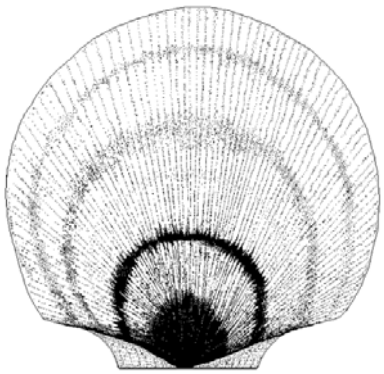
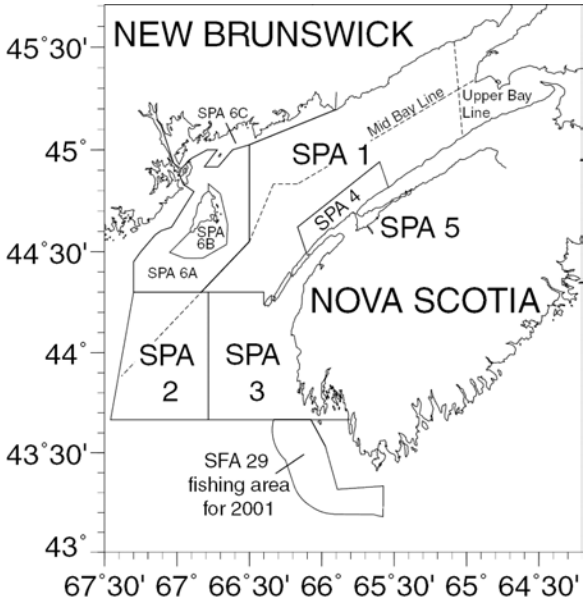


Scallop Production Areas (SPAs) in the Bay of Fundy



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. 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 and portions of the Nova Scotia side of the Bay of Fundy to the Mid-bay line and a portion of 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, meat count and individual meat weight restrictions. The gear width limit is 5.5 m with ring size of not less than 82 mm inside diameter. Quotas were introduced in 1997. Total allowable catches (TACs) are set and landings are reported in terms of meat weights (adductor muscles).

Summary

All SPAs

- There are no objectives and associated reference points for these fisheries; the prevention of growth overfishing is one potential objective. Discussions between the fishing industry and DFO to develop reference points for the scallop fisheries in the Bay of Fundy are required.
- In order to preserve recruitment, the impact of fishing practices on the mortality of recruits and pre-recruit scallops needs to be investigated.

SPA 1

- Landings to December 2001 were 387 t against a TAC of 320 t.
- Catch rates for all fleets have increased since 1997, with those of the Full Bay at the long-term median level in 2001.
- RV surveys show a large 1998 year-class in the 8-16 mile Digby area, but this year-class has not shown up elsewhere in SPA 1.
- Preliminary work indicates that the 8-16 mile Digby area will support an increased TAC similar to that in SPA 4, but elsewhere in SPA 1 the level of removals should remain at the present level.

SPA 3

- Landings in 2001 were 163 t against a TAC of 200 t because the Full Bay fleet had redirected their effort to Scallop Fishing Area 29 where catch rates were higher.

- Commercial catch rates averaged 15 kg/h in 2001, compared to 13 kg/h in 2000.
- The 2001 RV survey indicated an increase in the numbers of commercial-size scallops from 2000, although estimates from this survey are highly variable.
- A potentially above average year-class (1998) observed in the 2000 RV survey did not appear in the 2001 survey as recruit size scallops in the numbers expected.
- The current TAC of 200 t should not be changed.

SPA 4

- Landings in 2000/2001 were 102 t against a TAC of 110 t. As of 28 January 2002, 243 t had been landed against the current 2001/2002 TAC of 400 t.
- Effort in the 2000-2001 season was the lowest in 26 years.
- Commercial catch rates to 7 January 2002 have averaged 47 kg/h in 2001/2002, compared to 16 kg/h in the previous season and are expected to increase by season's end.
- Since October 2001, average meat weights have decreased to 11 g. The average percentage of meats less than 8 g was at 7.4 percent as of the end of January 2002.
- The 2001 RV survey indicated that, due to the higher than average growth rate, the 1998 year-class, was already recruiting to the fishery and increased the biomass of commercial size scallops (shell height > 80 mm) in 2001.
- The remaining portion of the abundant 1998 year-class will recruit to commercial size by the summer of 2002.
- Concerns about large increases in natural mortality as occurred in 1989/1990, are being addressed by a joint monitoring program conducted with industry.
- The 2001/2002 season is underway with a TAC of 400 t. Any in-season increase will need to take into account the impact on the potential yield for 2002/2003.

SPA 6

- Preliminary landings to Dec 2001 were 161 t against a TAC of 155 t.
- Commercial catch rates have increased, with the Full Bay CPUE above the long-term median.
- RV surveys show little signs of recruitment, with the exception of the Duck Island Sound area, where recruitment is expected to enter the fishery in 2003.
- There has been an increase in the incidence of clappers in the Duck Island Sound area since 2000.
- The 2002 quota of 195 t should not be increased.

SFA 29

- A fishery was conducted in the western portion of Scallop Fishing Area 29 in 2001. Scallop fishers had consulted with lobster fishers in the area to deal with potential conflicts.
- The scallop fishery ran from June 11 to August 31, by which time, the 400 t TAC was caught.
- Commercial catch rates averaged 110 kg/h and meat weights averaged 24 g.
- A joint industry/DFO post-season survey found large concentrations of commercial size scallops, as well as localised distributions of recruits and pre-recruits.
- The catch that would be sustainable in this area cannot yet be determined.

SPA 1 – Inner/Upper Bay of Fundy

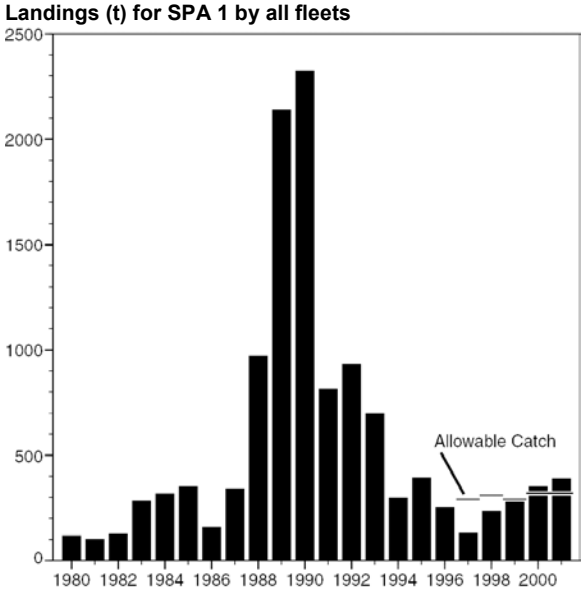
The Fishery

Landings in SPA 1 reached a peak in 1989, with a large recruitment pulse seen throughout the Bay, and by 1997 had declined to their lowest levels since 1980. Landings have increased since 1997.

The Mid-Bay vessels were not required to keep logbooks until 1996, so their earlier catches cannot be assigned to fishing areas. Landings for Statistical 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.

The 2001 quota for Full Bay licence holders was 240 t, the same as in 2000. The quota for Mid and Upper Bay fishers was 80 t, the same as their final 2000 quota.

Landings (t) for SPA 1 by all fleets



Landings by all fleets (tonnes of meats)

Year	Avg. 1993-97	1998	1999	2000	2001
TAC	-	310	290	320	320
Total	353	233	282	349	387*

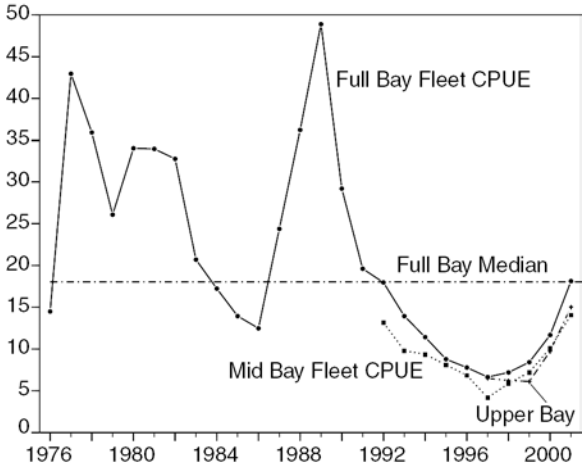
*preliminary.

The 2001 **landings** were 11% higher than in 2000, and almost triple those in 1997 (130 t), which were the lowest from 1980 to 2001. The 2001 landings to September 30th were 285 t for the Full Bay licence holders. Landings to December 31 were 59 t for the Mid Bay and 43 t for the Upper Bay fishers. The Mid and Upper Bay fleets exceeded their quota early in the season and the fishery for these fleets closed on April 27.

Resource Status

Catch per unit effort (CPUE) for the Full Bay fleet declined from a high in the late 1980's to a low in 1996-1997. CPUE has improved since then and is now at the 1976-2001 median. The CPUE for the Mid Bay fleet can only be calculated for the period since 1992 and for the Upper Bay fleet since 1997, as this is the extent of the logbook data. CPUE for the Mid and Upper Bay fleets are currently following the same trend as the Full Bay Fleet. They are expected to diverge in 2002 as the Full Bay fleet exploits the abundant 1998 year-class recruiting to the fishery in the Digby 8-16 mile area.

Catch per unit effort (kg/h)

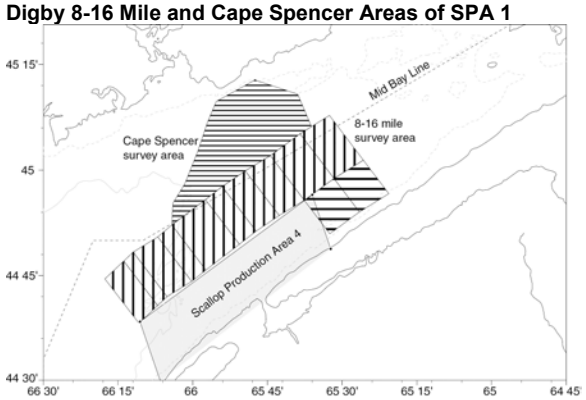


Digby 8-16 mile Area

Both **commercial CPUE** and **landings** increased in 2001 as the first of the 1998 year-class began to recruit to the fishery.

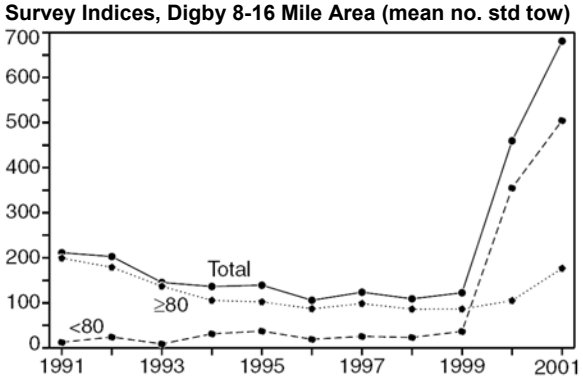
Research Vessel (RV) surveys have been conducted annually since 1981 in the Digby 8 to 16 mile area.

Digby 8-16 Mile and Cape Spencer Areas of SPA 1



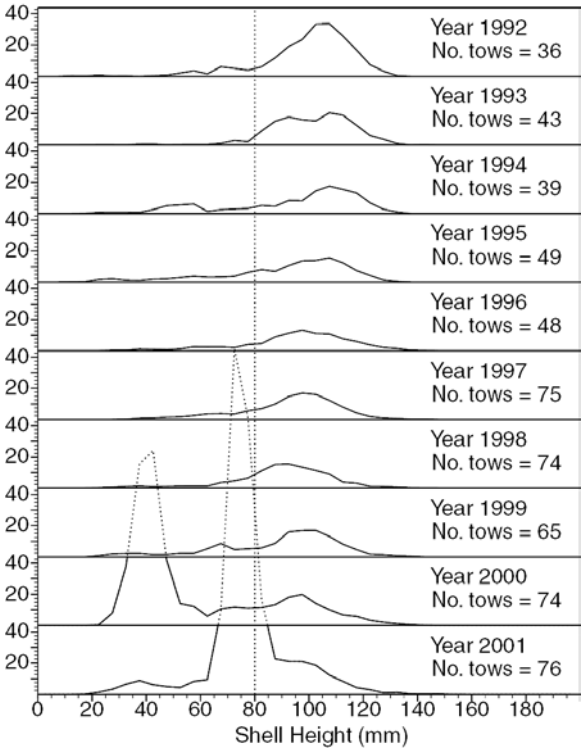
Since 1991 in the Digby 8-16 mile area, the RV mean catch per standard tow has declined to a low in 1996. It has increased in the last two years due to large recruitment here and in SPA 4.

Survey Indices, Digby 8-16 Mile Area (mean no. std tow)



The size frequency distribution from the RV surveys shows a decline in the number of larger scallops, and the large 1998 year-class encountered in the last two RV surveys. The area containing the pre-recruits was closed until March 5 in 2001, but then opened and will be fished in 2002.

Survey Indices, Digby 8-16 Mile Area (mean no./std. tow)



Preliminary work was done investigating the application of a new assessment model to the Digby 8-16 mile area. The model shows potential, but some inconsistencies need further resolution before it can be used for an evaluation of the stock status.

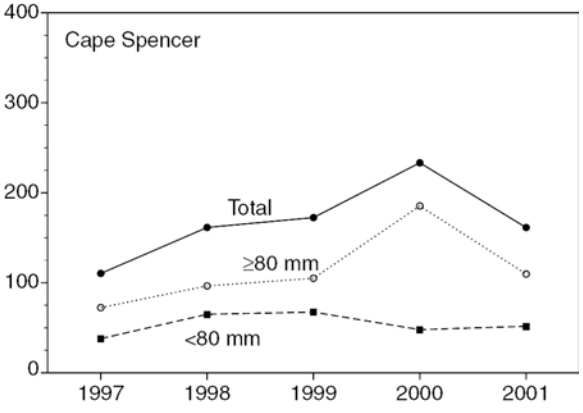
Cape Spencer Area

Commercial **CPUE** and **landings** for the Mid Bay fleet increased in the Cape Spencer area since 1997. The Full Bay Fleets CPUE and landings were following the same pattern until 2001, when effort fell to 30 percent of that in 2000. This was due to the Full Bay Fleets access to other areas such as SPA 4 and the 8-16 mile Digby area.

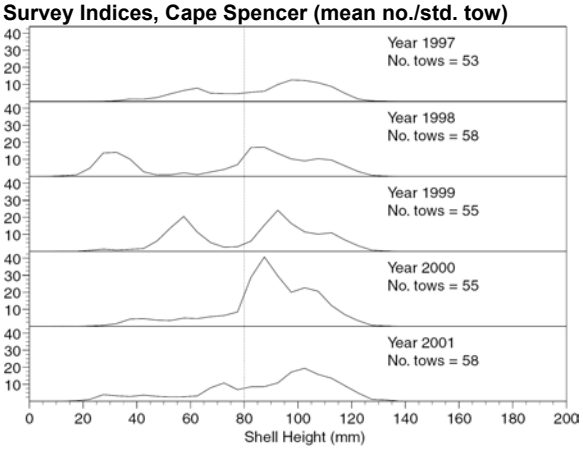
Annual **RV surveys** of the Cape Spencer area were initiated in 1996, and are now carried out in conjunction with the SPA 1 and 4 surveys in the Digby area.

The decline from the 1989 peak to the low around 1996 seen in the Digby 8–16 mile RV survey was also seen in the Cape Spencer surveys. Since 1997, the numbers in the Cape Spencer survey have increased slightly, as an above average 1997 year-class entered the fishery. The fishery will be dependent on this year-class in 2002. The more recent year-classes entering the fishery are weak. The large pulse of pre-recruits observed in the Digby 8-16 mile area was not observed in the Cape Spencer area.

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



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

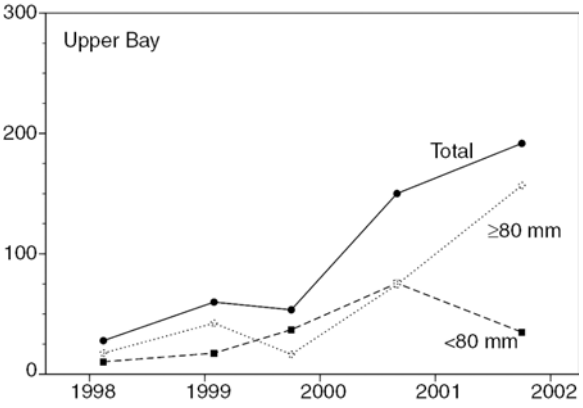


Upper Bay Area

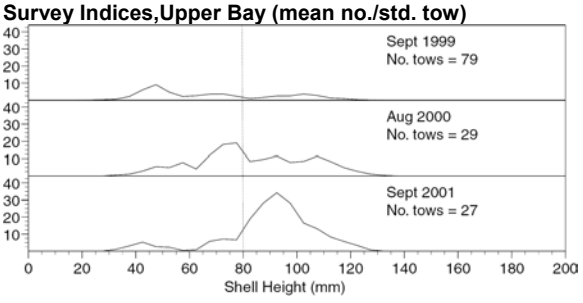
Commercial **CPUE** for all fleets increased in 2001 for the Upper Bay area, and **landings** more than doubled from 2000.

The numbers in the Upper Bay have increased greatly in the last two RV surveys. There are signs of two incoming year-classes in the survey, but at present they do not appear to be as strong as the one that entered the fishery in 2001.

Survey Indices, Upper Bay (mean no./std. tow)



Survey Indices,Upper Bay (mean no./std. tow)



Outlook

The large 1998 year-class in the Digby 8-16 mile area will enter the fishery in 2002. This increased abundance will support a higher quota for this area but will necessitate changes in management.

The Cape Spencer area had an above average 1997 year-class that recruited to the fishery in 2001. The fishery will be highly dependent on this year-class for the next two years as the survey indicates that the 1998 and 1999 year-classes are not as strong. Removals from the Cape Spencer area should remain at present levels.

Conditions have improved in the Upper Bay area, and it should support the present catch rates for the next few years. Removals from the Upper Bay area should remain at present levels.

Preliminary modelling work and comparisons to SPA 4, indicate that the 8-16 mile Digby area of SPA 1 will support a similar increase to SPA 4, but for the rest of SPA 1, the level of removals should remain at the present level.

Management Considerations

The large 1998 year-class recruiting to the fishery will only be available to one of the three fleets fishing in SPA 1. This will complicate setting the quota for the next few years.

There are no objectives and associated reference points for these fisheries; the prevention of growth overfishing is one potential objective. Discussions between the fishing industry and DFO to develop reference points for the scallop fisheries in the Bay of Fundy are required.

In order to preserve recruitment, the impact of fishing practices on the mortality of

recruits and pre-recruit scallops needs to be investigated

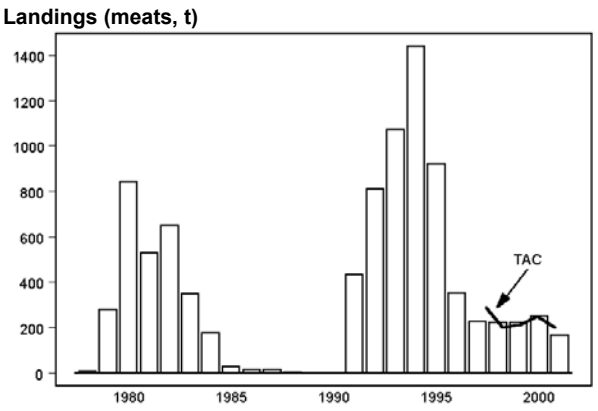
SPA 3 – Brier Island/Lurcher Shoal, St. Mary's Bay

The Fishery

There are three main beds in this area, those around Lurcher Shoal, those below Brier Island, and St. Mary's Bay, although scallops can be found throughout most of the area. St. Mary's Bay (formerly SPA 7) was combined with SPA 3 in 1999 for management purposes with a single TAC. The lobster fishery influences the scallop-fishing season throughout this area.

In the 1950's and 1960's, this area was heavily exploited but subsequently, fishing was minimal until 1980, when both the inshore and offshore fleets fished the area until 1986. In 1986, an agreement was reached between the two fleet sectors to establish separate inshore and offshore grounds, north and south of latitude 43˚40'N, respectively. This agreement excluded the offshore fleet sector from the area now defined as SPA 3.

Landings in SPA 3 increased each year from 1991 to 1994 to a high of 1439 t. Landings declined from 1995 until 1998. However, there is uncertainty about the landings from 1991 to 1996, due to concern over misreporting.



Since 1999, the landings for SPA 3 and 7 are combined. In 1999, there were serious doubts raised about whether all of the landings reported for SPA 3 came from this area. There did not appear to be any reason to suspect that landings reported to SPA 3 in 2000 and 2001 were from other areas.

Landings (tonnes of meats)

Year	Avg. 1993-97	1998	1999	2000	2001
TAC 3	–	150	–	–	–
Total 3	802	162	–	–	–
TAC 7	–	50	–	–	–
Total 7	…	58	–	–	–
TAC 3+7	–	–	200+15	200+50	200
Total 3+7	–	–	222[1]	244[2]	163*

[1] Includes 5.8 t from 15 t re-opening in Sept./Oct. 1999.
[2] Includes 18.9 t from 50 t re-opening in Oct./Nov. 2000.
* Preliminary.

Landings in 2001 were 163 t against a quota of 200 t because the Full Bay fleet had redirected their effort to Scallop Fishing Area 29 where catch rates were higher.

Resource Status

Commercial **catch rates** (CPUE) averaged 15 kg/h in 2001, compared to 13 kg/h in 2000.

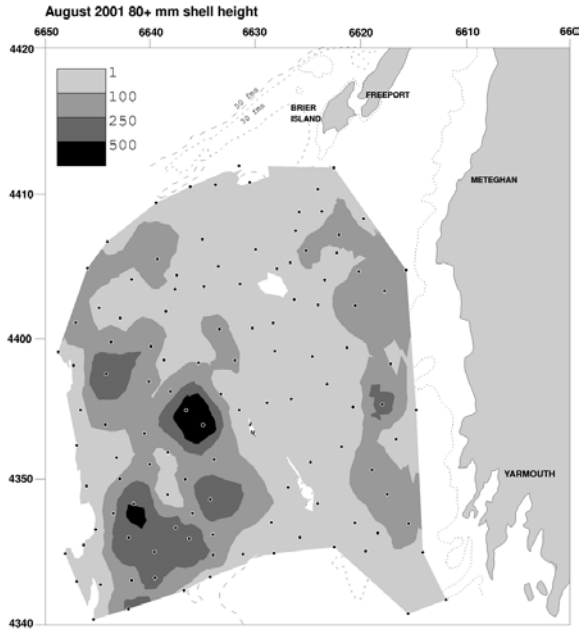
Annual **research vessel (RV) surveys** have been conducted in August since 1991. Due to coverage and design, only the results from the 1995 to 2000 surveys are comparable.

Surveys of St. Mary's Bay have been conducted since 1999.

Brier/Lurcher

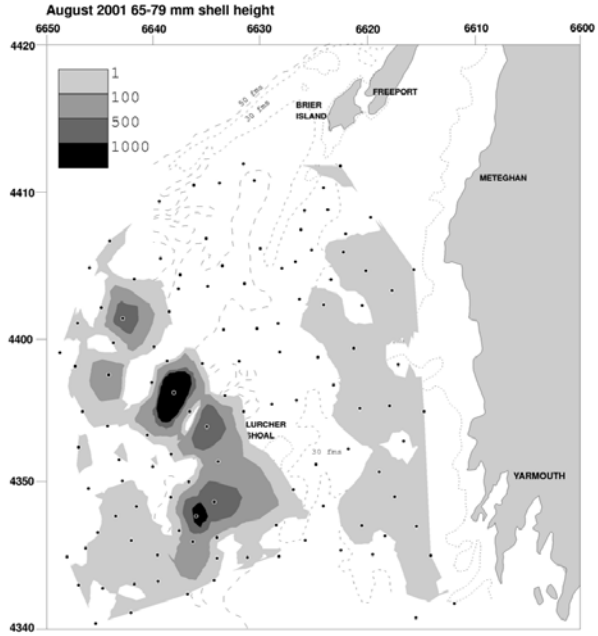
The highest densities of **commercial-size** scallops (shell height ≥80 mm) continue to be in the southwest area of Lurcher Shoal. The scallops in this area usually have smaller meats-at-shell height than those caught elsewhere in SPA 3.

Survey Mean No./Tow (commercial size: shell height ≥80mm)



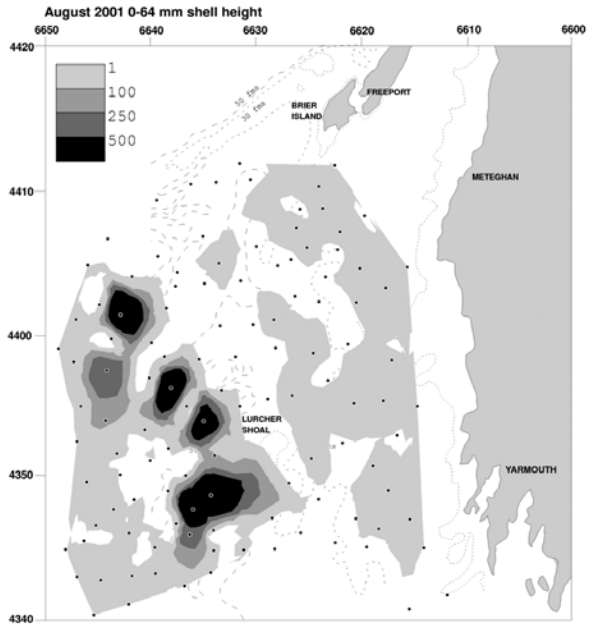
In the 2000 survey, large numbers of **pre-recruits** (1998 year-class, shell heights <65 mm, expected to recruit to the fishery in two years) had been observed in the Lurcher Shoal area. However, large numbers of **recruits** (shell height 65–80 mm) were not observed in 2001. This trend has been noted before for this survey and may be due to the low sampling intensity and thus low precision. The spatial distribution of recruits in 2001 was patchy, with small areas of high density.

Survey Mean No./Tow (recruits: shell height 65 to 80mm)



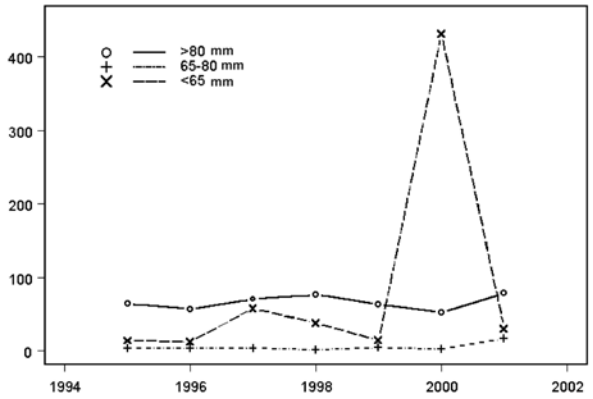
Pre-recruits in the 2001 survey also exhibited a patchy distribution with the highest densities in areas west of 66º 30´ W, where scallops traditionally have lower yields. Scallops in this size range are probably two years old (1999 year-class). There were commercial-size scallops located in the same areas.

Survey Mean No./Tow (pre-recruits: shell height <65mm)



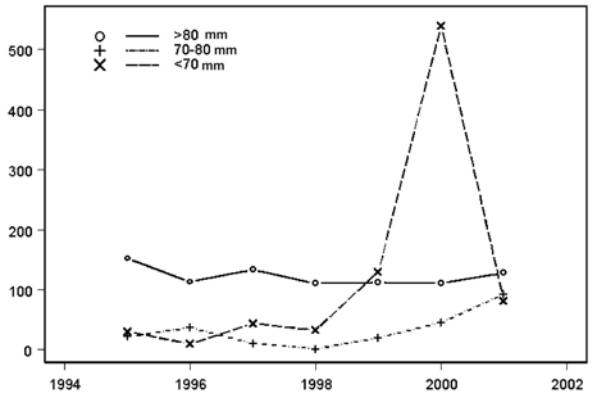
Mean numbers per tow from the **RV survey** indicate a slight increase in 2001 compared to 2000 for commercial-size animals in both the Brier Island and Lurcher Shoal areas. The mean number of recruits increased by a small amount in the Brier Island area but far short of expectation, given the large abundance of pre-recruits estimated from the 2000 RV survey.

Survey Mean No./Tow, Brier Island



The mean number of recruits in the Lurcher area observed in the 2001 survey increased over that of the previous year. However, this increase was not as large as expected given the large estimate for the pre-recruits in the 2000 survey.

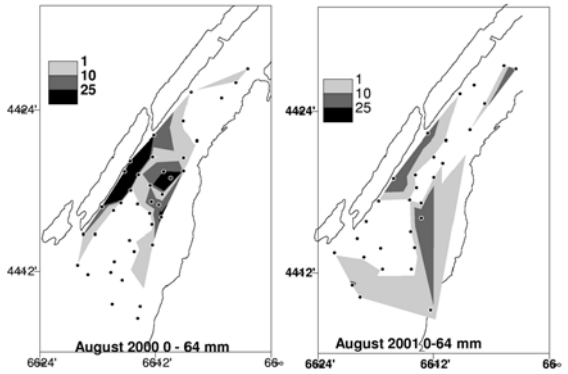
Survey Mean No./Tow, Lurcher Shoal



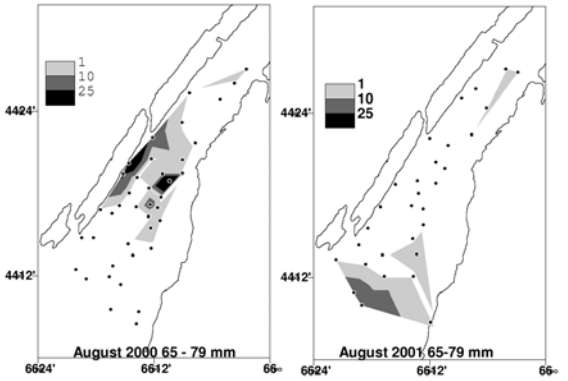
St. Mary's Bay

While the distribution of commercial size scallops in St. Mary's Bay was widespread; densities were highest at the mouth of the Bay. The distribution of recruits and pre-recruits were reduced from the previous year.

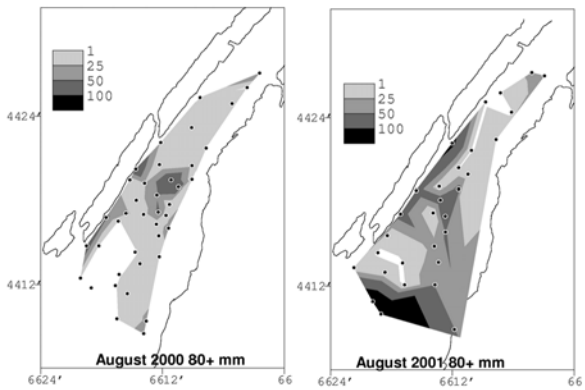
Survey Mean No./Tow (pre-recruits: <65mm), St. Mary's Bay



Survey Mean No./Tow (recruits: 65-80mm), St. Mary's Bay



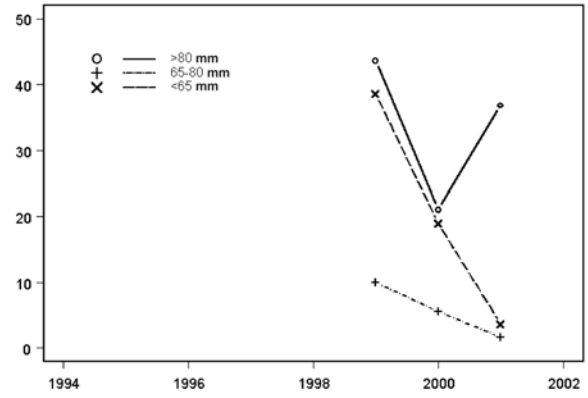
Survey Mean No./Tow (commercial size: ≥80mm) , St. Mary's Bay



The survey series for St. Mary's Bay is only three years long. Declines were observed for both recruits and pre-recruits while the

abundance on commercial size scallops appeared to have increased in 2001.

Survey Mean No./Tow, St. Mary's Bay



Sources of Uncertainty

Survey estimates form this SPA are highly variable. As with all scallop surveys in the Bay of Fundy, abundance estimates of pre-recruits are tentative, and the following year's survey is needed to confirm the strength or weakness of potential recruitment.

Outlook

The 2001 survey estimates for commercial size scallops were greater than those in 2000, but similar to the estimates in 1999. There was a small increase in commercial catch rate from 2000 to 2001. The current TAC of 200 t should not be changed.

Management Considerations

There are no objectives and associated reference points for these fisheries; the prevention of growth overfishing is one potential objective. Discussions between the fishing industry and DFO to develop reference points for the scallop fisheries in the Bay of Fundy are required.

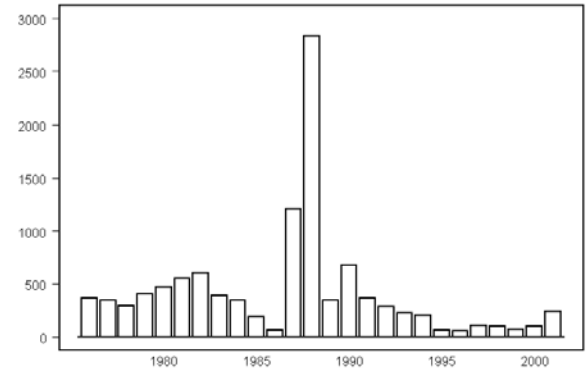
In order to preserve recruitment, the impact of fishing practices on the mortality of recruits and pre-recruit scallops needs to be investigated.

SPA 4 – Digby

The Fishery

Landing data in what is now SPA 4 are available from 1976 to 2001. The fishing season in SPA 4 had been restricted to the fall since it was established in 1997 until the 2001/2002 season, which extends from 1 October 2001 to 30 April 2002. Prior to 1997, the former Inside Zone (within 6 miles), which represents 75 percent of the present area of SPA 4, was fished from October to the end of April.

Landings (meats, t)



Landings steadily declined from 1991 to 1995 as the remnants of large year-classes (1984, 1985) were fished down. Portions of what is now SPA 4 were closed in 1995 and 1996. The fishing industry reported that bad weather had reduced opportunity to fish in 1999. While an extension of the 1999 fishing season into January 2000 was granted, poor weather remained a problem.

The 2000 fishing season was extended into the spring of 2001. A total of 102 t was landed in this fishery against a TAC of 110 t. The TAC for the 2001/2002 fishery has been set to 400 t with 243 t landed by 28 January 2002.

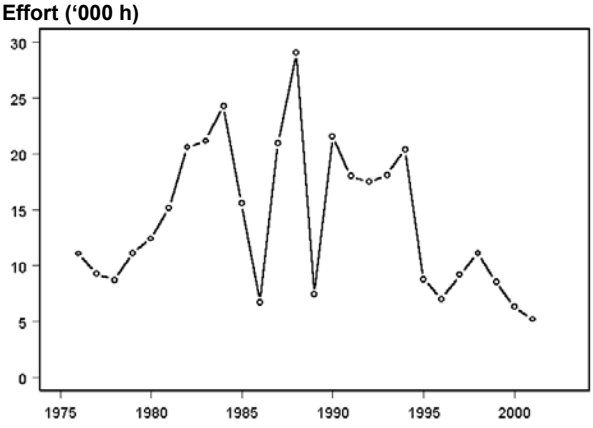
Landings (meats, t)

Season	Avg. 1993–97	1998	1999	2000-2001	2001-2002
TAC	–	120	120	110	400
Total	137	107	77	102	243*

* as of 28 January, 2002. Season still open.

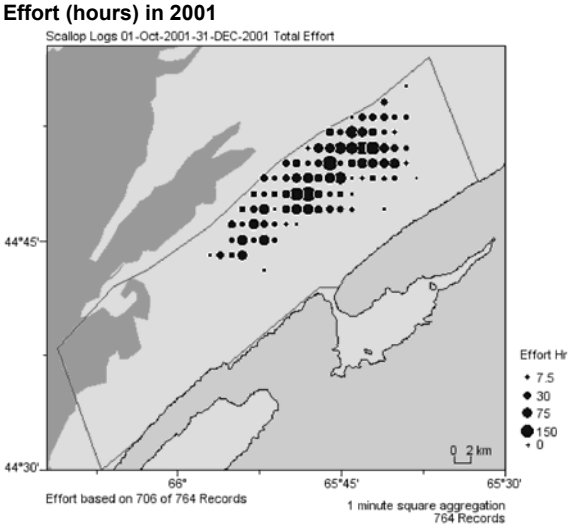
Total **effort** (hours) was low in 1995 and 1996, due to the closures in the inside fishing zone, but effort in SPA 4 increased thereafter until 1999. In 2000, effort was at its lowest level in 26 years. This trend should be reversed in 2001/2002 due to the higher TAC.

Effort ('000 h)



In October 2001, the fishery was restricted to the area from Digby Gut up the Bay to Parkers Cove. This restriction was put in place to protect the abundant 1998 year-class, which was widespread but most heavily concentrated in the area below Digby Gut to Gullivers Head. After 30 October, the whole area was opened but fishing continued to be concentrated in the Digby Gut area and above.

Effort (hours) in 2001

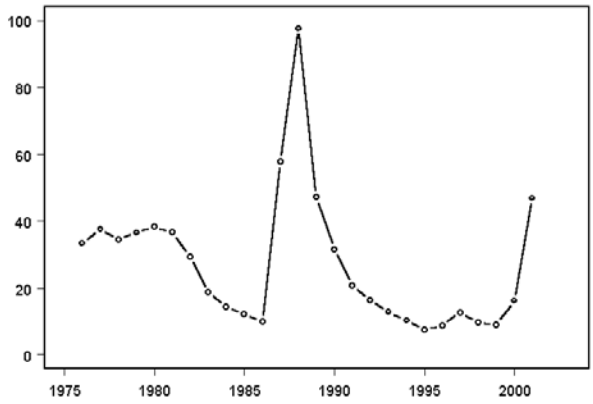


Since October 2001, average meat weights have decreased to 11 g. The average percentage of meats less than 8 g was at 7.4 percent as of the end of January 2002.

Resource Status

The average **commercial catch rate** (CPUE) increased in the 2000 season (16.2 kg/h) over the 1999 season (8.9 kg/h). The 2001/2002 CPUE was 46.8 kg/h as of 31 December and is expected to increase by the end of the season.

Catch Rate (kg/h)

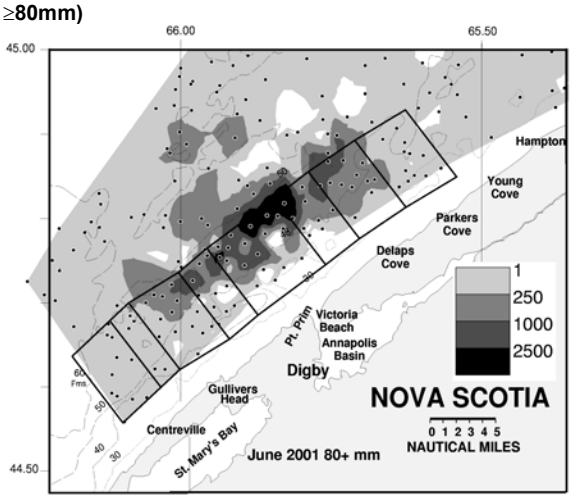


Research vessel (RV) surveys, using a consistent stratified random design, have been conducted since 1991. Prior to 1991, surveys had been stratified according to the

spatial pattern of the current year's commercial catch rate.

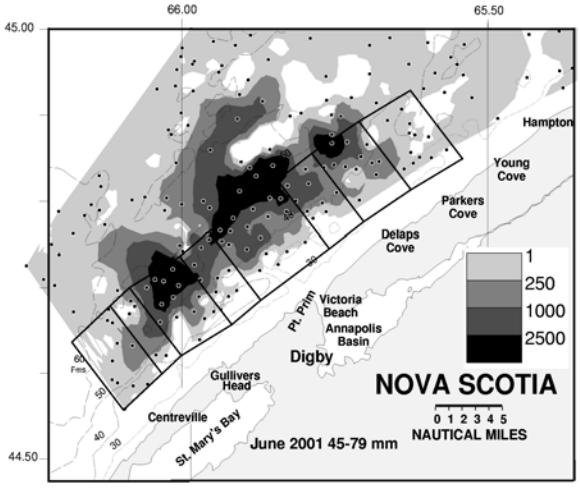
In 2001, densities of commercial size scallops (shell heights ≥80 mm) had increased, mainly due to the higher than expected growth of the 1998 year-class.

Mean Number per Tow (commercial size: shell height ≥80mm)



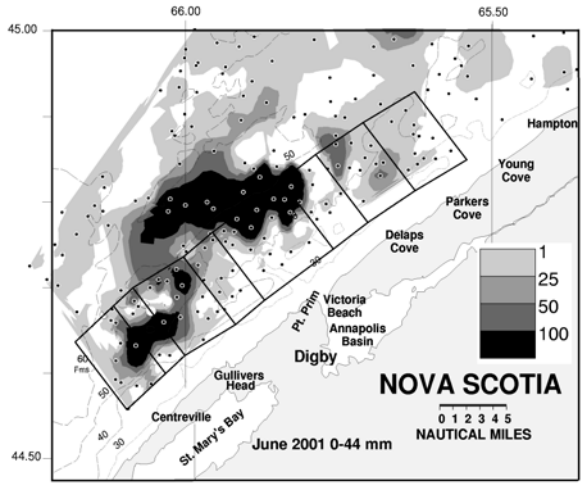
In the 2001 survey, scallops that would recruit (shell heights 45 to 80 mm) in the 2002/2003 season were widespread and highly abundant in areas 4 to 12 miles from the Nova Scotia shore. The scallops of this year-class (1998) are growing faster than expected and are recruiting during the 2001/2002 season.

Mean Number per Tow (recruits: shell height 45 to 80mm)



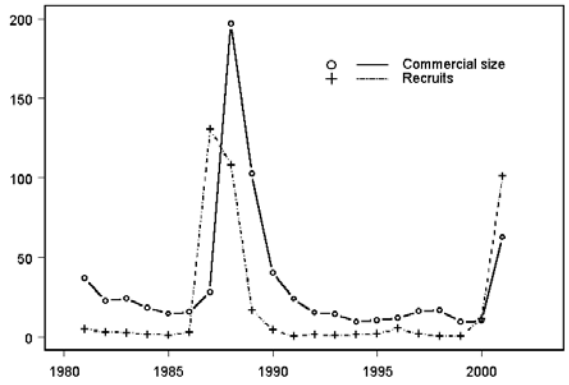
In the 2001 survey, estimates of pre-recruits (shell height < 45 mm, expected to recruit in two years) indicated concentrations from about 6 to 8 miles in SPA 4, extending into SPA 1. Survey estimates of this size class are qualitative at best. Scallops of this size range are probably two-year olds.

Mean Number per Tow (pre-recruits: shell height <45mm)



RV survey estimates of numbers of commercial size scallops and recruits in 2001 increased by 609 and 902 percent, respectively, over estimates in 2000. This increase is mainly due to the very abundant and fast growing 1998 year-class first detected in large numbers as 2 year olds in the 2000 survey.

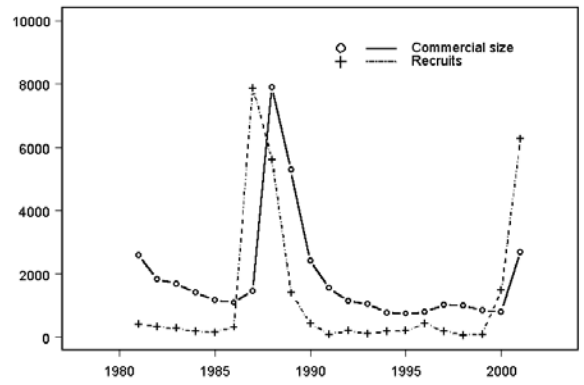
Survey Population Numbers (millions)



The new assessment model used for SPA 1 was also used to analyze the survey and commercial catch data and estimate fishing

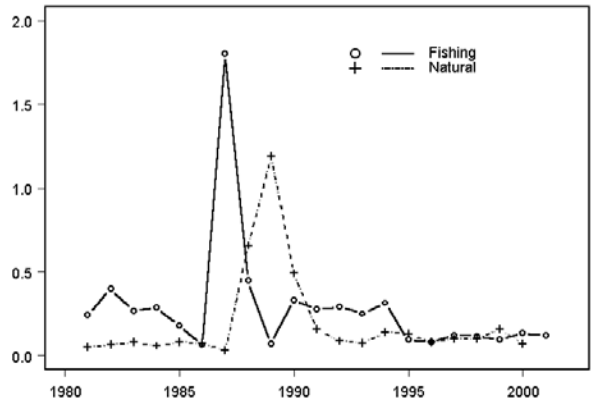
mortality, natural mortality and population biomass from SPA 4. This model estimates that the 1998 year-class will have the second largest biomass at age 3 in the 21-year time series. The increase in commercial size biomass in 2001 is mainly due to scallops of the 1998 year-class recruiting to the fishery earlier than expected because of their faster growth rate.

Population Biomass (meats, t)



This population has seen catastrophic natural mortality in the past but current estimates of mortality are low. The high fishing mortalities in the late 1980's were in response to the large 1984/85 year-classes.

Mortality Estimates



Sources of Uncertainty

The assessment model estimated natural mortality from trends in clapper (dead paired shells) numbers in the RV survey. The recruitment of the abundant 1984 and 1985 year-classes was followed by catastrophic mortality in the 1988/1989 and 1989/1990 seasons. Current estimates of natural mortality are low but there is concern about increasing mortality as the 1998 year-class recruits to the fishery.

Joint industry/DFO monitoring of clapper trends on a bimonthly basis was initiated in the fall of 2000, and to date no signs of increasing natural mortality have been detected. However, the underlying reasons for mortality events are unknown. Therefore, projections of biomass to the 2002/2003 season were made assuming that natural mortality in 2001/2002 will be equal to that estimated for 2000/2001.

To date, the 1998 year-class has exhibited higher than expected growth rates. This trend will result in the model underestimating biomass for 2002/2003. The degree to which biomass will be underestimated will be determined after the June 2002 survey has been completed.

Outlook

Catch levels for 2001/2002 were evaluated with respect to the probability of the resultant fishing mortality exceeding $F_{0.1}$=0.14. This level was chosen as a threshold for growth overfishing. Natural mortality in 2001/2002 was assumed equal to that estimated for 2000/2001.

Catch in 2001/2002 Season

Catch (meats, t)	Prob. F > 0.14
300	0.35
400	0.61
500	0.75
600	0.82
700	0.86
800	0.89
900	0.91

The current TAC for 2001/2002 is set at 400 t. While the risk of growth overfishing from the current TAC is high on scallops from year-classes prior to 1998, the large size of

the 1998 year-class should offset this effect. However, the fact that this year-class is recruiting early means that it is being fished in the current season at a smaller than optimal size. Any in-season increase in TAC for 2001/2002 will need to take into account the impact on the potential yield for 2002/2003.

Catch in 2002/2003 Season, Prob(F>0.14)

Catch (meats, t)	2001/2002 = 400 t	2001/2002 = 600 t	2001/2002 = 800 t
500	0.05	0.07	0.09
600	0.11	0.13	0.16
700	0.18	0.20	0.23
800	0.26	0.29	0.31
900	0.34	0.37	0.39
1000	0.42	0.44	0.46

The probabilities above reflect the uncertainties in the data and the population model. These probabilities will have to be re-evaluated after the survey in June 2002.

Management Considerations

There are no objectives and associated reference points for these fisheries; the prevention of growth overfishing is one potential objective. Discussions between the fishing industry and DFO to develop reference points for the scallop fisheries in the Bay of Fundy are required.

SPA 6 – Grand Manan and Southeast New Brunswick

The Fishery

The areas around Grand Manan and off southwest New Brunswick are designated SPA 6. This area is further divided into the Grand Manan Island inside zone (SPA 6B), the New Brunswick inside zone including the Wolves (SPA 6C), and the outside zone (SPA 6A).

One TAC has been set for the whole area and a maximum percentage of this TAC was to come from the inside zones SPA 6B+6C. This percentage has changed over time, and in 2001 no more than 90 t was to come from these areas. **Landings** from the individual subareas are available for 1997 to 2001 only. In 2001, landings were 161 t against a TAC of 155 t.

Landings (tonnes of meats)

Year	1997	1998	1999	2000	2001
TAC	170	130	160	140	155
Total	127	178	150	142	161[1]

1. preliminary.

Following consultation with industry, the area known as the Duck Island Sound Box was closed to protect the large numbers of pre-recruit scallops found during the 1999 RV survey. This closure came into effect the second week of the 2000 fishing season.

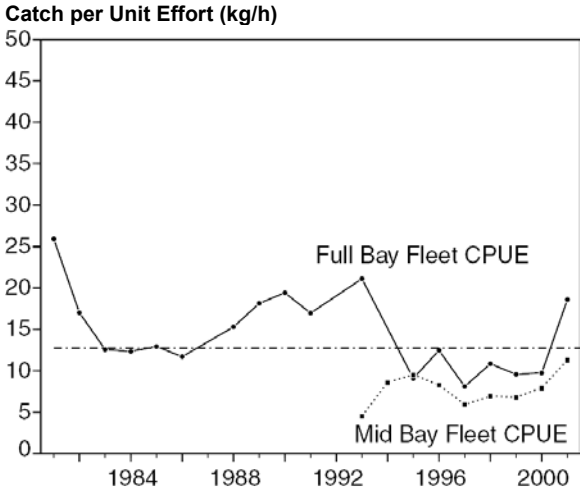
The 2001 SPA 6 quota for the Full Bay fleet was 50 t with a maximum of 30 t from the inside zones (SPA 6B+C), the same as in 2000. Full Bay landings by subarea for 2001 were 3.7 t, 7.4 t and 5.1 t for SPA 6A, B and C respectively.

The final 2001 quota for the Mid Bay fleet was 105 t with a maximum of 60 t from the inside zones (6B and 6C). Mid Bay landings for 2001 by subarea were 25.8 t, 73.0 t and 46.3 t for SPA 6A, B and C respectively. There are still problems with quota overruns due to late submissions of monitoring documents.

The meat weight sampling program provided information on the sizes of scallops being landed, and is used to monitor the proportion of scallops less than 11 g in the catch. Port samples in 2001 indicate that the fishery had less reliance on small scallops than it had in the past.

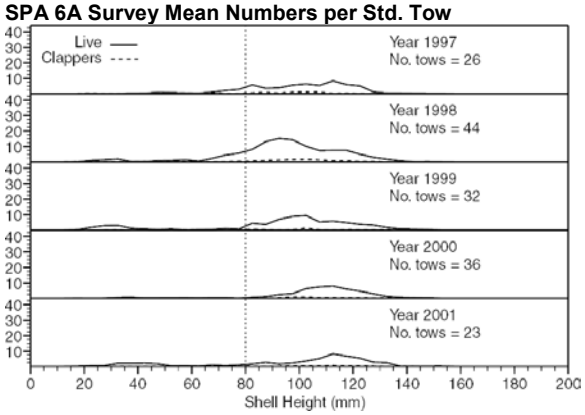
Resource Status

Commercial catch rates (CPUE) for both fleets increased in 2001, and the Full Bay fleet CPUE was above the 1981-2001 median. The Mid Bay fleet's CPUE is now at the highest level in the limited time series.

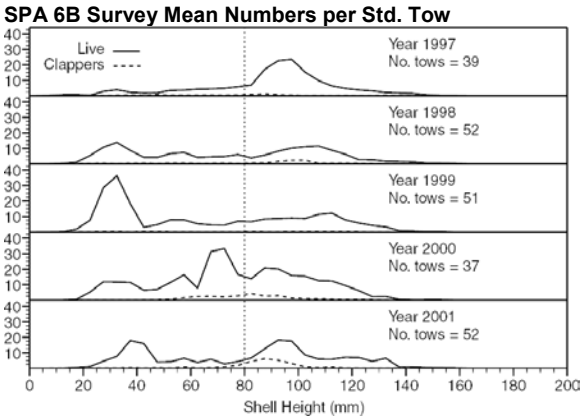


Research vessel (RV) surveys were conducted annually from 1979 to 1991. A new survey series with a different design was initiated in 1996. SPA 6C was not covered by the surveys until 2000.

In SPA 6A, there has been little sign of recruitment for the last five years, and while the scallops are growing larger, their numbers are being fished down. Without stronger recruitment in this area, catch rates can be expected to decline.



SPA 6B had a strong recruitment pulse in 2001, mainly in the Duck Island Sound area. A cause of concern has been the increase in clappers (dead paired shells) in the last two years. (dashed line in figure below). The 2001 survey picked up another year-class at 40 mm shell height. While not appearing to be as strong as the last good year-class (1997), it will help support the fishery in 2003.



SPA 6C has only been surveyed in the last two years, and at present the survey is not covering all the fishable grounds. The survey shows low numbers of commercial sized scallops, but the fishery has been able to locate patches of scallops, and this year fished an area in Mace's Bay.

Outlook

For SPA 6A and 6C the RV survey shows little sign of any strong year-classes that will enter the fishery in the next few years. Within SPA 6B, recruitment is confined to the Duck Island Sound area, with no strong year-classes indicated for the rest of 6B.

The Mid Bay fleet has not had a problem taking its quota, but will see declining catch rates as the population is fished down. The 2002 quota of 195 t should not be increased.

Management Considerations

There is a problem with quota over-runs in this fishery due to untimely reporting of monitoring documents.

Due to the clapper ratios and the high productivity of the Duck Island Sound area, this area should continue to be managed separately from the rest of SPA 6B.

Concerns have been raised, particularly in regards to Duck Island Sound, about the impact of salmon aquaculture sites on commercial scallop grounds.

SFA 29 – Southwest Nova Scotia

The Fishery

SFA 29 encompasses a very large inshore area, from the south of Yarmouth (latitude 43˚40'N) to Cape North in Cape Breton. SFA 29 inshore scallop licenses are restricted to east of Baccaro (East of longitude 65˚30'W) inside the 12-mile territorial sea. In the context of this report, SFA 29 refers to the area west of longitude 65˚30'W continuing north to SPA 3 at latitude 43˚40'N.

A limited fishery by the Full Bay fleet was granted from 1996-98. Access was again granted to this fleet in 2001 with a full at sea monitoring program, and with a condition of a post-season industry-funded survey. The fishery occurred June 11th–Aug 31st with the 400 t TAC being taken. Scallop fishers had consulted with lobster fishers in the area to deal with potential conflicts. Lobster by-catch was minimal despite high scallop catch rates.

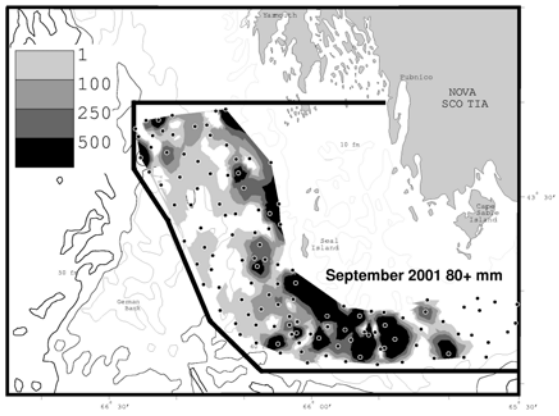
Resource Status

A **RV survey** of part of SFA 29 in 2000 identified areas of large concentrations of commercial size scallops. RV survey information was distributed to fishermen prior to the opening of the 2001 fishery. Average commercial catch rates in 2001 were 110 kg/h and meat weights averaged 24 g.

A post-season joint industry/departmental survey was conducted in September 2001. This survey covered more of the area than the RV survey in 2000.

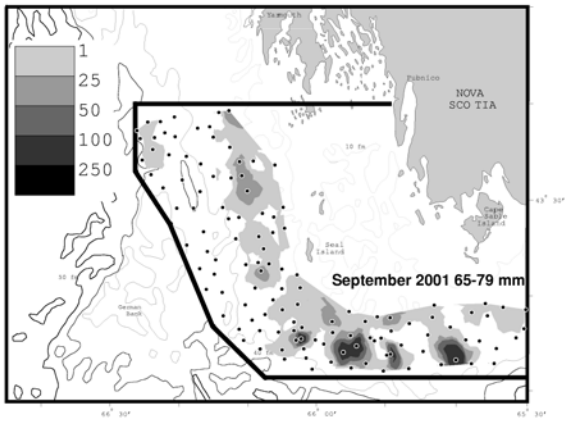
Large concentrations of commercial size scallops (shell height > 80 mm) were found throughout the survey area, with larger concentrations on the nearshore edge of the survey area.

Mean Number per Tow (commercial size: shell height >80mm)



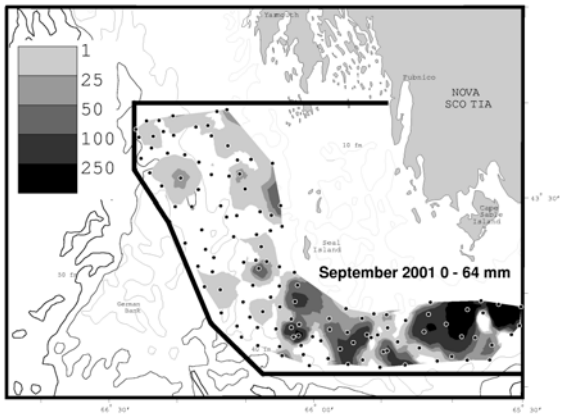
Recruits (shell height 65–80 mm) were mainly concentrated in the southern portion of the survey area.

Mean Number per Tow (recruits: shell height 65-80mm)



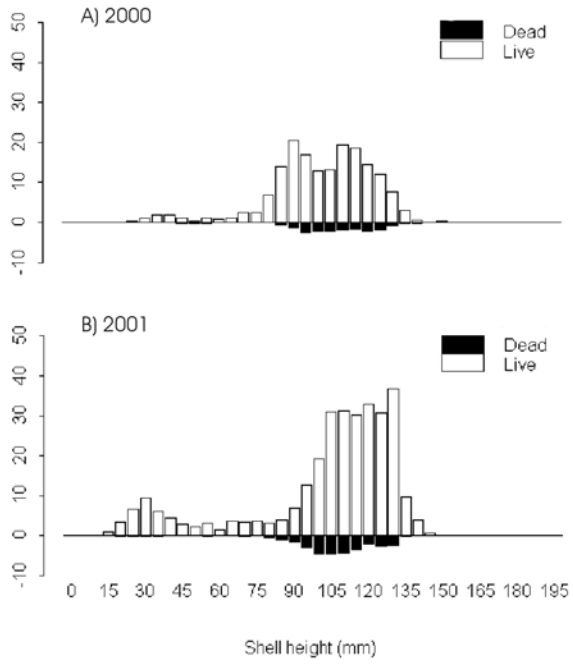
The distribution of pre-recruits (shell height < 65 mm, expected to recruit to fishery in two years) overlapped that of the recruits but the highest densities were in the eastern most section of the survey area.

Mean Number per Tow (pre-recruits: shell height <65mm)



The shell height frequencies from the 2000 and 2001 surveys show that there are large numbers of old scallops in the area.

Mean Number per Tow from the 2000 and 2001 Surveys



Sources of Uncertainty

The 2001 survey was the first extensive survey of SFA 29 west of longitude 65˚30'W. This survey was conducted with a commercial vessel using commercial gear. A June 1999 comparative fishing experiment between the DFO survey vessel and a commercial vessel indicated differences between the two vessel and gear combinations. It is unlikely that catchability or fishing efficiency estimates obtained for the departmental vessel after many years' experience will be applicable to the commercial vessel. Therefore, a longer time series will be required before trends can be interpreted from this survey.

There is little knowledge of the recruitment or mortality dynamics in this area.

Outlook

Commercial catch rate, survey estimates and size composition, all indicate that there is a substantial biomass of commercial size

scallops in this area. The catch that would be sustainable cannot yet be determined.

Management Considerations

Any future fishing effort in this area should consider targeted effort on localized areas to avoid concentrations of recruits and pre-recruits, predetermined limits on catch rate, meat counts, and minimum shell heights. There also should be mandatory observer coverage of lobster bycatch, and an industry post-season survey.

For more Information

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