

Sea Scallop

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Sea scallops, *Placopecten magellanicus*, are found in western North Atlantic continental shelf waters from Newfoundland to North Carolina. North of Cape Cod, concentrations are generally scattered in shallow water less than 20 m (11 fathoms) deep. South of Cape Cod, sea scallops are normally found at depths between 40 and 200 m (22 to 110 fathoms). Commercial concentrations generally exist between 40 and 100 m (22 to 55 fathoms) in waters cooler than 20°C (68°F). Principal U.S. commercial fisheries are conducted in inshore waters of the Gulf of Maine, on Georges Bank, and in the Mid-Atlantic offshore region. Recreational fishing is insignificant, occurring primarily in Maine where shallow-water scallop beds most commonly occur.

Scallops grow rapidly during the first several years of life. Between ages 3 and 5, scallops commonly increase 50 to 80% in shell height and quadruple their meat weight. During this time span, the number of meats per pound is reduced from greater than 100 to about 23. Maximum size is about 23 cm (9.0 in.) shell height, but scallops larger than 17 cm (6.7 in.) are rare. Sexual maturity commences at age 2, but scallops younger than age 4 probably contribute little to total egg production. Spawning occurs in late summer and early autumn; spring spawning may also occur in the Mid-Atlantic region. Eggs are buoyant, and larvae remain in the water column for four to six weeks before settling to the bottom.

The commercial fishery for scallops is conducted year round, with dredges and otter trawls as the primary gears. The U.S. fishery is managed under the New England Fishery

Gulf of Maine, Georges Bank, and Middle Atlantic Sea Scallop

Table 33.1 Recreational and commercial landings (thousand metric tons, meats)

Category	Year										
	1977-86 Average	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
U.S. recreational	-	-	-	-	-	-	-	-	-	-	-
Commercial											
Gulf of Maine											
United States ¹	0.7	0.4	0.5	0.6	0.6	0.6	0.7	0.8	0.5	0.6	0.7
Canada	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total	0.7	0.4	0.5	0.7	0.6	0.6	0.7	0.8	0.5	0.6	0.7
Georges Bank											
United States ¹	5.4	4.9	6.1	5.8	10.1	9.4	8.5	3.7	1.1	1.0	2.2
Canada	6.5	6.8	4.4	4.7	5.2	5.8	6.1	6.2	5.0	2.0	3.0
Total	11.9	11.7	10.5	10.5	15.3	15.2	14.6	9.9	6.1	3.0	5.2
Mid-Atlantic											
United States	4.5	7.9	6.5	8.3	6.6	7.0	5.0	2.8	5.9	6.1	4.7
Total nominal catch	17.1	20.0	17.5	19.5	22.5	22.8	20.3	13.5	12.5	9.8	10.6

¹Includes Southern New England

Summary Status

Long-term potential catch	=	
Gulf of Maine	=	300 mt (territorial waters)
Georges Bank	=	10,000 mt
Mid-Atlantic	=	3,000 mt
SSB for long-term potential catch	=	Unknown
Importance of recreational fishery	=	Insignificant
Management	=	NEFMC Sea Scallop FMP
Status of exploitation	=	Overexploited
Age at 50% maturity	=	2 to 4 yrs (GB and MA)
Size at 50% maturity	=	60 mm (2.4 in.) to 90 mm (3.5 in.) shell height (GB and MA)
Assessment level	=	Size structured (DeLury)
Overfishing definition	=	5% MSP
Fishing mortality rate corresponding to overfishing definition	=	$F_{5\%} = 0.71$
M = 0.10		$F_{0.1} = 0.12$
		$F_{max} = 0.23$
		$F_{1995} = 0.41$ (Georges Bank) $= 0.85$ (Middle Atlantic)

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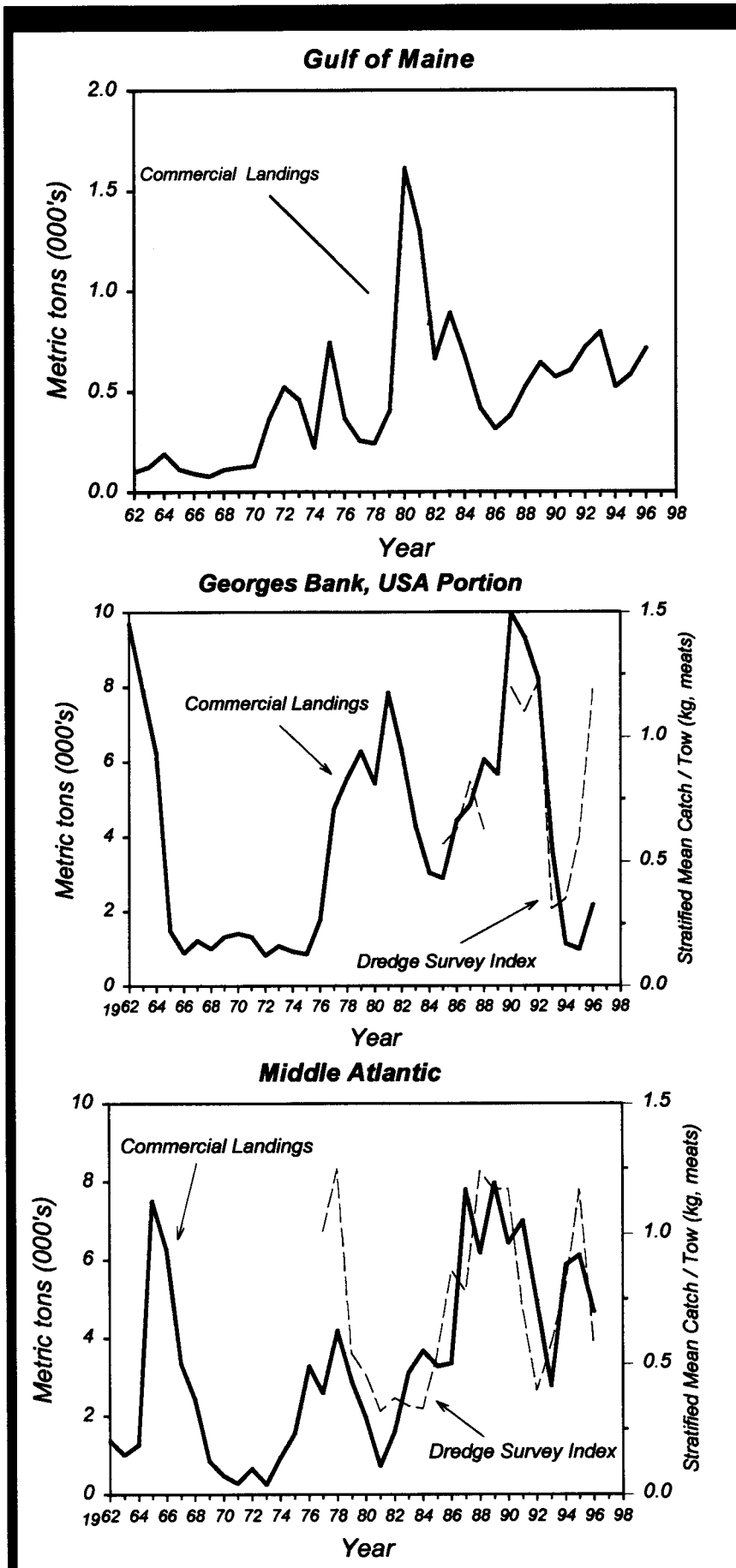
Management Council’s Fishery Management Plan for Atlantic Sea Scallops (*Placopecten magellanicus*). Management measures include a moratorium on permits, days-at-sea restrictions, closed areas, and restrictions on gear and crew size. The total nominal catch (U.S. and Canada) averaged 20,400 mt (meats) from 1987-1992 but has since declined sharply; 1995 and 1996 landings were 9,800 mt and 10,600 mt, respectively.

Gulf of Maine

Since 1987, landings have been relatively constant about an average of 600 mt; the 1996 total was 700 mt (meats). More than 80% of the 1996 total catch was from state territorial waters indicating continued dependence of the fishery on inshore scallop beds.

Georges Bank

Total (U.S. and Canadian) landings from Georges Bank were 5,200 mt (meats) in 1996, well below the 1987-1992 average of 13,000 mt. Of the 1996 total, U.S. landings accounted for 42 percent (2,200 mt) while Canadian landings accounted for 58% (3,000 mt). Landings for the U.S. more than doubled over 1995 levels while Canadian landings increased by 50%. Canadian landings have been significantly higher than U.S. totals since 1993.



“Stock rebuilding is occurring in the closed areas, but elsewhere on Georges Bank, fishing mortality remains high.”

Since December 1994, half of the U.S. portion of Georges Bank has been closed to scallop harvesting due to implementation of area closures to protect groundfish stocks. This appears to have contributed to an increase in sea scallop stock biomass.

NEFSC sea scallop dredge survey indices for 1996 rebounded to long-term median levels, after declining to the lowest value in the time series in 1993. In the South Channel area of the Bank, the total abundance index in 1996 decreased slightly from 1995 levels. Abundance and biomass indices for recruited sea scallops in 1996 were more than 2 times higher than in 1995 and were the third highest observed in the time series; however, numbers of pre-recruit scallops per tow decreased 50% from 1995 levels. In the Southeast Part, abundance and biomass indices for 1996 were comparable to long-term averages; and while pre-recruit indices in 1996 increased 49% over 1995, recruits decreased slightly. In the U.S. portion of the Northern Edge and Peak, abundance and biomass indices for total scallops, pre-recruits, and recruits for 1996 increased to the second highest level observed since 1975.

Because of area closures, U.S. landings for 1994 and 1995 were the lowest observed since 1977. Fishing mortality in 1995 was estimated to be 0.41 (32% exploitation rate); the lowest since 1982, and lower than the overfishing definition ($F_{5\%}=0.71$, 49% exploitation rate) provided by New England Fishery Management Council, but is still higher than F_{max} ($F=0.23$, 20% exploitation rate). Stock rebuilding is occurring in the closed areas,

but elsewhere on Georges Bank, fishing mortality remains high.

Middle Atlantic

The total nominal catch in 1996 was 4,700 mt, 23% below the 1995 total of 6,100 mt. Abundance indices increased between 1992 and 1995, but decreased substantially from 1995 to 1996. The index in 1996 was 67% lower than in 1995 and was the second lowest since 1985. The pre-recruit abundance index in 1996 decreased 86% from the 1995 level and is the third lowest in the history of the survey. The abundance index for recruits in 1996 was less than half of the 1995 value.

A significant redirection of fishing effort from Georges Bank to the Mid-Atlantic region occurred between 1993 and 1996. This resulted from a number of factors including low abundance on Georges Bank, strong 1990 and 1991 year-classes in the Mid-Atlantic region, and large-scale area closures on Georges Bank. Consequently, effort on Mid-Atlantic sea scallops increased greatly, with virtually all small scallops being harvested once available to the gear. The removal of maximum meat count regulations has resulted in even more effort on sea scallops in the 50-70 count range. Fishing mortality in this region appears to have increased to a record high in 1994 ($F=1.27$, 69% exploitation rate). Although fishing mortality decreased to 0.85 (55% exploitation rate) in 1995, it was still higher than the above overfishing definition.

Amendment 4 to the Sea Scallop FMP specifies reductions in days at sea to reduce overall harvest rates and dependence on new recruits. Amendment 4 specifies an increase of ring size from 3.25 to 3.50 in., which is designed to shift size selectivity toward large-sized scallops; and restricts the shucking capacity of vessels by limiting crew size to a maximum of seven. However, in the absence of further reductions in fishing effort in the Mid-Atlantic region, all the mea-

sures specified in Amendment 4 appear insufficient to reduce fishing mortality below F_{max} .

The rapid growth potential of sea scallops and potential implications for management have been demonstrated in the closed areas on Georges Bank. After 20 months of closure, average densities within the closed areas were about three times higher than in open areas. These results indicate that area closures are a viable option for increasing spawning stock biomass. The importance of these area closures as a source of recruitment has yet to be evaluated.

For further information

- NEFSC [Northeast Fisheries Science Center]. 1992. Report of the Thirteenth Regional Stock Assessment Workshop (13th SAW), Fall 1992. Woods Hole, MA. NOAA/NMFS/NEFSC. *NEFSC Ref. Doc. 92-02*.
- NEFSC [Northeast Fisheries Science Center]. 1997. [Report of the] 23rd Northeast Regional Stock Assessment Workshop (23rd SAW). Stock Assessment Review Committee (SARC) consensus summary of assessments. Woods Hole, MA: NOAA/NMFS/NEFSC. *NEFSC Ref. Doc. 97-05*.
- Lai, H.L. and L. Hendrickson. 1997. Current resource conditions in Georges Bank and Mid-Atlantic sea scallop populations. Results of the 1996 NEFSC Sea Scallop Research Vessel Survey. Woods Hole, MA. NOAA/NMFS/NEFSC. *NEFSC Ref. Doc. 97-09*.