STOCK STATUS REPORT

ICELAND SCALLOP: GRAND BANKS OF NEWFOUNDLAND (NAFO DIV. 3LN) AND STRAIT OF BELLE ISLE (NAFO DIV. 4R)

Background

The Iceland scallop (Chlamys islandica) is widely distributed within the subarctic. In Newfoundland, populations are normally found in waters from 55 m-200 m, usually on hard bottom with variable substrate composition consisting largely of sand, gravel, shell fragments, and stones. Being a filter feeder, the species is most abundant in areas with strong currents as in the Strait of Belle Isle in the northeastern Gulf of St.Lawrence. Other areas where Iceland scallops are found in commercial quantities include St. Pierre Bank (Div. 3Ps) and Grand Bank. Elsewhere, they are harvested in Greenland, Iceland, Norway and Russia.

Unlike many species of scallops, the Iceland scallop is dioecious (i.e. each animal is either male or female). They become sexually mature at three to six years of age. Spawning in Newfoundland begins around April-May and is thought to be triggered by short-term variations in temperature. The species is highly fecund producing millions of eggs which are externally fertilized. Larvae are planktonic for up to 10 weeks before settling out on substrates, including shell debris and filamentous materials. Settlement is gregarious resulting in densities sometimes approaching 100 animals per square meter.

Growth rates and meat yield vary from one area to another. It takes approximately 7-8 years to reach commercial size of about 65 mm (or 2.5") in shell height. The animals frequently live in excess of 25 years, but seldom exceed sizes greater than 100 mm (or 4").

The directed fishery for Iceland scallops in Newfoundland began in the Strait of Belle Isle in 1969, but has now expanded into St. Pierre Bank (1989) and the Grand Banks (1993). Each area is now regulated by catch levels and by seasons.

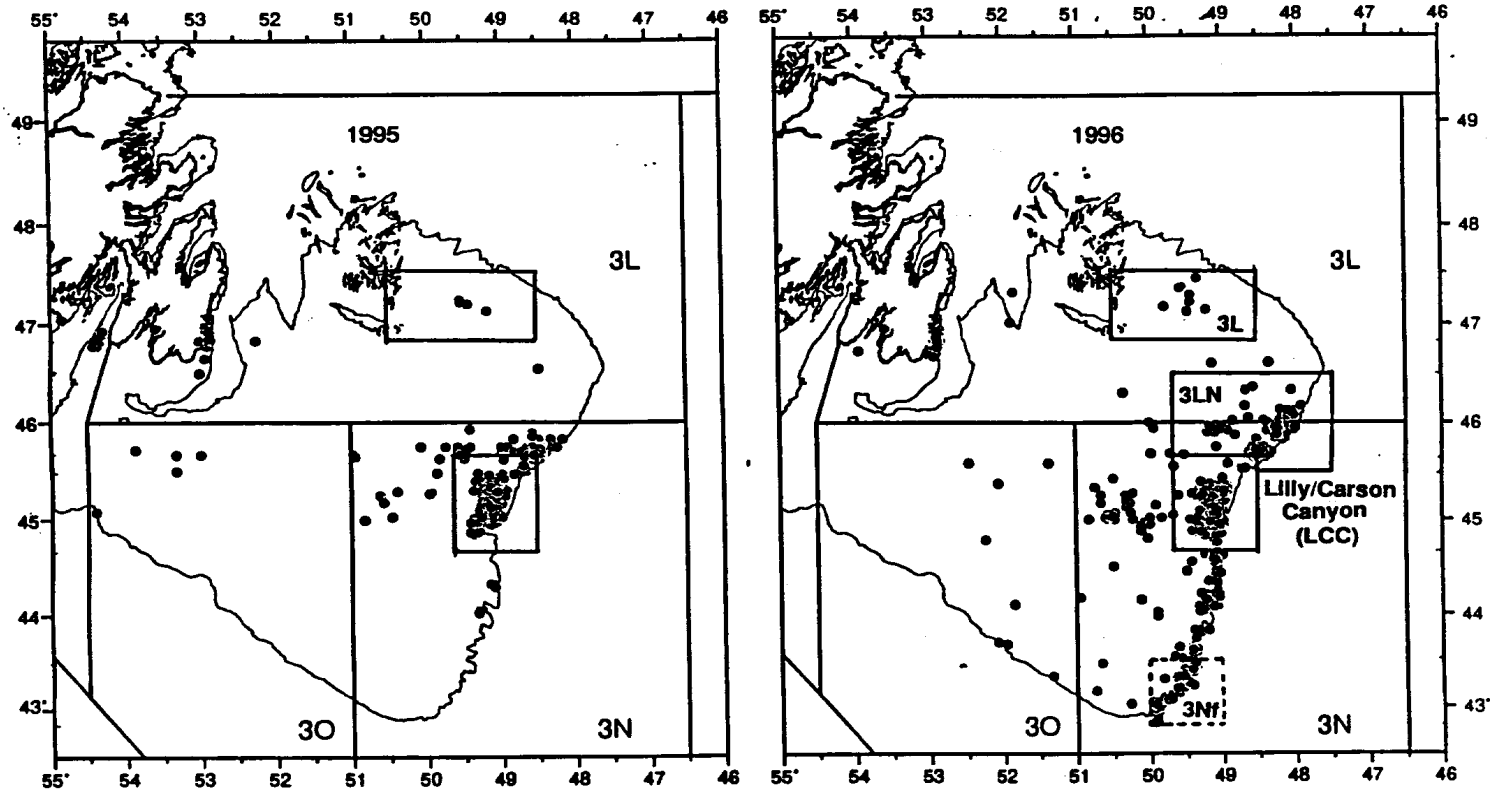
3LN Fishery

The directed fishery for Iceland scallops on the Grand Banks of Newfoundland is quite recent. After several years of exploratory fishing and commercial trials, fishing activity began in earnest in 1993 with a total of 10 vessels participating. The majority of removals in the first year had come from NAFO Div. 3L, the remainder (3 t) being from 3N. Much of the effort has since moved into Div. 3N. At first a variety of gear types were in use. With experience most of the vessels abandoned the large, heavy gear (eg. New Bedford rakes) in favour of smaller Digby buckets. Of the 52 vessels participating in the fishery in 1996, 49 prosecuted the offshore beds along the eastern Grand Banks. Catch rates are highly variable with meat count typically in the 40-80/lb range.

Nominal catch (t, round) and effort of Iceland scallops from NAFO Div. 3LNO. All figures are based on the species-specific conversion factor of 9.2.

Year	No. vessels	NAFO Division 3L	3N	3O	3LNO
1992	1	20	2	-	22
1993	10	489	325	3	817
1994	57	86	3,844	11	3,941
1995	48	101	6,400	0	6,501
1996	52	406	9,048	0	9,454
Totals		1,102	19,619	14	20,735

Fleet composition in 1996 has shifted in favour of larger vessels. Two new entrants in the >65 ft LOA size class and three in the 55-65 ft category entered the fishery. In just four years total removals from the Grand Banks has approached 21,000 t round, making it the largest fishery for this species in Canada.



Two zones on the eastern Grand Banks have been under a TAC regime since 1995: 1,000 t shellstock for NAFO Div. 3L and 3,000 t shellstock for the Lilly Canyon/Carson Canyon (LCC) area. TACs in these areas remained unchanged in 1996. However, recognizing a discontinuity in resource distribution a new zone (3LN) contiguous to the LCC was proposed with an additional TAC of 3,000 t. Also, at the request of stakeholders, a TAC of 5,000 t had been set for all areas outside of the three zones.

As in previous years, most of the effort (93%) was directed into NAFO Div. 3N which accounted for at least 97% of total removals (8,240 t out of 8,474 t, round). Most (30%) of the effort continued to be directed into the Lilly Canyon/Carson Canyon box.

The majority of removals in 1996 came from newly discovered aggregations to the southeast of the Bank (Div. 3Nf). Elsewhere, as in Div. 3L, effort was sparse.

1996 Fishery Performance

Lilly Canyon/Carson Canyon

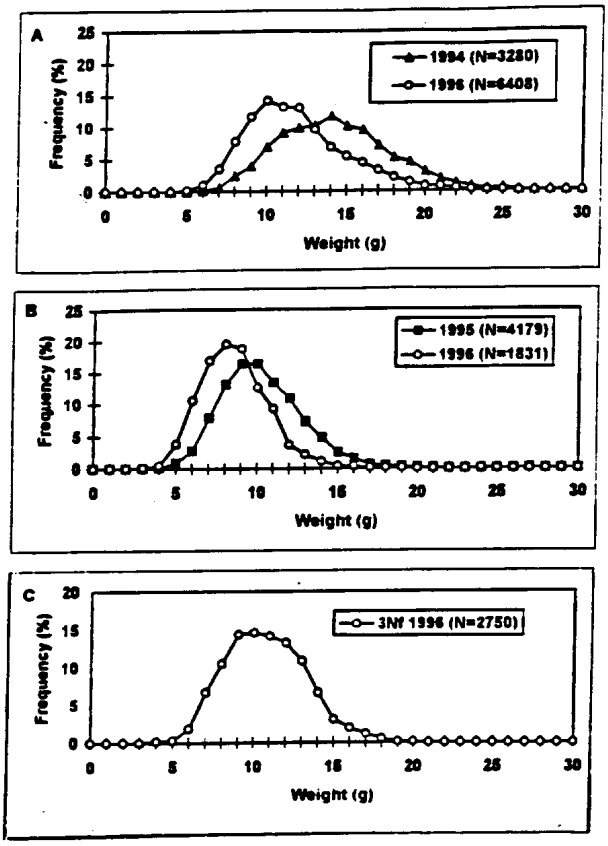
Catch rates have remained stable during the last three years (90 kg/tow). Individual meat weight distribution confirms the shift first detected in 1995 towards smaller scallops. However, new pockets of large animals (low meat counts) appear to have been located in 1996 and selectively harvested.

3N North (portion of 3LN, in 3N only)

The proposal to establish a new zone to the northeast of the Canyons was not fully implemented in 1996. Only that portion of the new box within 3N was examined for catch rate changes from the previous year. Overall, this zone saw a decline of 30% from the previous year, but CPUEs remained steady within the 1996 season. Only 43% (1,292 t) of the TAC (3,000 t) was taken, a reduction of 55% from 1995. This probably reflects a diversion to areas south where meat counts were lower and catch rates higher. The latter would most likely reflect the locating and fishing of new aggregations. A shift from the previous year towards smaller sizes (high meat counts) is again evident. Higher counts in 3LN in 1996, relative to the other zones, may have encouraged the fleet to move elsewhere, in search of new aggregations.

Year	LCC	3N North
1994	92	-
1995	98	110
1996	86	79

Unadjusted CPUEs (kg/tow) in the Lilly Canyon/ Carson Canyon and in 3N north.



Unadjusted (as landed) frequency distributions of individual meat weights from A. Lilly Canyon/Carson Canyon zone, 1994 - 1996, B. 3LN north, 1995 - 1996, and C. 3Nf, 1996.

Southeast 3N (3Nf)

This never-before fished area was discovered by the Newfoundland-based fleet soon after the LCC box was closed to fishing in mid-May 1996. By July many vessels had moved into this area. Catch rates were higher here relative to the other areas (124 kg/tow versus 98 kg/tow in the LCC and 110 kg/tow in 3LN north). When the bulk of effort shifted to 3Nf mean daily catch rate in this area was at the 200-300 kg/tow range, well above catch rates in any other area at any time. In the July-August period a total of 745 fishing days was directed into this new area with nearly 2,700 t removed (out of a total of 3,107 t for the new zone). Moreover, the majority of meats was large and comparable to counts in the LCC in 1996.

Research Surveys

There were no new research surveys in 1996. The 1994 survey had estimated biomass around the Canyons at 19,600-38,000 t (mean = 28,800 t) round. Similarly, total biomass in an area in 3L pointed to a biomass between 4,000 and 15,000 t (mean = 9,500 t) round. Using a 10% exploitation rate, TACs of 3,000 t and 1,000 t had been proposed respectively for the two areas. Additional aggregations trending northeast from the Canyons (3LN) had been surveyed in 1995. Biomass here was estimated at 15,000-45,000 t (mean = 30,000 t) round. Again, a 10% exploitation rate had suggested a further catch in 1996 of approximately 3,000 t round for this area.

An exploratory survey on the Flemish Cap conducted in 1996 by Fishery Products International found no evidence of scallops in that area confirming our suspicion that further eastward expansion of the fishery is highly unlikely.

Natural Mortality

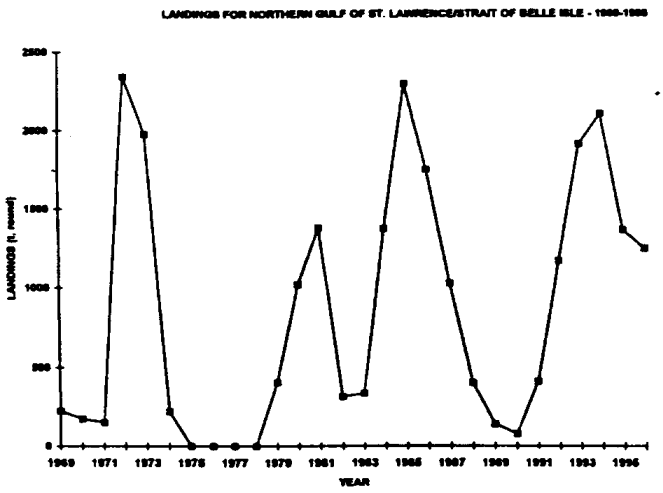
Analysis of data from research vessel survey in this area suggests that annual natural mortality is in the 0.13 to 0.19 range, higher than the pre-exploitation value estimated at 0.05. The higher rates are thought to include non-yield gear-related mortality. To date this has not been incorporated into our assessments.

Resource Status/Perspectives

In the absence of new research information it was possible to examine fishery performance data only. Overall, with the exception of 3LN north, where CPUEs have declined, it appears that catch rates have remained relatively stable over the past several years. The increase in meat counts, particularly in the Lilly Canyon/Carson Canyon area may either reflect a decline in the availability of large scallops or a fishing pattern that attempts to maximize economic yield (i.e. balance total weight caught with counts). Consequently, we have no basis to advise changes in catch levels for the three TAC zones: viz. eastern 3L (1,000 t round), Lilly/Carson Canyons (3,000 t round), and 3LN (3,000 t round). However, it is proposed that a new TAC zone be established in 3Nf. Area-based scaling relative to the Lilly Canyon/Carson Canyon box (517 versus 2,037 n mi^2 respectively in waters $\leq$100 fm) would suggest a preliminary catch level not exceeding 800 t round.

4R Fishery

From its inception nominal effort in the day-fishery in the Strait of Belle Isle was based on price and availability of scallops relative to other species. Four strong peaks in landings are evident: 1972-73, 1980-81, 1984-86, and 1992-94. In the past, each peak was followed by several consecutive years of poor catches. The sharp increase in landings in 1972 and 1973 was concomitant with a changeover to 2.5" rings from 3.0" rings in scallop rakes. The widespread use of the more efficient "Labrador rake" beginning in the mid-1980's also contributed to the higher landings thereafter as did record prices and exploitation of new grounds.



Beginning in 1991, the bulk of the fishery returned south of 51°25'N to beds once considered most prolific. Scallop aggregations here apparently have recovered following an extended fallow period.

Nominal fishing effort increased dramatically between 1990 (11 vessels) and 1994 (80 vessels) but declined in 1995 (43 vessels). Overall catch rates in 1994 dropped by 30% from 1993. As well, within season catch rates in the core area south of 51°25'N had declined from 40 kg/tow to 34 kg/tow.

Catch rates in this area experienced a further decline of 32% in 1995 from the 30% reduction already noted between 1993 and 1994. Also, fishing effort had become increasingly dispersed. The pattern of decline shown by the CPUE data had been corroborated by a number of stakeholders directly involved in the fishery.

Fishery Performance in 1996

Fishing zones in Div. 4R were simplified in 1996 to include all areas north of Ferrole Point (14A). The fishery commenced June 3, with much of the reremovals occurring in the July-August period. Vessels under 35 ft LOA continue to outperform larger vessels in the 35-44 ft and 45-54 ft categories with vessels $\geq$55 ft realizing the best CPUEs. The TAC of 1,200 t round was taken by mid-September. An exploratory area to the south with a pre-emptive TAC of 200 t had also been proposed. However, there was little interest in this area.

Overall, CPUE for the entire Strait was up slightly (10%) in 1996 from the previous year (32 versus 29 kg/tow). As in 1995 effort had also been directed into coastal aggregations that had not been included in the 1995 research survey.

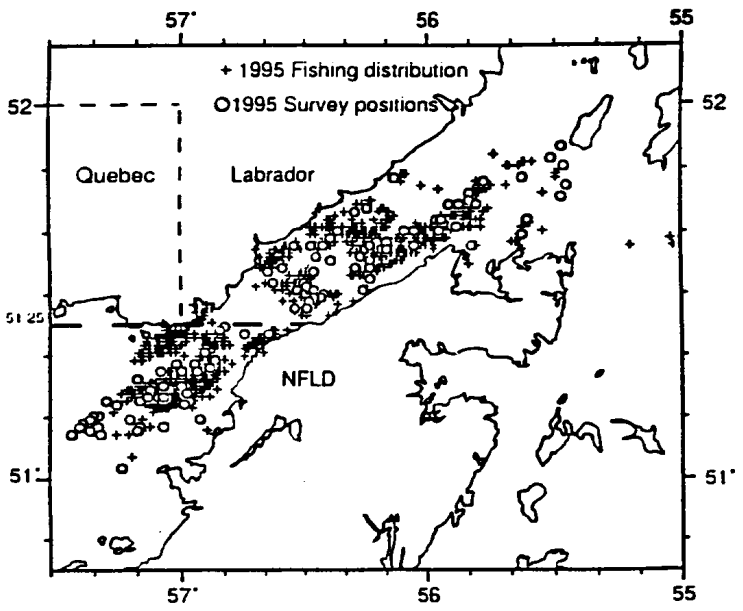
Year	Removal (t, round)	Fishing days	CPUE (kg/tow)
1994	2,294	2,769	35
1995	1,497	2,113	29
1996	1,204	1,385	32

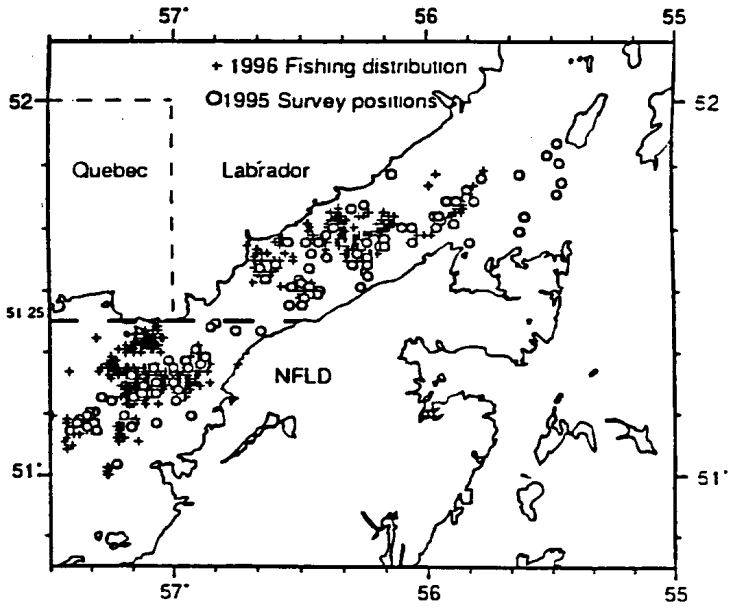
Research Surveys

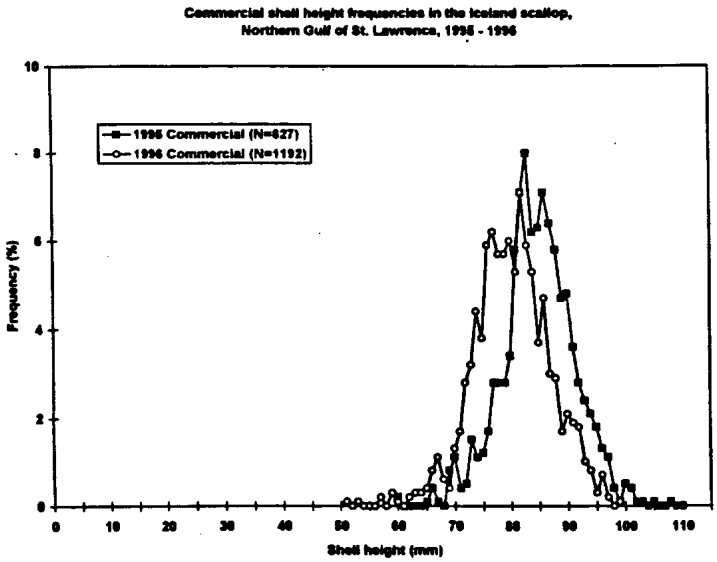
There were no new research surveys in 1996. A survey in 1995 had estimated biomass at 10,000-14,000 (mean = 12,000 t) round. A 10% exploitation rate is considered appropriate for this slow growing species. A catch level in the range of 1,000-1,400 t had been proposed.

The 1995 research vessel survey showed no evidence of new recruitment indicating little potential for increased abundance. Catch rates have been maintained over the last several years likely as a result of exploiting new aggregations of scallops, sometimes consisting of smaller scallops. The fishery continues to operate over areas that are also nursery grounds for recently settled scallops, possibly impairing future recruitment.

It is recommended that catch level in 1997 not exceed 1,200 t round.







For More Information

Research Document:
Naidu, K. S., F. M. Cahill, P. J. Veitch, and E. M. Seward. 1997. Synopsis of the 1996 Fishery for Iceland Scallops in NAFO Div. 4R (Strait of Belle Isle). CSAS Res. Doc. 97/6

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