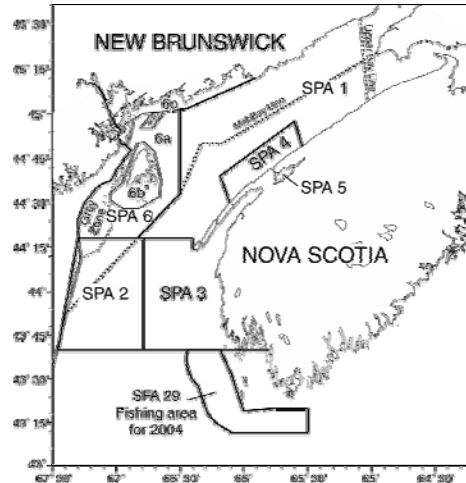
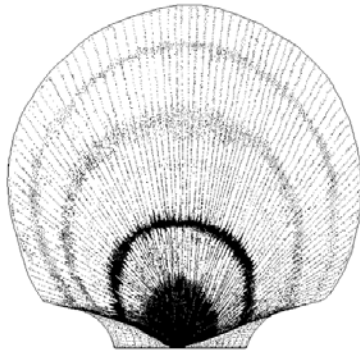




STOCK ASSESSMENT REPORT ON SCALLOPS (*PLACOPECTEN MAGELLANICUS*) IN SCALLOP FISHING AREA (SFA) 29



Refer to full detail map on page 10 for place names.

Context

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. 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.

Scallop Fishing Area (SFA) 29 encompasses a very large inshore area inside the 12-mile territorial sea, from the south of Yarmouth (latitude 43°40'N) to Cape North in Cape Breton. This report refers to only that portion of SFA 29 west of longitude 65°30'W continuing north to SPA 3 at latitude 43°40'N.

Prior to 1986, the Full Bay Scallop fleet had fished in this area without restrictions. Following the 1986 inshore/offshore scallop fishing agreement, fishing by the Full Bay fleet was restricted to north of 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. Scallop fishers had consulted with lobster fishers in the area to deal with potential conflicts. Lobster bycatch was minimal in 2001 despite high scallop catch rates. Lobster bycatch continues to be monitored in this fishery.

In 2002, the Minister approved access to this area by the Full Bay fleet and inshore east of Baccaro licence holders who are authorized to fish in SFA 29 west of longitude 65°30'W. SFA 29 inshore scallop licenses were historically restricted to east of Baccaro (East of longitude 65°30'W). A joint project agreement was signed with the fishing fleets, Natural Resources Canada and Department of Fisheries and Oceans with all parties providing funds to conduct multi-beam acoustic mapping of the seafloor and other scientific work. A map showing bottom features for the entire area has been prepared and was distributed to the fishermen for the 2004 fishery. Work is continuing on analyzing surficial geology and the spatial distribution of scallops.

SUMMARY

- For the fourth consecutive year, a fishery was conducted in the western portion of Scallop Fishing Area 29. Starting in 2002, the TAC was shared between the Full Bay Fleet and a limited number of inshore east of Baccaro licence holders who are authorized to fish in SFA 29 west of longitude 65°30'W (i.e., east of Baccaro fleet).
- A total of 511 t (376 t Full Bay; 135 t east of Baccaro) was landed against a TAC of 600 t.
- Average meat weights ranged from 14.9 g to 22.6 g.
- Average catch rates for the Full Bay Fleet were 54.4 kg/h over the whole area in 2004 compared to 49.7 kg/h in 2003. The average catch rate for the east of Baccaro Fleet was 32.0 kg/h over the whole area compared to 34.8 kg/h in 2003.
- While a catch of 80 t in Area A in 2004 did not seem to result in a large decline in survey biomass, continued fishing in this area in 2005 will probably be limited to scallops ages 6 and older.
- Survey biomass indices of commercial size scallops indicate that the 2004 catch level of 80 t will be excessive for Area B in 2005 given the lack of recruitment.
- Survey biomass indices of commercial size scallops in Area C appear to be stable at a catch of 160 t in 2004.
- While Area D to the east of 65°40' W can be open to fishing in 2005, a lower TAC of 55 t is recommended for the whole area of D.
- There was not enough survey information to recommend catch levels for Area E. The 2004 survey indicates that this area is marginal for scallop habitat.
- The bycatch of lobster in this area was low in 2004 but it was not clear what impacts the scallop fishery may have had on the lobster population.

DESCRIPTION OF THE ISSUE

A meeting of the Regional Advisory Process was held May 12, 2005 at the Mic Mac Amateur Aquatic Club, in Dartmouth N.S. to review the 2003 and 2004 fishery and assess the status the scallop stock in Scallop Fishing Area 29 in support of the management of the 2005 fishery. Participants included DFO scientists and fishery managers, representatives of the industry and provincial governments.

The opening of the 2003 fishery was delayed until the end of July with Area B closing 22 August due to high lobster bycatch. Fisheries management opened Area E in the latter part of the season and the whole fishery was closed on 12 September.

In 2004, the fishery opened on 14 June and continued until 31 July. Prior to 2004, Area D had been closed to fishing because of the large number of young scallops in the area. The western half of the area (west of longitude 65°40'W) was opened for the 2004 season after it was determined from the 2003 survey that there were enough commercial size scallops for a fishery.

The eastern half of Area D remained closed because most of the scallops there were smaller than 110 mm shell height.

Average meat weights ranged from 14.9 g to 22.6 g. The smallest average meat weights from all areas came from Area A.

Scallop Landings (meats, t)

		Fleet				Total	
		Full Bay		East of Baccaro			
Year	Area	TAC	Landings	TAC	Landings	TAC	Landings
2001	Total	400	400			400	400
2002	29A	75	1	25	4	100	5
	29B	150	193	50	75	200	268
	29C	375	334	125	106	500	440
	Total	600	528	200	185	800	723
2003	29A						
	29B	150	114	51	38	201	152
	29C	188	33	63	32	251	65
	29E		2		2		4
	Total	338	149	114	72	451	221
2004 ²	29A	150 ¹	70	50 ¹	10	200	80
	29B		33		47		80
	29E		<1		3		3
	29C	187.5	124	62.5	35	250	159
	29D	112.5	149	37.5	40	150	189
	Total	450	376	150	135	600	511

¹ TAC for 29A, B and E combined.

² Preliminary landings.

ASSESSMENT

Average **catch rates** for the Full Bay Fleet were 54.4 kg/h over the whole area in 2004 compared to 49.7 kg/h in 2003. The highest catch rates in 2004 by area were in the open area in the western portion of D at 70.1 kg/h. This was the first year that a fishery was permitted in D and high catch rates were expected.

The average catch rate for the east of Baccaro Fleet was 32.0 kg/h over the whole area compared to 34.8 kg/h in 2003. This fleet also recorded its highest rates in Area D at 44.4 kg/h.

A post-season joint industry/departmental **research survey** was conducted in October 2004. The surveys for 2001 to 2003 had been conducted using the same vessel and captain while in 2004 a new vessel and captain were used. No comparative tow data is available and differences in fishing power between the two vessels are unknown.

The highest concentrations of **commercial size** animals (shell height 110+ mm) occurred in the eastern portion of D and the northern part of C (Figure 1).

Recruits (shell height 80–110 mm) mainly occurred in Area D and the northern part of C (Figure 2). Based on ageing studies to date, this size range probably represents two year-classes which will recruit to the fishery in 2005 and 2006.

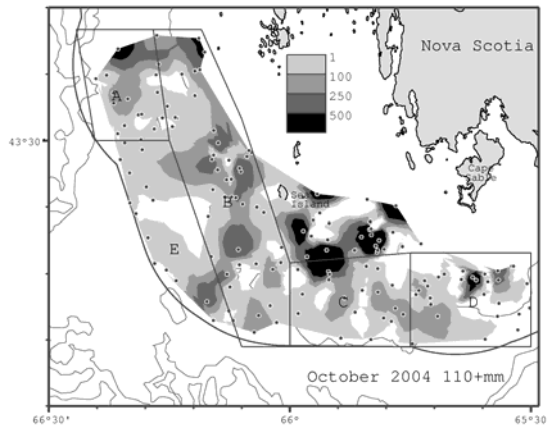


Figure 1. Total number of scallops per tow (commercial size: shell height >110mm).

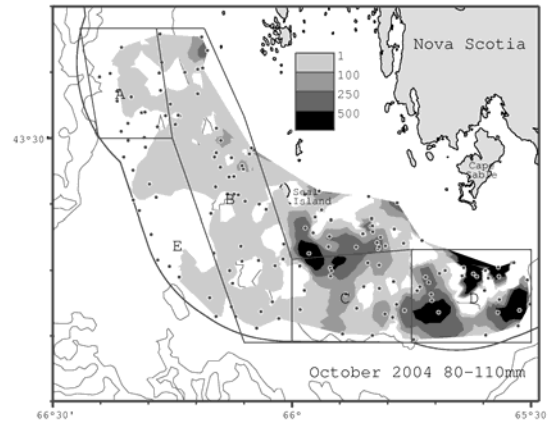


Figure 2. Total number per tow (recruits: shell height 80-110mm).

The distribution of **pre-recruits** (shell height 65–79 mm, expected to recruit to the fishery in three to four years) overlapped that of the recruits but the highest densities were in Area D (Figure 3).

Densities of clappers were low with a local area of high abundance in the northern part of Area D (Figure 4). The size range of the clappers in the tows in this area was 65 mm to 120 mm with the peak at 90 to 105 mm. These same tows had large numbers of live scallops with similar size frequencies.

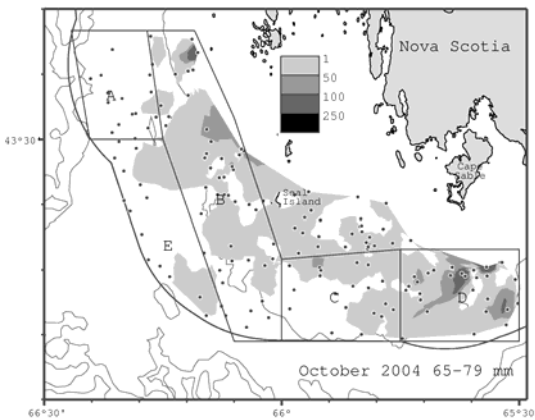


Figure 3. Total Number per Tow (Pre-recruits: Shell Height 65–79mm).

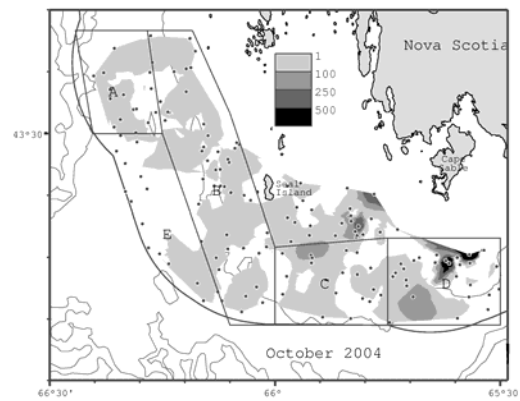


Figure 4. Total Number Clappers per Tow (Commercial Size: all sizes).

Recruitment (shell height 80–110 mm) continues to be low in Area A, while the survey biomass index for commercial size animals (>110 mm) appears to be stable (Figure 5).

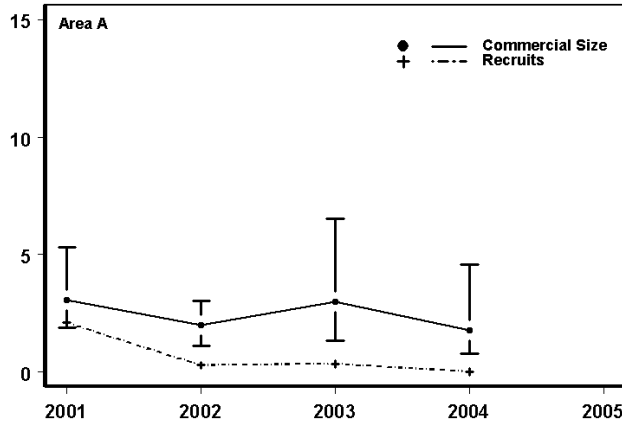


Figure 5. Survey biomass index (kg/tow): Area A. 95% bootstrap confidence intervals calculated for commercial size indices only.

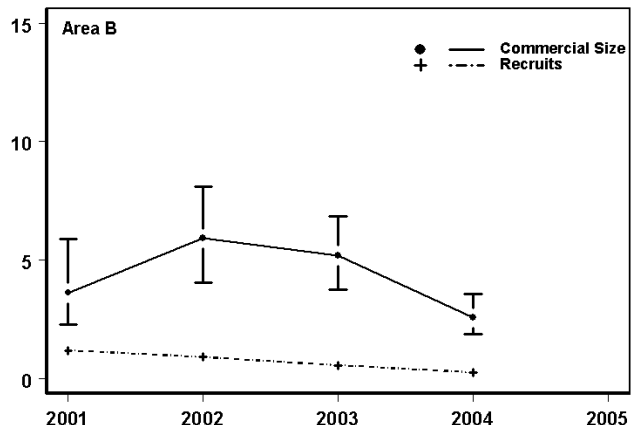


Figure 6. Survey biomass index (kg/tow): Area B. 95% bootstrap confidence intervals calculated for commercial size indices only.

Recruitment (shell height 80–110 mm) has declined in Area B since 2001 and the survey biomass index for commercial size animals has declined by 57 percent since 2002 (Figure 6).

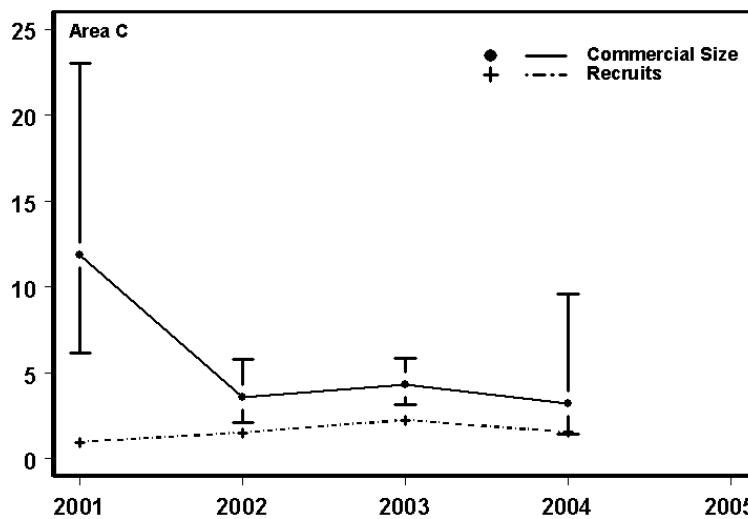


Figure 7. Survey biomass index (kg/tow): Area C. 95% bootstrap confidence intervals calculated for commercial size indices only.

The largest decline of the survey biomass index for commercial size scallops in Area C occurred from 2001 to 2002 (after the 2002 fishery) but this index has remained stable since 2002 (Figure 7). Recruitment (shell height 80–110 mm) has increased since 2001.

Area D was unfished prior to 2004 and all size classes exhibited increases in biomass up to 2003 (Figure 8). After the 2004 fishery all size classes showed declines in the fished area (Figure 8b). However, in the survey area east of 65°40' W where fishing did not occur, commercial size scallops and recruits (shell height 80–110 mm) continued to increase (Figure 8a). The biomass index for commercial size scallops in the fished portion of the survey dropped by 89 percent.

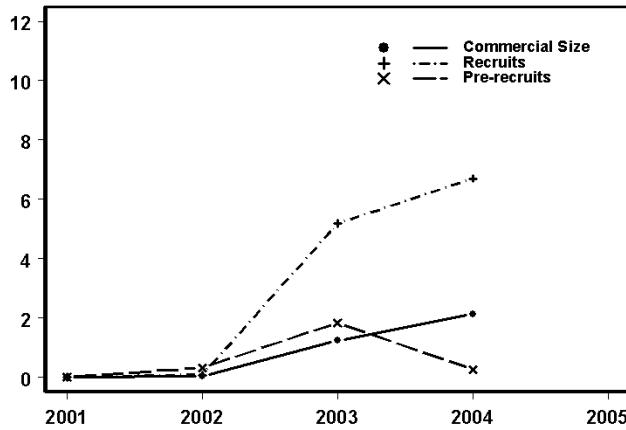


Figure 8a: Survey biomass index (kg/tow): Unfished portion of Area D.

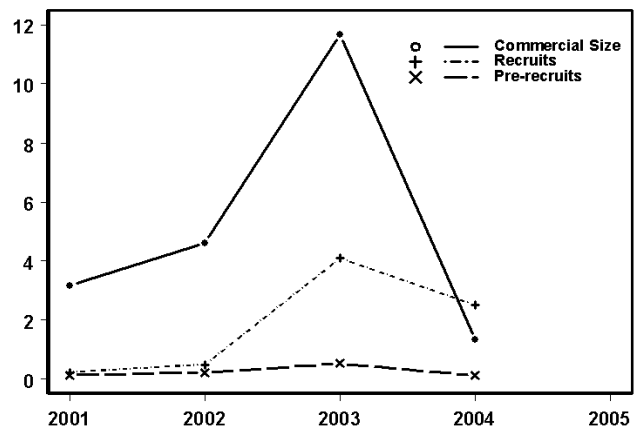


Figure 8b: Survey biomass index (kg/tow): Portion of Area D fished in 2004.

Lobster Bycatch

The regular monitoring by onboard observers of lobster bycatch from this fishery is unique relative to other scallop fisheries. Observer coverage was required for both fleets and consists of one observed trip per vessel. In 2004 observer coverage accounted for 15 percent of the landed weight of scallops. Lobsters were observed in all areas but the highest catch rates were in Area B (Figure 9). The total number of lobsters caught in the 2004 scallop fishery was estimated to be 3208. Of those caught, 3 percent were dead and 13 percent were injured. These estimates assume that observations from observed trips are representative of non-observed trips.

Regulations required that all lobsters caught were returned to the water.

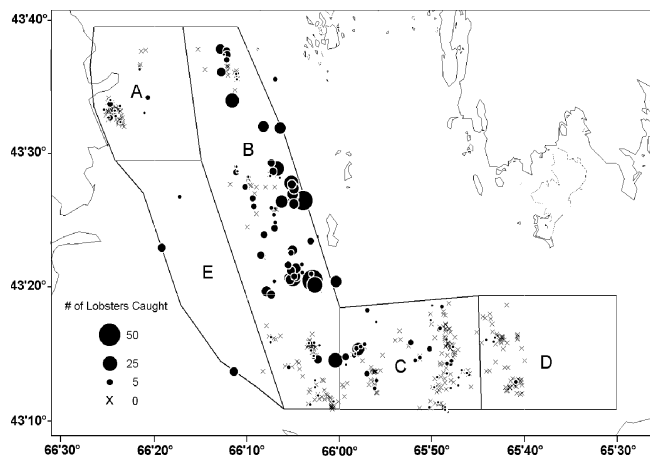


Figure 9. Position and Number of Lobsters Caught in SFA 29 2004 fishery.

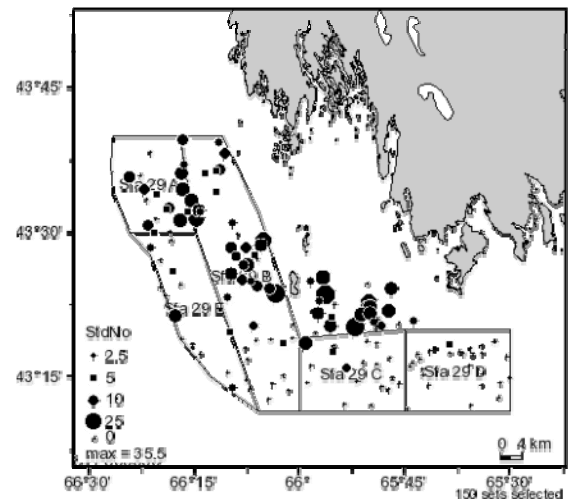


Figure 10. Position and number per tow of lobsters caught in the 2004 SFA 29 research survey.

The catch of lobster in the 2004 survey (4.2 per tow) was 1.5 times that of the 2003 survey (2.7 per tow). Within the management area, most lobsters were caught in areas A and B (Figure 10). More exploratory survey tows were completed in the area above C in 2004 and lobster

catches there were much higher than in the regular survey area (9.0 per tow). The 2004 survey was conducted in October while previous surveys had been done in September. The impact on the catches of lobster of surveying a month later than usual, in the survey was unknown.

Sources of Uncertainty

There are only four years of extensive surveys of areas A to D in SFA 29. The 2001 to 2003 surveys were conducted on the F/V *Julie Ann Joan* while the 2004 survey was on the F/V *Brantelle*. No comparative survey data is available and differences in fishing power between the two vessels are unknown. However, the same type of gear and fishing practices were used throughout the four years on the two different vessels. In addition, the spatial distribution observed in 2004 appeared to be consistent with patterns noted in previous years. For the time being pending further investigation, all four years of the survey will be used to interpret trends for this fishery.

Little is known about the recruitment or total mortality dynamics in this area.

CONCLUSIONS AND ADVICE

Recruitment (shell height 80 to 110 mm) to the fishery appears to be available in Area C and D only. Based upon growth analysis completed to date, this size range is comprised of scallops ages 3 and 4. The average meat weight of 5 year old animals was 15.2 g which corresponds to a 33/500 g meat count.

Very few scallops with shell heights less than 105 mm were found by the survey in Area A. While a catch of 80 t in 2004 did not seem to result in a large decline in survey biomass, continued fishing in this area in 2005 will probably be limited to scallops ages 6 and older.

Survey biomass indices of commercial size scallops indicate that the 2004 catch level of 80 t will be excessive for Area B in 2005 given the lack of recruitment.

Survey biomass indices of commercial size scallops in Area C appear to be stable at a catch of 160 t in 2004.

Landings of 188 t in Area D had a larger than expected effect on the survey indices which indicated a decline of 89 percent in biomass in the fished area. Recruitment in Area D will occur in 2005 and 2006, and the prospects for future years will have to be evaluated after the 2005 and 2006 surveys. While the area to the east of 65° 40' W can be open to fishing in 2005, a lower TAC is recommended for the entire area of D. Areas C and D are of comparable size and the current survey index for recruited scallops (110+ mm) in Area D is about 1/3 of that in Area C (160 t). Based on this comparison, a TAC of 55 t (approximately 160/3) is recommended for Area D in 2005.

There was not enough survey information to recommend catch levels for Area E. The 2004 survey indicates that this area is marginal for scallop habitat.

OTHER CONSIDERATIONS

Bycatch of lobster in this area was low but it was not clear what impacts the scallop fishery may have on the lobster population. The impacts of the scallop fishery on juvenile lobsters and on lobster habitat were not evaluated. During the molting period lobsters are less mobile, more

prone to injury and involved in mating. Efforts should be taken to avoid those areas and times when lobsters are in high concentrations or are soft-shelled. The closure of a portion of Area B in previous years due to high lobster catches was an example of the types of measures that could be taken.

Continued mandatory observer coverage of lobster bycatch with detail on the condition of lobsters caught, and an industry post-season scallop survey should be continued in 2005. The survey design will be developed in consultation with the fishing industry.

SOURCES OF INFORMATION

Smith, S.J, M.J. Lundy, and C. Frail. 2005. Scallop Fishing Area 29: Stock status and update for 2005. DFO Can. Sci. Advis. Sec. Res. Doc. 2005/040.

Smith, S.J, M.J. Lundy, D. Roddick, D. Pezzack, and C. Frail. 2003. Scallop Production Areas in the Bay of Fundy and scallop fishing area 29: Stock status and forecast. Can. Sci. Adv. Sec. Res. Doc. 2003/010.

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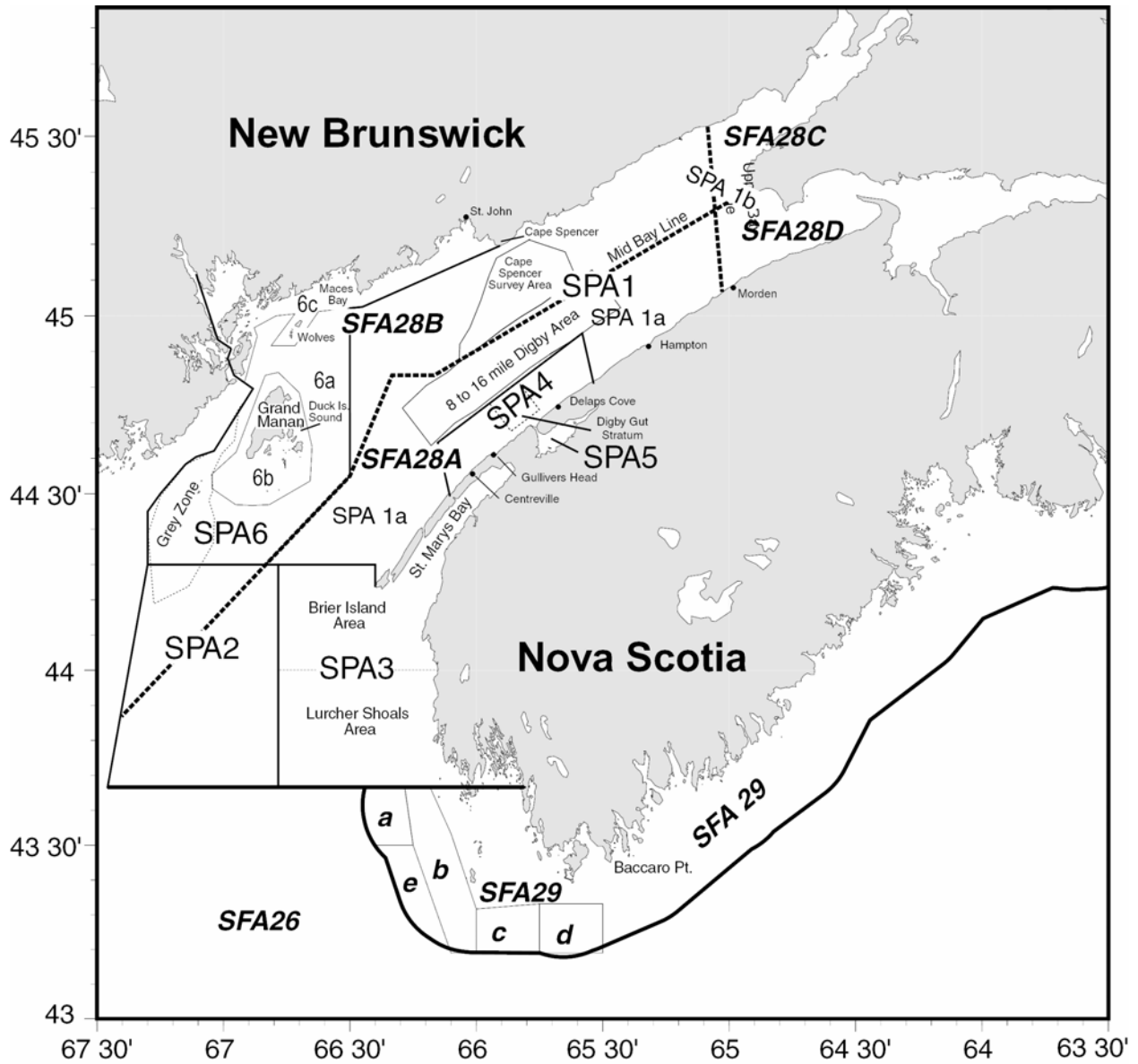
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Locations and Place Names used in this Science Advisory Report