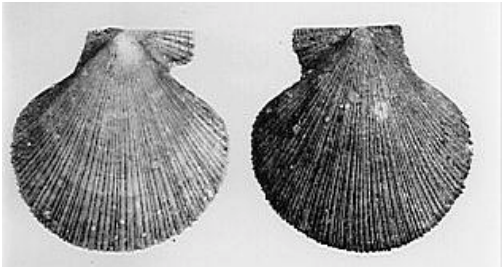


Iceland Scallop in Newfoundland and Labrador

Background

The Iceland scallop, Chlamys islandica, is widely distributed within the subarctic. In Newfoundland and Labrador, populations are normally found in waters from 50-200 m, usually on hard bottom with variable substrate composition, consisting of sand, gravel, shell fragments, and stones. Being a filter feeder, the species is abundant in areas with strong currents. It is a sedentary, slow growing and long-lived species frequently living up to thirty years or more, but seldom exceeding sizes greater than 100mm (~4 in). Commercial aggregations are found in the Gulf of St. Lawrence (NAFO Div. 4R), over St. Pierre Bank (Subdivision 3Ps), Grand Bank (Div. 3LN) and along coastal Labrador (Div. 2JH). The Newfoundland and Labrador fishery for Iceland scallop began in the Strait of Belle Isle in 1969, but later expanded onto St. Pierre Bank (1989) and the Grand Bank (1993). Most of the aggregations within each area are under catch limits. Where research data are not available, precautionary TACs are in place. Combined nominal catch has begun to decline from record levels in 1996-97. Much of the fishing effort directed at the species has been diverted into crab and shrimp.

Some new data became available in 1999 from a joint fisher/DFO research survey in 4R. For other aggregations, only fishery information is summarized.

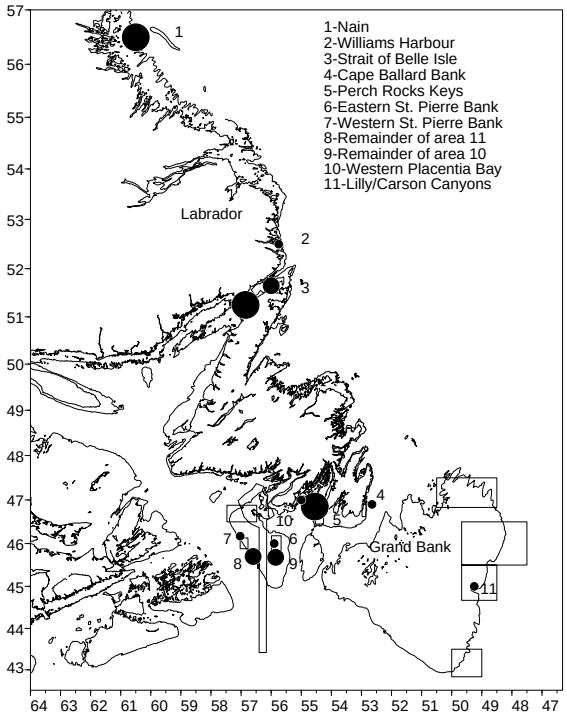


Fig. 1. Scallop aggregations fished in Newfoundland, 1999.

Summary

- The 1999 catch estimated at 3,016 t was down sharply from the previous year (6,570t) and record levels (11,200 t) in both 1996 and 1997.

Divisions 3LNO

- In 1999, only six vessels participated in the scallop fishery over the Grand Bank, down from 21 the previous year, a decline of 70%.
- The catch of 138 t represents a decline of 90% from 1998. The majority (97%) of the catch was drawn from aggregations around the Lilly Canyon and Carson Canyon (NAFO Div.3N). Catch rate (74 kg/tow) has leveled off, but is down

25% from 1995, when deposits here were first commercialized.

Subdivision 3Ps (Canadian Zone)

- The 1999 catch dropped by almost 60% compared with the previous year (1,188 t vs. 2,763 t).
- Near-shore aggregations (Perch Rocks) accounted for 40% (478 t) of the catch from this area. Catch rates in 1999 dropped by 30% from the previous year.
- Western St. Pierre Bank recorded a 90% decline in catch from 1998 (51 t, down from 508 t)

Canada/France Transboundary area of Subdivision 3Ps

- There was no fishery in this area in 1998 and 1999.

NAFO Div. 4R (Strait of Belle Isle)

- The catch limit was set at 1,100 t, split equally between north and south of 51^0 25'N.
- The nominal catch in 1999 is estimated at 1,046 t. About 700 t (or 67%), came from the area south of 51^0 25'.
- CPUE for the entire area in 1999 dropped 11% to 29.9 kg/tow from 33.6 kg/tow in 1998.
- Three sources of information (research survey, fisher and observer) in 1999 indicated low recruitment for 2000 and beyond.
- Research vessel sets in the Strait of Belle Isle, some in never-before-surveyed locations, led to the discovery in 1999 of two aggregations to the north.
- Lacking significant recruitment, the fishery continues to deplete standing stock biomass. Longer-term sustainability at current catch levels is unlikely.

Labrador

- Landings in 1999 were down from 1998 (644 t vs. 1,190 t), a decline of 46%.

The 1999 Fishery

Lilly Canyon, Carson Canyon and Cape Ballard Bank

In 1999, only six vessels participated in the scallop fishery over the Grand Bank, down from 21 the previous year, a decline of 70%. Of these, four vessels fished the Lilly Canyon and Carson Canyon (LCC), the preferred grounds for the offshore fleet. Both fishing effort and removals have fallen to their lowest levels since the aggregations here were first commercialized. In 1999, only 134 t, the lowest in its six-year history, were taken and accounted for 97% of the removals from the entire area. Catch rates here have declined from about 80 kg/tow in the 1995-98 period to 74 kg/tow in 1999. The remaining 3% was caught on the Cape Ballard Bank off the Avalon Peninsula. Overall, in 1999, only 138 t out of a TAC of 6, 800 t (or 2%) was taken.

3Nf - No activity

3LN - No activity.

Eastern 3L

Some activity was recorded for this area but no catches reported. This area continues to be the least attractive to the offshore fleet.

NAFO Subdiv. 3Ps (St.Pierre Bank)

Scallop aggregations here were first commercialized in 1989. Landings peaked in 1997 (5,245 t) but have since declined. Only 34% of the overall 1999 TAC (1,188 out of 3,500 t, round) for the 3Ps area was taken. This represents a drop of 60% from the previous year. Again, many vessels that would have normally fished scallops had diverted fishing effort into crab and shrimp.

While the area off Cape St. Mary's (Perch Rocks) has been exploited since the early 1990's, a significant increase in effort was evident beginning in 1997. Forty percent of removals (478 t out of 1,188 t) from 3Ps in 1999 were taken from these near-shore aggregations. Catch and effort have declined in each of the last three years. Proximity to shore remains the compelling consideration to preferentially fishing these beds, even with catch rates here in 1999 down to 35kg/tow from 52kg/tow the previous year.

Residual areas outside of TAC " boxes" (Management areas 10 and 11), but also under pre-emptive catch limits (1,000 t, round per area in 1999), produced a further 568 t (or 48% of 3Ps total). Included in this are catches (~60 t) from inshore Placentia Bay. Both sea scallop and Iceland scallop would have been caught here, but there was no attempt to distinguish the two species. The remainder (142 t) came from the Eastern and Western TAC "boxes" on the Bank.

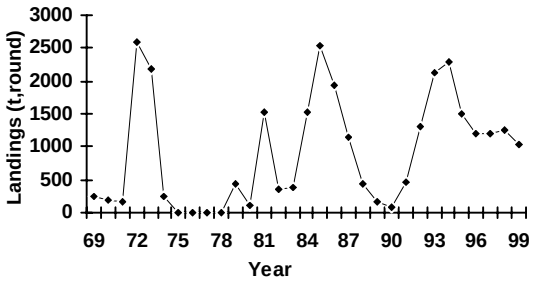
Canada/France Transboundary Area of Subdiv. 3Ps

There was no fishery in this area in 1998 and 1999.

NAFO Div. 4R (Strait of Belle Isle)

Although the fishery here has persisted for 30 years, landings have fluctuated widely, variously attributed to a mix of price and availability of scallop relative to other species. Scallop beds within this area are considered a single stock for assessment purposes. Proximity to fishing grounds permits daily excursions resulting in a high quality product. The fishery is regulated by TAC and season, and beginning in 1999, by area. The number of active licences varies widely, from a high of 107 in 1985 to a low of 11 in 1980.

The TAC in 1998 and 1999 remained at 1,100 t; the catch in each of the two years was estimated at 1,307 t and 1,046 t respectively. Until 1998, the prescribed catch level was for the entire area. In recent years, a disproportionate amount of effort had gone into aggregations to the south. To discourage continued localized depletion, it was decided in 1999 to partition the TAC equally between two areas, north and south of latitude 51° 25'N.



Nominal catch of Iceland scallop from the Strait of Belle Isle, 1969-99.

Continuation in 1999 of the TAC of 1,100 t was conditional upon: (a) provision by area fishers of fishing coordinates where seed scallops are purportedly abundant, (b) fisher participation in a DFO survey in May 1999,

including use of traditional fishing gear to be provided by fishers, (c) the reinstatement of the conversion factor of 9.2 to convert meat weights to round weights, temporarily abandoned in 1998, (d) assisting DFO in the placement and retrieval of spat collectors, (e) establishment of refugia and (f) partitioning the 1999 TAC equally to the north and south of 51° 25'N.

Only three of the six conditions were met. viz. (a), (b) and (c).

In 1999, 42 vessels were active between June 07 to August 15. Approximately 1,200 vessel days were expended. After seven weeks (July 25) into the fishery it was determined that the 50% quota to the south had been taken. The fishery to the north of 51° 25' commenced July 26 and closed August 15. It was determined, however, that the bulk of the removals, estimated at 704 t (or 67%) had again come from the south. Only 342 t (or 33% of the TAC) had come from the north. Total nominal catch in 1999 is estimated at 1,046 t, round.

Non-standardized CPUEs, computed from fishing logs, have declined from 35 kg/tow in 1994 to 30 kg/tow in 1999. Meat yield from individual scallops, however, has continued to increase resulting in lower counts (no/kg). This may be due to reduced competition for food within low-density aggregations.

Table 1. Removals by year, effort and CPUEs for Strait of Belle Isle.

Year	Removal t, round	CPUE kg/tow
1994	2,294	35
1995	1,497	29
1996	1,204	32
1997	1,205	34
1998	1,307	34
1999	1,046	30

Labrador

The 1999 nominal catch here was down 46% (644 t) from that of the previous year (1,190 t). A late start and diversion of effort to the crab fishery apparently contributed to the lower landings.

Resource Status and Outlook

The scallop population in 4R has long been characterized by a paucity of seed or pre-recruit scallop. The fishery in recent years continues to be supported by accumulated cohorts of old scallop.

Elsewhere, throughout Newfoundland and Labrador, the fishery is relatively new and driven largely by the discovery of new aggregations. Catch rates have been maintained through areal expansion. Consequently, it is difficult to infer changes in stock size by following changes in commercial CPUEs.

Overall, fishing effort has been disproportionately large relative to the known resource base. With the large number of vessels participating in the expanding fishery, it is anticipated that the number of newly discovered aggregations will decline. Typically, new aggregations are fished down rapidly, sometimes before management measures can be adopted.

There were no research vessel surveys into NAFO Subdiv. 3Ps, NAFO Div. 3LNO and NAFO Div. 2HJ in 1999.

The primary focus of a research mission to 4R in 1999 was to reconcile long-standing

differences of opinion regarding pre-recruit (<60mm) abundance over the entire area. On the basis of two surveys into the area (one each in 1995 and 1997), DFO had cautioned that there was little recruitment coming into the area. Area fishers had contended otherwise. During pre-season consultations with stakeholders it was decided that area fishers would provide to DFO precise locational coordinates where fishers purportedly encountered "plenty" of seed scallop.

Coordinated by the Fish, Food and Allied Workers Union (FFAW), two experienced fishers participated in a research survey in May 1999. Thirty-five fisher-provided locations were fished with the commercial gear commonly used in the Strait's area. The tows in areas reportedly containing an abundance of pre-recruits failed to locate significant numbers. Overall they contributed to only 1.4 % of the total numbers caught (76 out of 5,321) and 0.2 % of the total weight (1.14 out of 581 kg). Additional research vessel sets over the area with research gear, some in never-before surveyed locations, similarly failed to support reports of the abundance of pre-recruits. Two new commercial aggregations to the north were discovered, however.

Overall, research observations on size composition were quite similar to those made in 1995 and 1997. Scallops throughout the area consisted of large (old) animals. Mean, and modal sizes (shell height) of scallop suggest that size-distributions remained unchanged over 5-yr period. These observations are corroborated by data assembled from fisher-provided locations and by at-sea catch data assembled by observers in 1999.

Typically, scallops here show a history of encounters with fishing gear. Sub-lethal events are indelibly recorded on scallop shells as "shock" or "stress" rings. Overall, the incidence varied from 31% to as high as 71%, indicating intense past fishing activity. All 15 samples examined in 1999 carried evidence of previous encounters with fishing gear. Fifty-seven percent of scallops examined (772 out of 1,343) had one or more "stress" rings.

Management Considerations

Strong recruitment in Iceland scallop populations tends to occur sporadically between which it is generally low or negligible. Combined with very slow growth, this means that annual exploitation rate within an aggregation has to be low to be sustainable over the long term.

The general management objective has been to achieve sustainability through a strategy of 10% exploitation of the mean research vessel biomass. However, because of the interaction of the fishing gear with the hard bottom found in Newfoundland waters containing preferred larval settlement substrates, it is believed that there is considerable additional and unaccounted mortality which occurs as a result of fishing itself. In addition, exploitation has been substantially higher than the target and has resulted in significant depletion of localized aggregations over very short periods. When faced with depletion in one area, the fleet normally moves on to other aggregations, often newly discovered. This pattern of sequential depletion results in a form of "pulse" fishing.

From a biological perspective, there is probably no reason why a "pulse" fishing strategy could not be an alternate management strategy. The key would be to maintain a balance between the number/size of commercially attractive aggregations along with a pattern of exploitation that

would allow individual aggregations to be left unfished long enough to fully recover. The alternative would be periodic long-term fishery closures.

In 4R, much of the fishing activity has returned to grounds long left fallow. Even here, the biomass consists primarily of one or two predominant year classes. Little incoming recruitment has been detected. Consequently, the fishery here continues to crop down the standing stock.

The long-term management strategy for this resource should be re-evaluated through dialogue among Science, Oceans and Environment, management and stakeholders. Stakeholders should be fully apprised of the consequences of the current management strategy.

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Naidu, K. S., F. M. Cahill and E. M. Seward. 2000 (in press). A review of the 1999 Newfoundland and Labrador scallop fishery. CSAS Res. Doc. 00/xx.xxp.

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