map is compiled from Statistics Canada Catalogue 54-204, Shipping report, part 3. Cargoes handled at Canadian Points in Coastwise Shipping.

Note: 32 percent of logs loaded and 10.5 percent of logs unloaded have not been accounted for.

Chart 9a

BC Ferries Systems and Roads

LEGEND

BC Ferries

Water taxi .....

Main Highways

Unrestricted roads

Restricted roads ----------

Rail access is looked upon as the key to the development of the north, and, as mentioned earlier a system of branch lines is being planned to feed the new Prince Rupert super-port. The BC Rail extension from Summit Lake to Dease Lake is part of this plan and now reaches to Chipmunk on the Driftwood River. Ballast is laid for the track from there to Dease Lake and the full extension should be complete in about a year.* Freight to be carried on this route will include lumber from the northern region and asbestos from the Cassiar mine.

Coal from the new Chetwynd development will be transported to Prince George by B.C. Rail, and from there to Prince Rupert via the CNR railroad.

Though the above developments are taking place outside the boundaries of the study area the increase in freight traffic will make a significant impact on the northcoast area.

Recreation and Tourism

With national parks at Longbeach and stretching from Bamfield to Cloose; and a marine park at Flores Island, the west coast of Vancouver is growing in popularity as a tourist area. The north coast of Vancouver Island should become similarly popular with the opening of the newly established provincial park at Cape Scott and the completion of the highway link between Kelsey Bay and Port Hardy. With their more difficult access,the Bella Coola Valley area and the Queen Charlotte region are likely to remain fairly stationary from the tourist point of view.

* Work on this extension was suspended indefinitely April, 1977.

Hunting and Fishing. Hunting and fishing offer great variety throughout the region. Game animals on Vancouver Island include Coast or Columbian blacktail deer, cougar, and black bear; also wild fowl are abundant. Grizzly bear which are generally found only in remote areas of rugged terrain are plentiful in the ranges of the Bella Coola area and northwards, as are also blacktail deer and mountain goat. On the Queen Charlottes, game species are limited to Sitka deer, black bear and elk (wapiti).

Indians from the Bella Coola Valley both hunt, and act as guides for visiting parties of hunters. Forms of electronic communication used on these expeditions has not been investigated. Enquiries may reveal, however, that the use of such facilities as trail radios could add significantly to the safety of these pursuits.

Fishing is popular in the coastal inlets, seaplanes being chartered by U.S. and Canadian sportsmen for transportation into the fishing grounds. The sports catch mostly consists of Chinook, Coho and Pink salmon, and the usual method of fishing is trolling.

Boating. The west coast with its impressive scenery and many relatively sheltered waterways offers a remarkable opportunity for the boating public whose numbers are increasing steadily. One large sales organisation contacted, which has been in business for seven years, reported that there has been an industry-wide increase in the sale of pleasure craft, sales increasing for this firm over the years 1974 - 77 as follows (see table 6).

Table 6

Pleasure-craft sales of "The Boat Place" 1974 - 77.

Year	Vessels sold	Valve of vessels sold $	Sales Growth %
1974	175	780,000	14
1975	200	1,200,000	20
1976	240	1,600,000	25 [a]
1977 (estimated)	300		

Source: Verbal report from company representative.
[a]: Projected figure

Boat-owning households numbered about 100,000 in the south coastal area of B.C. in mid-1975 according to the Small Craft Harbours Branch of DOE; and of these, about 5,000 were owned by residents on the west coast of Vancouver Island & half of the 5,000 in Port Alberni (Marine Policy, p. 5). DOE further estimated that in 1976 approximately 10,500 non-resident boats would enter B.C. waters. Boat usage, including resident, non-resident, borrowed and rented was estimated to be, on average, 21,600 boats out per weekend day/night from July to August, 7,860 from June to September, and 2,300 from October to May.

Only about 35 percent of these craft have radio equipment according to the firm contacted, and in some cases, the equipment consists of CB radio only, which can be used to contact other boats, but neither the coastguard nor B.C. Tel.

Summary

Marine transportation and particularly barge transportation, is of vital importance in the coastal region because of a general absence of roads and railways and the huge tonnage of raw resource products to be transported to centralized processing plants in larger ports.

A most important development, at present in the planning stages, is a new deep-sea facility at Prince Rupert and an interlinked rail transportation system which when completed will make a significant impact on the north coastal area.

Marine passenger transportation is at present undergoing a period of reorganization.

Air transportation to Prince Rupert and the Queen Charlottes is on the whole preferred to ferry transportation. Airports in the region are limited in number, a fact which reflects a general scarcity of suitable sites.

Recreational potential on the west coast is considerable, with fishing and pleasure-boating particularly popular.

New regulations concerning the use of electronic equipment by towboats have been recently introduced. According to verbal report, only about one third of the unregulated boat-owning public uses radio equipment.

PART V

THE COMMUNITIES

Six percent of the population of B.C. live in the regional districts of Alberni-Clayoquot, Central coast (formerly Ocean Falls), Comox-Strathcona, Kitimat-Stikine, Mount Waddington and Skeena-Queen Charlotte, which together contain the study region. About one third of this number, or approximately two percent live in the small villages along the coast.

The following census figures show the distribution of population and intercensal population trends in the above regional districts.

Table 7

Preliminary Regional District Population Counts: 1971 and 1976 census data.

Regional District	Population		Percent change
	1971	1976	
Alberni-Clayoquot	31,747	31,737	0.0
Central Coast	4,215	4,133	-2.0
Comox-Strathcona	47,345	55,761	+18.0
Kitimat-Stikine	37,326	38,098	+2.0
Mt. Waddington	10,408	12,306	+18.0
Skeena-Queen Charlotte	22,299	21,917	-2.0
Total	153,340	163,952	+6.0
Total B.C.	2,184,621	2,406,212	+10.0

Source: Statistics Canada

With the exception of Comox-Strathcona and Mt Waddington districts, in which most of the growth has been in northeastern Vancouver Island, population growth in the regional districts of the study region have been less than that of B.C. as a whole. A downslide in the forest industry in 1976, and serious labour troubles in Terrace and Kitimat may have contributed to the small growth in the Kitimat-Stikine area. As already mentioned, the emergence of Port Hardy as an important terminal for coastal freight and passenger transportation and the upgrading of highways on northern Vancouver Island is likely to result in a spurt in population growth for that area.

Indian Communities

Unlike the native tribes of the interior, the coast Indians are descendants of stable communities, who depended on an abundant supply of fish for food and were able to devote time to the construction of relatively permanent homes and to cultural pursuits such as totem pole carving. Despite the traumatic experience of adjusting to an alien culture, the leadership strength of the coastal tribes is clearly evident today. For example, the Native Brotherhood of B.C. begun as an intertribal organization of Tsimshian and northern Kwakiutl villagers is now a labour union for all coastal native fishermen, shoreworkers, and tendermen; and is also actively engaged in the protection of the aboriginal fishing rights of native people in B.C. Major capital investment loans and grants from the government have been obtained by the Prince Rupert and area natives. In the current transportation

crisis, precipitated by Northland Navigation Ltd's withdrawal of passenger and freight service, the well-organized Bella Bella band Council have emerged as a strong voice.

The trend now is for native groups to negotiate with the provincial and federal governments on a tribal basis, rather than community by community, and fishing rights and land claims are high on their list of priorities. At present, the Native Brotherhood are extending their area of responsibility to co-ordinating land claims as well as fishing rights for interested Bands and Indian organizations.

In spite of growing leadership strength, however, the social and economic position of Indians in comparison with non-Indians in the study region is extremely poor with a higher proportion of unemployables amongst Indians than participants in the labour force.

Indian reservation population figures for the two censal periods are as follows:

Table 8

Preliminary population counts, Indians on Reservations; 1971, 1976.

Regional District	Population		% Change
	1971	1976	
Alberni-Clayoquat	1,165	1,112	-5.0
Central Coast	1,280	1,452	+13.0
Comox-Strathcona	897	775	-14.0
Kitimat-Stikine	4,963	5,429	+9.0
Mt. Waddington	1,265	1,179	-7.0
Skeena-Queen Charlotte	1,805	1,778	-2.0
Total	11,375	11,722	+3.0

Source: Statistics Canada

Population increase for Indians living on reservations has been 3 percent compared with an overall regional increase (including Indians on reservations) of 6 percent. Indians on reservations represent approximately 7 percent of the total regional district population, and this proportion has remained the same over the period. Reservation populations have increased in the central coast and Kitimat-Stikine regions, and declined elsewhere.

Incomes

Average household incomes for study area communities on Vancouver Island and for a selection of communities on the mainland are shown in table 9 .

Table 9

Average household incomes for study region communities: 1971*

	Non-Indian			Indian			
	Modal Ethnicity (% Indian)	Average Income ($)	% of B.C. Av. Income	Modal Ethnicity (% Indian)	Ave. Income ($)	% of B.C. Av. Income	Ind. Incomes / Non-Ind. Incomes (%)
Vancouver Is.	2.7	10,926	115.0	97.7	5,873	62	54
Mainland	5.7	9,385	99.4	92.7	6,547	69	70
Average B.C. household Income: $9,437							

Source: DOC Data Base which contains all communities of 30 or more persons on June 1, 1971.

*Figures are reasonably complete for Vancouver Island, non-available for Queen Charlotte Islands, and incomplete for mainland communities which include the following: non-Indian - Smith Inlet, Calvert Island, Namu, Kwatna Inlet, South Bentinck Arm, Lower Bella Coola, Hagensborg, Firvale, Shearwater, Ocean Falls, Kimsquit; Indian - Church House, Gilford Island, Rivers Inlet, Bella Coola, and Bella Bella.

Communities with higher incomes tend to be smaller resource-oriented towns, with unemployed persons presumably moving elsewhere. A great disparity will be observed between communities of high and low ethnicity probably reflecting the fact that numerous persons are unemployed and on welfare in the former; and also that the native labour force

tends to be poorly educated and untrained.

Although income figures are not available for the small Queen Charlotte communities, with the exception of Queen Charlotte City (ethnicity 30%); Masset (ethnicity, 44%), and Tlell (ethnicity 13%) all are of low ethnicity and based on logging or mining. Average household income are therefore, expected to be higher in this region.

Employment

The following table gives an idea of the percentage distribution of the labour force in various regional districts both within and outside the study area.

Table 10

Percentage distribution of labour force by industry and by regional district: midcoast region, 1971.

Regional District	Primary Industry	Manu-facturing	Construc-tion	Trans-portation	Finance & services	Pub. Adm. & Defense	Others
Comox-Strath-cona	17	15	4	6	35	14	9
Mt. Wadding-ton	40	13	3	6	21	9	8
Ocean Falls	19	27	10	8	25	-	11
Powell Riv.	4	49	2	3	33	2	5
Skeena-Queen Charlotte (part)	35	4	5	7	24	12	14
Total Midcoast	18	22	4	6	32	10	8

Source: Mid Coast study, p. 31.

Most manufacturing in the regions of table 10 consists of resource processing so that 40 percent of employment in the area is directly resource-based; and more than 50 percent in the Mt. Waddington district.

An occupational cross-section of Unemployment Insurance applications for November and December 1976 in coastal B.C. is provided in table 11; and in table 12, numbers and percentages of applicants for selected coastal communities showing the lowest and highest seasonal peaks.

The precariousness of employment in the region is indicated by substantial increases in unemployment in the resource industries, particularly in forestry, in which category in Vancouver Nth Island applications increased from 289 (8.6% of total population) to 2,977 (40%) between November and December. In this case the layoffs were described by the forest companies as "temporary" and were caused by a buildup of inventory in the logging industry.

Communities with a high level of unemployment and large increases in unemployment in table 12 are mainly fishing based, though Juskatla and Franklin River are forestry communities. More than 40 percent of the coastal claimant figures exceed the July provincial figure of 5 percent while 69 percent of July-January increases exceed the B.C. figure of 6 percent, the overall July-January increase for all coastal communities reaching 9 percent.

Age, Sex and Family Structure

Several studies have documented the youthful structure of the population of the study region; e.g. the Mid Coast Study (p. 29) states that this is particularly evident in Mt. Waddington and Queen Charlotte

TABLE 11

Unemployment Insurance Commission Claimant Statistics for Selected Areas of B.C.: November, December, 1976.

eg. District	Fishing	Forestry	Mining	Construction	Clerical & Related	Services	Total
Van. Nth Is. incl. Powell River							
November	37 1.1%	298 8.6%	43 1.2%	977 28.8%	1,200 34.6%	890 25.6%	3,465 100%
December	211 2.8%	2,977 40%	148 2.0%	1,635 21.9%	1,286 17.3%	1,198 16%	7,455 100%
% Change Nov-Dec	+470%	+898%	+244%	+63%	+7%	+35%	+115%
Van. Sth Is.							
November	6 .2%	144 4.1%	13 .4%	968 27.4%	1,300 36.8%	1,100 31.2%	3,531 100%
December	35 .7%	745 14.8%	47 .9%	1,511 29.9%	1,341 27.0%	1,366 27.0%	5,045 100%
% Change Nov-Dec	+483%	+418%	+361%	+56%	+3%	+24%	+42%
Skeena Nthn							
November	21 1.7%	161 12.8%	0 0.0 %	418 33.1%	356 28.2%	305 24.2%	1,261 100%
December	107 5.0%	446 21.2%	27 1.3%	686 32.6%	409 19.4%	430 20.4%	2,105 100%
% Change Nov-Dec	+409%	+177%	n.a.	+64%	+15%	+41%	+66%

Source : Unemployment Insurance Commission. LMA CMC printout.

a Sharp increase between November and December in the forestry industry were caused by temporary logging layoffs due to build up of inventories which lasted for approximately 6 weeks starting from 1 December 1976.

TABLE

Unemployment Insurance Applications in selected communities of the study region. : July 1976 and January 1977

Community	Applications July 1976 (1)	Applications/ Population(%) (2)	Applications January 1977 (3)	Applications/ Population(%) (4)	(4) - (2) (5)
Ahousat	5	0.8	27	4.5	+3.7
Aiyansh	2	0.4	6	1.1	+0.7
Bamfield	14	9.7	40	27.0	+17.3
Bella Bella	12	1.5	44	5.6	+4.1
Bella Coola	89	11.6	182	22.7	+12.1
Canyon City	7	8.9	7	8.9	0.0
Coal Harbour	22	6.6	18	5.4	-1.2
Franklin River	2	1.0	24	12.8	+11.8
Gold River	63	3.3	78	4.1	+0.8
Greenville	17	5.3	38	11.7	+6.4
Hagensborg	17	5.4	3	.9	-4.5
Hartley Bay	13	4.3	42	20.7	+16.4
Holberg	12	1.7	49	7.0	+5.3
Juskatla	3	2.1	26	18.3	+16.2
Kincolith	27	7.2	37	9.9	+2.7
Kingcome In.	3	1.8	5	3.0	+1.2
Kitimat	384	3.1	491	3.9	+0.8
Kitkatla	24	4.0	82	13.7	+9.7
Klemtu	14	6.8	27	13.0	+6.2
Kyuquot	6	4.5	18	13.3	+8.8
Masset	90	6.0	162	10.7	+4.7
Metlakatla	3	4.1	6	8.1	+4.0
Nass River	18	12.9	21	15.0	+2.1
New Aiyansh	13	2.5	75	14.5	+12.0
Ocean Falls	37	2.5	30	2.0	-0.5
Pr. Rupert	848	6.0	1,880	6.2	+0.2
Pt. Alice	46	3.1	47	3.1	0.0
Pt. Clements	17	4.2	63	15.6	+11.4
Pt. Edwards	59	5.8	186	18.3	+12.5
Pt. Hardy	187	5.2	293	8.2	+3.0
Pt. Renfrew	8	2.2	77	21.1	+18.9
Pt. Simpson	122	15.4	217	27.0	+11.6
Qu. Charlotte	78	8.0	192	18.1	+10.0
Sandspit	26	5.7	76	16.5	+10.8
Sewell Inl.	7	5.5	13	10.1	+4.6
Skidegate	6	?	31	?	?
Stewart	65	2.8	67	2.9	+0.1
Tahsis	52	3.2	50	3.0	-0.2
Tasu	10	3.2	5	1.5	-1.7
Terrace	925	6.8	1,357	10.0	+3.2
Tlell	3	12.5	10	42.0	+29.5
Tofino	9	15.0	158	26.0	+11.0
Ucluelet	99	8.5	315	26.9	+18.4
Winter Harbour	5	4.8	71	10.5	+5.7
Zeballos	18	5.5	51	15.5	+10.0
Total	3,498	5.2	6,495	9.6	+4.4
B.C. Total	121,077	5.0	143,632	6.0	+1.0

Source : Compiled from Unemployment Insurance Commission Regional Summary of Claimant Distribution and DOC Pacific Regional Data Base.

districts where the 1971 under 35 years age group represented slightly more than 72 percent of the population compared with the provincial figure of 59 percent; the 25 - 34 years age group, 19 percent compared with a provincial figure of 13 percent.

Males outnumber females in almost all of the study communities, particularly in logging settlements. For example, Juskatla and Port Clements, whose populations numbered 142 and 406 respectively in 1971 had male/female ratios of 1.36 compared to a ratio of unity for the province as a whole.

Families tend to be larger, with 39 percent of persons belonging to families of 5 or more in the midcoast region as compared to 33 percent for the remainder of the province (mid Coast Study, p. 30).

Characteristic of the communities as a whole is high labour turnover in industry and an inverse ratio has been found between quit rates and the availability of satisfactory TV services in an area by a Simon Fraser University research team (Maki et alia, 1976).

Amenities

Although above certain population levels small communities generally have police service, local roads, Department of Health and Welfare services and in some cases a nursing station and hydro power, adequate educational and recreational facilities are often seriously lacking. Social indicators such as high school drop out rates alcholism and crime rates tend to be abnormally elevated; and women have special difficulties rearing families on their own while husbands are away on logging operations or fishing expeditions. Also women are generally underemployed partly because of

sex-stereotyping of occupations in the resource and resource-related industries, but also because of inadequate social support services such as daycare centres. All of these problems tend to be accentuated in the Indian communities of the study region.

Amongst needs identified by the Mid Coast report which might more particularly concern DOC are:

(1) the need for effective systems which would increase access to regional employment for minority groups in the labour force

(2) the need for more effective systems for delivering an adequate range of social/institutional services to help reduce regional social inequalities.

More will be said of these needs and of ways in which they might be met as the study proceeds.

Education

All children in B.C. have access to public schooling where there are not sufficient children to operate a local school, bus transportation to larger centres is provided. On the west coast of Vancouver Island some children use ferry services. Where remoteness prevents children from attending a daily school they are flown to residential schools e.g., after Grade 8, children from Klemtu are flown to Terrace.

Recent developments in the northern areas include a large and well appointed school at Aiyansh; and two smaller schools at Greenville and Kincolith each of which will eventually provide education to Grade 12.

In view of an Indian vocational counsellor who was asked if poor TV and radio services are hampering the provision of education in particular communities, the need for these media in the education field is of secondary importance to the need for adequate audio-visual facilities. According to him, people in isolated and remote areas are not aware of what is available to them in terms of educational or employment opportunity programs; little is being done to provide opportunities for native children, or to improve the social atmosphere in their communities; and a particular need exists for information on pursuits in which Indians can participate in a communal way. These needs, in his opinion would best be met by the provision of audio-visual facilities and selected programs.

With the recent establishment of Northwest College in Terrace and North Island College on Vancouver Island whose mandate is to provide for the post-secondary needs in their areas, including the needs of outlying communities, a beginning has been made towards improving this situation. Up to now, as far as Indian Reserves are concerned, although persons have been brought to the college to attend courses, apart from some programs conducted at Kitimaat Village, Greenville and Aiyansh, most of what has been accomplished has been of a preparatory nature. Several communities including Kincolith, Masset, Skidegate and Stewart are at present under review for future programs.

North West College has adequate audio-visual facilities and personnel; and transportation also where road access to communities is possible. They are thus independent of TV and radio. North Island College on the other hand, makes use of CATV and is considerably hampered in its operations by the poor quality of this medium in many of the areas for which the college is

responsible.

A course of interest to the DOC which is held in Prince Rupert by Northwest College, and at Alert Bay by North Island College is a Fisherman's Upgrading Course the last Prince Rupert session of which was geared towards preparing fishermen to obtain their radio licences. Representatives from DOC would be welcome to participate in presenting material on these programmes according to the principal of the college.

Health Services

Most of the small communities are served by health stations into which medical personnel fly to hold clinics. These are described as 'nonoccupied'. Others have 'holding wards', and generally one resident trained nurse. Hartley Bay however, has two nurses. Stations are, for the most part, connected by radiotelephone with BC Tel or CN/CP. In some cases RAVEN Radio is used, because carrier services are not available. Communication services with some of the health stations are provided for, as follows (see table 13).

Most radios on health stations are owned by B.C. Health Services. The radio at Kingcome Inlet, although used by B.C. Health Services, is owned by DIAND.

Radio communication problems are, according to report, experienced at only one station, Nitinat, which is close to, but not within the study region.

Table 13

Communication Services Used by B.C. Health Department

OCCUPIED STATIONS		
	BC Tel	
RAVEN	Radio telephone	Landline
	Hartley Bay	Alert Bay
	Kincolith (HF radio to Vancouver)	Masset
		Port Hardy
		Prince Rupert[a]
		Tofino
NONOCCUPIED STATIONS		
	BC Tel	
RAVEN	Radio telephone	Landline
Friendly Cove	Churchhouse	Ahousat
Queen's Cove	Fort Ware	Banfield
	Guildford Island	Hot Springs Cove
	Kingcome Inlet	New Quatsino
	Klemtu	Opitishat
	Owekano	Shell Beach
	Aiyansh (?)	Ucluelet

Source: Telephone conversation with officer of BC Health Services

a : The health station at Prince Rupert is classified as a 'clinic'; and is also the location of the head office for northern B.C.

Summary

Approximately 2 percent of BC's population live in the small towns and villages of the study area. In the past five years, populations in the mainland north coastal areas and Queen Charlottes have declined. Port Hardy area on Vancouver Island has experienced fast growth and this is expected to continue.

Native Indians on reservations represent about 7 percent of the total regional population. In general, populations of the study area tend to be more youthful, families larger and M/F ratios higher than in the province as a whole.

Household incomes in the smaller resource-oriented towns tend to be higher than the B.C. average, while those in Indian communities tend to be far below that figure.

A major part of employment is concerned with the harvesting and processing of raw materials, which though only providing seasonal employment in many cases, when supplemented by UIC payments, provides a viable income.

High quit rates in industry are characteristic and a negative relationship has been documented between this variable and the presence of satisfactory TV in communities.

Adequate educational and recreational facilities are often seriously lacking, and in the smaller communities children are required to leave home to acquire a secondary education. The provision of audio-visual facilities and programs geared to Indian needs could probably accomplish

much to improve the social atmosphere on reservations. Regional colleges have recently been established in various parts of the province which will attempt to meet the needs of the small communities at the post-secondary level. Poor quality CATV or lack of these services in some areas hinders the work of North Island college which uses this medium to present selected programs.

As far as health services are concerned, B.C. Health department enjoys satisfactory communications with its community health stations through out the study region.

PART VI

TELECOMMUNICATIONS: TELEGRAPH AND TELEPHONE

The main telecommunications facilities in the area are owned and operated by BC Tel which is a subsidiary of the U.S. based General Telephone and Electronics Corporation (GT & E). In addition, several private systems are operated along the coast by such organizations as the Ministry of Transport (MOT), Department of Environment (DOE), RCMP, BC Government (BCG), McMillan Bloedel, BC Packers, BC Hydro and others.

DOC is concerned withthe orderly development of telecommunications services and preventing unnecessary duplication of expensive facilities as far as possible.

What follows in this and succeeding parts is a description of the services which exist in the study region with a view to providing an understanding of why certain areas are underprovided with these services, why certain organizations choose to install their own systems rather than use of the common carrier; and also to identify individual situations where the supply of telecommunication services might be improved.

Telegraph and telephone services will be discussed in Part VI of the study, broadcast services in Part VII and private systems in Part VIII.

A. TELEGRAPH SERVICES

Technological progress is changing the face of the telegraph industry in B.C. as elsewhere in Canada. A recent DOC study has shown that only 8% of telegrams are now filed over the counter which means that with wide area telephone services available, there is now only a small need

for telegraph offices in each community.

The same study has shown that the service is an elastic one with 75% of telegraph traffic being provided by industry, for which sector the service must complete sucessfully with automated substitutes such as TELEX to remain viable; and that across Canada the industry is losing money.

Two areas for which ready substitutes are at present unavailable are:

(a) overseas message services - since most countries have considerably lower telephone penetration rates than Canada and the USA and

(b) money transferal services - which represent less than 5% of the volume of business (and it is said will be outmoded eventually by developments such as home located touch-tone devices which will electronically authorise money transfers from bank accounts).

In order to increase revenues, the companies have the alternatives of increasing prices or adopting cost-cutting measures such as closing down offices - which has been taking place over several years. These are both sensitive approaches with on the one hand, price increases resulting in loss of custom to other media and on the other the closure of offices necessitating drastic staff reductions (from 8,000 employees in Canada in 1967 to approximately 1,000 today) with serious social and economic consequences for longer term employees who are not readily retrainable for other occupations. As might be expected a strong campaign has been conducted by the unions in order to keep offices open.

These evolutionary changes are manifest in the study region as elsewhere in B.C. where until about 6 years ago independent message services were conducted by CN and CP. At that time amalgamation took place and today telegraph offices are shared by CN and CP; but north of the BC Rail mainline, administration and payment of salaries is the responsibility of CNT, and south of the line of CPT.

Offices are located at Prince Rupert, Kitimat, Terrace, Queen Charlotte City and Victoria and are only open during the day. From all other locations in the study region, and at all other times telegrams may be sent through the Vancouver office by using the BC Tel provided WATS service which allows free dialling from any locality in the CP administered area. A similar service by CNT allows free dialling from northern locations to the Edmonton CNT main office.

Over the long term the demise of the system is considered inevitable by well informed sources. Decisions as to whether the federal government should subsidise the service in parts of the study region as has been done in Labrador, should be based upon factual records of levels of use in relation to tariffs charged such as might be available from the DOC Headquarters study; and also on the availability of telephone services in individual areas.

B. TELEPHONE SERVICES

Two telephone companies provide services to coastal communities, Prince Rupert, which confines its operations to Prince Rupert City, and BC Tel, which serves the remainder of the region. In addition, RAVEN Radio, an HF communications network, developed to serve isolated

communities is used by most of the Indian Bands.

Within communities not provided with exchange facilities, CB radios fulfil the need for inter-house, and house to community base station communication. In some instances, e.g. at Holberg, 'ham' radios provide additional links both to the immediate and outside worlds.

Telephone Service Sequence. The provision of communication facilities in an area usually follow a particular sequence:

1. MF/HF radio-telephone
2. VHF/PSRT's and rural radios
3. local exchange services with a connecting VHF/microwave radio toll system
4. with the establishment of the toll radio system, services such as data transmission, radio program channels and TV.

Radiotelephone

Radiotelephone, whether in the public service bands, HF or VHF is probably the most economical means of serving small communities. Problems for the telephone company lie in (1) providing power for sets, (2) finding persons in particular communities with adequate technical training to operate the radios, (3) providing maintenance services for radios and (4) bill collection.

Where no power source is available, wind, diesel or propane generators are used to charge batteries which are in turn used to power the sets, so that in the event of a complete power failure,

the community still has radio communication.

All of the above-mentioned items require maintenance which becomes extremely expensive in certain isolated communities. For example Kincolith where this type of system is used, until relatively recently could only be reached for maintenance work by float plane at high tide.

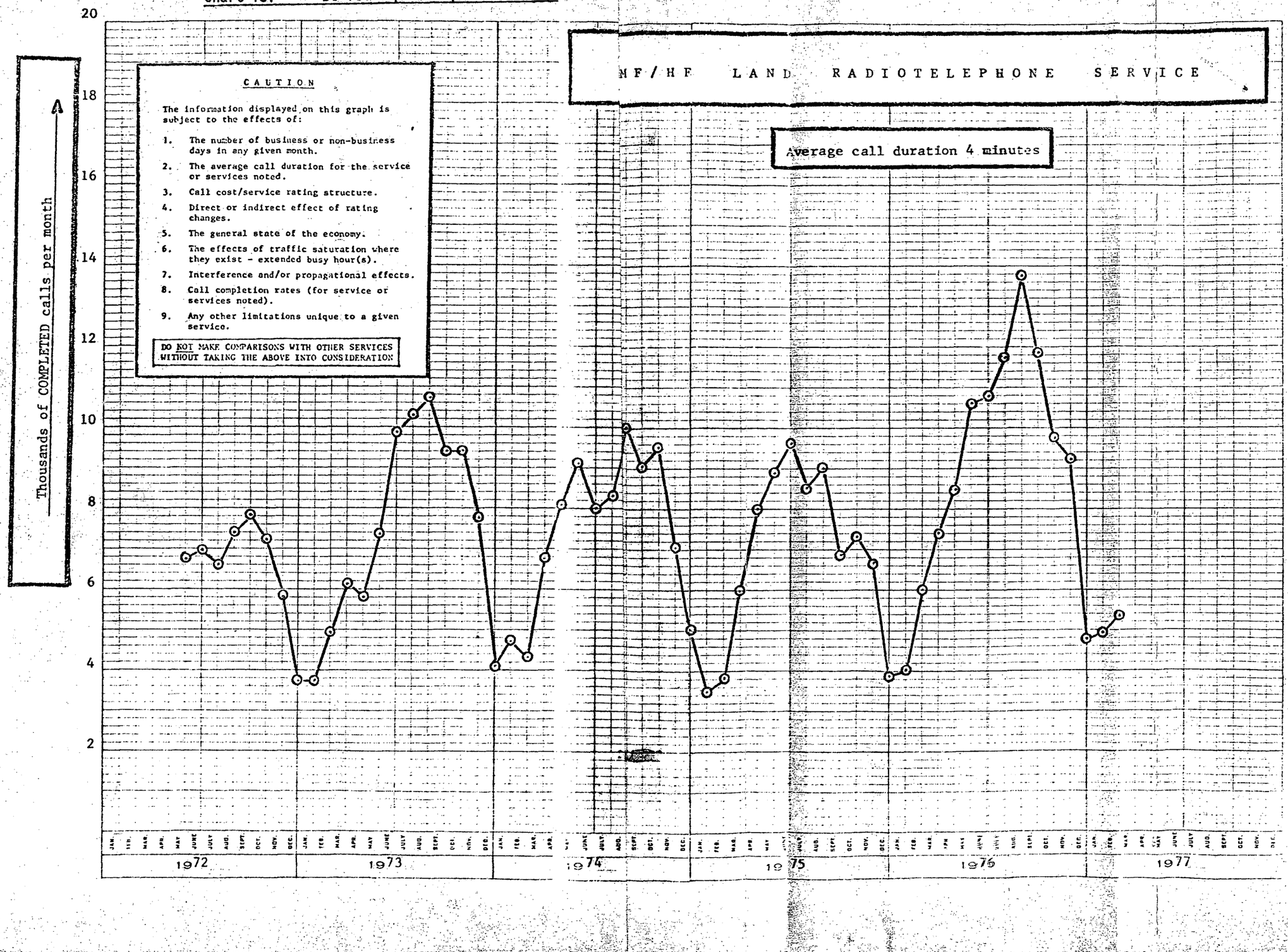
Usually it is the responsibility of the radio operator to also collect the bills and some communities fall into arrears in this respect with the result that services are suspended e.g. Kincolith, Churchhouse, Canyon city and Greenville have been in this predicament for varying periods of time.

HF Radiotelephones

Two HF radio services are provided by BC Tel, a land and a boat service. In this section we will be concerned with the land service which is available to individuals or groups anywhere who are prepared to purchase radios and pay the bills. (Exceptions to the general rule of subscriber ownership of the radios occur in the cases of 3 BC communities, including Kincolith in the study region, in which for various historical reasons the radios are provided by B.C. Tel).

Chart 10 shows completed call data for BC Tel's MF/HF service 1972-77. The general state of the economy is considered to be the most important factor in influencing the variations.

Chart 10. BC Tel MF/HF Completed Calls.



BC Tel HF radiotelephone facilities are used by Indian Bands, logging and mining communities, and in many cases private individuals.

Twelve channels on the frequency range 2 - 12 MHz are assigned to BC Tel for HF radio communication, the extremes of which are determined by the requirements of the seasons and the sunspot cycles. Some channels are overloaded and BC Tel is at present experimenting with distributing the load more evenly amongst channels and bringing in new channels as they are needed. A complete communications failure with all channels unusable is a very rare occurence. Because there may be only 1 - 3 channels that are physically supported by the atmosphere at any one time however, it is not realistic to describe HF radio in terms of number of radio channels available.

Rates are based on direct distance between caller and party called, as are rates for VHF radiotelephone andregular land telephone services.

RAVEN Radios at several locations in the study area are licensed to use BC Tel HF frequencies.

VHF Radiotelephone

In terms of ease of use, and cheapness of installation VHF radiotelephone is preferable to HF radiotelephone. Depending upon

altitude relative to the surrounding terrain, a VHF transmitter may have a service distance of 30 miles compared to province wide range for an HF transmitter.

Coverage of all mobile radio and other VHF services throughout the province is provided by 13 channels which are reproduced a number of times in separate areas, selected in order to avoid interference with each other.

Provision of VHF services to a community is determined by channel availability and cost. According to BC Tel the latter is sometimes low, e.g. if transmitter and receiver are placed on an accessible building in a city; but if on a mountain-top site requiring a battery powered helicopter-transportable installation, and perhaps an intermediate connecting link to the toll network, costs can quickly escalate to $100,000 or more.

Rural Communications. BC Tel has a policy of improving rural communications at present. This involves providing in some cases extra PSRT's, in others, cable loop extenders of various forms, and in yet others 'rural radio' i.e. instead of using a public service channel to reach a remote community, such as a logging camp, a private frequency might be used which then functions as a trunk. This system is frequently employed.

Cross-subsidisation and Government Assistance

Today, CRTC are empowered to require that carriers extend services to isolated Canadian communities where this is deemed desirable. An

encouragement to the companies, however is the recent government acknowledgement that the practice of cross-subsidization of uneconomic areas from the proceeds of economic areas has in some cases already reached practicable limits and that government "has a responsibility to assist the carriers to meet their service responsibilities" if the standards described above are to be maintained. (Sauve, 1976)."

BC Tel Services to Study Communities

Table 14 shows telephone services to pre-level (1) and level (1) and (2) communities. Communities receiving exchange service are listed in Appendix (A).

Prelevel (1) Communities. Yuquot Reserve, a Nootka reserve at Friendly Cove, which is supplied with RAVEN radio is the only community in the study region without BC Tel facilities.

Level (1) Communities. Logging camps, although often small and seasonal are usually supplied with at least BC Tel HF radio telephone for personal calls, and private radio communication to head offices in larger centres for business purposes, e.g. Kwatna Inlet a seasonal camp in Burke Channel operated by Allison Logging Company has this arrangement, the head office being in Vancouver. South Bentinck Camp, a Crown Zellerbach logging camp in the same area is similarly supplied. Other level (1) communities include Esperanza which is large enough to have a 21-bed hospital and hotel and is the location of a RAVEN radio which is also fitted with a B.C. Tel frequency; Kincolith which is a large but isolated community, and is scheduled to receive exchange services in 1978; Kyuquot, which in addition

Table 14

Study communities according to level of service provided by common carrier.

PRE-LEVEL (1) COMMUNITIES - NO SERVICE

(1971 Population figures in brackets unless otherwise stated)

Yuquot (31) -

LEVEL (1) COMMUNITIES. HF-AM RADIOTELEPHONE ONLY

Community	Population
*Esperanza	45
**Kincolith # 14 Reserve	374
[a] Kyuquot	135
Kwatna Inlet	35
South Bentinck Camp	90 E 76
Stoltze Camp	50 E 77

[a] In addition to a community owned HF radio, others are located at the Red Cross Hospital and the Fisheries station.

LEVEL (2) COMMUNITIES: VHF-FM RADIO TELEPHONE only.

Community	Population	PSRT LOCATION
Bull Harbour	29	Pt. Hardy
Burke Channel	40	Calvert Is?
Calvert Island	75	Calvert Island
Canyon City	79	Aiyansh
Churchhouse Reserve	132	Campbell River
Greenville	324	Aiyansh
Gilford Island	81 (E 76)	Alert Bay
Hardwicke Island	21	Newcastle Ridge

Community	Population	PSRT Location
Hartley Bay	209	Trutch (NHW has a VHF radio)
Hunts Inlet	34	Mt. Hays
*Kingcome Inlet	162	Alert Bay
**Kitkatla	425	Mt. Hays (NHW)
*Klemtu	205	Bella Bella
Mahatta River	180	Rumble Beach
Metlakatla	74	Mt. Hays
Naden Harbour	38	Masset
Namu	140	Calvert Island
Numukamis Reserve	110	Mt. Blenheim
Oona River	41	Mt. Hays
Port Neville	32	Newcastle Ridge
*Rivers Inlet	114	Calvert Island
Shearwater	40	Bella Bella
Smith Inlet	34	Calvert Island
Stuart Island	40	Campbell River
Uchucklesit Inlet	34	Pt. Alberni

*Also the location of RAVEN Radio fitted with one BC Tel transmitting and one receiving frequency.

** As above, but fitted with two transmitting and two receiving frequencies.

to a community radio has HF radio fitted with an Island Airlines frequency at their Red Cross Hospital, and also HF radio at the Fisheries Station located there; Stoltze Camp which is a small logging community of about 6 permanent homes whose company office is supplied with BC Tel HF radio services; Kincolith which is a relatively large but isolated community surrounded by difficult terrain, and is scheduled to receive regular exchange services in 1978.

All of the above communities are extremely isolated and distant from PSRT terminals.

Level (2) Communities. These range from very small communities, e.g. Bull Harbour (population 29 ['71]) to large; e.g. Kitkatla (population 424 ['71]). Radiotelephone is, for the most part, the best they can hope to receive for some time owing to their isolation. Canyon City and Greenville have both been offered exchange service but have refused on grounds of cost. BC Tel cannot therefore be held responsible for not providing a higher grade of service in these cases.

Level (3) Communities. Many of these communities have both radiotelephone and exchange services. BC Tel plans a TSL link to Kitkatla for 1977. Also a possibility exists for improved service to the area between Ucluelet and Estevan Point on Vancouver Island with a proposed MOT radio link and thus a capability for leasing facilities to B.C. Tel between Amphitrite Point and Tachtu Point. Level (1) community Esperanza could benefit from this development.

Ahousat's population of 838 (1974) almost all live on the Marktosis Indian Reserve which is served with a manual telephone switchboard - and one VHF radio circuit to the Tofino Central Office. BC Tel is planning to improve the grade of service to this community.

Rates for level (3) Communities. B.C. Tel uses concepts of density and continuity to delineate 'base rate' areas for communities which receive exchange services.

Density - Areas with 640 establishments per square mile are classed urban and receive a high grade service.

Continuity - ribbon developments with 6 establishments per 1000 feet also receive a high grade service.

There are no restrictions within base rate areas but incremental fees (currently 90¢ per quarter mile) are charged to one and two party-line subscribers up to a secondary base rate boundary approximately 10 miles from the dial offices.

Multi-party line subscribers receive unrestricted service up to the secondary base rate boundary.

Base rate areas in the Study region include Ucluelet, Tofino, Tahsis, Port Alice, Holberg, Hagensborg.

About 10 percent of BC Tel offices are without base rate boundaries because development is so sparse, rates being determined according to distance from the wire centres. These are named 'locality rate' areas and Aiyansh and Ahousat are in this category.

Line Usage. The following table provides some statistics on line usage of BC Tel services in the larger communities (see table 15).

Table 15

BC Tel Telephone Statistics for Selected BC Towns, October, 1976

Community	Indiv.	2-Party	Multi-party OBRA[a]	Multi-party IBRA	Total Res Main
	%	%	%		
Port Renfrew	65 (.62)	21(.20)	18(.17)	...	104
Bamfield	40 (.50)	28(.35)	12(.15)	...	80
Ucluelet	197 (.49)	139(.35)	65(.16)	2(.004)	403
Tofino	147 (.65)	30(.13)	50(.22)	...	227
Ahousat Band	...	...	31(1.00)	...	31
Tahsis	395 (.96)	16(.04)	...	...	411
Zeballos	61 (1.00	...	...	...	61
Port Alice	382 (.93)	26(.06)	1(.002)	...	409
Bella Coola	128 (.66)	26(.13)	39(.20)	...	193
Hagensborg	74 (.38)	26(.13)	96(.49)	...	196
Bella Bella	136 (1.00)	...	...	...	136
Kemano	67 (1.00)	...	...	...	67
New Aiyansh	80 (.71)	...	32(.20)	...	112
Tasu	80 (1.00)	...	...	...	88
Sandspit	157 (.95)	8(.05)	...	...	165
Queen Charlotte City	264 (.92)	15(.05)	5(.02)	2(.007)	286
Port Clements	93 (.68)	...	41(.30)	2(.02)	136
Port Simpson	129 (1.00)	...	...	...	129
	2,503 (.77)	355(.13)	390(.12)	6(.002)	3,234

Source: BC Tel Form DP 186. Not all coastal communities which receive BC Tel are listed.

a OBRA and IBRA 'outside' and 'inside' base rate areas respectively.

Seventy-seven percent of subscribers use 1-party lines as compared with 90 percent in urban areas. Ahousat Band, which receives switchboard magneto services during prescribed hours is supplied with multi-party line service only. Use of multi-party lines varies widely from district to district, but these figures are not meaningful without a measure of population dispersion levels outside the base rate areas.

Standards for Telephone Service

The long term objective of the Canadian Government for the provision of rural and remote telephone services is as follows:

- 24 hour a day availability
- demand access to virtually unlimited addresses
- operation by the users without the necessity for special training or procedures
- a quality of performance approaching sourthern standards

Taking the first of these, neither HF nor VHF radio in many cases satisfy the 24 hour a day objective due to their locations which may be offices or stores that are only accessible during business hours.

The second objective - demand access to virtually unlimited addresses - can be met anywhere in BC for the purchase price of an HF radio plus the required fees.

The third objective - operation by the users without the need for special training or procedures - is not met by the HF radiotelephones currently in use.

B.C. Tel however has plans (application lodged in 1972, but at present postponed indefinitely) to change to a semi-automatic operation. Such a service would probably meet the third objective adequately.

The fourth objective - a quality of performance approaching southern standards - would include the previous three, and other aspects such as direct dialling, ready wire-line availability, relatively prompt. maintenance services, relative freedom from static on the lines, choice of 1 or 2 party lines.

Neither HF nor VHF radiotelephones meet these standards; nor does the magneto service provided to Ahousat. However, in the study region where because of difficult terrain, isolation and small size of many communities it would be prohibitively expensive to supply level (3) services, VHF radiotelephone must also be considered acceptable.

By these arguments 1 pre-level (1) and 3 level (1) communities should be considered for a higher grade of service. These are Yuquot, Esperanza, Kyuquot, and Stoltze Camp (exceptions are the level (1) communities, Kwatna Inlet which is a small seasonal logging camp, and Kincolith which is already scheduled to receive exchange service.)

Conclusion

From the data provided, it would appear that in terms of coverage and line usage the study area is reasonably well supplied with telephone services. Whether there are enough telephones in various communities is another matter and not BC Tel's responsibility if the accessing

terminals have been provided by them.

Quality of service has not been dealt with here, and would require a subscriber survey for accurate information. It is recommended that certain communities be considered for upgrading of services. Also that alternative means of bill collection be explored for communities which are habitually in arrears e.g. DIAND might take responsibility for bill collection in certain instances.

Recommendations

Recommendations arising out of this section are:

(1) That, depending on relevant complaint levels, subscriber opinion be sought to provide information on the quality of service provided in selected areas.

(2) That alternative means of bill collection be found for communities which are habitually in arrears with respect to bill collection

(3) That Yuquot, Esperanza, Kyuquot and Stoltze Camp be considered for a higher grade of telephone service than is presently provided.

C. RAVEN RADIO

The RAVEN (Radio and Visual Education Network) Society was established in 1969 to serve native communities in B.C. which are geographically scattered, distant and isolated from each other. RAVEN's two principal functions are:

(1) to provide a point-to-point communications network

(2) to assist in preserving the cultural heritage of Native people and to further their socio-economic development.

RAVEN's operation's are run entirely by members of the society through their board of directors. Basic funding is provided by SOS.

Point-to-point Communications Network

At present there are 106 HF Raven transceivers throughout B.C. including 4 mobiles. Contacts can be made from points in Southwestern B.C. as far as Alaska and Yellowknife. Where the radios are used directly for business and occupational purposes, as on the west coast of Vancouver Island by fishermen, the system is reported to be working extremely well. Also at the Christy Residential School near Tofino, where the children are able to keep in contact with their families and teachers are able to phone for permission from parents for their children to visit doctors and dentists when necessary.

At some points on the mainland coast, e.g. Bella Bella, Prince Rupert and in the Nass and Skeena Valleys, the phones are not being used so well, partly because alternative land or radio-telephone services are available, and partly because there are not enough trained operators to keep the radios in service, e.g. the phone at Hartley Bay was out of repair for

for several months in 1976 because of lack of technical aid.

RAVEN has been assigned 4 channels, 4967 which is used as a general channel, 2240 which is used by mobile units and for private conversations. According to the RAVEN field worker, the two other frequencies are used only occasionally unless between communities which are relatively close to each other.

Among hindrances to the optimal developments of the radio system have been:

(1) the chief RAVEN worker, who until relatively recently had to cover the whole province on his own, had insufficient time to provide adequate technical teaching to members of the bands.

(2) the base station is in a private home in Qualicum rather than a purpose-related facility.

(3) the base station only operates on one frequency at a time and therefore at times provides inadequate coverage.

(4) insufficient information is provided to the band numbers about the location and handling of the radios.

An improvement to the system, suggested by the chief fieldworker would be to divide the province into 5 districts and hire a worker for each district who would then be able to more adequately supervise the use of radios.

In his opinion it would be desirable to choose a worker who is both able to provide instruction in the use of the radio and who in addition is personally interested, perhaps through his employment in seeing that the radios are kept fully operative. Also the RAVEN Society is planning within the next two years to establish a base station in a central location in the province.

RAVEN radio locations are listed in table 15a together with the corresponding band names of the local Indian populations served.

RAVEN radio locations are illustrated in Chart 10a.

Only Yuquot on the west coast of Vancouver Island is dependent upon the services of RAVEN radio alone. Fifty percent of the locations listed are provided with both RAVEN and exchange facilities.

Indians on reserves by DOC figures number approximately 33 percent less than the total native population which, according to RAVEN figures is served by the radios.

RAVEN Video Services

A second important aspect of RAVEN's activities, which will be mentioned here for the sake of completeness, is their audio-visual operation, the expansion of which in their view is essential for the furtherance of their objectives.

Up to now, the base station has been in a private home and no-one has been able to attend to programming, but it is hoped to hire a full-time programmer once a new station on the mainland has been established.

RAVEN has a library of tapes covering many aspects of Indian culture which are available to any band that wishes to use them. RAVEN is also assisting bands to obtain their own equipment so that they can design programs for themselves.

So far, three communities, Kyuquot, Aiyansh and Masset have acquired these facilities.

Table 15a

RAVEN RADIO LOCATIONS

	DOC PN FIGS [b]	RAVEN PN FIGS [c]
A. NON RESERVES		
Port Alberni - West Coast District Council Office		
Prince Rupert - North Coast District Council		2,500
Christie Residential School (Long Beach)		
B. URBAN RESERVES		
Kitimat (Kitimaat)[a]	687	904
Terrace (Kitselas)	59 E[d]	94
(Kitsumkalem)	61 E	97
Subtotal	807	1,095
C. RURAL AND REMOTE RESERVES		
1) Raven Service Only		
Yuquot (Nootka, Radio at Friendly Cove)	31	49 E
2) Raven and other HF		
*Esperanza (Nuchatlaht)	45('76)	71
+ **Kincolith #14 Reserve (Kincolith)	374	867
[1]Kyquot (Kyuquot) V[e]	55	237
Subtotal	474	1,175

[1](other HF radios are located at the Canadian RedCross Station and Dept. of Fisheries Station)

Table 15a Contd.

	DOC PN FIGS [b]	RAVEN [c] PN FIGS
3) Raven and BC Tel VHF		
Canyon City (Canyon City	79	134
Churchhouse (Homalco)	132	229
Gilford Is. (Kwicksutaineuk)	59	99
Greenville (Greenville)	324	741
Hartley Bay (Hartley Bay)	202	373
Kildonan (Uchucklesaht)	34	89
+ *Klemtu (Kitasoo)	248	287
+ **Kitkatla (Kitkatla)	425	779
Metlakatla (Metlakatla)	74	209
*Queens Cove (Ehattesaht)	45 (76)	103
*Rivers Inlet (Owikeno)	40	162
Subtotal	1,662	3,305

Source: DOC data base and Raven society records.

Notes.

a. Bracketed names are band names

b. DOC figures are 1971 figures unless otherwise stated.

c. Raven figures include persons living off reserves.

d. Estimated figures are those in the adjacent column multiplied by the overall RAVEN/DOC population figure ratio (= 1.6963) or vice versa (= .6308)

e V = reserve also has Raven Video facilities

* Raven radio fitted with 1 BC Tel transmitting and 1 receiving frequency.

** " " " " 2 " " " 2 " "

\+ " " " " aircraft frequency.

Table 15a Contd.

		DOC PN FIGS	RAVEN PN FIGS
4) Raven VHF and OTHER HF			
*Kingcome Inl. (Kingcome Inlet) ('other HF' is a DIAND station)		133	210 E
5) RAVEN and AUTOMATIC			
Bella Coola (Bella Coola)		482	668
Gold River (Nootka)		156 E	248[e]
Subtotal		638	916
6) RAVEN, VHF AND AUTOM.			
Aiyansh (Gitlakdamix)	V	516	356
Bella Bella (Bella Bella)		758	1,168
Masset (Masset)	V	677 E	1,074
Opitsat Res. (Clayoquot)		100	371
Ucluelet (Ucluelet)		225	310
Port Hardy & (Kwakewlth) Fort Rupert		324 E	514
Port Simpson (Port Simpson)		744	1,207
Quattish Res. (Quatsino)		99	124
Queen Charlotte City (Skidegate)		250 E	397
Subtotal		3,693	5,521
7) RAVEN, BC Tel VHF, and nonautomatic dial service			
*Ahousat (Ahousat)		834	812
Total study area population served by radios		8,272	13,083

f Raven population figure for Gold River also includes population of Yuquot Reserve.

Table 15a contd.

SUMMARY. Nos. of rural and remote communities according to additional services provided.	No. of Communities	DOC PN FIGS.	RAVEN PN . FIGS.
RAVEN only	1 (3%)	31	49
RAVEN and other HF	3 (10%)	474	1,175
RAVEN and VHF (including section C.4 of this table)	12 (41%)	1,795	3,515
RAVEN and EXCHANGE	13 (45%)	5,165	7,249
	29 (99%)	7,465	11,988

Additional Statistics		
Total number of radios on Rural and Remote reserves of study area	29	
Population per radio	257	413
Total number of RAVEN radios in B.C. (Dec. '76)	106	
" " " BC Bands using RAVEN radios	68	
" " "Study area bands using RAVEN radios	31	
RAVEN radios / RAVEN radios in Study Area / in B.C.	.28	

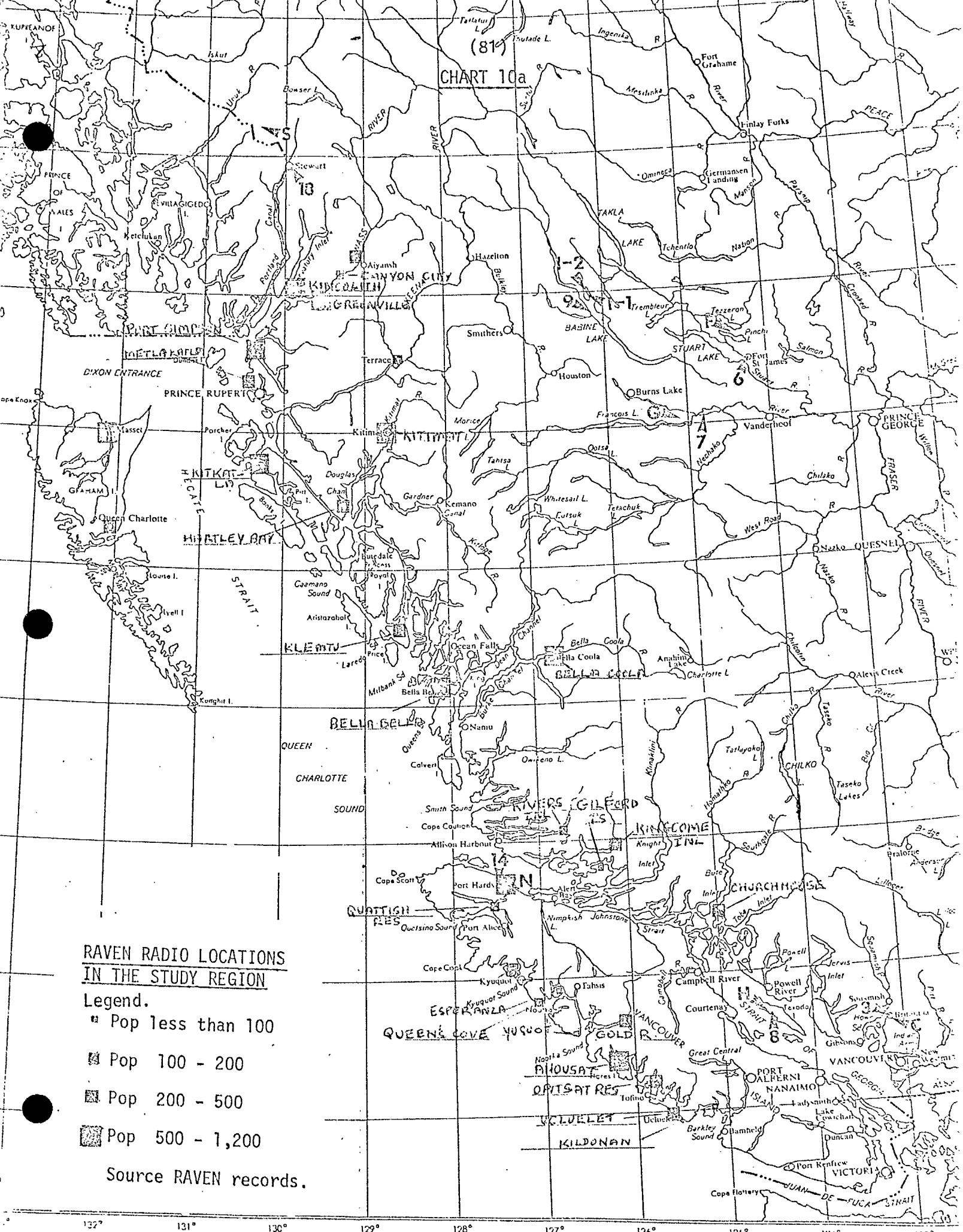


CHART 10a
(81)
RAVEN RADIO LOCATIONS
IN THE STUDY REGION
Legend.
Pop less than 100
Pop 100 - 200
Pop 200 - 500
Pop 500 - 1,200
Source RAVEN records.
132°
131°
130°
129°
128°
127°
126°
125°
124°
123°

Funding

Up to this time the point-to-point network has consumed the major part of the funding provided by SOS and other sources. The question has arisen, however, as to how more funding could be reserved for the purchase and operation of video facilities.

A recent DOC study suggested that if over the long term, funding for the point-to-point service were reduced to a level which supports only those locations which lack a more dependable means of service the above objective might be achieved. Also it was recommended that "a detailed study be undertaken preferably by the native (RAVEN) people in conjunction with DOC the results of which should enable SOS, DOC, BC Tel and other agencies to be determined, in ensuring that the needs of native communications are met and to further examine the role RAVEN can play to fulfil these needs".

For RAVEN communities in the study area, provision of basic telephone service is as follows:

Table 16

Provision of basic telephone service in RAVEN communities

Type of Location	No. Of Locations	POPULATION SERVED	
		DOC Data	RAVEN Data
Rural and Remote Reserves Where basic service is provided by the common carrier.	25 (86%)	6,861	10,640
Rural and remote reserves where basic service is provided by RAVEN	4 (14%)	505	1,224
	29 (100%)	8,173	12,959

According to table 16 by far the greater percentage of locations are rural and remote reserves where basic service is provided by BC Tel.

Factors which have seemed pertinent during the course of this study to assessing the relative importance of RAVEN's point-to-point and video operations for funding purposes are the following:

(a) in favour of a continuing substantial emphasis on RAVEN's point-to-point operations

- the fact that some communities are unable to meet their payments for BC Tel basic service (income levels recorded in Part V make this understandable)

- the fact that, according to the chief field-worker, the common people on some reserves, partly through lack of proper instruction have not yet realized the potential of the radio service, as others have done. In his opinion this situation could be improved with more field-workers and it would be profitable to communities to try to improve it.

(b) in favour of accelerating the development of RAVEN's audio-visual operations:

- the views of the Indian vocational counsellor expressed on p. 52, that audio-visual facilities, not necessarily RAVEN's could contribute a great deal towards improving the social atmosphere on reserves and providing necessary information which is at present lacking on educational and vocational opportunities that are available to native people.

- the fact that North Island College on Vancouver Island are ready to provide post-secondary programs to small communities in particular to small groups of 2 - 3 persons. At present the absence or poor quality of CATV on the west coast of Vancouver Island hinders this development in that area. However, if RAVEN - provided audio-visual facilities were available on reserves, in addition to RAVEN programs these other programs could more readily be made available.

Additional Comments

Since allocating public funds is usually a matter of choosing between a number of worthy alternatives, it may be that one aspect of RAVEN's activities should not be curtailed in order the other aspect can grow but that both should grow at the expense of some other project altogether. Indians on remote reserves are required to cope with a great deal of movement to and from home on the part of family members as children move to residential schools, teenagers to cities, and fathers to distant job locations. A criticism was heard that although the radios are used extensively by band councils there is not sufficient access to the radios for noncfficial individual use. Perhaps two radios are necessary in some communities, one in the band office, and another in the community hall as well as audiovisual facilities in the community hall. Only a survey of individual opinion can provide answers to these questions and this should be proceeded with as soon as possible.

Recommendations

Recommendations arising out of this study concerning RAVEN operations are:

(1) That RAVEN be requested to conduct the DOC recommended study of their operations with a view to providing factual information upon which their own and future government funding policies might be based.

(2) That RAVEN be provided with financial assistance for the above purposes; and also with other DOC resources should RAVEN consider this desirable.

PART VII

TELECOMMUNICATIONS: BROADCASTING SERVICES

Many coastal communities are without CBC Radio, CBC-TV or both. Others receive signals of very poor quality via repeater systems which relay signals across mountain tops.

Under the Federal Government's Accelerated Coverage Plan (ACP) implemented in July 1975, communities of 500 or more persons that are either unserved or inadequately served and can be covered by a single transmitter are to be provided with CBC radio and TV service. Some communities in the study region will be affected by this plan.

A second important development not connected with the ACP in the study area is the provision of satellite TV service to Ocean Falls, a town of approximately 1,500 inhabitants on the midcoast mainland which previously received very poor TV signals via a relay system from Terrace. B.C. Tel has recently (December, 1976) assisted in the provision of TV via the Anik 3 communications satellite - owned jointly by the Canadian Telecommunication companies and the Federal Government - to this community. A restructuring of both radio and TV in the Bella Coola Valley is made possible by this new system. The satellite signal is reported to be more consistent, of higher viewing quality, and not subject to failure during adverse weather conditions.

A. RADIO

Radio coverage of the coastal area is less comprehensive than TV coverage, a number of communities lacking this service completely.

Radio LPRT's provide only 3-5 mile coverage and at night sometimes as little as 1.5 mile coverage due to interference caused by other high powered AM stations.

FM transmitters, on the other hand, although more expensive to install (because of higher costs associated with mountain top sites as opposed to town buildings which can be used in the case of AM transmitters) are relatively free of interference problems and provide 15 - 20 mile coverage.

Present CBC policy is to install FM transmitters to carry AM program signals in a number of locations so that improved signals are available; and can be received on TV antennas.

Communities in the study region that are completely without radio services are as follows (table 17). Areas without service are indicated on Chart 11 and AM and FM radio stations in Charts 12 and 12a respectively.

From Chart 11 it will be seen that large areas of the study community are without radio services. Following are some comments on specific communities.

Vancouver Island None of the Vancouver Island communities listed in table 17 have populations of more than 500 persons so they fail to qualify for ACP. However, under this program an FM transmitter has been installed at Woss Camp and an AM transmitter at Port Hardy.

CBC have suggested relocation of the transmitter at Holberg CFS base in order to improve coverage of Holberg.

Table 17

Communities without CBC or CBC-Affiliate Radio Coverage

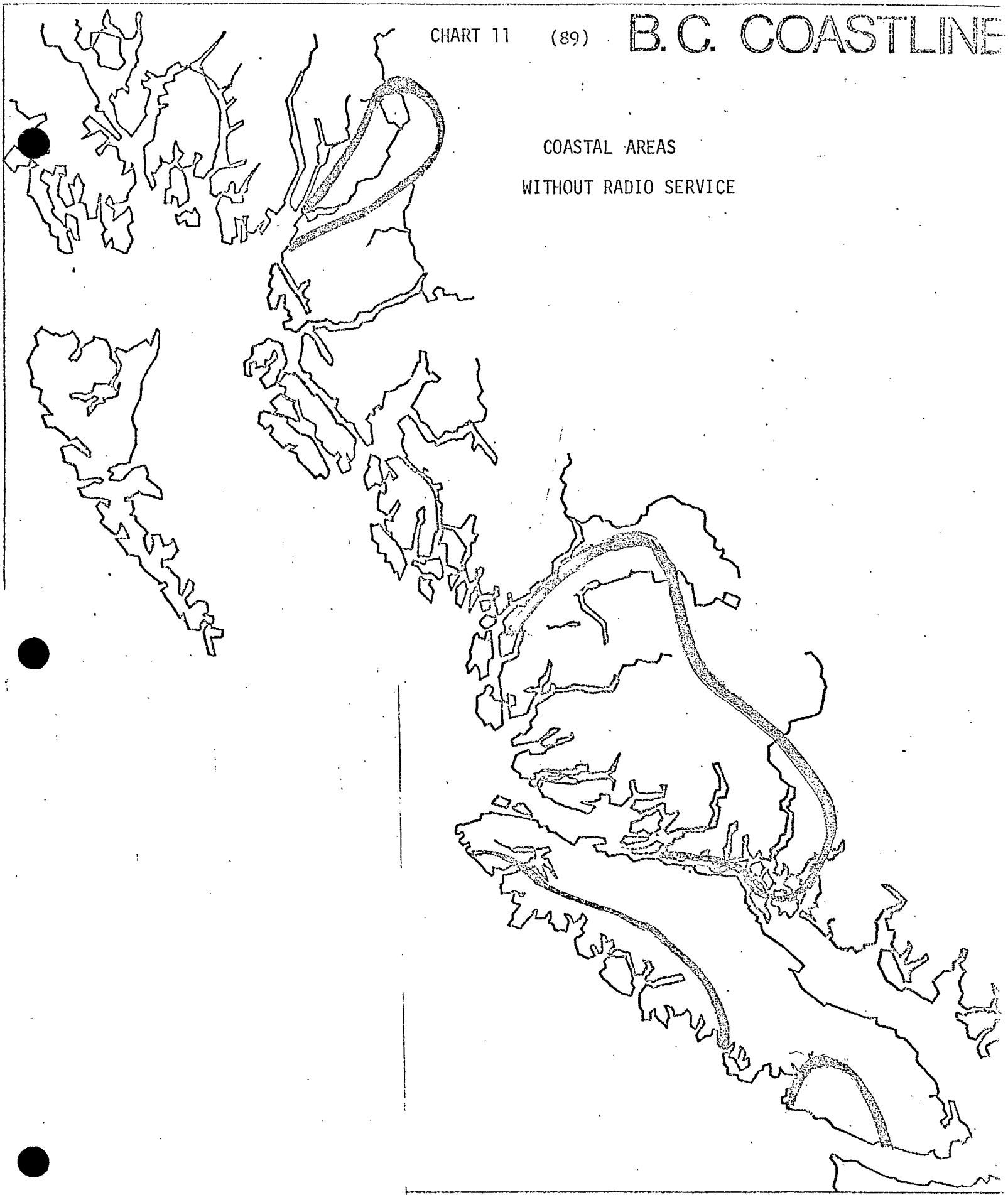
Population	Communities - South to North	
20 to 49	Gordon River Reserve; Hesquiat Reserve; Estevan Point; Yuquot Reserve; Esperanza; Amai Inlet; Stuart Island; Hardwicke Island; Kwatna Inlet; Port Neville; Smith Inlet; Firvale; Shearwater.	13
50 to 99	Hotsprings Cove; Quattish Reserve; Gilford Island; Calvert Island, S th Bentinck Camp; Canyon City.	6
100 to 199	Numukamis Reserve; Franklin River; Zeballos; Kyuquot Reserve; Mahatta River; Winter Harbour; Churchhouse Reserve; Kingcome Inlet; Rivers Inlet; Namu; Nass Camp.	11
200 to 399	Port Renfrew; Ahousat Band; Lower Bella Coola; Klemtu; Hartley Bay; Kemano; Kincolith # 14 Reserve; Greenville	8
400 to 499	Kitkatla	1
Over 500	Bella Coola	1
Total		40

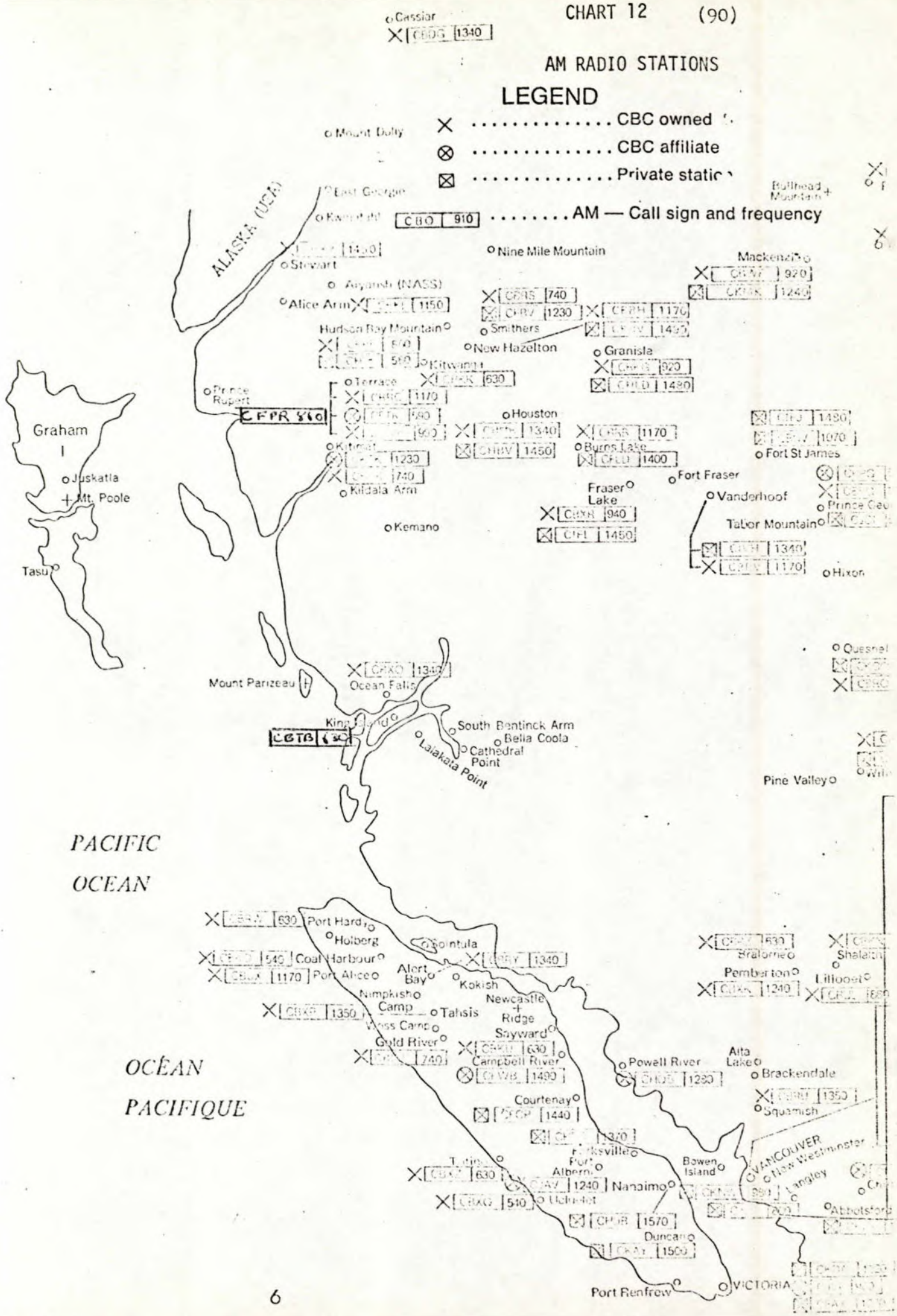
CHART 11 (89)

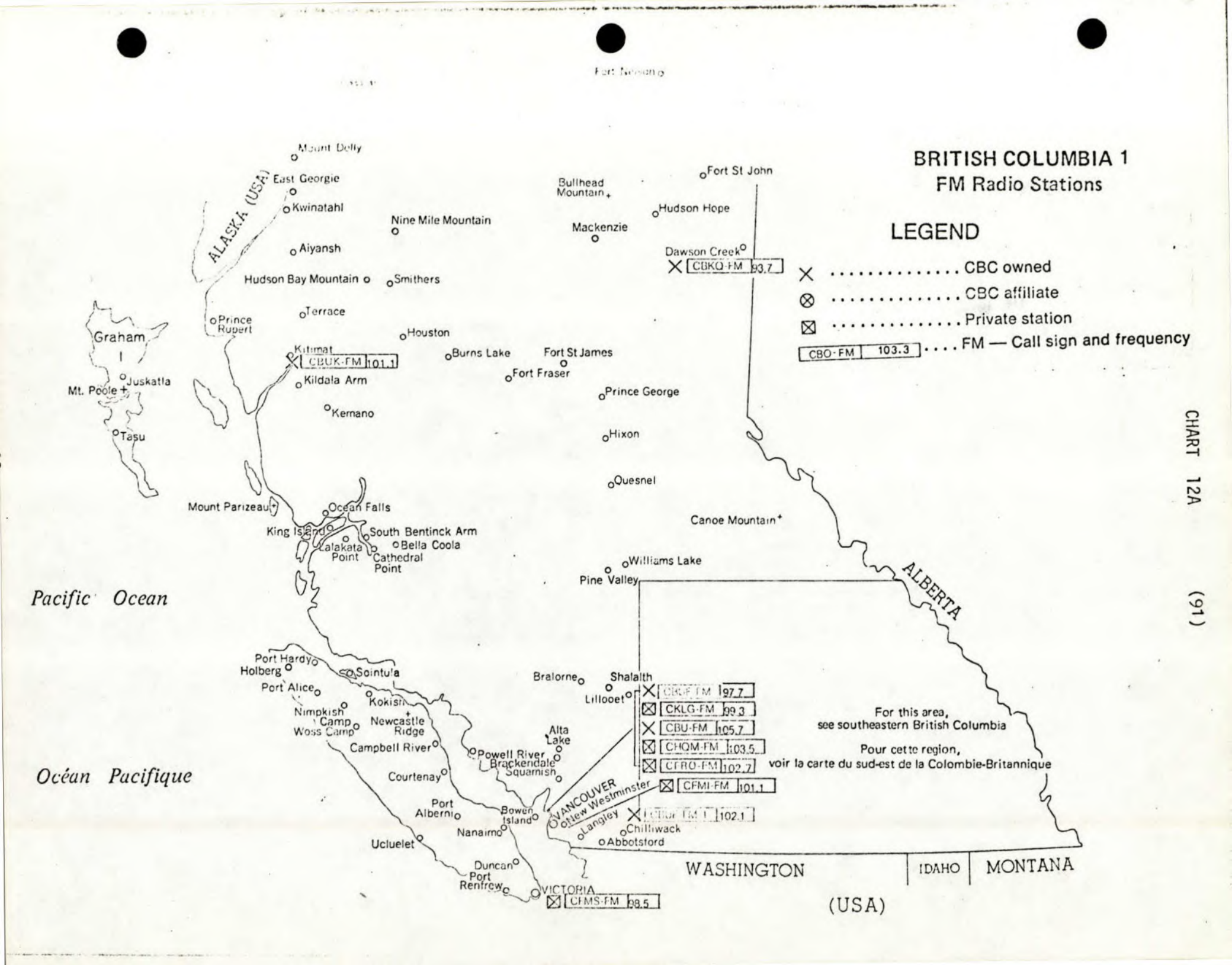
B.C. COASTLINE

COASTAL AREAS

WITHOUT RADIO SERVICE




AM RADIO STATIONS
LEGEND
CBC owned
CBC affiliate
Private station
CBO 910 ..... AM — Call sign and frequency
Cassiar
CBDG 1340
Mount Dolly
East George
Stewart
ALASKA (USA)
Nine Mile Mountain
Bullhead Mountain
Mackenzie
CKMV 920
CKKN 1240
Anyaish (NASS)
Alice Arm
CFPL 1150
CBNS 740
CKBV 1230
CFPR 1170
Smithers
CJFV 1490
Hudson Bay Mountain
New Hazelton
Granisle
CKDV 920
CHLD 1490
Kitwanga
Terrace
CHTC 1170
CBNS 630
Prince Rupert
CFPR 860
Houston
CBNS 1340
CKBV 1450
CBNS 1170
CFLD 1400
Burns Lake
Fort St James
Graham I
Juskatla
Mt. Poole
Kildala Arm
Fort Fraser
Fraser Lake
CBXN 940
CFFL 1450
Vanderhoof
Prince George
Tabor Mountain
CBYG 1340
CBYV 1170
Hixon
Kemano
Tasu
Quesnel
CBKO 1340
Mount Parizeau
Ocean Falls
South Bentinck Arm
Bella Coola
Cathedral Point
Laiakaia Point
CBTB 1300
Pine Valley
PACIFIC OCEAN
OCÉAN PACIFIQUE
CBAA 630
Port Hardy
Holberg
Scintula
CBAV 1340
CFCP 540
Coal Harbour
CBAX 1170
Port Alice
Alert Bay
Kokish
Nimpkish Camp
CBAP 1350
Tahsis
Newcastle + Ridge
Woss Camp
Sayward
Gold River
CBAU 630
CFNI 740
Campbell River
CJVB 1490
Powell River
CHQB 1280
Alta Lake
Brackendale
Squamish
CBRU 1350
Courtenay
CKCP 1440
CHUB 1370
Parksville
Port Alberni
Tofino
CBAT 630
CBAV 1240
Nanaimo
Bowen Island
VANCOUVER
New Westminster
Langley
Ucluelet
CBAG 510
CHOR 1570
Duncan
CBAL 1500
Abbotsford
Port Renfrew
VICTORIA


BRITISH COLUMBIA 1
FM Radio Stations
LEGEND
CBC owned
CBC affiliate
Private station
CBO-FM 103.3 .... FM — Call sign and frequency
Mount Dolly
East Georgie
Kwinatahl
Aiyansh
Nine Mile Mountain
Hudson Bay Mountain
Smithers
Terrace
Prince Rupert
Houston
Kitimat
CBUK-FM 101.1
Burns Lake
Fort St James
Fort Fraser
Kildala Arm
Kemano
Graham I
Juskatla
Mt. Poole
Tasu
Bullhead Mountain
Fort St John
Hudson Hope
Mackenzie
Dawson Creek
CBKQ-FM 93.7
Prince George
Hixon
Quesnel
Canoe Mountain
Williams Lake
Pine Valley
ALBERTA
Mount Parizeau
Ocean Falls
King Island
South Bentinck Arm
Bella Coola
Lalakata Point
Cathedral Point
Pacific Ocean
Océan Pacifique
Port Hardy
Holberg
Sointula
Port Alice
Kokish
Nimpkish Camp
Woss Camp
Newcastle Ridge
Campbell River
Courtenay
Port Alberni
Ucluelet
Duncan
Port Renfrew
VICTORIA
CFMS-FM 98.5
Bralorne
Shalalth
Lillooet
CKGF-FM 97.7
CKLG-FM 99.3
CBU-FM 105.7
CHQM-FM 103.5
CFRO-FM 102.7
CFMI-FM 101.1
CBUF-FM 102.1
Alta Lake
Powell River
Brackendale
Squamish
Bowen Island
VANCOUVER
New Westminster
Langley
Chilliwack
Abbotsford
Nanaimo
For this area, see southeastern British Columbia
Pour cette region, voir la carte du sud-est de la Colombie-Britannique
WASHINGTON
IDAHO
MONTANA
(USA)
CHART 12A
(91)

North Coast Again most communities which are without CBC coverage at present are too small to qualify for ACP. Bella Coola, however, does qualify and Valley residents are scheduled to receive CBC radio coverage within the forseeable future.

This will be delivered according to a CBC plan, already under implementation (and to be described in the following section) to provide AM radio and TV simultaneously to the Bella Coola Valley area. It is probable that Firvale, Hagensborg and Bella Coola will be covered by a single transmitter under this scheme.

Bella Bella has received CBC radio coverage since October 1976, microwave signals being carried from Vancouver via repeaters at Port Hardy and Calvert Island. This service is a direct result of the ACP.

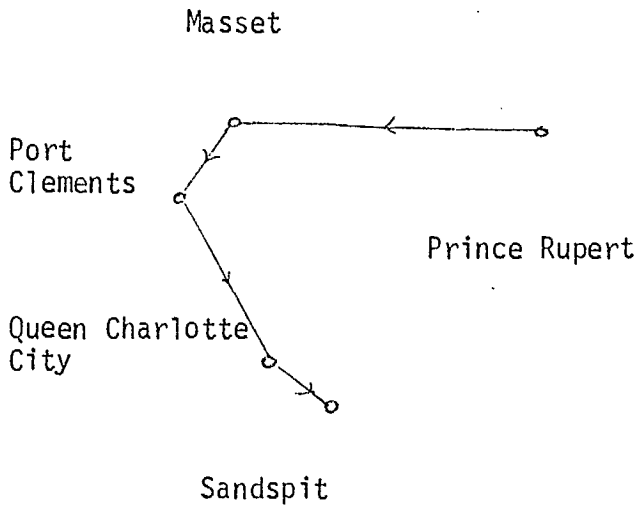
A new powerful 10,000 watt transmitter has been constructed at Digby Island near Prince Rupert. Kitkatla should receive this station. Kincolith, Nass and Greenville have been considered for radio coverage but present population numbers are not reckoned to be adequate.

Under the ACP program, a new FM transmitter is planned for Alert Bay (which will not, however provide coverage for Smith Inlet, Kingcome Inlet or Gilford Island.)

Queen Charlotte Islands

CBC are at present carrying out surveys to improve radio coverage of Juskatla and Queen Charlotte City. Masset is already reasonably well covered during daytime hours. A series of FM transmitters, placed on

mountain tops to serve as wide an area as possible is the plan most likely to be adopted. The probable arrangement will be as follows:



French Programs and ACP

A transmitter is being installed at Kitimat under the ACP to provide the French language program to residents of that area. Terrace which also has a significant French-speaking population already has this program.

CBC Affiliate Programs. One problematical aspect of ACP is that CBC-affiliate coverage of an area has until recently been acknowledged by the Federal Government to be CBC coverage, while in effect there may be only a token number of CBC programs presented. When established in the 1950s, affiliate relationships were mutually advantageous, since many radio-stations were incapable of producing their own programs. This situation has now changed so that most radio affiliates at least, are able to produce their own programs and also prefer to do so. (For TV the situation is somewhat different).

To improve CBC coverage in these areas a new project, the Accelerated Replacement Plan (ARP) has been introduced (1976) which should be mentioned here although at present it does not affect the study area as far as radio is concerned.

Affiliate stations broadcasting in the study area are CKTK, Kitimat, which is received in Kitimat, and CFTK, Terrace, which is received at Lakelse Lake, Remo, Terrace and Rosswood. With the exception of Lakelse Lake these communities already also receive regular CBC broadcasts via LPRTs from Prince Rupert, and from local CBC stations in Kitimat and Terrace.

Outlook for the Coastal Communities

Short of (a) lowering the critical figure for the ACP–and under the present criteria it had been found necessary to extend the terms of this plan from its original 5 years to 6 - or (b) the advent of satellite service to the isolated communities, it is unlikely in all but a few cases that the situation depicted in table 17 will change very much except as a result of BC Tel extending radio systems independently. (For BC Tel microwave radio systems see Appendix G).

It is possible, however, when 1976 population figures for coastal communities are published that Kitkatla will also qualify for ACP coverage.

Summary

Many communities in the study region are without CBC radio and TV or both, but most are too small to qualify for ACP assistance to effect improvements.

Ocean Falls now receives service via the Anik 3 communications satellite, which makes possible a restructuring of both radio and TV in the Bella Coola Valley.

To improve CBC coverage in certain areas of Canada previously covered by CBC affiliate programs, CBC has introduced ARP, but as far as radio is concerned this program has not affected communities of the study area.

Present CBC policy is to install FM transmitters to carry AM program signals so that clearer signals become available and signals can be received on TV antennas.

Two communities, Kitimat and Terrace have received the French CBC program.

A possibility exists that more communities, than at present anticipated will receive CBC radio coverage once the new plans are fully implemented.

It is probable that when 1976 population figures for the coastal communities are published Kitkatla may be found to have sufficient inhabitants to qualify for ACP coverage also.

B. TELEVISION

Television services where they do exist throughout the coastal areas are for the most part of poor quality due to the following factors:

- signals are received via chains of as many as five LPRT's in some cases, e.g. at South Bentinck and Hagensborg.

- antennas at key sites are subject to icing up and other malfunctions due to exposure to high winds and freezing temperatures; e.g. Mt. Parizeau repeater at Aristazabal Island, which it will be seen from chart 13, is a key station for reception in the Bella Coola valley, causes picture loss in that area for extended periods.

- distance between sites is too great; e.g. a distance of 80 miles separates repeaters at Mt. Parizeau and King Island further weakening the signal at Bella Coola, Hagensborg, etc.

- community TV associations have in some cases set up their own systems based on poor initial signals; or insufficient funds have been available for them to hire competent engineers in the planning stages; or to maintain equipment properly, once installed. Some systems in the Bella Coola valley are inherently poor for these reasons.

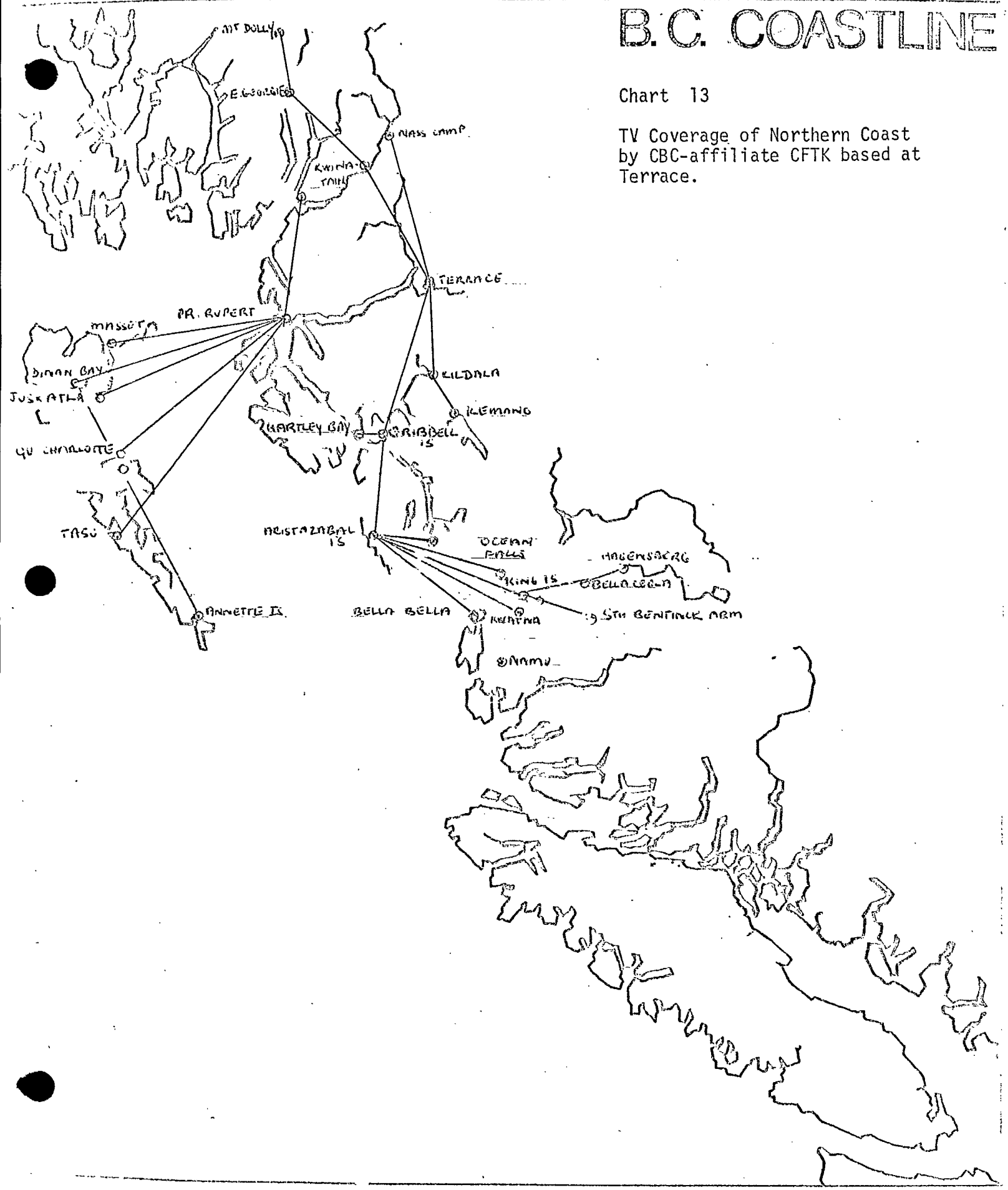
Some coastal communities are altogether without CBC or CBC-affiliate coverage. Amongst reasons are:

- cost in relation to population numbers served: under ACP CBC is only required to provide signals to communities with

B.C. COASTLINE

Chart 13

TV Coverage of Northern Coast by CBC-affiliate CFTK based at Terrace.



populations greater than 500 (although in practice smaller communities are often served e.g. Hagensborg).

- community isolation: e.g. Ahousat Band and Hot Springs Cove, two of the larger unserved communities are at present too far from the nearest trunk.
- difficult terrain between community and nearest source, e.g. Zeballos is close to Tahsis, but is separated by a high mountain from that community.
- power source not readily attainable; e.g. mountain-tops to the south of Namu are removed from hydro power.
- awaiting turn on CBC list of priorities, e.g. Namu, though small will be provided for, although not necessarily immediately served, by the new system planned for Bella Coola valley area.
- CBC awaiting to guage effects of planned system changes: e.g., it is possible that Kitkatla which the 1976 census may prove to have a population of more than 500) will receive adequate signals from Prince Rupert when a new CBC planned powerful transmitter comes into operation there.

Coastal communities without CBC or CBC-affiliate coverage are listed below in table 18 and the areas are indicated on chart 14.

Table 18

Communities Without CBC or CBC-Affiliate TV Coverage

Population	Communities - South to North	Total
Less than 20	Kimsquit	1
20 to 49	Hesquiat Reserve; Estevan Point; Yuquot Reserve; Esperanza; Amai Inlet; Kyuquot; Bull Harbour; Stuart Island; Hardwicke Island; Port Neville; Smith Inlet; Firvale; Naden Harbour	13
50 to 99	Hat Springs Cove; Gilford Island (Gwayadums Reserve); Calvert Island; Canyon City	4
100 to 199	Numukamis Reserve (Ohiaht Band); Zeballos; Churchhouse Reserve; Kingcome Inlet; Rivers Inlet; Namu; Sewell Inlet	7
200 to 399	Ahousat Band; Hot Springs Cove;	3
400 to 499	Kitkatla	1
Total		29

Source: DOC Data Base.

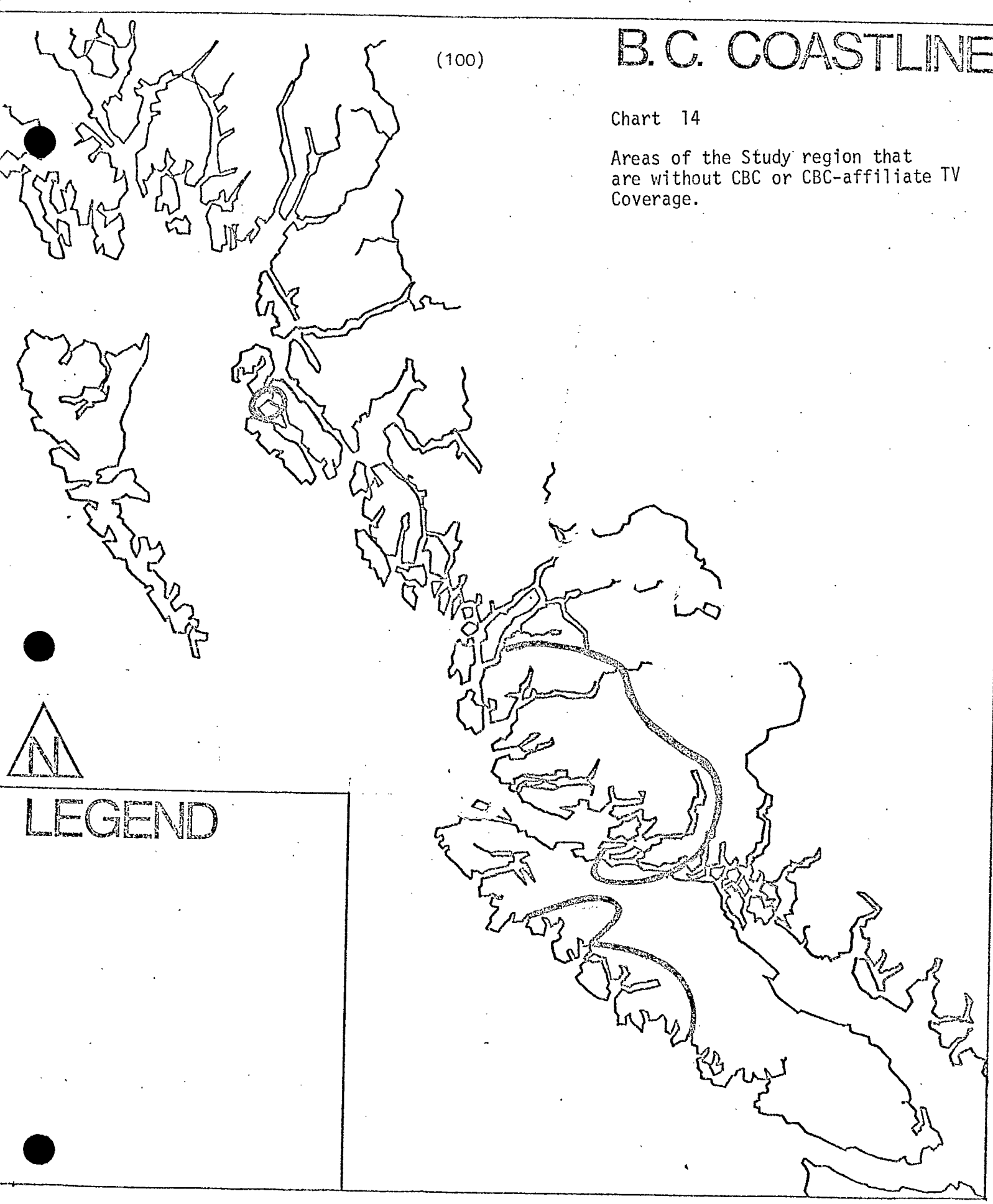
The larger communities Ahousat Band, Hot Springs Cove and Kitkatla have already been mentioned. It will be seen that the unserved communities for the most part occur in two main areas, the west coast of Vancouver Island, and the mainland southern coast of the study area and apart from being isolated, they are also too small to warrant special treatment.

New Plans for Vancouver Island With the introduction of ACP (1974), much of this is about to change. Ten new stations are being set up on Vancouver Island, some to receive microwave signals via links leased from

B.C. COASTLINE

Chart 14

Areas of the Study region that are without CBC or CBC-affiliate TV Coverage.



N

LEGEND

B.C. Tel. These include Woss Camp, Newcastle Ridge, Alert Bay and Port Hardy, at which points signals should be considerably improved over those presently received from the CBC-affiliate.

Present and future coverage of Vancouver Island are illustrated in Chart 15. Note the extraordinarily long hop from Victoria to Newcastle Ridge on figure 2 showing the present CBC-affiliate layout; and also the fact that CTV at present covers only the lower half of the island.

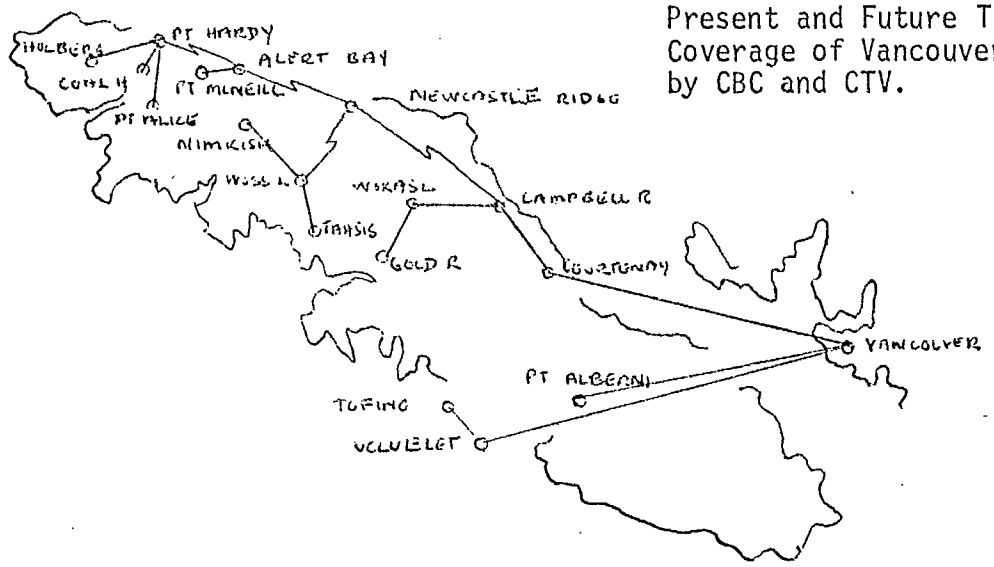
Stations to be completed by CBC within a year include Tofino, Nimkish, Woss Camp, Port McNeil, Holberg, Tahsis, Alert Bay, Port Alice, Port Hardy, Coal Harbour, Wokas Lake, and Gold River. The remainder, shown on the map are already functioning.

At present both CTV and CBC are fed to the island from Vancouver, CTV from CHAN-TV and CBC from CBUT. When the new plan is completed, probably within two years, CTV will be broadcast by BCTV-owned CHEK-TV, and CBC on the new Channel 10 which has recently been authorised by CRTC.

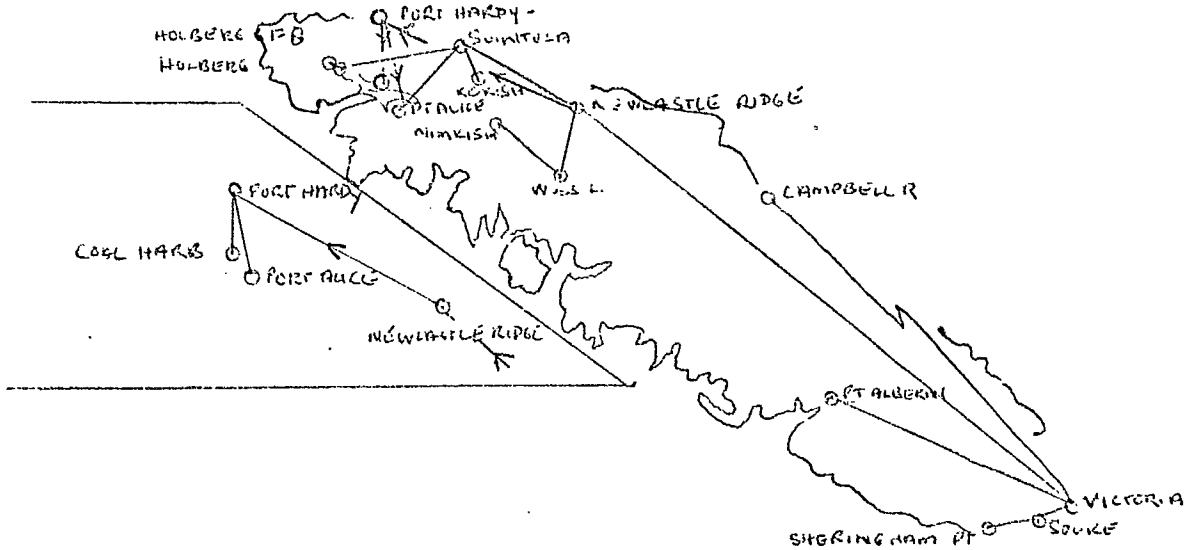
Wherever practicable, the same sites will be shared by both CBC and CTV so that as many areas as possible will receive dual coverage.

Zeballos, although close to Tahsis will not be receiving CBC programmes under the new system because of the previously mentioned difficulty of carrying signals from Tahsis which would necessitate the installation of at least two mountain-top repeaters. It is rumoured, however, that Zeballos may soon receive CATV as Tahsis has in the past; i.e. by an agent taping programs at Campbell River and 'bicycling' them in (by bus or aeroplane!) to be fed into a local CATV system.

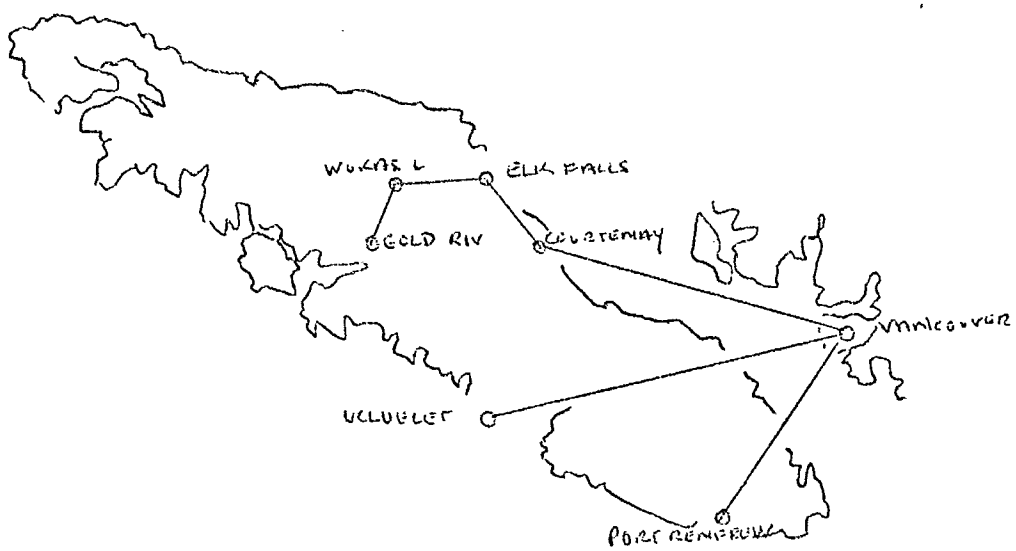
Present and Future TV Coverage of Vancouver Island by CBC and CTV.



CBUT



CHEK-TV



CHAN-TV

On the west coast of Vancouver Island a proposed DOT radio link from Mt. Ozzard to a remote, VHF, ship-to-shore radio facility near Tatchu Point on the northern entrance to Esperanza Inlet may provide facilities for BC Tel to carry TV services eventually into that area which includes the two relatively large communities of Ahousat Band and Hot Springs Cove.

New Proposals for the Mainland Region and Queen Charlotte Islands:

One or other of the following two proposals will be selected by CBC to improve TV reception in the Bella Coola Valley.

(1) A microwave feed from Timothy Mountain at Williams Lake to Hagensborg and from there a chain of repeaters located at King Island, Ocean Falls and Bella Bella to carry signals from Williams Lake to Bella Bella, and eventually to Namu. This approach is expensive (approximately $5 - 10,000 per month to lease the microwave facilities from BC Tel).

(2) Feeding the satellite signals from Ocean Falls into the Bella Coola Valley. Since the satellite receiving station is at present at a downtown location in Ocean Falls, the proposal would entail placing a translator on a mountain top above Ocean Falls and splitting the power using two antennas, one pointing east towards King Island to relay the signal to Bella Coola and Hagensborg, and the other towards Bella Bella to serve Bella Bella, and possibly Namu.*

The latter is the less expensive approach and is at present favoured by CBC. Programme signals however would originate from Toronto, and BC input would therefore be lacking.

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*Proposal 2 has since been adopted.

In either instance the troublesome Mt. Parizeau repeater would cease to be used as a junction point, and could possibly be eliminated altogether if line-of-sight transmission proves possible from Bella Bella to Klemtu as at present seems likely.

CBC are proceeding with the construction of buildings which will be needed for either system in the meantime. An improvement over present technology which should contribute to the reliability of future signals is that antennas in 'icing zones' in the area will be placed in twenty-eight foot high fibreglass domes which are divided into three floors housing from the apex down, antenna; radio and TV gear; and power source. Styrofoam lining will be used to prevent condensation.

Other plans in this region are for the installation of a new powerful CBC transmitter at Prince Rupert to replace the present CFTK transmitter. This, though potentially a 480 watt facility, is currently operating for most of the time at less than 50 watts; but nevertheless acts as the source signal for the Queen Charlotte Islands and Kincolith to the north.

A proposal has also been made to replace the transmitter and antennas at the CFTK station at Terrace which are not adequately retransmitting microwave signals received from Prince George into the CFTK network. Reception at the Queen Charlotte Islands and throughout the CFTK system should be considerably improved by the last two measures.

Alternative Programming. As for alternative stations on the northern mainland coast and Queen Charlottes, because of the high cost of maintenance in these areas, CTV will probably not be providing an alternative programme.

CATV. In addition to the broadcasting companies mentioned there are several cablevision operations in different parts of the region. Numbers of subscribers range from 60 in the case of a Franklin River Cable Company to 2,500 in the case of Skeena Broadcasting Company in Prince Rupert. Monthly charges range from $6 to $8.50 per month. Quality varies considerably, from poor in the case of signals received in Ucluelet to excellent in the case of Terrace.

Problem Areas and other Aspects

Following are some descriptions of particular problems and other items of current interest to do with the provision of TV services in the study region.

Refusal by CBC of ACP Assistance to Communities with Own LPRT Systems This policy although a problem elsewhere in B.C. does not appear to affect communities of the study region, most of which are expected to be either favourably affected by the new CBC measures, or to be too small to be eligible for assistance.

Illegal CATV Systems Several communities on the north coast and the Queen Charlottes are considering installing CATV systems themselves which are not of sufficient design quality to meet BP 23 and 24 specifications. One community has already done so. In most cases lack of funds for hiring a consultant is the reason given for proceeding on their own.

Communities involved are Hartley Bay (which already has an illegal CATV system in operation); and Kitkatla, Port Simpson, Kincolith, Masset and Skidegate which are at the planning stages. All of these should receive better off-air signals once the planned CBC improvements take place.[12]

Present policy at the regional level is to permit these installations to function unless they are causing interference to other licensed operators; in the case of at least one district office also to inform community societies involved that the specifications will 'probably' need to be complied with at a later date.

It is recommended that DOC Headquarters issues written guidelines on this matter to clarify the official stand for DOC field staff who must deal directly with these cases.

A further recommendation is that wherever practicable information on prospective area developments be released to appropriate community societies at an early date in the hope of forestalling this type of action; e.g., it is possible that if Masset residents were aware of CBC plans to install a new powerful transmitter in Prince Rupert, which is

the source of signals in their area, the acquisition of an illegal CATV system such as they are at present contemplating might seem somewhat premature.

Unlicensed LPRT's. A number of unlicensed LPRT's are operating in the study region. Probably many will be dismantled as new CBC plans are implemented. Recommended course of action is the same as for illegal CATV systems, at least until the effects of the new CBC planned developments become known.

Also DOC officers could (and do) offer to assist the owners to complete necessary licensing formalities (such as arranging for engineering briefs to be drawn up - which is a relatively complex matter).

If expenses to owners of becoming licensed are clearly too great, it is suggested that at least they should be required to file reports from time to time.

An American LPRT. In the case of one unlicensed LPRT a special comment is warranted. The owners are an American company whose operation involves the whole community of Reynolds Sound and who provide all services. Signals are received off-air from Prince Rupert and rebroadcast into the Reynolds Sound area. The station, which has been operative for two years, has been refused licensing by CRTC on the grounds that it is an American concern.

At present the company is pursuing two courses of action in order

to qualify for a licence:

(1) trying to set up a local TV society so that the licence can be issued to a Canadian holder

(2) considering becoming incorporated as a Canadian Company.

The problem with (1) is that as a result of labour turnover, not enough people remain sufficiently long to be part of the board. This situation is taking a very long time to regularize.

CBC Maintenance of CFTK - TV's Repeaters. The question has arisen as to why CBC is providing maintenance for CFTK's repeaters when no assistance is offered to community TV associations who have contributed to their own systems and would also seem to be deserving of aid.

A spokesman for CBC replied to this as follows:

(1) CBC is not providing blanket assistance to CFTK with respect to their repeaters, but mostly in the case of Aristazabal Island which is a vital link in the chain to the Bella Coola Valley area.

(2) The systems in the Bella Coola Valley are partially owned by TV societies, so that, in fact, some private systems are receiving assistance from CBC.

(3) Mt. Parizeau repeater has proved to be extremely costly to maintain: being accessible only by helicopter. When CBC offered assistance,

a strong possibility existed that a large part of the CFTK system would close down. CBC's intervention should be viewed as an interim measure to keep signals available in Bella Coola Valley and other parts served by the Mt. Parizeau repeater until one of their new planned systems are in operation.

(4) CBC would not provide assistance to private societies some systems being based on signals which in CBC's view were so weak that they should never have been expected to provide an adequate picture. Costs of maintenance, of course, would have to be borne by the taxpayer if CBC were to become involved in this way. When the new CBC systems are operational, it is expected that the less satisfactory private systems will voluntarily shut down.

Proposed Takeover of CFTK's Terrace Facilities by CBC. It has been proposed to a meeting of CFTK's stockholders that CBC should take over the CFTK facilities at Terrace, but no decision has, as yet, been reached. An improvement in the retransmission of the microwave signals received at Terrace is a necessity for the upgrading of the CFTK network. CBC does not, however, see that it is in their interest to install a new transmitter and antenna at the Terrace station unless control is also held by them over the quality of future programming, and maintenance of equipment at this station. CBC-affiliate stations customarily broadcast only a few hours of CBC programs a day, and for the remaining time in CBC's view, tend to fall short of CBC standards both in terms of content and quality.

Nor, in certain cases, is affiliate equipment maintained at a level

considered adequate by CBC.

SUMMARY

As a result of the provision of satellite TV service to Ocean Falls, a community of approximately 1,500 people, important changes are likely to take place in TV signal distribution patterns of the midcoast area. This should lead to much improved TV quality and coverage for Bella Coola Valley residents and others.

Several new station installations together with the present CBC policy of avoiding placing repeaters in tandem wherever possible, should improve the quality of reception in the northern region of Vancouver Island.

Persistent problems such as whether assistance should be granted to poorly functioning private LPRT systems; and whether unlicensed LPRT and CATV systems should be allowed to continue to operate should become very much less acute, many societies probably preferring to shut down their installations as the new alternatives become available. Also more communities are likely to receive signals as a result of the operation of new stations than is presently realised.

CBC maintenance of CFTK-TV's repeaters, about which some criticism was encountered, has been discussed, their action being seen as a timely interim measure to prop up the failing Bella Coola Valley system until their own new plans for the area materialise.

The proposed takeover of CFTK's Terrace facilities by CBC has been described. No agreement, however, has as yet been reached between the shareholders of the company and CBC on this matter.

Policy Recommendations

Policy recommendations concerning the delivery of TV services to BC coastal communities are as follows:

1. That in the case of unlicensed CATV systems written guidelines from DOC headquarters which incorporate the following:*

   - that the owners be informed (a) that they are operating illegally and will eventually be required to meet BP 23 and 24 specifications.
     (b) that in the interim period they will be permitted to function unless they are causing interference to others.

   - that a brief yearly report be required from them by DOC describing the current state of their operations.

2. That in the case of illegal LPRT systems a similar approach to that for unlicensed CATV systems be adopted, with the additional recommendation that owners be advised to seek assistance in completing necessary licensing formalities from DOC district offices.

3. That community societies be informed as soon as practicable of prospective developments in their areas in order to prevent, where possible, the premature installation of poorly designed systems.

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* See note 12.

4. That technical advice on system planning and maintenance be made available to community societies by DOC.

PART VIII

PRIVATE SYSTEMS

A number of different organisations have set up private systems in the area. These include Transport Canada, RCMP, Fisheries Service of Environment Canada, BC Forest Service, BC Department of Highways, BC Hydro and Power Authority and BC Emergency Health. This list includes three of the four largest BC Government users of telecommunications services - BC Hydro, BC Department of Highways, BC Forest Service - the fourth being BC Railways which is not represented in the study area.

These and some private sector systems are described in the following pages in order to show how different communications needs in the region are met; and also to indicate the extent to which present and proposed private systems conform to departmental policy.

A considerable amount of the information in this part is based on verbal report. All organisations represented were asked about their repeater locations, willingness to share frequencies, sites etc. with other agencies and use of common carrier facilities. Certain other items of information were not collected systematically, but have been referred to where emphasised by the various spokesman. In particular information on the use of TELEX, TWX and data transfer systems has not been collected systematically, and omission of reference to them does not imply that they are not used by the particular organisation being discussed.

TRANSPORT CANADA (DOT)

Transport Canada has need for a variety of communication systems throughout the study area, being responsible for safety at federal airports and harbours and along Canada's air and shipping routes. In particular DOT is concerned with the provision of ship-shore and air-ground communication, navigational aids for aircraft and marine vessels and the proper maintenance of these facilities.

DOT is in the somewhat unique position of a federal agency using radio to provide a public correspondence service as well as needing private facilities for certain of its own needs. DOT's radiotelephone service will be discussed together with BC Tel's in Part IX.

Air Services

DOT's communication and air navigation systems along the coast include radio stations providing two-way communication and scheduled weather broadcasts at Prince Rupert, Sandspit, Terrace, Port Hardy and Tofino; NDB's (nondirectional beacons) at various points along the coast and VOR's (VHF Omni Ranges - a primary navigation system combining constant and variable phase signals throughout 360° of azimuth to give a precise bearing by easily read instruments) at Malcolm, Port Hardy and Sandspit. Although no airports in the region have tower facilities Port Hardy, Prince Rupert, Sandspit and Terrace have instrument landing systems (ILS).

The above aids are owned by MOT but where links between facility

locations are necessary such as between airports the services of common carriers are used.

Air services, including communication, broadcast services, and navigational aids are generally considered adequate for large commercial airlines, but not for low-flying light aircraft, including recreational craft, which visit coastal B.C. during the summer. Radio contact with DOT is not possible for them en route from Prince Rupert to Port Hardy, or from Port Hardy to Tofino. Many such planes, however, are fitted with private company frequencies and are able to contact fishing and logging camps along the coast.

Few small aircraft use the above-mentioned NDB's because these transmit on VHF frequencies which are line-of-sight and the aircraft are generally flying too low for unobstructed reception. For planes that make use of NDB's coverage is particularly poor on the west coast of Vancouver Island.

Planned Projects In order to improve coastal facilities for aircraft, DOT has scheduled the following projects for the planning period (1977 - 83):

(1) a new seaplane base at Kyuquot (1977)

(2) VHF/DF (direction-finding equipment) for test at Port Hardy and Sandspit; and for installation at Prince Rupert (1977)

(3) a new air radio VHF Peripheral (remoted air-ground communications out) at Ethelda Bay, controlled from Prince Rupert (1977)

(4) tower control at Tofino Airport (whereby a plane which is lost or unsure of its position can be assisted to reach the airport); also radar facilities (1977-8).

(5) replacement of inadequate transmitters and relocation of antennas (a beacon at Cape Scott will be upgraded under this program which according to a spokesman for DOT, should be of assistance to low flying aircraft [1978-9]).

The following are planned for the forecast period (post 1983):

- a VOR-DME (combined VOR and direction-measuring equipment) for Tofino. This could be brought forward to 1978-9

- also for Tofino airport - improvements to lighting: e.g. for runway identification, and other facilities such as runway firehall trucks etc., also access roads.

Marine Services

With Canada and the U.S. extending their fishing jurisdictions to 200 miles from the shoreline, together with a steady growth in the volume of coastal traffic, both pleasure and commercial and the prospect of increased oil-bearing traffic down the coast, adequate surveillance of BC coastal waters has become imperative.

Important projects are underway to meet these needs as follows:

Vessel Traffic Management Systems A new VTM system complete with radar facilities is being installed at Tofino, the main purpose of which is to prevent tanker traffic from Alaska from entering Alberni Canal rather than Juan de Fuca Strait; and a second VTM (without radar)

with peripherals along the coast is planned for Prince Rupert within the next two years.

Proposed VHF coverage of the North Coast. In order to improve VHF communication on the north coast, including Queen Charlotte Islands, (much of which at present has only limited HF coverage from stations at Prince Rupert, Sandspit and Alert Bay) a new VHF repeater system is being planned by MOT.

Under this scheme four sites are proposed, two on Queen Charlottes - at Mt. Hobbs on Graham Island, and Yatza Mountain on Moresby Island - and two on mainland off-shore islands at Mt. Gil and Mt. Sarah. From the latter, Tolmie and Grenville channels, the two main shipping channels will be covered. See charts 16, 17 and 18.

Additional sites will also be required to relay control and voice channels back to a control point at Sandspit or (more probably) Prince Rupert.

Amongst channels fitted will be the distress and calling channel 16, VTM channel 11 and channels 21b and 26 for broadcasting weather reports and for receiving phone calls respectively.

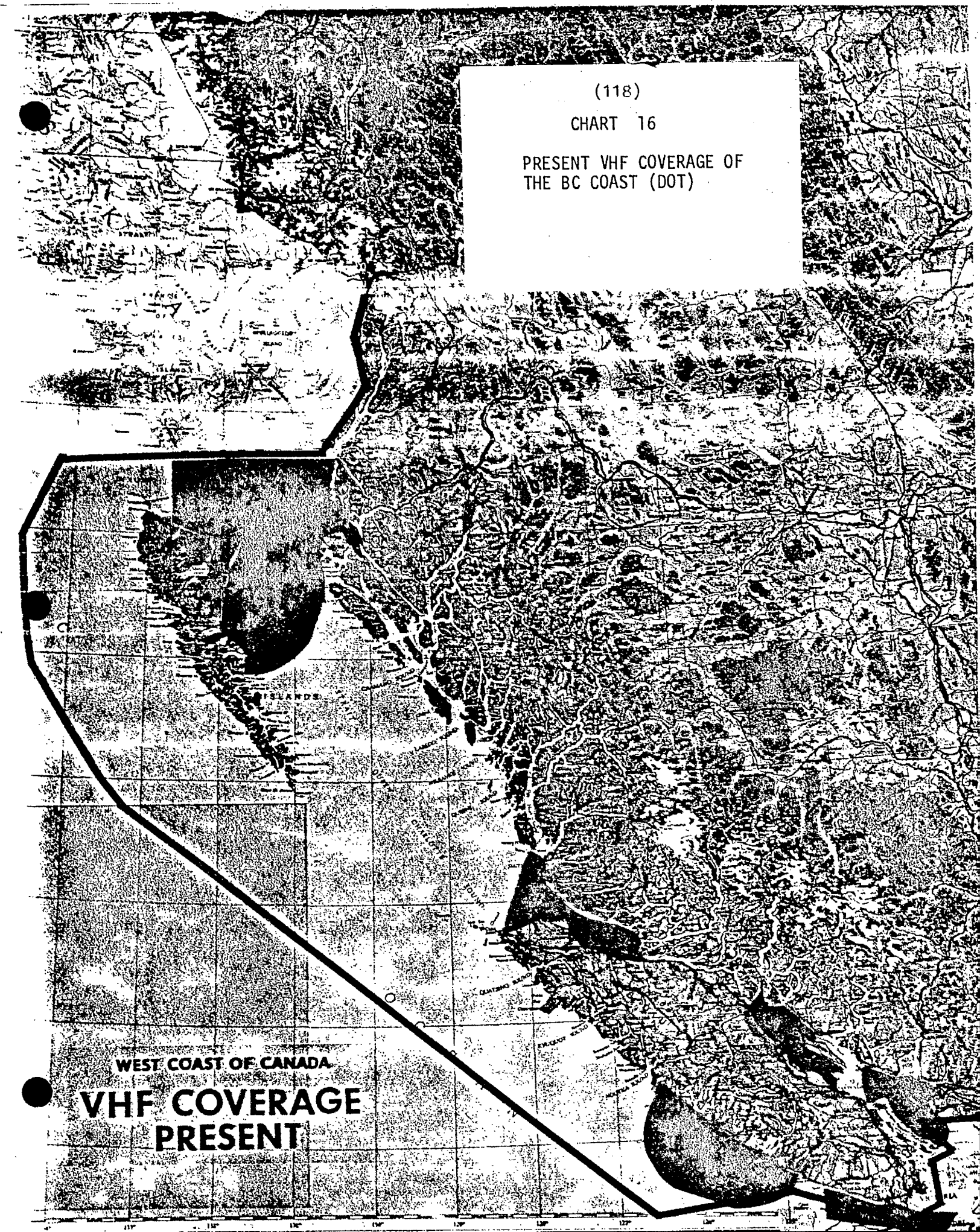
B.C. microwave facilities will be used where possible to link repeaters.

Although the system has not been planned to serve light aircraft, according to a spokesman for DOT, aircraft frequencies could be added

(118)

CHART 16

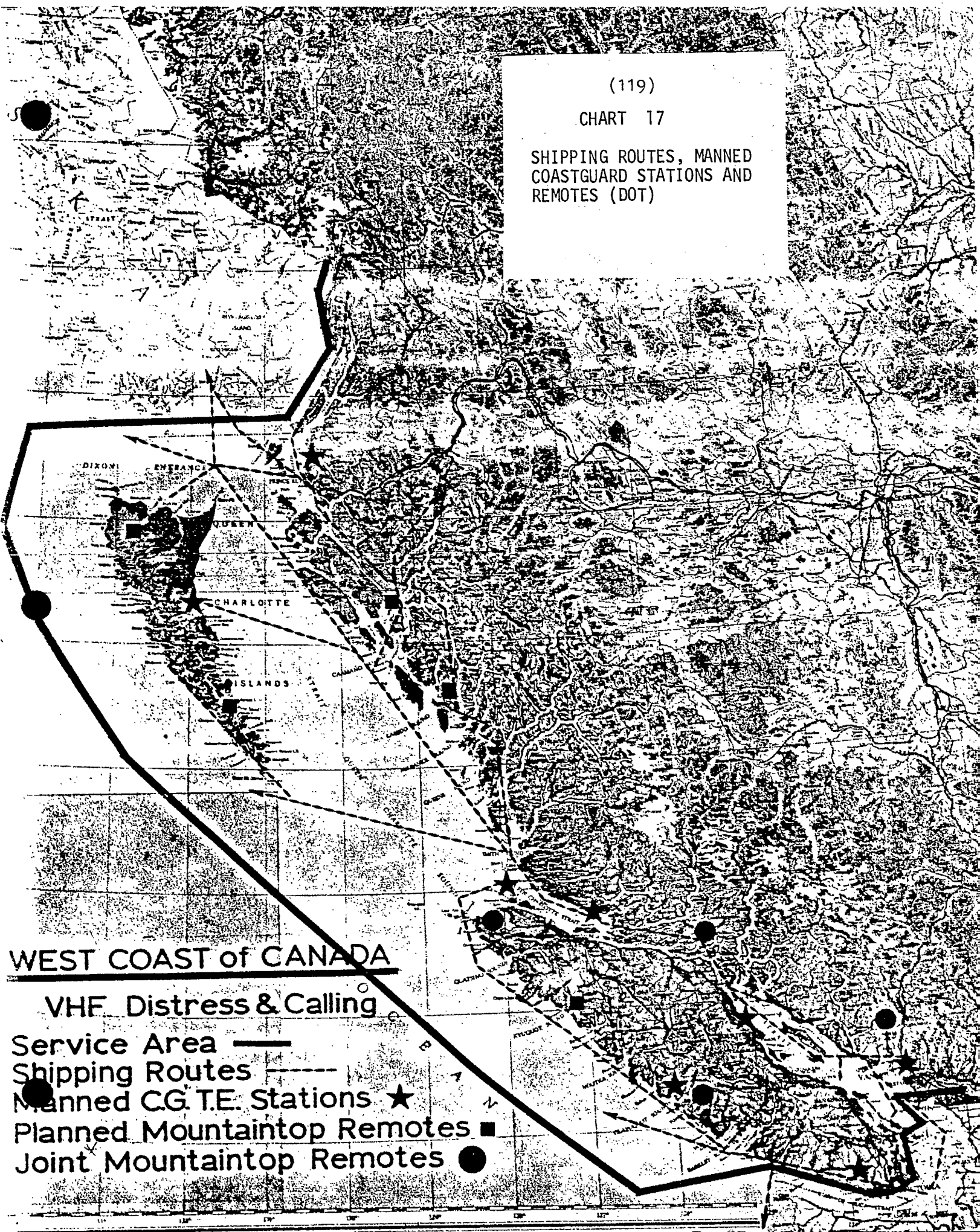
PRESENT VHF COVERAGE OF THE BC COAST (DOT)

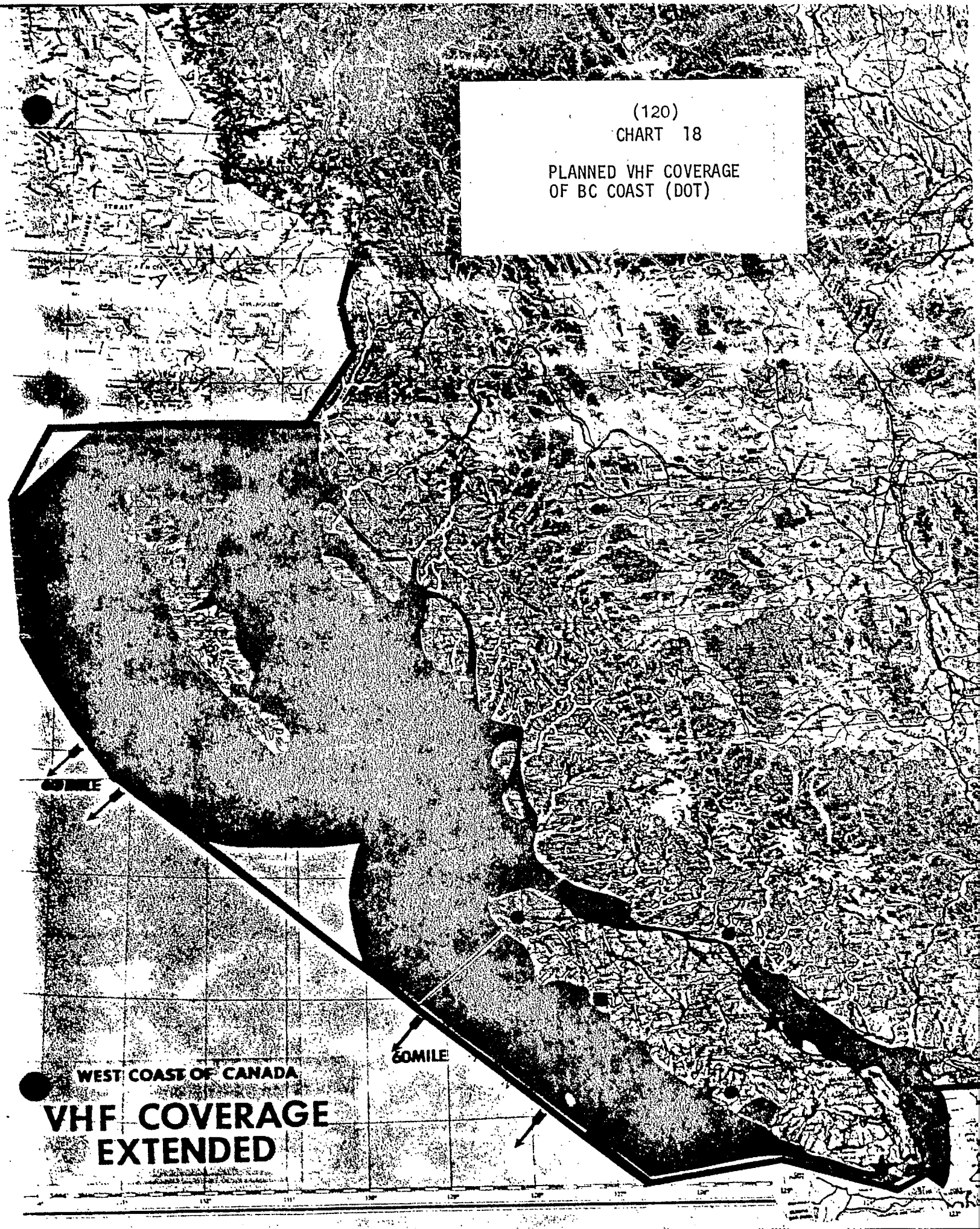


(119)

CHART 17

SHIPPING ROUTES, MANNED COASTGUARD STATIONS AND REMOTES (DOT)




(120)
CHART 18
PLANNED VHF COVERAGE
OF BC COAST (DOT)
60MILE
60MILE
WEST COAST OF CANADA
VHF COVERAGE
EXTENDED

at these sites. Modifications to present plans would consist of the provision of sufficient space in the buildings and a sufficient number of channels on the back-haul system.

Meadow Mountain Repeater Separate from the above system is a recently installed repeater at Meadow Mountain, a 3,000 ft. mountain, 25 miles west of Sandspit and immediately north of Skidegate Channel. This provides channels 16 and 26 only; and is connected by a DOT UHF link to Sandspit Airport. Mainly serving fishing-boats this repeater provides much needed communication between Sandspit and the West Coast. Due to a backbone of mountains running from north to south of the island, communication has previously been difficult or impossible, even on HF frequencies, between these areas.

Proposed Radio Link: Mt. Ozzard to Eliza Dome An important proposed private DOT system, which is planned for the west coast of Vancouver Island is a 2 GHz microwave link between Amphitrite Point near Ucluelet and DOT radar/communication site on Mt. Ozzard, and a second link between Mt. Ozzard and Eliza Dome at the entrance to Nootka Sound. The purpose of these is to provide a remote VHF ship-shore facility controlled from the new VTM centre at Tofino. At present DOT are planning a 10 voice channel with possible 'future' expansion to 17.

In contrast to the usual practice of B.C. Tel leasing facilities to DOT, an opportunity arises on this case for the reverse situation - holding the possibility of improved communication facilities for the

various small communities in that area. Such sharing would be in keeping with DOC policy that the spectrum is 'not only a valuable resource, but a limited one which must be used for the benefit of Canadians' (DOC Annual Report, 1975-76, p. 6).

Coast Guard

A branch of DOT which makes considerable use of private circuits is the coast guard. Again, wherever possible, facilities are leased from the common carriers. For example, coastguard stations at Prince Rupert, Sandspit, Bull Harbour, Comox, Vancouver, Victoria, and Tofino, and the Rescue and Co-ordination Centre at Victoria are linked by microwave circuits leased from BC Tel and CNCP. These are used primarily for communications connected with safety of life at sea, but also for conducting government business and for ship-shore radio-telephone communications (which will be treated in greater length in Part [IX]).

In addition the coastguard have their own radio circuits, both voice and key; and also teletype.

DOT radio circuits are used primarily to receive messages from weather ships and lighthouses, business telegrams from worldwide shipping to agents in B.C. and elsewhere; and also to provide a second continuous communications link between shipping and their Search and Rescue Centre at Victoria.

DOT teletype system, ADIS (Automatic Data Interchange System), and telex system, GDNS (Government Data Network System) are respectively

aircraft and a coastguard station services which link all air radio and coast guard stations across Canada to central computers in Ottawa, in the case of ADIS, and Toronto, in the case of GDNS. At these locations messages concerning ship and aircraft movements, the operative condition and safety of radio aids and other navigation facilities, and also administrative business messages are coordinated and released to designated points across Canada and elsewhere.

Lighthouses Lighthouses in the region relay weather information using private VHF and HF frequencies to designated coastguard stations. For example, Bull Harbour receives information from 9 lighthouses on the north coast and Queen Charlotte Sound from where it is sent by ADIS teletype circuit or Telex to the Vancouver weather office, and also to the Vancouver Marine Aeradio station for broadcast over their continuous marine broadcast frequency.

Lighthouses are able to communicate with each other via MOT's VHF radio network, but mostly use CB radio if distance permits.

A long contemplated move on the part of DOT to automate the lighthouse service has been steadily resisted, particularly by fishermen and coastal residents who appreciate the human element in the present operation.

A Private Message Service A pioneering service, DOT's message service, known popularly as the 'camp network' originally provided radio contact on a medium frequency for small settlements such as logging and fish camps which otherwise had no means of communication with the outside world. Although BC Tel services have now become more widespread DOT's message service continues to be popular probably

partly because BC Tel services are in some cases restricted to certain hours, while the DOT service is round-the-clock; and also because of the informal nature of the DOT service. A diminishing number of stations, however, are using the message service; and in fact none at all in the Queen Charlotte - Prince Rupert area where there used to be many stations

Tariffs for the service are shared by CNCP and the coast guard but in case of emergency, no charge is made by the coastguard. As is the case for lighthouses, terminal stations are linked in groups to designated coast guard stations. Settlements currently using the service are as follows (table 19).

Table 19

Settlements on DOT's Camp Network Nov '76

Designated Coast Guard Station	Camp Radio Location	Designated Coast Guard Station	Camp Radio Location
Bull Harbour	Bella Bella Belize Inlet Boswell Camp Boswell Narrows Butedale Dawsons Landing Duncanby Finn Bay Good Hope Namu Shearwater Talheo Cannery Warren Bay Wadhams	Tofino	Amai Inlet Esperanza Finlay Cove Fleetwood Logging Kyuquot
		Alert Bay	Awichalto Inlet Fort Neville Freshwater Bay Kingcome Inlet Ransome Pt. Simcom Bay

Source: Canada Transport Canada. Fixed Communications, Telecommunications and Electronics Operation Standards. First Edition, November 1976.

Problems Experienced by Coastguard Services

The following problems though mentioned here, are rather more in the province of DOT than of DOC to solve. It is felt, however, that DOC should be aware of radio communication problems which exist for DOT.

1. Frequency Congestion in Densely Populated Shipping Areas

   Although as yet not troublesome in the study region, this has become a problem in Georgia Strait because of the large number of marine vessels in the area, including pleasure craft. Misuse and congestion of the VHF distress and calling frequency 156.8 MHz (Ch. 16), expecially on weekends is particularly serious. Formerly (and to some extent still) experienced on the MF distress and calling frequency 2182, this problem, with an increase in the volume of VHF radios has now shifted to the VHF band. American authorities, through public relations measures, are reputed to have dealt with this type of misuse fairly effectively. At least 3 approaches are possible.

   (a) more stringent licensing requirements

   (b) PR work by DOT and DOC

   (c) stronger surveillance of radio channel use by DOT and DOC.

2. Poor Transmission and Reception at Vancouver Radio Site at Vancouver Airport

   This site, though quiet when chosen, is now adversely affected by industrial noise. VHF transmission and reception which, together with HF is remoted to a lower than sea-level location on Lulu Island, is particularly unsatisfactory. In the view of a coastguard spokesman, an elevated site, and additional

strategically located peripherals (Vancouver Radio already has a peripheral at Watts Point which works very well) e.g. at Mt. Town - a DOE transmitter site on Saltspring Island - would give excellent VHF coverage over most of Georgia Strait similar to that provided from a site on Mt. Hays at Prince Rupert for the Prince Rupert area. So far however, a suitable site has not been selected by DOT.

Recommendation Since DOC issues licences to boat-owners, the following recommendation is made:

- that DOC monitor the frequencies 2182 MHz and 156.8 MHz (Chan. 16) with a view to developing measures - preferably associated with the issuing of licences - to assist DOT in reducing congestion on these channels. Such measures might include:
  - published material to accompany radio licences
  - PR work, e.g. from booth at PNE, addresses to boat clubs etc.
  - more stringent licensing requirements.

BC DEPARTMENT OF HIGHWAYS (BC HIGHWAYS)

BC Highways repeater systems follow the main arterial highways in the province and are used for communication between regional control centres - of which three, Prince George, Kamloops and Dease Tower in the lower mainland control different parts of the study area - and depots and maintenance crews working on the roads; and in the surveillance of roads for public safety purposes.

BC Highways operates 2,200 mobiles throughout the province, some of which are used on ferries (BC Ferries provides main-route ferries and BC Highways about 25 side-route salt-water and fresh-water ferries througout the province; e.g. between Sointula and Port Hardy, and between Queen Charlotte City and Sandspit). In addition to Highways radios, some vehicles are fitted with BC Tel radiotelephones.

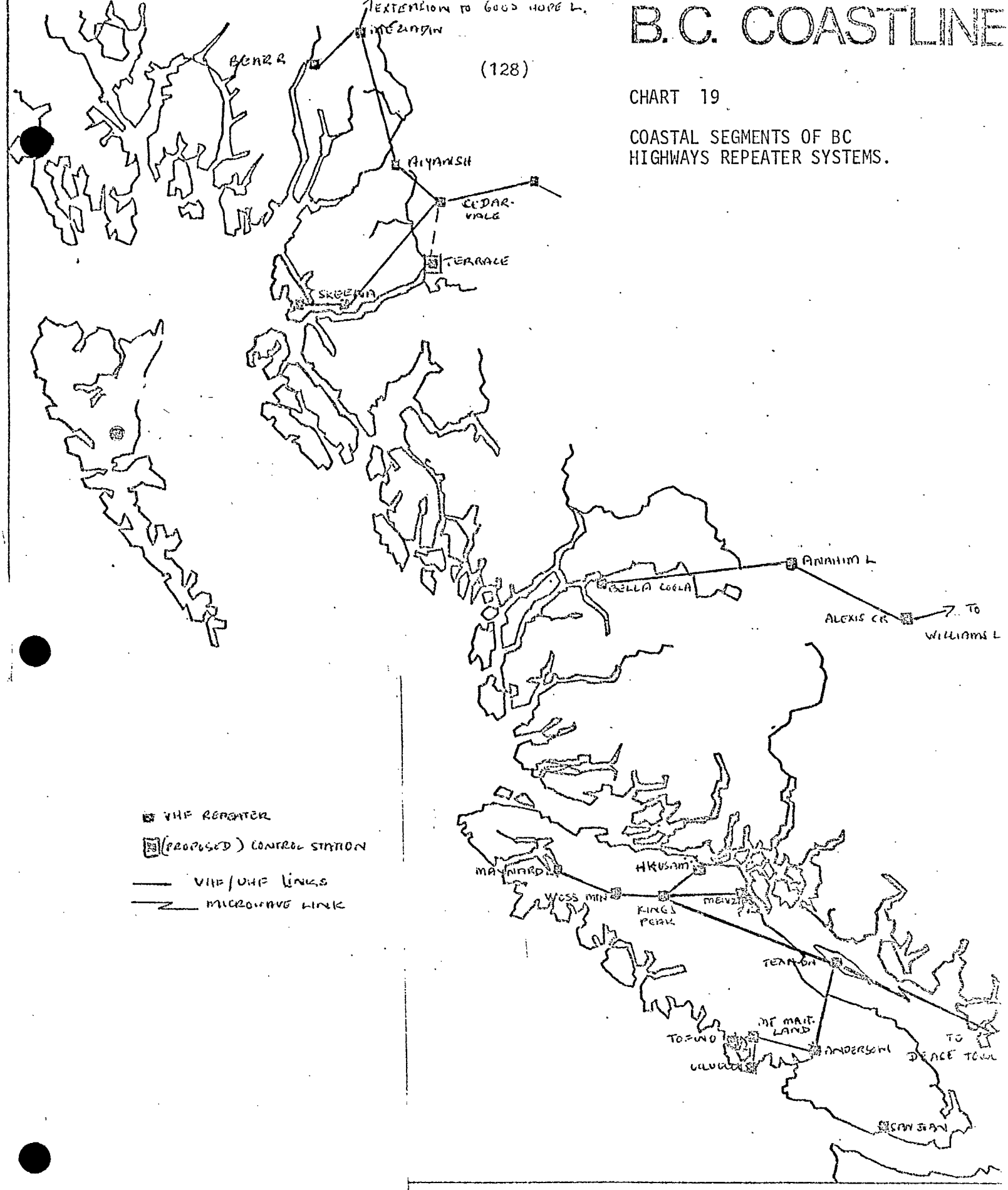
A considerable amount of BC Highways communication traffic is intermobile, either direct or through a repeater; or from mobiles to depots or headquarters, either direct or through one or several repeaters.

Several different repeater branch systems terminate in the study region (see Chart 19). These consist basically of VHF repeaters with mixed VHF and UHF interconnecting links, with a predominance of UHF links.

B.C. COASTLINE

CHART 19

COASTAL SEGMENTS OF BC
HIGHWAYS REPEATER SYSTEMS.



BC Highway's system has grown on a shared basis with BC Hydro's, many repeater sites and power sources being owned by one agency and shared with the other - although antennas and other equipment are generally individually owned.

Frequencies are not shared with BC Hydro, but there are isolated instances of sharing e.g. with Department of Public Works inspectors and also with RCMP in avalanche and slide areas where it may be necessary to close highways. The sharing of trunks with DOF, whose busy season complements BC Highway's has been considered by the two agencies, but rejected - 'probably because of the volumes of traffic involved.'

For private calls employees are recommended to use alternative private systems where they exist; e.g. between Bella Coola and Williams Lake where BC Tel long-distance facilities are available.

Plans. BC Highways has been engaged for the past four years in improving their system on a 'bit-by-bit' basis throughout the province; e.g. in 1974, most of the lower mainland systems from Hope west and including Vancouver Island were upgraded.

Present plans are for a new centre to be installed at Terrace to control the region west of a point between Burns Lake and Vanderhoof - a region previously controlled from Prince George.

B.C. HYDRO

BC Hydro uses three different communications systems in the course of its operations.

(a) microwave carrier - which provides point-to-point circuits for the protective relaying of high voltage power lines and supervisory control of major substations and generating stations; also voice circuits for telephone communication.

(b) power line carrier - which provides for supervisory control, telemetering and voice circuits between the stations connected by the high voltage power lines.

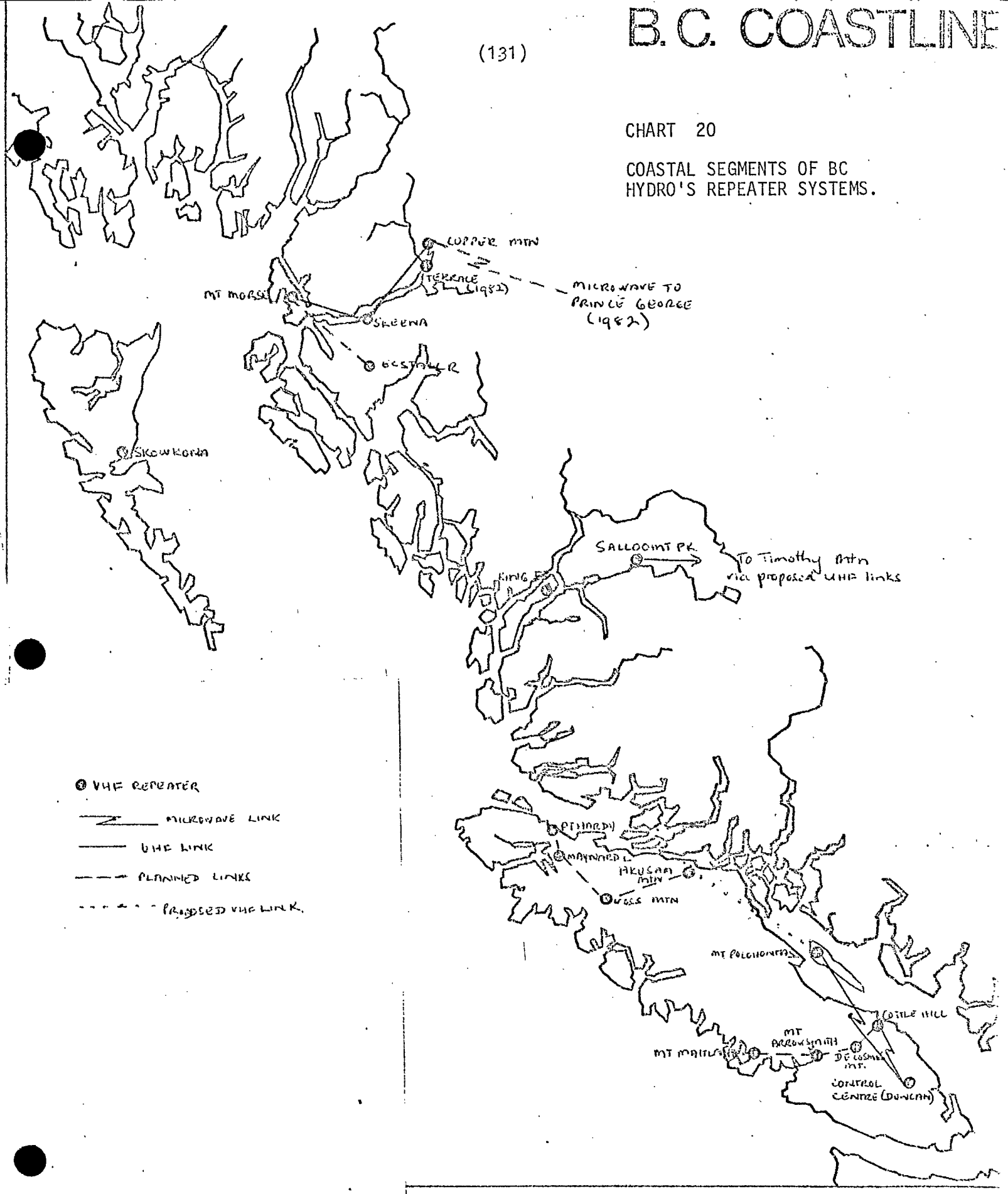
(c) a system of VHF repeaters with UHF connecting links used principally for voice communications to and from service crews working on the transmission and distribution line routes. Coastal sections of this system and BC Hydro's electric transmission system are illustrated in Charts (20) and (21).

On Vancouver Island, major transmission lines run from John Hunt generating station to Port Hardy with spurs off to Gold River, Tahsis and Port Alice. A southern line from this complex branches at Dunsmuir switching station to provide power for Port Alberni with its large McMillan Bloedel wood-processing plants, assisted by an additional generating station at Ash River. An extension of this line also supplies power to Ucluelet and Tofino. Port Renfrew is at the end of a line from Victoria which is also tied into the north south system.

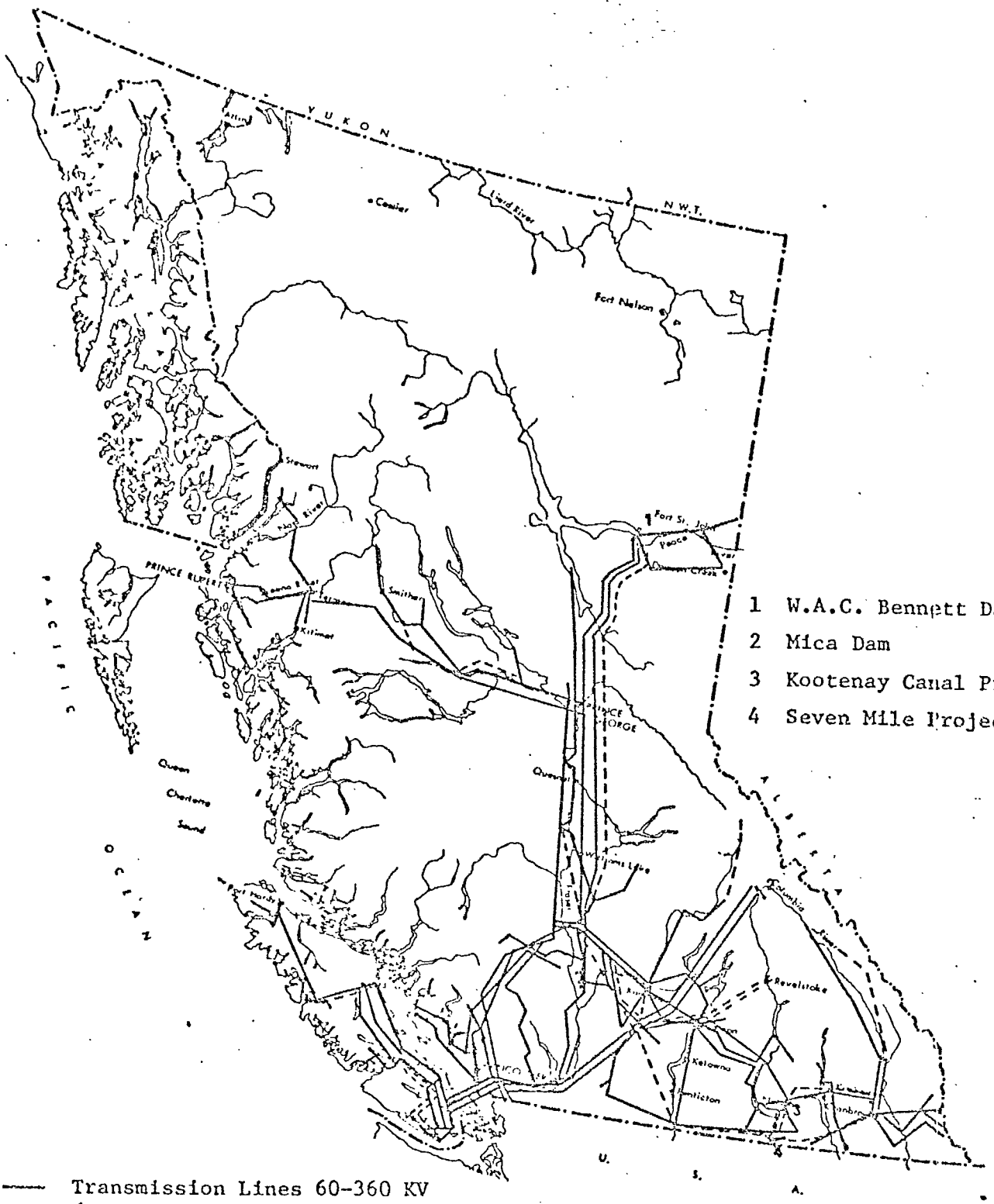
B.C. COASTLINE

CHART 20

COASTAL SEGMENTS OF BC HYDRO'S REPEATER SYSTEMS.



ELECTRIC TRANSMISSION SYSTEM



1 W.A.C. Bennett Dam
2 Mica Dam
3 Kootenay Canal Project
4 Seven Mile Project

—— Transmission Lines 60-360 KV (existing and under construction)

—— Transmission Lines 500 KV (existing and under construction)

- - - - Transmission Lines 60-360 KV (planned)

- - - - Transmission Lines 500 KV (planned)

Source: BC Manual of Resources and Development, November, 1974 P. 33

On the mainland, a power-line stretches from the Alcan plant at Kitimat, supplied by Alcan's generating station at Kemano to Prince Rupert and Alice Arm, branching at Terrace.

Most other BC Hydro supplied power in the region is provided by isolated diesel generators located at Masset, Port Clements and Sanspit, Bella Bella and Bella Coola, the latter being additionally supplied with Hydro power from Falls River generating station. Ocean Falls is supplied by the Ocean Falls corporation.

BC Hydro diesel stations are also used to provide backup systems in the event of power failures e.g. at Prince Rupert, Bella Coola and at Tofino Airport - in the latter case to serve the Tofino - Ucluelet area.

Mobiles move from area to area as they are needed and base stations achieve extended coverage of the mobiles through the VHF repeaters, most of which, in the study area are 'wild' repeaters.

The repeaters are designed to be shared with BC Highways. Encased in fibreglass domes (comshells) which protect them from the elements, and powered by long-lasting renewable batteries some of which have been in place for almost 10 years, they need very little maintenance, requiring neither fuel nor power. Access is mainly by helicopter.

Many small communities along the coast, some of which can only be reached by boat are not supplied by BC Hydro and use diesel generators that are owned by private companies operating in their areas.

BC MINISTRY OF FORESTS (BCFS)

The BC Ministry of Forests has 6 regional offices, 2 of which, Prince Rupert and Vancouver are administration centres for regions which include coastal areas north and south respectively of Cape Caution. In addition BCFS has numerous ranger stations, several of which, notably at Lake Cowichan, Port Alberni, Tofino, Gold River, Bella Coola, Prince Rupert and Queen Charlotte City serve study area ranger districts.

Radio Systems

VHF Systems BCFS VHF communication systems are referred to

within their department as their FM/F-1 and FM/F-2 systems.

FM/F-1 This provides for communications within the ranger districts between base stations and mobiles/portables and mainly concerns forest operations including fire, pest and disease control. Communication may be either direct or through stand-alone 5-watt repeaters.

In most cases, mobiles are in land vehicles as in Powell River which has 6 vehicles; but some few are supplied to chartered patrol aircraft and water-bombers; and some to government-owned launches - e.g. Lund ranger district north of Powell River has 3 launches each equipped with VHF-FM radios (and also SSB/AM radios) which are controlled via a repeater as they work in the coastal inlets.

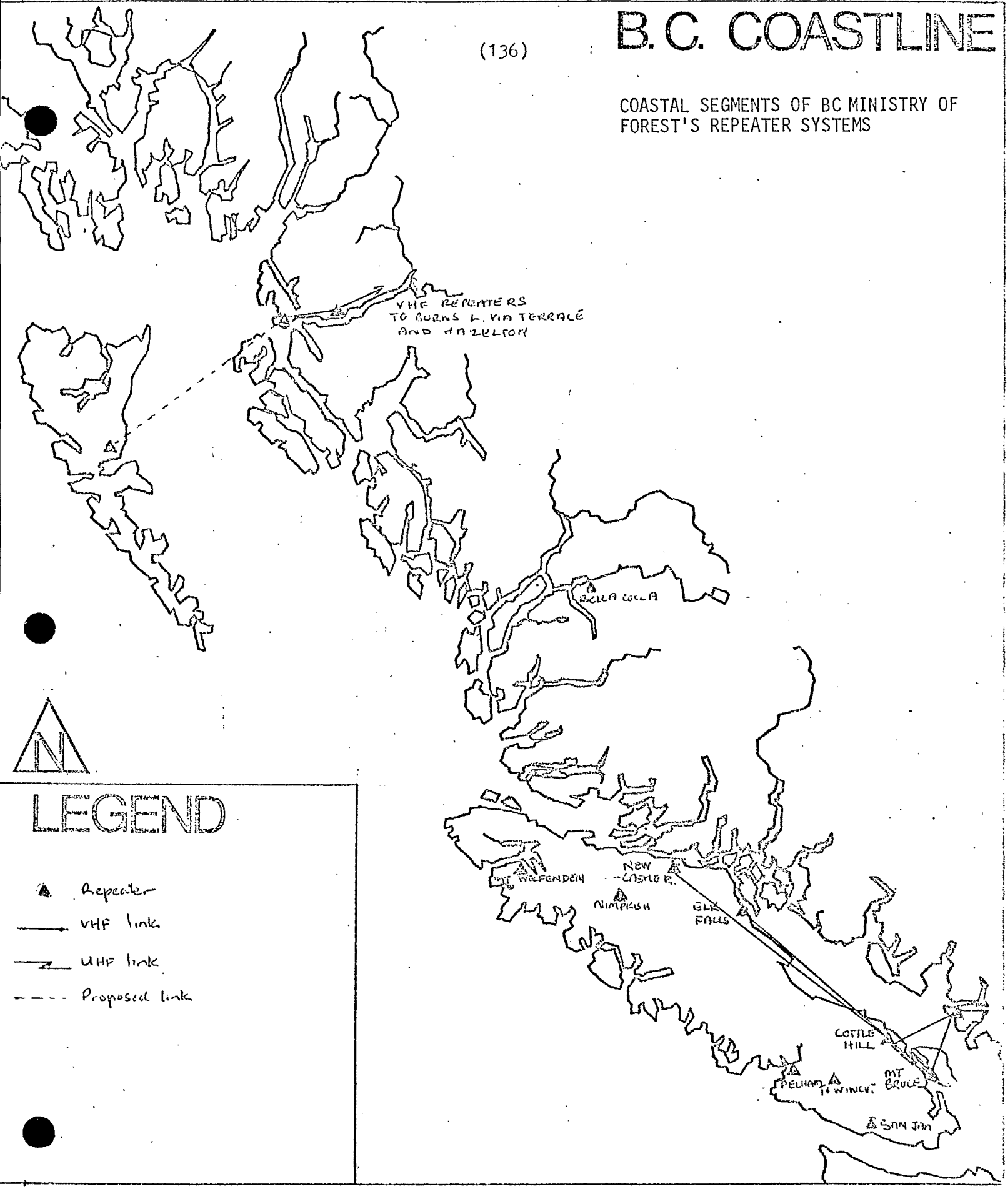
FM/F-2 These are chains of 2 or more 50 watt repeaters connected by VHF links to regional headquarters (see Chart 22). An exception is the extra-study region link, Mt. Bruce - Cottle Hill which is a UHF link.

Most of the regional systems are connected both with each other and to Vancouver central headquarters by switching mechanisms in the regional offices.

This network provides for administrative traffic between Vancouver and regional offices. Also via this system launches, base-stations, land mobiles and in the summer, aircraft, can communicate with Vancouver headquarters or with any other district office in the province.

B.C. COASTLINE

COASTAL SEGMENTS OF BC MINISTRY OF FOREST'S REPEATER SYSTEMS



Traffic volume is extremely heavy in the summer from May to October and BCFS is investigating other means of transferring data such as increased use of telex and teletype facilities in order to reduce the amount of traffic on their main chain.

HF Systems Ranger stations which engage in a substantial amount of boat work are supplied with HF facilities, the main HF terminal being located in the Vancouver office.

Sharing BCFS is willing to share sites, power etc., wherever possible and does so in many instances. Except to a small extent with its own Parks Branch, BCFS does not share frequencies however; nor would they in view of the heavy volume of their own traffic to be provided for, also because of variations in their system loading.

Use of BC Tel Facilities BCFS leases space and equipment from BC Tel in a few instances e.g. at Newcastle Ridge but does not lease circuits. At present BCFS is considering providing 'roving' repeaters where a particular need exists - e.g. for use during fire-fighting operations so that crews can communicate through departmental repeaters to BC terminals (which, in general, are too low to be contacted directly).

Assignment of Repeater Sites BCFS, being closely associated with the Department of Lands has some control over the assignment of sites to themselves and other organisations. To perform this function more effectively, a computer program has been developed by

them to ensure compatibility with respect to allocated frequencies etc. between prospective sharers of sites.

Radio Communication on Logging Roads A recently marketed radio (1976) known as 'WR 156' is at present being introduced into BCFS to provide increased safety for service personnel travelling on logging roads.

Most multi-frequency radios on the market allow a frequency separation of 1 MHz or less. Radios on BCFS vehicles have normally covered 3 - 4 MHz. BCFS frequency assignments are in the 160 MHz band while forest company frequencies are mostly in the 150, but sometimes in the 170 bands - requiring BCFS vehicles to be equipped with at least 2 radios and, in isolated instances, 3 or even 4.

The WR 156 has 'wide frequency spacing' and is tuneable to a range of approximately 20 MHz, although some degradation in operation occurs at this spacing. Thus only one radio now needs to be carried on BCFS vehicles - a considerable improvement from the point of view of installation and maintenance costs alone.

WR 156 is not licensed for marine use.

Licensing of BCFS Projects If requiring the issuance of a new frequency at a location within 73 miles of the US border, licensing involves considerable delay. This is frequently not a problem however, because

planning a new repeater installation generally takes up to 2 years and as a rule, holdups in the delivery of equipment cause even greater delays than does licensing.

Future Plans

At present BCFS are conducting studies as a basis for providing improved coverage of the west coast of Vancouver Island and, in particular, for the ranger station at Tofino; also for linking the Tofino station into existing systems on the east coast of the island.

ENVIRONMENT CANADA - DEPARTMENT OF FISHERIES (DOF)

Much of the Department of Fisheries traffic consists of point-to-point HF communication between ship station, district office and Vancouver.

Single DOF stations providing VHF communications are located at a number of points in the study region, e.g. at Thornton Creek, near Ucluelet for business communication with DOF vessels; and at Terrace Prince Rupert, Bella Coola and Port Alberni all using a common DOF frequency for working to mobiles and portables.

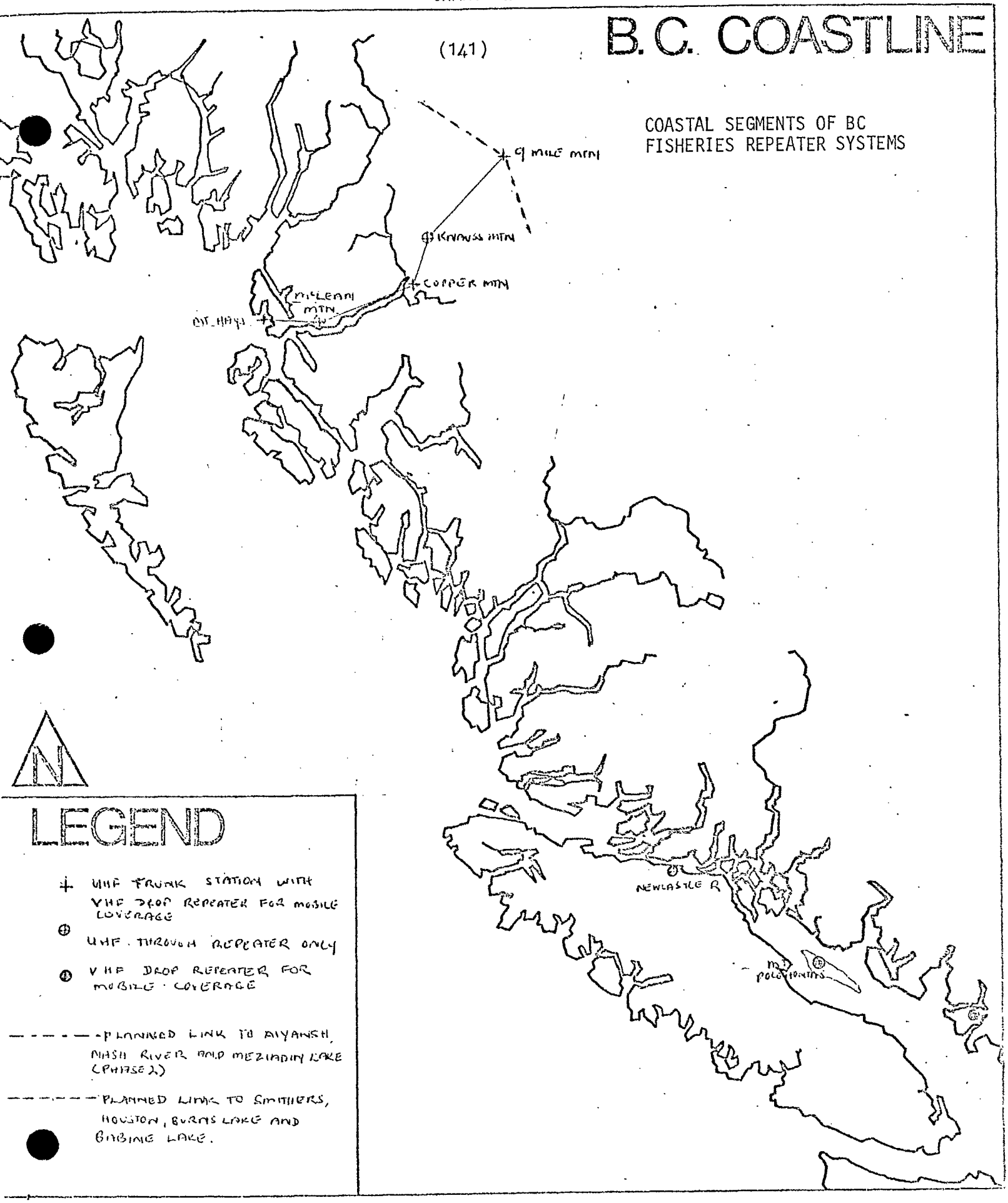
DOF is in the process of installing a VHF system of repeaters working to mobiles, part of which is already in place in the form of a base station in the Fraser Valley and repeaters at Burnaby and Aldergrove. Further repeaters will be placed along Highway 16 and the Skeena River to Terrace and northeast to Hazelton (see Chart 23) licences for which have already been issued. These systems are being set up to deal with the increasing volume of data to be transmitted to Vancouver during the fishing season and to prepare for facsimile and telex data transmission at a later date.

DOF is interested in sharing sites wherever possible. A tentative agreement has been reached for example to lease building space from the B.C. Forest Service at Mt. Hays, Mclean Mountain, Copper Mountain and Knauss Mountain for its Skeena Valley System. DOF is particularly interested in sharing with the Coast Guard.

B.C. COASTLINE

(141)

COASTAL SEGMENTS OF BC
FISHERIES REPEATER SYSTEMS



LEGEND

- UHF TRUNK STATION WITH VHF DROP REPEATER FOR MOBILE COVERAGE
- UHF THROUGH REPEATER ONLY
- VHF DROP REPEATER FOR MOBILE COVERAGE
- PLANNED LINK TO KIYANSH, NASH RIVER AND MEZIADIN LAKE (PHASE 2)
- PLANNED LINK TO SMITHERS, HOUSTON, BURNS LAKE AND BABINE LAKE.

RCMP

The RCMP have VHF base stations in their detachment offices, usually with one mobile working to each to cover local requirements. Detachments are stationed at Port Renfrew, Ucluelet, Tofino, Gold River, Tahsis, Port Hardy, Bella Coola, Prince Rupert, Aiyansh, Stewart, Masset and Queen Charlotte City. Highway patrol is their main business and 'wild' repeaters are installed at various sites to extend local coverage. There is no trunked system however. Highways that are most used receive priority for the installation of repeaters and coverage is not adequate in some places e.g. Bella Bella. A new repeater is planned for this area for the summer of 1977. At present a link is being set up between Tofino, Ucluelet and Alberni via repeaters at Mt. Ozzard and Klitsa Mountain. It is RCMP's intention to extend this system to Nanaimo probably within 2 years. A second link is planned to connect Stewart and Terrace, via repeaters at Stewart and Aiyansh.

RCMP have boats stationed at Port Alberni, which patrol the Alberni canal; at Ocean Falls, which patrols King Island and Burke Channel as far as Bella Coola and Namu; and at Prince Rupert. Repeater sites are chosen to serve both patrol boats and land mobiles, e.g. the new Bella Bella repeater site. Coverage of the police boats is not always satisfactory, and HF-SSB radios are preferred for this purpose.

A Grumman Goose plane, owned by the RCMP is stationed on the west coast of Vancouver Island and can communicate with the base stations at Tofino, Gold River and Tahsis. A second is stationed at Prince Rupert. Base Stations are also fitted with the frequency 2182 which can be used to communicate with fish boats and DOT coastguard stations.

CIPC Detachments at Gold River, Port Hardy and Prince Rupert, like most of the larger detachments in BC are supplied with terminals of a coast-to-coast computer system, CIPC (Canadian Police Information Centre) based in Ottawa, but with 7 sub-computers in various provinces including one in Vancouver. Nine hundred and seventy terminals feed into this system with approximately 130 in B.C. Each terminal is on a dedicated loop and communication is possible between terminals. CNCP holds the contract for the systems but makes use of BC Tel facilities in certain areas. Messages consist of information on wanted persons, stolen vehicles and other property. Messages sent to distant locations cost the same as messages to local points. Channel availability* runs at about 99.1%.

Masset, Bella Coola and Tahsis are being considered as possible terminal sites within the next 3 - 4 years.

* i.e. freedom from hardware breakdown.

BC EMERGENCY HEALTH

According to information received from the director of the ambulance service, the B.C. Emergency Health department are preparing to establish a province-wide VHF Communications system for medical emergencies. Currently 80 base-stations mobiles and pages are being placed in various communities and funded by the commission and it is planned to connect these elements within two years into an integrated system. Few of the coastal communities will be affected for some time however. Amongst those that will be are Ucluelet and Tofino which will be served out of central dispatch centre to be established in Nanaimo. The Queen Charlottes will have a base station but the isolation of these islands will prevent any real integration. Though there is a road connection for part of the year to the Bella Coola Valley that area is considered too isolated to participate even in the first stages of the system.

BC GOVERNMENT PACIFIC EMERGENCY PROGRAM (PEP)

The Pacific Emergency Program is conducted by the Provincial Department of Energy, Transport and Communications. Its purpose is to coordinate the telecommunication systems of government and private agencies, including amateur agencies, for use in national emergencies.

PEPs' second main function is to train volunteers, - supported by a variety of communications facilities - to keep key services operating in national emergencies.

PEP does not own systems of repeaters anywhere in the province.

McMILLAN BLOEDEL LTD.

McMillan Bloedel Ltd. has need for a number of different types of communication facilities to serve the various parts of its operation which, in the study region is represented by logging divisions at Estevan, Franklin River, Kennedy Lake, Sarita, Tofino on Vancouver Island; and Queen Charlotte and Hecate on the Queen Charlotte Islands (see charts 5 and 6); also lumber, plywood newsprint and linerboard operations at Port Alberni.

Linking all divisions is their 'Mainland Island' telephone system, which is a private switched system (switching mechanism in Nanaimo) set up by BC Tel to serve the entire MB operation. Not only is it possible to dial directly from any system number to another on this network, but also to dial from any system number to any non-MB subscriber number in communities in which MB offices are located. Long-distance calls cannot be sent from non-system numbers through the system, however, but have to be made through B.C. Tel's long-distance facilities.

MB's ambulances (approximately 28 - more than 1 to a division in some cases) use BC Tel VHF mobile radio-telephone services; as do firewardens, at times, if working when MB's base radios are not manned.

Communications between operators, drivers, first aid units, base stations and the complete organisation of a logging division require private radio facilities in addition to those provided by BC Tel; e.g., engineers working in the bush carry portables in case of emergency, which

are fitted with either 1 or 2 frequencies depending upon whether or not communication to the base is via repeater.

Grapple radios are used to provide communications between one or two loggers in the bush and the operator of a grapple system which brings logs from the bush to the roadside. These sets are distinct from all others used by MB and operate on the UHF frequency 469 MHz.

MB's repeaters are single facilities, one to a division where they occur - but not all divisions have repeaters. Since, in some cases 60 - 120 radios use one repeater, MB does not share repeaters.

Communication with Aircraft.

Firewardens also use portables to communicate with FIFT's (Forest Industry Flying Tanker Service). This service, based in Port Alberni is owned by a consortium of companies - including MB, B.C. Forest Products, Pacific Log, Tahsis Company, and Western Forest Industries, the controlling interest (53% of shares) being held by MB. For member companies - services provided include the transportation of executives and fire-fighting. Planes owned include 2 Martin Mars which are used exclusively for water bombing, a Grumman Goose, which is used for 'bird-dogging' or providing 'lead-ins' for the Martin Mars on fire operations - and a Jet Ranger helicopter.

Coverage is provided as far north as Seymour Inlet; at which latitude forest conditions change and forest reports are no longer necessary.

FIFT have had difficulty with HF communication, finding that frequencies interfered with each other. In their view VHF communication is the only solution possible and they would be interested to consider sharing setting up a VHF system to serve the communication needs of low-flying aircraft along the coast.

Communication with Marine Vessels Through MB's subsidiary Kingcome Navigation, the company owns 8 tugboats and 3 other vessels including a self-propelled rail-car barge and a self-propelled, self-dumping log carrier (the first in the world). All of these vessels carry SSB radios, and are able to communicate, either directly with a base station in MB's Vancouver office, or through BC Tel's HF or VHF radio facilities.

BC Tel facilities are preferred in the case of long distance communication which is reported to be otherwise frequently unsatisfactory.

BC FOREST PRODUCTS LTD.

B.C. Forest Products Ltd. uses several different systems throughout its operations. These include:

(1) Signal communication - a short-range system of transmitters and receivers that is used between yarding operations and chokermen on the actual logging operation of placing cables around the logs to haul them out of the forest.

(2) two-way radio - used for communication between mobile vehicles, or a handheld transmitter and mobile vehicle/or base station. Generally this is used with a repeater to strengthen the signal so that it can be received anywhere in the area that is being logged.

(3) a series of mobile radios providing a communications network to guide aircraft in the event of forest fire.

B.C. Forest Products does not use sytems of repeaters.

RAYONIER CANADA LTD.

Rayonier Canada, a U.S. based subsidiary of ITT (International Telephone and Telegraph) uses a WATS line to its various operations on Vancouver Island (see Chart 4); and a second to the remainder of the province; also FX lines between Vancouver and Port Alice.

In the field, drivers of log trucks and foremen have two-way radios to local office base stations.

Repeaters are used by truck radios only and have been supplied at Holberg and Port McNeil. Repeaters are not shared.

With the exception of a small landing barge that runs between June Landing and Mahatta River, Rayonier owns no marine vessels but hires transportation services of Seaspan International Ltd. and is their largest customer.

SEASPAN INTERNATIONAL LTD.

Seaspan's towing operations take place mostly in the Gulf of Georgia but about once weekly, vessels deliver chemicals to Rayonier's Port Alice operation and tow craft or pulp back to markets in Vancouver. A similar service is provided for Tahsis Company's operations at Gold River. Seaspan has a base station in Vancouver for direct short range communication with its vessels, and also uses BC Tel's marine radio-telephone facilities.

B.C. PACKERS LTD.

BC Packers uses radio communication for fisheries dispatching of all types, covering the area from the U.S. Canada border in the south to Alaska; and including Queen Charlotte Islands and the west coast of Vancouver Island.

Extensive use is made of MF SSB radio, maximum range required being 250 - 300 miles. Frequent use is made of CB and VHF radio.

All mobiles owned by BC Packers are of the marine type. Two aircraft owned by the company communicate with ground stations through a transmitter receiver on Mt. Hayes, which is connected by landline to Port Edward and fitted with a VHF land mobile frequency.

BC Packers does not consider it is feasible for them to share a coastal VHF system with other companies, although this would depend upon cost considerations. Reasons are, (1) they would only be interested in a system which could be used by marine mobiles as well as aircraft, (2) in their view, sites for marine communication would not be suitable for air-ground communication and (3) far more sites than interested agencies could provide would be needed for satisfactory marine communications for an extended operation such as theirs.

BC Packers does not have systems of repeaters anywhere in the region.

Commentary

None of the private companies described in the foregoing pages use systems of two or more repeaters - and few complaints were voiced about the various systems discussed by them. Several government agencies have installed extended systems however, and it is with the setting up of such systems that we will mainly be concerned in this commentary.

It is DOC's responsibility to ensure that telecommunication services develop throughout the province in an orderly manner; and that services of the common carrier are not paralleled by private systems, particularly in 'uneconomic' areas which must be cross-subsidised from revenues obtained from other parts of carrier operations.

In licensing new systems, DOC's requirement is that the applicant should have explored, in descending order of importance a) leasing common carrier circuits; b) sharing trunk circuits of other existing systems; c) sharing sites and some other facilities ('buildings, towers, antennas, etc.') with existing users.

Sharing trunk circuits of carriers and other private organisations

The first of the above alternatives may not be available to agencies planning new systems in the study region, particularly to those with operations distant from main highways.

For example, in a recent study conducted for the federal Department of Fisheries (Feb. 1976) for their Skeena system - which roughly parallels several existing systems - it was found that the use

of BC Tel microwave facilities* would involve re-routing the DOF system (presumably in a less advantageous manner). Also although BC Tel has mobile radiotelephone and microwave systems along most of the proposed route, coverage, using either system, of a total of about 60 miles could be expected to be 'sporadic' or 'very poor'.

As for sharing other existing trunk circuits, all VHF/UHF systems throughout the study area are low capacity, single user, simplex operations, terminating at the control centres of the organisations concerned, designed mainly for the purpose of keeping in touch with mobiles, and mostly already too heavily loaded for sharing with DOF to be practicable.

For instance, in the above-mentioned study, it was found that BCFS and BC Highways trunks are heavily loaded in the summer and winter respectively; and BC Hydro trunks all the year round. Furthermore, BC Hydro and BC Highways also had gaps along the proposed DOF route. RCMP's system was found by them to be 'tending to be more of a group of isolated repeaters than a continuous point-to-point trunk system.' Also a reluctance was reported on the part of RCMP 'to share mobile channels with other users, even though they might be protective agencies.'

A licence to install their own system in the Skeena Valley was eventually granted to DOF.

Further evidence of the difficulties of sharing existing systems is the fact that the sharing of trunking facilities between BC Highways and BCFS whose busy periods are complementary was

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* For BC Tel microwave systems in the area see Appendix G.

seriously considered for a period, but failed to materialise due to the differences over message priorities and volume of business on the lines.

Although the sharing of trunks of existing VHF/UHF systems would not seem feasible for newcomers, it is important that any new proposed system - VHF/UHF/microwave - continues to be examined by DOC with the above mentioned priorities in mind, particularly in areas where the introduction of new private systems might delay the provision of common carrier service to small communities.

Licensing of private systems. The question of whether or not an organisation should be permitted to install and maintain a private system, is often a difficult one. Arguments advanced by applicants are usually based on cost considerations (it is felt that they can provide their own service more cheaply), anticipated delays in licensing and a stated need for maintenance services which are faster and more suited to their needs than the grade of service which the common carrier might be expected to provide.

These arguments would appear to have substance in some cases. For example, the nature of DOT's ship-shore safety and coastal communications would generally be considered critical and important. Their remote transmitters however are tone-controlled and if the tones are wide of the target frequencies by more than 5 cycles (a problem known as 'carrier drift') the transmitters fail to become activated.

Although DOT has a line standard which it is understood will be met, according to a DOT spokesman, outages have sometimes lasted for

several days before being corrected. With DOT manpower and resources DOT feels it would react more quickly and effectively to its own needs.

Sharing of sites, power sources, etc. The advantages of sharing sites, power sources etc. are well understood throughout the area e.g. BC Hydro and BC Highways systems have been planned on a shared basis, and many mountain-top sites are shared by several different organisations. On a negative note BC Hydro has been reported to have expressed concern over intermodulation problems caused by other VHF transmitters in the vicinity of their sites in the Prince Rupert - Hazelton area.

The role of BC Department of Energy, Transport and Communications

Unlike the situation which prevailed when most BC private systems were installed, BC Transport Branch at present, takes an active role in coordinating the communications needs of BC Government agencies throughout the province.

In the coastal area, present attention is focused on higher density areas - an ambulance installation for Kitimat, a sheriff's station on Mt. Hays to serve Prince Rupert.

Recommendations

Based on concerns which have arisen in this section on private systems in the coastal area, the following recommendations are made:

- that DOC pursue its present policy of requiring that, wherever possible, other organisations lease facilities from the common carrier in order in the long run to expedite

the provision of telecommunications services to remote areas

- that in the event of ongoing problems being experienced by DOT or other agencies with facilities leased from BC Tel,BC Tel first having been approached by DOT through the proper channels without satisfactory result, that representatives of DOC, BC Tel and DOT meet together in order to determine how the situation might be improved

- that DOC examines the incidence of gaps in common carrier system along key routes with a view, if found excessive, to suggest that improvements be made so that organisations with a need for extended communications along such routes might more readily satisfy their requirements through the common carrier rather than through their own installations.

Arising out of earlier sections of Part VIII

- that the possibility of adding aircraft frequencies in addition to marine frequencies at proposed DOT VHF repeater installations on the north coast be considered in order to improve communications facilities for low-flying aircraft

- that DOC monitors the distress and calling channels 2182 MHz and 156.8 MHz with a view to developing measures - preferably associated with the issuing of licences - to assist DOT in reducing congestion on these channels.

PART IX

MARINE RADIOTELEPHONE SERVICES

British Columbia is the only province in Canada in which a private telephone company provides a ship-shore public correspondence service in addition to DOT.

This situation has arisen in B.C. because BC Tel, who inaugurated their ship-shore service in 1929 had built up traffic and made a considerable investment in the service before DOT entered the field (1959). Rather than duplicate services or set up in competition, DOT elected to provide a complementary 'High Seas' service - a satisfactory development from BC Tel's point of view because BC Tel had an established clientele of commercial users, with scheduled hours for calling their fleets who were considerably inconvenienced by channels being occupied for lengthy periods by calls from deep-sea ships coming into port.

BC Tel continues to operate a local service primarily designed for marine vessels which sail along the coast of Washington, B.C., and Alaska but also for certain ships of foreign registry, which visit B.C. regularly and are registered with B.C. Tel.

Marine vessels must be registered with BC Tel in order to use BC Tel facilities.

DOT's main marine functions are safety of life at sea, and operation and navigation control of ships, so that DOT stations are equipped to deal with several different types of calls, some aircraft, some shipping navigation, and some requests for

connection with the BC Tel network. Any vessel which has the appropriate frequencies and a call sign may use DOT facilities.

Coverage

MF and HF: B.C. Tel provides MF marine coverage from Vancouver and Prince Rupert and HF for aircraft and longer range ships from Vancouver. Special MF channels have been assigned to each of tug-boats, fishboats and pleasure craft from Vancouver.

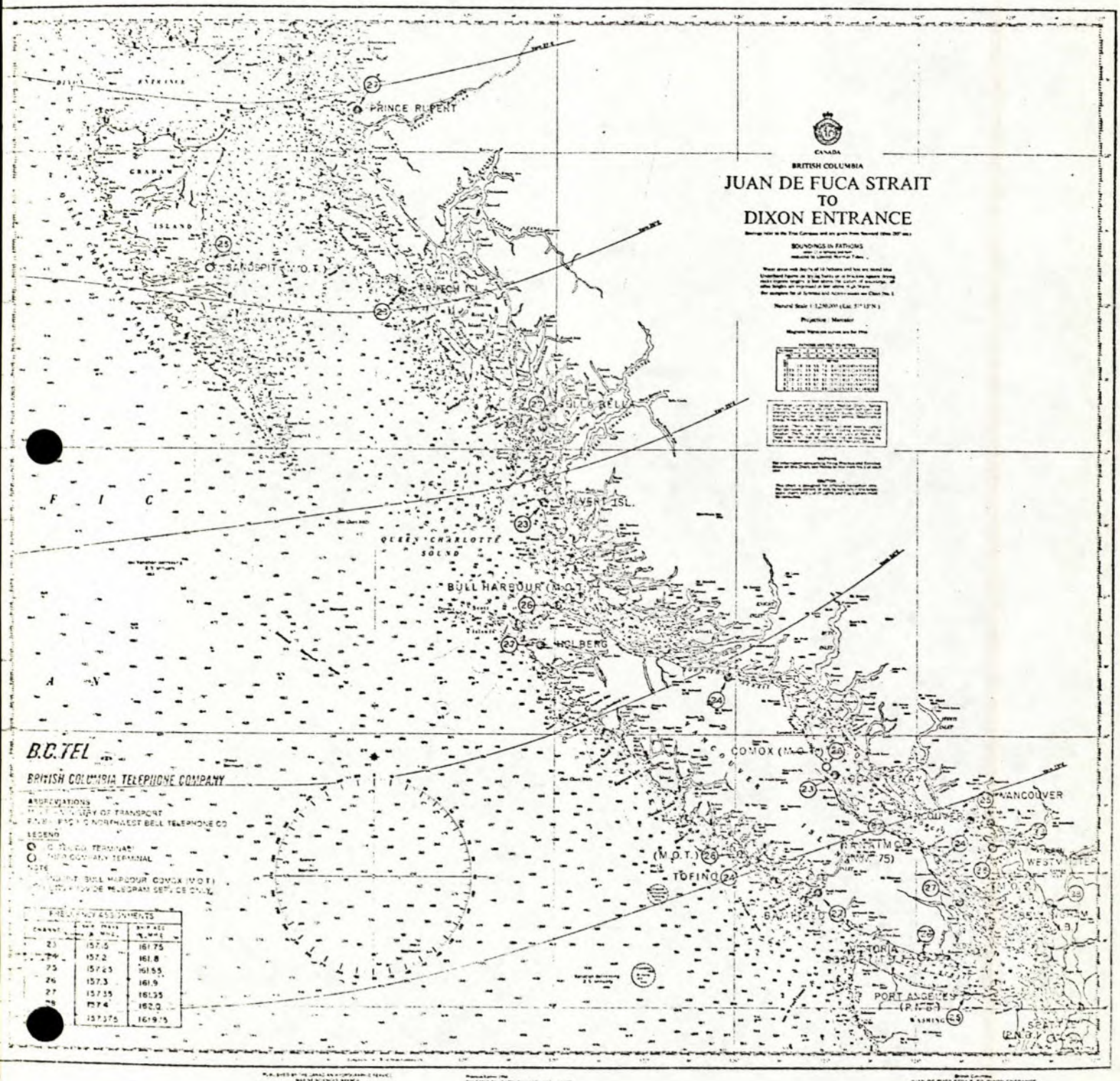
DOT provides 'High Seas' (HF) service through Vancouver only; and MF for its coastal service from Tofino within, and Alert Bay and Victoria outside the study area.

VHF: BC Tel at present has 14 terminals along the coast (see chart 24) with 2 more scheduled for study area locations Kitimat (1978), and Mt. Blenheim (no date) near the head of Barkley Sound [also at extra study area locations Powell River (because of 'dead spots in Secret Cove and Jervis Inlet), Campbell River (Aug. 1977), Alert Bay (no date) and Victoria (no date)]. BC Tel terminals each cost approximately $25,000 to install; & new installations are only considered where an estimated 100 or more vessels are likely to use the service.

DOT provides VHF service from Vancouver, Tofino and Victoria only.

BC Tel terminals are reported to provide good coverage of the outer coast but poor to non-existent in the major northern inlets. Trutch Island repeater, for example, which serves both the Queen Charlottes and Douglas Channel (to a certain extent) provides only intermittent

V.H.F. MARINE PUBLIC RADIOTELEPHONE SERVICE



coverage at Hartley Bay (if Hartley Bay or Trutch equipment is not finely tuned, Hartley Bay becomes a 'dead' spot).

Only land PSRT services are available at present at Bella Coola and Kitimat and many boats are not equipped with the appropriate frequencies to access these facilities.

Other 'dead' spots include the headwaters of inlets from Ocean Falls north, and are marked on Chart (25); extensive areas unserved by BC Tel lie on the west coasts of Vancouver and Queen Charlotte Islands.

A recent DOT study prompted by the need for adequate surveillance of Canada's recently established 200-mile fishing limit showed through testing and opinion that MF coverage from Tofino needs improvement with respect to location of antennas etc. Steps are being taken to effect this.

DOT's VHF radiotelephone service is not available north of Vancouver Island. This is in keeping with the fact that DOT's service is primarily High Seas' and most high seas traffic destined for BC calls at ports on the lower mainland, particularly Vancouver.

Frequencies

Both services used paired frequencies in the 2, 4 and 160 MHz bands. DOT's High Seas service operates on frequencies between 4 and 23 MHz. In addition DOT has Channel 26 (157.3/161.9 MHz) which BC Tel does not use. This is a primary calling channel in every country and therefore is regarded as a first essential channel for international shipping.

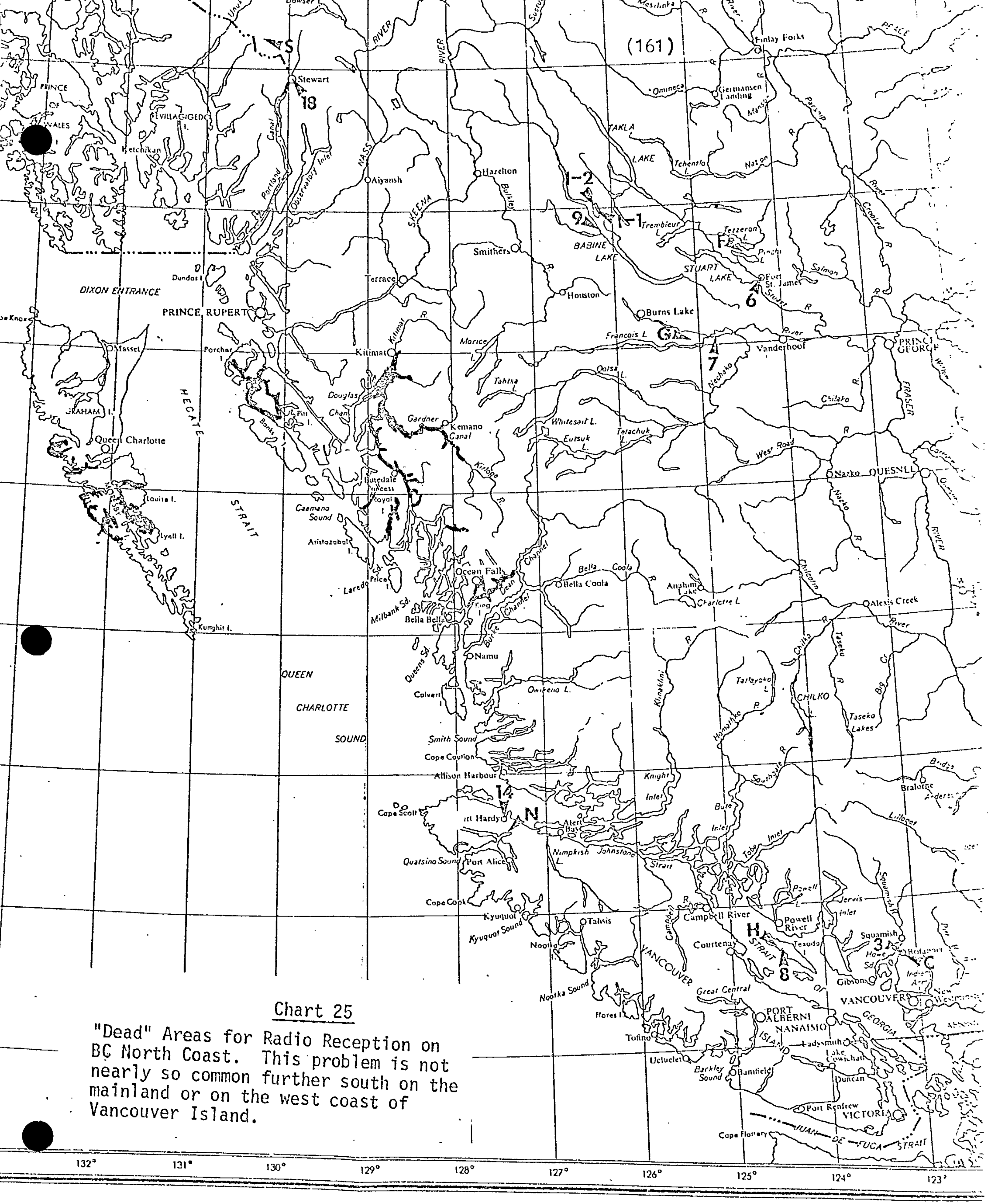


Chart 25

"Dead" Areas for Radio Reception on BC North Coast. This problem is not nearly so common further south on the mainland or on the west coast of Vancouver Island.

BC Tel is deliberately listed in the international operator's handbook, in effect, as a private (not a public correspondence) station, so that highseas ships do not seek to use their frequencies.

Patching

Calls received by BC Tel are patched into their own network; calls received by DOT are directed through BC Tel's Vancouver radio board on one of two lines and BC Tel again does the patch.

Radiotelephone Usage*

Both agencies are receiving an increasing volume of traffic from pleasure-craft and fishing boats, mainly at present, in the Gulf of Georgia. Table (20) shows these increases for BC Tel.

Table (20)

Increases in number of BC Tel Marine Radiotelephone Registrations 1974-6

Date	VHF Marine Mobile	HF DSB & SSB	Total Cols. (1) & (2)	VHF/Total (%)
(1)	(2)	(3)	(4)	(5)
Sept 1974	2,314	4,840	7,154	32
" 1975	3,422	4,753	8,175	42
" 1976	4,204	3,859	8,073	52
Increase 1974-6	+82%	-20%	+12.8%	

Source: B.C. Tel

* See also Appendices D, E, & F.

In compliance with ITU regulations (Geneva, 1959) BC Tel is replacing DSB facilities with SSB, but rather than using HF/SSB, it would apperar from table 20 that most marine traffic is choosing VHF/SSB, which, if within range of a terminal is Al service. For a reliable conclusion, an increase in number of radiotelephones should also be compared with an increase in the number of marine vessels. Although figures for increases in registered BC sailing ships, steam and motorboats are available from the Registrar of Shipping, these being for 1974-76, 1.5%, 0.0% and 10.9% respectively, with an overall increase of 9.2%, figures for increase in numbers of pleasure craft only are not readily obtainable.

Reason for the large increase in the purchase of VHF sets as compared with HF sets is probably largely a matter of price, a Japanese VHF set with a full range of channels costing approximately $550 while an HF/SSB set costs $2,000. Vessels which value life on board, however, should be using HF radio in order to have proper coverage.

Conversion to SSB

The above-mentioned ITU regulations concerning the changeover from DSB to SSB service have been established in order to improve communication and conserve spectrum. These 'in essence' are as follows:

"No new DSB installations above 4 MHz after 1 January 1972.
No new DSB installations above 4 MHz after 1 January, 1973.
No DSB transmission above 4 MHz after 1 January 1978,
No DSB transmissions below 4 MHz after 1 January 1982."

(BC Tel: Marine Radiotel Services)

All maritime 160 MHz VHF-FM equipment to be narrowband after 1 January 1973' (Marine Radiotel Service, BC Tel, 1975).

At present DOT stations which provide MF/HF facilities offer both SSB reduced carrier (A3A)& SSb full carrier (A3H) service, the latter of which is compatible with dsb communication so that AM sets already in use can continue to be used for a period; VHF service is SSB only.

BC Tel offers DSB-only service for tugboats and fishboats from Vancouver, but otherwise a choice of DSB-only or SSB-only channels at Vancouver and Prince Rupert in order to encourage the use of SSB before the new rules become mandatory. BC Tel's HF service for longer range ships and aircraft is DSB/SSB; and BC Tel VHF service, SSB-only.

Billing

Billing procedures for DOT's High Seas Service are subject to international agreement and bills are sent from Ottawa on receipt of the necessary information from coastguard operators.

For services in general, whichever agency holds the billing ticket and performs the billing receives the larger proportion of revenue.

A typical 3-minute ship-shore call through the coast guard to the BC Tel network costs $1.70 which can be broken down to $0.50, $1.00 and $0.20 respectively for ship, coast guard and BC Tel charges.

BC Tel's VHF customers pay a monthly service fee and a further fee per minute of conversation. No charge is made for connections or disconnections.

In the case of MF and HF services, neither a monthly charge, nor a charge for connections and disconnections is made.

For calls which extend beyond local BC Tel stations, long-distance fees, of course, are also charged.

'High Seas' Long Distance Calls to the U.S. and Mexico

For many years the US has refused to accept into their network long-distance calls placed through DOT's HF service on frequencies above 4 MHz. (A similar situation exists for calls into the Mexican network, but there are so few as to be unimportant.) Calls on DOT's VHF, MF, and 4 MHz frequencies are accepted however.

The purpose of this policy has been to protect private telephone companies which provide HF service in those countries. US long distance calls are accepted into the Canadian network, however, so that the policy is not reciprocal. Approaches have been made to the US Government through Ottawa to have this restriction lifted, but so far without success.

Coast Guard Administration

Hitherto DOT's radiotelephone services have been provided through the Coast Guard branch and administered through the Canadian Air Transportation Administration, but within the near future the Coast Guard is to become a separate telecommunications organisation with its own administration.

At that time, in the view of a DOT spokesman, the separate notes of BC Tel and DOT should be reviewed in joint discussion between the two

agencies. Potential areas of conflict, where coastguard plans might be considered competitive with BC Tel's operation should be identified. For example if Coast Guard wish to install a duplex radio-telephone patching facility at Prince Rupert for cruise vessels traversing the west coast - a service which DOT feels a commitment to provide - would this necessarily be competitive with BC Tel's service?

Outlook

According to a BC Tel spokesman, marine radiotelephone service at present presents problems, particularly to the private company, being labour intensive and involving working in many cases with boats which have substandard equipment so that 'results are usually less than perfect.' The introduction of SSB has considerably improved HF service.

Probably, the present situation will continue until 1982 at which time, by international regulation, the only mode of operation will be SSB. BC Tel are then likely to improve their HF system.

The decline in use of HF radio in favour of VHF may change with improvements in HF technology - a subject which is at present the focus of considerable research at CRC and elsewhere.

Summary

BC Tel and DOT provide complementary marine radiotelephone services in BC, the one primarily designed to operate as a local coastal service, and the other primarily as a High Seas service.

In compliance with ITU regulations a changeover is being implemented in both services from DSB to SSB modes.

Because of the nature of BC's coastline it is difficult to provide services throughout the whole area. Both services exhibit deficiencies in some areas.

For many years US policy has prevented acceptance of long-distance calls on frequencies above 4 MHz into the US network - a policy aimed at protecting US private telephone companies that provide a comparable HF service. Attempts to reverse this policy have not met with success.

Both services are receiving an increasing volume of traffic from pleasure-craft and fishing-boats particularly on BC Tel's VHF frequencies. By contrast BC Tel's HF service has declined over a period of several years. Comparable trend information has not been obtained from DOT.

Within the near future, the Coast Guard is to become a separate telecommunications organisation with its own administration.

Provision of marine telephone service at present presents problems, particularly to the private company, being labour intensive and involving working in many cases with boats which have substandard equipment.

Recommendations

Arising out of the foregoing the following courses of actions are recommended.

- that BC Tel be requested to investigate the adequacy of marine radiotelephone facilities at Bella Coola

- that DOC convene meetings between BC Tel and the 'new' Coast Guard administration in order to review potential areas of conflict between the two agencies in the light of present DOC policies.

- that an examination be made of the question of US refusal to accept HF calls above 4 MHz received by DOT in the US network in order to determine whether or not DOC might make a contribution to the settlement of this issue.

PART X

TWO SPECIAL TOPICS

TWO SPECIAL TOPICS:

COMMUNICATIONS FOR FISHBOATS; AND PRIVATE AIRLINE COMPANY DISPATCH

In this part two topics are singled out for consideration. These are the use of radio by fishermen and private airline company despatch.

COMMUNICATIONS FOR FISHBOATS

Every year some fishing-boats are lost along the coast. In 1975 14 lives were lost in the 2-week long herring-roe season alone. (It should be noted however that in the corresponding 1977 season, no lives were lost). An enquiry conducted into the 1975 losses did not mention use of radio as being an important factor. It is felt in some quarters, nevertheless, that improved communications should contribute significantly to lowering the general casualty rate.

Present regulations concerning the use of radios on marine vessels apply only to ships of over 100 tons of which there are not more than 50 engaged in fishing on the west coast, the majority of the 6 - 7,000 fishing vessels being below 15 tons.

A Previous Suggested Measure Concerning Use of Radio. About 3 years ago the Workers Compensation Board (WCB) proposed that all marine vessels over 5 tons (which would effectively include all fishing vessels and many pleasure vessels) should be compulsorily fitted with VHF radio and that vessels operating further than 15 miles from land should be

fitted with HF and MF radio.

In the view of a DOC District Manager the idea behind the WCB regulation was excellent although the manner of application proved impracticable.

A seasoned skipper, commenting on the regulation stated that

- fishermen who have sailed for any length of time realise the value of radio as a means of communication
- to ask fishermen working up the coast to be equipped with VHF radio is at present unreasonable because the only VHF outlets are the 3 BC Tel PSRT's at Calvert Island, Bella Bella and Trutch Island; also DOT service if within 40 - 50 miles of Bull Harbour, Prince Rupert or Sandspit.
- when fishing during the season fishermen are surrounded by others and for the most part a VHF set is not more use to them than CB radio - which is also considerably more versatile, several communities being accessible by CB radio that are not by radiotelephone.
- if DOT served the entire coast with VHF repeater stations, then VHF radio would probably be regularly carried.
- VHF radio, though much less expensive than HF still tends to be quite expensive equipment for some.
- DOT's vessel traffic management system whereby a boat is expected to broadcast at strategic locations and other boats to listen in, is not being used effectively by fishing-boats because most VHF sets can only be used to listen to 2 channels

at a time, one of which must be the distress and calling channel 16, and the other usually channel 6 for intership calling. If a scanner unit became available so that several frequencies could be monitored simultaneously this situation could be much improved.

- difficulties are being encountered by mariners in determining how best to invest in radio equipment; e.g. as reported in one instance the purchase of $3,000 equipment understood to be recommended by DOT for receiving broadcasts from Bull Harbour on frequency 2054 preceded actual broadcasting by DOT on that frequency by 18 months, thus tying up capital needlessly. This was thought to be a common experience.

Present measures to encourage proper use of radio

Amongst educational courses which would promote more informed use of radio are the following:

- provision of opportunities for fishermen to obtain radio licences as part of fishermens' upgrading courses at regional colleges

- arrangement of short sessions, such as an Echo-Sounding and Sonar School (Jan, 1977) for Department of Fisheries officers and other interested mariners arranged by DOF.

- introduction on a trial basis of rudiments of navigation classes for Grade 10 students at a native school - to date an isolated instance.

- provision for navigation experience on coastal vessels arranged for some senior students by school authorities (pilot project only) - to date an isolated instance.

For various reasons (e.g. as suggested in the following section), many fishermen are unable to attend extended courses such as those provided at the regional colleges. Short courses at various levels would appear to be a desirable alternative.

The idea behind the secondary school introduction to navigation, which could appropriately include information on the use of radio is that many of the students will be spending much of their lives at sea, and that the earlier they are introduced to systematic learning of the subject the better.

Suggested Measures One opinion was that on the north coast, at least, the type of person most likely to profit from navigation courses, including radio aspects, would be a member of the age-group 28-35 years, with a grade 9 village school education, who though strongly motivated and also an excellent sailor would also probably be a family man and therefore in many cases unable to attend an extended course at a regional college. Much could be accomplished in his case using taped programs, if local CATV were available.

A former secretary - manager of the Fishing Vessel Owners Association Association of B.C., in an attempt to create awareness of the dangers to fishermen in the 1977 herring-roe season offered a 6-part formula to the Vancouver Province (March 10, 1977), the first item being 'to expand safety courses, sponsored by both government and

industry, and require that every skipper and helmsman obtain a 'safety ticket' before he is granted a licence to fish'. He further stated "It's discouraging to see that a great many fishermen and some organisations as a whole aren't bothering to keep up with developments in safety equipment, skills and regulations." Courses envisaged by him would be of 2 - 3 days duration and include presentations by representatives of DOT, DOE (Atmospheric Branch and Fisheries Department), DOC, and the universities. In his view it should be compulsory for all boats to carry small VHF radios of 5 - 6 lbs.

Other Problems Experienced by Fishermen

Two areas in which it would appear fishermen have not received sufficiently useful direction in the recent past are certain aspects of the phasing-in of SSB radio; and also the phasing-in of LORAN C.

Phasing in of SSB Radio According to a spokesman for the Fishermens' Union, fishermen are expressing dissatisfaction with ITU regulations which mean that they must eventually dispense with their MF-AM (DSB) radios which in their opinion are more effective at medium ranges (50 - 150 miles) than any of the replacements available.

A second objection is that, in view of the fact that the new regulations are not mandatory until 1982, it is unfair that presently-used DSB equipment, which is still fully operative cannot be legally transferred to a new vessel.

On the first of these questions, enquiries revealed the following, of which fishermen should be aware.

- there are not enough frequencies on the maritime mobile bands and a need exists to reduce bandwidth.

- Canada is one of the slowest nations to implement the plan, giving fishermen a better chance to adjust than in most countries.

- DSB equipment is no longer manufactured for the maritime mobile service since the specification has been cancelled.

- equipment suppliers are no longer stocking parts for DSB units (in many fishermens' view this situation has been contrived).

- American stations have already switched over to SSB equipment. Fishermen might need to contact American ports e.g. in Alaska, where SSB equipment is already mandatory.

- DSB equipment will still be allowed on 2182 KHz-even after 1982 for distress purposes.

- MF/SSB will still be allowed for communication between fishboats and with BC Tel stations and Coast Guard stations for weather reports (on 1630 KHz).

A further experienced opinion was that although the fishermens' main objection was probably the expense of purchasing new sets, a large part of the problem is likely to have been that SSB sets need proper tuning to be effective, and this requires knowledge which many fishermen do not possess.

The second objection concerning transferral of operative DSB radios from owned old to new vessels would appear to be reasonable in the light of recent reports of improved HF models soon to be reaching the market.

Phasing in of LORAN C. Amongst navigation systems operated by DOT is LORAN(Long Range Navigation), a position-finding aid used by any aircraft or marine vessel with the appropriate equipment - a LORAN receiver and specially prepared charts or tables - based on the differences in time of arrival of pulsating signals from two or more pairs of stations (each pair consisting of "master" and "slave" stations) to establish a line of position.

LORAN A equipment was designed during the war and owing to various shortcomings, including (a) shortage of replacement parts (b) incomplete coverage of certain areas of the B.C. coast, (c) failure at night due to "skip", a second LORAN system known as LORAN "C" has been introduced to the region (April 1977).

Serving shipping off the B.C. coast at present are LORAN A master stations located at Gray Point on Moresby Island and Port Grenville in the U.S., working independently with a slave station at Spring Island off the west coast of Vancouver Island; and LORAN C master station at Williams Lake, and slave stations at Shoal Cove in northern Alaska and Moses Lake in the Seattle area. LORAN C will enable any vessel up to 200 miles at sea to pinpoint its position within 50 yds., which is a higher degree of accuracy than can be achieved using LORAN A.

LORAN C will eventually replace LORAN A. Fishermen, however, want a lengthy phase-in period for LORAN C (10 yrs. was mentioned). They say that the "A" sets, though not as accurate as the "C", provide a sufficient level of accuracy for their purposes. Also that the A sets have required a significant outlay on their part.

Commenting on this, a spokesman for DOT stated that B.C. LORAN stations are part of a U.S. operation which had become too expensive to maintain. Also that the prices of LORAN C are dropping "as for calculators in recent years". The main problem apart from cost, may have been that information on fishermens' LORAN A records, which have been compiled over the years indicating the best fishing spots, snags etc., are not compatible with LORAN C information. Steps are being taken to correct this. Also the U.S. Gov't preceded the introduction of LORAN C with seemingly insufficient PR work although a meeting for fishermen was held in Vancouver at which explanation was made that LORAN A equipment can be written off according to certain taxation formulae.

He further stated that most of the world are already using LORAN C.

A third area in which fishermen want change is the licensing of new radio equipment.

Licensing of new radio equipment

Fishermen consider that only one license at a nominal charge should be required of them by DOC providing a call sign which could be used with all of their equipment. For data collection purposes, they are prepared to fill out extra forms itemising all types of equipment which they operate.

On this subject, a DOC spokesman stated that he would assume that the objection is to paying a so-called "amendment fee"; also to the need for separate licensing for CB radios. All other equipment is already under one license, providing application is made for it all at once. An amendment fee of $8 is charged, however, each time new equipment is added. This charge is presumably calculated on a cost basis and the alternative would be to require taxpayers to pay for the fees.

In his view it may be possible to resolve their problem by including in the license all equipment that may possibly be carried, although this may not be agreeable to DOC because licensing information is used as a data source.

At present the same call-sign can be used for all DOC approved radio equipment i.e. all equipment considered technically acceptable for maritime mobile radio service. CB radio is not,however, considered acceptable marine radio equipment. The Coast Guard, in fact, refuses to monitor the CB emergency frequency, taking the view that there is "so much chatter" on CB radios that it interferes with other radio communication. Mariners who carry only CB radios, in an emergency must first contact other vessels with equipment which can be used to contact DOT stations.

Commentary

At present education rather than regulation would seem to be the more desirable approach to promoting use of HF and VHF radio by fishermen in coastal B.C. A clear need exists for provision of more opportunity for instruction in the operation and maintenance of radios.

It would also appear that in the case of some radio regulations insufficient information is provided to fishermen on forthcoming changes. This should not only take the form of easily understood and widely disseminated explanation of new regulations that are being introduced, but also of clear and concise information on investment in suitable radio gear to provide for the change.

As for the purchase of new equipment being recommended before DOT facilities are available, a similar situation exists for the tugboat industry, new radio regulations for which are expected to take effect on January 1, 1978 requiring the replacement of DSB by SSB sets. According to newspaper report "due to DOT funding restrictions", the expanded VHF network, originally intended to be in place when the new regulations come into force will not be operative at that time - so that the experience of boat owners in this regard is not an isolated one and may also have been due to funding restrictions.

Fishermen have traditionally been subjected to seemingly unreasonable regulations, because the resource which they harvest cannot be rationed by market price, but must be conserved nevertheless. Some measures have been designed to produce inefficiency in order to conserve the fish. As a group therefore, they tend to be unusually

cautious about accepting new regulations since such is the case it would appear doubly important that the underlying purpose of new regulations be adequately communicated to fishermen in order to prevent misunderstandings which might occur.

Summary

It is felt in some quarters (e.g. WCB) that lack of adequate radio communications on board fishing vessels is likely to be a contributory factor to some marine disasters.

A recent attempt* to bring in regulations concerning the compulsory use of VHF and HF radio on all vessels over 5 tons proved unacceptable to fishermen.

There would seem to be good reasons for adopting an educational rather than a regulatory approach towards attaining the commendable objective of the WCB regulations. Amongst these are insufficient outlets for VHF use on the north coast; ubiquitous use of CB radio which, it must be recognized, is also more versatile in some situations; effective 2-channel-only capability of most VHF sets; and difficulties associated with investing in radio equipment.

Dissatisfaction over some aspects of the phasing-in of SSB radio and of LORAN C is being expressed by fishermen; and also over present licensing arrangements.

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* by the Workers' Compensation Board.

Recommendations

Recommendations arising out of the foregoing are:

- that more information be provided to vessel-owners prior to and concerning the introduction of new systems e.g. on LORAN C and the changeover to SSB equipment.

- that more "safety" courses be offered sponsored by both government and industry, also modular courses of 3-4 days at increasing levels of sophistication covering various aspects of marine navigation including radio.

- that pamphlets be prepared by DOT/DOC providing clear and concise information on investment in radio gear.

- that the Rescue Coordination Centre (RCC) be requested to collect data on radio equipment carried by marine vessels which meet with disaster - this later to be used as a basis for determining future DOC policy in this field.

PRIVATE AIRLINE COMPANY DISPATCH

Approximately 15 third and fourth level airline carriers work on the BC Coast. At present they claim that the HF/SSB systems which they use are inadequate in terms of coverage and reliability and that they are losing money because of this (see Appendix B). After being approached by several of these companies, the B.C. Government Department of Transport and communications prepared a statement (December, 1975) of the problem as they see it and proposed that a further study of the area be undertaken in detail to determine where the specific difficulties lie. A minimum consulting fee for the job was also proposed. They feel that the problem, however, is both an intergovernmental and interdepartmental one and suggest a meeting of interested parties including DOC to explore the matter further.

In addressing the question of whether or not DOC should become involved in this project conversations were held with representatives of several insititutions including various departments of MOT, DOC, BC Tel, two forestry companies and three airline companies. Almost all persons consulted had an intimate knowledge of telecommunications planning and maintenance in the area.

Opinions expressed were extremely varied and not all felt that better airline communications were a pressing problem, at least from the safety point of view. For example, none of the DOC district managers had been approached by the small airline operators in their districts and none were aware of the airline problem being an important one. Okanagan Helicopters, which provides its own maintenance work, intimated that

currently their air-radio systems are adequate. On the other hand MOT, over the years, have received numerous letters from the small companies and with them in mind have instituted a programme to upgrade their NDB's and improve weather broadcasting. However, their emphasis is more on providing for the safety needs rather than the efficiency needs of the small companies.

Some Examples: Two examples may illustrate the situation. The first is a statement by West Coast Air, a company which carries equipment capable of utilising all airways and marine beacons, and VHF navigational facilities including VOR's and ILS systems, glide slopes and transponders for radar identification purposes within the control zones, weather radar, DME and radar altimeters. This is one of the two largest companies and flies 21 aircraft.

"At present we use beacons at McInnes Island and Egg Island for IFR approaches to a limit of 1,000 feet and two miles. This is now done on weather information that can be up to four hours old at these locations. If the aircraft fails to break out of the cloud at the approach limit, it must climb out and return to an alternate airport and on some occasions planes are unable to complete trips resulting in a total or partial loss of revenue often having incurred substantial operation costs for flying from Vancouver. This could be greatly alleviated by the installation of communications and reliable weather information at some existing light houses. Also with reliable weather information and some communication facilities in this area aircraft could also probably attain lower limits in these approaches resulting in an increased incidence of completion of scheduled flights to the Ocean Falls and Bella Coola area."

A second example is provided by a company based in Port Alberni which has 5 seaplanes for charter flight and whose business consists mainly of logging, fishing and government business trips on the West Coast of Vancouver Island.

Formerly the company used HF/DSB which was satisfactory in that it provided good range. More recently they changed to HF/SSB at considerable expense but had difficulty in maintaining the equipment and are now using VHF alone. This however limits them to line-of-sight communication and involves extra flying which was formerly avoided by having HF communication with their base.

Both of these companies would welcome a VHF repeater system, firstly because of its long-range capability, but also because they find HF sets awkward to manipulate. The first company is extremely concerned about the weather reporting in midcoast region, at present limited daily to three four hourly broadcasts from four lighthouses. The second company demonstrates a state of affairs which is 'typical' and which arises because of the capital and maintenance costs of HF equipment and the shortage of technicians trained in HF radio maintenance. In addition, this company appeared to be under the misapprehension that international regulations were already in force prohibiting the use of HF/DSB radios. In actuality the old sets can still be used until 1983. They believe also that HF/SSB radio is inherently inferior to HF/DSB, whereas in fact, a better range with less noise is potentially obtainable with this equipment.

Savings to the Airlines When it is considered that plane costs to the

air company range from $85 per hour for a Cessna 180 on wheels to $400 per hour for a Mallard, while a Bell helicopter costs about $240 per hour, it will be seen that any reduction in nonrevenue producing trips could produce substantial savings. Two further factors should be considered in arriving at a decision to participate in the project. These are (1) the economic viability of the airlines, (2) the contribution of the airlines to the general welfare of the coastal communities.

Economic Viability of the Airlines According to an airline spokesman, escalating costs, particularly of fuel, have reduced aircraft companies annual net earnings over the last three years to a marginal figure (an annual return on investment of 'four percent at best while others are losing money' being quoted by a larger company).

General Welfare of the Communities Served by the Small Airlines The general welfare of a number of communities in the study area is completely dependent upon the services of the small companies. For most logging camps, such as Percy Logging at Jervis Inlet (population, 35), Timfor Products at Phillips Arm (pop., 35), Big Bay at Stewart Island (pop. 200) and Shoal Bay at Gilford Island (pop. 100) the small airlines provide, apart from log barges the only transportation links with the outside world.

A VHF System Opinions as to what would represent adequate coverage varied greatly. The spokesman for West Coast Airlines described his company's requirements as "something that would relay through a series of repeaters or one or two prime stations, and be available for

all companies to utilise for traffic information on a common frequency". Repeater sites suggested were Mt. Benson near Nanaimo, Newcastle Ridge in the Campbell River Area and Calvert Island which is the site of a B.C. Tel microwave Station. All of these sites have power and existing facilities. In his opinion, about four repeaters would suffice to cover the coast up as far as Bella Bella and five to Prince Rupert. Costs would vary a great deal depending upon whether existing sites were utilised. Cost of new repeaters could be upwards of $56,000 each and maintenance costs could range from a small cost for existing sites with resident trained technicians to $3,000 or more per year for an antenna which had to be serviced by a maintenance crew flown in by helicopter. Of this the major expense would be for hiring a helicopter at $300 per hour.

A different suggestion was that DOC set aside a frequency for air-ground public correspondence similar to the marine channels 25, 26 and 27, which the aircraft could monitor for calls; a selective calling mechanism could also be installed. This system could utilise existing B.C. Tel Marine Public Correspondence Sites at Trutch, Bella Bella, Calvert Island etc. (see chart 24). Most of these have resident technicians so that maintenance costs would be low. Expense to the companies would include:

(a) for continuous monitoring by aircraft:- the cost of fitting a separate receiver (existing air-ground channels could probably still be used for transmitting)

(b) without continuous monitoring:- no new radio equipment

costs except selective calling equipment.

Expense to B.C. Tel would include:-

(a) air-ground equipment

(b) costs for the installation of a selective calling mechanism.

It should be noted that subsidisation has not been suggested by BCG. Alternatives to be considered are (a) having the complete system owned and operated by the airlines; (b) having the ground portion of the system owned and operated by B.C. Tel; (c) some combination of (a) and (b).

An HF System At least one well-informed source felt that an HF system would be preferable to a VHF repeater system. Arguments were that considerably more acceptable sets from the ease of utilisation point of view can be designed today for aircraft use. Supporting this point of view is the fact that about 60 planes use BC Tel's HF service for calling ahead to order fuel etc. At present only one public channel is provided and this would be inappropriate for aircraft dispatch, but a dedicated system might be possible. It has also been suggested that CRC might be consulted about the relative merits of an HF or VHF system for the coast.

Funding. At present the funding situation is unclear. BCG at least would not wish to commit funds until the amount of assistance that will be provided for B.C. Coastal transportation services by the Federal Government is decided. It has been suggested that other parties who might be interested in contributing to the costs of a consultant's study and perhaps later start-up costs are MOT, Coastguard, DREE, and some private

companies with operations in the area such as McMillan Bloedel, B.C. Forest Products Ltd., and Tahsis Company.

Conclusion The situation of the third and fourth level airlines has been examined from the points of view of safety of operations, economic viability of the companies, importance to the coastal communities, and cost of communication improvements.

It would appear that the safety of some operations leaves much to be desired, and that although HF/SSB sets are ideal in principle, in practice, the cost of the sets and the difficulties associated with obtaining adequate installation and maintenance services and their awkwardness of operation result in some companies preferring to manage without long distance communications. Given the isolation of many of the coastal communities of the study area, however, a valuable public service appears to be provided by the smaller airlines and also desirable competition is being generated by them within the industry.

Whereas a repeater system which would be effective in the bays and inlets would be prohibitively expensive, it may be that the requirements of the small airlines are relatively modest, consisting of 4 - 5 repeaters at existing repeater sites.

While the VHF repeater system is the proposal put forward by BCG, the possibility of designing a superior HF system, preferably in consultation with CRC, should not be overlooked.

Recommendations (1) That experts be drawn together from BCG, DOC,

BC Tel, MOT (including Coastguard), DREE, McMillan Bloedel Ltd. and B.C. Forest Products to discuss improving the communications systems of third and fourth level aircraft which operate along the coast.

(2) - that the DOC consider how a 24 hour radio repair service might be made available to small aircraft companies operating in the coastal areas.

PART XI

RECAPITULATION AND CONCLUSION

Together with rapidly increasing sophistication in the technology of radio communication various important factors are affecting the need for - and provision of - communications services in the study area.

To recapitulate, amongst these factors are:

- the establishment of a 200 mile fishing limit and the need that this implies for adequate DOT communications and surveillance facilities, both HF and VHF, off the B.C. coast
- the prospect of greatly increased tanker traffic down the coast as the result of the discovery of oil in Alaska and the Yukon and a growing shortage of oil in the U.S.
- proposed establishment of an oil port at Prince Rupert, Kitimat, Cherry Point, or Port Angeles to carry overseas and northern oil to Edmonton and the U.S. Midwest[13]
- proposed establishment of a major port at Prince Rupert for grainhandling and other purposes
- a trend in provincial government policy to try to ensure as far as possible that crown corporations are run in a more business-like manner with a better balance between expenses and revenue (this has affected transportation services in

the area)

- a growing assertiveness on the part of environmental groups and native peoples affecting projects such as the location of the new oil port; placement of DOT facilities etc.

- new ITU regulations concerning the use of SSB radio because there are not enough frequencies in the mobile bands and a need exists to reduce bandwidth

- developments in communications technology - satellite service to Ocean Falls

- aknowledgement of Federal Governments' responsibility to assist telephone companies to provide better telephone service to certain uneconomic areas

- burgeoning use of CB radio

In this study an attempt has been made to describe something of the background against which these various factors have become important and to provide insight into some of the difficulties experienced by diverse groups and agencies in providing themselves and others with communications services during this evolutionary period.

In the initial stages of this study, DOC District Managers, whose several regions included parts of the study area - and other persons were asked for information on relevant problems of which they were aware.

Amongst those identified were:

- need for adequate radio facilities on fishing vessels, many of which on the north coast rely on CB radio
- need for more marine communications along the coast
- need for written guidelines on the approach to be taken to CATV systems which fail to meet BP 23 and 24 specifications
- need for examination of the assumption of CFTK's LPTV maintenance by CBC
- need for official guidelines in the licensing of stations operated by foreign owners
- need for better communication systems for low-flying aircraft
- need for TV improvements in northern Vancouver Island

These and other questions have been examined and some recommendations made.

Before closing, a comment seems warranted on two aspects which leave a strong impression, namely the use of CB radio and the need for improved HF radio communication.

Use of CB radio. Though much criticised, CB radios work particularly well on water and are used widely by fishermen for calling to each other and their homes. Another noteworthy use is for house-to-house communication in native villages and the communication from houses

to band offices. In Port Simpson, where both CB radios and BC Tel services are offerred, CB radio is encroaching on the province of the regular telephone system for intra-community needs - which is an interesting development. With operation and maintenance of present HF, MF and VHF SSB radios often problemmatical for an inexperienced user, and planned DOT VHF facilities not yet in place, it must be acknowledged that CB radio is at present fulfilling an important role in providing communication in isolated areas.

Need for improved HF radio. Throughout the study, the need for improved radio has been apparent for reasons which include (1) some lowflying aircraft operators have dispensed with HF radio altogether because of the awkwardness of HF equipment and the difficulty of maintaining it (2) a very high proportion of RAVEN radios are out of action and there is only one field worker to provide maintenance* (3) marine HF radiotelephone communication leaves much to be desired (4) although satellite communication is strongly advocated for remote areas, it is at the same time extremely vulnerable and it is important that HF service continues to be developed.

DOC's Communications Research Centre (CRC) have been concerned with demonstrating uses for HF radio other than bringing a voice to the south from remote areas e.g. to interface, if possible with a trail radio system so that persons in remote locations with a very small radio could talk back to their community and, in the limit could, in fact, access the Trans-Canada Telephone System. Recently a contract for the prototype of an improved HF radio has been awarded

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* 60 percent were reported to be out of action or almost out of action (Native Voice - early 1977)

by CRC to a firm of radio manufacturers. If satisfactory, the first model may be on the market by the summer of 1978.

This radio incorporates many desirable features such as automatic channel evaluation and selection, wide range (from 1 - 30 MHz), voice activation, availability for use with/without a device called "sincompex" - which improves speech reception by amplification of the quiet syllables - and capability for use with an antenna, also being developed, suitable for all frequencies on a more or less instantaneous basis.

So far, this radio has been developed as a land facility. For ship use some modifications would be necessary. The radio has not been developed with small aircraft in mind and may require considerable modification for aircraft use. Such a radio - if also easily maintained in addition to its other advantages - could contribute greatly towards solving the long-distance communications needs of the area.

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In conclusion, it is well-recognised by the DOC and others that the provision of adequate telecommunication services leads to the social, political and economic advancement of communities. To this end, it is hoped that not only will this study provide a useful background against which to evaluate future proposals as they arise, but that it will stimulate the creative application of telecommunications technology and policy in this isolated region.

SUMMARY OF RECOMMENDATIONS

Recommendations arising out of the study are as follows:

I. From PART VI: TELEGRAPH AND TELEPHONE:-

(a) - that, depending on relevant complaint levels, subscriber opinion be sought to provide information on the quality of telephone service provided by BC Tel in selected areas

(b) - that alternative means of telephone bill collection be found for communities which are habitually in arrears

(c) that Yuquot, Esperanza, Kyuquot and Stoltze Camp be considered for a higher grade of telephone service than is presently provided

(d) - that RAVEN be requested to conduct the DOC recommended study of their operations with a view to providing factual information upon which their own and future government funding policies might be based

(e) - that RAVEN be provided with financial assistance for the above purposes; and also with other DOC resources should RAVEN consider this desirable.

II From PART VII: BROADCASTING SERVICES:-

(a) - that in the case of unlicensed CATV systems, guidelines be written at DOC headquarters which incorporate the following:*

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* See note 12.

that owners be informed (1) that they are operating illegally and will eventually be required to meet BP 23 and 24 specifications (b) that in the interim period they will be permitted to function unless they are causing interference to others.

: that a brief yearly report be required from them by DOC describing the current state of their operations.

(b) - that in the case of illegal LPRT systems, a similar approach to that for unlicensed CATV systems be adopted, with the additional recommendation that owners be advised to seek assistance in completing necessary licensing formalities from DOC district offices.

(c) - that community societies be informed as soon as practicable of prospective developments in their areas in order to prevent, where possible, the premature installation of poorly designed systems.

(d) - that technical advice on system planning and maintenance be made available to community societies by DOC.

III From PART XIII: PRIVATE SYSTEMS:-

(a) - that DOC pursue its present policy of requiring that, wherever possible, other organisations lease facilities from the common carrier in order in the long run to expedite the provision of telecommunications services to remote areas

(b) - that in the event of ongoing problems being experienced by DOT or other agencies with facilities leased from BC Tel, BC Tel first having been approached by DOT through the proper channels without satisfactory result, that representatives of DOC, BC Tel and DOT meet together in order to determine how the situation might be improved.

(c) - that DOC examines the incidence of gaps in common carrier system along key routes with a view, if found excessive, to suggest that improvements be made so that organisations with a need for extended communications along such routes might more readily satisfy their requirements through the common carrier rather than through their own installations.

(d) - that the possibility of adding aircraft frequencies in addition to marine frequencies at proposed DOT VHF repeater installations on the north coast be considered in order to improve communications facilities for low-flying aircraft.

(e) - that DOC monitors the distress and calling channels 2182 MHZ 156.8 MHz with a view to developing measures - preferably associated with the issuing of licences - to assist DOT in reducing congestion on these channels.

From PART IX: MARINE RADIOTELEPHONE SERVICES

(a) - that BC Tel be requested to investigate the adequacy of marine radiotelephone facilities at Bella Coola.

(b) - that DOC convene meetings between BC Tel and the 'new' Coast Guard administration in order to review potential areas of conflict between the two agencies in the light of present DOC policies.

(c) - that an examination be made of the question of US refusal to accept HF calls above 4 MHz received by DOT in the US network in order to determine whether or not DOC might make a contribution to the settlement to this issue.

IV From PART X: COMMUNICATIONS FOR FISHBOATS: AND PRIVATE AIRLINE COMPANY DISPATCH

(a) - that more information be provided to vessel-owners prior to and concerning the introduction of new systems e.g. on LORAN C and the changeover to SSB equipment.

(b) - that more 'safety' courses be offerred sponsored by both government and industry, also modular courses of 3-4 days at increasing levels of sophistication covering various aspects of marine navigation including radio.

(c) - that pamphlets be prepared by DOT/DOC providing clear and concise information on investment in radio gear.

(d) - that the Rescue Co-ordination Centre (RCC) be requested to collect data on radio equipment carried by marine vessels which meet with disaster - this later to be used as a basis for determining future DOC policy in this field.

(e) - that experts be drawn together from BCG, DOC, BC Tel, MOT (including Coastguard), DREE, McMillan Bloedel Ltd., and BC Forest Products to discuss improving the communications systems of third and fourth level aircraft which operate along the coast.

(f) - that the DOC consider how a 24 hour radio repair service might be made available to small aircraft companies operating in the coastal areas.

APPENDIXES

APPENDIX A

Communities of the Study Region: Location Population and Communications Information

Source: Principally DOC Data Base which includes native reserves with populations of greater than 25; non-Indian communities with populations of greater than 30 at the time of the 1971 Census (1 June). Where significant populations, not attributable to other place names, existed on the fringes of larger legal communities they were included in the larger community. Where two or more 'unincorporated places' as defined for census purposes were located close together, their populations were summed into one community with both names given. The portion of rural population that is not attached to communities is not accounted for in the data base. Generally it was considered possible to capture 80 - 100% of the population of communities in remote areas and 25 - 70% of the population in rural areas.

With respect to telecommunications services the data base includes all facilities to which the public have access, telephone, radiotelephone, AM and FM radio television and CATV. HF radio systems have been included where they were either significant or open to public access. In the section on off-air and cable television, the measure of reception quality used is that developed for the study Here You See It! There Your Don't referred to in the bibliography, and ranges from '1' (the picture is as good as could be desired) to '6' (the picture is so bad as to be unwatchable).

Notes. In the first column of the table, abbreviations for the

APPENDIX A (Contd).

Regional districts are as follows:

A-C = Alberni-Clayoquot

C = Capital

C-S = Comox-Strathcona

K-S = Kitimat-Stikine

MW = Mt. Waddinton;

VF = Ocean Falls

S-Q = Skeena-Queen Charlotte.

In the sections headed, RADIO AND TELEVISION, 'LPRT' = Low Power Relay Transmitter. 'MW' = Microwave.

APPENDIX A

	REG'L Dist.	POPULATION 1966	1971	1976	LOCATION LAT	LONG
AHOUSAT BAND	A-C			834 '74	49° 17'	126° 03'
Marktosis Res.			294	E		
AIYANSH # 1 Res., see new Aiyansh						
AMAI INLET	C-S	29	42		50° 02	127° 04'
BAMFIELD	A-C	181	144		48° 50	125° 08'
BELLA BELLA] NEW BELLA BELLA] IR #1] CAMPBELL ISLAND]	OF		26 BB +758 IR + 6C1 =790		52° 10	128° 05
BELLA COOLA	OF		765 inc 82 IR		52° 22'	126° 45'
BELLA COOLA (Lower)	OF		209			
BULL HARBOUR	MW	21	29		50° 55	127° 56'
BURKE CHANNEL] (CATHEDRAL PT.)]	OF			40 E	52° 11'	127° 26'
CALVERT ISLAND	OF	4	75		51° 30'	128° 0'
CANYON CITY] KITWILLUCHSIT] # 7 Res.]	K-S		79		55° 12'	129° 14'
CHURCHHOUSE RES.] UPE RES.] HOMALCO BAND)]	C-S		132		50° 20'	125° 03'
COAL HARBOUR	MW	236	234		50° 36'	127° 34'
DODGE COVE	S-Q	159	103		54° 17'	130° 25'
ESPERANZA	C-S	56	45		49° 53'	128° 44'
ESTEVAN PT.	A-C		23		49° 23'	126° 32
FIRVALE	OF	57	43		52° 26'	126° 18'
FRANKLIN RIVER	A-C	249	187		48° 59'	124° 45'
GOLD RIVER	C-S	598	1973	1921	49° 41'	126° 08'
GORDON RIVER	C	44			48° 35'	124° 44'
GREENVILLE] (LACHKALTSOP #9 Res.)]	K-S		324		55° 03'	129° 35'
GUILFORD ISLAND] (GWAYASDUMS RES. BAND)]	MW		59		50° 42'	126° 34'
HAGENSBORG	OF	231	315		52° 23'	126° 32'
HARDWICKE ISLAND	C-S		51	21	50° 25'	125° 55'
HARTLEY BAY] KULKAYRI # 3 Res.]	K-S	3	202		53° 25'	129° 17'

NOTE: For data information and list of abbreviations for this table see P. A-1

	RD	POPULATION 1966	POPULATION 1971	POPULATION 1976	LOCATION LAT	LOCATION LONG
HESQUIAT RESERVE	A-C		40		49° 24'	26° 28'
HOLBERG incl. CF BASE	M-W		437H 651CFB = 1088	700E	50° 39'	128° 0'
HOT SPRING COVE OPENIT RESERVE	A-C		27 +60res = 87		49° 22'	126° 15'
HUNTS INLET	S-Q	31	34		54° 04'	130° 27'
JUSKATLA	S-Q	205	142		53° 78'	132° 20'
KEMANO	K-S	323	346		53° 24'	127° 56'
KIMSQUIT	OF	closed	down			
KINGCOME INLET QUAEE RESERVE	M-W	16	29 + 133 = 162		50° 58'	126° 10'
KINCOLITH # 14 RESERVE	K-S		374		55° 0'	129° 57'
KITIMAT inc KITIMAT RES. *	K-S	9,782	11,824 + 689IR =12,501	12,810	54° 04'	128° 40'
KITSAULT incl ALICE ARM **	K-S	364			55° 27'	129° 28'
KWATNA INLET	OF	33	14		52° 06'	127° 25'
KYUQUOT inc HOUPSITAS RES.	C-S	58	80 + 55 I.R. =135		50° 02'	127° 23'
LAKELSE LAKE	K-S	91	134		54° 23'	128° 33'
LONGBEACH	A-C	84	103		49° 04'	125° 44'
MAHATTA RIVER	M-W	141	180		50° 28'	127° 48'
MASSET	S-Q	1,654	1,512		54°	132° 08'
METLAKATLA	S-Q	74			54° 20'	130° 27'

* ** Kitkatla, Klemtu after 2 pages

(contd.)

	RD	Population			Location	
		1966	1971	1976	LAT	LONG
NADEN HARBOUR	SQ		38		58° 58'	132° 38'
NAMU	MW	225	140		51° 51'	127° 51'
NASS CAMP (Just beyond BOUNDARY at AIYANSH	K-S	114	177			
NEW AIYANSH	K-S		516		55° 16'	129° 05'
NUMUKAMIS RESERVE	A-C		110		48° 54'	125° 00'
OCEAN FALLS	OF	2,505	1,085	1,500	52° 22'	127° 40'
OONA RIVER	S-Q	60	41		53° 50'	130° 15'
OPITSAT RESERVE	A-C		100 E		49° 11'	125° 54'
PORT ALBERNI	A-C		26,655	19,304	47° 15'	124° 45'
PORT ALBION incl. UCLUELET BAND ITTATSOO RES.	A-C	105	58 + 225 IR = 283		49° 15'	124° 45'
PORT ALICE	M.W		1,507	1,497	50° 23'	128° 27'
PORT CLEMENTS	S-Q	205	406	404	53° 43'	132° 10'
PORT EDWARD	S-Q	1,019	1,129		54° 13'	130° 16'
PORT HARDY	MW		1,777	3,579	50° 43'	127° 30'
PORT NEVILLE	C-S	32	32		50° 29'	126° 04'
PORT RENFREW	C	377	362		48° 33'	124° 25'
PORT SIMPSON incl Pt. Simpson I.R.	S-Q	102	50 PS 744 IR = 794		54° 33'	130° 26'
PRINCE RUPERT	S-Q		15,747	14,247	54° 17'	130° 18'
QUATTISH RES. QUATSINO	MW		99		50° 52'	127° 34'

	RD	POPULATION			LOCATION	
		1966	1971	1976	LAT	LONG
QUEEN CHARLOTTE CITY INCL. SKIDEGATE & SKIDEGATE I.R.	S-Q		1,055		53° 15'	132° 05'
RAINBOW LAKE	S-Q	25	36		54° 13'	130° 06'
REMO	K-S	83	110		54° 29'	128° 44'
RIVERS INLET incl. KATIT #1 RESERVE	OF		74 + 40 IR = 114		51° 30'	127° 35'
ROSSWOOD	K-S	20	35		54° 49'	128° 46'
SANDSPIT	S-Q	447	460		53° 15'	131° 51'
SEWELL	S-Q	11	128		52° 52'	131° 59'
SHEARWATER	OF	10	40		52° 09'	128° 05'
SMITH INLET	OF	23	34			
SOUTH BENTINCK CAMP	OF		24	75 E	52° 02'	126° 40'
STEWART GRANDUC	K-S		1,357	2,350	55° 56'	130° 0'
STUART ISLAND	C-S	26	40		50° 22'	125° 08'
TAHSIS	C-S	1,465	1,651		49° 56'	126° 40'
TASU	S-Q	331			52° 44'	132° 03'
TERRACE THORNHILL	K-S	13,597	10,093 +Thornhill		54° 30'	128° 35'
TLELL	S-Q	57	24		53° 54'	131° 56'
TOFINO	A-C		461	606	49° 09'	125° 54'
UCHUCKLESIT INLET	A-C		34		49° 01'	125° 02'
UCLUELET	A-C	1,018	1,170		48° 57'	125° 33'
WINTER HARBOUR	MW	92	105		50° 31'	128° 01'

		Population			Location	
	RD	1966	1971	1976	LAT	LONG
YUQUOT RES (NOOTKA BAND) (FRIENDLY COVE)	C-S		31		49° 36'	126° 37'
ZEBALLOS	C-S		186	460 (E 75)	49° 59'	126° 40'
KITKATLA	K-S		425		53° 06'	130° 07'
KLEMTU KITSOO # 1 Res	K-S	14	17 + 188IR = 205		52° 35'	128° 32'

	Telephone		Radiotelephone	
	Phon Serv.	Auto Exch.	VHF	HF
AHOUSAT BAND Marktosis Res.	Yes	AHOUSAT (non automatic)	Yes	RAVEN on Marktosis Res.
AIYANSH # 1 Res., see new Aiyansh				
AMAI INLET	No	No	No	
BAMFIELD	Yes	Bamfield	Yes	
BELLA BELLA] NEW BELLA BELLA] IR #1] CAMPBELL ISLAND]	Yes	Bella Bella	Yes	RAVEN
BELLA COOLA	Yes	Bella Coola	No	RAVEN
BELLA COOLA (Lower)	Yes		No	
BULL HARBOUR	No	No	Yes	
BURKE CHANNEL] CATHEDRAL PT.]	No	No	No	BC Tel
CALVERT ISLAND	No	No	Yes	
CANYON CITY] KITWILLUCHSIT] # 7 Res.]	No	No	Yes	RAVEN
CHURCHHOUSE RES.] KUPE RES.] HOMALCO BAND]	No	No	Yes	RAVEN
COAL HARBOUR	Yes	Port Hardy	Yes	
DODGE COVE	Yes	Pr. Rupert	Yes	
ESPERANZA	No	No	No	RAVEN
ESTEVAN PT.	Yes	No	Yes	
FIRVALE	Yes	Bella Coola	No	
FRANKLIN RIVER	Yes	Port Alberni	Yes	
GOLD RIVER	Yes	Gold River	No	RAVEN
GORDON RIVER	Yes	Port Renfrew	No	
GREENVILLE] LACHKALTSOP #9 Res.]	No	No	Yes	RAVEN
GUILFORD ISLAND] GWAYASDUMS RES. BAND]	No	No	Yes	RAVEN
HAGENSBORG	Yes	Hagensborg	No	
HARDWICKE ISLAND	No	No	Yes	
HARTLEY BAY] KULKAYRI # 3 Res.]	No	No	Yes	RAVEN

Note: For data information and list of abbreviations for this table see p. A-1

	Telephone		Radiotelephone	
	Phone Serv.	Auto Exch.	VHF	HF
HESQUIAT RES.	Yes	No	Yes	
HOLBERG incl. CF BASE	Yes	Holberg	Yes	
HOT SPRING COVE OPENIT RES.	Yes	No	Yes	
HUNTS INLET	No		Yes	
JUSKATLA	Yes	Pt. Clements	Yes	
KEMANO	Yes	Kemano	No	
KIMSQUIT	CLOSED	DOWN		
KINGCOME INLET QUAEE RES	No	No	Yes	RAVEN
KINCOLITH #14 Reserve	No		No	Nursing Stn. Dept. of Highways RAVEN
KITIMAT KITIMAT RES.	Yes	Kitimat	Yes	RAVEN
KITKATLA	No	No	Yes	RAVEN
KITSAULT	CLOSED	DOWN	Yes	
KLEMTU KITSOO #1 Reserve	No		Yes	RAVEN
KWATNA INLET	No	No	No	
KYUQUOT HOUPSITAS RES	No	No	No	Can. Red Cross Stn Fisheries Stn. RAVEN
LAKELSE LAKE	Yes	Terrace	Yes	
LONGBEACH	Yes	Tofino	Yes	
MAHATTA RIVER	No	No	Yes	
MASSET	Yes	Masset	Yes	RAVEN
METLAKATLA	No		Yes	RAVEN

	Phone Serv.	Auto Exch.	VHF	HF
NADEN HARBOUR	No		Yes	
NAMU	No		Yes	
NASS CAMP (Just beyond Boundary at AIYANSH)	Yes	Aiyansh	Yes	
NEW AIYANSH	Yes	Aiyansh	Yes	RAVEN
NUMUKAMIS RESERVE	No		Yes	
OCEAN FALLS	Yes	Ocean Falls	Yes	
OONA RIVER			Yes	RAVEN
OPITSAT RESERVE	Yes	Tofino	Yes	
PORT ALBERNI	Yes	Port Albern	Yes	RAVEN
PORT ALBION UCLUELET BAND ITTATSOO RESERVE	Yes	Ucluelet	Yes	RAVEN
PORT ALICE	Yes	Port Alice	Yes	
PORT CLEMENTS	Yes	Port Clements	Yes	
PORT EDWARD	Yes	Port Edward	Yes	
PORT HARDY	Yes	Port Hardy	Yes	RAVEN
PORT NEVILLE	No	No	Yes	
PORT RENFREW	Yes	Port Renfrew	No	
PORT SIMPSON	Yes	Port Simpson	Yes	RAVEN
PRINCE RUPERT	Yes	Pr. Rupert	Yes	RAVEN
QUATTISH RES. QUATSINO	Yes	Port Hardy	Yes	RAVEN
QUEEN CHARLOTTE CITY	Yes	Q. Charlotte City	Yes	RAVEN
RAINBOW LAKE	No		Yes	
REMO	Yes	Terrace	Yes	

	Phone Serv.	Auto Exch.	VHF	HF
RIVERS INLET KATIT # 1 RES.	No	No	Yes	RAVEN
ROSSWOOD	Yes	Terrace	Yes	
SANDSPIT	Yes	Sandspit	Yes	
\/ SEWELL	Foreign Exchange	Inaccessible to public	?	
SHEARWATER	No	No	Yes	
SMITH INLET	No	No	Yes	
SOUTH BENTINCK CAMP	No	No	No	
STEWART GRANDUC	Yes	Stewart	Yes	
STUART ISLAND	No	No	Yes	
TAHSIS	Yes	Tahsis	No	
TASU	Yes	Tasu	No	
TERRACE THORNHILL	Yes	Terrace	Yes	RAVEN (2)
TLELL	Yes	Pt. Clements	Yes	
TOFINO	Yes	Tofino	Yes	
* UCLUELET	Yes	Tofino	Yes	RAVEN
WINTER HARBOUR	Yes	Port Alice	Yes	RAVEN
YUQUOT RES. NOOTKA BAND FRIENDLY COVE	No	No	No	RAVEN
ZEBALLOS	Yes	Zeballos	No	
* UCHUCKLESIT INL.	No	No	Yes	RAVEN

RADIO

Service Call Sign	Signal Source Program Source	Via* qual	Serv CS (Chan.)	Sign. source Prog. source	via Qual.
AHOUSAT BAND Marktosis Res.	None	...	...	...	...
AIYANSH # 1 Res. see new Aiyansh	None	...	...	...	...
AMAI INLET	None	...	...	...	...
BAMFIELD	CBC-E CBXQ	UCLUELET Vancouver CBU	LPRT		
BELLA BELLA] NEW BELLA BELLA] IR #1] CAMPBELL ISLAND]	CBC-E CBTB	Calvert Is. Vancouver CBU	MW		
BELLA COOLA	None		Scheduled coverage	to receive CBC	
BELLA COOLA (Lower)	None				
BULL HARBOUR	None				
BURKE CHANNEL] CATHEDRAL PT.]	None				
CALVERT ISLAND	None				
CHURCHHOUSE Res.	None				
COAL HARBOUR	CBC-E	Coal Harbour Vancouver CBU	LPRT		
DODGE COVE	CBC-E CFPR	Pr. Rupert Pr. Rupert	off-air	PR-E CHTK	Pr. Rupert Pr. Rupert	Off-ai
ESPERANZA	None				
ESTEVAN PT.	None				
FIRVALE	None				
FRANKLIN RIVER	None				

* Note: for data information and list of abbreviations for this table see p. A-1

RADIO (contd)

	Service Call Sign	Signal Source Program Source	Via Qual.	Service CS (Ch)	Sign source Prog source	via qual.
GOLD RIVER	CBC-E CBKJ	Gold River Van CBU	LPRT			
GORDON RIVER	None					
GREENVILLE	None					
GILFORD ISLAND	None					
HAGENSBORG	None					
HARDWICKE ISLAND	None					
HARTLEY BAY	None					

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	Sign S Prog. S	via qual
HESQUIAT RES.	None					
HOLBERG inc CF BASE	PR-E CBC-A CFHG	Holberg Holberg		Some VHF radios owned by individuals to access the Tofino PSRT		
Hot Springs Cove	None					
HUNTS INLET	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
JUSKATLA	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
KEMANO	None	-	-	-	-	-
KIMSQUIT	Closed down					
KINGCOME INLET QUAEE RES.	None					
KINCOLITH #14 Res	None					
KITIMAT KITIMAT RESERVE	PR-E CFTK	Terrace Terrace	O/A	CBC-E CBUK	Kitimat Pr. Rupert	LPRT
	CBC-E CBUK-FM	Kitimat Kitimat	O/A			
KITKATLA	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A]			
KITSAULT Incl. ALICE ARM	CBC CBKL	ALICE ARM Pr. Rupert	LPRT			
KLEMTU KITSOO # 1 Res.	None	-	-	-	-	-
KWATNA INLET	None	-	-	-	-	-
KYUQUOT HOUPSITAS RES.	None	-	-	-	-	-
LAKELSE LAKE	PR-E CFTK	Terrace Terrace	O/A	-	-	-
LONGBEACH	CBC-E CBXQ	Ucluelet Van	LPRT	-	-	-
MAHATTA RIVER	None	-	-	-	-	-
MASSET	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
METLAKTLA	CBC-E CFPR	" " " "	O/A	PR-E CHTK	" " " "	O/A

RADIO (contd.)

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	Sign S Prog. S	via qual
NADEN HARBOUR	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
NAMU	None	-	-	-	-	-
NASS CAMP (Just beyond BOUNDARY AT AIYANSH)		-	-	-	-	-
NEW AIYANSH	CBC-E CBKL	Alice Arm Pr. Rupert	LPRT	-	-	-
NUMUKAMIS RESERVE	None	-	-	-	-	-
OCEAN FALLS	CBC-E CBXO	Ocean Falls Vancouver	LPRT	-	-	-
OONA RIVER	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
OPITSAT RESERVE	CBC-E CBXZ	Tofino Vancouver	LPRT			
PORT ALBERNI	CBC-A CJAV	Pt. Alberni		PR-E CKNW	New Westmin.	
	PR-E CFUN	Vancouver		PR-E CKWX	Vancouver	
	CBC-E CBU	Vancouver				
PORT ALBION UCLUELET BAND ITTATSOO RES.	CBC-E CBXQ	Ucluelet Vancouver	LPRT			
PORT ALICE	CBC-E CBUX	Port Alice Van CBU	LPRT			
PORT CLEMENTS	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
PORT EDWARD	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
PORT HARDY	CBC-E CBRW	Pt. Hardy Van CBU	LPRT			
PORT NEVILLE	None					
PORT RENFREW	None					

RADIO (Contd)

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	Sign S Prog. S	via qual
PORT SIMPSON	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
PRINCE RUPERT	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
QUATTISH RESERVE) QUATSINO)	None					
QUEEN CHARLOTTE CITY	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
RAINBOW LAKE	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
REMO	CBC-E CBRC	Terrace Pr. Rupert	LPRT	CBC-F CBWK	Terrace Van (CBU-FM)	
	PR-E CFTK	Terrace Terrace	O/A			
RIVERS INLET) KATIT #1 RES.)	None					
ROSS WOOD	CBC-E CBRC	Terrace Pr. Rupert	LPRT	CBC-F CBWK	Terrace Van (CBU-FM)	LPRT
SANDSPIT	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
SEWELL	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
SHEARWATER	None					
SMITH INLET	None					
SOUTH BENTINCK CAMP	None					
STEWART GRANDUC	CBC-E CBKA	Stewart Pr. Rupert	LPRT			
STUART ISLAND	None					
TAHSIS	CBC-E CBXP	Tahsis Van CBU	LPRT			
TASU	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A

RADIO

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	Sign S Prog. S	via qual
TERRACE THORNHILL	CBC-E CBRC	Terrace Pr. Rupert	LPRT	CBC-F CBWK	Terrace Vancouver	LPRT
				PR-E CFTK	Terrace Terrace	O/A
TLELL	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A	PR-E CHTK	Pr. Rupert Pr. Rupert	O/A
TOFINO *	CBC-E CBXZ	Tofino Vancouver	LPRT			
UCLUELET	CBC-E CBUT-7	Vancouver Vancouver	O/A	CBC-E CBUT-7	Vancouver Vancouver	O/A
WINTER HARBOUR	None					
YUQUOT RES. NOOTKA BAND FRIENDLY COVE	None					
ZEBALLOS	None					
*UCHUCKLESIT INLET	None					

TELEVISION - OFF AIR (contd.)

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv. CS (Ch)	SS PS	via Q
AHOUSAT BAND inc. Marktosis Res.	None					
AMAI INLET	None					
AIYANSH # 1 Res. See New Aiyansh						
BELLA BELLA NEW BELLA BELLA IR # 1 CAMPBELL ISLAND	CBC-A CKD1-TV-1 (9)	Bella Bella TCE CRTK-TV	3 LPRT			
BELLA COOLA	PR-E (11) CHVT-TV-2	Bella Coola TCE-CFTK-TV	4 LPRT 5.0			
BELLA COOLA (Lower)	PR-E (11) CHAN-TV-2	Bella Coola TCE-CFTK-TV	4 LPRT 5.0			
BULL HARBOUR	None					
BURKE CHANNEL at CATHEDRAL PT.	CBC-A (13) CFSB-TV-3	Cathedral Pt. TCE CFTK-TV	5 LPRT			
CALVERT ISLAND	None					
CANYON CITY (KITWILLUCHSIT) # 7 Res.	None					
CHURCHOUSE RES. (AUPE RES. HOLMACO BAND)	CTV CHAN-TV-4 (13)	Courtenay Van	1 LPRT			
COAL HARBOUR	CBC-A CFKB-TV-3	Pt. Hardy Vic. CHEK-TV	2 LPRT 5.0	CBC-E* (8) CBUT-20	Pt. Hardy Van.	O/A
DODGE COVE	None					
ESPERANZA	None					
ESTEVAN PT.	None					
FIRVALE	None					
FRANKLIN RIVER	None					

TELEVISION - OFF-AIR contd.

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	SS PS	via Q
GOLD RIVER	CBC-E*	Wokas Lake	O/A			
	CBUT-12 (7)	Van				
GORDON RIVER	CTV (11)	Pt. Renfrew	1 LPRT	CBC-A	Victoria	O/A
	CJTV-TV-1	Van		CHEK-TV	Victoria	
	CBC	Van	O/A			
	CBUT (2)	Van				
GREENVILLE]	CBC-A	TCE	O/A			
(LACHKALTSOP #9 Res.]	CFTK-TV (3)	TCE CFTK-TV				
GUILFORD ISLAND RES.]	None					
(GWAYASDUMS RES. BAND]						
HAGENSBORG	CBC-A	Bella Coola	3 LPRT	CBC-A	Hagens-	4 LPRT
	CHTV-TV-2 (13)	TCE	4.0	CHTV-TV-3	borg TCE	5.0
HARDWICKE ISLAND	None					
HARTLEY BAY]	CBC-A	Gribell Is.	1 LPRT			
(KULKAYRI #2 Res)]	**	CFTK-TV				

* Scheduled for 1977 under new CBC Vancouver Island System.

** Not yet authorised.

TCE = Terrace

TELEVISION - OFF AIR (contd.)

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	Sign S Prog. S	via qual
HESQUIAT RES.						
HOLBERG inc. CF BASE	CBC-A CFKY-TV-1 (4)	Holberg Victoria (CHEK-TV)	3 LPRT	CBC-E* CBUT-21(2)	Pt. Hardy Van.	O/A
HOT SPRING COVE OPENIT RES.	CBC-A CFTK-TV-1	Pr. Rupert Terrace	2 hop LPRT	-	-	-
HUNTS INLET	CBC-A CFTK-TV-1 (6)	Pr. Rupert Terrace	2 LPRT	-	-	-
JUSKATLA	CBC-A CFTK-TV	Juskatla Terrace	3 LPRT	-	-	-
KEMANO	CBC-A CFTK-TV-5	Kemano Terrace	2 LPRT	-	-	-
KIMSQUIT	Closed down,	but had none.				
KINGCOME INLET) QUAEE RES.)	None	-	-	-	-	-
KINCOLITH #14 Res.	CBC-A	Kincolith Terrace	3 LPRT	-	-	-
KITIMAT) KITIMAT RES)	CBC-A CFTK-TV (3)	Terrace Terrace	O/A			
KITKATLA	None					
KITSAULT ALICE ARM	CBC-A CKCC-TV-1 (7)	Kwinatahl Terrace	1 LPRT			
KLEMTU KITSOO # 1 Res.	CBC-A CFKK-TV-1 (2)	Klemtu Terrace	3 LPRT			
KWATNA INLET	CBC-A CKKB-TV-1 (12)	Kwatna Inlet Terrace				
KYUQUOT) HOUPSITAS RES)	None					
LAKELSE LAKE	CBC-A CFTK-TV (3)	Terrace Terrace	O/A			
LONGBEACH	CTV CKUP-TV-1 (6)	Ucluelet Van	1 LPRT	Van CBC-E CBUT-7(7)	1 LPRT UCLUELET Van	1 LPRT
MAHATTA RIVER	CBC-A CFKY-TV-1 (4)	Holberg Vic. (CHEK-TV)	3 LPRT			
MASSET	CBC-A CHMH-TV-1 (8)	Masset Terrace	3 LPRT 2.0			
METLAKATLA	CBC-A CFTK-TV-1 (6)	Pr. Rupert Terrace	2 LPRT			

* Scheduled for 1977 under new CBC Vancouver Island System.

TELEVISION - OFF AIR (Contd.)

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	Sign S Prog. S	via qual
NADEN HARBOUR	None					
NAMU	None					
NASS CAMP	CBC-A (5) CFTK-TV-6	Nass Camp Terrace	1 LPRT			
NEW AIYANSH	CBC-A CFTK-TV-6 (5)	Nass Camp Terrace	1 LPRT			
NUMUKAMIS RES.	None					
OCEAN FALLS	CBC-A (2) CFTK TV-9	Ocean Falls Terrace	2 LPRT 5.0	CBC-E	Lk. Cowichan or Toronto Toronto	Satel-lite
OONA RIVER	CBC-A CFTK-TV-1 (6)	Pr. Rupert Terrace	2 LPRT			
OPITSAT RES.	CTV CKUP-TV-1 (6)	Ucluelet Vancouver	1 LPRT	CBC-E CBUT-7 (7)	Ucluelet Vancouver	1 LPRT
PORT ALBERNI	CBC-E CBUT-3 (4)	Vancouver Vancouver	O/A			
PORT ALBION UCLUELET BAND ITTATSOO RES.	CTV (6) CKUP-TV-1	Ucluelet Vancouver	1 LPRT	CBC-E CBUT-7 (7)	Ucluelet Vancouver	1 LPRT
PORT ALICE	CBC-A (2) CKPA-TV-1	Port Alice Victoria	3 LPRT 4.0	CBC-E* CBUT-17	Pt.Hardy Vancouver	O/A
PORT CLEMENTS	CBC-A (6) CFTK-TV-1	Pr. Rupert Terrace	2 LPRT 5.0	CBC-A CFTK-TV-7 (2)	Juskatla Terrace	3 LPRT
PORT EDWARD	CBC-A CFTK-TV-1 (6)	Pr. Rupert Terrace	2 LPRT			
PORT HARDY	CBC-A CFKB-TV-3 (3)	Pt. Hardy Victoria	2 LPRT 4-5	CBC- A CFKB-TV-4 (7)	Newcastle Ridge Victoria	1 LPRT 4.0
	CBC-E* CBUT-19 (6)	Courtenay Vancouver	MW			
PORT NEVILLE	None					

TELEVISION - OFF AIR (Contd).

	Serv CS (Chan)	Sign Source Prog. Source	Via qual	Serv CS (Ch)	Sign S Prog. S	via qual
PORT RENFREW	CBC-E CBUT (2)	Vancouver Vancouver	O/A 5.0	CBC-A CHEK-TV (6)	Victoria Victoria	O/A 4.0
	CTV CJTV-TV-1	Pt. Renfrew Vancouver	1 LPRT 6.0			
PORT SIMPSON	CBC-A CFTK-TV-1 (6)	Pr. Rupert Terrace	2 LPRT			
PRINCE RUPERT	CBC-A CFTK-TV-1 (6)	Pr. Rupert Terrace	2 LPRT 3.0	CBC-E CFPR	Pr. Rupert Pr. Rupert	O/A
QUATTISH RES QUATSINO	CBC-A (3) CFKB-TV-3	Pt. Hardy Victoria	2 LPRT			
QUEEN CHARLOTTE CITY	CBC-A (4) CHQC-TV-1	Q. Charlotte City Terrace	3 LPRT 5.0			
RAINBOW LAKE	CBC-A (6) CFTK-TV-1	Pr. Rupert Terrace	2 LPRT			
REMO	CBC-A CFTK-TV (3)	Terrace Terrace	O/A			
RIVERS INLET KATIT #1 RES.	None					
ROSSWOOD	CBC-A CFTK-TV (3)	Terrace Terrace	O/A			
SANDSPIT	CBC-A CHQC-TV-1 (4)	Q. Charlotte City Terrace	3 LPRT 4.0			
SEWELL	None					
SHEARWATER	CBC-A CKDI-TV-1 (9)	Bella Bella Terrace				
SMITH INLET	None					

* Scheduled for 1977 under new CBC Vancouver Island System.

TELEVISION - OFF AIR

	Serv CS (Chan)	Sign Source Prog. Source	via qual	Serv CS (Ch)	Sign S Prog. S	via qual
SOUTH BENTINCK CAMP	CBC-A CFSB-TV-2 (13)	S. Bentinck C Terrace CFTK-TV	5 LPRT			
STEWART GRANDUC	CBC-A CKHF-TV-2 (2)	Mt. Dolly Terrace	3 LPRT			
STUART ISLAND	CTV CHAN-TV-4 (13)	Courtenay Vancouver	1 LPRT			
TAHSIS	CBC-A (3) CFNV-TV-2	Nimpkish Vic CHEK-TV	3 LPRT	CBC-E* CBUT-14	Woss Camp Van	O/A
TASU	CBC-A (1) CFAL-TV-1	Tasu Terrace	3 LPRT 4.0			
TERRACE THORNHILL	CBC-A CFTK-TV (3)	Terrace Terrace	O/A 2.7			
TLELL	CBC-A (6) CFTK-TV-1	Pr. Rupert Terrace	2 LPRT 5.0 E			
TOFINO	CTV (6) CKUP-TV-1	Ucluelet Vancouver	1 LPRT 4.3	CBC-E CBUT-7 (7)	Ucluelet Vancouver	1 LPRT 4.7
UCLUELET	CTV CKUP-TV-1 (6)	Ucluelet Vancouver	1 LPRT	CBC-E CBUT-7 (7)	Ucluelet Vancouver	1 LPRT
WINTER HARBOUR	CBC-A CFKY-TV-1 (4)	Holberg Vic(CHEK-TV)	3 LPRT			
YUQUOT RESERVE	None					
ZEBALLOS	None					

* Scheduled for 1977 under new CBC Vancouver Island system.

CABLE TV (contd.)

	Company	Rates Inst.	Rates Mo.	Sub-scribers	Service CS (Chan.)	Sign. source Prog. source	via Qual.
AHOURSAT BAND Marktosis Res.	None						
AIYANSH # 1 Res. see new Aiyansh	"						
AMAI INLET	"						
BAMFIELD	"						
BELLA BELLA NEW BELLA BELLA IR #1 CAMPBELL ISLAND	"						
BELLA COOLA	"						
LOWER BELLA COOLA	"						
BENSON LAKE	Closed down						
BULL HARBOUR	"						
BURKE CHANNEL] CATHEDRAL PT.]	"						
CALVERT ISLAND	"						
CANYON CITY] KITWILLUCHSIT] #7 Res]	"						
CHURCHHOUSE] AUPE RES.] HOMALCO BAND]	"						
COAL HARBOUR	"						
DODGE COVE	"						
ESPERANZA	"						
ESTEVAN PT.	"						
FIRVALE	"						
FRANKLIN RIVER	Martin Semkiw	$15	$6	63	CBC-E, CBUT	Vancouver Vancouver	O/A 4
					CTV CHAN-TV (3)	Burnaby Burnaby	O/A 4
					CBC-A CHEK-TV 16	Victoria Victoria	O/A 4
					CBS-A KVOS-TV (4)	Bellingham Bellingham	O/A 4

CABLE TV (Contd.)

	Company	Rates Inst.	Mo	Sub-scribers	Service CS (Chan)	Sign. source Prog. source	via Qual
GOLD RIVER	Telesis Development Company	$10	$1350	325	CBC, CBUT-1 (2)	Courtenay Vancouver	4 LPRT 2
					CTV CJGR-TV-3	Gold River CHAN-TV	4 LPRT 3
					(9) ABC KOMO-TV(4)	Seattle Seattle	O/A 4
					CBS-A KVOS-TV(9)	Bellingham Bellingham	O/A 2
GORDON RIVER							
GREENVILLE							
GUILFORD ISLAND							
HAGENSBORG							
HARDWICKE ISLAND							
HARTLEY BAY							

CABLE TV. (Contd.)

	Company	Rates inst.	Rates No.	Sub-scribers	Serv CS. (Chan.)	Sign. source Prog. source	via Qual.
HESQUIAT RES.	None						
HOLBERG including CF BASE	None						
HOT SPRING COVE & OPENIT Res.	None						
HUNTS INLET	None						
JUSKATLA							
KEMANO	None						
KIMSQUIT	None						
KINGCOME INLET	None						
KINCOLITH] # 14 Res]	None						
KITIMAT inc.] KITIMAT RES.]	Skeena Broad-casters Ltd.	25.0	8.50	2000 6 BULK	CBC-A CFTK-TV(6)	Terrace Terrace	MW 1
					PBS KCTS-TV(9)	Haney? Seattle	MW 2
					CTV CIFG-TV(4)	Pr. Rupert Pr. George	MW 2
					Also	local programs	
KITKATLA (Dolphin Is. Res)	None						
KITSAULT inc. Alice Arm	None						
Klemtu inc KITSOO # 1 Res.	None						
KWATNA INLET							
KYUQUOT	None						

CABLE T.V. (Contd.)

Company	Rates Inst.	No.	Sub-scribers	Serv CS	(Chan.)	Sign. source Prog.	source	via Qual.
LAKELSE LAKE	None							
LONGBEACH	None							
LOWER BELLA COOLA								
MAHATTA RIVER	None							
MASSET inc. CFS Base & Masset I.R.	None							
METLAKATLA (Tsimpsean #2 IR)	None							

	Company	Rates Inst. Mo.	Sub-scriber	Service CS (Chan)	Sign Source Prog. Source	via qual
NADEN HARBOUR	-	-	-	-	-	-
NAMU	-	-	-	-	-	-
NASS CAMP Just behond BOUNDARY at AIYANSH	-	-	-	-	-	-
NEW AIYANSH	-	-	-	-	-	-
NUMUKAMIS RESERVE	-	-	-	-	-	-
OCEAN FALLS	-	-	-	-	-	-
OONA RIVER	-	-	-	-	-	-
OPITSAT RESERVE	-	-	-	-	-	-
PORT ALBERNI	Alberni Cable Television Ltd.	15 6.00	6969 Bulk 103	CBC-E CBUT (2)	Vancouver Vancouver	1 LPRT 2
				CBC-A CHEK-TV-3 (6)	Victoria Victoria	3
				CTV CHAN-TV (5)	Burnaby Burnaby	O/A 3
				CBS-A KVOS-TV (3)	Bellingham Bellingham	O/A 2
PORT ALBION UCLUELET BAND ITTATSOO RES.	Ucluelet Video Services	15 7.00		CBC-E CBUT -(2)	Ucluelet Vancouver	1 LPR 3
				CTV CKUP-TV-1 (5)	Ucluelet Vancouver	1 hop 3
				ABC KOMO-TV (4)	Seattle Seattle	O/A 5
				NBC KING-TV (6)	Seattle Seattle	
				KVOS-TV (3)	Bellingham Bellingham	O/A 3
PORT ALICE	-	-	-	-	-	-

	Company	Rates Inst. Mo.	Sub-scriber	Service CS (Chan)	Sign Source Prog. Source	via qual
PORT CLEMENTS	-	-	-	-	-	-
PORT EDWARD	-	-	-	-	-	-
PORT HARDY	-	-	-	-	-	-
PORT NEVILLE	-	-	-	-	-	-
PORT RENFREW	-	-	-	-	-	-
PORT SIMPSON	-	-	-	-	-	-
PRINCE RUPERT	Skeena Broadcasters Ltd.	25 8.50	2000 + 17 BVLK	CBC-A CFTK-TV-1 (3)	Pr. Rupert Terrace	2 LPRT 2
					(Also local programs)	
				CTV CIFG-TV-4 (4)	Pr. Rupert Pr. Rupert	MW 1
				PBS KCTS-TV (5)	Pr. Rupert KCTS Video Tape	Cable 2
QUATTISH RESERVE QUATSINO	-	-	-	-	-	-
QUEEN CHARLOTTE CITY	-	-	-	-	-	-
RAINBOW LAKE	-	-	-	-	-	-
REMO	-	-	-	-	-	-
RIVERS INLET KATIT # 1 Reserve	-	-	-	-	-	-
ROSSWOOD	-	-	-	-	-	-
SANDSPIT	-	-	-	-	-	-
SEWELL	-	-	-	-	-	-
SHEARWATER	-	-	-	-	-	-
SMITH INLET	-	-	-	-	-	-
SOUTH BENTINCK CAMP	None					
STEWART GRANDUC	None					

	Company	Rates Inst.	Rates Mo.	Sub-scriber	Service CS (Chan)	Sign Source Prog. Source	via qual
STUART ISLAND	None						
TAHSIS	Telesis Develop-ment Ltd.	50	7	350	CBC-A CHEK-TV	Victoria Victoria	MW
					CTV CHAN TV	Vancouver Vancouver	MW
					CBS-A KVOS-TV	Bellingham Bellingham	MW LPRT
TASU	None						
TERRACE THORNHILL	Skeena Broad-casters Ltd.	25	8.50	2,400	CBC-A CRTK-TV (6)	Terrace Terrace	MW 1
					PBS KCTS-TV (9)	Haney ? Seattle	MW LPRT
					CTV CIFG-TV (4)	Pr. Rupert Pr. George	MW 2
					(Also local	Programs)	
TLELL	None						
TOFINO	Tofino TV Cable Ltd.				CBC-E CBUT (2)	Vancouver Vancouver	O/A
UCLUELET	Ucluelet Video Ltd.	15	7	282	CBC-E CBUT-7 (2)	UCLUELET Vancouver	LPRT 3.0
					CBS-A KVOS-TV (3)	Bellingham Bellingham	O/A 3.0
					ABC KOMO-TV (4)	Seattle Seattle	O/A 5.0
					CTV CKUP-TV-1 (5)	Ucluelet Vancouver	1 LPR 3.0
WINTER HARBOUR							

CABLE T.V.

	Company	Rates Inst.	Rates Mo	Sub-scriber	Service CS (Chan)	Sign Sc. Prog. Sc.	qual.
YUQUOT RES. NOOTKA BAND FRIENDLY COVE	None						
ZEBALLOS	None						

STATEMENT OF WORK - DESIGN OF AIRLINE COMMUNICATIONS SYSTEM

A Preliminary Report Prepared by Aidan Furlong

December, 1975.

STATEMENT OF WORK - DESIGN OF AIRLINE COMMUNICATIONS SYSTEM

INTRODUCTION

It has been established that a need exists for an improved communications system to enable the Third and Fourth Level Airline carriers working on the British Columbia coast to operate efficiently and safely. The experience of the airline operators has been that HF/SSB systems are not adequate in terms of coverage or reliability, while VHF systems, although limited to line of sight, have proven to be reliable, relatively easy to maintain, and in addition, relatively inexpensive.

Following a preliminary investigation of the problem and discussions with the various airlines, this department has decided to have designed and costed a VHF system that would give improved communications coverage for airline operators.

OBJECTIVES

The objective of the project is to develop a VHF/AM relay system, complete with trunk connections to the airline dispatching offices, which would be capable of providing reliable, efficient communications for airline operations. The system would be established either on dedicated sites and owned by the airline operation or would be established by B.C. Tel (on their existing sites) based on an equipment specification and then leased to the airlines.

The objective of this statement of work will be to outline the airlines' communications/operations problems and indicate the system design requirements in a manner that will enable the Communications Consulting Engineer to put together a cost effective system design.

AIRLINE COMMUNICATIONS PROBLEMS

There are currently some fifteen third and fourth level carriers providing air service along the coast from Vancouver to Stewart, including Vancouver Island. These carriers typically operate ten to fifteen aircraft, all equipped with VHF and a portion with HF/SSB. Most of these airlines operate over long scheduled routes (or provide charter services) which do not allow them to maintain VHF line-of-sight communications with their dispatching stations. They have found HF/SSB expensive, difficult to maintain, unreliable at cruising heights and subject to fading with distance while the provision of VHF relay stations is difficult to financially justify except for a few heavily travelled routes.

The carriers need reliable communications for dispatching, safety, weather and flight information. MOT Aeradio Stations exist at only a few locations and cannot be used for dispatching purposes.

Since the carriers are often in competition on specific routes and for charter work, it has not been practical for them to form a shared communications system. Therefore, the Provincial Government is considering taking the lead in putting together a system for their common use.

SYSTEM DESIGN REQUIREMENTS

The consultant will be required to undertake the following:

1. Analyze the information provided by the airlines in response to the Department of Transport and Communications questionnaire re the nature of their communications problems and suggested remedies. (Attachment #1).

2. Determine the anticipated communication loading configuration through discussions with the airlines and through an analysis of their flight and communications patterns based on an "adequate" level of service (which shall be determined and defined by consultant). All airlines on the list (attachment #2) should be contacted re their loading requirements.

3. Based on 2, determine, via propagation studies, suitable VHF relay TX/RX locations, powers, antenna patterns, etc. required to give adequate coverage when aircraft are, say, 1000 feet off the water.

4. Based on 2, determine the number of trunk circuits and VHF channels at each site needed to adequately carry the traffic. This would include air-ground and ground-ground traffic.

5. Investigate possible designs and costs for a control system for operation of the network. This control system should address the following options:

   (a) A looped system with selective calling on both an aircraft and airline basis.

   (b) A selective calling system on both an aircraft and airline basis with a zoning system access code arrangement to permit a number of simultaneous calls.

   (c) A system such as (b) above, but incorporating features to provide privacy.

(d) Any control features that would be necessary to ensure system operation without providing zoning, selective calling or privacy.

Any control system design should not require costly modifications or additions to the normally existing VHF communications equipment of the aircraft.

The consultant can refer to the control system proposals prepared by Glenayre Electronics Ltd. or Challenger Electronics (attachments #3 and #4). Note that their proposals were prepared on a Commercially Confidential basis.

6. Following the above and further discussion with the Department and the airlines, the consultant will provide a detailed system/ equipment specification, and cost estimate based on an agreed concept and choice of options.

7. Ensure via contact with MOT and DOC that there would not be any frequency, or operational constraints on the operation of such a VHF/AM system.

8. Examine the economic and operational factors involved in:

(a) Having the complete system owned and operated by the airline operation.

(b) Having the ground portion of the system owned and operated by B.C. Tel.

(c) Some combination of (a) and (b).

The budgetary proposal prepared for the Department by B.C. Tel could be used for reference. (Attachment #5).

9. The pros and cons of a phased program, which would extend coverage and features over a number of years, should be explored.

10. An equitable billing concept should be discussed with the airlines and B.C. Tel and a system proposed.

11. In the event that a decision is made to proceed with the system, the consultant will be required to undertake one of the following tasks:

(a) A performance test for the system if B.C. Tel provides the service.

(b) If the airline operation owns the system, the consultant will liaise with suppliers, purchase equipment, contract for and supervise installation, and perform acceptance/performance tests.

ADDITIONAL FACTORS

1. The airlines will be expected to use their own facilities whenever possible, i.e. when working within line-of-sight of their base stations or repeaters.

2. Any control features, such as selective calling or privacy, must be capable of working with a large number of makes and models of aircraft radios. There should be a minimum amount of modifications required to the aircraft radios, preferably to the audio lead only, and any extra equipment in the aircraft should be lightweight, small, and inexpensive.

3. There could be some 150-200 aircraft equipped to use the system.

4. There could be some 20-30 dispatching/base stations connected to the network.

5. It would appear desirable to design the system by "zones" so that the entire network or an entire trunk circuit is not tied up for one call.

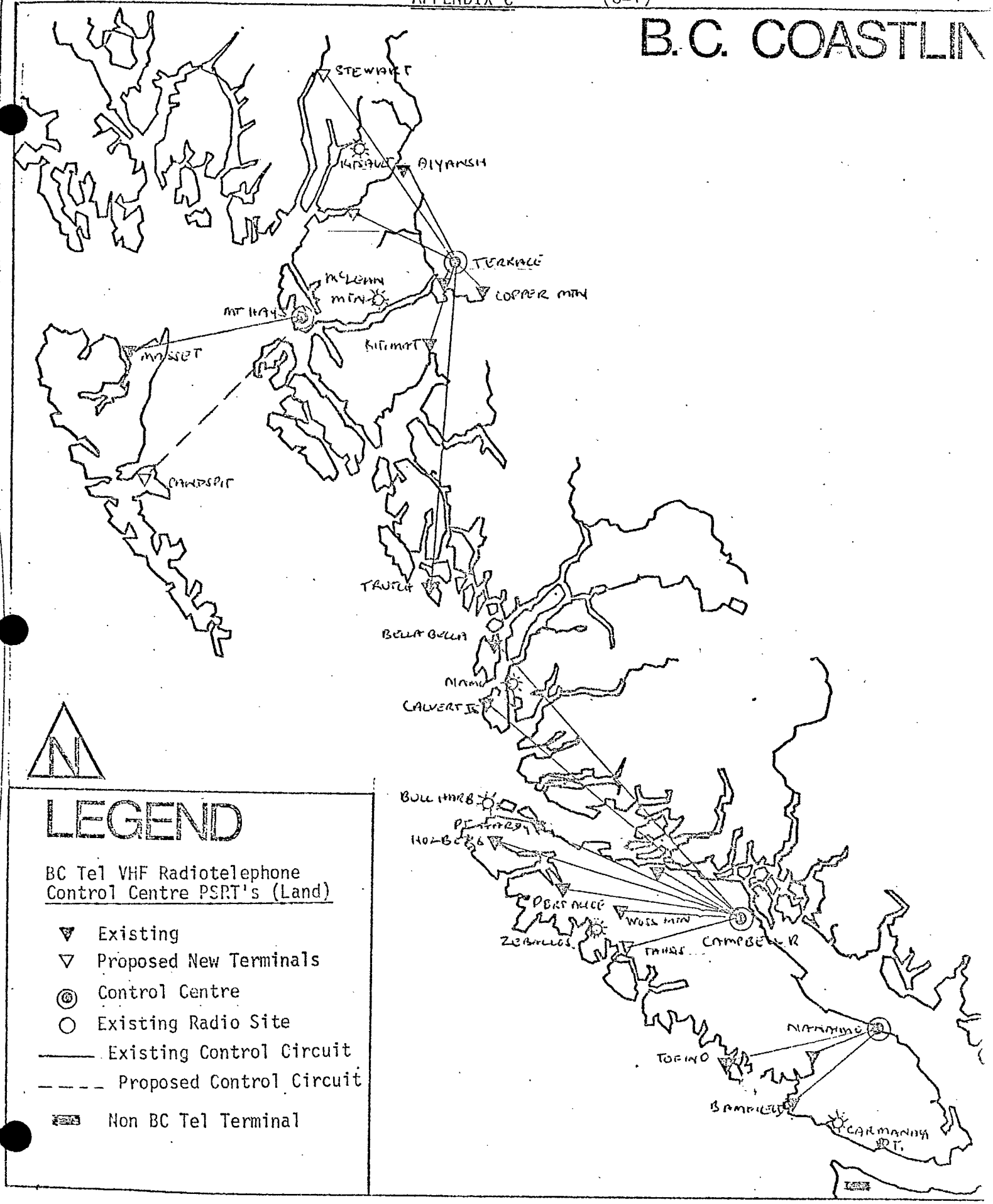
6. A Program Manager for the project will be appointed by the System Development and Regulation Branch of the Department of Transport and Communications. The program manager will be responsible for the overall project from inception to operation, including financial control, design approvals, and final system acceptance following recommendation by the consultant.

COST OF DESIGN

Based on the above, and further discussions as deemed necessary, the consultant will provide a detailed estimate of time and costs necessary to perform the required system design.

An estimate of the costs related to the installation of the system will be required if it is decided to proceed with the installation.

B.C. COASTLIN



LEGEND

BC Tel VHF Radiotelephone Control Centre PSRT's (Land)

- ▼ Existing
- ▽ Proposed New Terminals
- ◎ Control Centre
- ○ Existing Radio Site
- ——— Existing Control Circuit
- - - - - Proposed Control Circuit
- ▭ Non BC Tel Terminal

APPENDIX D

MF/HF MARINE RADIOTELEPHONE SERVICE

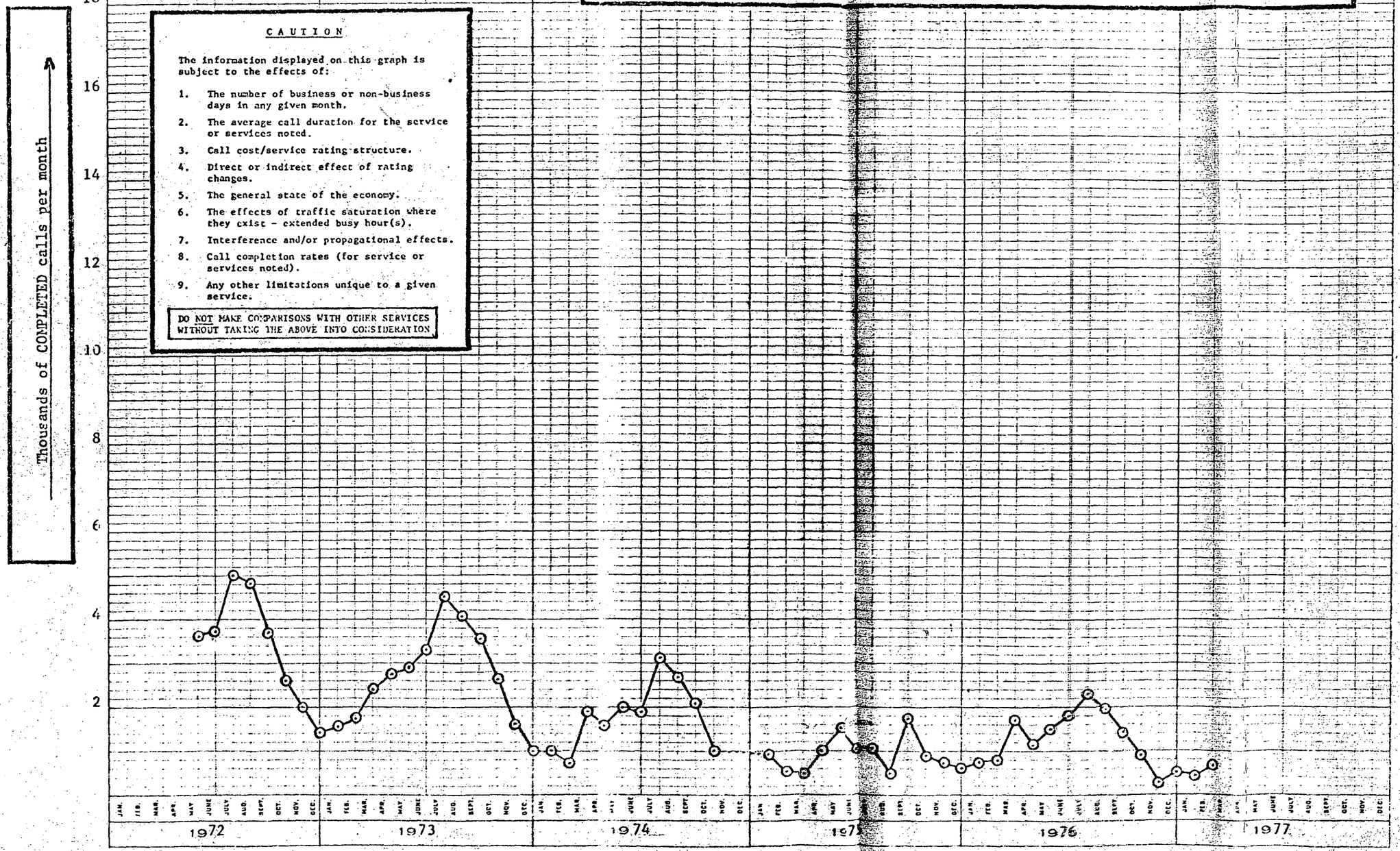
Average call duration 5 minutes

CAUTION

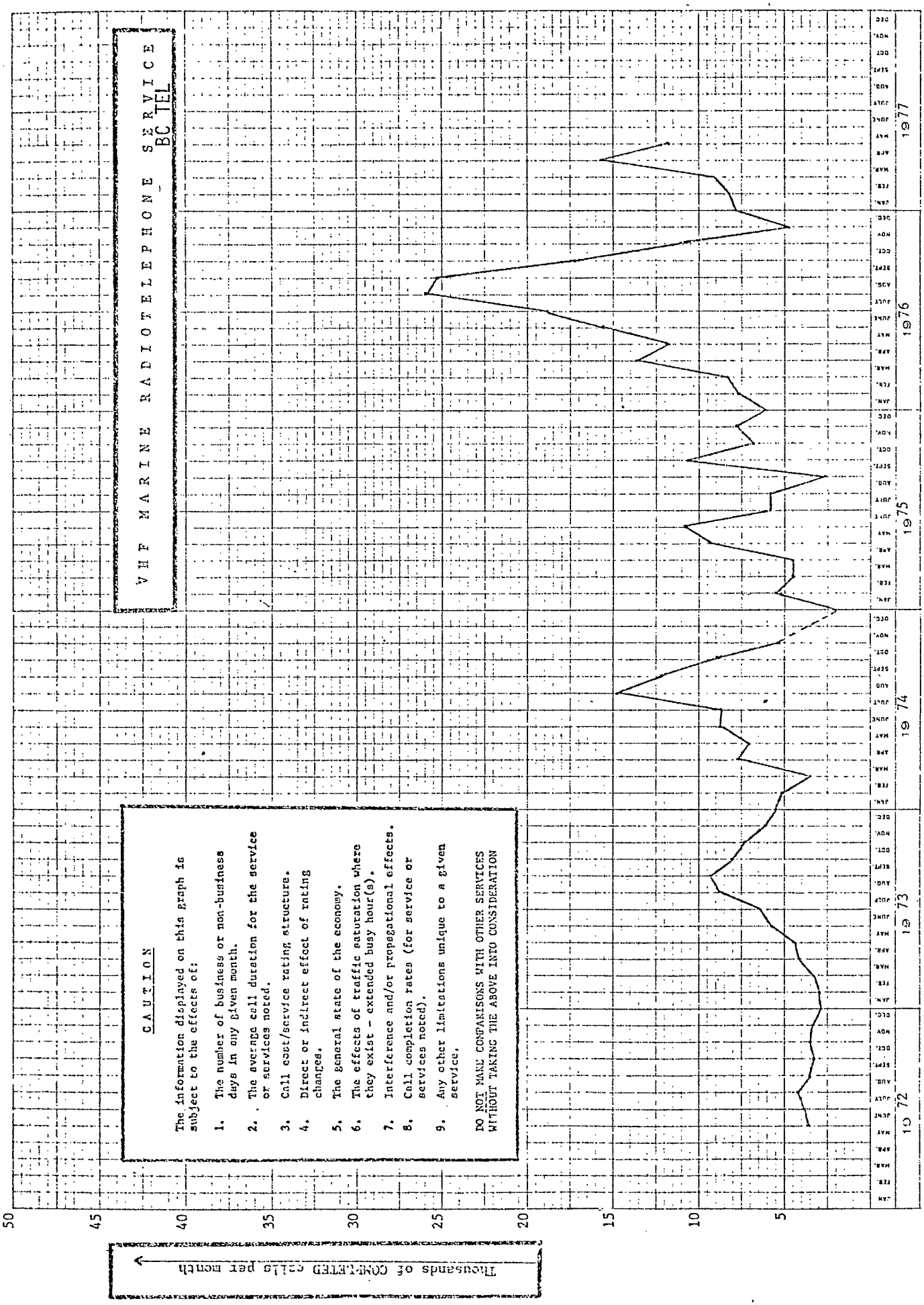
The information displayed on this graph is subject to the effects of:

1. The number of business or non-business days in any given month.
2. The average call duration for the service or services noted.
3. Call cost/service rating structure.
4. Direct or indirect effect of rating changes.
5. The general state of the economy.
6. The effects of traffic saturation where they exist - extended busy hour(s).
7. Interference and/or propagational effects.
8. Call completion rates (for service or services noted).
9. Any other limitations unique to a given service.

DO NOT MAKE COMPARISONS WITH OTHER SERVICES WITHOUT TAKING THE ABOVE INTO CONSIDERATION



APPENDIX E


VHF MARINE RADIOTELEPHONE SERVICE
BC TEL
CAUTION
The information displayed on this graph is subject to the effects of:
1. The number of business or non-business days in any given month.
2. The average call duration for the service or services noted.
3. Call cost/service rating structure.
4. Direct or indirect effect of rating changes.
5. The general state of the economy.
6. The effects of traffic saturation where they exist - extended busy hour(s).
7. Interference and/or propagational effects.
8. Call completion rates (for service or services noted).
9. Any other limitations unique to a given service.
DO NOT MAKE COMPARISONS WITH OTHER SERVICES WITHOUT TAKING THE ABOVE INTO CONSIDERATION
Thousands of COMPLETED calls per month
50
45
40
35
30
25
20
15
10
5
1972
1973
1974
1975
1976
1977

APPENDIX F

DOT Marine Public Correspondence Service Statistics

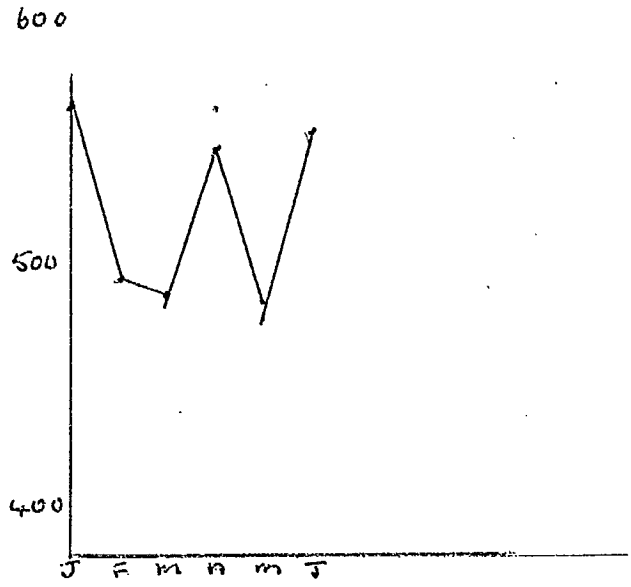


Figure (9) DOT completed duplex calls, HF and VHF, 1977.
Source: Canadian Coast Guard.

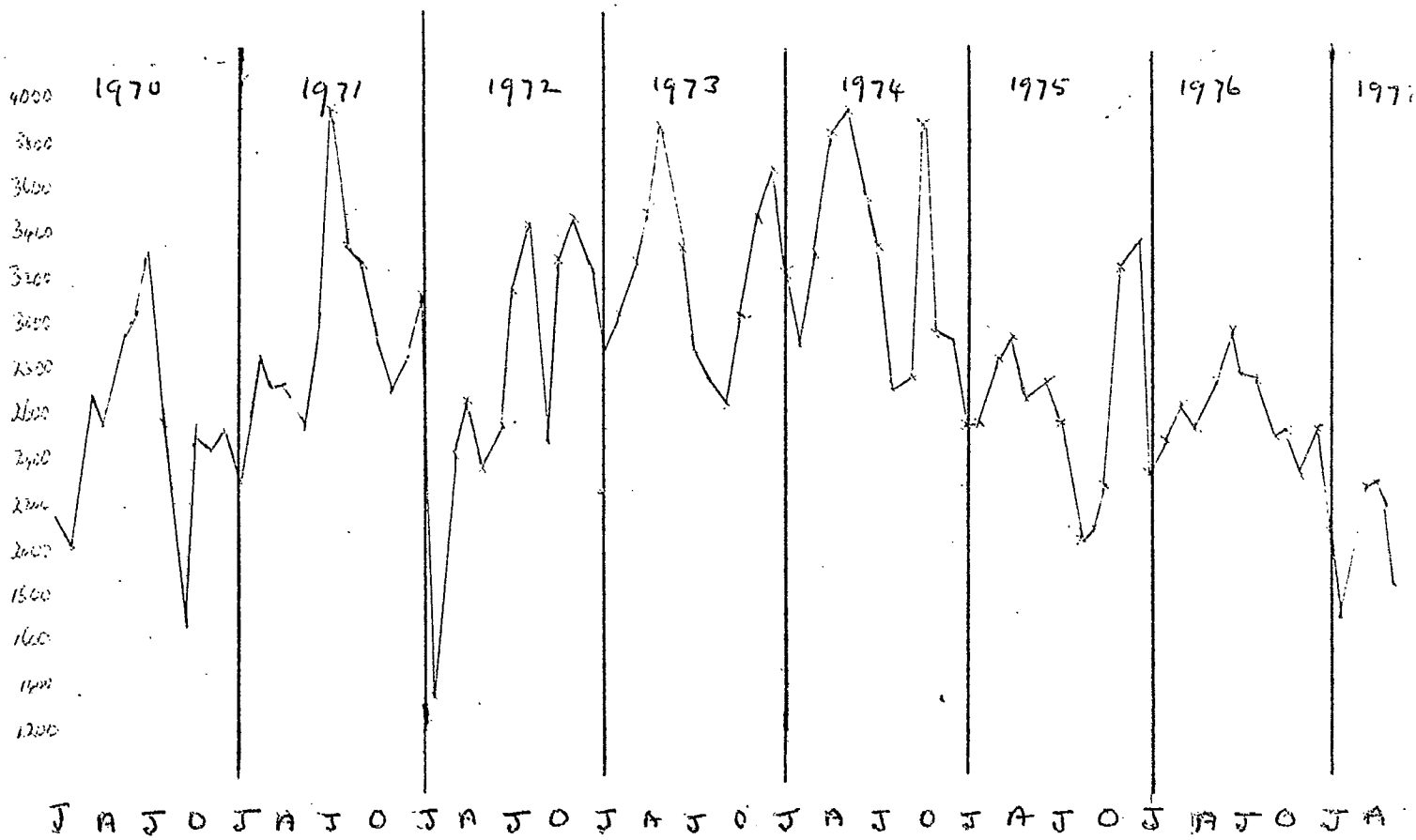
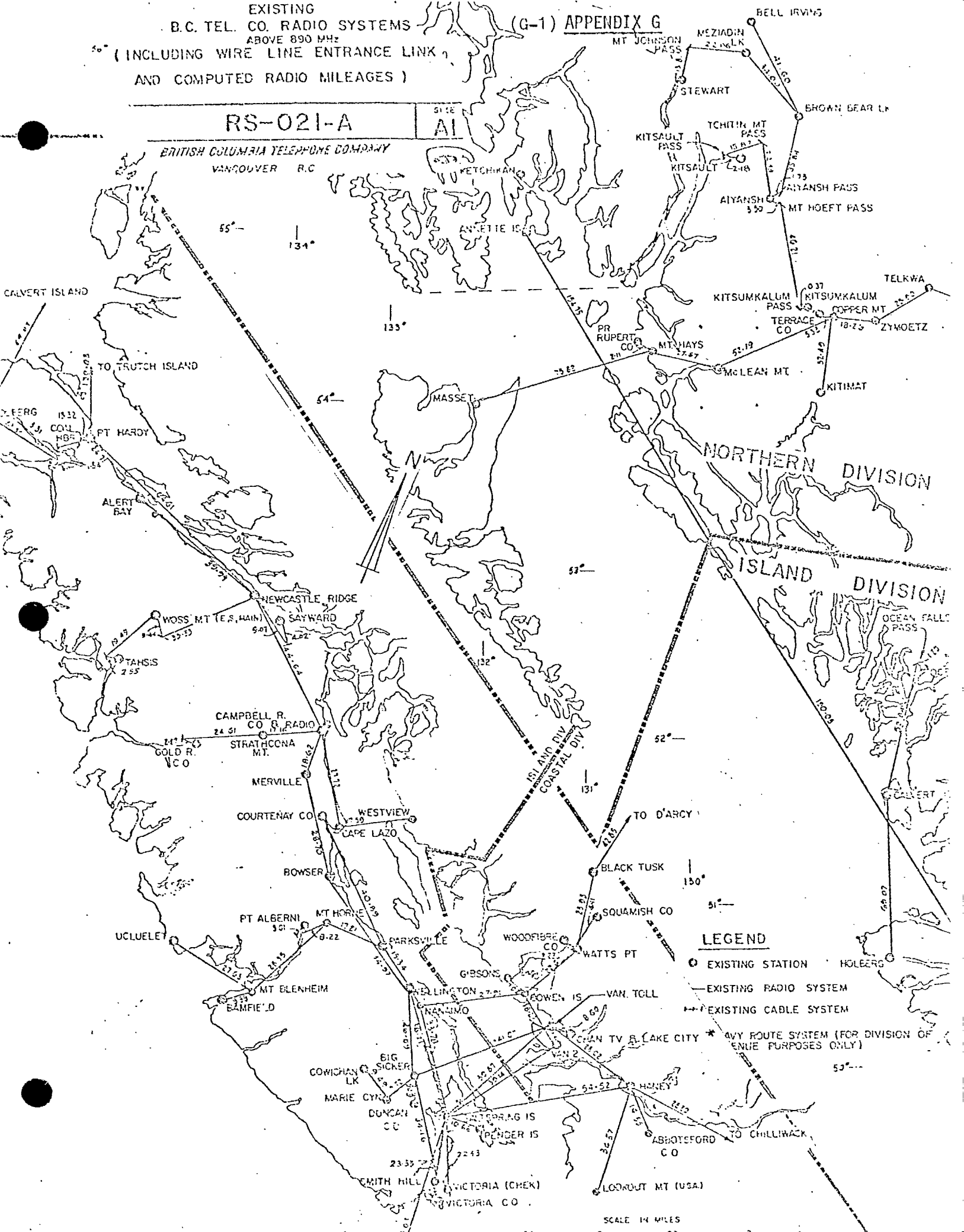


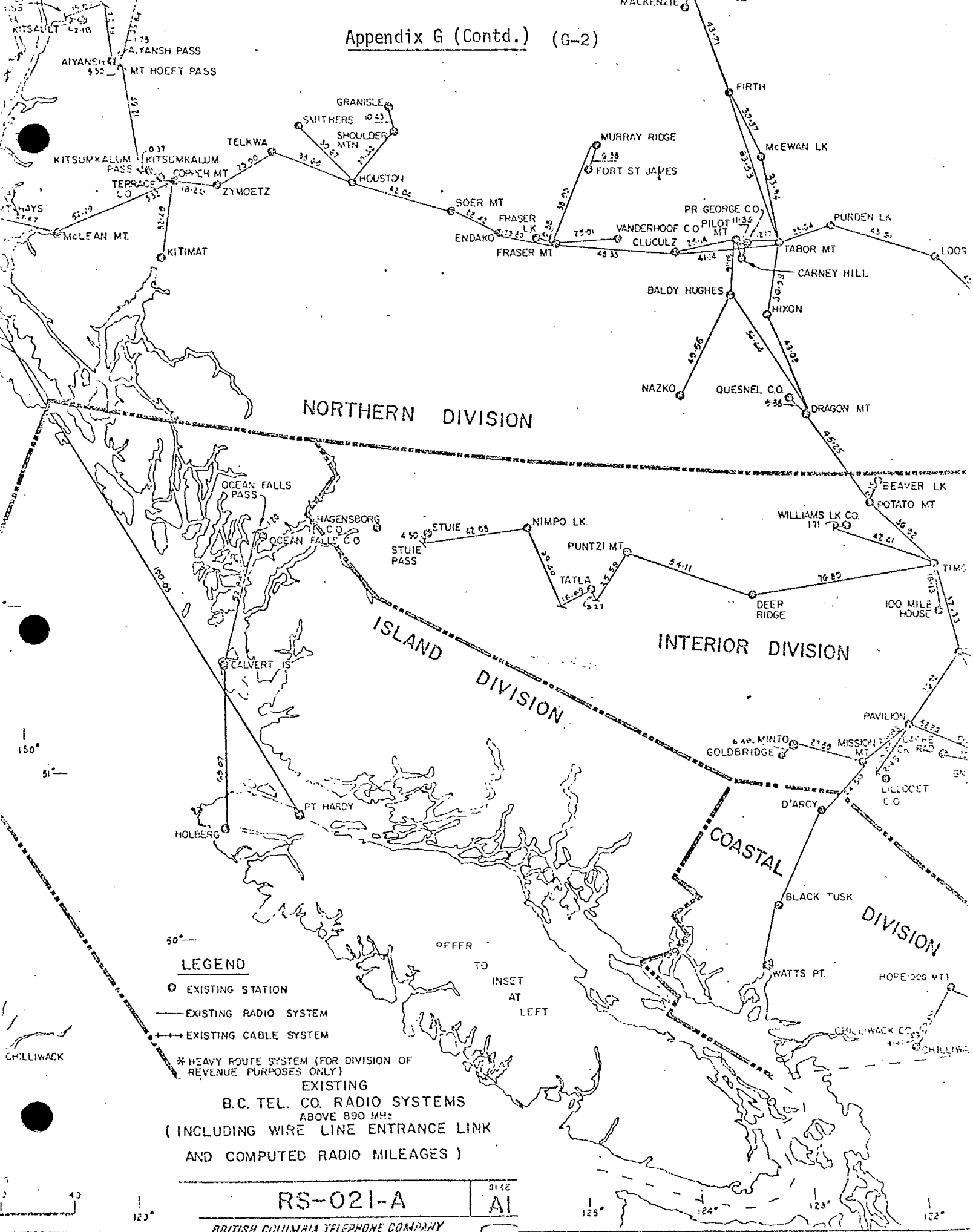
Figure DOT telegrams received.
Source: Canadian Coast Guard

EXISTING B.C. TEL. CO. RADIO SYSTEMS ABOVE 890 MHz (INCLUDING WIRE LINE ENTRANCE LINK AND COMPUTED RADIO MILEAGES)

RS-021-A | AI

BRITISH COLUMBIA TELEPHONE COMPANY





LEGEND

- EXISTING STATION
- EXISTING RADIO SYSTEM
- EXISTING CABLE SYSTEM
- * HEAVY ROUTE SYSTEM (FOR DIVISION OF REVENUE PURPOSES ONLY)

EXISTING
B.C. TEL. CO. RADIO SYSTEMS
ABOVE 890 MHz
(INCLUDING WIRE LINE ENTRANCE LINK
AND COMPUTED RADIO MILEAGES)

RS-021-A	SHEET A1

BRITISH COLUMBIA TELEPHONE COMPANY
VANCOUVER B.C

APPENDIX H

Information Concerning Kitimat Oil Port Proposal

The proposal is for an oil unloading terminal at Kitimat and a 753-mile oil pipeline to Edmonton to receive oil from tankers which would 'traffic along, the West Coast of B.C. and into Canada's inland coastal waters' - bringing oil from Alaska, Indonesia and the Middle East destined for the energy-short eastern US states.

Kitimat Pipeline Ltd. is a consortium of 5 US companies:

Ashland Oil Canada Ltd.	(24%)*
Farmers Union Central Exchange Inc.	(5%)
Hudson's Bay Oil and Gas Ltd.	(15%)*
Interprovincial Pipeline Ltd.	(15%)*
Coch Industries Inc.	(26%)
Murphy Oil Corporation	(15%)

* Canada-based

Estimated cost of port and pipeline - $494 m.

Financing is expected to be 10% equity (shares) and the balance long-term debt KPC expects that, of the long-term debt of $444,600,000, $75 m will be raised in Canada and the remaining $369,600,000 in the U.S.

According to the chairman, a major proportion of the $494 m would be spent in Canada, much of it in the Kitimat area. "Annual operating expenditures are expected to be $18 m in the first year of operation, rising to about $30 m by the 6th year).

APPENDIX H (contd.)

The construction will create 2,000 to 3,000 direct jobs for 2-3 years with a total pay-roll of about $90 m.

Hearings are being conducted by Commissioner Andrew Thompson (UBC law professor) - assisted by Captain David J. Bremmer (DOT Vancouver), John M. Miller (Environmental Protection Service (EPS) and Marvin Shaffer (a consulting economist specialising in resource economics) - concerning this and several alternative proposals, commencing 18 July, 1977.

Federal Grants Awards totalling $1,400,000 have been made to the following key groups to assist with the presentation of their various positions at the hearings.

			For Witnesses	had sought
* Kitimat Oil Coalition	$100,000	+	$ 40,000	$456,000
UFAWV	60,000	+	40,000	
Native Organisations	60,000	+	40,000	
District of Kitimat	5,000			
Kitimat-Stikine R.D.	5,000			
** Prince Rupert area workers and Unions	15,000			
BC Wildlife Federation	10,000			
	$260,000	+	$120,000	

Total estimated cost of enquiry $1,400,000.

*representing 21 environmental groups, Garry Gallon Co-ordinator

** otherwise known as VOICE (Victims of Industry and Changing Environment).

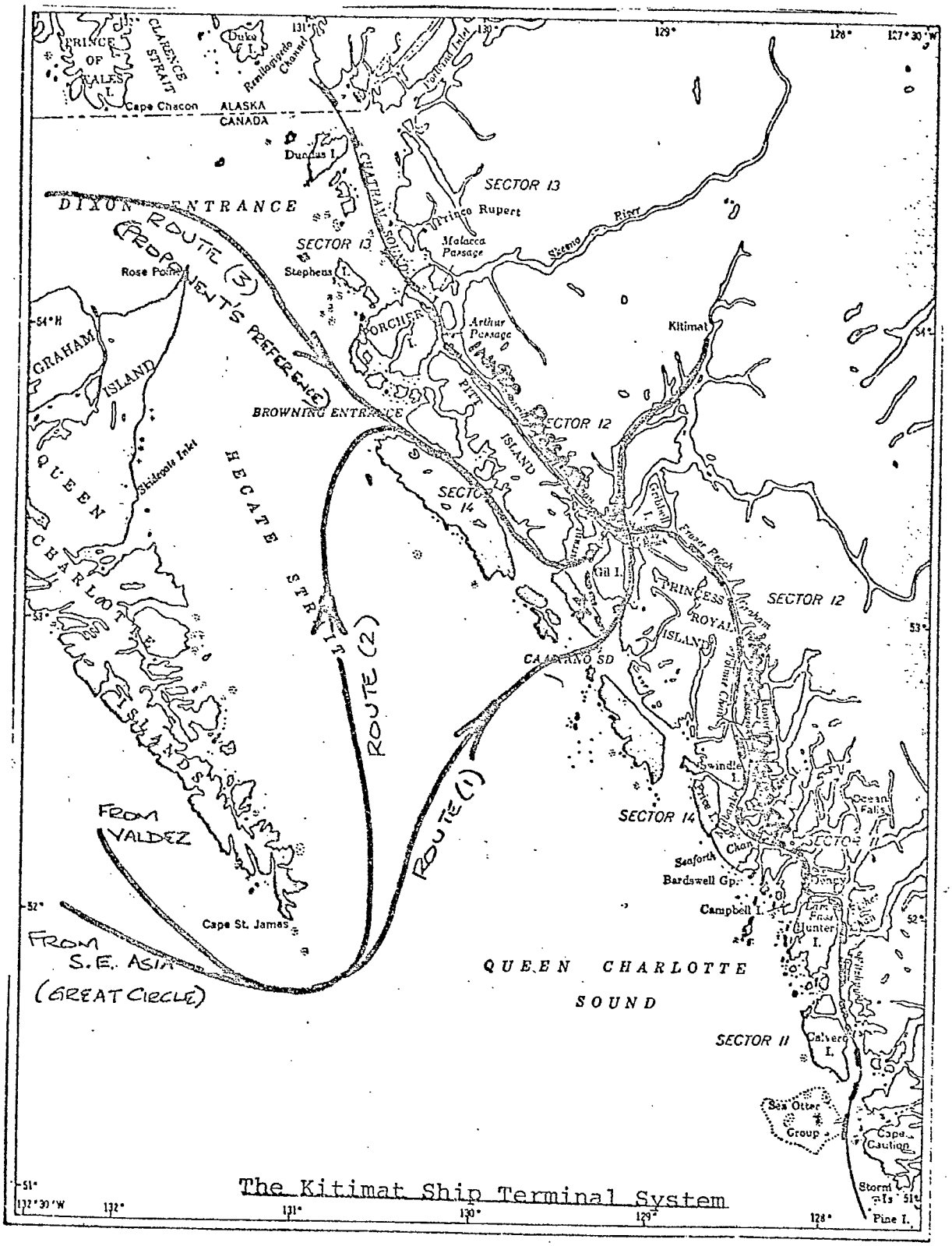
APPENDIX H (Contd.)

Initially about 7 tankers a month (of up to 320,000 deadweight tons) will unload oil at Kitimat. These will approach along one or other of the routes shown in the following illustration (see The Kitimat Ship Terminal System, p. H-4.

Sources of information.

"$494 m oil pipeline go-ahead requested," Vancouver Province, 9 December, 1976.

"Ottawa gives $380,000 for Probe, "Vancouver Province, 28 May, 1977.



Source: Termpol Assessment of the Kitimat BC Marine Oil Terminal Proposal, May 1977.

Vancouver Province Dec 9 '76 P1.

$494m oil pipeline go-ahead requested

By KEN BELL
Province Business Writer

Kitimat Pipe Line Ltd. Wednesday applied to the National Energy Board for permission to build an oil unloading terminal at Kitimat and a 753-mile oil pipeline to Edmonton. The estimated cost is $494 million.

The company simultaneously lodged details of the marine aspects of the proposal with the Ministry of Transport (MoT) in Ottawa.

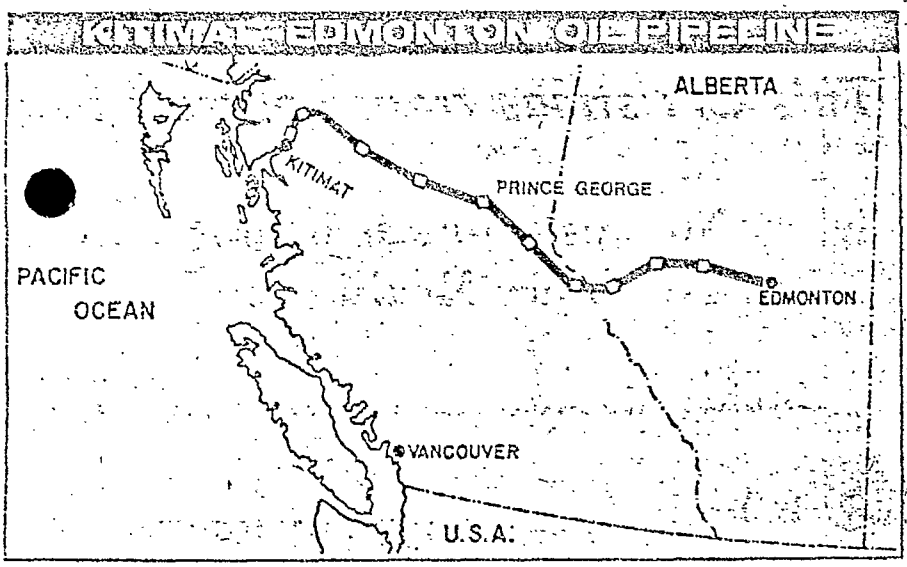
While the six-volume application to the NEB was made public, the MoT refused permission for KPL to release the marine details understood to be another six-volume submission.

The NEB application cost about $2 million to prepare and more than 200 copies of it are being printed.

The basic procedure with the application will be:

- The NEB and its staff will make a preliminary examination of the proposal.
- It will then order a hearing, probably

See Page 19 — LINE



NOTES

1. Pearse Report, p. 36.
2. Calvert C. Knudsen, "Why the B.C. Forest Industry is in Trouble", letter to the editor, Vancouver Province, 10 September 1976, p.4.
3. This section is largely a paraphrase of information contained in the B.C. Government Annual Report of Mines and Petroleum Resources, 1974.
4. Iona Campagnolo, "Northland Subsidy," Native Voice, January 1977 p.8.
5. Norman Hacking, "Passengers in Danger," Vancouver Province, 10 December 1976, p. 22.
6. Norman Hacking, "Northland Plan Ignored," Vancouver Province, 15 December, 1976, p.17.
7. Norman Hacking, "B.C. Shipping Study is put on the shelf in Ottawa," Vancouver Province, 5 November 1976, p.18.
8. Tony Eberts, "Bella Coola wants to be big wheel of coastal transport," Vancouver Province, 8 January, 1977, p. 37.
9. Ron Percival, "Campbell River/Bella Bella Linked," Native Voice, January 1977, p. 8.
10. "Tugboats face big bill," Vancouver Province, 19 March, 1976.
11. Madam Sauve in her 1976 address to the Telecommunications Carriers Association reported in Telephony October 1976, p. 114.
12. Since this section on illegal CATV systems was written all of the systems mentioned have been exempted from licensing by a CRTC ruling entitled MATV Licensing and Exemption (CRTC public announcement, Ottawa, March 16, 1977). Amongst criteria listed for exemption are that the entire undertaking must be located on land owned or leased by the person carrying on the undertaking, that no charges for the service maybe levied by the operator and that all local television signals are distributed through this system - but none that are received via satellite or microwave. All the systems mentioned are on Indian-owned land and meet the criteria listed.
13. The Kitimat proposal, though extremely important in its implications for the study region, if adopted, was withdrawn at the commencement of the federally conducted West Coast Oil Port Inquiry (July 1977). The enquiry has proceeded nevertheless, with the Kitimat proposal and alternative proposals and locations - both within and outside the study region - being examined. For further details of the Kitimat Oil Port Inquiry, see APPENDIX H.

BIBLIOGRAPHY

Bancroft Clifford G. Mining Communities in BC. A Social Infrastructure Analysis. University of Victoria, January 1975.

B.C. Govt. Department of Economic Development. The Mid Coast Report '76. A summary Report of Development Possibilities in the Mid-Coast Northern Vancouver Island and Queen Charlotte Islands Region of British Columbia. Prepared by I.P.A. (Interim Planning Agreement) Staff 1976.

B.C. Govt. Department of Industrial Development, Trade and Commerce. Skeena - Queen Charlotte Regional Economic Study. Victoria, 1973.

B.C. Govt. Department of Lands, Forests and Water Resources. Land Series Bulletins. Second edition revised. Queen's Printer, 1971.

B.C. Govt. Department of Mines and Petroleum Resources. Annual Report, 1974, Queen's Printer.

Canada. Communications Canada. Here You See It! There You Don't ...! A comparative analysis concerning the availability and quality of television reception within communities of British Columbia and the Yukon. August, 1973.

Canada. Transport Canada. West Coast Fishing Vessels Casualities Inquiry. March, 1975.

---------- Air Navigation Radio Aids.TP207

---------- Radio Aids to Marine Navigation (Pacific).TP145

Farstad, Graham. North-West British Columbia: A Social Perspective. A Study prepared for the the Department of Human Resources. Victoria, B.C., 1975

Hoyles Niblock Associates Ltd. Study of Government Communication Services. A report prepared for the B.C. Government in two phases - Phase 1, May 1973, Phase 2, May 1974.

HSU, H.S.Y. An Analysis of Gross Returns from Commercial Fishing Vessels in British Columbia 1971-4. Technical Report Series No. PAC/T-76-5. Special Economic Programs and Intelligence Branch, Pacific Region, 1976.

Maki, Dennis R. et alia. Economic Benefits of Improved Television Services to remote British Columbia Communities. Simon Fraser University: March, 1976.

Meyer, Philip A. and Harrison, Mary C. Marina Policy in the Tidal Area of the Pacific Coast. A study commissioned by the Small Craft Harbours Branch of Environment Canada, Pacific Region, 1976

Pearse, Peter H. Timber Rights and Forest Policy in British Columbia. Report of the Royal Commission on Forest Resources (Peter Pearse Commissioner). 2 Vols. Victoria, 1976.