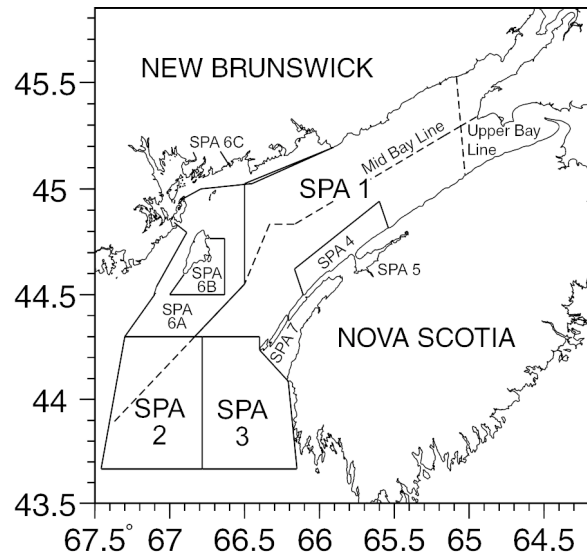


Scallops in Production Areas (SPA's) in the Bay of Fundy



Summary

SPA

All

- In order to preserve recruitment, the impact of fishing practices on juvenile mortality needs to be investigated.
- It is recommended that dockside monitoring (where not yet implemented), meat weight sampling and other measures be implemented to improve data quality including area of capture data.

1

- Landings to 10 October 1999 were 258 t against a TAC of 290 t.
- Catch rates of the Full Bay and Mid-Bay fleets have increased slightly since 1997, but are still at low levels.
- The surveys on both sides of the Bay show similar trends and indicate that abundance is at a low level.
- The present level of removals from this stock appear to be in balance with production from the low level of recruitment and growth of the biomass.
- There should be no increase in the TAC.

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 Bay of Fundy area is fished by the Full Bay and the Mid-Bay licensed fleets. Full Bay vessels are 45' to 65' and Mid-Bay vessels are generally between 30' to 45'. Full Bay licensed vessels are permitted to fish all the Bay of Fundy. The Mid-Bay license holders have access to the New Brunswick side of the Bay of Fundy to the Mid-bay line and SPA 2. There are also 16 Upper Bay Licences restricted to the upper reaches of the bay. The fishery has been managed using limited entry, gear size limits, seasonal closures, minimum shell height and meat count restrictions. The gear width limit is 5.5 m with ring size of not less than 82 mm inside diameter. This industry became a quota fishery in 1997. Total allowable catches (TACs) are set and landings are reported in terms of meat weights (adductor muscles).

- 2
- Highest landings of 112 t (as of 13 November) reported from this area in 1999. Previous landings in the previous two years were less than 30 t.
 - Serious doubts have been raised about whether all of the landings reported to SPA 2 actually came from this area.
- 3+7
- Landings for SPA 3 and 7 combined are unchanged at about 220 t over the last three years.
 - Serious doubts have been raised about whether all of the landings reported to SPA 3 actually came from this area.
 - The survey indicates a decline in recruited population from 1998.
 - Survey estimates of scallops with modal shell height of 40 mm in Lurcher Shoal area are the largest observed in the series. Measures are needed to protect this recruitment pulse from incidental fishing mortality until at least 2001.
 - Recommend that 2000 TAC remain at the 1999 level of 200 t.
- 4
- Landings in 1998 were 103 t against a TAC of 120 t.
 - The fishing season has not finished in 1999 but reported landings are below what they were at same time this year.
 - The survey indicates a decline in abundance of commercial-sized scallops with little sign of recruitment to the fishery in the near future.
 - Population models indicate that fishing mortality has increased by more than 50 percent since 1996.
 - Given the lack of recruitment in this stock it would be prudent to refrain from setting the 2000 TAC until a better estimate of biomass can be obtained.
- 4
Inshore
- There is an industry request to re-open the area inside of 1 mile from shore that has been closed since 1996.
 - Exploratory surveys since 1997
- found large scallops but few signs of recruitment.
- An exploratory winter fishery for a limited time period with meat weight sampling and other conditions is suggested to gather more information.
- 5
- Landings in 1999 were 11.9 t against a TAC of 10 t.
 - The survey in 1999 indicated an increase in numbers and weight since 1998.
 - An increase in TAC for 2000 from 10 t to 17 t could be indicated here.
- 6
- Landings in 1999 as of 30 October were 144 t against a TAC of 160 t.
 - In 1999 the survey showed an increase in 6B and a slight decrease in 6A in the abundance of commercial-sized scallops.
 - Recruitment observed in Duck Island Sound needs to be protected from incidental fishing mortality until at least 2001.
 - The scientific advice for the TAC in 1999 was 130 t. The scientific advice for the TAC in 2000 is also 130 t, with a maximum of 80 t from the inside zones (SPA 6B+6C).

SPA 1 – Inner/Upper Bay of Fundy

The Fishery

Landings in SPA 1 reached a peak in 1989, with the large recruitment pulse seen throughout the bay, but by 1997 had declined to their lowest levels since 1980. Although landings have increased since 1997 they are still at low levels.

The Mid-Bay vessels were not required to keep logbooks until 1996, so their earlier catches cannot be broken down by fishing area. Landings by Statistical District for districts 24, 40, 43, 44, 48 and 79, (coast of Bay of Fundy from St. John, N.B. to Mordon, Nova Scotia) were used to estimate

Mid-Bay landings from Area 1 prior to 1997.

Landings (tonnes of meats)

Year	Average 1991-95	1996	1997	1998	1999
TAC	—	—	290	310	290
Total	710	202	142	231	258 ¹

¹preliminary to 10 October, 1999.

The 1999 quota for Full Bay licence holders was kept at 240 t, the same as in 1998. The fishery was still open for this fleet at the time of this assessment. The 1999 quota for the Mid and Upper Bay fishers was 50 t, down from the 70 t in 1998 but the same as 1997. When they reached this quota in September 1999 their season was extended as long as a self-funded meat weight sampling program was put in place.

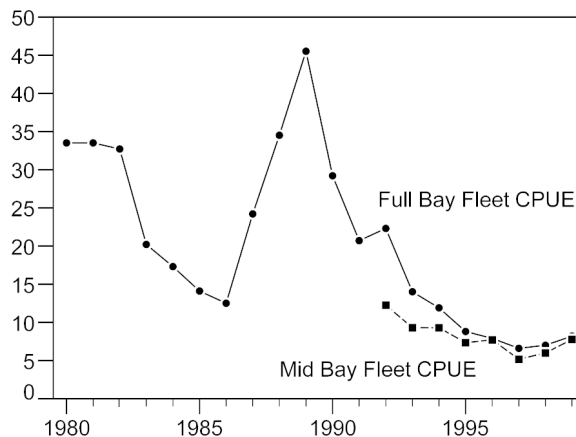
The 1999 landings increased by 12 percent over 1998 levels. While the Mid and Upper Bay fleets exceeded their allowable catches, the Full Bay had not reached theirs as of 10 October. The 1999 landings to October were 194 t for the Full Bay licence holders, 47 t for the Mid-Bay and 17 t for the Upper Bay fishers.

Results of the voluntary **meat weight sampling** program indicated a decline in the size range of meats being caught, with fewer large and fewer small scallops showing up in the samples. However, the sampling intensity of this program was quite low. There were also indications that the recruiting year-class was being harvested in the 8-16 mile grounds off Digby in 1999.

Resource Status

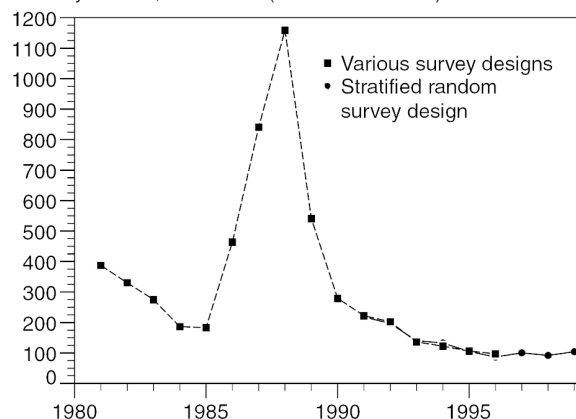
Catch per unit effort for both the Full Bay and combined Mid and Upper Bay fleets has declined from the highs of the late 1980's to a low in 1997. It has improved slightly since then but is still at a low level.

Catch per unit effort (kg/h)



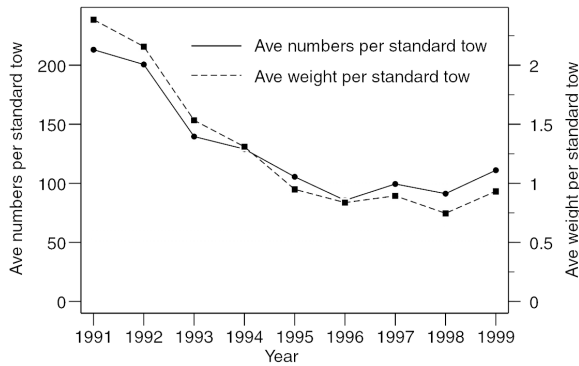
Research vessel surveys have been conducted annually in the Digby area since 1978. These surveys show the effects of the large recruitment pulse in the late 1980's and the current low levels of abundance.

Survey indices, 8-16 miles (mean no./std. tow)



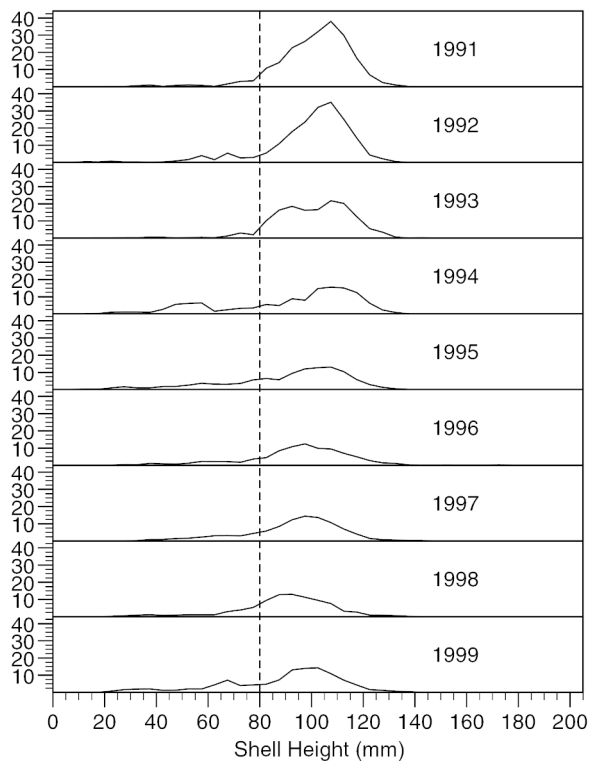
Since 1991 the zone from 8-16 miles offshore of Nova Scotia has shown a decline in mean catch per standard tow in both numbers and weight.

Survey Indices, 8-16 miles



The size frequency distribution from the surveys in the 8–16 mile Digby grounds shows a decline in the number of larger scallops. The numbers of pre-recruit scallops (less than 80 mm in shell height) in the 8–16 mile survey have improved slightly in the southwestern part of SPA 1, but there are still no signs of strong recruitment in the survey.

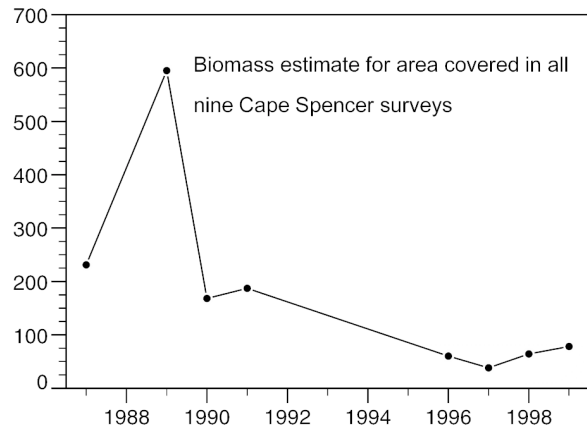
Survey indices, 8-16 miles (mean no./std. tow)



The general pattern of a decline from the 1989 peak to the low in 1997 in the 8–16

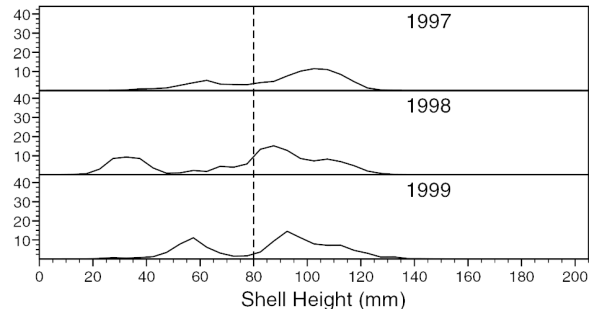
mile survey was seen in the Cape Spencer surveys as well. Since 1997, the biomass in the Cape Spencer survey has shown a higher increase than in the 8–16 mile grounds. While the 1999 biomass in Cape Spencer was double that observed in 1997, it is still quite low.

Survey indices, Cape Spencer (t)

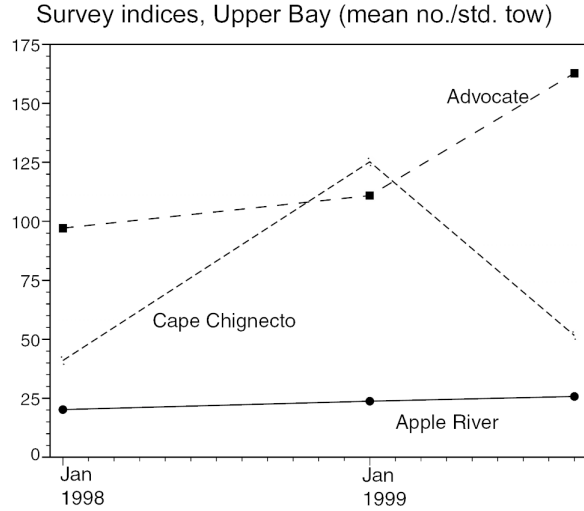


The shell height frequencies for this area also show pre-recruits that will enter the fishery in the next two years.

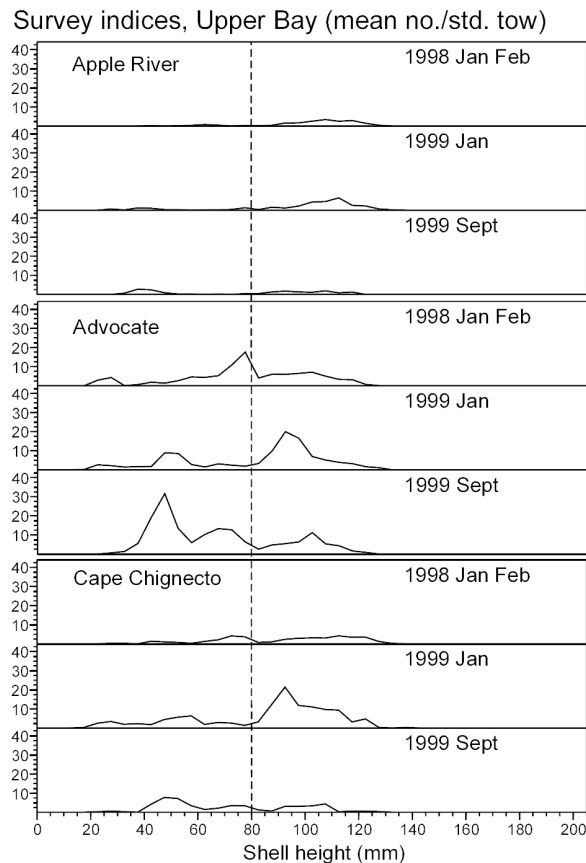
Survey indices, Cape Spencer (mean no./std. tow)



Survey information in the Upper Bay area is limited to 1998 and 1999. The density of pre-recruit scallops is highest in Advocate Harbour where the abundance of commercial-sized is higher than that seen for the 8–16 mile Digby grounds.



The shell height frequencies show pre-recruits that will enter the fishery over the next year in the Advocate Harbour and Cape Chignecto areas, but there is little evidence of pre-recruits in the Apple River area.



Outlook

The present level of removals from this stock appear to be in balance with production from the low level of recruitment and growth of the biomass. Conditions have improved more in the Cape Spencer and Upper Bay areas than in the Digby grounds. The fishery appears to be stable at the moment, but the low population levels are still a concern. There should be no increase in TAC in this area.

Management Considerations

The harvesting of the recruiting year-class is a concern as it will result in growth overfishing.

It is recommended that dockside monitoring, meat weight sampling and other measures be implemented to improve data quality including the area of capture data.

SPA 2 – Southwest Bank

The Fishery

Prior to 1997, the scallop beds in SPA 2 had not been heavily fished. A TAC of 20 t was set for 1997. No catch limits were set for 1998 or 1999 but special licence conditions were applied. Due to poor growth and yield, there were no size controls in this fishery in 1998. In 1999, vessels could fish under special license with an at-sea observer required if fishing without restrictions on meat count or with no observer if fishing under a 45/500 g meat count. A portion of this area north of the Mid-Bay Line is open to fishing by the Mid-Bay fleet. The entire area is open to fishing by the Full Bay Fleet.

Landings (tonnes of meats)

Year	Average 1991–95	1996	1997	1998	1999
TAC	–	–	20	–	–
Total	<2	1	29.7	15.3	111.6 ¹

¹preliminary to 13 November, 1999.

The **landings** in 1999 were unprecedented in the history of this area with the Full Bay fleet landing 93 t and Mid-Bay fleet 18.6 t. Historically fishing has mainly occurred on Southwest Bank but once SPA 3 closed in July 1999, a large number of fishing logs listed their position as just to the west of the SPA 2/3 boundary. Landings in SPA 2 began to increase at the same time as SPA 3 was closed with the bulk of the landings for the year coming from July to September. However, **catch rates** were recorded as being 16 to 22 kg/h from July to September, higher than were recorded for SPA 3 for all of 1999 (11–14 kg/h). Based on historical fishing patterns and the magnitude of past removals in SPA 2 we can only conclude that most of the catch recorded as being from SPA 2 came from somewhere else.

Resource Status

There were no new surveys for this area. Results from the 1996 survey of SPA 2 indicated that the scallops exhibit very poor growth and yield in this area. Reports from industry are that yield has improved over the last two years.

Sources of uncertainty

Removals from this scallop production area in 1999 are unknown due to uncertainty about the accuracy of catch data.

Outlook

There is no new information on SPA 2 and no surveys are planned for 2000. Fishing in

this area has been opportunistic due to sporadic recruitment.

Management Considerations

It is recommended that dockside monitoring, meat weight sampling and other measures be implemented to improve data quality including the area of capture data.

SPA 3, 7 – Brier Island/Lurcher Shoal, St. Mary's Bay

The Fishery

Landings in SPA 3 increased each year from 1991 to 1994, declined to 1996 and have remained relatively unchanged since then. There are two main beds in this area, those around Lurcher Shoal and those below Brier Island, although scallops can be found throughout most of the area. In 1999 SPA 3 and SPA 7 (St. Mary's Bay) were combined for management purposes with a single TAC. The fishing season in St. Mary's Bay is influenced by the lobster fishery.

Landings (tonnes of meats)

Year	Average 1991–95	1996	1997	1998	1999
TAC 3	–	–	237	150	–
Total 3	883.6	200	190	162	–
TAC 7	–	–	50	50	–
Total 7	36	58	–
TAC 3+7	–	–	–	–	200
Total 3+7	–	–	–	–	222 ¹

¹preliminary. Includes 5.8 t from re-opening in Sept./Oct. 1999.

Landings in 1999 are for SPA 3 and 7 combined and a comparison of the combined landings for the two areas for 1997 and 1998 indicate that overall landings have been unchanged at approximately 220 t. The fishing season was closed in SPA 3 on 22 July because the quota was overrun. This closing was earlier than normal and serious

doubts have been raised about whether all of the landings reported to SPA 3 actually came from this area.

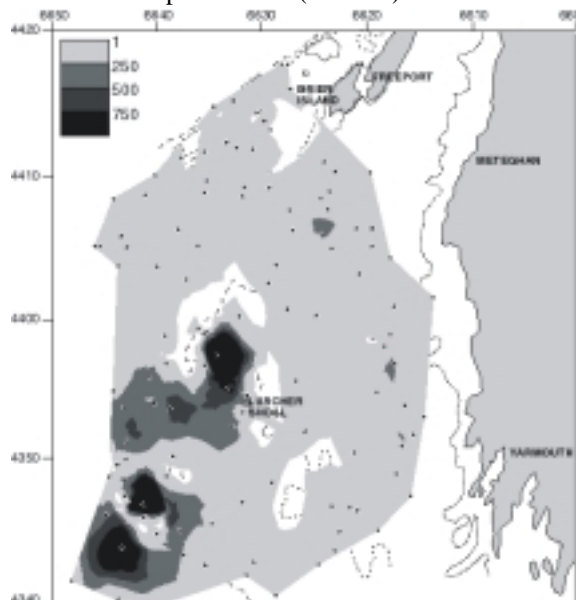
A limited re-opening was initiated in September/October 1999 in the deeper water areas on the western side of SPA 3. Conditions of licence included at-sea observers, industry-funded meat weight sampling (minimum of 50 percent of trips) and the provision of fishing logs to Science Branch within 12 hours of landing. A total of 5.8 t out of the 15 t allocated was landed. Logs were provided in a timely fashion and 61 percent of the trips provided meat weight samples.

Resource Status

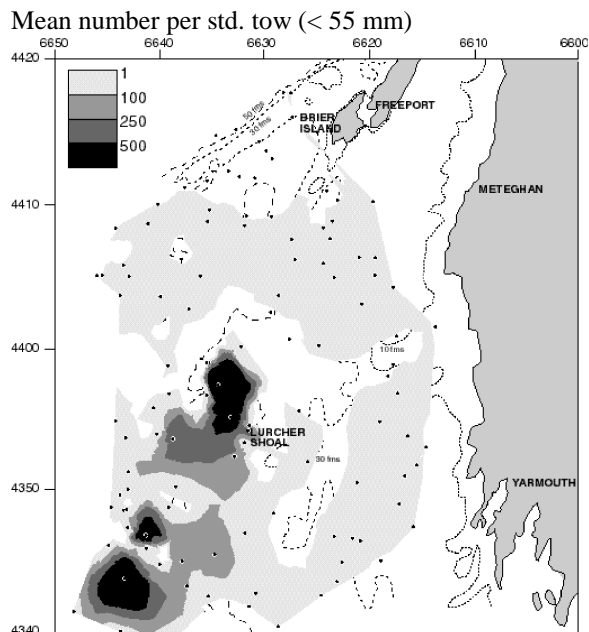
Annual **research vessel surveys** have been conducted in August since 1991. In terms of coverage and design, only the results from the 1995 to 1999 surveys are comparable. In 1999, the first survey of St. Mary's Bay (38 stations) was completed but more surveys are required before the data can be used for stock assessment.

The highest densities of scallops continue to be in the southwest area of Lurcher Shoal. The scallops in this area usually have smaller meats-at-shell height than those caught elsewhere in SPA 3. However, all scallops caught in the survey in 1999 exhibited higher meat weights-at-shell height than usual throughout the whole area.

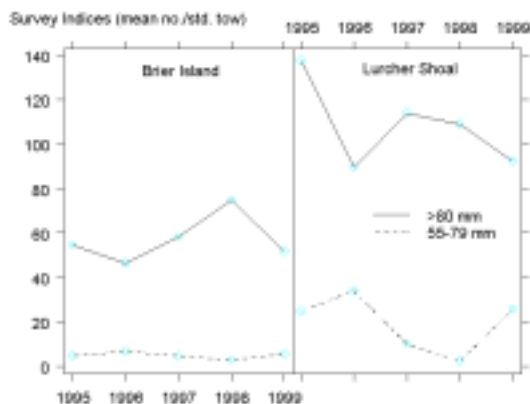
Mean number per std. tow (all sizes).



Large numbers of small scallops with a mode at 40 mm shell height were observed in the Lurcher Shoal area. While the survey index of the abundance of animals at this size is less accurate than for larger animals, these catches were the largest seen in this survey series. These catches could indicate above average recruitment to the 2001 and 2002 fishery. There are also high densities of commercial-sized scallops located in the same areas and measures should be taken to protect these pre-recruits from incidental fishing mortality.



Mean numbers per tow from the survey indicate declines in 1999 compared to 1998 for recruited animals. An increase in the numbers of scallops at the 55–79 mm shell height range was observed in the Lurcher Shoal area in 1999. These animals should enter the fishery in 2000. There was little sign of scallops in this size range in the Brier Island area.



Mean weight per tow declined in the Brier Island area but increased in the Lurcher Shoal area due to the increase in weight-at-shell height and the larger number of older animals there.

Sources of uncertainty

Removals from this scallop production area in 1999 are unknown due to uncertainty about the accuracy of catch data.

The survey estimates of the abundance of the small scallops (mode of 40 mm shell height) are tentative and the 2000 survey should confirm the strength of this potential recruitment.

Outlook

The survey in SPA 3 indicates that the mean number per tow of recruited animals has declined from 1998. While there were some sign of good recruitment from animals in the 55 to 79 mm shell height range in Lurcher Shoal, there was little sign of recruitment in the Brier Island area. It is recommended that 2000 TAC remain at the 1999 level of 200 t.

Management Considerations

Measures should be taken to protect the recruitment pulse in the Lurcher Shoal area from incidental fishing mortality until at least 2001.

It is recommended that meat weight sampling and other measures be implemented to improve data quality including the area of capture data.

SPA 4 – Digby

The Fishery

Landings in what is now SPA 4 are available from 1991 to 1999. Landings steadily declined from 1991 to 1995 as the large year-classes (1984, 1985) were fished down. Portions of what is now SPA 4 were

closed in 1995 and 1996. In 1998, the fishing season ran from 22 September to 22 December with total landings of 103 t against a TAC of 120 t. Preliminary reports from the 1999 fishery which opened on 1 October, are that only 32.5 t have been landed to date compared to 90.7 t landed by this time last year. The fishing industry has reported that bad weather has reduced opportunity to fish.

Landings (tonnes of meats)

Year	Average 1991-95	1996	1997	1998	1999
TAC	-	-	100	120	120
Total	299.8	71.2	116.1	103	32.5 ¹

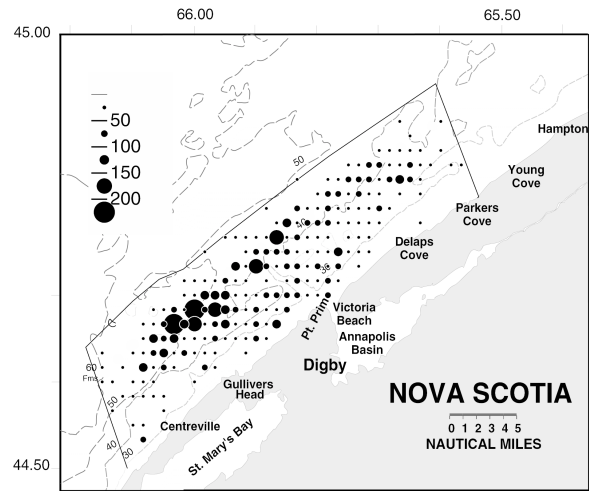
¹ preliminary to 13 November, 1999

Total **effort** (hours) was low in 1995 and 1996 due to the closures but has been increasing each year since then.



A large part of the effort in 1998 was targeted on the deeper waters off of Centreville to Digby Gut which previous research surveys had shown to be areas of high density but low yield.

Effort (hours) in 1998.



Resource Status

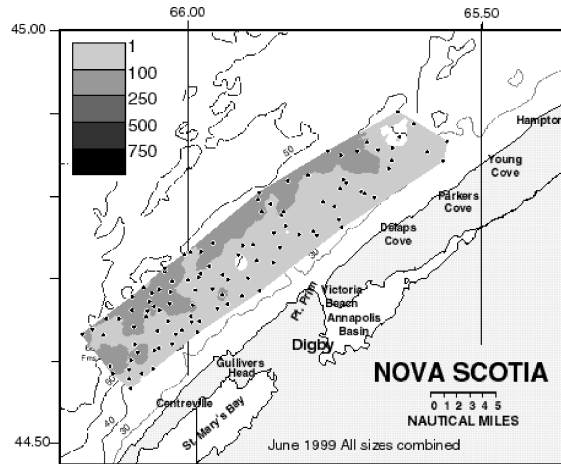
The **commercial catch rate** declined in 1998 from the previous year and at 9.4 kg/h is the second lowest in the series. The preliminary estimate for the 1999 catch rate is 8.9 kg/h and suggests there will be a further decline this year as catch rates usually decline as the season progresses.



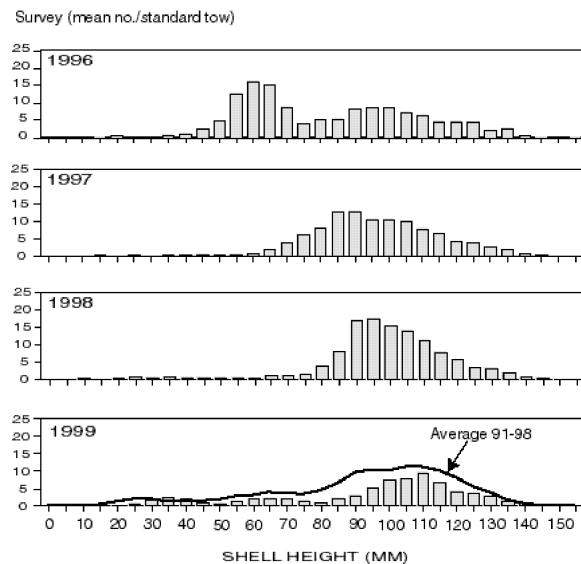
Research vessel surveys using the same stratified random design have been conducted since 1991. Prior to 1991, surveys had been stratified according to the current year commercial catch. The survey is conducted in June prior to the fishery.

The greatest concentration of scallops in SPA 4 continues to be in the deeper water off of Centreville to Digby Gut. However, densities are much reduced compared to previous years.

Mean number per std. tow (all sizes)

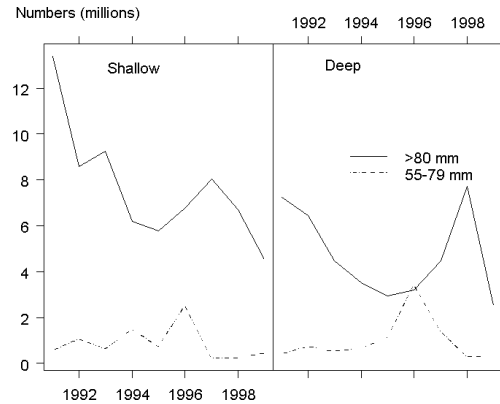


The largest recruitment in the last nine years was detected in 1995/1996. Since then the post-recruit population has been fished down and the 1999 survey indicates that it is currently below average levels.



Growth and yield decrease with increasing depth for this scallop stock. Recent research has found that this decrease accelerates at

depths deeper than 90 m. Trends in the survey index for depths above (shallow) and below (deep) 90 m reflect recent fishing patterns. Fishing in 1996 and 1997 was concentrated in the shallow areas while high densities of recruiting scallops (55–79 mm shell height) were observed by the survey in the deeper water. In 1998, the recruited scallops (80+ mm shell height) in the deeper water were harvested by the fishery. The index for recruitment in both depth ranges does not indicate any strong year-classes in the near future.



Estimates of exploitation rate from **commercial catch rate** data using a depletion estimator indicated that fishing mortality has increased by about 60 percent from 1996 to 1998. The actual fishing mortality estimates of 0.45, 0.43 and 0.62, for 1996 to 1998, respectively were probably more reflective of the smaller areas being fished than of the entire stock area.

Estimates of fishing mortality from the **research vessel survey** data indicate that fishing mortality increased by 50 percent in 1997 compared to 1996 and by 88 percent in 1998 compared to 1997. These estimates probably reflect the stock area as a whole assuming that all of the population is likely to be fished. The estimated fishing mortality of 0.20 for a catch of 103 t in 1998 is close

to the 0.22 forecast for the TAC of 120 t in the 1998 assessment.

Sources of uncertainty

The population model used here to interpret the survey data assumes that recruiting year-classes are reliably detected by the research survey. The survey recruitment index was only derived from the two survey drags lined with 38 mm polypropylene stretch mesh.

The population model estimated a biomass of 1500 t in 1998 and it should have been possible to catch a TAC of 120 t from this biomass. The fact that the 1998 catch was only 103 t indicates that either the biomass estimates or the reported catch, or both, are incorrect.

Outlook

While the estimates of fishing mortality from the commercial catch rate and survey data differ in magnitude, they agree in the trend that fishing mortality has been increasing in this fishery since 1996. Forecasts for the year 2000 from the population model using the survey data, suggest that in the absence of fishing, recruitment will not balance the losses due to natural mortality and as a consequence there is no surplus production and the population is in decline. This decline will continue unless recruitment increases in the near future. Estimates of population biomass are uncertain and it is difficult to determine what proportion of the population is being taken by the fishery.

Management Considerations

Given the lack of recruitment in this stock it would be prudent to refrain from setting the 2000 TAC until a better estimate of biomass can be obtained. We recommend that a research program be initiated as soon as possible with the participation of the fishing industry to obtain a more accurate estimate of biomass. Fisheries management will have to participate as well, as modifications to current regulations may be required to conduct the work.

It is recommended that meat weight sampling and other measures be implemented to improve data quality including the area of capture data.

SPA 4 – Inshore

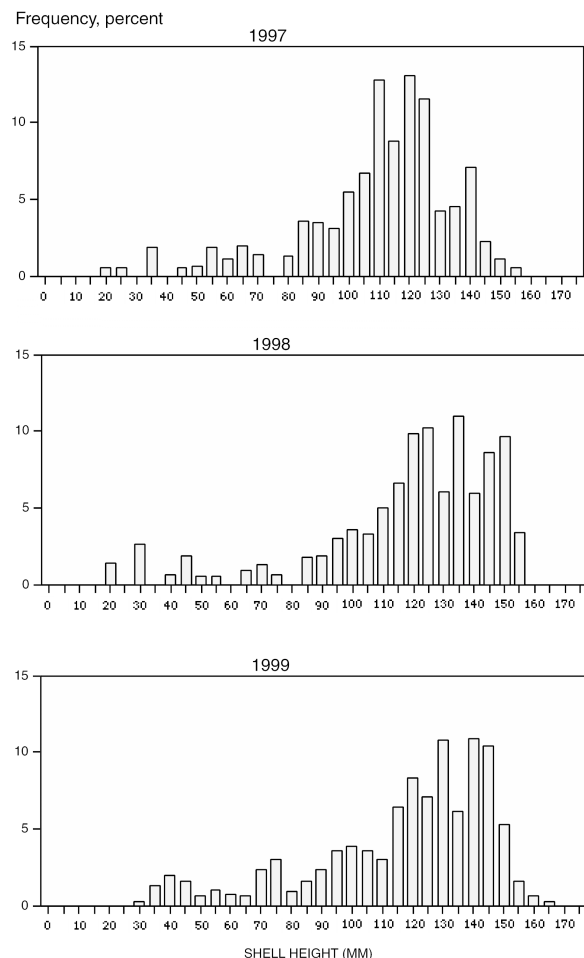
The Fishery

In 1996 the area inside of 1 mile from shore was closed to scallop fishing due to concerns of the lobster fishermen and has remained closed to date. In 1999 commercial fishermen on the Inshore Scallop Advisory Committee proposed that this area be reopened for a limited time during January/February when lobster gear are not in the water.

Resource Status

Resource inventory surveys have been conducted in September/October since 1997 using fishing vessels. The 1997 and 1998 surveys covered the area within two miles of shore and while densities were similar between the two years they did not show large numbers comparable to offshore. The 1999 survey covered more areas closer to shore with stations picked by the skipper of

the fishing vessel used in the survey. Shell height frequencies from all three surveys showed proportionately large numbers of older animals. Catch rates from the 1999 survey were relatively good when compared with other commercial fishing areas and the catch was predominantly large, older animals with high meat yields.



Sources of uncertainty

The survey time series is only three years long and the survey design is still evolving. None of the surveys detected substantial recruitment and we do not know what the relationship may be between recruitment in the inshore and offshore areas. While the survey catch rates were judged to be

adequate for fishery operations, the resource may be quite patchy.

Management Considerations

An exploratory winter fishery for a limited time period with meat weight sampling and real time monitoring of catch-rates may provide needed data on the size composition and extent of scallops in the inshore zone.

SPA 5 – Annapolis Basin

The Fishery

The 1999 fishery opened on 2 January and closed 13 January when the quota had been caught. Landings in 1998 and 1999 were double those reported in the previous two years.

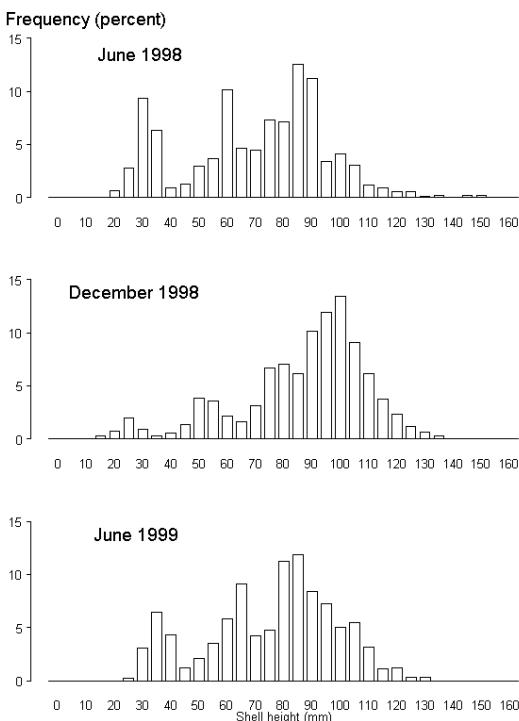
Landings (tonnes of meats)

Year	Average 1991–95	1996	1997	1998	1999
TAC	–	–	25	10	10
Total	...	4.9	5.0	11.4	11.9 ¹

¹preliminary.

Resource Status

Research vessel surveys were conducted in June 1998 and 1999. In addition, a survey was done in December 1998 using a commercial fishing vessel. The shell height frequencies from all three surveys indicate that there is a wide range of shell height sizes of recruited animals with good signs of recruitment over the next two years.



The **mean number per tow** of 122 in 1999 was higher than that observed for 1998 (101). Meat weights-at-shell height have significantly increased in June 1999 (20 to 30 percent) over those observed in June and December 1998.

Sources of uncertainty

While previous studies in the Digby Gut area of SPA 4 indicated that meat weight increases by almost 23 percent from June to the fall when the fishery occurs, only a small increase was observed between June and December 1998 in SPA 5. The larger meat weights observed in June 1999 are assumed to indicate that meat weights will be at least as large when the fishery occurs in January 2000.

Outlook

The combined increase in number per tow and meat weight suggests an increase in survey biomass of 68 percent from 1998 to

1999. An increase in TAC from 10 t to 17 t could be indicated here.

SPA 6 – Grand Manan and Southeast New Brunswick

The Fishery

The areas around Grand Manan and off of southwest New Brunswick are designated SPA 6. This area is further divided for regulatory purposes into the outside zone (SPA 6A), the inside zone around Grand Manan Island (SPA 6B), and the mainland New Brunswick inside zone including the Wolves (SPA 6C). The 1999 fishery for the Full Bay fleet was still open at the time of the assessment.

Landings (tonnes of meats)

Year	Average 1991–95	1996	1997	1998	1999
TAC	–	–	170	130	160
Total	128	179	144 ¹

¹preliminary to 30 October, 1999.

In the last three years **landings** from SPA 6 comprised approximately 25 percent of the total from the Bay of Fundy. Landings from SPA 6 in 1999 to 30 October were lower than for the same date in 1998.

There are 99 Full Bay licenses and approximately 207 Mid-Bay licenses. In 1999, 36 Full Bay vessels and approximately 130 Mid-Bay vessels actively fished SPA 6.

While one TAC has been allocated to the whole area, a maximum portion of this TAC was allocated to come from the inside zones SPA 6B+6C. However, from 1997 to 1999 landings were recorded as coming from either 6A+6C combined or 6B. This

mismatch is not expected to be a problem in 2000 when the landings from individual areas (6A, 6B or 6c) will be available.

The Full Bay license holders fish under an Individual Transferable Quota (ITQ) system. The 1999 SPA 6 quota for the Full Bay fleet was 50 t with a maximum of 30 t from the inside zones (SPA 6B+6C). The blended meat count was 45/500 g and the minimum shell height regulation was 95 mm. Preliminary Full Bay fleet landings for SPA 6 in 1999 were 21 t; 13 t from SPA 6A+6C and 8 t from SPA 6B.

Mid-Bay license holders fish under a competitive quota system. The final catch level for 1999 was 110 t, with a maximum of 80 t from both inside zones (SPA 6B+6C). The blended meat count was 45/500 g and the minimum shell height regulation was 95 mm. Preliminary landings for the Mid-Bay fleet for SPA 6 were 123 t; 83 t from SPA 6A+6C and 40 t from SPA 6B. The Mid-Bay Fleet exceeded the quota in 1999 by 13 t. A contributing factor to this overrun was delays in the landings reporting process.

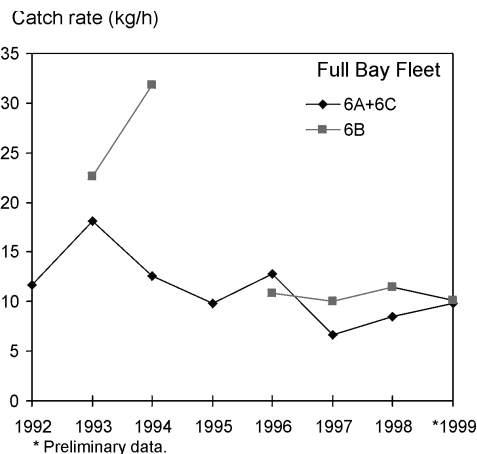
There was a decrease in effort (hours) for both the Full Bay and Mid-Bay fleets in both zones in 1999.

Resource Status

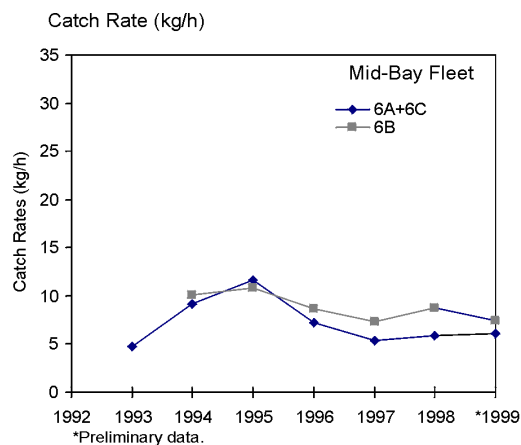
Catch and effort information to estimate catch rates is available from logbooks for 1992 to 1996. From 1997 to 1999, this information was provided by both Full Bay and Mid-Bay fleets in the form of inshore scallop monitoring documents. Data from last three years are more comprehensive for all vessels in the fleet.

Preliminary **commercial catch rates** for SPA 6 were available from the Full Bay

fleet. In 1999, the catch rate 6A+6C increased from 1998 by 17 percent while the catch rate for the Grand Manan inside zone (SPA 6B) decreased by 13 percent.

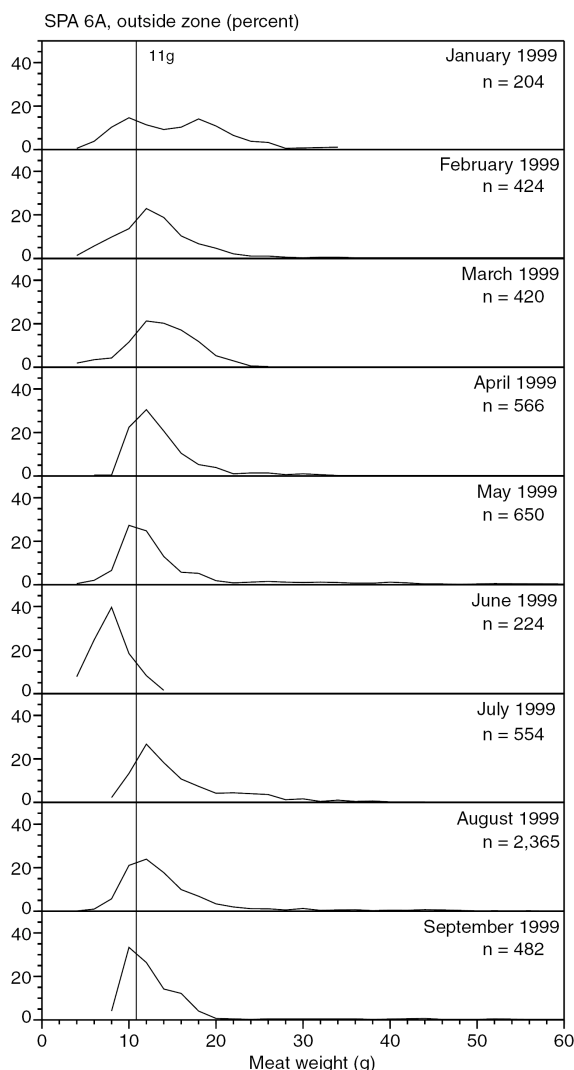


Preliminary catch rates for SPA 6 are available from the Mid-Bay fleet. There was minimal increase in the 1999 catch rates in 6A+6C while the Grand Manan inside zone (SPA 6B) catch rate decreased by 15 percent from 1998. Generally, Mid-Bay fleet catch rates tend to be lower than those from the Full Bay fleet.

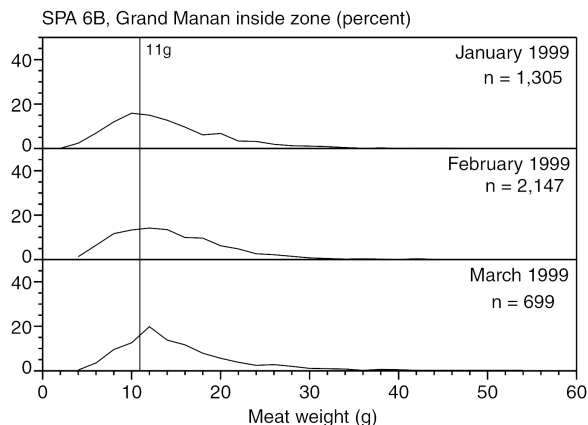


The industry **meat weight sampling** program initiated in 1998 provided information on catch composition from all areas and was used to monitor the presence of scallops less than 11 g during 1999. The 1999 mean meat weight for SPA 6A was higher than 1998. The monthly meat count

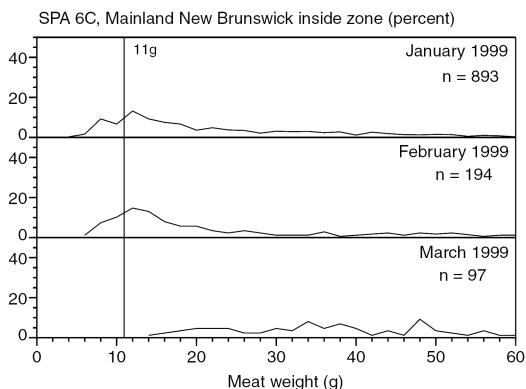
was constant with the exception of the month of June when there were an unusually large number of scallop meats less than 11g.



During the three months (January to March) SPA 6B was open the meat weight remained constant and was higher than in 1998. There was little change in the monthly meat count and overall it was lower than 1998. The percentage of scallops less than 11 g decreased marginally.

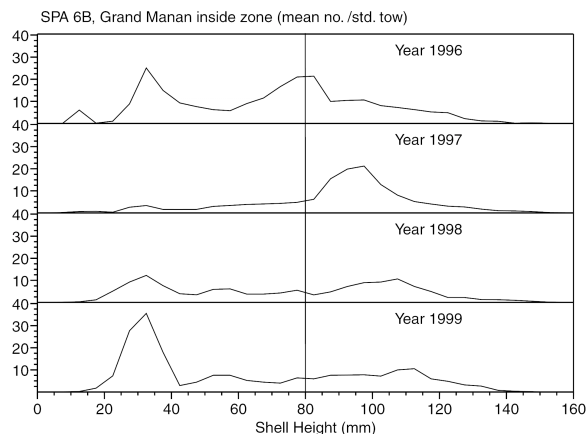


Meat weight samples were collected for the first time from SPA 6C in 1999. The mean meat weight was higher than the other areas and the meat count was lower. The percentage of less than 11 g meats was lower than in the other areas.

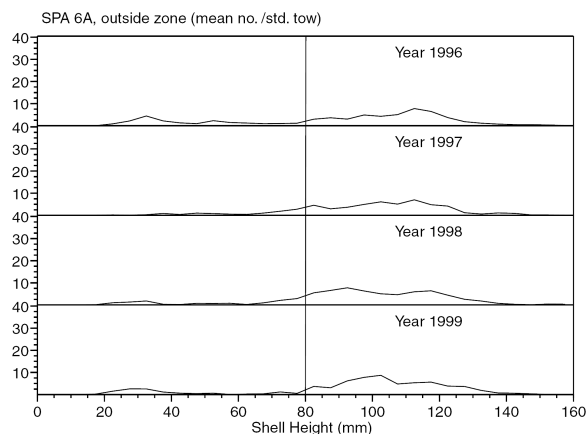


Research vessel surveys were conducted annually from 1979 to 1991. A new survey series with a different design was initiated in 1996.

The 1999 survey indicated an increase of 14 percent in mean number of scallops greater than 80 mm in the inside zone (SPA 6B) from 1998. In 1999, the mean number of scallops less than 80 mm increased 83 percent (concentrated in the 25 to 40 mm shell height range) over that observed in 1998. The majority of these small scallops were found in Duck Island Sound.



In 1999, there was a small decrease in mean number per tow of scallops in the outside zone (SPA 6A) from 1998.



The Grand Manan inside zone (SPA 6B) survey mean weight per tow in 1999 increased by 19 percent for scallops greater than 80 mm, and by 38 percent for scallops less than 80 mm, from 1998.

Survey Indices, Grand Manan inside zone (6B).

Year	Shell Height mm			
	No./std. Tow		Kg/std. tow	
	<80	≥80	<80	≥80
1996	88.6	142.9	0.42	1.18
1997	35.8	102.9	0.12	1.46
1998	72.4	64.9	0.13	0.95
1999	132.7	74.1	0.18	1.13

The survey mean weight per tow for the outside zone (SPA 6A) increased 15 percent for scallops equal to or greater than 80 mm.

The fact that the number per tow did not increase implies that the weight increase was mainly due to growth.

Survey Indices, Outside Zone (SPA 6A).

Year	Shell Height mm			
	No./std. Tow		Kg/std. tow	
	<80	≥80	<80	≥80
1996	19.3	46.0	0.03	0.65
1997	9.6	46.7	0.02	0.63
1998	12.5	58.1	0.02	0.61
1999	11.5	55.5	0.01	0.70

Outlook

The 1999 survey mean numbers of recruited animals have increased in the Grand Manan inside zone but decreased in the outside zone.

The overall increase in mean numbers of scallops less than 80 mm from 1998 in the Grand Manan inside zone may be a positive sign however tracking these scallops in subsequent years has proven difficult in the past. These juvenile scallops are located in areas that are fished heavily for a short period of time and may suffer high incidental fishing mortality.

The scientific recommendation for the TAC in 1999 was a total of 130 t for both fleets with a maximum of 80 t from SPA 6B and 6C. The advice for the TAC in 2000 is the same.

Management Considerations

Recruitment observed in Duck Island Sound needs to be protected from incidental fishing mortality until at least 2001.

It is recommended that meat weight sampling and other measures be implemented to improve data quality including the area of capture data.

For more Information

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 ISSN: 1480-4913

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***Correct citation for this publication***

DFO, 1999. Scallop Production Areas in the Bay of Fundy. DFO Science Stock Status Report C3-56(1999).