

**FERIC**

**FOREST ENGINEERING RESEARCH INSTITUTE OF CANADA  
INSTITUT CANADIEN DE RECHERCHES EN GÉNIE FORESTIER**

*TN#*  
**38**

# **Logging Use of Foreshore Leases on the Coast of British Columbia**

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## FOREWORD

The Engineering Services Division of the B.C. Forest Service mailed the questionnaires to lease holders and made the telephone follow-ups.

FERIC is also indebted to staff of the Engineering Services Division, particularly Dave Lawrie and his student assistant, Ross Benton, for arranging card-punching of all data at B.C. Government facilities.

Funding for the project was provided jointly by the Government of British Columbia, the Government of Canada and the Council of Forest Industries of British Columbia (COFI). COFI granted permission to publish the report.

COFI Subcommittee members Sig Techy, Ken Boyd, Bill Cafferata, Dave Lawrie, Phil Oakley, Ray Travers and Vern Wellburn designed the questionnaires used in the survey. They determined the analysis format of the computer program used to compile the results of the survey. They also assisted in the return of the questionnaires and the good reply ratio is a result of their efforts.

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## SUMMARY

This report presents the results of a computer analysis done by the Forest Engineering Research Institute of Canada (FERIC) on a questionnaire survey conducted by the Council of Forest Industries of British Columbia (COFI). The questionnaire surveyed the holders of foreshore leases and licences on their present and future needs of water areas. The questionnaire survey was part of a larger joint study conducted by the Provincial Government, the Government of Canada and COFI on foreshore and estuary use for log sorting and storage on the coast of British Columbia.

This report gives the main results of the questionnaire survey and describes the key variables for each of the seventeen areas.

Computer printouts of the answers to the questionnaire are given for the total coastal area of B.C.

## I. INTRODUCTION

The Subcommittee on Foreshore and Estuary Use for the Council of Forest Industries (COFI) designed a questionnaire to collect information on the present and future use of foreshore leases by the logging industry on the coast of B.C. The B.C. Forest Service sent the questionnaires to the lease and licence holders. When the questionnaires were returned, the B.C. Forest Service confirmed that the questionnaires were complete and then removed the holder's identity from the questionnaire. Once holder identity had been removed, the Forest Engineering Research Institute of Canada (FERIC) checked the questionnaires for reasonable and clear answers to the questions. All answers were then computer coded and compiled into a format approved by the COFI Subcommittee. The answers were compiled for the total B.C. Coast and for the geographical areas (Figures A and B) that make up the total.

The results apply to 1979, a year of heavy activity in coastal logging operations.

While every effort was made to check and reconcile the questionnaire replies, it should be noted that no onsite observations were made during the study. It should also be noted that while the response was excellent and replies covered the major operations, there are still many small or temporary users of foreshore areas whose operations are not reflected in the results.

This technical note is a summary of a more detailed report submitted to COFI in May, 1980.

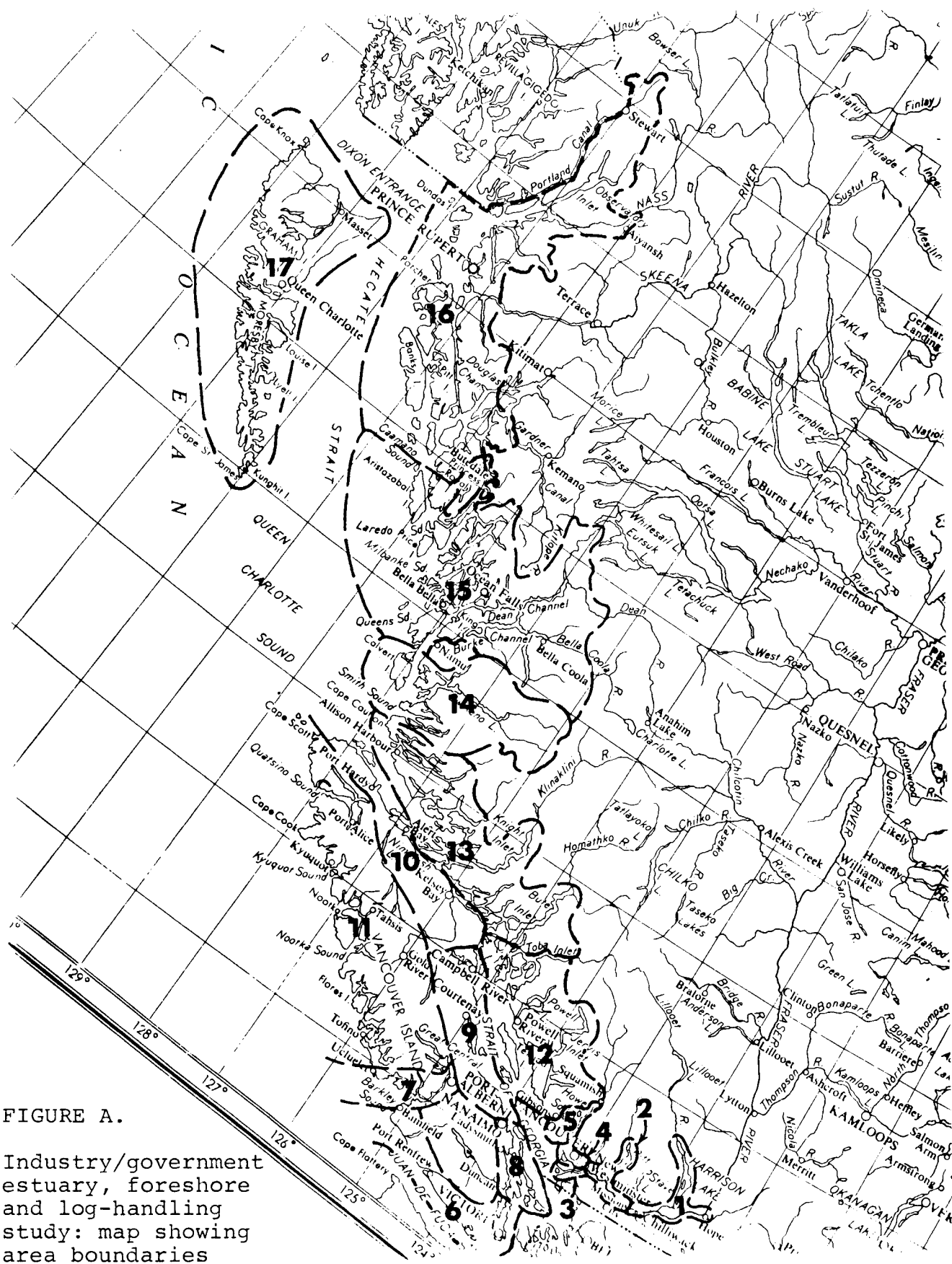


FIGURE A.

Industry/government  
estuary, foreshore  
and log-handling  
study: map showing  
area boundaries

FIGURE B. Area Codes

1. Fraser River above Mission (to Hope) and Harrison Lake.
2. Fraser River from New Westminster to Mission inclusive plus Pitt Lake.
3. Main Fraser River below New Westminster.
4. North Arm of Fraser River and Vancouver Harbour.
5. Howe Sound.
6. South End of Vancouver Island from mouth of Alberni Inlet to South of Cowichan Bay.
7. Alberni Inlet and Ucluelet Harbour.
8. East Coast of Vancouver Island from Cowichan Bay to Nanaimo Harbour inclusive plus adjacent Gulf Islands.
9. East Coast of Vancouver Island north of Nanaimo to and including Menzies Bay.
10. East Coast of Vancouver Island north of Menzies Bay.
11. West Coast of Vancouver Island north of the Alberni Inlet and Ucluelet.
12. Mainland and adjacent Islands north of Howe Sound to and including Toba Inlet.
13. North of Toba Inlet to the boundary of Rivers Inlet P.S.Y.U. including adjacent islands.
14. Rivers Inlet P.S.Y.U. area.
15. Dean P.S.Y.U. area.
16. Hecate P.S.Y.U. area.
17. Queen Charlotte Islands.

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P.S.Y.U. = Public Sustained Yield Unit

## II. RESPONSES TO THE QUESTIONNAIRES

The questionnaire designed by the COFI Subcommittee had two parts. The first part, or Questionnaire I (see Appendix I), dealt with present and future uses of existing foreshore leases and licences to occupy. The second part, or Questionnaire II (see Appendix I), dealt with the expected area requirements for additional, new leases in 1990 and 2000.

Table 1 gives the characteristics of the responses to Questionnaire I.

TABLE 1. Characteristics of Responses to Questionnaire I

Number of Companies Contacted	283
Number of Companies Replying	187
Reply Ratio	66%
Number of Leases or Groups of Leases	966
Number of Questionnaires Rejected	23
Net Number of Leases or Groups of Leases	943
1978 Annual Cut on the Coast	32 311 000 m <sup>3</sup>
Volume of Wood Included in the Survey <sup>1</sup>	36 584 000 m <sup>3</sup>
Total Water Acreage Covered by the Survey	8 956 ha

<sup>1</sup>Some logs are included more than once. Other logs are taken directly to mills by truck.

The B.C. Forest Service made sure that as many questionnaires were returned as possible. They also re-contacted the lease holders to ensure that the answers to the questionnaires were complete and correct. Most of the major holders of leases completed the questionnaires. The response rate was not as good for Questionnaire II as it was for Questionnaire I.

### III. RESULTS

#### A. QUESTIONNAIRE I

Table 2 gives a summary of the results for the 17 areas surveyed in Questionnaire I. Appendix II explains some of the abbreviated headings in the computer printout and Appendix III gives the computer printout results of Questionnaire I for the total B.C. Coast.

##### 1. Area Descriptions

The following is a series of brief descriptions of the highlights of the total coast and of six subareas. The six subareas result from combining the seventeen individual areas into common geographical or functional groups.

##### (a) All Areas

The survey had 662 responses. The responses included 943 leases with 8 956 hectares of water area. The leases were mainly located in intertidal or deep water sites. Most of the sites had water depths greater than 6 metres. Bottom types were mainly mud or rock. Water current either had a negligible or moderate effect on most sites. The most significant use of the areas (47%) was for in-transit and mill storage. Lift-and-lower and skid-type dumps were the main modes of log entry into the water. The majority of logs were bundled and scaled before dumping. Most logs were not sorted at the dumpsite. If logs were sorted at the dumpsite then from 6 to 10 log sorts were made. Most logs (68%) left booming grounds in bundle boom form. The storage grounds could hold about twice as much volume when the booms were bundle booms than when they were flat rafts. Future expectations showed a 6 percent reduction in use of present leases by 1990 and a further 7 percent reduction by 2000.

TABLE 2. Summary of the Seventeen Areas in Questionnaire I

Area Number	Number of Leases	Hectares	Log Volume (1000 m <sup>3</sup> )			Future Use <sup>1</sup>		No. of Environmental Problems
			Dumped	Sorted	Water Storage Capacity	1990 (% of 1979 Area)	2000	
1	18	135.37	851	584	109	100.00	100.00	1
2	151	759.83	1815	513	2272	94.48	94.18	6
3	20	106.88	5	75	353	100.00	100.00	2
4	145	474.00	123	157	1927	98.12	94.20	4
5	75	850.68	2107	2920	2430	95.40	77.65	13
6	32	166.53	1198	375	448	100.00	96.99	4
7	52	813.09	2797	1353	1618	100.00	93.71	3
8	64	1075.93	3321	1997	2228	97.93	97.64	30
9	19	359.16	1476	658	350	86.79	86.79	6
10	21	293.48	4070	340	477	96.80	93.75	2
11	109	1453.82	5560	4247	2396	95.17	91.48	7
12	94	998.76	4740	4423	1573	92.59	83.22	9
13	63	334.59	3186	310	769	66.19	50.24	0
14	5	38.08	433	0	58	77.15	77.15	3
15	8	161.83	593	71	108	87.50	29.71	1
16	37	481.49	1430	894	1348	92.50	82.47	3
17	30	452.56	2879	259	832	92.60	76.75	12
TOTAL 943		8956.08	36584	19176	19296			106

<sup>1</sup> After predicted area deletions.

There were 106 responses out of 662 that had environmental problems in various forms and about half of these still persist.

(b) Subarea A (Area codes 1 and 2)

This Subarea includes the Fraser River from Hope to New Westminster and the Harrison and Pitt Rivers and Lakes. The majority of leases are administered by the Department of Lands, Parks, and Housing and the Fraser River Harbour Commission. Location, water depth, bottom type and current at the leases are consistent with the river or lake in which they are located. The main uses of the area change from in-transit storage and sorting and booming to mill log storage as you move down the River. Similarly the predominant method of log entry into the lease changes from lift-and-lower and skid-type dumps to barges. Logs entering the area by barge had already been sorted, scaled and bundled. Sorting and booming in the upper part of the area primarily produce flat rafts whereas in the lower part of the area, bundle booms are made. Slightly more volume is sorted on land than in the water in the sorting operations. In the lower part of the area, use of leases is high (82% to 88% throughout the year). In the upper part, lease use is high in the spring, summer and fall (59% to 78%) and low in the winter (9% to 47%). The few environmental problems are concerned with fish and debris. There are few plans to decrease the use of present leases in the future, and modest additions are predicted.

(c) Subarea B (Area codes 3 and 4)

This area includes the Fraser below New Westminster and Vancouver Harbour. The area is administered by the Fraser River Harbour Commission, the North Fraser Harbour Commission, and the National Harbours Board. The main uses are for in-transit and mill storage. Logs are stored in both bundle booms and flat-rafts. Utilization is extremely high (84% to 90%) all year. There are a few environmental problems and they result from debris. There are few plans to decrease the present use of the leases in the future, and modest increases are predicted.

(d) Subarea C (Area code 5)

This area includes Howe Sound. It is administered by the Department of Lands, Parks and Housing. The primary location type is deep water but there are some estuary and intertidal locations. Log storage is the predominant function with sorting and booming the second. Logs enter the area by most means but barges predominate. The area produces and stores more flat rafts than bundle booms. Users project that with deletions and some additions the net lease area will decrease from 851 ha to 817 ha by 2000 A.D. There are environmental problems with organized groups. Utilization of the leases is high all year round.

(e) Subarea D (Area codes 6, 7 and 8)

The south end of Vancouver Island from Ucluelet Harbour to Nanaimo Harbour and the Gulf Islands are included in this area. Several groups administer the leases and include the Department of Lands, Parks and Housing, Pacific Logging, the Ministry of Transport and the Canadian National Railway. The area contains intertidal, deep water and estuary sites thereby giving a variety of water depths but all with generally moderate currents. The prime use in the area is storage of logs for pre-tow, in-transit and mill storage purposes. Logs enter the area by skid-type and lift-and-lower dumps and by barge. Any sorting and booming in the area produced bundle booms. Lease utilization is moderate in the Alberni Canal and high in the rest of the area. A slight reduction in use of the present leases is likely in the future, offset by additions. There are some environmental problems and they concern debris and fish.

(f) Subarea E (Area codes 9, 10 and 11)

This area includes the northern part of Vancouver Island from Nanaimo Harbour to Ucluelet Harbour. The Department of Lands, Parks and Housing administers the leases. The locations are primarily intertidal with some located in deep water and estuaries. Log storage, log sorting and booming, and no-use-at-present are the main use classifications of the leases. Logs arrive at sorting and booming grounds by land dumps, bundle booms or barges. The area north of Menzies Bay predominantly sorts logs on land and they are scaled and bundled before dumping by skid-type or

lift-and-lower dumps. Logs are stored mainly as bundle booms. Lease usage varies from moderate to heavy throughout the year. There are some environmental problems and they involve Federal and Provincial agencies as well as organized groups. A slight reduction in present lease requirements is forecast for the future, offset by substantial additions in Area 11.

(g) Subarea F (Area codes 12 to 17)

This area includes the Mainland and adjacent islands north of Howe Sound to the Alaska border and the Queen Charlotte Islands. The leases are located in intertidal, estuary, lake and deep water areas. Log storage and sorting and booming are the main uses of the area although there is no sorting usage in Area 14, and "dormant site" is the main use classification in Area 15. Barge loading uses are significant in Areas 15, 16 and 17. Use of the log storage area is primarily for pre-tow and in-transit purposes. Lift-and-lower and skid-ramp dumps are the main means in which logs enter the water. Logs are dumped both in loose and bundled form. Sorting and booming grounds produce predominantly bundle booms. Lease utilization is generally about 70% of capacity in the spring, summer and fall months and about 35% in the winter months. There are environmental problems with debris and fish. A substantial increase in net lease areas is predicted for this Subarea, as new logging operations open up.

2. Description of the Source and Nature of Environmental Problems

An analysis and summary of questionnaires with respect to the source of environmental complaints and the type of environmental problems is given in Tables 3 and 4. Tables 3 and 4 correspond to sections 18 and 19 on the computer printout in Appendix III.

TABLE 3. Summary of "Source of Environmental Problems"<sup>1</sup>

Source of Complaint	Responses With
Federal	42
Provincial	22
Organized Groups	27
Other	
B.C. Rail - access to lease	1
Department of Transport	1
Local people	6
Oyster growers	1
Trespasser and other lease holders	<u>6</u>
TOTAL	106

<sup>1</sup>Refers to Question 18 on computer printout or to the source of the complaint.

TABLE 4. Summary of "Nature of Environmental Problem"<sup>1</sup>

Problem	Number of Responses From Questionnaires With a Single En- vironmental Problem at the Site	Number of Responses From Questionnaires With More Than One Environmental Problem at the Site
Fish	16	15
Shellfish	1	11
Loose Logs	1	8
Debris	6	15
Noise	2	10
Other		
Pleasure boats and ferry traffic	7	3
Vandals and thieves	2	-
Disagreement with Indians over access	1	-
Better use policies	2	1
Illegal commercial boat tieups	1	-
Log storage in intertidal zone	1	1
Effluent	1	5
Booms too far out in inlet	1	1
- too many logs		
- navigational hazard		
Esthetics	1	-
Foreshore encroachment	1	-
Access for new bridge or traditional fishing area to set nets	2	-
Damage to floats by booms	-	1
Lights or smoke	-	2
Total	46	73

<sup>1</sup> Refers to Question 19 on computer printout.

## B. QUESTIONNAIRE II

Questionnaire II was designed to determine projected needs for new lease areas by 1990 and 2000 respectively. Copies were sent to the same 283 leaseholders who received Questionnaire I. Copies were returned from 91 leaseholders, or 32%, of which 66 indicated future needs or no future needs, and the remaining 25 gave partial, or inconclusive data. Clearly it is difficult to predict the future of the water-based industry over 10 or 20 years. The replies were tabulated, however, and used to project forward from the data already given in Table 2.

Table 5 shows predicted changes in water lease areas based on the replies in Questionnaire I (current areas and predicted deletions) and Questionnaire II (predicted additions). The predicted net coastal lease area rises from 8 956 ha in 1979 to 10 580 in 1990, to 10 808 in 2000. Most of the apparent net increase is between 1980 and 1990. Modest decreases in net area are projected for Areas 5 (Howe Sound), 7 (Alberni Inlet), and 9 (Nanaimo to Menzies Bay). Increased net areas are projected for all other areas, and these are major for Areas 11 (Northwest Vancouver Island), 12 (Jervis Inlet to Toba Inlet) and 16 (Hecate P.S.Y.U.).

Reasons for changes were not asked in the Questionnaires but it is apparent that net decreases are expected mainly in heavily-populated portions of the coast, and net increases mainly in unpopulated portions where increasing logging activity will require additional space for dumping, storage, barge loading and booming.

TABLE 5. Projected Changes in Lease Areas by 1990 and 2000  
(Lease Areas in Hectares)

Area	1979 Leases (Table 2)	Projected to 1990			Projected to 2000		
		Deletions	Additions	Net Area by 1990	Further Deletions	Further Additions	Net Area by 2000
1	135	0	9	144	0	9	153
2	760	42	54	772	2	40	810
3	107	0	12	119	0	12	131
4	474	9	34	499	19	32	512
5	851	39	111	923	151	45	817
6	166	0	14	181	5	5	181
7	813	0	26	839	51	0	788
8	1 076	22	169	1 223	3	96	1 316
9	359	47	10	322	0	22	344
10	293	9	28	312	9	8	311
11	1 454	70	484	1 868	54	92	1 906
12	999	74	226	1 151	94	103	1 160
13	335	113	346	568	53	156	671
14	38	9	73	102	0	40	142
15	162	20	118	260	94	32	198
16	481	36	230	675	48	190	817
17	453	34	204	622	71	0	551
Total	8 956	524	2 148	10 580	654	882	10 808

## APPENDIX I

### SAMPLES OF QUESTIONNAIRE I AND QUESTIONNAIRE II

INDUSTRY/GOVERNMENT  
ESTUARY, FORESHORE AND LOG HANDLING STUDY

LOG HANDLING QUESTIONNAIRE #1

Current Operations

Ref. No.

Note - Please fill out one form for each Lease, etc.  
or group of contiguous Leases used for a  
single purpose.

A. OWNERSHIP

1. COMPANY \_\_\_\_\_
  2. ADDRESS \_\_\_\_\_
  3. LOCATION OF LEASE(S), ETC. \_\_\_\_\_
  4. PERSON TO WHOM ENQUIRIES MAY BE DIRECTED \_\_\_\_\_ PH. \_\_\_\_\_
  5. IF SUBLEASED, TO WHOM? \_\_\_\_\_
- =====

B. LEASE

1. LEASE, LICENCE TO OCCUPY, ETC. NUMBER(S) \_\_\_\_\_
2. YEAR ESTABLISHED \_\_\_\_\_ 3. RENEWAL YEAR - LAST \_\_\_\_\_  
- NEXT \_\_\_\_\_
4. ISSUING AGENCY \_\_\_\_\_
5. TOTAL AREA \_\_\_\_\_ ACRES
6. MAP REFERENCE NO. (See Attached List) \_\_\_\_\_

C. PHYSICAL CHARACTERISTICS

1. LAKE ( ) RIVER ( ) ESTUARY ( ) INTERTIDAL ( ) DEEP WATER ( )
2. DEPTH AT ZERO TIDE  
(a) Dry - 10' ( )  
(b) 10' - 20' ( )  
(c) 20' Plus ( )
3. TYPE OF BOTTOM  
(a) Sand/Gravel ( )  
(b) Mud ( )  
(c) Rocky ( )
4. TIDAL CURRENT - Negligible ( ) Medium ( ) Strong ( )

D. MAIN USES

% of Area

% of Area

- |                      |                        |
|----------------------|------------------------|
| 1. LOG DUMPING ( )   | 6. LOG BOOMING ( )     |
| 2. BARGE DUMPING ( ) | 7. LOG STORAGE ( )     |
| 3. BARGE LOADING ( ) | 8. NOT UTILIZED ( )    |
| 4. LOG SORTING ( )   | 9. OTHER (Specify) ( ) |
| 5. LOG BUNDLING ( )  | _____                  |
|                      | _____                  |
|                      | _____                  |

E. METHODS AND VOLUMES

1. DUMPING

- (a) DUMP TYPE - FREE FALL ( ) LIFT AND LOWER ( )  
CONTROLLED CONVEYOR ( ) SKID ( ) BARGE ( )  
OTHER (Specify) \_\_\_\_\_
- (b) LOGS DUMPED - PRESORTED ( %) CAMP RUN ( %)  
BUNDLED ( %) LOOSE ( %)  
SCALED ( %) UNSCALED ( %)
- (c) VOLUME DUMPED/YEAR \_\_\_\_\_ CUBIC METERS - LOG AVERAGE \_\_\_\_\_  
FIR ( %) CEDAR ( %) HEM ( %) BAL ( %) SPRUCE ( %) CYPRESS ( %)  
OTHER ( %)
- (d) IF LOGS NOT SORTED AT THIS LOCATION, INDICATE NORMAL SORTING LOCATION(S)  
AND PERCENTAGE IF MORE THAN ONE.

\_\_\_\_\_ ( %)  
\_\_\_\_\_ ( %)  
\_\_\_\_\_ ( %)

2. BARGE/SHIP LOADING - SHORE INSTALLATION ( ) MOBILE CRANE ( )  
SELF-LOADING ( ) FRONT END LOADER ( )

3. SORTING AND WATER BUNDLING

- (a) VOLUME/YEAR \_\_\_\_\_ CUBIC METERS (b) NUMBER OF SORTS \_\_\_\_\_  
FIR ( %) CEDAR ( %) HEM ( %) BAL ( %) CYPRESS ( %) SPRUCE ( %)  
OTHER ( %)
- (c) SOURCE OF LOGS -  
LAND DUMP AT SITE ( %)  
BUNDLE BOOMS ( %)  
FLAT RAFTS ( %)  
BUNDLE BARGE ( %)  
LOOSE BARGES ( %)
- (d) VOLUME/YEAR BUNDLED IN WATER \_\_\_\_\_ CUBIC METERS

4. BOOMING

- (a) VOLUME/YEAR \_\_\_\_\_ CUBIC METERS
- (b) TYPE - FLAT RAFTS ( %) (Of Volume)  
BUNDLE BOOMS ( %)  
FLAT BAGS ( %)  
BUNDLE BAGS ( %)

5. STORAGE

- (a) PURPOSE - CAMP (PRE-TOWING) ( %) (Of Area)  
IN-TRANSIT ( %)  
MILL OR MARKET ( %)

(b) CAPACITY -	<u>SECTIONS</u>	<u>CUBIC METERS</u>
FLAT RAFTS	_____	_____
BUNDLE BOOMS	_____	_____
FLAT BAGS	_____	_____
BUNDLE BAGS	_____	_____

F. UTILIZATION

(a) PERCENTAGE OF AREA USED BY MONTHS -

JAN. (    )    FEB. (    )    MAR. (    )    APR. (    )    MAY (    )    JUNE (    )  
JULY (    )    AUG. (    )    SEPT. (    )    OCT. (    )    NOV. (    )    DEC. (    )

G. EXPECTED LIFE OF OPERATION

1. DO YOU EXPECT THE LEASE(S) TO BE IN USE BY YOU IN:

1990 - YES (    ) NO (    )    2000 - YES (    ) NO (    )

H. PROBLEMS

1. HAVE YOU HAD PROBLEMS IN OPERATING THIS AREA WITH ANY OF THE FOLLOWING?

FEDERAL AGENCIES                      YES (    )    NO (    )  
PROVINCIAL AGENCIES                   YES (    )    NO (    )  
ORGANIZED GROUPS                      YES (    )    NO (    )  
OTHER (SPECIFY) \_\_\_\_\_ YES (    )    NO (    )

2. IF YES TO ANY OF THE ABOVE, WHAT WAS THE MAJOR PROBLEM?

FISH (    )    SHELLFISH (    )    LOOSE LOGS (    )  
DEBRIS (    )    NOISE (    )    OTHER (SPECIFY) \_\_\_\_\_

3. DOES THE PROBLEM STILL EXIST?    YES (    )    NO (    )

INDUSTRY/GOVERNMENT

ESTUARY, FORESHORE AND LOG HANDLING STUDY

LOG HANDLING QUESTIONNAIRE #2

Ref.

Note - Please fill out one form for each Company

- A. 1. COMPANY \_\_\_\_\_  
2. ADDRESS \_\_\_\_\_  
3. PERSON TO WHOM ENQUIRIES MAY BE DIRECTED \_\_\_\_\_  
PHONE \_\_\_\_\_
- =====

B. NEW LEASE AREA REQUIREMENT FORECAST

Ref.

<u>YEAR</u>	<u>LOCATION CODE</u> (See Attached)	<u>USE CODE(s)</u> (See Below)	<u>ACRES</u>
<u>1990</u>			

2000

IF YOU EXPECT TO NEED NEW AREA(S) FOR LOG HANDLING IN 1990 AND/OR 2000, ENTER THE AREA NUMBER FROM THE ATTACHED AREA LIST UNDER THE DATE COLUMN AND THE USE CODE(S) FROM THE LIST BELOW.

<u>USE</u>	<u>CODE</u>	<u>USE</u>	<u>CODE</u>
DUMPING	D	STORAGE	X
SORTING	S	BARGE LOADING	L
BOOMING	B	BARGE UNLOADING	U
BUNDLING	W	OTHER (Specify)	_____

## APPENDIX II

### DEFINITIONS OF HEADINGS ON COMPUTER PRINTOUTS

1. Area - the area encompassed by lease, licence or group of licences on the questionnaire. Always recorded in hectares.
2. No. of Resp. - the number of questionnaires analyzed.
3. No. of Leases - the number of leases or licences listed on the questionnaires.
4. Resp. With - some questions could have more than one answer or response. Multiple answers were counted. Eg. one area "no. of resp." could have three uses therefore three area "resp. with."
5. Location of areas - combination of location type indicates multiple response on questionnaire.
6. Source of logs for sorting and water bundling - the mode or method logs entered the area for sorting and water bundling and not for other processes. Volume is the volume sorted.
7. Method of log entry into water - the method by which logs were dumped at the site. Volume is the volume dumped.
8. Volume dumped - the volume of logs dumped into an area was classified as presorted or camp run, bundled or loose, and scaled or unscaled. Note: all logs are not sorted and bundled at dumps.
9. Sorting locations if not at dump site - if logs were not sorted at dump location then other normal sorting locations were indicated.
10. Sorting - the number of sorts made at the locations with sorting. Volume is the volume sorted.

11. Type of boom produced - the type of booms made at the locations with boom making facilities. Volume is the volume boomed.
12. Storage made - the capacity of the storage area by boom or bag type.
13. Seasonal utilization - the percentage of the lease area used by months.
14. Future expectations - the expected life of the operation.
15. "Environmental Problems" - where "environmental problems" had occurred responses were counted and nature of problem recorded.
16. Does problem still exist? - does the "environmental problem" still exist? Only yes answers were reported.

## APPENDIX III

COMPUTER PRINTOUT FOR THE TOTAL B.C. COAST AREA

(ALL AREAS ARE IN HECTARES  
ALL VOLUMES ARE IN THOUSAND CUBIC METERS)

THIS IS ALL AREAS

1) AGENCY CONTROL OF HECTARES AND RESP. : AGENCY				4) BOTTOM CONDITIONS : BOTTOM TYPE			
	AREA (HECTARES)	NO. OF RESP.	NO. OF LEASES		AREA (HECTARES)	NO. OF RESP.	% OF AREA
DEPT OF LANDS, PARKS & HOUSING	7030.09	456	596	/	SAND/GRAVEL	1121.82	12.5
FRASER RIVER HARBOURS COMMISSION	679.54	88	146	/	MUD	2495.06	27.9
* PORT ALBERNI HARBOUR COMMISSION	443.33	12	29	/	ROCKY	2434.03	27.4
CANADIAN NATIONAL RAILWAY	35.49	2	4	/	SAND/GRAVEL/MUD	1438.16	16.1
NORTH FRASER HARBOUR COMMISSION	472.99	75	130	/	SAND/GRAVEL/ROCKY	619.53	6.9
MINISTRY OF TRANSPORT	86.52	10	16	/	MUD/ROCKY	585.58	6.5
NAT'L HARBOURS BOARD-VANCOUVER	44.72	7	7	/	OTHER COMBINATIONS	241.88	2.7
PACIFIC LOGGING	24.28	1	1	/			
NANAIMO HARBOUR COMMISSION	138.73	11	14	/	ALL	8955.45	100.0
ALL	8955.45	662	943	/			
2) LOCATION OF AREAS : LOCATION TYPE				5) TIDAL CURRENT : NEGLIGIBLE MODERATE STRONG			
	AREA (HECTARES)	NO. OF RESP.	AV. HA. PER RESP.		AREA (HECTARES)	NO. OF RESP.	% OF AREA
LAKE	197.81	16	12.4	/			
RIVER	1200.15	192	6.3	/			
ESTUARY	954.57	38	25.1	/			
INTERTIDAL	2259.06	146	15.5	/			
DEEP WATER	2996.99	206	14.5	/			
RIVER/ESTUARY	50.91	2	25.5	/			
ESTUARY/INTERTIDAL	164.26	10	16.4	/			
INTERTIDAL/DEEP WATER	1083.50	48	22.6	/			
OTHER COMBINATIONS	48.80	4	12.2	/			
ALL	8955.45	662	13.5	/			
3) WATER DEPTH AT ZERO TIDE :-				6) MAIN USES OF AREA :- FUNCTION TYPE			
	AREA (HECTARES)	RESP. WITH	% OF AREA		AREA (HECTARES)	RESP. WITH	% OF AREA
LESS THAN 3 METRES	2431.90	442	27.2	/			
3-6 METRES	1949.76	484	21.8	/			
MORE THAN 6 METRES	4574.27	394	51.1	/			
ALL	8954.75	1320	100.0	/			
				7) SOURCE OF LOG FOR SORTING AND WATER BUNDLING :- VOLUME (1000 CU.M.)			
	AREA (HECTARES)	RESP. WITH	% OF AREA		AREA (HECTARES)	RESP. WITH	% OF AREA
LAND DUMP	6104	44	31.8	/			
BUNDLE BOOMS	5772	38	30.1	/			
FLAT RAFTS	1077	20	5.6	/			
BUNDLE BARGES	1459	10	7.6	/			
LOOSE BARGES	4764	21	24.8	/			
COMBINATIONS	0	0	0.0	/			
ALL	19176	133	100.0	/			

\* These answers may be slightly in error because of inaccurate answers given in Area #2.

THIS IS ALL AREAS

(ALL AREAS ARE IN HECTARES  
ALL VOLUMES ARE IN THOUSAND CUBIC METERS)

8) METHOD OF LOG ENTRY INTO WATER :-			10) SORTING LOCATIONS IF NOT AT DUMP SITE :-		
	VOLUME (1000 CU.M.)	NO. OF RESP.		VOLUME (1000 CU.M.)	RESP. WITH
FREE FALL	1423	23			
LIFT AND LOWER	12566	76	/	ON LAND AT SITE	8846 64
CONTROLLED CONVEYOR	950	1	/	ON LAND AWAY FROM SITE	13139 95
SKID	13836	111	/	IN WATER AWAY FROM SITE	3869 30
BARGE	6715	16	/		
OTHER MEANS	335	2	/		
COMBINATIONS	260	2	/	ALL SORTING LOCATIONS	36584 662
N/A	499	431	/		
ALL	36584	662	/		
9) VOLUME DUMPED :-			11) SORTING		
	VOLUME (1000 CU.M.)	RESP. WITH	NO. OF SORTS	VOLUME (1000 CU.M.)	NO. OF RESP.
A) PRESORT VS CAMP RUN			NONE	0	577
PRESORTED	18924	127	1 - 5	3803	33
CAMP RUN	17660	132	6 - 10	8733	39
ALL	36584	259	11 - 15	3601	9
			16 - 20	1785	2
			21 - 25	1254	2
B) BUNDLED VS LOOSE			26 - 30	0	0
BUNDLED	25172	178	31 - 35	0	0
LOOSE	11412	88	36 - 40	0	0
ALL	36584	266			
			ALL	19176	662
C) SCALED VS UNSCALED					
SCALED	26713	157			
UNSCALED	9871	92			
ALL	36584	249			

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12) TYPE OF BOOM PRODUCED :-

	VOLUME (1000 CU.M.)	RESP. WITH	% OF VOLUME
FLAT RAFT	10182	76	23.0
BUNDLE BOOMS	30117	159	68.1
FLAT BAGS	1034	11	2.3
BUNDLE BAGS	2911	23	6.6
ALL	44243	269	100.0

16) SEASONAL UTILIZATION :-

1977 SEASONAL CUMULATIVE PERCENTAGE		1978 SEASONAL CUMULATIVE PERCENTAGE	
AV. %	NO. OF RESP.	AV. %	NO. OF RESP.
JAN 68.1	662	JUL 80.3	662
FEB 69.2	662	AUG 80.9	662
MAR 73.4	662	SEP 82.8	662
APR 78.2	662	OCT 82.7	662
MAY 80.5	662	NOV 80.0	662
JUN 81.2	662	DEC 71.3	662

13) SHIP/BARGE OUTLOADING METHODS :-

	NO. OF RESP.
SHORE INSTALLATION/COMBINATION	11
MOBILE CRANE ON BARGE	1
SELF LOADING BARGE	61
FRONT END LOADER	2
N/A	587
ALL	662

17) FUTURE EXPECTATIONS :-

	AREA (HECTARES)	NO. OF RESP.
1990 YES	8430.54	597
1990 NO	525.03	65
2000 YES	7776.48	544
2000 NO	1179.16	118

18) ENVIRONMENTAL PROBLEMS :-

	RESP. WITH
FEDERAL	42
PROVINCIAL	22
ORGANIZED GROUPS	27
OTHER	15
ALL	106

14) STORAGE CLASSIFICATION

	AREA (HECTARES)	RESP. WITH
PRE-TOW STORAGE	1464.75	187
IN TRANSIT STORAGE	2056.52	168
MILL OR MARKET STORAGE	2175.07	254
ALL	5696.05	609

19) NATURE OF ENVIRONMENTAL PROBLEMS :-

	NO. OF RESP.
FISH	16
SHELLFISH	1
LOOSE LOGS	1
DEBRIS	6
NOISE	2
OTHER	20
MORE THAN ONE OF ABOVE	29
ALL	75

15) STORAGE MODE

	VOLUME STORED (1000 CU.M.)	RESP. WITH
FLAT RAFTS	44616	6126
BUNDLE BOOMS	44054	11444
FLAT BAGS	N/A	719
BUNDLE BAGS	N/A	1007
ALL	88670	19296

20) DOES PROBLEM STILL EXIST ?

	NO. OF RESP.
YES	54

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THIS IS ALL AREAS

21) SPECIES MIX DUMPED :-

SPECIES	VOLUME (1000 CU.M.)	% OF VOLUME
FIR	3912.22	10.69
CEDAR	8167.32	22.33
HEMLOCK	14083.37	38.50
BALSAM	7521.26	20.56
SPRUCE	1623.01	4.44
CYPRESS	1038.42	2.84
OTHER	237.89	0.65
TOTAL	36582.88	100.00

22) SPECIES MIX SORTED :-

SPECIES	VOLUME (1000 CU.M.)	% OF VOLUME
FIR	2378.18	12.40
CEDAR	4519.71	23.57
HEMLOCK	5865.15	30.59
BALSAM	5044.01	26.30
SPRUCE	628.78	3.28
CYPRESS	577.48	3.01
OTHER	162.61	0.85
TOTAL	19175.63	100.00