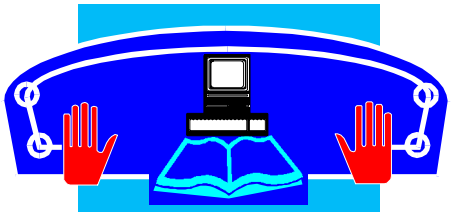

Prefeasibility Analysis Of A Portable Commercial Fishing Operation For Chesterfield Inlet, Nwt

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PRE-FEASIBILITY ANALYSIS OF A PORTABLE COMMERCIAL FISHING OPERATION FOR CHESTERFIELD INLET, NWT

Prepared for:
NWT Department of Economic Development and Tourism

Prepared by:
DPA Consulting Limited
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1.0 INTRODUCTION

The NWT Department of Economic Development and Tourism commissioned a pre-feasibility analysis of a portable commercial fishery operation for the Chesterfield Inlet River System. The terms of reference specified the following tasks :

(1) Assess suitability of a freezer packer vessel for Chesterfield Inlet system.

(2) Define existing and potential arctic char quotas for river system.

(3) Define the operating logistics for a mobile fishing operation vis a vis shore based requirements and the Rankin Inlet plant.

(4) Examine potential employment and income benefits.

(5) Provide projected operating statements for the project.

(6) Provide preliminary cost estimates and possible suppliers.

(7) Define existing and potential markets for arctic char.

Due to timing and budget constraints, data collection was conducted by telephone. The study is a preliminary analysis to be used by the Department in determining whether a more extensive feasibility anaysis of the concept is warranted.

Our report is organized as follows:

Section 2 provides an overview of current and potential harvesting levels in the Chesterfield Inlet system.

Section 3 provides an overview of current and potential market prospects for arctic char.

Section 4 examines the logistics of a collector/packer system for the Chesterfield Inlet system. Several options for both the portable storage and collection of fish are explored. Estimated capital and operating costs as well as names of suppliers are provided for each option.

Section 5 provides a projected operating costs for one collector/packer option involving portable refrigerated sea water (PSW) fish storage units and two collector/packer vessels.

Section 6 outlines the employment and income associated with the option outlined in Section 5.

Section 7 provides a summary and recommendations.

2.0 EXISTING AND POTENTIAL CHAR HARVESTING LEVELS

2.1 Quotas and Catches

Quotas, catches, and fishing patterns were discussed with Mr. Al Kristofferson at the DFO Fresh Water Institute in Winnipeg. Data on quotas and recent year catches supplied by Mr. Kristofferson are shown in Table 2.1.

Although the Chesterfield area quotas are 127,000 lbs, we were cautioned that this production of char may not be available from the area on a sustai-ned basis.[1] Test fishing is required to determine the volumes that are sustainable. The recorded catch of 43,500 lbs should not be considered to represent the catch potential because it represents several years production from different locations. Furthermore, the catch includes fishing for both subsistence and commercial purposes.

Subsistence fishing occurs in the Chesterfield area, although the level of catch for this purpose is not documented. A large scale or even modest scale commercial fishery may not be supportable on top of subsistence fishing. The increasing urbanization occurring in Inuit communities could reduce subsistence fishing as former fishermen begin to purchase their fish. This would increase the local market for char.

2.2 Biological Factors Affecting Fishing Patterns

Char winter in the fresh water lakes where temperatures are warmer than in the sea. In late spring, they migrate down rivers to the sea, traveling unknown distances along the coastal shoreline. An inward migration occurs" in late summer (August to mid-September) when char move back upriver to the lakes to overwinter.

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[1] Char are slow maturing (7-9 years) so while initial catches may be encouraging they may not be sustainable.

TABLE 2.1: QUOTA AREAS AND RECORDED CATCHES, CHESTERFIELD INLET AND COMMUNITY AREA

Area #	Name	Map Coordinates	Listed Quota Kg	Listed Quota Lbs	Recorded Catch Year	Recorded Catch Kg	Recorded Catch Lbs
16	Chesterfield Community Area[1]		2300	5000	?	2300	5000
39	Josephine River[1]	63-02N 90-41W	4500	10000	1979	1320	3000
9	Big River, Barbour Bay	63-33N 92-27w	900	2000	1974	2530	5500
26	East Point	63-44N 91-56W	45430	10000	?	? .	
36	Hannaway	63-33N 92-22W	2300	5000	?	4536	10000
4a	Merle Harbour	63-42N 91-24W	2300	5000	?	?	
63	Ranger Seal Bay	63-45N 91-43W	9100	20000	Has Produced		
65	Robin Hood Bay	63-45N 92-02W	6800	15000	Has Produced		
71	Steep Bank Bay	63-36N 91-37W	4500	10000	1977	454	1000
72	Stoney Point Area[2]	63-54N 92-45W	6800	15000	1976	8754	19000
83	Unnamed River	63-32N 92-35w	6800	15000	?	?	
84	Unnamed River	63-32N 92-50W	6800	15000	?	?	
TOTAL			57600	127000		19894	43500

Notes

[1] Used by Chesterfield Inlet for Subsistence Food Fishing

[2] Used as a collection point: fish may have come from adjoining areas.

Interception of the late summer migration offers the best fishing, with good yields of high quality fish, fattened by a summer of feeding.

This biological pattern leads to a concentration of fishing over a short period with numerous runs traveling up many rivers at the same time. With limited fishing effort, it is difficult to intercept all runs to such wide dispersed areas within one season.[2]

The fishing pattern suggests the need to issue fishing licenses by areas. Area licensing would insure that each fisherman has a reasonable catch and that overall catch potential of the area is maximized.[3] This type of licensing would also facilitate adequate regulation of the fishery.

2.3 Community Factors Affecting Fishing Patterns

Chesterfield Inlet is a large inlet which extends 200 miles inland. The community of Chesterfield Inlet is located at the entrance to the inlet. The population is approximately 300, of which 10-15 are fishermen. Fishermen operate out of freight canoes equipped with outboard motors which limit fishing effort to about 50 miles from the community. A mother ship or camp accommodation facilities would be necessary to exploit char fisheries in the remote upper reaches of the inlet.

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[2] The Goldberg report indicated that the Arctic Tern has had problems with missing the fishing "at certain river estuaries, thus limiting its catch potential.

[3] On the Yukon River, fishermen have a voluntary system of allocating fishing areas. Historic fishing areas are the domain of established fishermen -- by gentlemen's agreement other do not intrude. New fishermen must find unused areas of the river to fish.

2.4 Other Factors

The Goldberg report indicates that low catch volumes, coupled with high fish prices, are seriously affecting the financial situation of the Issatik fish plant. Low char catches have led to prices that reach or exceed those for Pacific Coast salmon with which char competes in both the Canadian and USA market (see section 3.0). If a viable processing operation is to be achieved, increased volumes to the Issatik plant from areas such as Chesterfield Inlet are essential.

2.5 Conclusions on Catch Potential

Quotas for the Chesterfield Inlet area are in the range of 127,000 lbs. This is split between commercial and subsistence requirements. Although DFO would not commit to specific figures until more biological data (via test fishing) were available, they implied that permissible commercial catches in the initial years would not likely exceed half the established quotas. We have used a figure of 50,000 lbs in the economic analysis that follows. This volume by itself would not provide enough additional catch to make the Issatik plant viable; other areas (e.g., Wager Bay) may have to be exploited.

3.0 ARCTIC CHAR MARKETS

3.1 Prices

Our review of arctic char markets included the following:

- a telephone interview with Mr. Balder Johnston (frozen fish sales manager of Fresh Fish Marketing Corporation of Winnipeg) regarding current frozen dressed and steak prices of arctic char;
- a review of recent BC government statistics for BC salmon.

The data collected are shown in Table 3.1.

At present, arctic char delivered to Winnipeg is sold by FFMC in two forms -- frozen whole or steaked. The market for char steaks in the USA has only been recently explored by FFMC, but it appears to offer significantly better returns than the frozen whole product. In the market analysis that follows, we have compared the data on arctic char with similar data on BC salmon. Due to similar taste, texture, and colour, market analysts generally assume salmon and arctic char are competitive products.

The figures in Table 3.1 indicate that salmon prices have been declining and are considerably below the quoted FFMC char prices for delivery to the US. The FFMC price of $6.50/lb in USA warehouses for char steaks is a "good" price and is likely based on good quality red or pink fish. However, the volume of char steaks that can be sustained over the long term at this price is questionable, "especially given the general level of salmon steak prices. Char and salmon face stiff competition from other protein food items such as beef, pork, and chicken which sell below $1.00/lb for some cuts .

TABLE 3.1: COMPARATIVE WHOLESALE MARKET VALUES, SALMON AND CHAR (PRICES PER POUND)

	1981		1984[4]	
BC Salmon	Frozen Dressed	Steaks	Frozen Dressed	Steaks
Sockeye	2.83	3.74[1]	na	3.60
Coho	2.91	3.00	na	3.22
Chum	2.01	2.61	na	2.30
Spring (Chinook)	3.77	6.30[2]	na	--
Pink	1.43	--	na	--
Arctic Char[3]			3.35-3.50 Cdn	6.50 US 7.75 Cdn

[1] Less than 1,000 lbs produced.

[2] Only 2,200 lbs produced.

[3] Frozen dressed price FOB Winnipeg, steak price in US cold storage .

[4] Based on 1984 survey by DPA Consuling Limited.

Sources: BC Salmon: Fisheries Production Statistics of BC, 1982.
Province of BC Marine Resources Branch.
DPA Consulting Limited survey for 1984 data.

Arctic Char: FFMC Winnipeg, Mr. Balder Johnston by telephone.

3.2 Returns from Steaking

The calculated returns from steaking char seem to be considerably higher than those from steaking salmon. Steak prices are usually related to those of frozen dressed headless fish. Losses associated with cutting steaks from dressed headless are about 12-15%, consisting of sawdust loss and unuseable collar and tail pieces. In a recent study, our projections of direct processing costs for steaking were as follows:

Labour	$.10/lb.
Shrink wrap material and shipping box	$.16/lb.
Total	$.26/lb.

These costs, combined with the dressed salmon and char prices in Table 3.1, provide the following estimated return from steaking earned by processors such as FFMC:

	Char	Sockeye	Coho
Dressed headless price	$3.50	$2.44	2.80
Fish cost in steaks at 75% recovery	4.67	3.25	$2.80
Steaking costs	.26	.26	.26
Total steak cost	4.93	3.51	3.99
Steak price	7.50*	3.94	4.26
Additional return from steaks	2.57	.43	.27

* Allowing $.25/lb for freight to US and US cold storage costs .

These calculations indicate that prices of $7.75 (Canadian) in the USA provide a very good return for char steaking compared to salmon steaking. Again, we question whether such high returns for steaked arctic char can be sustained over the longer term.

3.3 Quality Factors Related to Steaking

Good quality dressed frozen fish are required for steaking, because quality defects that are not apparent in whole dressed fish show up in steaks. Cutting steaks reveals any poorly removed blood lines (which are difficult to remove from the frozen product), bruises, and blood spots that result from rough handling of the whole fish.

Mr. Johnson, of FFMC, stated that he was not aware of any quality problems in the steaking of recent deliveries of Arctic char. He indicated, however, that flesh colour is a factor and only the pinker char were being steaked for the US market. White fleshed char are left to the Canadian whole dressed market. He stated that Cambridge Bay char were always pink while Rankin Inlet catches included a greater percentage of white fleshed char. This indicates that not all of Chesterfield Inlet catch could necessarily be directed into th'e higher return, steaking market.

3.4 FFMC Payment System

FFMC makes initial payments to fishermen at prices established by the Board of Directors. Final payments, if any, are also determined by the Board of Directors and are dependent on FFMC operating costs and net results for the year. All char sales are pooled and shared between producers. Because char that is steaked is not identified by production area, all producers benefit from higher sales obtained from char that is steaked for the USA market. This system does not provide an incentive to producers to make extra processing efforts or to undertake added costs (i.e., sophisticated collecting and packing systems) directed toward producing a higher quality end product.

3.5 Conclusions on Market Potential

It was Mr. Johnson's opinion that 250,000-300,000 lbs of char per year would be needed to sustain a char steak market in the USA. This volume would have to be of good colour and quality, and would mean more than doubling recent yearly production levels from the Rankin Inlet plant.

The fact that salmon and arctic char prices seem significantly out of line suggests that future arctic char prices may fall. This, in turn, may require a reduction in prices paid to the Issatik plant as well as to fishermen.

4.0 LOGISTICS OF A COLLECTOR/PACKER SYSTEM FOR CHESTERFIELD INLET

4.1 Background

Our analysis of the Goldberg reports and discussions with Territorial officials, Mr. Al Kristofferson of DFO, and the personnel of Outcrop Consulting in Yellowknife leads us to the following conclusions regarding char operations in the Keewatin region:

1. Production volumes of char need to be increased in order to:
   - provide greater throughput for the Issatik plant, in order to increase labour utilization, cover overhead costs, and generally improve the economic viability of the plant.
   - increase the individual fisherman's income through higher catch volumes. This requires expansion of present fishing areas, thereby increasing opportunities for present fishermen and new entrants .

2. The quality of frozen char produced from this area needs to be maintained at as high a level as possible. This can be controlled by a central, supervised processing operation that will be Fisheries Department inspected. "On the grounds" cleaning can lead to poor quality fish and take up time which would be better spent fishing in this short season.

3. The char fishery in the area is not well defined as to char habitat (i.e., river and lake systems), likely fishing locations, or sustainable catch levels. It is also subject to cyclical variations, a relatively short fishing season, widely dispersed catch areas. and the presence of subsistence fishing which can intrude on commercial operations. Exploitation of the upper Chesterfield Inlet area would require vessels capable of

working in shallow waters. There is also reluctance on the part of DFO officials to open up new areas and expand quotas until more biological data have been gathered. A larger test fishing program is needed, but this requires planning, structuring, and agreement (commercial, governmental, or a combination of both) .

4. The severity of winter weather in the area suggests that all equipment be removable to land storage where it can be protected and repaired or overhauled for the next season.

4.2 Description of the Criteria for Collector/Packer System

For the above reasons, we recommend against any permanent shore based freezing or icemaking facility. Instead, we recommend working toward a collector/packer system that focusses on the following:

1. **Flexibility - equipment whose size, capacity, and operation can be adapted to changing circumstances in the fishery.**

2. **Portability** - equipment that can be moved quickly and easily in order to exploit fishing opportunities as they occur , as well as to facilitate removal of the equipment to winter storage facilities.

3. Fast-service - vessels that are capable of reasonable speeds under loaded conditions to provide frequent or daily service to fishermen on the grounds and fish delivery to the processing plant.

A fresh fish collector/packer system meeting these criteria must consist of the following:

1. Remote self-contained fish storage units that can be located adjacent to areas being fished. The units must

be readily accessible to fishermen, simple to operate, and capable of being located on land.

2. A fast collector boat capable of transporting and placing storage units in strategic fishing locations, servicing or picking up from the units on a regular basis, and able to remove the units to winter storage at the close of fishing. The vessel will also be required to tow or transport on board fish boats to the fishing grounds along with gear needed to set up remote fishing camps . It must also be able to service the camps with fuel and food throughout the fishing season.

Three options for fish storage units are explored and costed in Sections 4.3 and 4.4. Two options for a collection and packing vessel are discussed and costed in Section 4.5.

4.3 On-Grounds Fish Storage Systems

There are three systems to consider for fish storage at remote fishing sites.

1. boxed, iced fish
2. slush ice cooling
3. refrigerated sea water (RSW) cooling.

The boxed, iced fish and slush ice systems require portable ice making plants strategically located to service satellite storage bins located at fishing camps. Fach system is discussed below.

1. Boxed, Iced Fish. Daily catches would be iced down in boxes or tubs and kept under cover (under tarps, or in a lean-to or small shed) awaiting arrival of the collector. Fish could be left round (preferably) if pick-up can be arranged frequently. Otherwise, fish could be gilled, gutted, and belly iced with final blood removal, heading and washing to be done at the processing plant. This system has the greatest risk of spoilage and the shortest elapsed time

between catch and collector pick-up. Also, fish can suffer some disfiguring, bruising, or loss of scales through contact with the ice.

2. Slush Ice Cooling. In this system, well insulated bins or chests are filled with sea water which is charged with flake ice. The water is circulated with a small circulating pump or air is pumped into the bin and bubbled through the ice/water mixture to provide circulation. Round fish are placed in the chest and kept out of contact with each other through the flotation provided by the salt water. Ice is the refrigerant in the system and must be added as needed to maintain low temperatures.

Fish can be held in good condition in slush ice for several days which allows some leeway in collection scheduling. Fish must go into the system round whole, because dressed fish would suffer leaching of the flesh and a pick-up of salt from the sea water. The small recirculating or air pump would require a small gas generator or the pump could be direct driven by a small gas engine (e.g., Briggs & Stratton). If the slush ice system is located at the ice plant, the pump could be operated from the ice maker generator.

3. Refrigerated Sea Water **(RSW). This system is similar to the slush ice system. Refrigeration is supplied through stainless steel pipes located on the floor or sides of the insulated chest. Sea water can be closely controlled (i.e., around 1°-20 C) but avoids freezing the fish. RSW units require a refrigeration compressor, which can be driven by gas or electricity, and a recirculating or air pump. RSW is widely accepted in British Columbia.** It **has been installed in packer vessel holds and has been adapted to barges for transporting salmon catches. It can keep roundfish in good condition for many days while the fish are being transported to the processing plant or being held at dockside awaiting processing. RSW is superior to slush ice in maintaining a high quality of fish.** It also **has a greater capacity for a**

given bin size because no ice takes up space.

The selection of a single type of storage unit may not be necessary because logistics and costs may dictate the use of a combination of these portable fish storage systems.

Operating costs for systems 1 and 2 above would be on the order of $1,000 for a 7-week season. The costs include fuel and lube oils for the ice machines and some annual maintenance costs. The ice machines need only be operating when there is a demand for ice.

Operating costs for the RSW system would also be on the order of $1,000 for a season. RSW containers do not need to be operated continuously. Depending on the outside temperature of the container, RSW brine can be kept at the desired temperature with only 4 or 5 hours of refrigeration per day. Operating costs are estimated as follows:

Annual Cost Per Unit

Fuel,* lube oils	$ 700
Annual maintenance	300
	$1,000

*5 gallons/day/50 days = 250 gallons = 1100 litres @ $.62 = 700

A labour factor could be added if an attendant is employed at each unit to caretake, maintain temperatures, and assist fishermen in unloading catches as well as assisting in transfer of fish to the collection. Wages offered should reflect the fact that the work required would not be continuous or extensive (possibly $50/day - $2,500/season). On the other hand, it is possible that the fishermen themselves could operate and service the units which would be located in many instances near their camps. The specific arrangements would be examined in a more detailed feasibility analysis.

4.4 Capital Cost Estimates for Fish Storage Systems

Portable Ice Makers (Required for Systems 1 and 2)

2000 lb/24 hour continuous operation	
Howe ice maker and required refrigeration	$15,000
6 KW Kohler generator (Diesel)	11,000
Ice bin (aluminum outside and inside)	
3000 lb capacity	6,000
Pump and piping for water supply	1,000
Freight Vancouver/Churchill	2,000
	$35,000
4000 lb/24 hour continuous operation	
Howe ice maker and required refrigeration	$20,000
12 KW Kohler generator (Diesel)	13,000
Ice bin (aluminum outside and inside)	
3000 lb capacity	6,000
Pump and piping for water supply	1,000
Freight Vancouver/Churchill	3,000
	$43,000

Howe ice makers have a cast aluminum top and bottom, formed-in-place insulation, stainless drum and outer cladding. Therefore, they are suitable for use in salt water situations . They will make salt water ice, but at a lesser capacity than that quoted above.

The units will be supplied in three separate pieces, each piece on its own skid (i.e., generator set, ice maker, and ice bin) . Supplier quote from Cory Lack Ltd., 2780 Olapan Rd., Richmond, BC (phone 604 273-1531).

Refrigerated Sea Water Units (System 3)

Two quotes were obtained for custom made brine holding tanks.

Cory Lack Ltd

Custom made fibreglass brine holding tank, 1000 lb fish

capacity with necessary refrigeration equipment and power supply -- $11,000.

North Shore Refrigeration Ltd, 990 Marine Drive, North Vancouver, BC (phone 604 987-8544).

100 cubic foot brine holding tank, 1 ton capacity - 200-300 fish, with refrigeration compressor unit direct driven by a gasoline motor (Briggs Stratton type) -- $7,000.

A further possibility suggested by Cory Lack engineer, Kelly Wong, was to adapt a home-type chest freezer for this purpose since all custom built equipment will be expensive. We have estimated the cost of an adapted home freezer as follows:

20 cu ft home freezer capacity 725 lbs (about 100 fish)	$ 600.00
Welded aluminum liner (if a metal line freezer, it could be water sealed by welding of any seams or joints, possibly for $100)	300.00
Portable electric air compressor to create circulation of brine	750.00
3 KW - 2300 Watt Briggs Stratton generator set to power chest freezer and pump	1,100.00
Piping Installation and change of controls to prevent freezing	300.00
	$3,050.00

Recommended freezers:

General Freezer Ltd.
9230 Islington Ave
Woodbridge, Ontario, L4L 1B3

W. C. Wood CO. Ltd.
5 Arthur Street South
Guelph, Ontario, NIR 5W5

4.5 Description of Requirements and Options for Collector/Packer Vessel

Two types of vessel have been considered and their availability and costs investigated.

1. A Sealander landing craft vessel with shallow draft and capabilities of a motorized barge

2. A medium-sized, BC West Coast troll vessel of modern semi-displacement hull design.

4.5.1 Landing Craft - Sealander

Complete specifications and layout options for the Sealander line of vessel manufactured by Versatech Products Inc. of North Vancouver is contained in Appendix Al. Power options for gas and diesel are given (Volvo diesels apparently are favoured by purchasers due to their reliability and lower operating cost). With twin power plants, these vessels are fast and highly maneuverable. Sealander vesels are being used increasingly on the BC coast by forest companies in transporting equipment to remote logging operations. Several Sealanders are reported to be operating out of Hay River on Great Slave Lake. Han Fisheries at Dawson City, Yukon Territories, operates a similarly designed vessel of aluminum construction, powered by twin Mercuries. The vessel during fishing season makes a daily 60 mile run (120 miles return

trip) from Dawson City to the Alaska border to collect spring and chum salmon catches from fishermen fishing along the remote stretches of the Yukon River. These distances are comparable to those between Chesterfield Inlet locations and the Issatik plant. (See Appendix A.2 for photograph of Han's vessel.)

Without going into greater detail, an examination of the descriptive material will suggest the suitability of this type of craft for transporting, loading or unloading RSW or slush ice containers, boxed iced fish, ice making equipment, etc., at remote beach locations and its capabilities to operate in river or shallow tidal estuary locations.

There are **some drawbacks to these vessels which might also be considered.**

. The design of the planing hull may mean a rough ride in heavy seas and could require running below maximum speed under such circumstances.

. There is no accommodation for crew as these vessels are basically designed and used as day boats.

Besides crew wages, fuel will be the significant cost of operating these landing craft. Operating costs for the season are estimated as follows.

18-22 ft model - powered by two 140 HP Volvo diesels

Fuel* and lube oil	$ 5,500
Skipper (40 days @ $150)	6,000
Deckhand (40 days @ $100)	4,000
Benefits @ 15%	1,500
Misc. (food, repairs, etc.)	1,000
Insurance	500
	$18,500

● Loaded 3 gal/hr/motor; empty 1 gal/hr/motor, average 2 gal/hr/8 hr day/40 days operation = 1000 gal = 4500 litre per engine = 9000 litres/season @ $.62/litre.

27 ft model - powered by two 165 HP **Diesels**

Fuel* and lube oil	**$ 7,500**
Skipper (40 days @ $170)	**6,800**
Deckhand (40 days @ $130)	**5,200**
Benefits @ 15%	**1,800**
Misc. (food, repairs, etc.)	**1,200**
Insurance	**500**
	$23,200

Capital Cost Estimates (See Appendix A.1 for elaboration)

Sealander	Model 22/2	Model 27/4
Hull	$19,429	$27,795
All aluminum helmsman house	6,844	11,823
Standard equipment package	3,423	3,423
Twin Volvo diesel, stern drive engine	22.345	26.685
	$52,041	$69,726
Freight to Churchill, Manitoba	6,000	8,000
Delivery Churchill to Rankin	1,000	1,000
	$59,041	$78,726

4.5.2 West Coast Troll Vessel

A second option for the collector/packer system would be a displacement-type vessel such as a West Coast troll vessel (see picture in Appendix A.2).

We recommend that such a vessel should be considered only in conjunction with a portable fish storage system (such as RSW) discussed above. We do not recommend the purchase of a troll vessel to act as a freezer/packer similar to the Arctic Tern. An operation similar to the Arctic Term would involve a crew of 5 or 6 who fish from individual motorized canoes. The daily catch would be dressed and frozen on board until the hold capacity was reached, then a trip to Rankin would be made . We do not see this as a viable option for Chesterfield Inlet for the following reasons.

1. A freezer packer acting as a mother ship tends to concentrate fishing (5-6 fishermen) in one area to the exclusion of other fishable areas. Fishing effort needs to be widely dispersed to intercept char due to:
   - the sensitivity of char to over fishing (7-9 year maturity)
   - the short, concentrated fishing season (40-50 days)
   - the cyclical year-to-year variation that can occur in the runs to the separate river systems
   - DFO support for the conventional fishing methods involving small inshore boats close to the river estuary (DFO officials favour this approach because it separates char populations and provides for more effective resource management).

2. Existing data indicate there are more possible fishing sites in Chesterfield Inlet than in the Hudson Bay Coast -south of Rankin. The Goldberg report on the Arctic Tern mentions four sites: Ferguson River, Eskimo Point, Willson Bay, and Corbit Inlet. Table 2.1 suggests there may be some ten sites in Chesterfield Inlet which could be fished. We question whether a single freezer/packer vessel could adequately fish Chesterfield Inlet in one year.

3. In limited volume fisheries, processors like the Issatik plant are left with idle capacity while paying higher landing prices for dressed and frozen-at-sea fish. The Issatik plant merely has to box and ship the fish with little opportunity to better utilize existing labour. The final result is a higher cost structure that in many cases cannot be supported. While small-scale freezing at sea may have its merits, it requires operational planning whereby the freezer/packer vessel is tied into a suitable shore facility engineered to handle frozen products exclusively and at low cost. We are not aware that such a total freezing-at-sea concept has been successfully developed in any Canadian fishery. In BC, the

freezing-at-sea concept has only been marginally successful, mainly in the salmon trolling fishery, and at the present time many "freeze aboard" vessels in BC are up for sale or have been seized by loan institutions and are on the market at distress prices. Quality problems are more likely to be apparent with fish dressed and frozen on board. This has occurred already in the case of the Arctic term.

For these reasons, we would recommend the acquisition of such a freezer/packer vessel only under certain conditions. For example, further feasibility analysis may reveal that a displacement type hull is needed on the coastal run between Chesterfield and Rankin Inlets if rough seas are a constant problem in the summer. The requirements of a major test fishing program could also necessitate the purchase of such a vessel . The key point to be made is that, even if a troll is purchased, it should be tied in with a remote fish storage system 'described earlier. In fact, further feasibility analysis might reveal that a landing craft collector vessel would be required for the shallow water of the upper Chesterfield area, and a troll vessel to handle transport between Chesterfield and Rankin.

We have researched the requirements and costs of a suitable troll vessel in the BC market. There are many fishing . vessels presently for sale in BC as a result of the current recession and declining catches in the province's salmon fishery. Many vessels are up for sale individually: some have been seized by chartered banks and credit unions while some have been seized through government sheriffs and are in the hands of bailiffs.

Given the volume of fish, the shortness of season, and the need to store the vessel on land for winter, we recommend a vessel with the following characteristics:

- a vessel under 40 feet

- a semi-displacement hull
  (Such a vessel can be hauled out of water and trailered with relative ease.)

- fibreglass construction
  (Wooden hulls are prone to damage in severe winter temperatures and annual maintenance is costly. Aluminum or steel can also cause problems due to severe temperature fluctuations.)

- diesel powered.

We have identified the following candidate vessels:

- 37 ft Faro[1] fibreglass powered by a V-8 Caterpillar diesel - could be fitted for freezing/packer capacity, 10-12000 lbs, asking price $45,000-$50,000.

- 37 ft Faro fibreglass powered by a 671 GMC diesel - fibreglass hold - could be fitted for refrigeration/packing capacity - 18-20,000 lbs, asking price $55,000-$65,000.

- 36/41 ft Deltaga[2] fibreglass powered by a 1979 Volvo 70c engine, insulated and fibreglass hold, refrigerated. sea water system, asking price $75,000, open to offers.

[1] A popular fishing hull design in fibreglass constructed at Faro Shipyards, Nanoose Bay, Vancouver Island, BC. (See photograph in Appendix A.2.)

2 Designed and built by Deltaga Boat Works, Richmond, BC.

The asking prices for these vessels are half the replacement cost. They also come equipped with extensive electronic gear (radio, sounder radar, etc.) If they have been used as

trollers, they are equipped with stabilizers which can be lowered overboard on the troll poles for stability in rough seas. These vessels have operated 50-100 miles off the west coast of Vancouver Island. They can achieve speeds of 10-15 knots depending on engine power: they can achieve above average speed due to more modern hull design.

The cost of freighting this size of boat to Churchill is estimated as follows:

CNR freight charge	$10,000
Hauling out, transporting, loading and securing, returning to water at Churchill	3,000
Delivery Churchill/Rankin Inlet	1,000
	$14,000

Operating costs were estimated on the basis that the vessel was principally used to pack and transport fish from Chesterfield Inlet down to the Issatik plant at Rankin. Operating costs were based on six round-trips from Chesterfield Inlet to Rankin plant to pack fish or deliver frozen catch in a 2 month season:

Crew Wages	
Skipper 50 days @ $170	$ 8,500
Deckhand 50 days @ $150	7,500
Benefits @ 15%	2,400
Total Wages	$18,400
Fuel*	$ 2,500
Insurance	1,500
Crew Food & Supplies 50 days @ $30	1,500
Maintenance Engine and Electronic Refrigeration	1,0130
Miscellaneous	500
	$ 7,000
Total operating costs per season	$25,400

* Fuel: - 6 trips of 200 miles 1,200 miles
- miscellaneous miles 600
1,800

1,800 miles at 12 miles/hr = 150 hours operating
- fuel 6 gals/hr = 900 gals = 4,100 litres x $.62 = $2,500

4.6 Summary of Operating Logistics

A collector/packer system to effectively exploit the Chesterfield Inlet area requires both portable fish storage units and a speedy collector vessel. Refrigerated sea water (RSW) units appear to offer the most feasible opportunity. The RSW option combines low capital costs with the capability of maintaining fish in better quality for longer periods than a frozen or slushed ice system.

The Sealander landing craft vessel has some attractive features for operating in the river or shallow estuary locations reported to exist in the Chesterfield Inlet system, and in the beach loading and unloading of fish storage units. It remains to be determined whether such a vessel could also operate successfully in open sea transport from Chesterfield to Rankin. A West Coast troll vessel may be better suited for this transport requirement.

These accessories are available as optional extras. The prices quoted include installation at the time of construction of the vessel.

Sales Taxes, if applicable, are NOT included.

1.	Loading Davit with Manual Winch	1,183.00
2,	Loading Davit with Electric Winch	1,700.00
3.	"A" Frame Loader with Manual Winch	2,590.00
4.	"A" Frame Loader with Electric Winch	3,415.00
5.	Electric Winch with 50 ft. S.S. Cable	1,081.00
6.	Trolley Loader - QUOTED TO MEET YOUR REQUIREMENTS	
7.	Hydraulic Crane - QUOTED TO MEET YOUR REQUIREMENTS	
8.	Sponson Protection Shoes - 8' long Kevlar	2,475.00
9.	8,000 B.T.U. Cabin Heater - Diesel Forced Air	2,240.00
10.	Hot Water Cabin Heater	1,106.00
11.	Window Defroster Fans, each	79.00
12.	Fire Extinguisher 2 - 3/4# Dry Chemical B & C	37.00
13.	Fire Extinguisher 6 - 3/4# Dry Chemical B & C	60.00
14.	FIREQUENCH 5# Halon 1301 Automatic	2,736.00
15.	Upholstered Folding Bank	693.00
16.	Rubber "D" Section Rub Rail instead of Aluminum on 27/4	1,827.00
17.	Rubber "D" Section Rub Rail instead of Aluminum on 37/8	2,485.00
18.	Anti-fouling paint - 18/1 and 22/2	400.00
19.	Anti-fouling paint - 27/4	1,052.00
20.	Anti-fouling paint - 37/8	1,755.00
21.	Mercathode Electrolysis Protection	185.00
22.	Wright Spreader Lights, per pair	263.00
23.	Vehicle Loading Tracks	2,367.00
24.	Extra Bollards, each	48.00
25.	8 - Passenger Module	6,638.00
26.	Crane Base - 27/4	1,336.00
27.	Crane Base - 37/8	1,651.00
28.	Lifting Rig - 27/4	1,262.00
29.	Lifting Rig - 37/8	1,993.00

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5.0 PROJECTED OPERATING COSTS FOR POSSIBLE COLLECTOR/PACKER SYSTEM

5.1 Assumptions for Operating Scenario

The following scenario has been developed to give an indication of the costs to the Issatik plant of operating an RSW collector/packer system for Chesterfield Inlet.

1. **Assumptions re. equipment** -- Two 18 or 22 ft Sealander landing craft to place fishermen and equipment in Chesterfield Inlet, collect catch, and transport fish to the Issatik plant. This assumes one vessel operates in the upper Chesterfield Inlet area and the other has open sea transport capability.

   -- Six 1,000 lb capacity RSW containers . Three units in transport, three units at various fishing ground locations.

2. Catch/Packing Logistics -- Turn around time for each container would be three days. In a 40-50 day season, each container is circulated 15 times. Assuming fishing fills containers on average over the season to 50% of capacity, each container will produce 15 trips times 500 lbs = 7,500 lbs. The six containers will produce 45,000 lbs to 50,000 lbs in total.

3. Capital Costs -- The amortization of capital costs is not included in projected operation costs.

The operating costs for the collector/packer RSW system are as follows:

Two landing craft @ $18,500 each[1]	$ 37,000
Six RSW containers @ $1,000 each[2]	6, 000
	$ 43,000

1 Operating costs are detailed in Section 4.5.1.

[2] Operating costs for RSW systems are outlined in Section 4.3. They were assumed to be operated by fishermen at no cost .

The resulting cost of fish collected and packed to the Issatik plant based on a 45,000 lbs catch would be $0.93/lb.

5.2 Financial Results

By BC fishing industry standards, the operating cost of the collector/packer RSW system is high. However, the system offers opportunities for savings in two other areas which would partially compensate for high operating costs:

(a) **The 45,000 lbs could be dressed and frozen at the Rankin plant at little or no increase in total labour costs. This could occur because of the under-utilization of present labour at the plant. The labour cost per lb could be cut from $0.47 to $0.20 per lb, a possibile savings of $0.27 per lb. $10,000 to $12,000 could be generated by the greater plant throughput.3**

(b) It may be possible to lower the price paid to fishermen if greater catch volumes could be guaranteed. A decrease from $1.25 to $1.00 would represent a saving of $11,000 on the 45,000 lbs catch.

The net financial result assuming savings (a) and (b) can be realized would be an additional 45,000 lbs of char production at a net operating cost increase of ($43,000 - $23,000 =) $20,000 ($0.45 per lb).

This scenario covers a basic start-up operation. Three container locations may be not sufficient to cover all possible Chesterfield Inlet fishing sites. More RSW containers could be added to the system without necessarily increasing the number of collection/packer vessels. Further expansion could. therefore, dilute the overall operating cost per lb of the system.

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3 See discussion in Goldenberg report, "Feasibility of Privitization of the Issatik Food Plant", pages 19 and 20.

The system would require that the fishing manager be in radio contact with remote fishing stations and the collector/packer vessels to efficiently and effectively dispatch equipment and vessels during the fishing season. We have not addressed communication requirements or costs because we have no information on the Issatik radio communication system or equipment.

6.0 EMPLOYMENT AND INCOME IMPACTS

Based on the operating scenario outlined in Section 5.0, annual employment and direct income impacts would be as follows:

	Employment	Income	
Collector/Packer Vessels:			
2 vessels @ 2 crew per vessel for 8 weeks	8 person-months	2 skippers @ $6,000[1] 2 deckhands @ $4,000[1]	= $ 12,000 = $ 8,000 $ 20,000
Fishermen			
45,000 lbs @ 6,000 lbs average catch per fisherman = 8 fishermen for 8 weeks	16 person-months	45,000 lbs @$1.00/lb x 30% return to labour[2]	= $ 13,500
Issatik Processing Plant			
No additional employment or income due to current under-utilization	0		0
Totals	24 person-months or 2 person-years		$ 33,500

1 See page 4-9.

[2] The returns to fishermen's labour is based on 1982 financial results in the BC gillnet fishery. The $1.00/lb price was price paid to fishermen in Chesterfield Inlet in 1983.

7.0 SUMMARY AND RECOMMENDATIONS

7.1 Summary of Analysis

1. The current quota for the Chesterfield Inlet system is 127,000 lbs of char, which must be shared between subsistence and commercial fishing activities. Further test fishing is required before extensive commercial fishing is permitted. Commercial volumes greater than 50,000 lbs are not expected to be allowed during initial years of project start-up.[1]

2. The market for char sold in a steaked form appears favorable. However, there is a significant imbalance between prices for arctic char and those for competitive products such as salmon. This suggests that future prices for char in the marketplace may fall which would, in turn, place downward pressure on prices paid for char to the Issatik plant and to fishermen.

3. The most dominant characteristics of the char fishery in the Keewatin region are the shortness of the season (50 days) and the wide dispersion of char runs and fishing areas. These characteristics necessitate a collection/packer system that is flexible, portable, and has fast service vessels. An effective system must include portable fish storage units and a fast collector boat able to operate in shallow estuarial or river areas. Three types of fish storage units and two types of collector vessels were assessed, and capital and operating costs outlined.

   Preliminary analysis suggests that refrigerated sea water (RSW) units may be the most appropriate for fish

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[1] This is an estimate made by DPA Consulting based on conversations with, but not confirmed by, DFO officials.

storage, and a Sealander landing craft type of vessel may be the best choice for a collector vessel.

4. A possible operating scenario was developed which included two Sealander collector vessels ($59,000 each) and six portable RSW units ($11,000 each). Total capital costs were estimated to be on the order of $185,000. Annual operating costs associated with the system were estimated at $47,000.

   Based on a projected 45,000 lbs volume for Chesterfield, the cost for collection and packing was estimated at $0.93 per lb (before allowing for amortization of the capital investments). This is higher than current costs to fly fish out of the Chesterfield area (estimated at $0.50 to $0.60 per lb). However, there is scope to reduce the cost through efficiency gains at the Issatik plant (due to higher throughout) and possibly reducing the price paid to fishermen for fish. Per lb costs would also be less if fish volumes were greater than 50,000 lbs.

5. The scenario we developed would involve employment for four people for the 40-day season on the two collector/packer vessels. Employment at the Issatik plant would not increase because of the present under-utilization of labour during the processing season. A catch level of 45,000 lbs in the Chesterfield Inlet system might require 8 fishermen. Total direct income creation resulting from the project would be on the order of $33,500 per annum.

7.2 Recommendations for Further Analysis and Action

The analysis undertaken in this study is preliminary, and was undertaken without a comprehensive understanding of all the physical and economic conditions that affect the arctic char fishery in the Rankin and Chesterfield Inlet areas. The

following are suggestions for further analysis and action.

1. **Territorial officials should begin discussions with DFO** officials in Winnipeg about test fishing requirements for the Chesterfield Inlet system. Careful planning and cooperative arrangemen-ts are required. A key issue is the extent to which commercial and test-fishing activities can be carried out at the same time. Further investigation should be made of the feasibility of using a Sealander craft for test fishing purposes. A clear agreement on test fishing and the extent of future commercial fishing should be reached before any investment in capital equipment is made.

2. Consideration should be given to testing in the coming season the feasibility of one or more of the proposed mobile fish storage systems. This could be one in cooperation with the Arctic Tern -- one or more remote fish storage units could be integrated with their operation. Such a test could determine:
   - whether storage units can be run unmanned:
   - the logistics of loading and unloading storage units;
   - the ability of the units to function under Keewatin conditions.

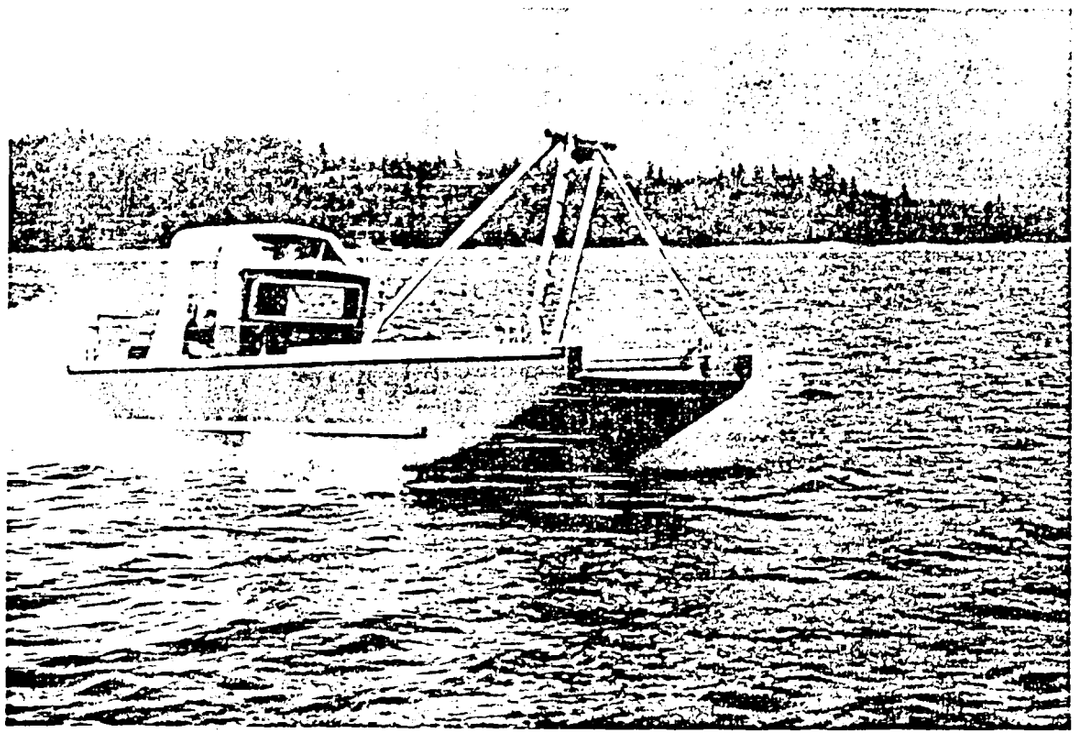
3. A more detailed economic analysis on how a collector/packer system fits with an overall fisheries development strategy for the area is warranted. For example, the commercial volumes that appear to be available from the Chesterfield Inlet system will not provide enough additional fish to make the Issatik plant financially viable. There is a need to establish a fish procurement plan for the Issatik plant that could involve, for exmaple, hiring a fishing manager and organizing a fishing plan that would not simply focus on the Rankin and Chesterfield Inlet areas.

APPENDIX A

A l : DATA AND SPECIFICATIONS FOR SEALANDER LANDING CRAFT

A.2: VESSEL PHOTOGRAPHS

LANDING CRAFT
Sea Lander
THE CANADIAN SEA TRUCK



SEALANDERS MODELS 18/1 AND 22/2

These smaller Sea Landers are designed for **light** work such as marine surveying and research or for speedy transport of cargos up to 2 ton. Beach landing and front drop ramp provide convenient loading and easy access to shore. Controls are situated well aft to provide a maximum flat deck space for work or cargo.

The 18/1 and 22/2 are sturdily constructed as a work craft and are not an adaptation of mass production pleasure or ski boats.

They may be powered by small inboard/outboard or outboard motors.

Fabric tops are avai I able for **protection** from inclement weather.

The beam is only 8 ft. so overland transport is not a problem.

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LANDING CRAFT
Sea Lander
THE CANADIAN SEA TRUCK

CONSTRUCTION

HULL	Fiberglass reinforced plastic. Extra thickness in all high stress areas. Balsa core stiffening applied throughout bottom.
DECK	3/8" plywood lai d over the fiberglass structure then overlaid again. Surface gelcoat contains non-slip grit.
RAMP	Double laminated plywood 3/4" thick, overlaid with fiberglass.
SIDES .	½" thick sandwich construction, fiberglass plywood; top rail reinforced with 2"x4" mahogany overlaid with fiberglass. Outsides protected by 2"x1½"x.095" rectangular hollow section aluminum rubbing strokes.
HULL STRUCTURE	Box-frame, similar to a truck chassis, formed by polyurethane foam beam sections, overlaid with fiberglass and laminated to hull and deck.
BUOYANCY	Closed-eel l polyurethane foam of 2 lb./cu. ft. density sprayed. in place in cells formed by box-frame. Total volume of foam approximately 80 cu. ft.

SPECIFICATIONS MODEL 18/1 AND 22/2

DIMENSIONS	18/1	22/2
Length Overal I	18'-4"	22'-4"
Length, Water Line	14'-3"	16'-6"
Beam	8'-0"	8'-0"
Freeboard unladen, forward	33"	37,1
" " aft	25"	33"
Freeboard laden, forword	29"	31"
" " aft	22"	27"
Draught, unladen	6"	6"
" laden (excluding power-leg)	lo"	12"
Deck width	7'-6"	7'-6"
Deck area	100 sq. ft.	130 Sq. ft.
Deck length	141-61'	18'-0"
Deck to gunwhale, forward	24"	29 II
" " " aft	18"	25 "
Width of ramp opening at thresh-hold	6'-0"	6'-2"
PAYLOAD	2200#	4000#
WEIGHT, Bare hull	1500J+	1600#
TOTAL BUOYANCY, Built in	5400#	9200#
Residual buoyancy, normal rig, including fuel, personnel etc. at 1 metric ton load, approx.	1000#	2000#

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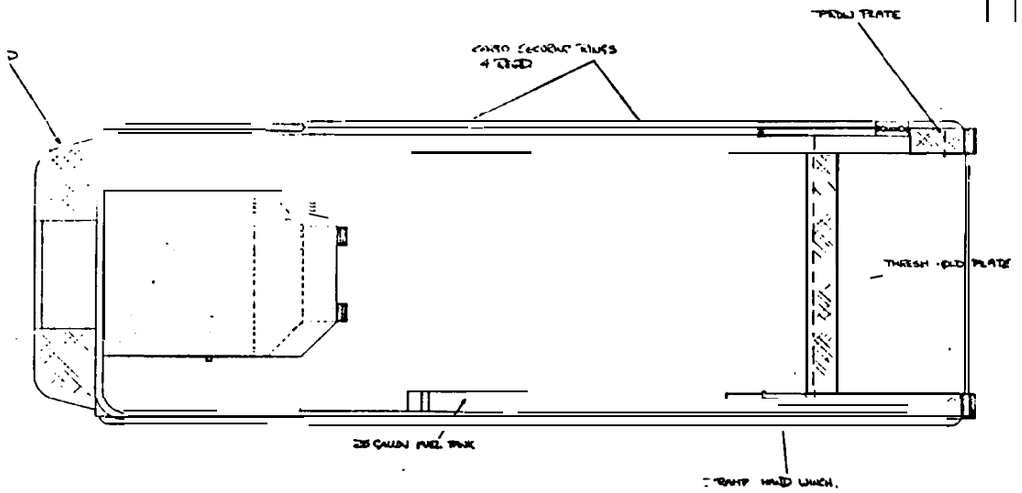

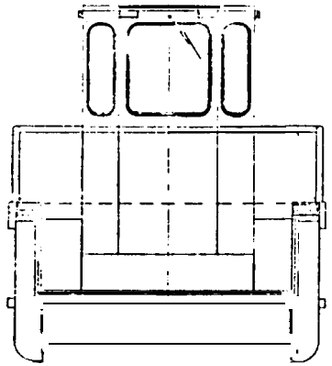

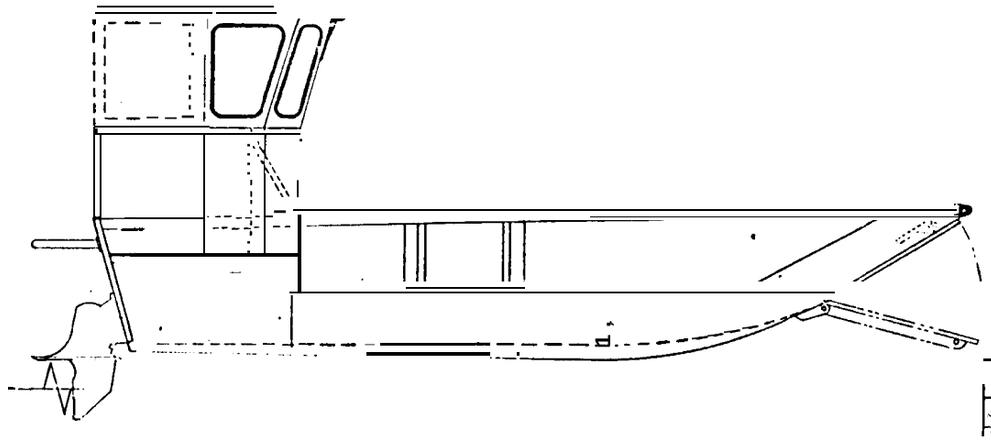

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		22' CATAMARAN
		TITLE 22/2 MARK II
		DRAWING NUMBER 2-1002.0

SEALANDER PRICE LIST - March, 1984

PRICES QUOTED IN CANADIAN DOLLARS AND EXCLUSIVE OF ALL TAXES

Specifications and prices are subject *to* change without notice.

SEALANDER MODELS 18/1 and 22/2

SEE ILLUSTRATED BROCHURE FOR DESCRIPTION AND SPECIFICATIONS:

HULL

Complete with:

Loading ramp and winch
Two rub rails each side
Four cargo tie down rings
Four mooring bollards

Supplied with either inboard/outboard motor well and full height transom or outboard well and outboard transom opening. Specify power to be used when ordering. Inboard configuration can be converted to outboard but not vice versa.

PRICE, F.O.B. OUR PLANT	MODEL 18/1	$ 15,897.00
	MODEL 22/2	$ 19,429.00

HELMSMANS STEERING STATION

Helmsmans steering station and wind screen with safety glass window, counter to install engine controls and instruments, suitable to attach vinyl top (top not included), 40 gal. fuel tank secured under hinged seat. Steering station and wind screen hinges forward to lay flat on deck when boat in storage.

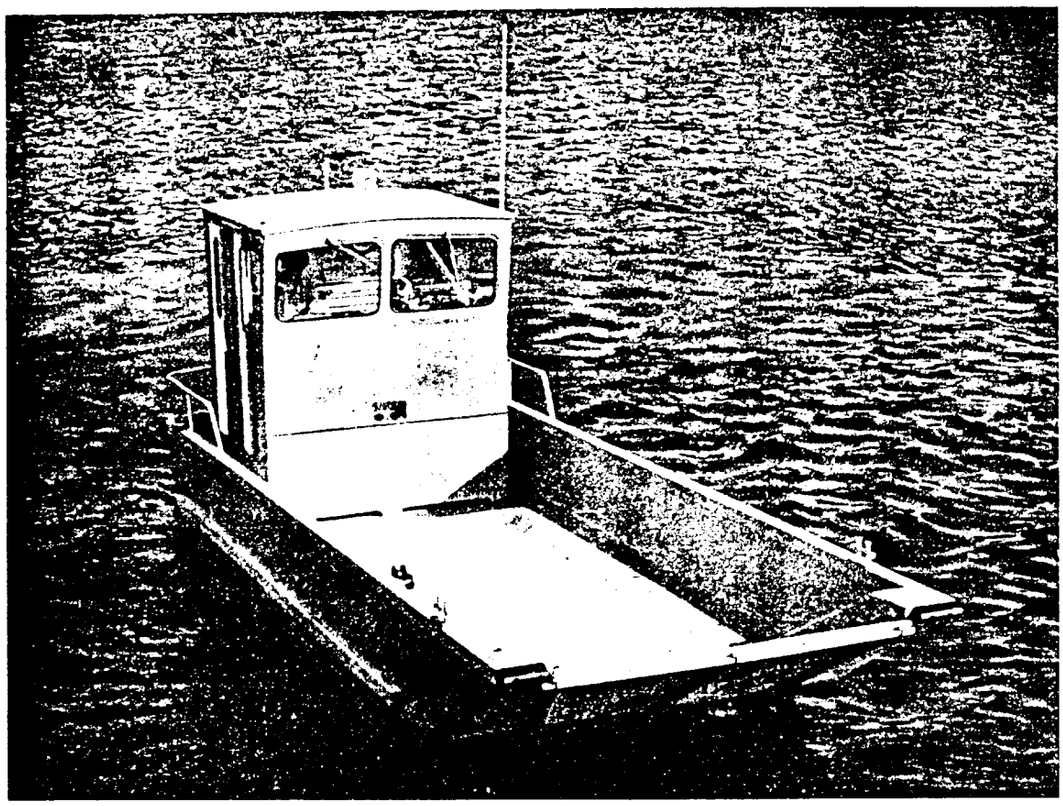
PRICE	$	3,844.00
FABRIC TOP AS ILLUSTRATED	$	1,209.00
OR ALL ALUMINUM TOP & BACK.		3000.00

Power.
VOLVO INBOARD/OUTBOARD MODEL AQAD30 - 140HP.

SPEED EMPTY. 30 KNOTS
LOADED 20 KNOTS.

LANDING CRAFT
Sea Lander

THE CANADIAN SEA TRUCK



THE MODEL 27/4

Model 27/4

SEALANDER LANDING CRAFT

Speedy, manoeuvreable, beach landing. Foam filled hull, 100% flotation with full load.

A versatile vessel, adaptable for a multitude of jobs:

1. **Cargo** Transport.
2. **Water** Taxi. *
3. Fire Boat.
4. Patrol Boat.
5. Hydrographic **Survey.**
6. **Oil Spill Cleanup.**
7. **Lightening.**
8. Mobile Medical Clinic.
9. Crew Boat. *
10. Log Salvage.
11. Vehicle Transport.
12. **Diving Tender.**
13. **Fishing.**
14. **Fish Packer.**

● **When equipped with Sealander Passenger Module.**

Available in four models:

Model 18/1:	**Length 18',**	**Beam 8',**	**Cargo Capacity 1 ton.**
Model 22/2:	**Length 22',**	**Beam 8',**	**Cargo Capacity 2 tons.**
Model 27/4:	**Length 27',**	**Beam 10',**	**Cargo Capacity 4 tons.**
Model 37/8:	**Length 37',**	**Beam 12',**	**Cargo Capacity 8 tons.**

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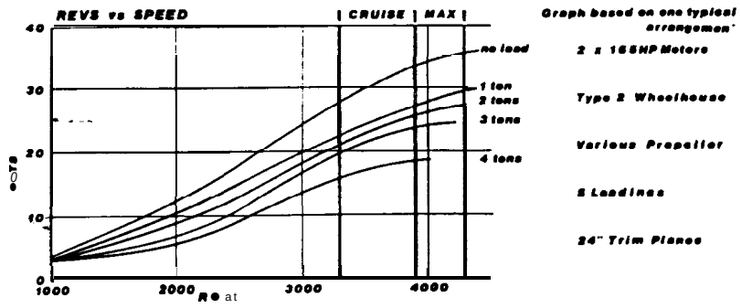

SPECIFICATIONS

CONSTRUCTION:
Hull: Fiberglass reinforced plastic. Extra thickness in all high stress areas. Balsa *core* stiffening applied in bow area and bottom.

Deck: ½" (13mm) plywood laid over the fiberglass structure then overfaid again. Surface **gelcoat** contains non-slip grit.

Ramp: Double laminated plywood 1" (26mm) thick, overlaid with fiberglass.

Sides: ⅞" (22mm) thick sandwich construction, fiberglass plywood: top **rail** reinforced with **2"x4"** (50mm x 10Omm) mahogany **overlaid** with fiberglass. OutsIdes protected by 2- 4" x **1¾"x.12"** (1 00mm x 45mm x 3mm) rectangular hollow section aluminum rubbing **strakes**.

Hull **Structure: Box-frame, similar to a truck chassis, formed by polyurethane foam beam sections, overlaid with fiberglass and laminated to** hull and deck.

Buoyancy: Closed-cell polyurethane foam of 2 lb./cu.ft. (32 Kg/cu.m) density sprayed in place in cells formed by box-frame. Total volume of foam **approxi-mately** 270 cu. ft. **(9.63m³)**

Dimensions:		
LOA	**27' 4"**	**8.33m**
LWL	22' **3"**	**6.78m**
Beam	9'11"	3.02m
Freeboard unladen, forward	**41"**	**104.1cm**
aft	34"	86.4cm
laden, forward	**34"**	86.4cm
aft	27"'	68.6cm
Draught, unladen	**9"**	22.9cm
laden	16"	40.6cm
(excluding power-leg)		
Deck width	9' **5"**	2.87m
Deck area, without **pilot** house	**206sq.** ft.	18.95m
Deck length, **inboard** power	19' 6"	5.94m
outboard power	20' **6"**	6.25m
Deck to **gunwhale** forward	**30"**	**76.2cm**
aft	**25"**	63.5cm
Width of ramp opening at threshold	**8'2"**	2.48m
at top	**8'2"**	2.48m
Metacentricheight - unladen	22'0"'	**6.71m**
Payload:		
Sheltered waters	8,000 **lbs.**	**3,360 kg.**
Sea conditions	5,000 **lbs.**	**2,270 kg.**
Weight:		
Bare hull	4,000 **lbs.**	**1,820** kg.
Total Buoyancy:		
Built-in	7,000 **lbs.**	7,710 kg.
Residual buoyancy, normal rig **including** fuel, personnel etc. at 4 ton load. approximately	4,000 **lbs.**	1,820 kg.

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FIVE POWER OPTIONS

TWIN ME RCRUISER 170 H. P., 224 CU. IN. GASOLINE STERN DRIVE MOTORS.

or

TWIN ME RCRUISER 228 H. F., 307 CU. IN. GASOLINE STERN DRIVE MOTORS.

or

TWIN ME RCRUISER (RENAULT) 145 H.P., 219 CU. IN., DIESEL STERN DRIVE MOTORS.

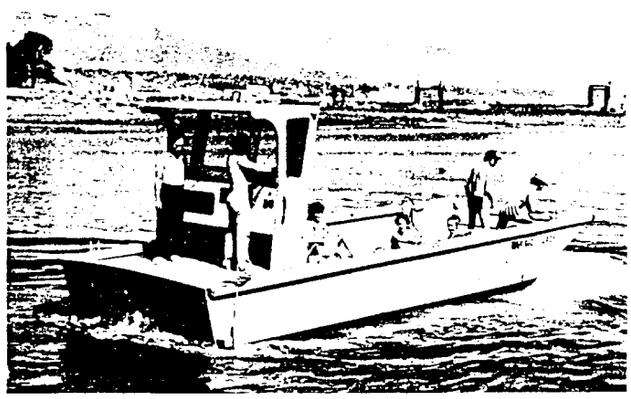
or

SINGLE G.M. DETROIT 6V-53 216 H. P., 318 CU. IN., DIESEL MOTOR, BORG WARNER GEAR AND MERCURY II TR DRIVE.

or

TWIN MERCURY BLACK MAX 200 H.P. OUTBOARDS.

ALL 27/4 SEALANDERS
are equipped with trim tabs to level the vessel under varying load conditions.



FOLD DOWN WINDSCREEN
& CONTROL CONSOLE

UNIT IS HINGED TO FOLD TO DECK LEVEL FOR ECONOMY IN SHIPPING.

CAN BE QUICKLY SET UP WITH SIMPLE TOOLS.

PROVIDES PROTECTION FROM WIND AND A SOLID MOUNT FOR CONTROLS & INSTRUMENTATION.

FA8RIC TOPS ARE AVAILABLE FOR EXTRA COMFORT IN INCLEMENT WEATHER.

* LANDING CRAFT Sealander

SEALANDER MODEL 27/4

SEE ILLUSTRATED BROCHURE FOR DESCRIPTION AND SPECIFICATIONS:

HULL

Complete with:

Loading ramp
Tow rub rails, each side
Six cargo tie down rings
Four mooring bollards

Supplied with either inboard/outboard motor well and full height transom *or* outboard well and outboard transom opening. Specify power to be used when ordering. Inboard configuration can be converted to outboard but not vice versa.

PRICE, FOB OUR PLANT $,27,795.00

WHEELHOUSE

Mounted aft above motors

Dimension:	7'W x8'L x 9'H
Construction:	G.R.P.
Windows:	Safety Glass
Window frames:	Aluminum
Doors:	Port and Starboard
Ventilation:	Rear sliding window
Console:	With locker under
Safety rails:	One, each side aft.

PRICE, F.O.B. OUR PLANT $ 11,823.00

RECOMMENDED POWER PACKAGES FOR SEALANDER MODEL 27/4

Complete motor installation includes:

One 70 gallon, 2-compartment fuel tank
Batteries and switches
Fuel filters
Steering
Engine controls

Instrumentation, consisting of:

Tachometer
Oil pressure gauges
Engine water gauges
Battery gauges
Vacuum gauge (except diesel)
Tilt indicator gauge (Mercury only)
Fuel level gauages
Hour meter

We will quote on other suitable Power Packages on request.

THREE POWER OPTIONS:

Twin Mercruiser 170 h.p., 224 cu.in. Gasoline Stern Drive Motors	$	16,956.00
Twin OMC 205 hp. Sea Drive	$	13,595.00
Twin Volvo AQD 40/280, 165 hp., 220 cu. in. Diesel stern drive motors	$	26,685.00

STANDARD EQUIPMENT PACKAGE FOR SEALANDER 27/4

Running Lights
Anchor Light
Two Cabin Lights
Spot Light
Electric Horn
Two Windshield Wipers
One #5 Chemical Fire Extinguisher
Automatic Bilge Pump
One Anchor & 100 ft line

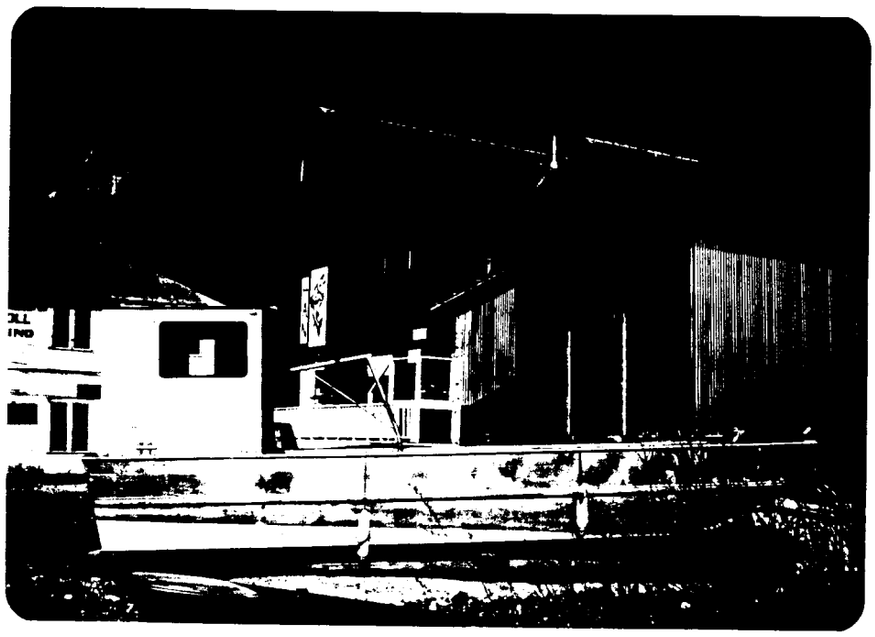
Bilge Blower
Electric Hydraulic Trim Planes
One Life Ring & 50ft line
Four 5 x 25 Fenders
One 6ft Boat Hook
one 4" Compass
Two Mooring Lines - 12ft
One Spring Line - 25ft

PRICE, INSTALLED $ 3,423.00

SEALANDER MODEL 27/4 and 7'W x 8'L x 9'H CABIN WITH STD. EQUIPMENT PACKAGE

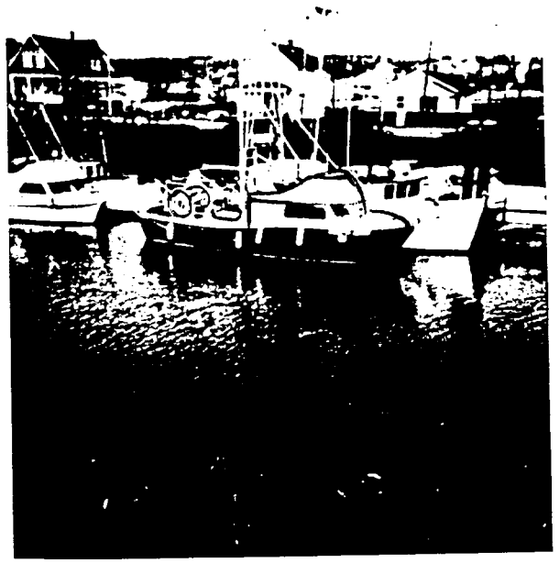
Powered with Twin Mercury 170 hp. Motors	$ 59,997.00
Powered with Twin OMC 205 hp. Sea Drives	$ 61,636.00
Powered with Twin Volvo AQD 40/280 Diesel	$ 69,726.00

A.2 VESSEL PHOTOGRAPHS



Han Fisheries Ltd., Landing Craft
Dawson City, Yukon

- Operating costs are approximately $20,000 per year
- Packs 200,000 lbs of fish via daily trips during season



37 ft BC West Coast Troll Vessel
Fibreglass "Fare" hull, diesel power