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THE INSHORE FISHING PROJECT

A presentation to the Board of The Falkland Islands Development Corporation.

Fortoser Limited.

6th. November, 1986

Fortoser Ltd., of Grimsby were contracted to The Falkland Islands Government and The Falkland Islands Development Corporation to undertake a survey of inshore fishing with the following terms of reference.

1. Carry out research into the stocks of fish in the fishing area and assess such stocks, and in particular those of high potential commercial value and low bulk, such assessments taking into account -

a) the different species,
b) their location (place, depth and seabed) movement,
c) seasonal variations in numbers, size, breeding and migration of such species;

2. With the assistance of an appropriate commercial enterprise and the agreement for its assistance to Fortoser being approved of in writing by the Project Director prior to the commencement of the survey, examine different methods of fish handling, preservation, processing, packaging, transport, marketing and distribution, having regard to available or possible technology, relevant costs and available markets both in the Falkland Islands and overseas;

3. Make recommendations for the commercial exploitation of the fish stocks which shall include -

a) scale of area or areas of any operation or operations,
b) organisation, management and staffing of any operation or operations,
c) costs of and methods of financing the setting up of viable operations;

4. Provide a commercial assessment of an inshore fishing industry;

5. Assist F.I.D.C. in the preparation of detailed written material, setting out all relevant information that would be required by potential investors or participants in an inshore fishing industry around the Falkland Islands.

In accordance with the above Fortoser Ltd. entered an agreement with J. Van Smirren Ltd., a well known shellfish and fish processing company from Boston, Lincolnshire.

The 18 metre inshore fishing vessel COASTAL PIONEER arrived in Stanley on November 18th., 1984 after a 59 day voyage from her home port of Grimsby. The survey commenced shortly afterwards.

The Survey

The Terms of Reference placed an emphasis on the development of high potential commercial value and low bulk stocks and for this reason an early decision was made to concentrate on finding shellfish, and in particular the Antarctic King Crab (Centolla). An earlier survey by a Japanese fishing team and numerous anecdotal reports suggested that this specie was abundant.

The programme for the first 12 months of operation was drawn up by Fortoser and the Senior Fisheries Adviser of the O.D.A. This allowed 6 months for the vessel, at that time based in Fox Bay, to do a circle of the Islands using a variety of gear and in the most promising areas. The second half of the year was to be spent consolidating the earlier work and , in some cases, re-visiting places to determine the effect of seasonality.

The programme was adjusted to take account of a number of factors that affected the survey. These included the weather, navigational hazards and the suitability of the fishing gear. It was, for example, decided early in the survey to abandon the use of gill nets, principally because of their effectiveness as fishing gear.

During this first part of our programme it was to become clear how important the logistics of operating small fishing vessels in remote areas was to the success, or failure, of an inshore industry.

Results of the first survey

1. Species caught

Large quantities of a medium - sized red crab Paralomis granulosa, were taken in most areas and a detailed distribution will be shown on the charts. Catches of this crab were made in depths ranging from 15m - 40m in areas of weak to moderate tide. The crabs generally avoid soft mud and rock.

By sharp contrast to the quantities of Paralomis there were only low catches of the King Crab, Lithodes Antarctica. The earlier Japanese survey had indicated large quantities of this specie but we learned from photographs that they took, that they had in fact mistaken the crab for Paralomis. They caught small quantities of Lithodes off New Island but did not record accurately the positions or depths.

Catches of roundfish were generally low but included Hake, Whiptail, Kingclip, Red Cod, Falkland Herring, Southern Blue Whiting and, Mullet.

The only catches of quantity were Lobster Krill, Munida gregaria, which appeared in the inshore trawling stations and several varieties of Skate, which were taken in the deeper water.

Small quantities of Queen Scallops, Squid and Octopus were found.

2. Fishing gear

We began by using the standard English East Coast parlour crab pot and varied it by using both side and top entrances. In addition we used a number of pots styled on those fished by the Japanese during their survey. The

results showed that the Japanese conical pot caught more crabs but was difficult to handle. We therefore designed a smaller conical pot and this is very close in shape and size to that used by the Chileans.

The demersal trawl was very efficient but when fishing close inshore became quickly full of Lobster krill. Catches of 2 tonnes for a 30 minute towing period were not uncommon. Unfortunately the suitability of the inshore grounds and the time available to us meant that the trawling programme was reduced in favour of static gear.

As mentioned in a previous paragraph fishing with gill nets was abandoned. The nets did not fish well and were easily fouled. More work is needed to find a net that will lie better and remain fishing for at least two tides.

3. Identification of possible commercial species

While the King Crab remained the most attractive specie caught it was clear that there were insufficient to establish a profitable industry. However, the related crab, Paralomis, had a similar taste and texture and was available in much greater numbers.

Early samples sent to J. Van Smirren for examination were met with enthusiasm. The meat quality was identical to that of King Crab and it was felt that premium prices could be obtained for the product. It was decided therefore to concentrate on this species and to learn as much about its habits and the size of the stock as possible within the time available.

The trawling programme was suspended and our efforts were directed towards catching crab with pots.

4. Fox Bay

The ship and the survey team were based at Fox Bay Village with the crew housed in the former Bunkhouse. This centre is ideal for survey work as it is well placed to work most of the fishing areas.

We felt, however, that a commercial fishing industry would operate under serious handicap from Fox Bay and it was agreed with the management of F.I.D.C. that processing could only be carried out efficiently if the plant was close to Stanley. Several factors were considered before this decision was made.

a) Suitable cold storage transport was not available to take frozen produce from Fox Bay to a point of export.
b) The proximity of the identified main fishing grounds to Stanley and to Mare Harbour where catches could be landed.
c) The additional cost of shipping spares, processing materials etc. to Fox Bay.
d) The size of the available labour force.
e) The work that would be required to bring buildings and the water supply to a standard that meet the very stringent International Food Hygiene Acts.

5. Logistics

COASTAL PIONEER logged 230 days at sea during her year of operation. This compared very favourably with a similar size of vessel working the fishing grounds in the British Isles. No major problems with the vessel were experienced and very little time was lost because of weather.

There are no slipways in the Falklands capable of taking a ship of COASTAL PIONEER's size but we were able to take advantage of the large tidal range at Weddell Island to dry the vessel out and carry out routine underwater maintenance.

The distance from suppliers and the lack of suitably qualified maintenance engineers has been overcome by careful planning.

The commercial fishing trial

An agreement was reached with O.D.A. and F.I.D.C. in January, 1986, that a commercial fishing trial would commence as soon as the vessel had been rigged with suitable gear and the processing plant was ready to accept catches. In the meantime an intensive grid survey using pots and a small beam trawl was started in an attempt to identify the areas of maximum catch rates for the crab Paralomis granulosa.

COASTAL PIONEER was rigged with a 2 tonne pull hydraulic pot and line hauler and with 300 pots of a new design.

The former Seaplane hangar in Stanley was taken over and low-cost processing plant installed.

As part of the fishing trial the company's marine biologist visited Chile to see, at first hand, their established crab industry.

The commercial fishing trial was split into two parts. Phase 2 (part a) would concentrate on crab fishing and the position would be reviewed after 6 months. Phase 2 (part b) would , in light of the results of part a, either continue on crab fishing or revert to trawling for fin fish.

Preliminary results from commercial trial

a) Catch rates.

The catching effort was restricted to an area within Choiseul and Lively Sounds. This was partly for operational reasons but dense concentrations of Paralomis were known to be in this area and it was logical to work as close to the landing port and the processing plant as possible.

Crabs of less than 75mm carapace length and all female crabs were returned to the water.

The catch rates for crabs of each carapace length group can be seen in the figure.

The distribution of the different c.l. groups can be seen on the charts and it will be noted that they remain in isolated groups.
The corrected total referred to in the table excludes a small by-catch of crabs of less than 75mm c.l.

b) Operating procedures.

COASTAL PIONEER was based at Lively Island for the duration of the commercial fishing trial and the crew occupied the Bunkhouse on this F.I.C. share farm. It became the pattern to work from early in the morning, returning to Lively each evening. Catches were landed into Mare Harbour and taken by trailer, twice weekly, to the plant in Stanley. The ship returned to Stanley each weekend, landing her catch and taking fuel and stores.

It is clear from our trials that a commercial fishing boat, based in Stanley, could operate successfully and maintain a steady supply to the processing plant

c) Stanley Processing plant

The plant was opened in March 1986 using the former seaplane hangar on Moody Brook Road. An electric shellfish boiler, small blast freezer and a second-hand reefer container formed the main part of the installation together with numerous smaller items sent from the U.K.

The resident team renovated the interior of the building and the plant was passed as suitable for food production by the Environmental Health Officer.

The Factory Manager from J.Van Smirren Ltd. visited Stanley in June and established the quality standards from which to operate.

Three deliveries a week of live crab have been received and approximately 20 tonnes of raw material passed through the plant during the commercial phase.

Crabs have been butchered, boiled and frozen for export and each crab was split into legs, claws and bodies before storage. Six hundred cartons of sections are already in the U.K and a further 700 are due to be shipped in early December.

A small workforce was recruited to work in the plant and experimental meat extraction has been undertaken. This meat has been sold locally and the revenue has helped to off-set the costs of employing staff. The opinions of local consumers have been noted and it is pleasing to repot that the sales are increasing amongst the civilian population. We have provided crab for several functions and both the major Stanley hotels serve it on their menus.

d) Visit to Chile.

Christopher Garrod, the company's marine biologist, visited Chile in March, 1986 and spent 11 days in Punta Arenas. His report has been valuable in giving us an indication of the way in which the established Paralomis fishery was run in Chile and has given a great deal of encouragement to the team working in the Falkland Islands.

The fishery for Paralomis began as the main effort on King Crab reduced because of diminishing stocks. Since 1977 the catches of Paralomis have increased and while it is still not as large, in terms of tonnage, as King Crab, at least one major exporting company have concentrated all their effort on it.

A great deal is still to be learned about the biology of Paralomis but Mr Garrod met the senior Chilean scientist working on this specie, Dr I.Campodonico, and discussed with him, in some detail, our work.

Visits were also made to a number of processing plants and 5 days were spent at sea on a typical Chilean crabber.

e) Results from commercial fishing trial

The report showing the results from the commercial fishing trial has recently been submitted to the O.D.A. for comment. In the meantime it has been agreed for the plant to remain open and for COASTAL PIONEER to continue fishing for crab.

The catch rates for each carapace length group can be seen from the Tables. The effort was directed towards crabs of 75mm c.l. and above and it can be seen that the largest part of the catch was in the range 75mm-85mm group. Catch rates for the 75mm + groups correspond to 2.12 kgs/pot after correction for a by-catch of under-sized crabs.

Present indications are that the size of sexual maturity for male crabs is 65mm - 68mm carapace length

It can be seen from the Table showing earlier work in Choiseul Sound that the number of crabs in the 70mm-75mm c.l. group is larger than the 75mm + groups.

We estimate that a sustainable yield of 250 tonnes of live crab per annum is possible from the areas to the south and west of Lafonia.

Processing trials carried out in Stanley using small samples of raw crab show a meat yield of approximately 25%. It is anticipated that commercial production, using simple mechanical methods would reduce this yield to slightly below 20%.

Meat extraction was undertaken in Stanley using a prototype mangle for the legs and spatulas for the claws and bodies. Compressed air blowers, commonly used in the U.K. for local crabs, have been tried by J. Van Smirren at their factory. The results have been encouraging and we believe that using mangles and blowers all meat extraction can be done in Stanley.

We do not believe that, using the methods indicated, crabs of less than 75mm. c.l. can be used at present. The meat yields are reduced considerably and the labour required for extraction would be uneconomic. However, water-based meat extractors are widely used in Europe and it may be possible, at a future date, to include smaller crabs. In considering this the effect on taste and appearance must be taken into account as well as the obvious difference to catch rates and the ability of the stock to re-produce itself.

Markets for the crab have been identified in the U.K. and overseas. The tariff free entry that Falkland Islands produce has into the E.F.C. makes Europe the most attractive market and already considerable interest has been shown by British and Continental buyers. The size of the potential yield, around 60 tonnes of meat per annum, is suitable for the catering trade and a price of £9.00 per kilo is expected for the finished product.

Favourable comparisons have been made with other crab meat products and the results from market trials are encouraging.

Anticipating the expansion of the project arrangements have been made to launch the product at the International Food Exhibition in London in early February, 1987.

Future possibilities for inshore fishing

Fortoser Ltd. will shortly be putting a detailed proposal to the F.I.D.C. for the expansion of the present research project into a fully commercial fishery.

The fishery, like that of the Chileans, will be small but based on a T.A.C. of 250 tonnes per annum a two boat operation can be successful. All meat extraction should be carried out in Stanley and a throughput of 60 tonnes per year with a turnover of £0.5 million is not unreasonable.

The existing plant at Stanley can be used with additions to the freezing and cold storage capacity. The interior of the building needs modification and would include removal of the internal structures, to be replaced by purpose-built processing rooms conforming with Food and Hygiene regulations.

A workforce of 10 people, including female and part-time staff, would be required to handle the expected throughput.

COASTAL PIONEER has proved that a vessel of her size can operate satisfactorily in these waters. Low-cost alterations to her deck layout and the addition of live holding tanks are all that are required to convert the vessel into an operational crabber. A second vessel should be of similar size and with live holding tanks and chilled fishroom.

One vessel based in Stanley would operate into Mare Harbour supplying live crabs two or three times weekly. The second vessel could be operated from Fox Bay and work the western end of the main fishing grounds. The need for crew accommodation to be provided in Stanley is vital if the fishery is to succeed. A crew of four is required for each vessel and the Skipper and at least one

crew member will be recruited in the United Kingdom.

While the proposals for the development of a fishery are based on the crab, Paralomis, further research for other species should not be forgotten. The King Crab has been caught in small quantities around the coast and a concentrated effort is needed to prove conclusively the presence, or absence, of this specie in commercial numbers. It is hoped that the second vessel will be able to spend at least some of its time in research.

A locally registered company, Falkland Seafoods Ltd., has been established. Our proposals for the future of the inshore fishing industry conclude that the fish catching, processing and marketing should be performed by this company.

Training

It has been the policy of Fortoser Ltd. to employ local staff wherever possible. Two members of the ship's crew and three shore staff have been recruited in the Falklands One of the crew members is presently undergoing training in the U.K. at the Grimsby Nautical College. It is hoped that one of the shore staff will shortly be able to attend a refrigeration course, also in Grimsby.

SUMMARY OF COMMERCIAL STATIONS NOS 1714-2369
From 9.5.86 to 25.9.86

No. of stations	576
No. of pot hauls	8,309
Total weight	19,036 kgs
Total no. of crabs	48,822
Corrected weight *	17,596 kgs
Corrected no. of crabs*	43,764

Mean catch	Mean catch (corrected*)
2.29 kg./pot	2.12 kg./pot
5.9 crabs/pot	5.3 crabs/pot

C.L. group	Numbers	Weight (kgs)
65 - 69	110	25
70 - 74	4,948	1,416
75 - 79	24,842	8,770
80 - 84	12,809	5,508
85 - 89	4,878	2,527
90 - 94	1,017	628
95 - 99	198	145
100-104	20	17
Total	48,822	19,036 kgs
Corrected total *	43,764	17,595 kgs

* Fishery directed at species of over 75mm c.l. The corrected figures exclude by-catch of under-sized crabs

ESTIMATED WEEKLY CATCH OF PARALOMIS GRANULOSA BY COMMERCIAL FISHING BOAT

Based on Data from Fishing Trials in Choiseul Sound during October 1985

	Mean Whole Live Weight per Crab (g)	Using D Section Pots[2]		Using 6' Ø Conical Pots[3]	
		Number of Whole Live Crab	Weight of Whole Live Crab (Kg)	Number of Whole Live Crab	Weight of Whole Live Crab (Kg)
CARAPACE LENGTH GROUP (mm)					
<70	143	51,077	7,304	47,108	6,736
70 - 74	262	4,863	1,274	7,868	2,061
75 - 79	323	2,577	832	3,900	1,260
Probable minimum → biological size 80 - 84	394	1,157	456	2,393	943
85 - 89	475	247	117	743	353
90 - 94	566	97	55	128	72
95 - 99	669	7	5	30	20
ALL SIZES		60,025	10,043	62,170	11,445

[2] Assuming ship hauls 300 pots three times a week. (Figures raised from total fishing effort during trials of 270 pot nights.)

[3] Assuming ship hauls 125 pots three times a week. (Figures raised from total fishing effort during trials of 50 pot nights.)

The pots were fished overnight during the trials. It is assumed that catch per pot remains constant irrespective of pot immersion time above one night.

Ship can use 300 D section pots or 125 conical pots, but not both.