Miramichi Striped Bass Stock (*Morone saxatilis*)

General description

The Gulf of St. Lawrence striped bass are genetically distinct from the Bay of Fundy fish but the stock structure within the Gulf is not known. Spawning occurs in the spring (usually June) in estuary waters, towards the head of tide. During summer and fall, striped bass undertake wide ranging feeding migrations along the coast, ascend the rivers in late fall and overwinter in fresh water. Historically, striped bass have been exploited principally as a by-catch species in numerous commercial gear set primarily for gaspereau and smelt. Reported landings vary greatly among years which suggests that striped bass abundance is highly variable with time. In 1990, the Gulf of St. Lawrence striped bass were categorized as either reduced or declining (Chaput and Randall 1990). Conservation measures, generally aimed at reducing fishing mortality, were introduced to arrest the decline and increase the spawning escapement.

The 1995 Miramichi River study was the third year of sponsorship by the New Brunswick Wildlife Federation and was funded under the Canada-New Brunswick Co-operative Agreement on Recreational Fisheries. A review of the status of striped bass in the Bay of Fundy was undertaken in 1994 (Anonymous 1995).

The principal study area is the Miramichi River estuary which is currently the only site where substantial bass spawning occurs in the Gulf of St. Lawrence. It also coincides with well-developed fixed-gear commercial fisheries. Based on the 1994 results the following predictions for 1995 were made: an increase in the number of females in the spawning population, fewer age 2 and 3 year-old bass based on relative abundance in gaspereau and smelt fisheries, and an increase in the number of repeat spawners (bass which had spawned in previous years). The validity of the above predictions was assessed and the data base regarding stock structure, spawner abundance and spawner success has been updated.

Management

The striped bass management plan remained unchanged from the previous year. Bycatch retention size limits which had been imposed in 1993 and 1994 were not enforceable in 1995 although voluntary release of a component of the striped bass spawner population occurred in the Miramichi gaspereau fishery. Recreational fishery limits (minimum size for retention of 68 cm total length, one fish per day retained and a season for retention which opened July 1) remained in effect.

Landings occurred as, but not limited to, by-catch in three fixed-gear commercial fisheries: gaspereau during May and June, eels during June to October, and smelt from October to March. There were no recreational fisheries data collected.

Bass are frequently captured in First Nations food fishery gear throughout the southern Gulf of St. Lawrence. A portion of this catch is consumed.

Public consultation

A Science workshop was conducted in January 1996 to review the assessment data for 1995. Assessment methods were described and preliminary stock status was presented and discussed. The data tabled at the meeting and discussions related to the analysis and interpretation were included in the draft assessment prepared by the team leader which was subsequently peer reviewed in February.

Target

The target is defined in general terms:

- to arrest the decline in abundance,
- to increase abundance, and
- to sustain abundance at levels corresponding to supporting habitat.

These principles guide the management plan.

Status of the stock

Spawner abundance: The estimate of spawners in the Miramichi River was obtained by two methods. In 1994, it was observed that the relationship between the number of tags returned from a daily tagging group was directly proportional to the number of

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days available to the gaspereau fishery. Using those data, it was estimated that the gaspereau traps in the Miramichi captured on average 1.3% of the bass in the area on any given day. Using this value, and knowing the average number of bass per day in the 13 traps in the Northwest Miramichi, estimates of the spawning stock in 1993 and 1994 were determined as being almost identical to the estimates derived using the mark-and-recapture data. The estimates were different in 1995; the mark-and-recapture estimate was about 85,000 fish while the gaspereau trap catch method indicated less than 37,000 fish. From observations in the field, more females were observed in 1995 than in either of the previous years. In 1993 and 1994, greater than 90% of the spawners were male whereas in 1995, the male component declined to 62%. The number of bass in the spawning area decreases over time such that by the close of the gaspereau fishery, very few bass remain in the area. Abundance upon arrival in the estuary in both 1994 and 1995 appears to have approached 75,000 to 100,000 fish. Unregulated and directed commercial fishing for striped bass since July 1994 could have been a factor in the observed reduction of bass in May-June 1995. Bass of Gulf origin were readily available in local fish markets throughout the summer and autumn of 1994.

Spawning success: Abundance of young-of-the-year striped bass was estimated from the fall open water smelt fishery of the Miramichi. The average number of bass per smelt trap per day of fishing in 1995 was 475 fish, the highest ever recorded since the first sampling in 1991. This indicates that spawning success was higher in 1995 than in previous years, an interpretation consistent with increased numbers of females being observed during May and June.

Abundance indices (number of fish per unit of effort) by age group of striped bass sampled in the Miramichi River estuary fisheries, 1991 to 1995. Age groups 0 and 1 are based on by-catch in the fall smelt fishery and age group 2 and spawners on catches in the May and June gaspereau fishery.

Age group	1991	1992	1993	1994	1995
0 group	380	63	29	98	475
1 group	0.5	1.1	6.1	0.1	1.2
2 group	0.1	-	5.6	8.0	0.3
Spawners	2	-	4	69	37

Athough the impact of by-catch related mortality on total mortality in the first year is unknown, the relatively high abundance of young-of-the-year in the 1995 autumn smelt fishery is promising of a strong spawning stock in 4 to 5 years time. The success of this year-class is contingent however, upon good survival over the first winter and protection from the various fisheries in subsequent years.

Stock structure: The Gulf of St. Lawrence striped bass should be considered a single biological unit for management purposes because the available evidence indicates that production of Gulf of St. Lawrence striped bass remains dependent on spawning in the Miramichi River estuary. Of the striped bass tagged and released at various locations in the Gulf, 100% of the May to June recaptures have occurred in the Miramichi. The geographic range of striped bass which spawn in the Miramichi extends from the Gaspé peninsula to Cape Breton Island. Overwintering sites appear to be selected opportunistically.

Environmental considerations

There were large differences among years in the average 0-group pre-winter lengths. The strong 1991 year-class had the largest observed pre-winter lengths. The 1992 and 1993 year-classes had shorter pre-winter lengths and were less well represented in the 1994 and 1995 gaspereau fishery. The average length of the 1995 0-group was comparable to the previous high observed in 1991. Available evidence for a number of temperate fish species suggest that larger young-of-the-year experience better over-winter survival.

Prospects

Any change in the status of the striped bass resource will depend on spawner success over the next three years. The Gulf of St. Lawrence striped bass stock should still be considered in a reduced state. Future production remains largely dependent on the 1991 year-class which has been targeted commercially.

Potential egg production in 1996 is likely to be higher than the levels inferred for 1993 and 1994. It remains to be determined if increased egg production from females of the 1991 year-class will be sufficient to offset losses of these fish in the 1995 fisheries. Recruitment of females from the 1992 year-class to the spawning stock should occur in 1996 but the number of spawners remaining after the 1995 fishery harvests is unknown.

Management considerations

Although long-term prospects for the striped bass population of the Miramichi River are improved over previous years, spawner success remains highly dependent on a single year-class. Since a substantial component of this year-class is expected to be of legal retention size in the recreational fishery in 1996, consideration should be given to restricting the fishery to hook-and-release to ensure that the 1991 year-class is given opportunity to realize its maximum spawning potential.

Striped bass from the southern Gulf of St. Lawrence should be considered as a single management unit. The wide ranging feeding migrations in combination with opportunistic selection of overwintering sites provides ample opportunity for exploitation of this stock throughout the southern Gulf, in all seasons. The management plan for striped bass should reflect this aspect and be extended to the waters of Prince Edward Island and the Gulf coast of Nova Scotia.

Research recommendations

- The estimation of spawner abundance in the Miramichi River should continue in 1996. Methods for estimating abundance based on catch rates in the gaspereau fisheries should be refined to facilitate the estimation of spawner abundance in the future. The characteristics of the spawning population should also be described, especially the proportion female and the contributions of the various year-classes.

- The Miramichi fall smelt fishery should continue to be sampled for the abundance of young-of-the-year bass to serve as an index of spawner success.

References

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