GASPEREAU ASSESSMENTS

Miramichi River

Introduction

The gaspereau fishery in the Miramichi River is comprised of variable proportions of alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*). Alewives migrate earlier into the river than bluebacks and tend to be accessible to capture during the entire fishing season whereas blueback herring are normally exploited only in the latter half of the season. The fishery is regulated by season (May 15 to June 15) and effort restrictions (weekly closure for the month of May from 1200 hours Saturday to 1800 hours Sunday). Prior to 1991, fishing was also restricted on weekends in June. Fishing occurs at three main locations: Loggieville, Chatham and Newcastle. Updates of landings, catch-at-age and catch rates are provided for the 1991 and the 1992 fisheries.

The fishery

The total landings of gaspereau in 1991 and 1992 were estimated at 2,022 and 1,315 t, respectively, values which are neither the highest nor the lowest of the last 15 years.

The gaspereau catch was estimated to have consisted of 66% alewife by weight in 1991 and 64% in 1992, which represents about 5.3 and 3.2 million alewives as well as 2.7 and 1.9 million blueback. The alewife catch in 1991 was dominated by the 1987 cohort while, in 1992, the dominant cohort was from 1988. The proportion of the alewife catch which was new recruitment in 1991 was the highest noted in the series since 1982 (87%) while in 1992, new recruitment as a percentage of alewife catch was down to 50%. The blueback herring catch in 1991 was dominated by the 1987 cohort and new recruitment represented 71 % of the catch. In 1992, the dominant cohort was 1988 and new recruitment comprised 38% of the catch.

The abundance index, based on the sum of the daily catch per unit of effort, indicated that the abundance of alewife had increased since 1990 and was highest in 1992 at all three fishing locations in the Miramichi River. The coefficient of variation of the catch rates has also increased. For blueback herring, catch rates have fluctuated annually at both the Chatham and Newcastle locations with the highest values noted for the 1988 and 1989 fishing years. Catch rates since 1990 have remained relatively stable at about two-thirds the 1988 and 1989 values.

Prognosis

The changes in the 1991 and 1992 fisheries regulations have not affected total catches or catch rates. Alewife catch rates were high in the last three years and these likely correspond to moderate to low fishing mortality values as per previous assessments. Catch rates remained higher for alewives than blueback herring. Lower catch rates for blueback are likely a function of run timing in relation to the fishing season. Inter-annual changes in run timing contribute to the varying proportions of alewife and blueback in the catches as well as in the variations in catch rates. Due to the changes in blueback run timing and the continued high catch rates for alewives, no major change in stock size is anticipated and no change in management plan is suggested for 1993 and 1994.

Stock: Miramichi River
Species: Alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*)

Year	1987	1988	1989	1990	1991	1992	Min[1]	Max[1]	Mean[1]
Landings (t)									
Total	2145	1888	1924	1789	2022	1315	119	11381	1953
Alewife	1094	680	808	1091	1353	839	463	1353	775
Blueback	1051	1208	1116	698	669	476	177	1395	782
Alewife									
New recruits (%)	86	58	61	76	90	87	47	90	66
Dominant cohort	1983	1984	1985	1987	1987	1988		-	-
Catch rate(kg/hr)	1592	889	1005	1743	2263	2504	735	2504	1356
Blueback									
New recruits (%)	66	33	17	34	71	38	17	71	45
Dominant cohort	1983	1983	1983	1984	1987	1988			-
Catch rate (kg/hr)	1247	1913	1866	1017	1044	1426	447	1913	1198

1 Total landings for the 1950 to 1992 period. All others for 1982-1992.

Catches: Catches averaged 1,561 t in the last ten years. The proportion of alewife to blueback catches in the total landings fluctuate annually relative to the timing of the migration of the two species. Alewife arrive first and tend to be exploited throughout the fishing season, blueback usually only occur in the June period.

Data and Assessment: Catch at age was analysed using a catch rate index from volunteer logbooks. Cohort analysis was not conducted for the 1991 and 1992 fisheries but fishing mortality levels have been below $F^{0.1}$ values as per the 1990 assessment. Exploitation is higher on alewife than blueback. The. abundance of alewife based on catch rates as reported in logbooks have increased since 1990 and reached the highest value in 1992. Blueback catch rates have not changed since 1990 and are lower than the previously high values noted in 1988 and 1989.

Recruitment: Recruitment is variable and not predictable. Landings in 1991 of alewife and blueback were comprised of a high percentage of new recruitment but this proportion was substantially reduced in 1992.

State of the Stock: Catches have not fluctuated greatly and the level of landings is determined, in part, by the timing of the migrations and markets. Present exploitation levels on alewife appear to be sustainable while the level on blueback is probably under the potential sustainable value.

Recommendations: Because of annual variations in blueback run timing and the continued high catch rates for alewives, no major change in stock size is anticipated and no change in management plan is suggested for 1993 and 1994.

Margaree River

Introduction

This assessment evaluates the 1991 and 1992 fisheries. Cohort analysis is used to estimate the pre-fishery population numbers from the catch-at-age and an index of abundance is calculated from catch and effort logbooks.

The river is partitioned into two management zones which essentially divide the length of the Southwest Margaree in half: a lower zone encompassing all waters downstream of Nova Scotia provincial highway #19 bridge and an upper zone encompassing all waters upstream of the bridge. Fishery regulations in 1991 and 1992 were similar to those imposed since 1984: a one day staggered closure per week with the fishery closed from Friday 18:00 to Sunday 8:00 for the lower river zone and Saturday 18:00 to Monday 8:00 for the upper zone. The fishing season closed on June 30, as in previous years.

The fishery

The number of licenses has been frozen at the 1990 value of 62. About 40 tip-trap sites were fished in 1991 and 1992. The enforcement of new fisheries inspection regulations in 1992, particularly the requirement that all gaspereau destined for human consumption must be cured in a certified building, secure from the elements, prevented some individuals from actively participating to the same extent as in previous years. The landings of gaspereau in 1991 and 1992 were estimated to have been 450 and 550 tons, respectively, about half the 1986 to 1990 mean.

The 1991 and 1992 fisheries were characterized by low landings and delayed in-river migrations. The delayed migration of the gaspereau in the river was the latest recorded. Ice conditions off the western shore of Cape Breton which persisted into early May in 1991 and mid-May in 1992 could have contributed to the late arrival of the gaspereau to the Margaree River.

The gaspereau catch was estimated to have consisted of 95% and 96% alewives by weight in 1991 and 1992, respectively. The alewife catches in 1991 and 1992 were in the order of 2 million fish. New recruitment dominated the catch compositions in both years and were the highest in the time series at 87 to 90%. The 1987 cohort was dominant in 1990 and 1991 while the 1989 cohort was dominant in 1992. The 1986 and the 1988 cohorts have been weakly represented in the catches.

The best fits of abundance index and population numbers were obtained at an F value in 1992 between 0.5 and 0.6. The population of alewives ascending the Margaree River in 1992 was estimated at 5 million, while about 3.1 million ascended in 1991. The exploitation rate on this stock remains high with about 60%, on average, of the spawning population being removed by the fishery. Tuning the F values for 1991 as the year for the terminal fishery provided an estimated F of 1.0 for the 1991 fishery, as compared to 0.9 when the 1992 data are included. $F_{0.1}$ value based on previous assessments was estimated as F=1.0. Population size was estimated using estimates of larval abundance in Lake Ainslie (1983-85 and 1989-91). The values of escapement and larval density were log-transformed; the correlation was highest (0.62), though not significant (P=0.19), for F in 1992 of 0.4.

Prognosis

No forecast of expected recruitment is possible. Although larval densities reflect the estimates of escapement, high escapement levels in the past have not necessarily translated into strong recruitment. The in-river temperatures observed in 1990 to 1992 have been relatively cold with river and lake temperatures not exceeding 15° C on a regular basis until well towards the end of May. The impact of such cold temperatures on subsequent recruitment is unknown. Variable conditions at sea would also be expected to impact on the recruitment strength of individual cohorts. The low catches obtained from the river in the last two years are about half the recent five-year average catch but such low catches have been noted within the previous 29 years. The high dependence on new recruitment, 90% of the catch in the 1991 and 1992, does not provide any buffer for escapement should a succession of weak cohorts occur. The fishery is harvesting the stock at high levels, about 60% of spawning population is removed

every year. Yield-per-recruit analysis of the Margaree River alewife stock has provided an estimate of a sustainable fishing exploitation as high as 75%. The fishing mortality in most years has approached this value and in 1990, the level was exceeded. On that basis, the restrictions on effort should be maintained to ensure at least some free, though limited, movement of gaspereau to Lake Ainslie. Staggered weekend closures are the most important component of this management strategy.

Species: Margaree River
Stock: Gaspareau

Year	1987	1988	1989	1990	1991	1992	Min[1]	Max[1]	Mean[1]
Landings (t)	1259	1666	1123	1016	450	550	58	1776	857
New recruits (%)	86	58	61	76	90	87	52	90	74
Dominant cohort	1984	1984	1985	1987	1987	1989	-	-	-
Catch rate (tons/trap)	54	50	43	30	12	25	12	54	32

1 Landings are for the 1950 to 1992 period. All others are for 1983 to 1992.

Catches: Catches averaged 1,100 t between 1986 to 1990. Low catches of less than 600 t have been noted recently and in 1983 and 1986.

Data and Assessment: Catch at age was analysed using a catch rate index from volunteer logbooks. Terminal F values for 1992 were estimated at 0.6 whereas 1991 values were 0.9. The lowest catch rate in the 1983 to 1992 series was noted in 1991. Migrations were 10 days later than usual in 1991 and 14 later days in 1992, relative to migration timing noted in previous years.

Recruitment: Recruitment is not predictable. Landings were composed of 90% new recruitment in 1991 and 1992. The 1986 and 1988 year-classes are weak relative to the neighbouring cohorts.

State of the Stock: Catches have fluctuated because of the dominance on new recruitment. The proportion of new recruitment in the catches is dependent on the strength of neighbouring year-classes. The exploitation rate remains high with about 60% of the spawning stock being removed annually.

Recommendations: Because there are only three year-classes contributing to the spawning escapement, the high dependence on new recruitment, and the recent weak year-classes, effort restrictions should be maintained to ensure some free movement of spawners into the lake.