

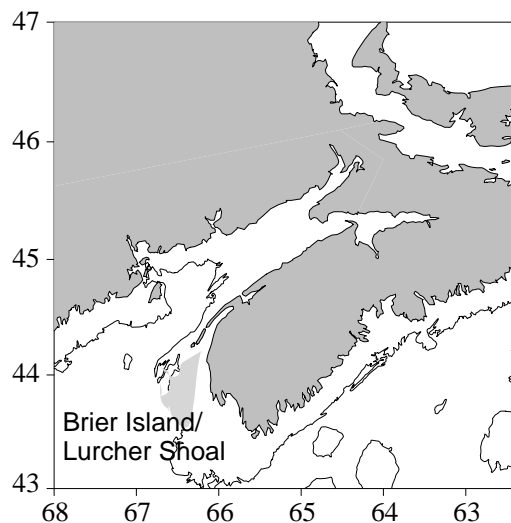
BRIER ISLAND AND LURCHER SHOAL SCALLOP

Background

The sea scallop *Placopecten magellanicus* occurs only in the northwest Atlantic Ocean from Cape Hatteras 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. The Brier Island and Lurcher Shoal beds have not been fished persistently. 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. At the peak of this fishery in 1994, 75% of the Bay of Fundy landings came from these beds. Growth overfishing and low levels of subsequent recruitment have reduced this stock in 1995.

Unlike many commercial scallop species, the sea scallop has separate sexes. Male scallops develop a white gonad in the summer months, while females 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.

This industry is a competitive fishery, with limited entry, gear size, seasonal closures, minimum shell height and meat count restrictions. However, these measures have not effectively controlled effort.



The Fishery

The scallop beds below Brier Island and above 43°40'N have been fished sporadically for decades. No landings were reported for the years 1988-90 when the fleet was targeting the strong 1984 and 1985 year-classes off Digby. Following the decline of that fishery, activity increased on the beds below Brier Island. In 1994, a substantial portion of these grounds were closed to scallop fishing from Nov. 21, 1995 to May 31, 1996, due to conflict with the lobster fishery. Licenses are limited to 99, however in 1995, only 94 vessels participated in the fishery. Fishing days were restricted to Monday to Friday from August 11, 1995 to October 2, 1995 in all areas. The regulation meat count was 55 meats/500g from October 1, 1994 to April 30, 1995; 72 meats/500g from May 1, 1995 to June 30, 1995; 50 meats/500g from July 1, 1995 to July 1, 1996. The Science recommendation was 30 meats/500g which would target fully recruited scallops. The regulation minimum shell height was 76 mm. These measures have little control on fishing effort, and with 54 license holders having groundfish licenses, effort has increased as a result of changes in that fishery.

Landings increased each year from 1990 through to 1994, declining in 1995, while in contrast, effort has increased. The landings from these stocks are the current mainstay of the Bay of Fundy fishery, supplying 63% of the 1995 catch.

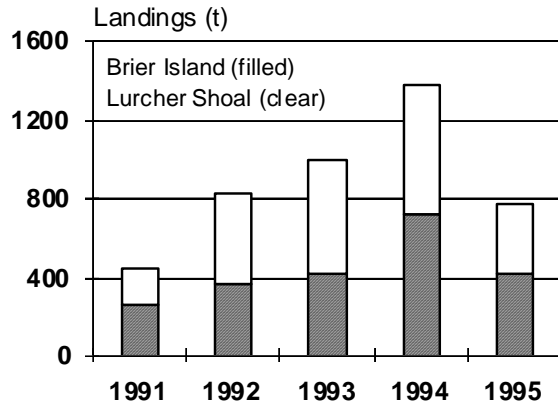
Available from: Maritimes Regional Advisory Process, Department of Fisheries and Oceans, P.O. Box 1006, Stn. B105, Dartmouth, Nova Scotia, Canada B2Y 4A2 Telephone: 902-426-8487 Email: d_geddes@bionet.bio.dfo.ca.

Landings (000s metric tons meats)

Year	88-90 AVE	1991	1992	1993	1994	1995**
Total*	0.00	0.45	0.83	0.99	1.38	0.77

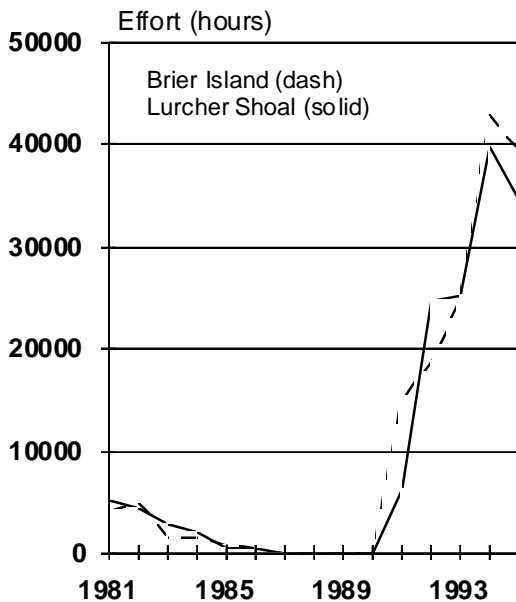
* Full Bay Licenses Only

** preliminary



Landings on both beds have fallen in 1995. The majority of the 1995 landings came from the Brier Island bed (above 44°N), as was the case in 1994.

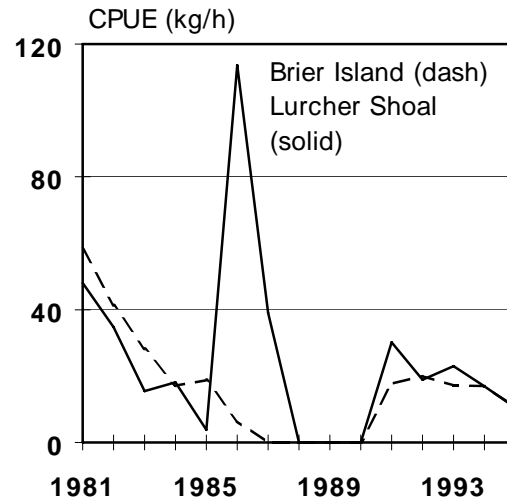
Effort increased steadily from 1990 to 1994 as the fleet moved away from the Digby beds. Effort fell in 1995 with the decline in stock numbers.



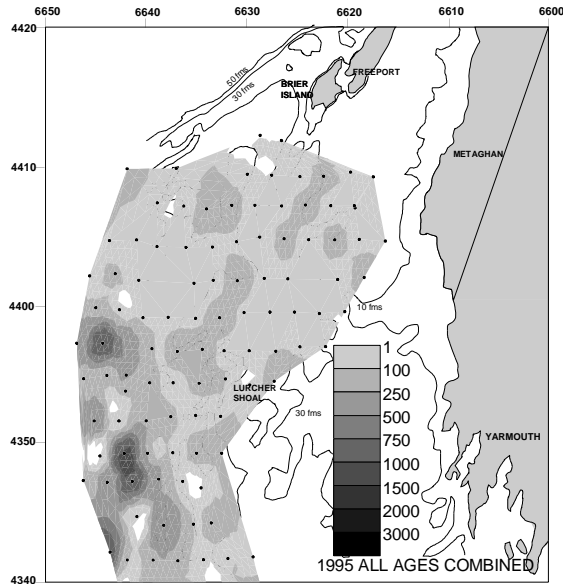
Resource Status

Fleet activity is monitored through logbooks, sales slip records and port sampling information. Logbook compliance has been poor (13%) in the recent past (1990), but is now at 77%, a decrease from 87% in 1994. Data from research vessel surveys are also used to assess scallop stocks.

Catch rates (CPUE) fell on both beds by 39% from 1994, and is currently at a low level (10.6 and 10.4 for Brier Island and Lurcher Shoal respectively). CPUE was generally higher in the 1980s.



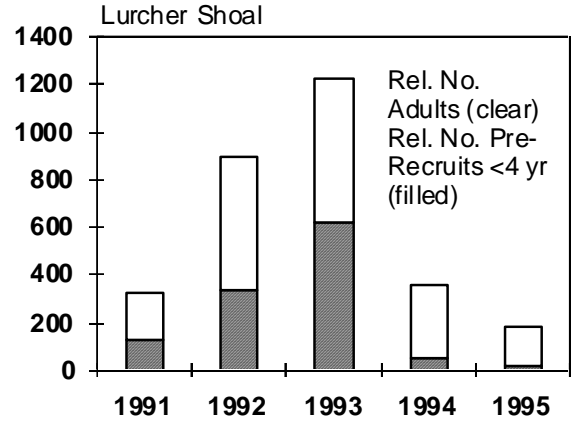
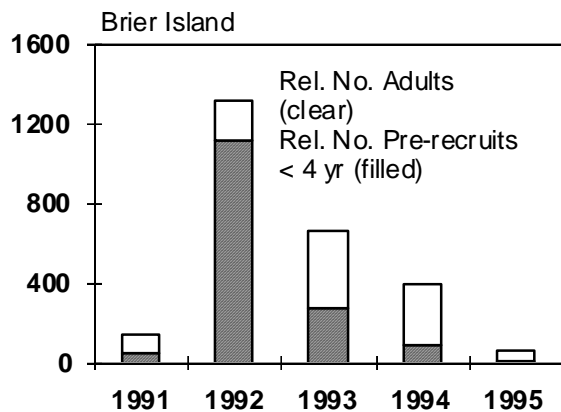
Annual stock assessment surveys have been conducted in August since 1991, using the government research vessel, *J.L. Hart*. The area surveyed has changed from year to year, with the grid area expanding to reflect commercial activity.



Spatial distribution of scallops in numbers of scallops per standard tow. Dots indicate research vessel survey tow locations.

In 1995, 42 tows were made on the Brier Island grounds and 60 on the Lurcher Shoal beds. The largest concentrations of scallops are in the deeper water off Lurcher Shoal. The pre-recruit scallops are also found in this area, although the dominant age groups are the five and six year old scallops.

Scallop **abundance indices**, estimated from the research vessel survey, have declined dramatically in recent years. The 1995 survey catch was only 18% of the 1994 survey on the Brier Island bed, and 50% of that surveyed in 1994 on the Lurcher bed.



The high number of pre-recruit scallops in 1992 on Brier Island and 1993 on Lurcher (see graphs above), were heavily fished at small sizes. There was no evidence of a strong pre-recruit year class, and the absolute number of pre-recruit scallops relative to adult abundance is the lowest on record for this area. The percentage of clappers was high on both beds with 7.9% clappers on Brier Island, and 16% on Lurcher Shoal. These clappers are not associated with starfish predation and may be the result of the increased fishing activity in the area.

Exploitation rate was calculated for each bed from the survey numbers. As the survey area was not constant from 1991 to 1993, these years could not be included in the calculations. The 1994 and 1995 survey areas were the same, and so exploitation rate was calculated for that period. All ages of animals were included and a natural mortality of 0.1 was assumed. The exploitation rate was 0.74 for the Brier Island bed and 0.49 for the Lurcher Shoal bed in 1994/1995.

Regarding **sources of uncertainty**, the survey does not accurately estimate the number of scallops less than 40 mm. However, large recruitment pulses are detected in the survey before they reach the fishery. The present low abundance of pre-recruits indicates that landings cannot be sustained at current levels over the next several years.

Outlook

The strong **recruitment** pulses which settled on Brier Island and Lurcher Shoal have been heavily fished at small sizes and there has been no large recruitment pulse since the settlement of these animals. Landings from these areas are expected to fall further in 1996, and are not expected to increase at least until 1999, dependent upon the presence of pre-recruits in the 1996 survey. All of the major spawning aggregations

in the Bay of Fundy are at very low population levels. This raises concern for **recruitment overfishing**.

None of the current management regulations have been effective in controlling effort. In order to prevent recruitment overfishing, it is necessary to close large areas of the scallop beds. These closed areas will provide on-going broodstock supply. To prevent growth overfishing, closure of the remaining portion of the beds could be managed on a rotational basis dependent upon the pattern of recruitment.

The change to the meat count regulation (50 meats per 500 g) has been a positive *step* toward maximizing yield from this area. Although the number of pre-recruits are currently low, the adjusted count should ensure that future strong year classes are able to sustain the fishery for a greater length of time. However, the minimum shell height of 76 mm (3 inches) is not consistent with the goals of the meat count regulation, which is to target fully recruited scallops. According to the meat weight-shell height relationships, the minimum shell height should be increased at least to 90 mm to prevent very small scallops from being blended with a few larger ones to achieve the meat count.

The closure of a large portion of the Brier Island and Lurcher beds during lobster season may have a secondary effect of enhancing juvenile survivorship, as the period coincides with the time of scallop settlement.

For More Information

Contact: Dr. Ellen Kenchington,
Invertebrate Fisheries Division,
Science Branch,
Department of Fisheries and Oceans,
PO Box 550, Halifax, Nova Scotia
B3J 2S7

Tel: (902) 426-2030
Fax: (902) 426-1862
E-Mail: Kenchington@bionet.bio.dfo.ca

References

Kenchington, E.L., Lundy, M.J. and D.L. Roddick. 1995. 1991-1994 Bay of Fundy scallop stock surveys and fishery statistics: Brier Island and Lurcher Shoal and an evaluation of the effectiveness of the meat count regulation for these stocks *DFO Atl. Fish. Res. Doc.* 95/9, 24 pp.

Kenchington, E.L. and M.J. Lundy. 1996a. 1995 Bay of Fundy Scallop Stock Assessments: Brier Island and Lurcher Shoal. *DFO Atl. Fish. Res. Doc.* 96/15, 31 pp.

Kenchington, E.L. and M.J. Lundy. 1996b. An Assessment of Areas for Broodstock Protection in the Approaches to the Bay of Fundy. *DFO Atl. Fish. Res. Doc.* 96/13, 21 pp.