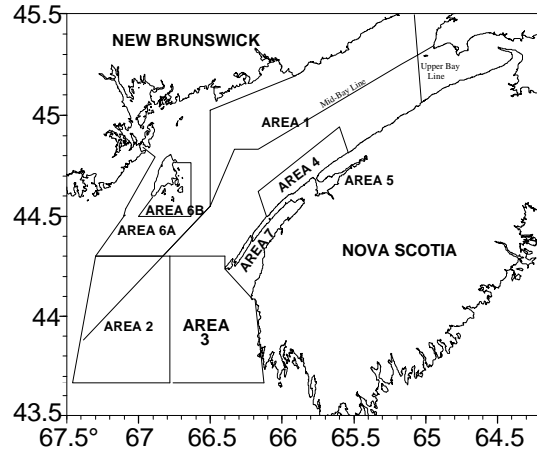


Area 3 Brier Island/ Lurcher Shoal Scallop



Background

The sea scallop *Placopecten magellanicus* occurs only in the northwest Atlantic Ocean from Virginia north to Labrador. Within this area, scallops are concentrated in persistent, geographically discrete aggregates or "beds", many of which support valuable commercial fisheries. The larger beds are found offshore and in the Bay of Fundy along the Nova Scotian coast. Scallops in different beds, and in different areas of large beds, show different growth rates and meat yields.

Unlike many commercial scallop species, the sea scallop has separate sexes. Male scallops develop a white gonad in the summer months, while female gonads are bright red. Eggs and sperm are released into the water and fertilization takes place in the sea. Spawning begins in late August to early September, and the larvae drift in the water for almost a month before settling to the bottom in October.

The Brier Island and Lurcher Shoal beds have been fished sporadically. These beds were heavily exploited in the 1950s and 1960s, but sustained low effort until the 1990s when they have become the mainstay of the Bay of Fundy fishery. In 1994, 75% of the Bay of Fundy landings came from these beds.

99 Full Bay license holders are licensed to fish in Area 3. These vessels are between 45' and 65' long, and tow 7 to 9 drags off the starboard side.

This industry became a quota fishery in 1997, with limited entry, TAC, gear size, seasonal closures, minimum shell height and meat count restrictions.

The Fishery

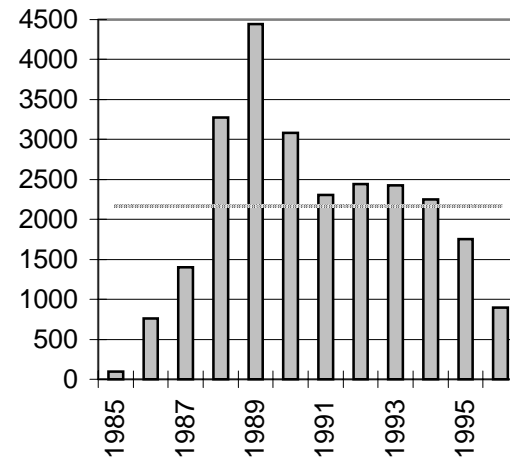
Landings in the whole of the Bay of Fundy by all fleet sectors have declined from 1995 by 49% in 1996, including catches of 76.7 mt from SFA29 outside of the regulation fishing area. The landed value of the catch was approximately \$13.9 million.

Landings (mt)

Ave 85-90	1991	1992	1993	1994	1995	1996*
2319	2304	2443	2429	2254	1754	900

*preliminary

Bay of Fundy Scallop Landings (mt) (dash line: average over time series)



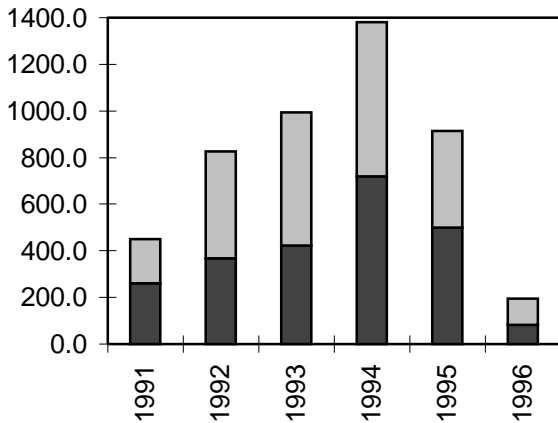
Landings in Area 3 increased each year from 1990 through to 1994, declining in 1995 and again in 1996. There are two main beds in Area 3, the beds around Lurcher Shoal and the beds below Brier Island, although scallops can be found throughout most of the area. Only one fleet is eligible to fish Area 3. This is the Full Bay fleet with 99 licences.

Landings (000s metric tons meats)

Year	88-90 AVE	1991	1992	1993	1994	1995	1996
Total	0.00	0.45	0.83	0.99	1.38	0.92	0.20*

*preliminary

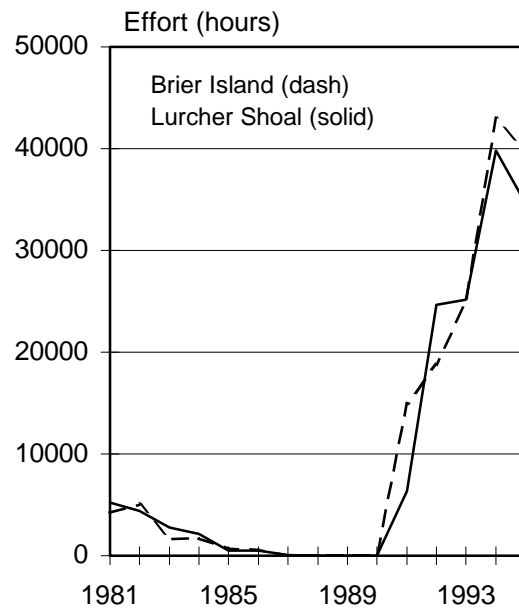
Area 3 Landings (mt) for Brier Island (dark box) and Lurcher Shoal (light box). 1996 landings are preliminary.



Effort increased steadily from 1990 to 1994 as the fleet moved away from the Digby beds to this area. Effort fell in 1995 with the decline in stock numbers. Effort data for 1996 are not yet available.

Historically the scallop beds in the lower Bay of Fundy have not supported an extensive, stable fishery, as have the beds off Digby, N.S. The scallop beds between Brier Island and 43°40' N (Area 3), were heavily exploited in the 1950s and 1960s. In the 1970s, scallop fishing on these grounds was both minimal and sporadic, and the stocks

were considered to have been depleted due to earlier over-fishing.



However, at the end of the decade catches increased as both the offshore and Bay of Fundy fleets fished these beds. Most of this effort was incidental to concentrated effort expended on nearby German Bank (NAFO 4Xq) and beds south of Lurcher Shoal. Fishing continued in this fashion through to the end of 1986. Since 1990, the Area 3 beds have been annually exploited by the Full Bay fleet.

For 1997, a quota management plan was implemented defining seven fishing areas with associated restrictions. A preliminary TAC and minimum size restrictions for Area 3 were set by industry and management.

1997 Interim Management Plan

TAC: 237 mt

Meat Count: 45/500 g

Minimum Meat Weight: 10 g (voluntary)

Shell Height Minimum: 95 mm

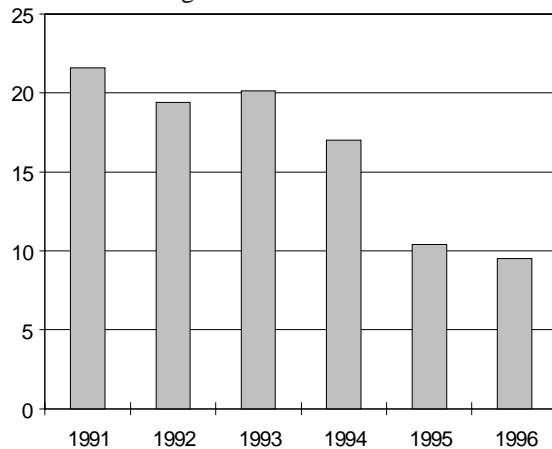
Season: Closed January 1, 1997 to May 31, 1997 and November 1, 1997 to December 31, 1997

Commercial sampling is poor and catch at age is not considered reliable.

Resource Status

Fleet activity is monitored through logbooks and port sampling information. Logbook compliance has been poor (13%) in the recent past (1990), but was at 87% in 1994, and 77% in 1995. In 1996, logbook data were only analyzed for catch per unit effort (CPUE) due to its late receipt. The CPUE data were calculated from data on 403 fishing days which are a good portion of the total data.

Area 3: CPUE kg/hour



CPUE declined 39% in 1995 and fell a further 9% in 1996. The 1996 value is not statistically different from 1995.

Data from research vessel **surveys** were also used to assess these scallop stocks. Annual

stock assessment surveys have been conducted in August since 1991, using the government research vessel, *J.L. Hart*. The area surveyed has been consistent from 1994 to 1996. In 1996, 113 tows were made on Area 3.

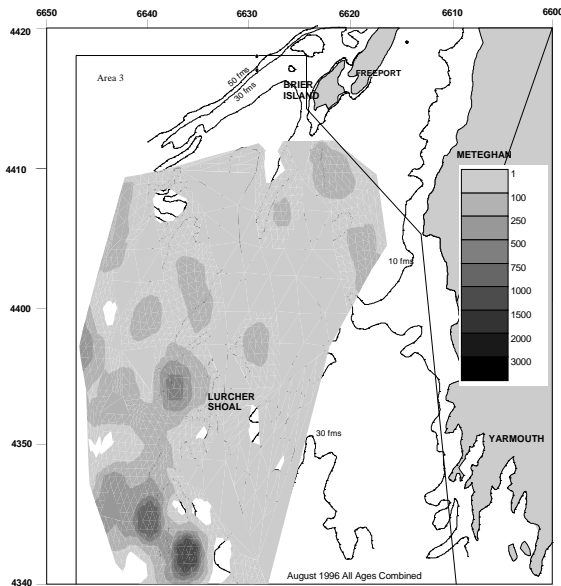
The largest concentrations of scallops are in the deeper water off Lurcher Shoal. The pre-recruit scallops are also found in this area.

The 1992 and 1993 **pre-recruit** year-classes are numerically dominant on Lurcher Shoal. The large 1990 year-class is numerically dominant on the Brier Island beds, but is largely gone due to being fished out before reaching optimal yield. More recent year-classes are weaker.

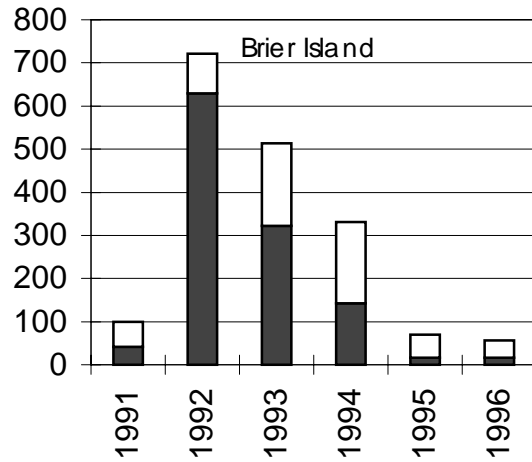
The **average number of scallops per standard tow** caught during the survey has declined dramatically since 1992 and 1993, and remains low in 1996 after a sharp decline in 1995.

The incidence of **clappers** (paired empty shells) has increased in the surveys from lows of less than 2.5% from 1991 to 1993 to 16% in 1994 and 17.1% in 1996. The clappers were present throughout the size class distribution with greater numbers in the recruited size classes. The number of clappers reflect natural mortality and incidental fishing mortalities.

1996 Spatial Distribution of Scallops in Area 3.
Number of Scallops/Std. Tow.

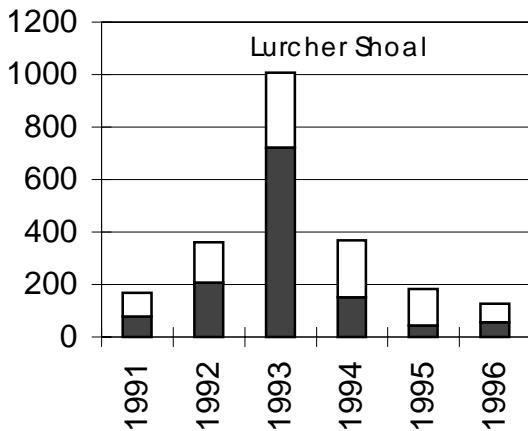


Survey Relative No. Pre-recruits (dark) and Recruited Scallops (5+; open)



Exploitation Rates (%) were calculated for the 4+/5+ and 5+/6+ age groups from the survey data, assuming a natural mortality rate of 0.1. Exploitation in 1996 was 18% and 23% respectively for Brier Island, and 42% and 49% for Lurcher Shoal.

Survey Relative No. Pre-recruits (dark) and Recruited Scallops (5+; open)



Outlook

Research vessel abundance indices show a further decline in 1996 to the lowest levels since 1991. There is no sign of a strong pre-recruit year-class. Therefore, no reversal of the downward trend in landings is expected for at least 5 years.

The percentage of clappers is higher than normal but does not appear to be concentrated in any one size group, suggesting that the clappers are not due to predation. The high clappers may be a result of incidental fishing mortality given the high level of effort these beds have sustained in recent years.

Based on preliminary estimates of the 1996 landings, the proposed industry/management TAC of 237 mt for 1997 could result in an exploitation rate in the range of 25 to 35%.

Management Considerations

Yield per recruit analysis indicates that at exploitation rates greater than 38%, the

optimum age-at-first capture is 7 years. This age corresponds to a minimum meat weight of 10 g, a shell height of 108 mm and a meat count of 45/500 g.

A size of first capture of 5 years (the age targetted in the 1997 Interim Management Plan) would result in only a 6% loss of yield at exploitation rates greater than 31%. The minimum shell height at age 5 would be 95 mm with a corresponding minimum meat weight of 7 g. A meat count of 45/500 g should be retained under this scenario.

Management measures to limit fishing effort substantially (about half the current exploitation levels), would lower exploitation to meet generally accepted conservation levels.

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97/63.

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