

Not to be cited without  
permission of the authors<sup>1</sup>

DFO Atlantic Fisheries  
Research Document 95/137

Ne pas citer sans  
autorisation des auteurs<sup>1</sup>

MPO Pêches de l'Atlantique  
Document de recherche 95/137

The Fishery for Iceland Scallops in  
Northeastern Gulf of St. Lawrence (NAFO Subdiv. 4R) in 1994

by

K. S. Naidu, F. M. Cahill and E. M. Seward  
Science Branch  
Department of Fisheries and Oceans  
P. O. Box 5667  
St. John's NF A1C 5X1 Canada

<sup>1</sup>This series documents the scientific basis for the evaluation of fisheries resources in Atlantic Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Research documents are produced in the official language in which they are provided to the secretariat.

<sup>1</sup>La présente série documente les bases scientifiques des évaluations des ressources halieutiques sur la côte atlantique du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

Les Documents de recherche sont publiés dans la langue officielle utilisée dans le manuscrit envoyé au secrétariat.

### **Abstract**

In the absence of recent research vessel surveys for the Iceland scallop in the Gulf of St. Lawrence, information on the 1993-94 fishery performance was examined to evaluate resource status. In 1994, the fishery returned to areas once (1970's) considered most prolific in the Gulf. Scallop aggregations here have apparently recovered following a prolonged fallow period of up to 20 years. Reported landings in 1994 were 2,105 t round, up from 1,914 t in 1993. Nominal fishing effort in the last three years (1992-94) has increased dramatically and exploitation rates are high. A 17% reduction in catch rates was recorded within season. Overall CPUE was down 30% from the previous year. The attractive economic return for this high unit value fishery tends to favour overexploitation. Continued removals of the order of magnitude reported in the last three years will likely result in stock depletion to a level that would render further fishing uneconomical. A pulse fishing strategy that once was the rule in this fishery may no longer be appropriate as the ability to opportunistically switch to other species is no longer a viable option.

### **Résumé**

En l'absence de relevé de recherche récent sur le pétoncle d'Islande du golfe du Saint-Laurent, on a examiné des données sur le rendement de la pêche en 1993-1994 pour évaluer l'état de la ressource. En 1994, les pêcheurs sont retournés dans les lieux considérés préalablement (dans les années 1970) les plus prolifiques du golfe. Les gisements de pétoncle s'y sont reconstitués après avoir été laissés inexploités pendant une longue période, de près de 20 ans. Les débarquements déclarés en 1994 se chiffraient à 2 105 tonnes brutes. Ils étaient donc en hausse par rapport à 1993 (1 914 t). L'effort de pêche nominal a considérablement augmenté ces trois dernières années (1992-1994) et les taux d'exploitation sont élevés. Les taux de prises ont chuté de 17 % au cours de la saison. Dans l'ensemble, les PUE étaient en recul de 30 % par rapport à l'année précédente. Le rendement économique attrayant de cette pêche à forte valeur unitaire tend à favoriser la surexploitation. Des retraits continus de l'importance signalée ces trois dernières années aboutiront vraisemblablement à un fléchissement du stock, à un point où son exploitation ne serait plus rentable. Il se peut que la stratégie de pêche par à-coups qui était généralisée dans l'exploitation de cette espèce ne soit plus de mise, car la capacité de cibler de façon opportuniste d'autres espèces a cessé d'être une option viable.

## Introduction

The day-fishery for Iceland scallops in the northeastern Gulf of St. Lawrence began in 1969 when 224 t (round) was landed. Landings receded slightly to 173 t and 151 t respectively in the two succeeding years. In 1972 and 1973, landings from this hand-shucked fishery increased sharply, concomitant with a changeover to 2.5" from 3.0" rings, to 2,342 t and 1,975 t, respectively. Scallop prices receded towards the latter part of the 1973 season. Much of the fishing effort was redirected to cod, herring and shrimp all of which were then abundant. In 1974, a combination of severe ice conditions and poor prices resulted in further declines in scallop landings. There was no active fishery for the mollusc during the following four years (Table 1).

Fishing resumed in 1979 when 406 t were landed. Landings increased to 1,022 and 1,380 t in 1980 and 1981, respectively. Despite increasing scallop prices between 1982 and 1983 there was a sharp decrease in landings. Beginning in 1984, fishermen began using the Labrador rake. Catch rates and total landings increased markedly to 1,270 t and 2,111 t in 1984 and 1985, respectively when the fishery expanded to the Labrador side of the Strait of Belle Isle (Fig. 1). Landings dropped steadily between 1986 (1,752 t) and 1990 (79 t) (Table 1). This trend was reversed in 1991. Landings have since increased with 1,914 t landed in 1993 when most of the effort had shifted back south to aggregations west of Anchor Point that had been fished out in the 1970's. It is apparent that the dramatic increase in landings in 1992 and 1993 was the result of returning to fish the once prolific grounds that had been left relatively idle. Areal expansion and possibly more widespread use of the Labrador rake also contributed to the higher landings as were the record prices paid (~\$7.50/lb). High prices were maintained throughout 1994.

Research and management mandate for this fishery was transferred in 1982 to the Gulf Region. Three research surveys were completed during the 12-year period between 1982 and 1993: August 1985 (12 days); July-August 1986 (7 days); and July 1987 (9 days). The 1987 survey had suggested that resource depletion had taken place (Lanteigne and Davidson 1987). They had also reported that size frequency distributions had remained unchanged between 1985 and 1987 (inclusive). There was little port sampling activity in the last eight years, including during 1994.

### 1994 Fishery

The fishery has now returned to the areas once considered to be most prolific (early 1970's and early 1980's). The beds had apparently recovered following a prolonged fallow period of up to 20 years.

In 1994, an experimental fishing area (14A) was opened first with a pre-emptive TAC of 300 t round. The season started on May 31 and was extended for a total unadjusted removal of 332 t. Most of the fishing activity was to the south of Red Bay (Figs. 2 and 3). The fishery in area 14B with a TAC of 1,500 t (management invoked) commenced on June 13, 1994 and

was concluded within 7 weeks on July 30, 1994 with a catch of 1,581 t round (unadjusted) (Fig. 3).

Pressure to reopen the fishery resulted in an experimental fishery in 14A1 (September 6-October 5). This area is to the northeast of 14A. An additional 192 t round was taken (Table 2).

Much (75%) of the effort in 1994 was in 14B where catch rates (lbs/tow) were reported to be 30% higher than in the experimental zones (14A and 14A1) (Table 3). Approximately 71% of removals came from this "traditional" fishing area (14B), down from 90% the previous year. The majority (63%) was taken south of 51°25'N, the remainder came from 14A (16%) and 14A1 (13%). Most (77%) of the catch was shucked at sea with only meats being landed. The remaining 23% was landed round for land-based processing.

### Abundance Indices

#### a. Research - Nil

#### b. Commercial

Overall, better catch rates were encountered in 14B (Table 3). Catch rate (lb/tow, round) in 14B to the south of 51°25'N was 27% higher than to the north (84 lb/tow versus 66 lb/tow). Using all usable logbook data (~90%), we note a within season decline from 80's to 70's lb/tow (Table 4). Also, catch rate in the core area (14B south of 51°25'N) during the 7-week season dropped by 17% (74 lb from 89 lb/set) (Tables 5 and 6). Moreover the declines in catch rates were evident for each size class of vessel examined (Tables 7 and 8). Overall catch rates in 14B declined some 30% from the previous year (Table 9). Changes in CPUE in 14B north and 14A could not be examined (no data).

As expected, significant localized depletion was evident throughout. Fishermen do not fish randomly over the fishing grounds. Rather, once they locate a bed, they fish it until catch rates drop below some threshold level, and move on to another patch. Given this sequential pattern of stock depletion it is likely that composite catch rates are underestimated. If removals continue at the high level of recent years, further declines in CPUE can be expected in 1995 and beyond.

The high economic return for this high unit value fishery tends to favour over-exploitation. Continued removals of the order of magnitude seen in the last three years will likely result in stock depletion to a level that would render further fishing uneconomical. A pulse fishing strategy that was once the rule in this fishery may no longer be appropriate as the ability to opportunistically switch to other species is no longer a viable option (Naidu et al. 1982).

Statistics has continued to use 8.3 to convert meat weight to round applicable to sea scallop, instead of 9.2 for Iceland scallops. This would underestimate by at least 10% all round weights based on meat weight conversions. [Converted weights were based on full recovery of meats (biological yield), without adjustment for meat loss (~20% by weight) resulting from manual

extraction of meats.] The TAC (in round weight) on the other hand was based on full (100%) recovery of all meats from each scallop. This, too, would have contributed to underestimation of removals in the past, including the 2,105 t (round) reported for 1994 (instead of 2,300 t, Table 2).

#### References

- Lanteigne, M. and L.-A. Davidson. 1987. Status of the northeastern Gulf of St. Lawrence Iceland scallop (Chlamys islandica) stock - 1986. CAFSAC Res. Doc. 87/83. 21 p.
- Naidu, K. S., F. M. Cahill, and D. B. Lewis. 1982. Status and assessments of the Iceland scallop, Chlamys islandica in the northeastern Gulf of St. Lawrence. CAFSAC Res. Doc. 82/02. 66 p.

Table 1. Iceland scallop landings and effort statistics<sup>1</sup> from the northern Gulf of St. Lawrence/Strait of Belle Isle. For historical consistency a conversion factor of 8.3 (instead of 9.2) is used throughout.

| Year | Landings<br>(t, round) | No. of<br>active<br>licences | Effort<br>(boat days) | Catch per unit effort<br>(unadjusted) |                         |
|------|------------------------|------------------------------|-----------------------|---------------------------------------|-------------------------|
|      |                        |                              |                       | kg (round)<br>/boat day               | t (round)<br>/boat/year |
| 1969 | 224                    |                              |                       |                                       |                         |
| 1970 | 173                    |                              |                       |                                       |                         |
| 1971 | 151                    |                              |                       |                                       |                         |
| 1972 | 2342                   |                              |                       |                                       |                         |
| 1973 | 1975                   |                              |                       |                                       |                         |
| 1974 | 220                    | 24                           | 269                   | 818                                   | 9.2                     |
| 1975 | -                      | -                            | -                     | -                                     | -                       |
| 1976 | -                      | -                            | -                     | -                                     | -                       |
| 1977 | -                      | -                            | -                     | -                                     | -                       |
| 1978 | -                      | -                            | -                     | -                                     | -                       |
| 1979 | 406                    | 16                           | 459                   | 885                                   | 25.4                    |
| 1980 | 1022                   | 14                           | 774                   | 1320                                  | 73.0                    |
| 1981 | 1380                   | 24                           | 1262                  | 1094                                  | 57.5                    |
| 1982 | 315                    | 24                           | 413                   | 763                                   | 13.1                    |
| 1983 | 335                    | 23                           | 485                   | 691                                   | 14.6                    |
| 1984 | 1374                   | 46                           | 1272                  | 1080                                  | 29.9                    |
| 1985 | 2297                   | 107                          | 2887                  | 796                                   | 21.5                    |
| 1986 | 1752                   | 88                           | 2270                  | 772                                   | 19.9                    |
| 1987 | 1029                   | 57                           | na                    | -                                     | 18.1                    |
| 1988 | 403                    | 30                           | na                    | -                                     | 13.4                    |
| 1989 | 140                    | 14                           | na                    | -                                     | 10.0                    |
| 1990 | 79                     | 11                           | na                    | -                                     | 7.2                     |
| 1991 | 412                    | 24                           | na                    | -                                     | 17.2                    |
| 1992 | 1169                   | 72                           | na                    | -                                     | 16.2                    |
| 1993 | 1914                   | 71                           | na                    | -                                     | 26.9                    |
| 1994 | 2105                   | 80                           | 2769                  | 760                                   | 26.3                    |

na = not available

<sup>1</sup> Sources of landing and effort statistics:

- 1969-81: CAFSAC Res. Doc. 82/02
- 1982-83: CAFSAC Res. Doc. 86/77
- 1984-90: Can. MS Rept. 2154
- 1990-92: Science Branch, Gulf Region
- 1993 : Statistics Branch, Newfoundland Region
- 1994 : Science Branch, Newfoundland Region

Table 2. Estimates of removals (t, round) of Iceland scallops from the northern Gulf of St. Lawrence, 1994. Conversion factors are parenthesized.

| Area                   | Statistics Branch<br>(x8.3) | Science Branch |        |
|------------------------|-----------------------------|----------------|--------|
|                        |                             | (x8.3)         | (x9.2) |
| 14B (traditional)      | 1451.0                      | 1581.0         | 1715.5 |
| 14A (experimental I)   | 337.8                       | 332.0          | 365.5  |
| 14A1 (experimental II) | 261.5                       | 192.4          | 213.1  |
| TOTALS                 | 2050.3                      | 2105.4         | 2294.1 |

Table 3. Scallop removals, effort and CPUE by zone in the northeastern Gulf of St. Lawrence, 1994.

| Area | Removals<br>(t, round) | Effort<br>days | CPUE   |       |        |
|------|------------------------|----------------|--------|-------|--------|
|      |                        |                | lb/day | lb/hr | lb/tow |
| 14B  | 1581                   | 1985           | 1756   | 188   | 75     |
| 14A  | 524                    | 655            | 1478   | 150   | 58     |



Table 4. Iceland scallop catch rates for area 14B for 1994. (All vessels, all gears).

| Week                       | Dates           | Catch (round) per unit effort |        |         |
|----------------------------|-----------------|-------------------------------|--------|---------|
|                            |                 | lbs/day                       | lbs/hr | lbs/set |
| 1                          | June 13-19      | 1762                          | 205    | 84      |
| 2                          | June 20-26      | 1975                          | 203    | 80      |
| 3                          | June 27-July 03 | 1606                          | 189    | 75      |
| 4                          | July 4-10       | 1744                          | 185    | 75      |
| 5                          | July 11-12      | 1744                          | 182    | 73      |
| 6                          | July 18-24      | 1676                          | 175    | 69      |
| 7                          | July 25-31      | 1798                          | 181    | 71      |
|                            | 1994 Means      | 1765                          | 188    | 75      |
| 15% reduction in catch/set |                 |                               |        |         |

Table 5. Iceland scallop catch rates (CPUE's) from the traditional fishing area (Area 14B) south of 51°25'N in the northern Gulf of St. Lawrence, 1994. (All vessels, all gears)

| Week                                     | Dates             | Catch (round) per unit effort |        |         |
|--|-------------------|-------------------------------|--------|---------|
|  |                   | lbs/day                       | lbs/hr | lbs/set |
| 1  | June 13-19        | 1813                          | 204    | 89      |
| 2  | June 20-26        | 2463                          | 225    | 97      |
| 3  | June 27-July 03   | 1651                          | 208    | 90      |
| 4  | July 4-10         | 1774                          | 192    | 84      |
| 5  | July 11-17        | 1686                          | 177    | 77      |
| 6  | July 18-24        | 1445                          | 166    | 70      |
| 7  | July 25-31        | 1713                          | 185    | 74      |
|  | 1994 Means        | 1765                          | 196    | 84      |
| 17% reduction in catch/set within season |                   |                               |        |         |
|  |                   | lbs/day                       | lbs/hr |         |
|  | 1993 Means        | 2580                          | 275    |         |
|  | 1993-94 reduction | 32%                           | 29%    |         |

Table 6. Estimates of CPUE (lb, round) for the traditional fishery for Iceland scallops (Area 14B) in the northern Gulf of St. Lawrence, 1994.

| Month   | Removals | CPUE   |         |        |
|---|----------|--------|---------|--------|
|   |          | lb/day | lb/hour | lb/tow |
| <b>A. <u>All of Area 14B</u></b>                |          |        |         |        |
| June  | 654      | 1817   | 203     | 80     |
| July  | 927      | 1714   | 180     | 73     |
| Within season % change                          |          | -6%    | -11%    | -9%    |
| <b>B. <u>Area 14B south of 51°25'N only</u></b> |          |        |         |        |
| June  | 413      | 1910   | 219     | 94     |
| July  | 509      | 1664   | 181     | 78     |
| Within season % change                          |          | -13%   | -17%    | -17%   |

Table 7. Estimates of CPUE's (lb/tow, round) by vessel size class (LOA) during the 7-week fishery in the traditional area (Area 14B) in the northern Gulf of St. Lawrence.

| Week                               | Dates           | <35' | 35-44' | 45-54' | 55-64' | Combined |
|------------------------------------|-----------------|------|--------|--------|--------|----------|
| 1                                  | June 13-19      | 81   | 75     | 77     | 118    | 84       |
| 2                                  | June 20-26      | 86   | 65     | 74     | 128    | 80       |
| 3                                  | June 27-July 03 | 85   | 60     | 63     | 175    | 75       |
| 4                                  | July 4-10       | 94   | 66     | 64     | 119    | 75       |
| 5                                  | July 11-17      | 78   | 69     | 69     | 96     | 73       |
| 6                                  | July 18-24      | 72   | 63     | 66     | 103    | 69       |
| 7                                  | July 25-31      | 77   | 68     | 65     | 97     | 71       |
| Totals                             |                 | 81   | 66     | 68     | 120    | 75       |
| No. vessels                        |                 | 18   | 24     | 26     | 10     | 78       |
| % (of 14B total)<br>weight removed |                 | 22   | 33     | 29     | 16     | 100      |

Table 8. Estimates of CPUE's (lb/tow, round) by vessel size class (LOA) during the 7-week fishery in the traditional area (Area 14B) south of 51°25'N only in the northern Gulf of St. Lawrence.

| Week  | Dates           | <35' | 35-44' | 45-54' | 55-64' | TOTALS |
|---|-----------------|------|--------|--------|--------|--------|
| 1   | June 13-19      | 73   | 74     | 89     | 121    |        |
| 2   | June 20-26      | 85   | 74     | 103    | 141    |        |
| 3   | June 27-July 03 | 80   | 67     | 74     | 186    |        |
| 4   | July 4-10       | 92   | 67     | 79     | 119    |        |
| 5   | July 11-17      | 65   | 72     | 84     | 99     |        |
| 6   | July 18-24      | 64   | 68     | 70     | 99     |        |
| 7   | July 25-31      | 64   | 72     | 69     | 101    |        |
| Totals  |                 | 77   | 70     | 82     | 128    |        |
| No. vessels   |                 | 17   | 21     | 18     | 10     | 66     |
| Total weight<br>(t, round)  |                 | 214  | 247    | 243    | 216    | 920    |
| % of total weight<br>removed from Gulf<br>in 1994                 |                 | 10   | 12     | 12     | 10     | 44     |
| % of total weight<br>removed from<br>Area 14B                     |                 | 14   | 16     | 15     | 14     | 58     |
| % of total weight<br>removed from<br>Area 14B south of<br>51°25'N |                 | 23   | 27     | 26     | 23     | 100    |

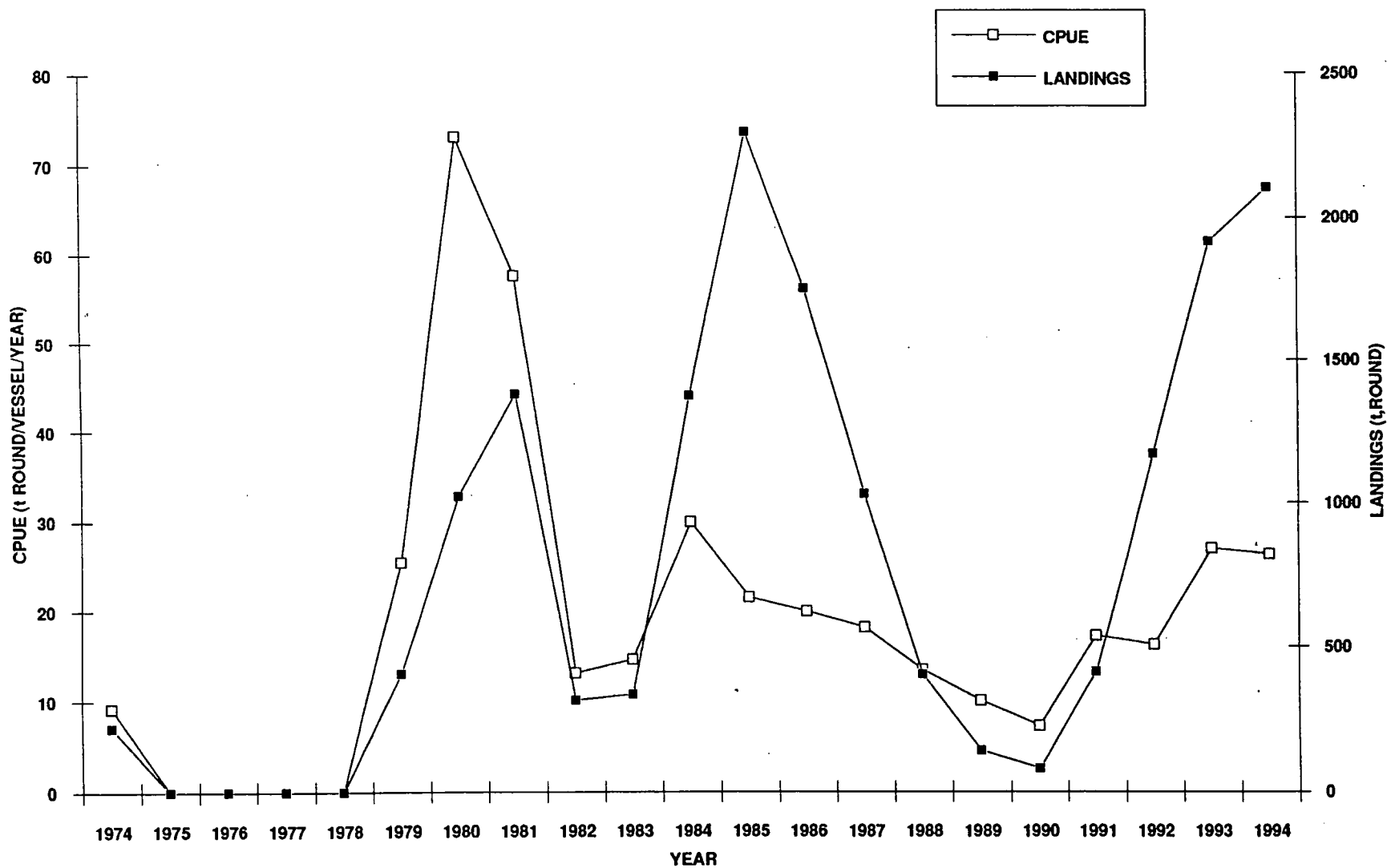
Table 9. Changes in CPUE (lb, round) for the Iceland scallop fishery in the northern Gulf of St. Lawrence, south of 51°25'N, 1993-94.

| Month | Removals<br>(t, round) |      | CPUE   |       |        |       |
|-------|------------------------|------|--------|-------|--------|-------|
|       |                        |      | 1993   |       | 1994   |       |
|       | 1993                   | 1994 | lb/day | lb/hr | lb/day | lb/hr |
| June  | 865                    | 413  | 2477   | 314   | 1910   | 219   |
| July  | 3371                   | 509  | 2682   | 285   | 1664   | 181   |

23% (30%) reduction in June catch/day (catch/hr)

38% (36%) reduction in July catch/day (catch hr)

Fig. 1. CPUE VS LANDINGS FOR NORTHERN GULF OF ST. LAWRENCE/STRAIT OF BELLE ISLE. - 1974-1994



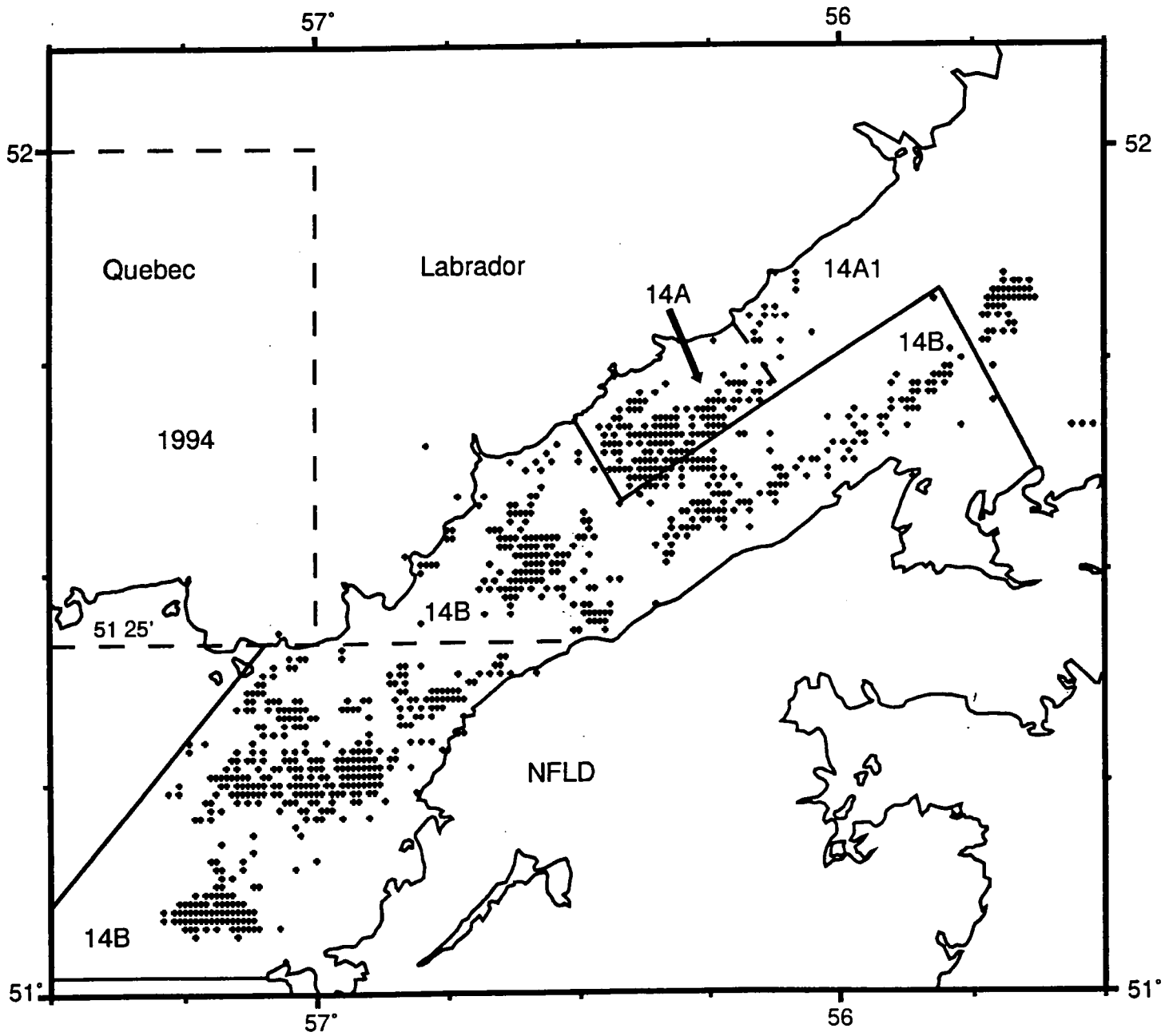


Fig. 2. Distribution of fishing effort for Iceland scallops in the northeastern Gulf of St. Lawrence in 1994.



Fig. 3 Scallop fishing pattern in northern Gulf of St. Lawrence, 1993-1994.

