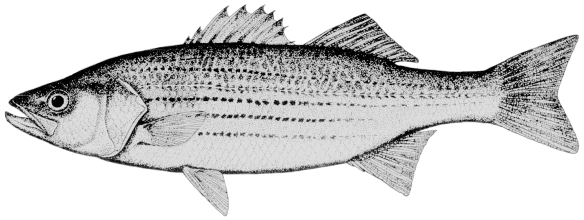


Striped Bass (*Morone saxatilis*) Southern Gulf of St. Lawrence

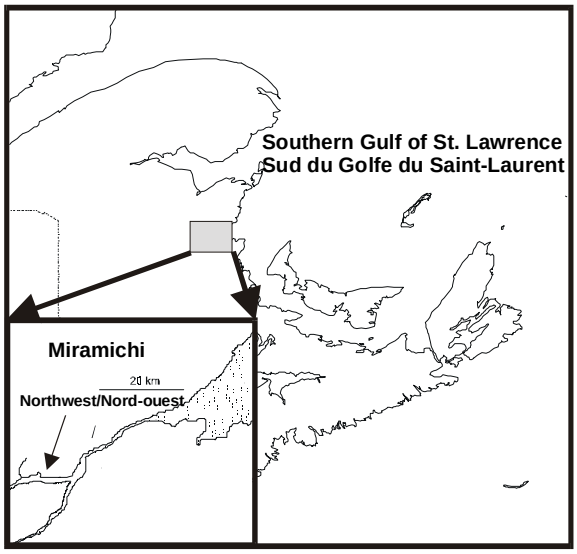
Background

The southern Gulf of St. Lawrence striped bass (Morone saxatilis) are genetically distinct from the Bay of Fundy fish but the stock structure within the Gulf is not known. The population in the southern Gulf represents the northern limit of spawning populations in the Atlantic Ocean. Generally, males first mature at age 3 years and the females first mature at age 4 years. Spawning occurs in late May and June in estuary waters, towards the head of tide. During summer and fall, juvenile and adult bass undertake wide-ranging feeding migrations along the coast. Bass ascend the rivers in late fall and overwinter in fresh water.

Historically, striped bass have been exploited principally as bycatch species in numerous commercial gear set primarily for gaspereau and smelt. Reported landings vary greatly among years, suggesting that striped bass abundance is highly variable.

In 1990, the southern Gulf of St. Lawrence striped bass stock was categorized as either reduced or declining. Conservation measures aimed at reducing fishing mortality were introduced to arrest the decline and increase the spawning escapement.

The principal study area is the Miramichi River estuary which is currently the only site where bass spawning occurs in the Gulf of St. Lawrence.



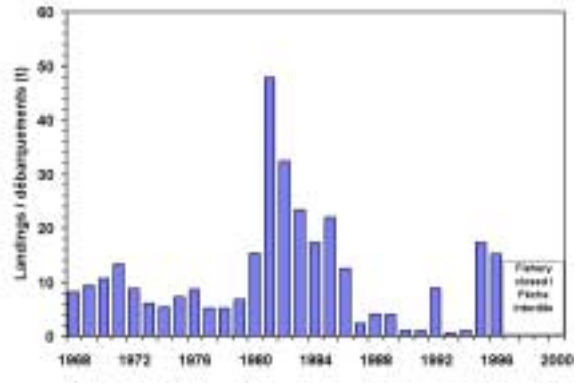
Summary

- The southern Gulf striped bass stock remains at low abundance.
- Spawner abundance has declined since the closure of directed fisheries in 1996 and remained low in 1999 and 2000 at just under 4000 fish.
- Juvenile-to-spawner recruitment is below expectation and the prospect for increased spawner abundance before the year 2002 is low.
- Continued but unquantified exploitation (bycatch mortalities, illegal removals) and /or environmental constraints on survival are factors that are limiting the maintenance (adult fish) and rebuilding (from juveniles) of the spawning stock.

The Fishery

Striped bass were primarily harvested as bycatch in the estuarine commercial fisheries from the southern Gulf of St. Lawrence. Landings varied annually but were less than 10 t between 1987 and 1994. Although striped bass were harvested into the fall of 1996, commercial fisheries for striped bass were permanently closed in March 1996 through an amendment of the Canada Fisheries Act, which prohibits the sale of wild striped bass in the Maritime Provinces. Commercial licenses were amended in 1998 so that all striped bass intercepted in any commercial gear must be returned.

Commercial landings (t)



First Nations harvested striped bass for food, social and ceremonial purposes. Fishery agreement levels were based on communal needs. First Nations harvests are unknown but assumed to be small relative to the commercial landings.

Recreational fisheries were exclusively catch-and-release between 1996 and 1999 and were closed in inland and coastal waters of the southern Gulf in 2000. Recreational catch data were not collected on a regular or wide geographic basis.

Striped bass are bycatch as juveniles and adults in several estuary fisheries in the southern Gulf including gaspereau fisheries in the spring and smelt fisheries in the fall. Continued exploitation on spawners through unsanctioned or illegal fisheries is suspected to be continuing.

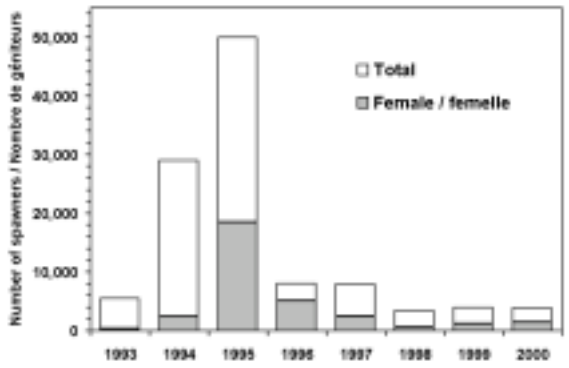
Resource Status

Spawner abundance is estimated on the Northwest Miramichi which is the major spawning area in the southern Gulf of St. Lawrence. Surveys for the presence of striped bass eggs or larvae in neighbouring estuaries (Richibucto and Kouchibouguac rivers) in 1996 to 1998 failed to find evidence of spawning activity.

The spawner abundance in the Northwest Miramichi was estimated by mark and recapture experiments based on catches of bass from the gaspereau fishery of the Miramichi River.

Spawner abundance in the Northwest Miramichi increased from 5,000 fish in 1993 to 50,000 fish in 1995. Most spawners from 1994 to 1996 were from the 1991 year-class. Spawner abundance declined to 8,000 fish in 1996 and 1997. Female striped bass have represented varying but generally small proportions (6% in 1993 to 63% in 1996) of the spawners. Females in both 1999 and 2000 were estimated at between 1,200 – 1,400 spawners.

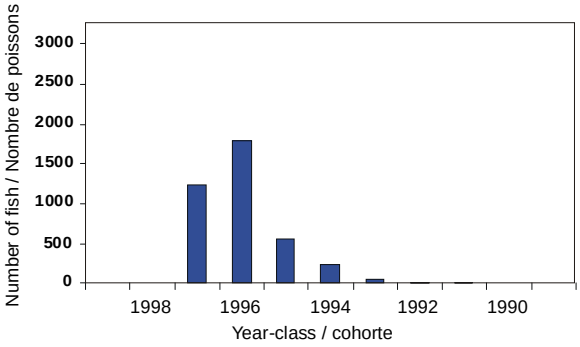
Striped bass spawner abundance



Fisheries harvests of spawners between May 1995 and May 1996 in the southern Gulf of St. Lawrence were about 40,000 fish, close to 80% of the estimated spawning stock of 1995.

Although the 1996 year-class was the dominant age group in the 1999 (as 3-year old males) and 2000 (mostly 4-year old males) spawning aggregations, it has not been abundant. The 1997 year-class was not abundant (about 1,200 fish) in the spawning area in 2000.

Year-class abundance in 2000



An index of **abundance of young-of-the-year** striped bass in the Miramichi for 1991 to 1998 was estimated from the bycatch in the fall open-water smelt fishery. Catch rates for 1995 and 1996, when female spawner abundances were higher, were in most cases more than ten times those observed in other years. Juvenile abundance is variable and generally reflects spawning stock size for that year.

Catch rate index (fish per net per 24 h) of young-of-the-year striped bass and median fork length (cm).

	Catch rate			Fork Length
		95% C. I.*		
Year	Median	Lower	Upper	(cm)
1991	18	15	227	13
1992	50	0	191	10
1993	17	2	62	10
1994	7	2	21	12
1995	255	132	671	13
1996	452	159	2964	11
1997	10	1	59	11
1998	16	2	109	13
1999	-	-	-	15

* C.I. means confidence interval

However, for a number of temperate fish species, larger young-of-the-year fish experience better over-winter survival. Striped bass which enter their first winter at a fork length ≤10 cm are less likely to survive than those of length >10 cm.

Despite the large pre-winter body length and high juvenile abundance of the 1995 year class, its contribution to the spawning stock has been below expectation. The 1996 year class had the highest young-of-the-year index but has not produced a large number of spawners to date. The 1999 year-class had the largest pre-winter body lengths of all year classes sampled since 1991.

Recent studies have shown that juvenile Miramichi River origin striped bass are distributed in the Miramichi River and along the coast and in neighbouring estuaries during their first summer and fall. These findings demonstrate the importance of estuaries throughout the Gulf as feeding and overwintering areas for all age groups of striped bass from the Miramichi.

The southern Gulf striped bass stock remains at low abundance. Any future changes in status of the southern Gulf of St. Lawrence striped bass stock will be

contingent on changes in indicators of stock status including: spawner abundance, spawner success and the overwinter survival of potential recruitment.

Outlook

Spawners of the 1995 and 1996 year-classes are less abundant than expected. There are no indications that the females of the 1997 year class or the males of the 1998 year class will be abundant. First indications from captures of the large bodied 1999 year class in the gaspereau fishery of 2000 are that it may provide an important component of the spawning stock in 2002 and 2003.

Despite the closure of the directed striped bass fisheries, the mature spawning stock is not rebuilding and has declined in recent years. The high mortality rate on adult fish may be a consequence of continued but unquantified exploitation (bycatch mortalities, illegal removals) and/or environmentally determined natural mortality (disease, overwinter survival, predation). The relative importance of these factors are unknown at this time.

Recruitment of juveniles (young-of-the-year) to the spawning stock has been low and below expectation. Although size-dependent winter mortality in the first and perhaps second year constrains the survival of some year classes, other factors may contribute to poor recruitment of juveniles to adults. Bycatch of juvenile striped bass in the openwater fisheries throughout the estuaries of the southern Gulf is known to be high in terms of absolute numbers but unknown in relative terms.

Management Considerations

The population of striped bass in the southern Gulf of St. Lawrence is at the northern limit of the species distribution and is more affected by adverse environmental conditions than other populations. These animals are particularly vulnerable during the winter when they reside, under the ice without feeding, in the brackish waters of the upper parts of estuaries. Striped bass habitat can be affected by high freshwater discharge events as well as effluent discharges from municipal and industrial activities.

Preliminary reference exploitation rates for a stock at maximum sustainable production are about 17% to 24%. These rates are lower than those used in the eastern United States and reflect the biological characteristics of the southern Gulf of St. Lawrence population.

Excessive fishing exploitation historically, at levels similar to those of 1995 and 1996, has likely been a major contributor to the boom-bust oscillations in the historical landings of striped bass from the southern Gulf of St. Lawrence. The exploitation rate in 1995-1996 could have been as high as 80%.

Adult spawning stock has not increased despite the closure of directed striped bass fisheries. Continued exploitation on spawners through unsanctioned or illegal fisheries may be an important contributor to the high mortality of adult fish.

The extended distribution of young-of-the-year striped bass outside the Miramichi estuary and reports of juveniles in other southern Gulf estuaries, as far east as River Philip (Nova Scotia) in the fall, suggest that open-water fisheries in these estuaries may also be of concern. The opening of the open-

water smelt fishery in Miramichi Bay (upriver Sheldrake Island) in 1999 and 2000 was delayed by two weeks to November 1 to reduce the total bycatch of juveniles. Such measures should be considered for fisheries in the other southern Gulf estuaries which have bycatch of striped bass but whose relative impacts, including those of the Miramichi fishery, remain unquantified.

Some striped bass greater than 50 cm fork length sampled from the Miramichi River in 1995 to 1997 contained levels of mercury in the musculature exceeding the Health Canada guidelines for unrestricted human consumption.

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Douglas, S., G. Chaput, and R. Bradford. 2001. Status of striped bass (*Morone saxatilis*) in the southern Gulf of St. Lawrence in 1999 and 2000. DFO Can. Stock Ass. Secr. Res. Doc. 2001/058.

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