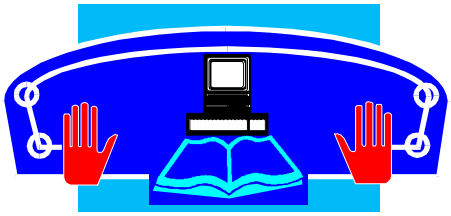


Report On An Experimental Weir/trap With Holding Pens On The Ekalluk River - Summer 1993 - Draft Only

Type of Study: Analysis/review Fisheries, Kitikmeot Fishery

Date of Report: 1994

Author: G.n.w.t. - Economic Development & Tourism - Kitikmeot Region

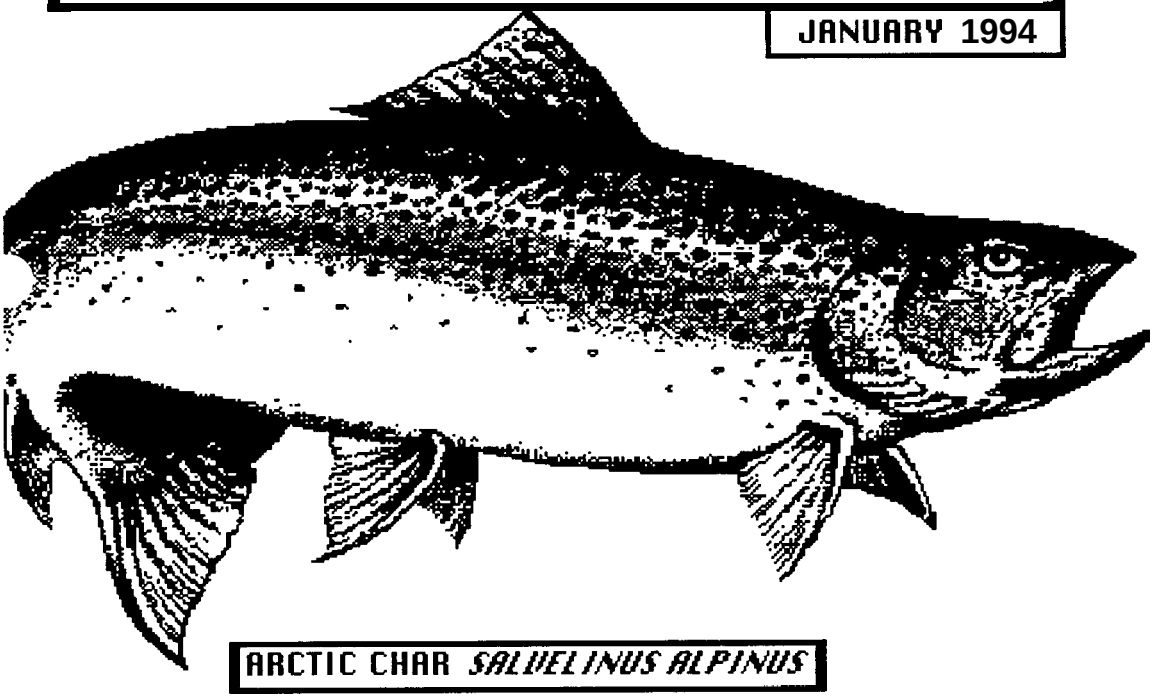
Catalogue Number: 3-8-9

THE REPORT OF AN EXPERIMENT WITH A WEIR AND HOLDING PENS TO DEMONSTRATE THRT CHARCAN BE HELD FOR EXTENDED PERIODS AND HARVESTED FOR A FRESH FISH MARKET.

3-8-9

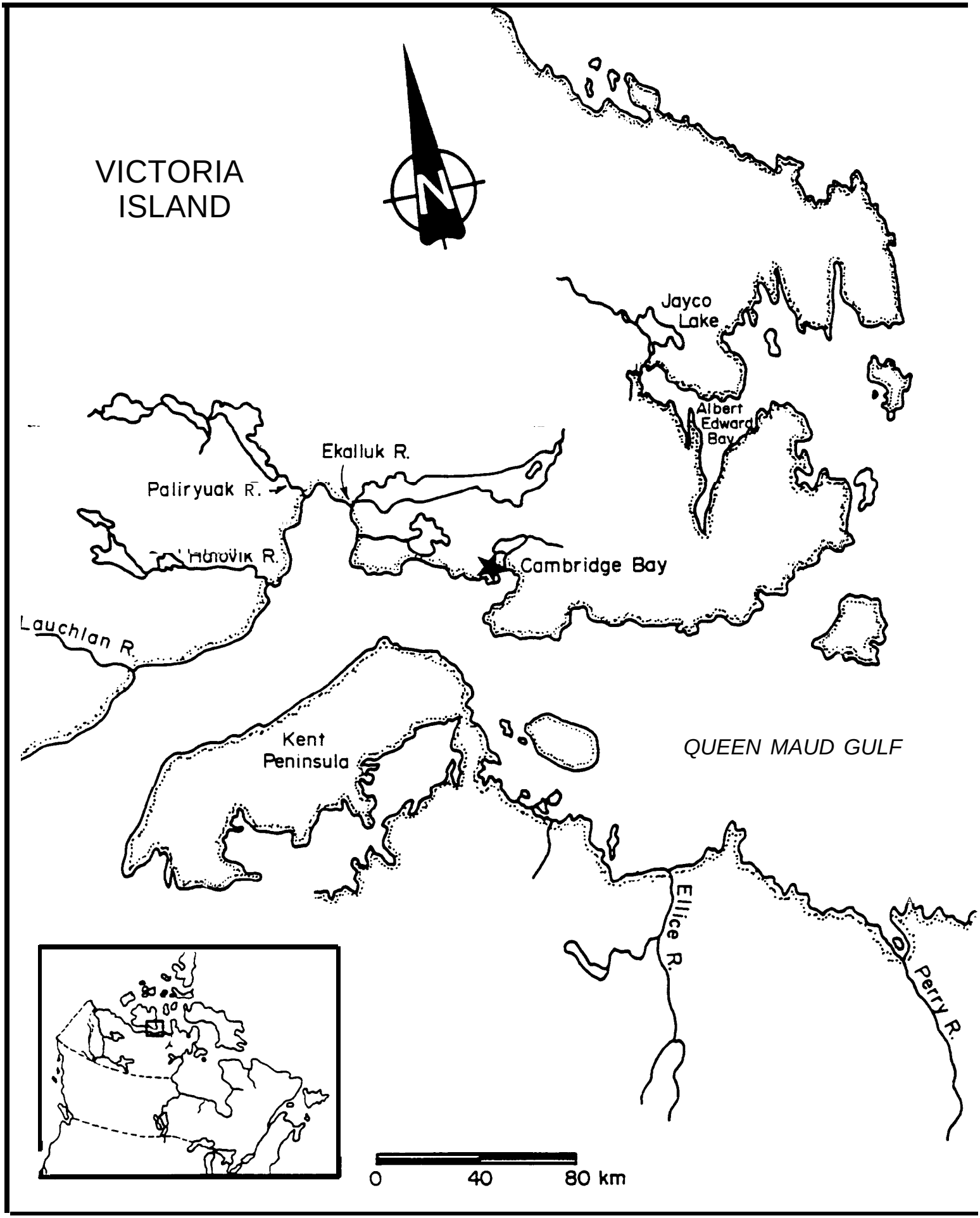
BY JOHN MCGRATH, REGIONAL SUPERINTENDENT, KITIKMEOT
AND
KEVIN SMART, RENEWABLE RESOURCE OFFICER, KITIKMEOT
DEP'T OF ECONOMIC DEVELOPMENT AND TOURISM
GOVERNMENT OF THE NORTHWEST TERRITORIES

JANUARY 1994



ARCTIC CHAR *SALVELINUS ALPINUS*

DRAFT ONLY


VICTORIA
ISLAND
N
Jayco
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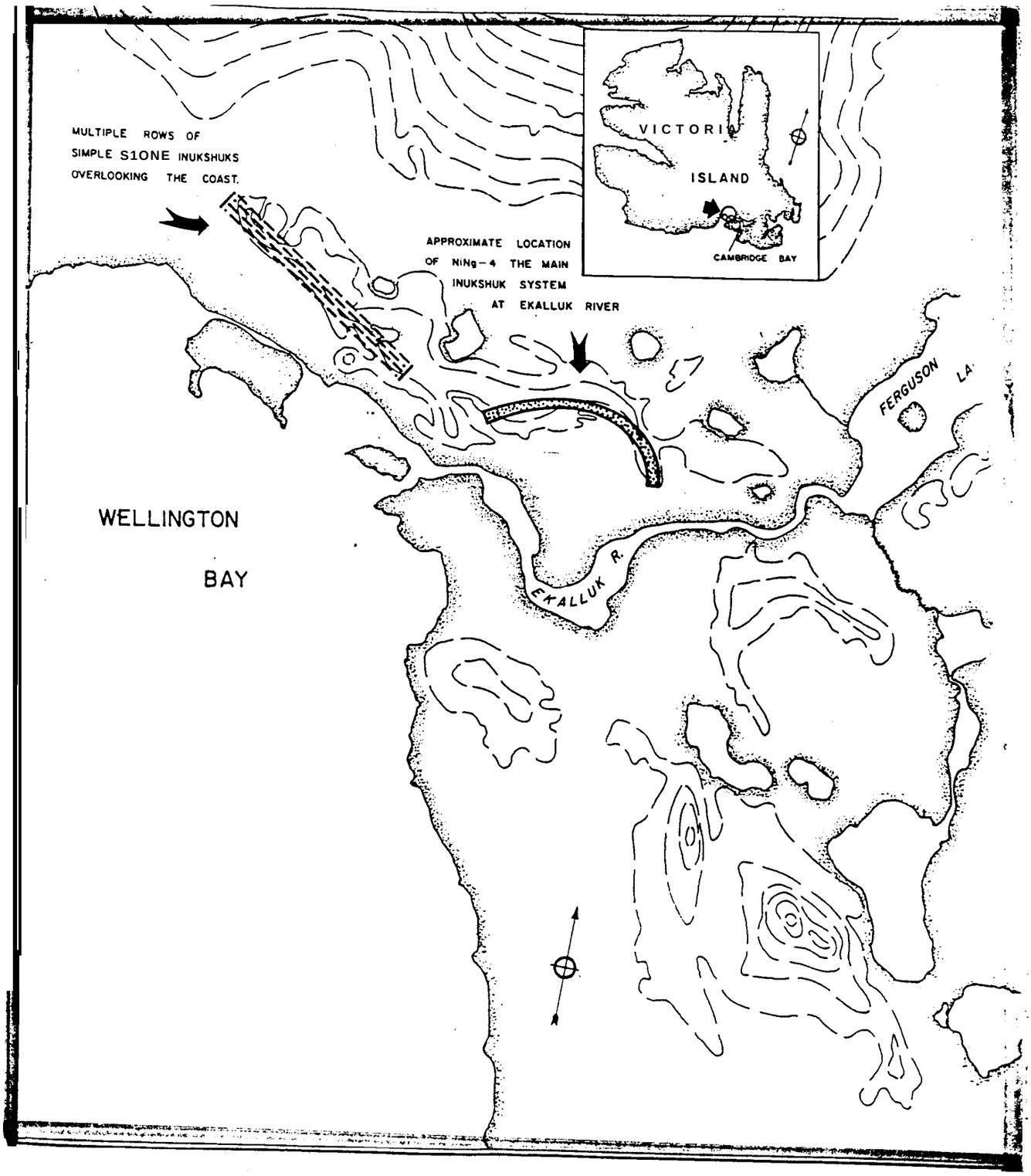
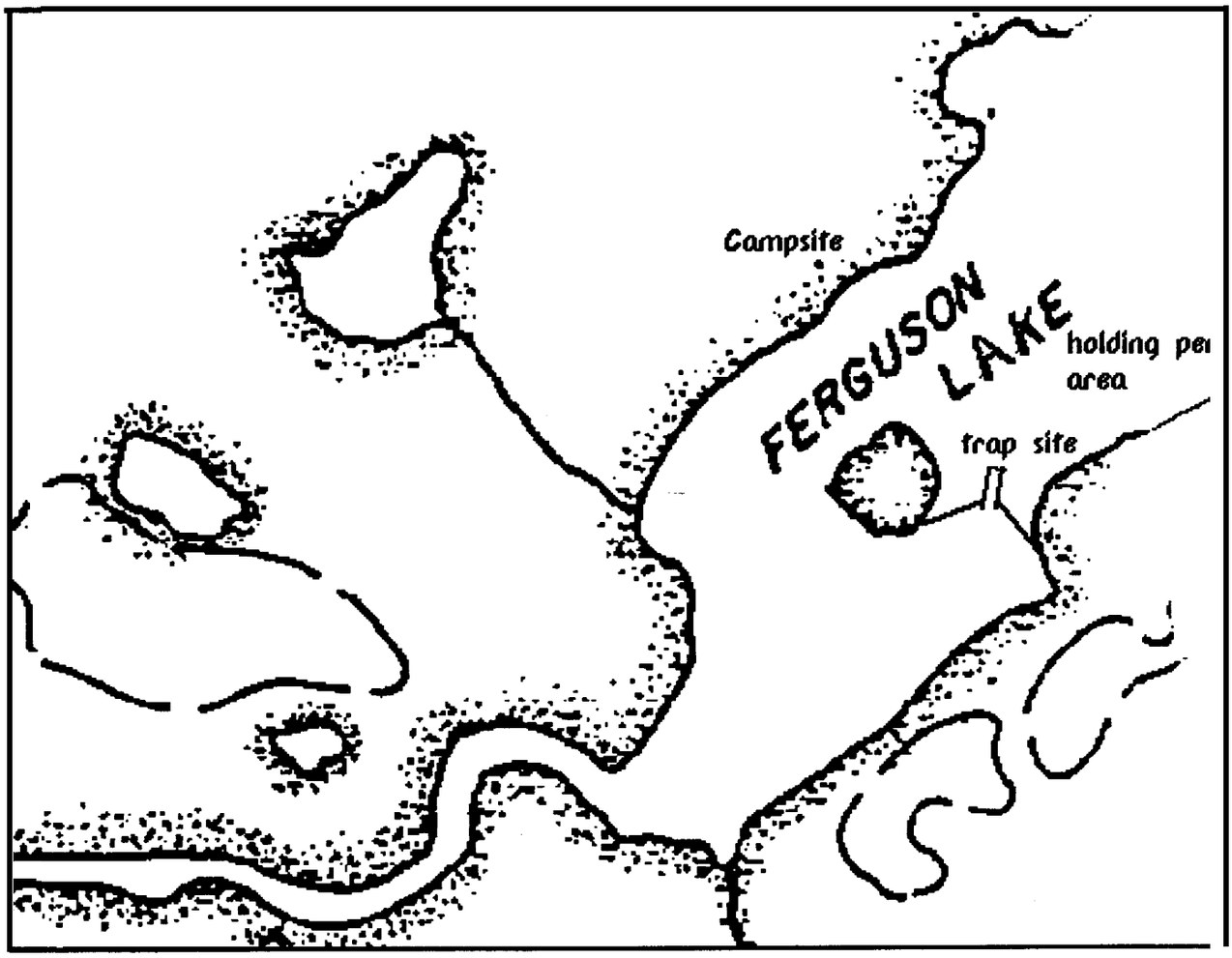

MULTIPLE ROWS OF
SIMPLE STONE INUKSHUKS
OVERLOOKING THE COAST.
APPROXIMATE LOCATION
OF NiNg-4 THE MAIN
INUKSHUK SYSTEM
AT EKALLUK RIVER
VICTORIA
ISLAND
CAMBRIDGE BAY
WELLINGTON
BAY
EKALLUK R.
FERGUSON
LA


Campsite
FERGUSON LAKE
holding pe
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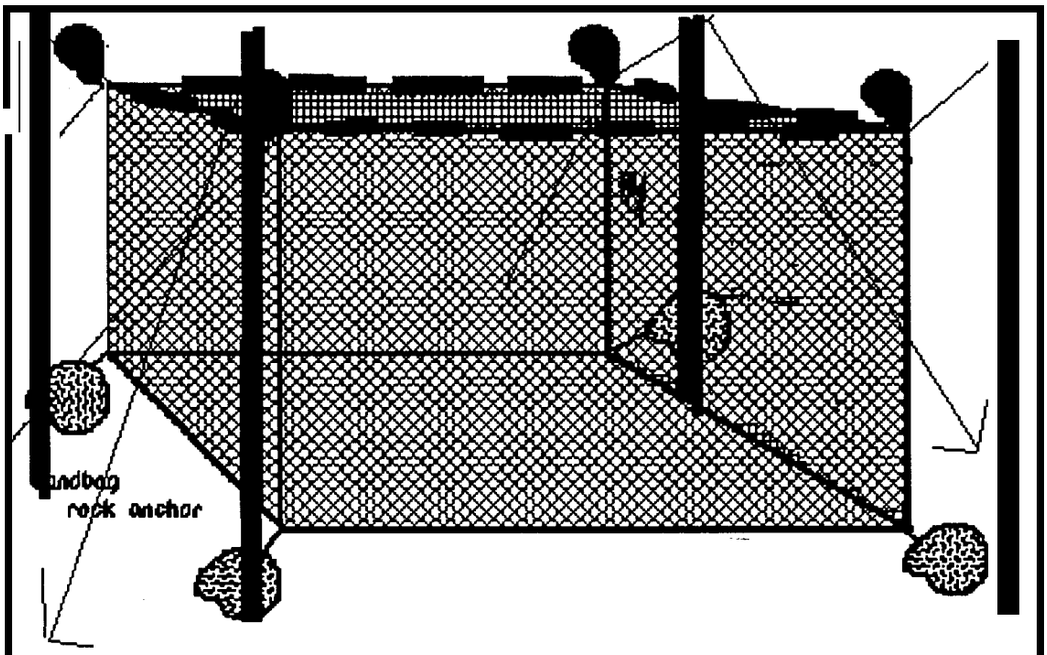
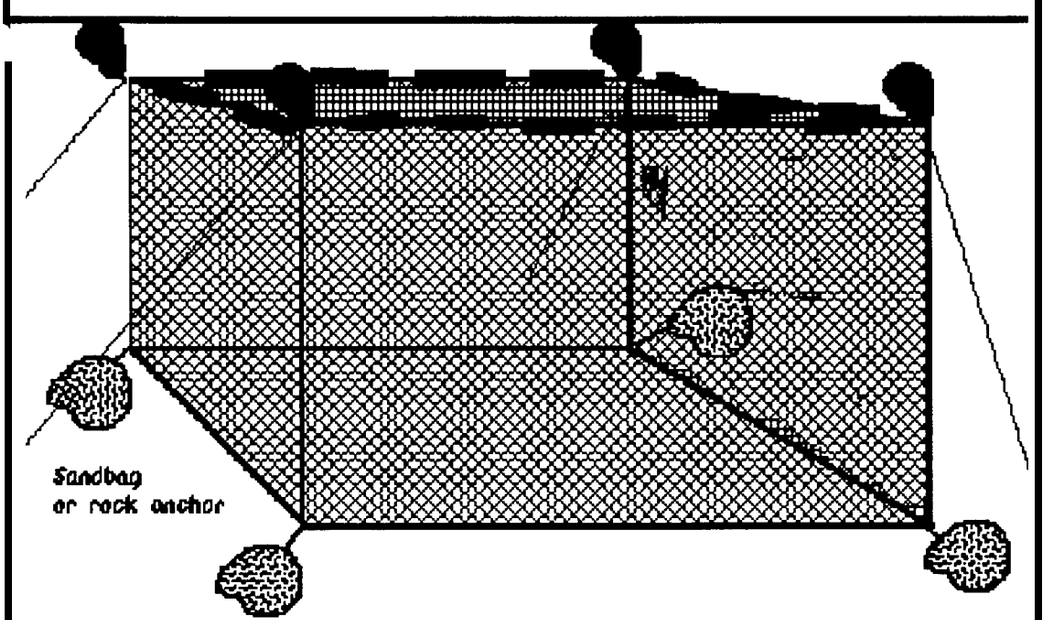


HOLDING PEN TYPE 'A-. ANCHORED AT THE **BOTTOM CORNERS WITH SANDBAGS AND** SECURED **AT THE TOP TO TWO-BY FOURS DRIVEN INTO THE MUD. THIS WAS** THE TYPE **WHICH MOVED** AFTER SNAPPING OFF THE TWO BY **FOURS.**



HOLD ING PEH TYPE **"B"** FREE STANDING **AT** THE **TOP AND ANCHORED AT** THE **BOTTOM FOUR CORNERS WITH** SANDBAGS. THIS TYPE **WOULD** BE **RECOMMENDED WHERE** THE FISH WAS TO BE HELD UNDER THE ICE. **IN A PERMENANT** SITE, IT WOULD BE POSSIBLE TO PUT **IN HEAVY** ANCHORS **WHICH COULD** BE EASILY RETRIEVED EACH YEAR.

THESE HOLD **ING PENS** ARE IDENTICAL:
12 X12 X6 FEET
APPROX. 32 CUBIC METERS
STOCK ING R.ATE : **50** KG PER CUBIC METER.

A REPORT OF AN EXPERIMENTAL CHAR FISHERY ON THE EKALLUK RIVER, KITIKMEOT REGION. NWT.

INTRODUCTION AND BACKGROUND

With the exception of the fishery being conducted by the Ikaluktutiak Co-op in Cambridge Bay, there haue been no significant commercial harvests of Arctic char within the Kitikmeot Region since the-closure of the Pelly Bag Fishery in the mid-to-late Seventies. The Cambridge Bay fish plant has been operating successfully for a ouer twenty fiue years and plans are now being developed to include secondary processing of high quality fish products. For most of the time the Plant operated, the product was shipped to the Freshwater Fish Marketing Corporation in Winnipeg and thus Co-op had no experience (or need) in marketing. Three years ago, the FFMC announced that it would no longer take char except at a price about one half of that expected by the Co-op. Since that time, the Co-op has been looking at other marketing possibilities, as the new prices made it impossible to fish as they had been doing for so many years. Clearly an evaluation was necessary

At the same time, preliminary investigations haue indicated that the char resource may be available in other areas of the Kitikmeot in quantities sufficient to support a viable and sustainable fishery if the marketing situation can be clarified. We haue had little contact with the market as the fish was virtually going to FFMC. We must now make contact with reputable buyers and assure them of quality and supply if we are to get top

dollar for our product. Prior to the establishment of any new infrastructure for commercial fishing or processing, however, this resource must be clearly identified and quantified to determine if a commercial-scale fishery would be viable, and under what conditions.

Through a thorough analysis of the available data, the Regional Office of the Department of Economic Development is convinced that the potential is significant enough to warrant an intensive assessment of the fishery resource and the preparation of a fishery development plan. The proposed plan would include:

- a regional evaluation to identify areas with sufficient fishery resources to develop a commercial fishery
- discussions with the local Hunters and Trappers Associations to coordinate development plans.
- an assessment of various fishing techniques and harvesting methods
- the determination of a total sustainable annual Kitikmeot Regional harvest
- an evaluation of additional infrastructure requirements both in the harvesting and processing sectors
- a strict policy presenting resource-use conflicts with existing or planned domestic or sports fisheries

It is clear from the literature that the char fishery in the Central Arctic has been primarily focussed in the Cambridge Bay area, probably because of the favoured position of that community in the

transportation grid of the Region, and the relative ease of access for the fisheries biologist s whose work is central to the development of this resource. If there is to be any significant future development of this fishery, it is necessary that this data collection be extended to other major river systems, particularly in the Eastern Kitikmeot. It should not be necessary however to rely totally on the limited resources of the Dept of Fisheries and Oceans to accomplish this. Both the NWT Government and the local Hunters and Trappers Associations, which haue increasingly been taking on more of the responsibilities of resource management in the Region, haue indicated that they are both willing and able to do much of the work necessary in managing this important resource. While their approach might not be as academic as that of the biologists from Fisheries and Oceans, they can nevertheless do basic population studies and tagging, all of which are necessary for a realistic assessment of the stocks. It is highly unlikely that, with it's limited resources, the Dept. of Fisheries and Oceans will do any expanded work in the area of char but this approach would allow them to assist and monitor the HTAs and the GNWT in the accomplishment of this work. Properly followed, this approach should be of benefit to the resource, the people and the governments. With it's limited goals such a program, while less than satisfactory for long-term sustainable development, can go far in identifying the best places to place limited funding resources. Meetings with DFO and HTAs would indicate that this approach is supportable, although close monitoring is suggested.

PRESENT FISHERY

While much biological work has been done on the char resources of the Central Arctic, particularly in the Victoria Island area, little has been done in the eastern part of the region. Ouer the years, various attempts haue been made to try and develop a fishery in that area somewhat like the the one which has proved to be at least modestly successful on Victoria Island and the adjacent mainland near Cambridge Bay. In that area, The Ekaluktutiak Co-op has been producing approximately 100,000 lbs of char a year for almost 30 years. This fishery has persisted in the face of initial quality problems which haue been overcome by an almost total reliance on aircraft for fish delivery.

There is a subsistence fishery in virtually every community on the Arctic Coast and in the early days before community consolidation these sometimes conflicted with the developing commercial fishery. At present however, since most of the people of the region haue moued into larger communities, there is little conflict as the commercial fisheries generally operate outside the range of the domestic or subsistence fishery, and quotas and licences are controlled by the local HTAs.

CONSTRAINTS

The principle constraint against fishery development in the Central Rrctic is the cost of transportation and any developmental breakthrough will haue to address this fact. Aircraft, jet boats and uarious types of over-ground transportation such as hovercraft haue all been tried ouer the years with indifferent success. Some promise is shown by the new Tundra Vehicles but the best proven ouer the ground transport is the Bombardier

13-passenger tracked vehicle. The problem with these machines is that they can only be used efficiently and in an enuironmentally friendly manner in the period after freeze-up, when the fish haue long gone to their wintering places. They are also quite expensive.

OPPORTUNITIES

How then do we blend these situations to produce an opportunity to develop a fishery in Kitikmeot East and fine-tune the existing char fishery in-Cambridge Bay? It is our belief that fish can be trapped in various types of weirs, not unlike the way the Inuit haue been doing for thousands of years, and kept in accessible gathering places until after freeze-up, thus extending the harvesting season, reducing the glut periods at the processing plant and supplying the high-end southern market with a constant supply of fresh fish. When trapped and penned, the char can be haruested and either frozen on site, thus obviating the need for a fish freezing plant where none now exists, or taken unfrozen and shipped to a fresh market in small amounts spread out ouer a longer season. This latter approach would call for the development of a steady market for this fresh product. Considering that the amounts of fish are relatively small (In global terms, the supply of Arctic char is miniscule) this should not proue to be a problem and preliminary results indicate this to be so. There is a good market for fresh wild char, and, as the limited amount of available product finds it's best niche, prices beyond that paid by the FFMC ouer the years can be surpassed. Much of the capitol costs associated with a fishplant can be bypassed if most of the fish is shipped unfrozen.

We have considered other ways to overcome the problems of transportation, such as reducing the weight of the fish through secondary processing, ie. filleting and smoking. The latter two processes together reduce the weight of the product by as much as between 50% and 60% and raise the value of the finished product. Char which now brings about $3.00 a lb if smoked can bring in excess of 10.00 a lb. (Using the 50% figure above, this would mean that the raw material would cost about 6.00 a lb. This would allow up to 4.00 for the smoking operation, although it should be noted that there is a further loss of weight through smoking of about 10%)

QUOTAS

Any discussion of fishery opportunity would be futile if it did not lend itself to the question of the population dynamics of the char, and this invariably leads to a discussion of quotas. Faulted though the system is, it is the only way at present that we can hope to preserve a general population of char for future generations. It is a fact however that at present uery little work is being done to study the char populations east of Cambridge Bay. Up to now, there haue been only one counting fence installed on any river in Kitikmeot east, and the counting fence is the most important tool in the biologists hands. Methods must be instituted to allow local people to take a more active part in the enumeration of the char resource, and it is our belief that this can be done in concert with ourselves, the HTAs, the Federal Fisheries Department and The Department of Renewable Resources.

At present, just from the quota allocations by OFO , it would seem that for Kitikmeot, the fishery in the Gjoa

Haven would have the best chance of success. This large area, bounded primarily by the littoral of Chantry Inlet and Rasmussen Basin, would seem to haue all the necessary criteria for a successful fishery, especially using the criteria established by 30 years of successful fishing in the Victoria Island area. The primary obstruction to developing this fishery is transportation, as the cost of siting an aircraft there for the fishery is prohibitive. Unlike Cambridge Bay, there is little opportunity to obtain side charters fo-r an aircraft devoted to that area and the lack of infrastructure and maintainance facilities drive aircraft costs beyond reasonable expectations, especially when you must consider the placing of fuel caches and other expensive undertakings associated with aircraft support. This was one of the most important considerations in doing the experimental work out of Cambridge Bay, where little work was needed in identifying new stocks of char, rather than in Gjoa Haven. We did however do an ocean trapping project in Gjoa Haven but with inconclusive results. Further experimental work is planned for this coming season.

ADDITIONAL WORK REQUIRED

Within the next fiue years, it would be desirable to identify all the areas and rivers which add to the total biomass of char in the Kitikmeot Region. We can then establish which systems deserue further work, either because of their rich char populations coupled with a remote location, or because of a favoured position in the migratory patterns of the char which would allow a specialized fishery such as a weir or trap fishery to take place. By using innovative techniques for fishing, fish

handling, and fish transportation, it is our belief that it is possible to conduct a limited economic fishery in Kitikmeot East. In the beginning the costs of this work would be fairly high, but, as the fishery develops, these costs would quickly disappear or be absorbed by the project revenue. Evidence of this will be presented in the latter part of this paper.

Perhaps one of the most important (and cheapest!) areas of investigation of the char resource would be through the oral history of the area and through a systematic search of the literature of the Eastern Kitikmeot. Because of the interest in the eighteenth and nineteenth centuries in the search for a Northwest Passage and the subsequent searches for the searchers of the Northwest Passage, the Gjoa Haven area is particularly rich in the writings of naturalists and explorers who passed through the area and wrote long and detailed reports on their travels and travails. Within these reports lie much information on fisheries and related subjects, waiting for the diligent researcher and archivist to bring them to light. As for the oral history, in a few short years, those elders who were born and brought up on the land will haue passed away and it would be a shame if the wealth of knowledge of the fish and the area were to pass with them. It is our duty to collect these data and preserve them for our own use in the present development and as a data bank for future researchers.

EKALLUK WEIR-TRAP AND HOLDING PENS

THE EXPERIMENT:

It was our intention to erect a trap on or near the

Ekalluk River and attempt to catch a quota of about 5000 pounds, moue them to holding pens designed for that purpose, and monitor and haruest them ouer a period of three months to see if there was any reason why char could not be held this way.

THE SITE

Work started on this project on August 13, 1993, at the head waters of the Ekalluk River which is located at the discharge end of Fergerson Lake, 50 miles Northwest of Cambridge Bay.

The lake at this site is about 1600 feet across, with a small island located in the center of this stretch of water. (See photograph and drawings). The original plan was to install the weir on the north side of this island, and bar off the south side completely, (See enclosed sketch) however when looking at the proposed site, it was felt that the south side was the more obvious route for returning char when migrating up the lake. Although preparations were made, and netting prepared, to close off the north side, it did not prove necessary for the quota which we had. This might change with larger quotas, as we haue no idea how much fish chose to go up the other side of the island and the run is short and does not allow for guessing. About half of the river remained open at all times throughout the experiment.

The deepest water in the area of the trap was four and a half feet, taken at a time when the lake was a little higher than normal, due to a tidal effect caused by a strong wind coming down the lake. Water levels in this part of the lake can uarg as much as a foot with little warning, due to wind tide effect.

There is a fair current flowing in the channel, and this

was a serious consideration in the design of the trap. The lake bottom consists of small and medium size rocks in a grey clay or pug.

GEAR

As shown in the diagram, the gear consisted of two strings of webbing or netting suspended from a series of wooden tripods ballasted down with sandbags, and meeting in the middle where a small box trap was constructed to contain the fish. When the tripods for the weir were driven into the pug and ballasted down with two heavy sand bags, the structures were quite secure, and easily withstood heavy winds and strong currents, although some sandbags were used on the footlines of the webbing when strong current lifted them. At the middle where the two strings of netting met, the structure was re-inforced by using a pipe-and-rail rig normally used in constructing counting fences (see diagram facing) which served to allow small fish to escape between the upright rods.

The tripods which were assembled on shore and secured with carriage bolts, were made in, three, four and six foot heights and the bottom ends of the tripods were pointed for better penetration in the river bed.

This year we made do with some makeshift options which, while they worked, were hard on the crew. With this experience now behind us we can say with some confidence that a few small design changes would make the work go ahead better and at little cost. Nevertheless, everything operated as planned and designed and the project met all expectations and more. A small boat was an indispensable part of the operation, for although much of the work had to be done in the

water with the aid of chest waders, the material had to be brought from the camp and the fish transferred to the holding pens, as well as harvesting the fish from the pens later on. It should also be noted that much of the material for the trap and pens was put on site by skidoo in the spring of '93 to reduce the costs of aircraft transportation.

THE FISHERY

Once the weir was in place, it rema-ined only to await the fish, which came back on the 26th of August as predicted. Some small fish (less than 100 pounds total) became entangled in the the three-inch webbing whereas none was reported in the two-and a-quarter inch size and this was noted for future gears. As the fish met the twine they followed along it and entered the box, from whence they were removed to the holding pens. The box seemed to hold about one hundred fish before the others would stop coming in, but as these were removed, others crowded in to take their place. There is lots of room here for improved design, especially if we were to consider a more permanant trap structure.

The fish were taken from the box with a dipnet, placed in a large fishbox filled with water and removed to the holding pens. while quite agitated on first being introduced to the confines of the bOH, a combination of low oxygen, stress and a cover on the box combined to quiet the fish, which were quickly moved to the holding pens, where they recovered in short order.

During the three months that the fish were in the pens, only two dead fish was found and it seems they were injured in the remoual-transporting phase of the

operation.

As we were unsure as to what stocking densities were best for the pens, we decided to err on the side of safety and placed only fifty kilos of fish per cubic meter in each pen. The allocated quota was caught in two days, and we feel that a quota of 20'000 pounds could easily be caught in less than a week by three men. This would mean some design changes, but these haue already been planned.

At designated times ouer the next couple of months, we went back to the riuer and haruested the char, using the Beauer and a North Warning helicopter (for which we were not charged) The final haruest took place during the last week of October. For this effort, we used two Skidoos and hauled the fish to CamBay Fishplant. Several interesting items were noted during this experience. When we arriued at the area of the char pen we were surprised not to see any sign of the posts we had installed earlier to raise the roof of the pen. We found the the posts (8) under the ice. Apparently when ice had formed around the pen, high winds must haue broken up this ice and in the process took down the posts. The pen itself did not moue much as it still held its square shape, although this could haue resulted from the pen being frozen into the covering ice. The 16 anchors helped the pen hold its position otherwise the pen could haue been pulled out of shape decreasing the amount of space for the fish, possibly causing overcrowding and probably resulting in mortality. In future it seems that the best option would be to sink the pen at least a foot under the water to allow for this and not anchor it to posts but only to the bottom. It would be a simple matter of triangulation to locate the pens under the ice, or consideration could be given to

equipping the headlines with an electronic beeper.

While the ice thickness was 12" at the pen, there was open water about 100 yards down from the site, in the area where the original trap was located, which gives an indication of the strength of the current flowing there.

We drilled a couple holes with an ice auger through the roof of the pen. It was a pleasant sight to see the char finning themselves in different depths throughout the pen and all seemed well. To harvest them, as the temperature was about minus twenty C, and windy, we got our largest tent and set it up on the ice near the holding pen. This made a good shelter where we could duck inside for warming up. While the bleeding, gutting and cleaning was done outside, had the weather been windy, it could all be done inside the warm tent, and we should be prepared to do this. In fact a system not unlike that designed for the musk-ox kill would be useful.

The char appeared every bit as good as when we put them in the pen. We haruested only 350 pounds, approximately what a grey insulated fishbox will hold, as a test. This allowed us to get the fish back to CamBay without it freezing. We made ice by drilling holes in the ice with the ice drill and shoveling up the ice chips. this worked well and the ice was excellent.

When doing fish on the ice they should not be left for more than a couple of minutes as they begin to freeze quickly. a good wag to clean them was to drill a hole and use this hole for washing and cleaning. When finished, the fish did not require any further processing, except for grading, and placing the styrofoam boxes in master cartons. If properly setup, this too could be done on site.

Although most of the fish was processed on site, some were simply bled, iced in tote boxes and flown back to the plant where the gutting and cleaning was done, followed by grading, weighing and packing ready for shipment to markets. Some of these fish were filleted and some fillets were smoked and others were cut in 8 oz. portions and vacuumed packed. The quality was excellent. The quality of the fish did not seem to be affected by doing it this way. A factor in this was the weather which at the time was below freezing, and the water was ice cold. In fact, ice had to be broken up on the cleaning site in order to get water, so the fish stayed super chilled through the whole process.

It took about one hour for two people to weigh, grade, pack and deliver the char to the airport. 200 pounds of this fish was sent on Friday, Ott 22nd to Japan to the Tsukiji Market in downtown Tokyo, the largest fish market in the world. The fish arrived Sunday and was available for the first auction at 4:00 AM Monday 25th of October. Those who saw the fish liked the freshness, the colour and the fat content, but the blueish colour of the skin was new to them as they are used to the silver skin on salmon. Char is a fish they know nothing about. The char is being looked at by the restaurant people and we are expecting a report later. We do know now that we can ship fresh char directly from the field around the world.

FINDINGS

1) Char can be trapped, held in pens and harvested ouer a two-to-three month period, thus avoiding a glut situation in the plant.

2) Fish can be culled as to size, year-class etc. and an optimum harvesting regime can be instituted.
3) With traps, fish are taken at the end of the season when they are in their best shape and at weights up to 20% higher than in the spring. This increases the the allowable catch-weight without taking any more fish.
4) Quotas can be easily controlled
5) Fresh fish can be shipped in top condition into all major markets in North America, Europe and the Far East.
6) Prices of at least $1.00 per pound ouer that of frozen product can be realized.
7) New markets were identified for fresh product.
8) Having fresh char available ouer an extended period allows for a rational marketing policy.
9) In the event that the fish is to be held frozen, the final product will still be superior to the gill-net caught fish, as studies have shown that a fish which is quickly killed and bled will haue better keeping qualities than those which die thrashing around in a gill-net.
10) There was a concern that the fish would be damaged from pressing against the netting. This did not happen. The few fish which were marked appeared to haue been the victims of seals or gill-nets.

There were many small improvements which we would make, if we were to repeat or continue this project which would make the handling of both the gear and the fish easier and more cost-effective.

RECOMMENDATIONS

1) that the findings be discussed with the CamBay fishermen at a local meeting and that the pros and cons

of weir us. gill-net fishing be fully explored before any plans are made for the coming season

2) that the findings be discussed with the Nunavut Wildlife Commission.

3) that in any new planned experimental fishery, the emphasis be placed on weirs and trap-fishing as the primary tools for fishery development as this promotes the concept of excellence and quality right from the beginning.

CAMBRIDGE BAY CO-OP FISHERY 1987

RIVER	QUOTA HOG	CATCH HOG	Over/Short	# oF FISHERMEN
Surrev River	7,780	6,988	292 Short	6 (Six)
30 Mile River	5.440	5,466	26 Over	4 (Four)
Byron Bav	7,280	7,606	326 Over	6 (Six)
Wellington Bay	11,600	11,727	177 Over	9 (Nine)
Ellice River	3,600	3,670	70 Over	4 (Four)
Jayko Lake	10,880	10,949	69 Over	4 (Four)

CAMBRIDGE BAY CO-OP FISHERY 1988

RIVER	QUOTA HOG	CATCH HOG	Over/Short	# of FISHERMEN
Surrev River	16,049	15,085	966 Short	6 (Six)
30 Mile River	11.993	11,996	3 Over	3 (Three)
Byron Bav	16,049	16,611	562 Over	6 (Six)
Wellington Bav	25,520	26,110	590 Over	8 (Eight)
Ellice River	10,560	9,913	647 Short	4 (Four)
Jayco Lake	23,980	20,803	3,117 Short	4 (Four)

CAMBRIDGE BAY CO-OP FISHERY 1989

RIVER	QUOTA HOG	CATCH HOG	Over/Short	# of FISHERMEN
Surrey River	16,060	16,170	110 Over	8 (Eight)
30 Mile River	12,100	12,081	19 short	4 (Four)
Byron Bav	16,060	16,185	125 Over	6 (Six)
Wellington Bav	25,520	23,901	1,619 Short	7 (Seven)
Ellice River	10,560	10,517	43 short	4 (Four)
Javco Lake	23,980	22,675	1,305 short	4 (Four)

CAMBRIDGE BAY CO-OP FISHERY 1990

RIVER	QUOTA HOG	CATCH HOG	Over/Short	# of FISHERMEN
Surrey River	16,060	16,396	336 Over	4 (Four)
30 Mile River	12,100	17,770	170 Over	3 (Three)
Byron Bay	16,060	1 5,73?	378 Short	6 (Six)
Wellington Bay	75,562	26,713	1,151 Over	6 (Six)
Ellice River	10,560	11,227	6670 ver	4 (Four)
Jayco Lake	23,980	77653	1.377 short	4 (Four)

CAMBRIDGE BAY CO-OP FISHERY 1991

RIVER	QUOTA HOG	CATCH HOG	Over/Short	# of FISHERMEN
Surrey River	16.060	15,790	270 Short	5 Five)
30 Mile River	17100	12,671	571 Over	3 (Three)
Byron Bay	16.060	15,532	528 Short	4 (Four)
Lease Point	14,110	6,810	7.300 short	4 (Four)
Ellice River	14,110	14,058	52 Short	5(Five)
Jayco Lake	27,558	3,927	23,631 Short	5(Five)
Perry River	11.464	1,059	10,405 Short	5 (Five)

CAMBRIDGE BAY CO-OP FISHERY 1992

RIVER	QUOTA HOG	CATCH HOG	Over/Short	# of FISHERMEN
Surrey River	16.094	15,545	549 short	3 (Three)
30 Mile River	17125	11,981	144 Short	5 (Five)
Byron River	16.094	16.417	323 Over	6 (Six)

CAMBRIDGE BAY CO-OP FISHERY 1993

RIVER	QUOTA HOG	CATCH HOG	Over/Short	# OF FISHERMEN
Surrey River	16,100	11,608	4,492 short	6 (Six)
30 Mile River	12,175	11,796	379 Short	3 (Three)
Byron Bay	16,100	16,416	316 Over	5 (Five)
Kulgayuk River	7,000	5,473	1,527 Short	2 (Two)
Ellice River	14,110	14,046	64 Short	6 (Six)
Jayco Lake	27,560	77,178	382 Short	7 (Seven)